HERITAGE IMPACT ASSESSMENT: PROPOSED EXPANSION OF THE ESIZAYO WIND ENERGY, ON PORTION 2 of FARM AANSTOOT 7 AND PORTION 1 AND REMAINDER OF FARM LEEUWENFONTEIN 71, WESTERN CAPE

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

Prepared for

WSP Group Africa (Pty) Ltd

On behalf of

BioTherm Energy (Pty) Ltd

Draft for comment: April 2022

ACO Associates cc
Archaeology and Heritage Specialists

Prepared by

John Gribble (MA)

ACO Associates

8 Jacobs Ladder, St James, Cape Town, 7945

Phone 078 616 2961

Email: john.gribble@aco-associates.com

EXECUTIVE SUMMARY

Project Name

Esizayo Wind Energy Facility Expansion.

Location

Proposed on Portion 2 of Farm Aanstoot Farm 72 and Portion 1 and the Remainder of Farm Leeuwenfontein 71, located in the Western Cape, approximately 30 km north of Matjiesfontein.

The approximate centrepoint co-ordinates of the proposed development area are:

-32.968132°S / 20.662501°E.

Locality Plan

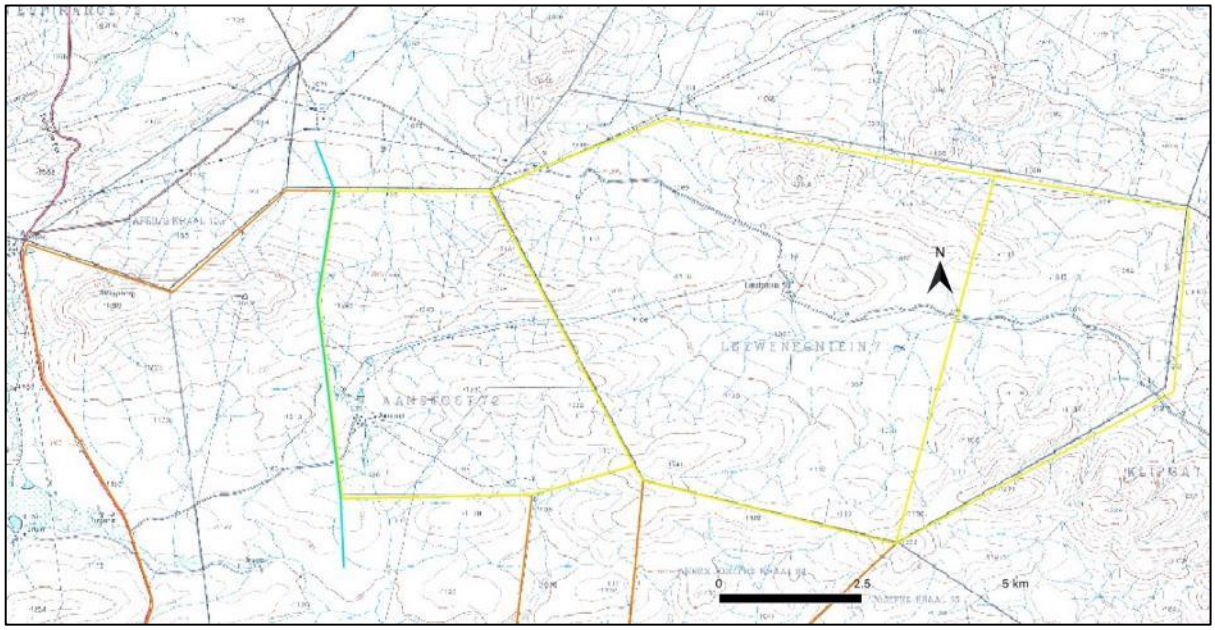

Figure 1: Extract from 1:50 000 topographical map sheet showing the three farms covered by the proposed Esizayo WEF expansion (yellow polygons), the authorised Esizayo WEF (orange polygons) and the OHPL (pale blue line). The R354 between Matjiesfontein and Sutherland is on the left of the image (Source: 1:50 000 chart 3220 DC, National Geo-spatial Information, http://www.ngi.gov.za).

Description of Proposed Development

The proposal is to expand the Esizayo wind energy facility through the addition of up to 23 wind turbine generators on three farms adjacent to and east of the site of the authorised wind farm.

It is anticipated that the WEF expansion will occupy an area of approximately 200 ha and the WTGs will be sited on a series of roughly east/west trending ridgelines on the three farms. The approved Esizayo substation and construction laydown areas within the authorised

WEF will be used for the expansion project so the project will comprise WTGs with associated hard standings, access roads and 33kV underground cables or overhead powerlines.

Turbine hub height is anticipated to be 150 m with a rotor diameter of 200 m. Each turbine will have a foundation of up to 25 m in diameter and up to 4 m in depth and will be surrounded by a compacted hard standing of up to 4.5 ha.

Approximately 30 km of access roads with an average width of 9 m are anticipated.

Heritage Resources Identified

Palaeontology – The palaeontological impact assessment by Almond (2022) indicates that the WEF expansion is underlain by Middle Permian sedimentary bedrocks within the lower part of the Abrahamskraal Formation. Elsewhere this succession has yielded sparse but scientifically important fossils of the Eodicynodon Assemblage Zone including lungfish burrows, low diversity invertebrate trace fossils, tetrapod (terrestrial vertebrate) burrows and trackways, plus exceedingly rare and fragmentary tetrapod skeletal remains (viz. fragments of temnospondyl amphibians and therapsids). Well-preserved tetrapod fossils are very sparsely distributed here while well-preserved petrified wood is unknown.

According to the SAHRIS palaeosensitivity map, areas underlain by Lower Beaufort Group bedrocks are provisionally assigned a high to very high palaeosensitivity. However, no vertebrate or vascular plant body fossil remains were recorded during the site visit to the Esizayo WEF expansion area and those fossils that were observed are of widely occurring taxa (sphenophyte ferns, lungfish burrows, low diversity invertebrate trace fossils) that are not considered to be of exceptional scientific or conservation value.

Archaeology – The survey for the Esizayo expansion project undertaken in March 2022 found very limited evidence of archaeological material. Isolated MSA stone artefacts were noted, and a small scatter of LSA chert and silcrete lithics were recorded in a sandy area next to the river, approximately 3 km east of the Leeuwenfontein farmstead. No other archaeological sites or material were noted

Built Environment –Colonial era farming settlements in this area are invariably found in river valleys, close to a permanent source of water and the three clusters of historical stone-built kraals and farm dwellings identified within the expansion area are all situated near watercourses. Two examples of remote shepherds' huts with small associated kraals were recorded, and both are also close to small streams. Apart from the farm complex on Aanstoot which is still used, none of the other historical settlements or structures identified were occupied and are either ruinous or abandoned. Ceramics and glass noted at these settlements suggest occupation since at least the first half of the 19th century.

Graves and Burials – A small farm graveyard containing at least five marked graves was identified approximately 300 m south east of the main house on the Leeuwenfontein farm complex.

Cultural Landscape and Visual – There will be a visual effect arising from the proposed Esizayo WEF expansion on a number of historical homesteads within the 20 km assessment

radius, as well as at places along the R354, which is identified by Winter & Oberholzer (2013 as a route of high scenic and rural value of Route III significance.

The existing cultural landscape of the proposed Esizayo expansion area can best described as a relict landscape in which the human imprint refers back to a use of and interaction with the land – both in the pre-colonial and colonial eras – which no longer survives. This is certainly true of the pre-colonial period, but is also increasingly true of colonial era as people have moved away from the farms, resulting in the abandonment of the historical farms complexes with their houses, outbuildings and kraals and the way of interaction with the landscape they represented.

It is perhaps also true that a new cultural landscape is evolving in the portion of the Roggeveld which falls within the Komsberg REDZ: one in which the concentration of renewable power generation projects is seeing the development of a new cultural landscape of a more industrial character.

Anticipated Impacts on Heritage Resources

The construction of the Esizayo WEF expansion will require the construction of access roads, the creation of WTG laydown areas, the excavation of foundations for the WTGs and trenching for electrical cabling.

Palaeontology - Given the very uniform underlying geology (and hence expected palaeontological resources) within the Esizayo WEF expansion project area, the PIA indicates that this assessment of impacts is likely to apply equally to all the layout options under consideration. The construction phase of the proposed WEF expansion will entail extensive surface clearance (e.g. for internal roads, pylon footings) as well as excavations into the superficial sediment cover and also into the underlying bedrock (e.g. for wind turbine foundations). These activities have the potential to impact fossil heritage (including microfossils, invertebrate trace fossils and plant debris) which occur widely within the project area. These impacts will be limited to the site (development footprint) and are generally direct, negative and of permanent effect (irreversible).

Direct impacts on the known fossil sites within the WEF expansion are not anticipated. In general, significant impacts on palaeontological resources during the construction, operational and de-commissioning phases of the Esizayo WEF expansion project are not anticipated but should they occur, are assessed to be low.

Archaeology - There will be will be no impacts to archaeological resources in the Exclusion Area, which has the greatest (albeit low, based on the survey results) potential archaeological sensitivity. Impacts to archaeological sites and materials on the higher ground where the WTGs are to be installed are also unlikely given the proven paucity of archaeological material on the higher ground. Significant impacts on archaeological resources during the construction, operational and de-commissioning phases of the Esizayo WEF expansion project are thus not anticipated but should they occur, they are assessed to be of low significance.

Built Environment - It is unlikely that there will be any direct impacts to most of the identified historical farm complexes and other elements of the historical built environment, either because they are within the Exclusion Area, or because they located in areas that are not

likely to be affected by activities arising from the project. Depending on the routing of the access roads, however, there is the potential for the Aanstoot farm complex to be impacted and once the proposed alignment of the access roads are known the potential for impacts to the Aanstoot farmstead may need to be re-assessed. The significance of potential impacts on the known historical built environment feature within the expansion area are assessed to be low.

Graves and Burials – There are unlikely to be any impacts to the graveyard identified at the Leeuwenfontein farmstead because it lies within the project Exclusion Area. Although considered unlikely, it is possible that currently unknown graves or burials may be affected by the expansion of the Esizayo WEF. Provided the mitigation measures recommended below are implemented the significance of potential impacts on graves and burials within the expansion area is assessed.

Cultural Landscape and Visual - The VIA indicates that the Esizayo WEF expansion may have a visual impact of very high magnitude on the following cultural heritage and cultural landscape receptors, particularly the Leeuwenfontein and Aanstoot homesteads within a 5 km radius but also other more distant farmsteads and sections of the R354 arterial road and the Komsberg/Kareedoringkraal secondary road. No mitigation of this impact is possible.

Recommendations and Conclusion

The following recommendations with respect heritage resources are made and must be included in the EMPr for the project:

- The Exclusion Area proposed by the developer must be implemented and no WEF-related activities may take place within the area. Should this not be the case, then the assessment of potential impacts on heritage resources in this report will need to be revisited and new measures to protect heritage resources or mitigate impacts to them will be required.
- Once the layout of the access roads is available, they will need to be surveyed for heritage resources and the results incorporated into the Final BA report, or the EMPr.
- If any archaeological material or human burials are uncovered during the course of the construction of the WEF expansion, then work in the immediate area must be halted. The find must be reported to Heritage Western Cape and may require inspection and mitigation by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

With respect to palaeontological resources, the PIA makes the following specific recommendations:

- Given the scarcity of scientifically important, unique fossil heritage recorded within the Esizayo WEF expansion project area, no further specialist palaeontological studies or mitigation are recommended for this development, pending the potential discovery of significant new fossils before or during the construction phase.
- The following general palaeontological mitigation measures apply to the construction phase of the WEF expansion:

    - Monitoring of all surface clearance and substantial excavations (>1 m deep) by the ECO / ESO for fossil material (e.g. bones, teeth, fossil wood) on an on-going basis during the construction phase.
    - Safeguarding of chance fossil finds (preferably in situ) during the construction phase by the responsible ECO / ESO, followed by reporting of finds to HWC.
    - Recording and judicious sampling of significant chance fossil finds by a qualified palaeontologist, together with pertinent contextual data (stratigraphy, sedimentology, taphonomy) (Phase 2 mitigation).
    - Curation of fossil material within an approved repository (museum / university fossil collection) and submission of a Phase 2 palaeontological heritage report to HWC by a qualified palaeontologist.
- Mitigation of significant chance fossil finds reported by the ECO / ESO would involve the recording, sampling and / or collection of fossil material and associated geological data by a professional palaeontologist during the construction phase of the development (See summarized Chance Fossil Finds Protocol in Appendix 4).
- The palaeontologist concerned with potential mitigation work (Phase 2) would need to submit a Work Plan for approval by Heritage Western Cape while any material collected would have to be curated in an approved depository (e.g. museum or university collection).
- All palaeontological fieldwork and reporting should meet the minimum standards outlined by HWC (2021) and SAHRA (2013).

The implementation of the visual mitigation measures recommended in the VIA (see Appendix 5) will go some way to reducing the visual impacts and mitigating the impacts of the WEF expansion project on the cultural landscape.

This assessment has found that the area identified for the proposed Esizayo WEF expansion is a heritage environment of low sensitivity and that significant impacts on heritage resources arising from the construction of the project are unlikely.

It is our considered opinion that, provided the recommended mitigation measures are implemented, the overall impact and significance of the Esizayo expansion on heritage resources will be negligible and the proposed activity is acceptable

Author/s and Date

Heritage Impact Assessment: John Gribble, ACO Associates, 2022.

Archaeological Impact Assessment: Incorporated in the HIA.

Palaeontological Impact Assessment: John Almond, 2022.

Visual Impact Assessment: Lourens du Plessis, 2022.

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.

Cultural landscape: The combined works of people and natural processes as manifested in the form of a landscape

Early Stone Age: Period of the Stone Age extending between approximately 2 million and 200 000 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.

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 20 000-300 000 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 – 10 000 years ago).

Quaternary: The geologic time period that encompasses the most recent 2.6 million years. It comprises the Pleistocene (2.6 Ma – 10,000 years ago) and the Holocene (10,000 years ago to the present) and is characterised by a series of global glacial cycles.

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.

Waypoint: A point of reference that can be used for location or navigation comprising the specific latitude and longitude of a place, site or feature.

ACRONYMS

DFFE	Department of Forestry, Fisheries and the Environment
BA	Basic Assessment
EMPr	Environmental Management Programme
ESA	Early Stone Age
GN	Government Notice
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
I&APs	Interested and Affected Parties
LSA	Late Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act 107 of 1998
NHRA	National Heritage Resources Act 25 of 1999
NID	Notice of Intent to Develop
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
WEF	Wind Energy Facility
WTG	Wind Turbine Generator

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1 INTRODUCTION

1.1 Proposed Project

Biotherm Energy (Pty) Ltd (BioTherm) wish to expand the authorised Esizayo wind energy facility (WEF) through the addition of up to 23 wind turbine generators (WTG) on three farms adjacent to and east of the site of the approved wind farm.

The proposed expansion area is located three farms, Portion 2 of Farm Aanstoot Farm 72 and Portion 1 and the Remainder of Farm Leeuwenfontein 71, approximately 30 km north of Matjiesfontein on the R354. The expansion area is located entirely within the Western Cape (Figure 2).

It is anticipated that the WEF expansion will occupy an area of approximately 200 ha and the WTGs will be sited on a series of roughly east/west trending ridgelines on the three farms (Figure 3).

The approved Esizayo substation and construction laydown areas within the authorised WEF will be used for the expansion project so the project will comprise WTGs with associated hard standings, access roads and 33kV underground cables or overhead powerlines.

Turbine hub height is anticipated to be 150 m with a rotor diameter of 200 m. Each turbine will have a foundation of up to 25 m in diameter and up to 4 m in depth and will be surrounded by a compacted hard standing of up to 4.5 ha.

Approximately 30 km of access roads with an average width of 9 m are anticipated.

The approximate centrepoint co-ordinates of the proposed expansion area are:

-32.968132°S / 20.662501°E.

1.2 Terms of Reference

ACO Associates cc (ACO) was appointed by WSP Group Africa (Pty) Ltd, on behalf of BioTherm, to carry out a heritage impact assessment (HIA) as part of the Basic Assessment (BA) for the proposed Esizayo WEF expansion project.

As required, ACO prepared and submitted a Notification of Intent to Develop (NID) to Heritage Western Cape (HWC).

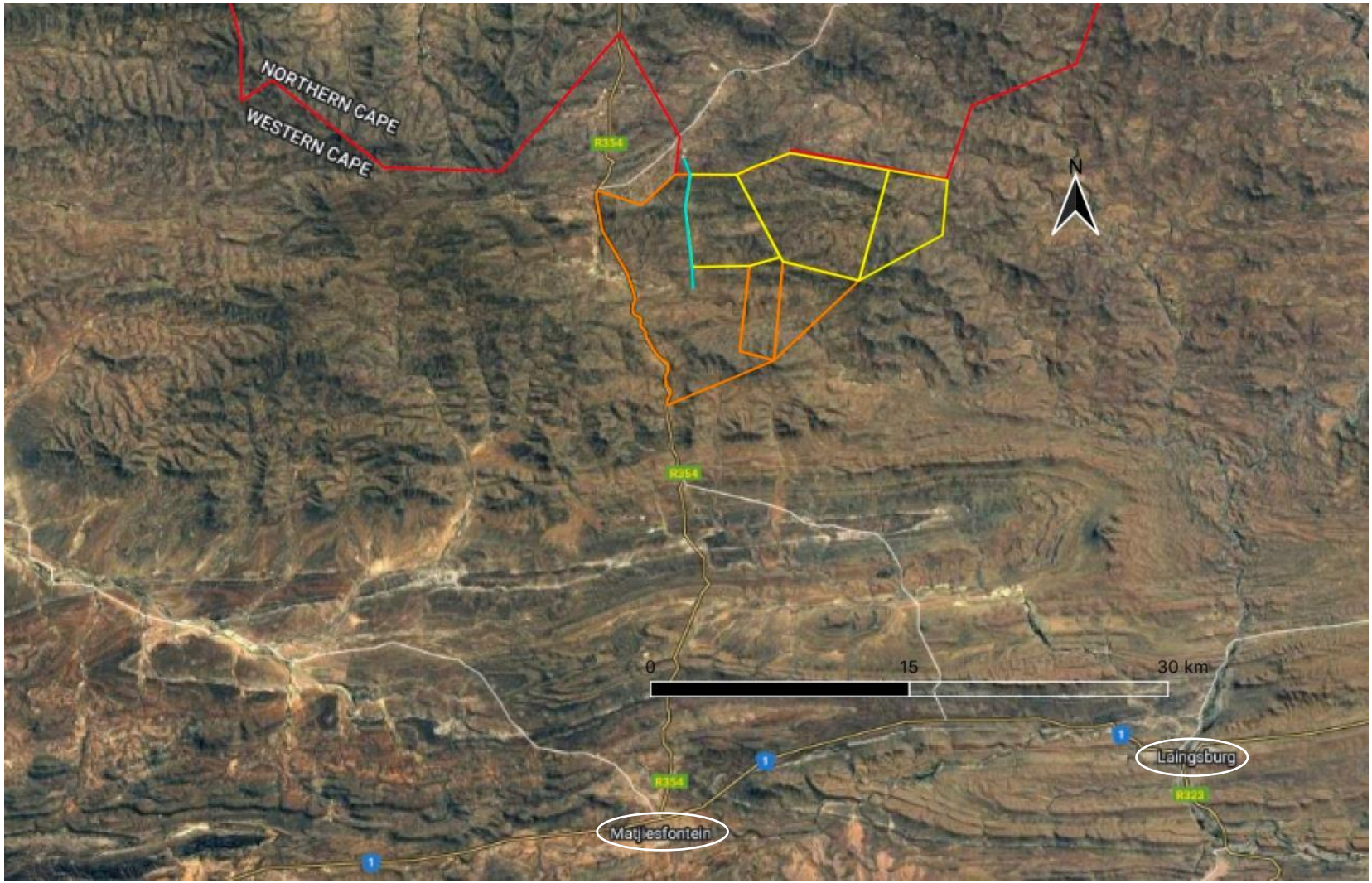

Figure 2: Location of the Esizayo WEF expansion area (yellow polygons) within its wider geographical context. Matjiesfontein and Laingsburg are to the south (circled), and the Western/Northern Cape provincial boundary runs along the northern edge of the project area (red line). The extent of the authorised Esizayo WEF is shown in orange, and the proposed OHPL that will link the WEF substation with Eskom's Komsberg substation is the pale blue line (Source: Google Earth).

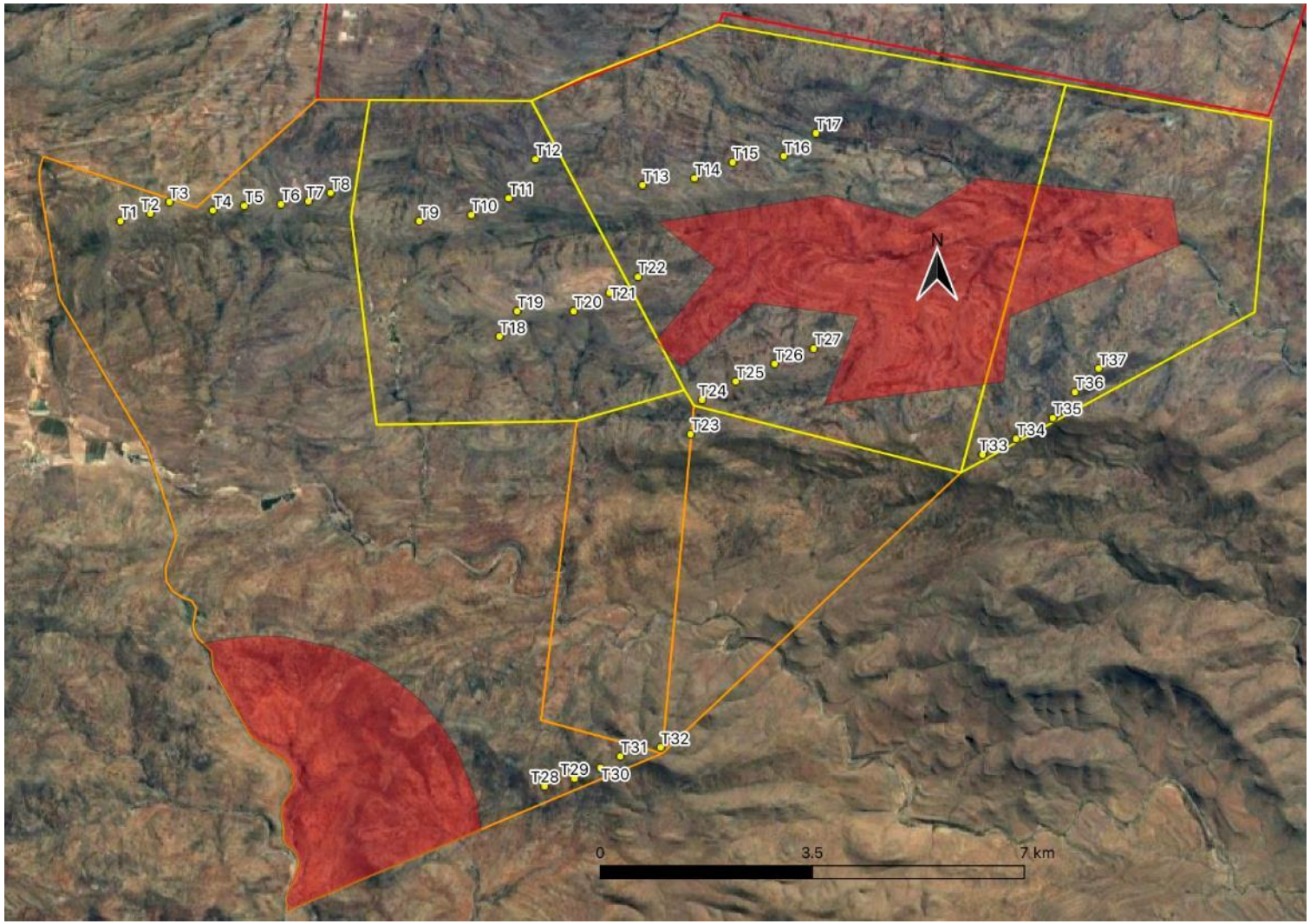

Figure 3: Proposed WTG layout for the Esizayo WEF expansion (numbered yellow dots within the yellow outline of the expasion area). Note the upper right Exclusion Area (shaded red) which encompasses most of the valley system at the centre of the expansion area (Source: Google Earth).

1.3 Content of Report

The EIA Regulations, 2014 (Government Notice (GN) R 982 of 2014, amended by GN R326 of 2017 and R517 of 2021) Appendix 6 prescribe the required content in a specialist report. These requirements and the sections of this specialist report in which they are addressed, are summarised in Table 1 below:

Table 1: Content of specialist report as per EIA Regulations, 2014

GNR 982, Appendix 6 Ref.:	**Item**	**Report Section:**
(1) (a) (i)	Details of the specialist who prepared the report;	1.5, App 6
(1) (a) (ii)	Expertise of that specialist to compile a specialist report including a curriculum vitae;	App 6
(1) (b)	A declaration that the specialist is independent in a form as may be specified by the competent authority;	1.6
(1) (c)	An indication of the scope of, and the purpose for which, the report was prepared;	1.2, 1.4
(1) (cA)	An indication of the quality and age of base data used for the specialist report;	4.1, 4.3
(1) (cB)	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	8
(1) (d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	4.3
(1) (e)	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	4
(1) (f)	Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	8
(1) (g)	An identification of any areas to be avoided, including buffers;	0
(1) (h)	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 4**Error! Reference source not found.**
(1) (i)	A description of any assumptions made and any uncertainties or gaps in knowledge;	4.6
(1) (j)	A description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	0
(1) (k)	Any mitigation measures for inclusion in the EMPr;	9
(1) (l)	Any conditions for inclusion in the environmental authorisation;	9
(1) (m)	Any monitoring requirements for inclusion in the EMPr or environmental authorisation;	n/a

GNR 982, Appendix 6 Ref.:	Item	Report Section:
(1) (n) (i)	A reasoned opinion whether the proposed activity, activities or portions thereof should be authorised;	10
(1) (n) (iA)	A reasoned opinion regarding the acceptability of the proposed activity or activities;	10
(1) (n) (ii)	If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and in the case of a closure activity, the closure plan;	9
(1) (o)	A description of any consultation process that was undertaken during the course of preparing the specialist report;	3
(1) (p)	A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	See BA Report
(1) (q)	Any other information requested by the competent authority.	n/a
(2)	Where the government notice *gazetted* by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	n/a

1.4 Scope and Purpose of this Report

A HIA is a means of identifying significant heritage resources in an area before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impact to the fragile and non-renewable cultural heritage of South Africa.

This HIA report aims to fulfil the requirements of the heritage authority (Heritage Western Cape) such that a comment can be issued by them for consideration by the Department of Forestry, Fisheries and the Environment (DFFE) who will review the BA Report and grant or refuse authorisation.

The HIA report will identify heritage resources which may be impacted by the WEF expansion, assess their significance and provide recommendations for any management and/or mitigation requirements that will need to be complied with from a heritage point of view and which must be included in the conditions of authorisation, should this be granted.

This HIA addresses all relevant aspects of heritage, including archaeology and palaeontology and is based on both fieldwork and desktop research. The report meets the requirements of HWC and the NHRA.

The HIA will form part of the BA Report and must be submitted for comment to HWC, as the statutory heritage commenting body under the NEMA for the Western Cape.

1.5 The Author

John Gribble has an MA (UCT, 1989), in archaeology and has been working in cultural resource management since the early 1990s (see curriculum vitae attached as Appendix 5).

He has worked within both the regulatory and commercial heritage management fields: the former during 13 years at the National Monuments Council / South African Heritage Resources Agency (SAHRA), and the latter as both a terrestrial and maritime archaeological consultant in South Africa and the UK. He holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #43) as follows:

- Principal Investigator: Maritime Archaeology and Colonial Archaeology; and
- Field Director: Stone Age Archaeology.

1.6 Declaration Of Independence

I, John Gribble, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Name of company (if applicable): ACO Associates CC

Date: 29 April 2022

2 RELEVANT LEGISLATION

2.1 National Heritage Resources Act (No 25 of 1999)

The National Heritage Resources Act (NHRA) came into force in 2000 with the establishment of the SAHRA, replacing the National Monuments Act (No. 28 of 1969 as amended) and the National Monuments Council as the national agency responsible for the management of South Africa's cultural heritage resources.

The NHRA reflects the tripartite (national/provincial/local) nature of public administration under the South African Constitution and makes provision for the devolution of cultural heritage management to the appropriate, competent level of government. In the Western Cape this is Heritage Western Cape.

The NHRA gives legal definition to the range and extent of what are considered to be South Africa's heritage resources. According to Section 2(xvi) of the Act a heritage resource is "any place or object of cultural significance". This means that the object or place has aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

In terms of the definitions provided in Section 2 of the NHRA, heritage resources potentially relevant to this assessment are:

- Material remains of human activity which are in a state of disuse and are in or on land [which includes land under water] and which are older than 100 years, including artefacts, human and hominid remains and artificial features;
- 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 which is older than 100 years;
- 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;
- Any movable property of cultural significance which may be protected in terms of any provisions of the NHRA, including any archaeological artefact or palaeontological specimen; and
- Intangible heritage such as traditional activities, oral histories and places where significant events happened.

As per the definitions provided above, these cultural heritage resources are protected by the NHRA and in the Western Cape a permit from HWC is required to destroy, damage, excavate, alter, deface or otherwise disturb any such site or material.

It is also important to be aware that in terms of Section 35(2) of the NHRA, all archaeological objects and palaeontological material is the property of the State and must, where recovered from a site, be lodged with an appropriate museum or other public institution.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list "historical settlements and townscapes" and "landscapes and natural features of

cultural significance" as part of the National Estate. Furthermore, some of the points in Section 3(3) speak directly to cultural landscapes.

Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA then it must include a heritage component that satisfies the requirements of S.38(3). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision.

2.1.1 Grading of Heritage Resources

The South African heritage resources management system is based on grading, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Grading, according to Winter & Oberholzer (2013) is "generally based on the intactness, rarity and representivity of the resource, as well as its role in the larger landscape or cultural context".

Heritage resources are graded according to criteria specified in Section 3 of the NHRA which suggests the following criteria for assigning heritage significance:

- Importance in the community or pattern in South Africa's history;
- Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Importance in demonstrating a high degree of creative or technical achievement during a particular period;
- Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- Significance in relating to the history of slavery in South Africa.

The generally accepted heritage resource grades are shown in Table 2 below.

Table 2: Grading of heritage resources (Source: Baumann & Winter 2005: Box 5).

Grade	Level of significance	Description
1	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
2	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
3A	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3A heritage resources.
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources.

2.2 National Environmental Management Act (No 107 of 1998)

The National Environmental Management Act (NEMA) provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals that are likely to have a negative effect on the environment.

Regulations governing the environmental authorisation process have been promulgated in terms of NEMA and include the EIA Regulations, 2014 as amended (GNR R326/2017) and Listing Notices 1 – 3 (GNR 324, 325 and 327/2017). These regulations were amended in April 2017 by Government Notices 324, 325, 326 and 327.

The proposed Esizayo expansion project triggers a number of activities in the Listing Notices and, in terms of GNR 325 therefore, will be subject to a BA process and will be required to obtain a positive environmental authorisation from the DFFE prior to commencement of the proposed activities.

2.3 Application Timeline

The application to DFFE under NEMA is currently in the draft BA phase.

3 PUBLIC PARTICIPATION

As required by the NEMA, the BA report will be subject to a 30 day public participation exercise.

This HIA will be circulated to Interested and Affected Parties (I&APs), which include HWC, the Laingsburg Local Municipality and the Central Karoo District Municipality, and nay heritage-related comments received will be addressed in the Final BA report.

4 METHODOLOGY

4.1 Literature Survey and Information Sources

A survey of available and relevant heritage literature was carried out to assess the general heritage context within which the WEF expansion project will be set.

This included a review of published material and available unpublished reports that have been conducted in the vicinity of the project, and include the HIAs generated for previous archaeological assessments and heritage studies for the authorised Esizayo WEF and the proposed OHPL for the wind farm.

The 1:50 000 maps sheets for the area, Google Earth satellite images and historical aerial photos were interrogated for evidence of heritage resources on the development site.

The information sources used in this report are presented in Table 3 below.

Table 3: Information sources used in this assessment.

Data / Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography of the study area and immediate surrounds
Satellite imagery	Google Earth	Various	Spatial	Current and historical satellite imagery of the study area and immediate surrounds
Cadastral data	Cape Farm Mapper (http://gis.elsenburg.com/apps/cfm/#)	Current	Spatial	Current cadastral boundaries, extents and aerial photography
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Palaeontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing palaeontological sensitivity and required actions based on the sensitivity.
Background data	Books, journals and websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.

4.2 Archaeological Desktop Review

This study includes a review of published material and unpublished reports, including those generated for a number of previous archaeological assessments and studies that have been conducted in the vicinity of the proposed Esizayo WEF expansion.

The proposed expansion area is immediately adjacent to the area for which HIAs were produced for the Esizayo WEF and its proposed OHPL (Webley and Halkett 2017a, 2017b; Gribble 2021) and these reports have provided important detail for this HIA.

In addition, the following reports, available on the SAHRIS online platform (https://sahris.sahra.org.za), in ACO's project archive, or from other archaeologists were reviewed and their findings have contributed to this assessment:

- The Suurplaat Wind Energy Facility (Hart et al. 2010)
- The Roggeveld Wind Energy Facility (Hart & Webley 2011, 2013)
- The Sutherland WEF Facility (Halkett & Webley 2011 & 2016)
- The Kareebosch Wind Energy Facility (Roggeveld Phase 2) (Hart & Kendrick 2014)
- The Hidden Valley Wind Energy Facility (Phases 1, 2 & 3) (Booth 2012)
- Karusa Wind Energy Facility substation and ancillaries (Booth 2015)
- Soetwater Wind Energy Facility substation and ancillaries (Booth 2016).

The 1:50 000 maps sheets for the area and Google Earth aerial images were interrogated for evidence of sites and heritage resources.

4.3 Archaeological Field Assessment

As part of the HIA, a physical survey was conducted within the expansion area by John Gribble and Gail Euston-Brown of ACO Associates between 7-10 March 2022 (Figure 4).

The survey took place in mid-summer so ground visibility was good. The extremely rough and remote nature of the terrain and the limited number of farm tracks meant that the survey was largely confined to the lower elevations and it was only possible to visit a couple of the proposed WTG locations.

However, previous experience in the surveys for the Esizayo WEF and in the wider area indicates that it is in the river valleys that the bulk of archaeological material and sites are located. The higher ground where the WTGs are to be installed is exposed and remote from resources such water, and the presence of archaeological sites and material is the exception rather than the rule

The field team carried hand-held GPS receivers set to the WGS84 datum which logged the survey tracks and on which the positions of any heritage resources located during the survey were recorded as waypoints (Figure 4 and Appendix 3).

Most of the heritage sites and resources located were photographed and photographs were taken of the landscape setting to provide context. No archaeological material was removed from the project area, and all observations were based on visible surface material.

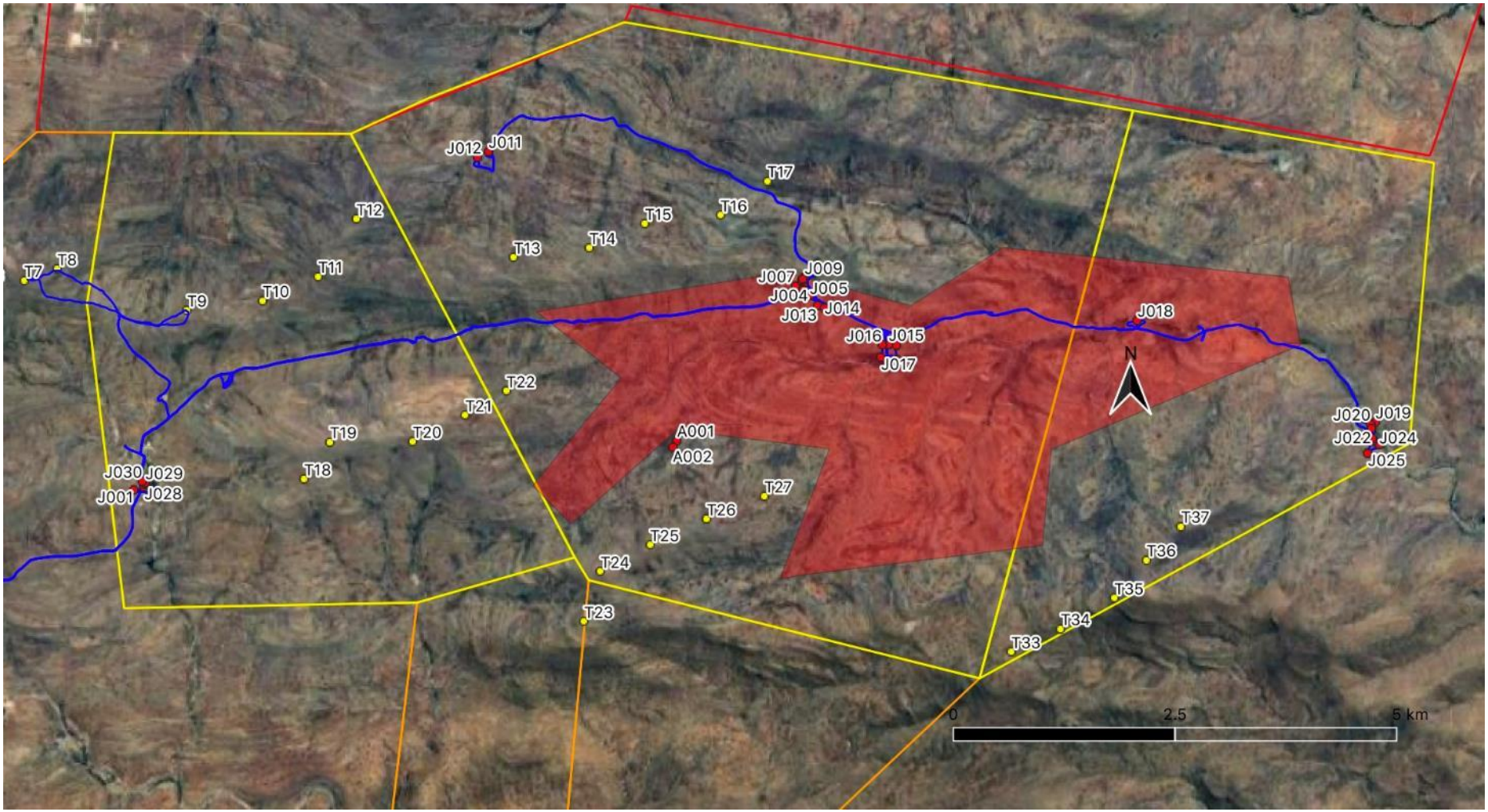

Figure 4: ACO survey trackplots (blue lines) and heritage sites (numbered red dots) recorded during the March 2022 field survey. The Exclusion Area is shaded red (Source: Google Earth).

The fieldwork protocol also provided for the grading of any finds of heritage resources, using the system set out by Baumann and Winter (2005) referred to above. The gradings of the sites are given in Appendix 3.

The ACO field team is suitably qualified and experienced to roughly date and characterise any heritage resources encountered during the survey.

4.4 Palaeontological Assessment

The SAHRIS palaeo-sensitivity map (see https://sahris.sahra.org.za/map/palaeo) indicates that the proposed WEF expansion will be constructed in an area of very high palaeontological sensitivity (Figure 5).

Figure 5: Extract from the SAHRIS palaeo-sensitivity map showing the Esizayo expansion area located in an area of very high palaeontological sensitivity (Source: https://sahris.sahra.org.za/map/palaeo).

The palaeontological impact assessment (PIA) for the proposed Esizayo WEF expansion was undertaken by Dr John Almond and is based on previous field-based palaeontological heritage assessments of the Esizayo WEF project area by him (Almond 2016f, 2021b), a four day site visit to the WEF expansion project area between 31 March and 3 April 2022, and a desktop review of several relevant palaeontological field surveys within adjoining WEF project areas, most notably those by Almond (2015b), Almond (2015c), Almond (2016b), Almond (2016c) and Almond (2021b).

The full PIA is attached below as Appendix 4.

4.5 Visual Assessment

The visual assessment for the Esizayo WEF expansion project was undertaken by Lourens du Plessis, a Geographical Information Sciences (GISc) practitioner, registered with the South African Geomatics Council, who specialises in Environmental GIS and Visual Impact Assessment (VIA).

The VIA was undertaken using Geographical Information Systems (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed facility. A detailed Digital Terrain Model (DTM) for the study area was created from topographical data provided by the Japan Aerospace Exploration Agency (JAXA), Earth Observation Research Centre, in the form of the ALOS Global Digital Surface Model "ALOS World 3D - 30m" (AW3D30) elevation model.

The VIA was supported by a site visit in July 2021 to verify the results of the spatial analyses and to identify any additional site specific issues that may need to be addressed in the VIA report.

The full VIA is attached below as Appendix 5.

4.6 Restrictions and Assumptions

The archaeological field study was carried out at the surface only and any completely buried archaeological sites or material would thus not be readily located.

As indicated above, the physical extent of the survey was constrained by the nature of the environment and very little access to the ridgelines where WTGs will be constructed was possible.

Based on previous experience in the immediate vicinity of the proposed expansion area regarding the likely locations of heritage resources, however, ACO is confident that the degree of survey coverage has provided a good picture of the archaeology present within the expansion area.

Although we believe that most of the relevant archaeological assessments and HIAs from the area have been located and reviewed, it is acknowledged that, particularly, recent (post-2010) heritage reports from the Western Cape do not generally appear on the SAHRIS database and that may mean that some recent reports may not have been identified for review.

With respect to palaeontology, since most fossils are buried beneath the surface, their nature and distribution cannot be directly assessed during field surveys of the development footprint. Palaeontological assessments therefore rely on extrapolating palaeontological sensitivities within the footprint from desktop data and field surveys of well-exposed sedimentary rocks, mostly from sites outside, and often well away from, the footprint itself. This approach assumes that the rock exposures seen are representative – in palaeontological terms - of the rock units (formations, members etc) that will be impacted by the proposed development.

The accuracy and reliability of palaeontological specialist studies as components of heritage impact assessments are generally limited by the following constraints:

- Inadequate database for fossil heritage for much of the RSA, given the large size of the country and the small number of professional palaeontologists carrying out fieldwork here. Most development study areas have never been surveyed by a palaeontologist.
- Variable accuracy of geological maps which underpin these desktop studies. For large areas of terrain these maps are largely based on aerial photographs alone, without ground-truthing. The maps generally depict only significant ("mappable") bedrock units as well as major areas of superficial "drift" deposits (alluvium, colluvium) but for most regions give little or no idea of the level of bedrock outcrop, depth of superficial cover (soil etc), degree of bedrock weathering or levels of small-scale tectonic deformation, such as cleavage. All of these factors may have a major influence on the impact significance of a given development on fossil heritage and can only be reliably assessed in the field.
- Inadequate sheet explanations for geological maps, with little or no attention paid to palaeontological issues in many cases, including poor locality information.
- The extensive relevant palaeontological "grey literature" - in the form of unpublished university theses, impact studies and other reports (e.g. of commercial mining companies) - that is not readily available for desktop studies.
- Absence of a comprehensive computerized database of fossil collections in major South African institutions which can be consulted for impact studies.

5 PHYSICAL ENVIRONMENTAL CONTEXT

5.1 Site Context and Description

The proposed Esizayo WEF expansion site is approximately 30 km north of Matjiesfontein, below the Great Escarpment and east of the R354 to Sutherland.

The site is is situated in semi-arid, hilly to mountainous terrain of the Klein Roggeveldberge region in the south-western part of the Great Karoo. The area is remote and dominated by east/west trending uplands with elevations of c. 1250 m above mean sea level in the north of the WEF study area. A central east/west trending valley drains the surrounding hills and mountains eastwards (Figure 1 - Figure 3, Plate 1 - Plate 3) and is a tributary of the Nuwerus River, which in turn feeds into the Buffels River just north of Laingsburg.

The terrain is rough above the central valley and is characterised by hillsides covered in a soft reddish colluvium, broken by horizontal bands of sandstone, shale and, in some places, chert. The hill and mountaintops are exposed and windswept.

The proposed WTGs that will comprise the Esizayo expansion will be installed on a series of roughly east/west trending ridgelines both north and south of the central river drainage. The WTGs will be linked by 33kV underground cables or overhead powerlines which will feed into the substation on the approved Esizayo WEF. At this stage the alignments of the access roads to the WTGs have not been finalised.

6 FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded on the site during the course of the project.

6.1 Palaeontology

The WEF Expansion project area is underlain by Middle Permian sedimentary bedrocks within the lower part of the Abrahamskraal Formation (Lower Beaufort Group, Karoo Supergroup) (Figure 6). Elsewhere this succession has yielded sparse but scientifically important fossils of the Eodicynodon Assemblage Zone. They include lungfish burrows, low diversity invertebrate trace fossils, tetrapod (terrestrial vertebrate) burrows and trackways plus exceedingly rare and fragmentary tetrapod skeletal remains (viz. fragments of temnospondyl amphibians and therapsids). Well-preserved tetrapod fossils are very sparsely distributed here while well-preserved petrified wood is unknown.

The Beaufort Group sedimentary bedrocks are extensively covered by Late Caenozoic superficial sediments (e.g. scree, surface gravels, alluvium, skeletal soils, calcretes) that are usually unfossiliferous. Satellite imagery shows that good exposures of potentially fossiliferous bedrocks are not generally found along ridge crests where most key WEF infrastructure (e.g. turbines, internal road network) will be sited. The overall palaeontological sensitivity of the project area is rated as low, although the potential for rare fossil sites of high palaeontological interest cannot be entirely discounted.

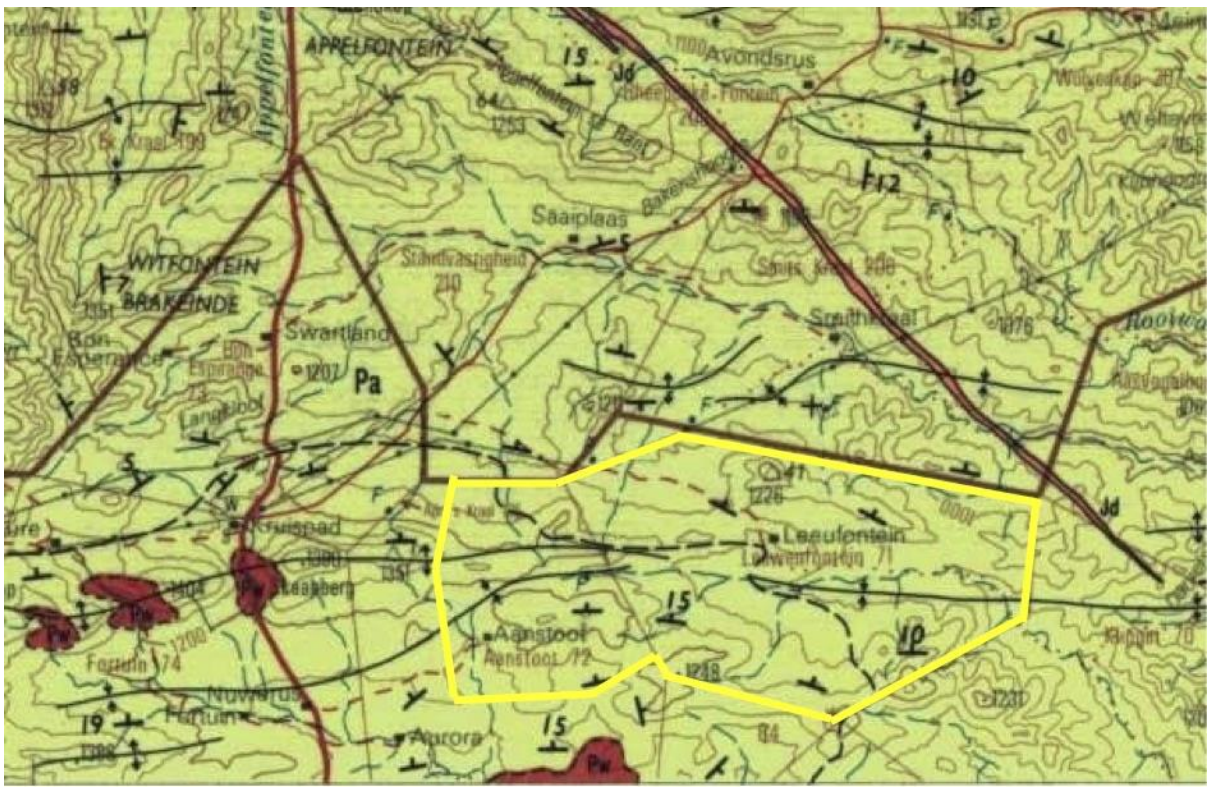

Figure 6: Extract from 1: 250 000 scale geology sheet 3220 Sutherland (Council for Geoscience, Pretoria) showing the location of the Esizayo WEF Expansion project area, *c*. 30 km northwest of Laingsburg, Western Cape Province (yellow polygon). The main mappable rock units represented within the broader region are: ECCA GROUP Waterford Formation (Pwa, orange / Pw, dark brown); LOWER BEAUFORT GROUP Abrahamskraal Formation (Pa, pale green); KAROO DOLERITE SUITE Karoo dolerite (Jd, red lines). Various Late Caenozoic

superficial deposits that are not mapped at 1: 250 000 scale include alluvium, colluvium (scree deposits, hillwash), downwasted surface gravels / eluvium, pedocretes (calcretes) and soils.

According to the SAHRIS palaeosensitivity map, areas underlain by Lower Beaufort Group bedrocks are provisionally assigned a high to very high palaeosensitivity. However, no vertebrate or vascular plant body fossil remains were recorded during the recent site visit to the Esizayo WEF Expansion project area. All the fossils observed so far within the project area are of widely occurring taxa (sphenophyte ferns, lungfish burrows, low diversity invertebrate trace fossils) that are not considered to be of exceptional scientific or conservation value (see PIA in Appendix 4 for detail).

Furthermore, none of the fossil sites recorded during the palaeontological site visit lie within the wind turbine footprints under consideration, and no No-Go or High Sensitivity areas have been identified here in terms of palaeontological heritage.

It is concluded that the overall palaeontological sensitivity of the Esizayo WEF expansion area is in practice **low** rather than **high** to **very high** as provisionally shown on the SAHRIS palaeosensitivity map for this part of the Klein Roggeveld. However, the potential for hitherto unrecorded, very rare sites of **high** palaeosensitivity (e.g. tetrapod skeletal remains and trackways) cannot be completely excluded.

6.2 Archaeology

In respect of archaeology, very little Early or Middle Stone Age (ESA / MSA) archaeology has been identified previously in the area. Halkett & Webley (2011) in their survey for the proposed Sutherland WEF observed MSA artefacts including scatters of polished/patinated stone chunks, flakes and cores, with occasional denticulated or notched pieces noted. Distinctive bifaces representative of the ESA were only seen on one site.

The same study recorded only a handful of well-defined Later Stone Age (LSA) sites, some associated with indigenous ceramics, generally located in proximity to water sources, near springs or on riverbanks. The LSA stone artefact assemblages included thumbnail scrapers and the raw material included a grey chert. Large flakes on indurated shale or hornfels were also common. In addition, they identified the presence of “open Khoekhoen encampments” along the dry riverbeds in the bottom of valleys.

The archaeological assessments conduced for the Esizayo WEF (Webley and Halkett 2017a & b) and Esizayo OHPL (Gribble 2021) on the farms immediately to west of the proposed WEF expansion site recorded only a handful of pre-colonial sites or materials, including two small shelters with rock paintings and associated artefacts on the farm Aurora. A further rock art site was reported by Mr Hanekom from the farm Saaiplaas north of the expansion area (Webley and Halkett 2017a & b). The MSA lithics noted were similar to those reported by Halkett & Webley (2011) – thin scatters or isolated occurrences of heavily patinated flakes, chunks and cores, generally made on hornfels. A few “pastoralist settlements” containing LSA artefacts, ceramics and grindstones were located along dry river beds in the bottom of valleys on Aurora.

One of the most common types of pre-colonial sites found in the Roggeveld are stone kraals or structures which typically consist of dry-stone walled enclosures in a roughly circular configuration, sometimes interlocking but not more than half a metre high and ranging from 3

– 4 meters in diameter. It is believed that many of these stone structures represent pre-colonial “kraals” for small stock such as fat-tailed sheep and goats although it is difficult to determine which are pre-colonial and which are colonial era in date. A number of these kraals were found distributed along the lower slopes of small koppies, and close to streams or fountains within the Esizayo WEF. No significant archaeological resources were identified on the high lying ridges which will accommodate the wind turbines.

Elsewhere in wider vicinity of the Esizayo WEF Lloyd Evans et al. (1985) excavated a small rock shelter containing a LSA assemblage on the grounds of the South African Astronomical Observatory outside Sutherland. They comment (1985: 108) that the “presence of the shell beads points to cultural ties with people along the Cape coast while the small scrapers found can be assigned to the Wilton industry”. Also near Sutherland Hart (2005) reported finding a dense artefact scatter associated with a shallow rock shelter while doing a survey for a golf course to the south of the town. The study indicated that archaeological sites can be expected in areas that were sheltered from the wind.

The survey for the Esizayo expansion project undertaken by ACO Associates in March 2022 found very limited evidence of archaeological material.

A couple of isolated MSA stone artefacts were noted, including a large circular flake found in the streambed adjacent to the Leeuwenfontein farm complex (Plate 4).

A small scatter of LSA chert and silcrete lithics (including a possible ESA core on a river cobble) were recorded in a sandy area next to the river at J018, approximately 3 km east of the Leeuwenfontein farmstead (Plate 5).

No other archaeological sites or material were noted.

Plate 1: View to the south of the Leeuwenfontein farm complex, showing the rugged and remote nature of the area (Photo: J Gribble).

Plate 2:View to the south from near the shepherd's bothy. WTGs 13-16 will be installed on the flanks of the hills on the left (Photo: J Gribble).

Plate 3: View to the east from the proposed position of WTG 8. WTGs 9-12 will be installed on the ridgeline centre left. ACO's bakkie (right) provides a scale within the landscape (Photo: J Gribble).

Plate 4: MSA flake found in the streambed at the Leeuwenfontein farmstead (Photo: J Gribble).

Plate 5: Possible ESA core (left) and LSA chert scraper (right) found at J018 (Photo: J Gribble).

6.3 Historical Sites and Built Environment

The Roggeveld was settled by European stock farmers from as early as 1750 (Schoeman 1986; Penn 2005). The early farmers found the escarpment, which enjoys the highest rainfall, particularly suitable for small stock farming during the summer months but moved down into the valleys and plains of the Karoo to escape the extreme winters. Drought, poor grazing and attacks by the San caused many farms to be abandoned. According to Penn (2005), in the 18th century there were numerous independent Khoekhoen kraals located amongst the Trekboer farms in the Roggeveld. While the violent conflict between the various groups has been well documented, very little is known of the peaceful interaction and assimilation which took place over the last 200 years.

The built environment of the WEF expansion area, like that in the Esizayo WEF, is characterised by farmhouses (some containing an inner core dating to the 19th century), barns, and stone kraals and shepherds' huts. Shepherds' stockposts consisting of small, low-walled stone huts and adjacent kraals are found dotted around the landscape.

These shepherds' huts reflect the original form of the farmhouses in this area which comprised a "small oblong low hut" built of slabs of *leiklip* piled on top of each other, un-plastered, with a reed roof. These structures were often expanded in the 19th century into the larger farmhouses found on the farm werfs today. According to Webley and Halkett (2017a) a fine, although much altered, example of a 19th century vernacular farmhouse can be found on Wolven Hoek in the Maralla West WEF.

The colonial settlements of this area are invariably found in river valleys, close to a permanent source of water and the three clusters of historical stone-built kraals and farm dwellings identified within the expansion area are all situated near watercourses (Figure 7 - Figure 10).

Two examples of remote shepherds' huts with small associated kraals were recorded, and both are also close to small streams (J011 & J012, and A001 & A002 on Figure 4).

Apart from the farm complex on Aanstoot which is still used, none of the other historical settlements or structures identified were occupied and are either ruinous or abandoned.

Ceramics and glass noted at these settlements suggest occupation since at least the first half of the 19th century.

The farm complex at Aanstoot (refer to Figure 7 and Plate 6) consists of a highly modified farmhouse (J028) with what seems to be an early core, two barns (J029 and J0271) one with animal stalls attached, and a more recent labourer's cottage (J030). There is a large, square stone-walled kraal (J001) on the rise behind the werf, and a series of stock pens below the werf, which include a sheep dip. A large and old orchard is located between the farm buildings and river.

Figure 7: The historical farm complex on Portion 2 of Farm Aanstoot Farm 72 (Source: Google Earth).

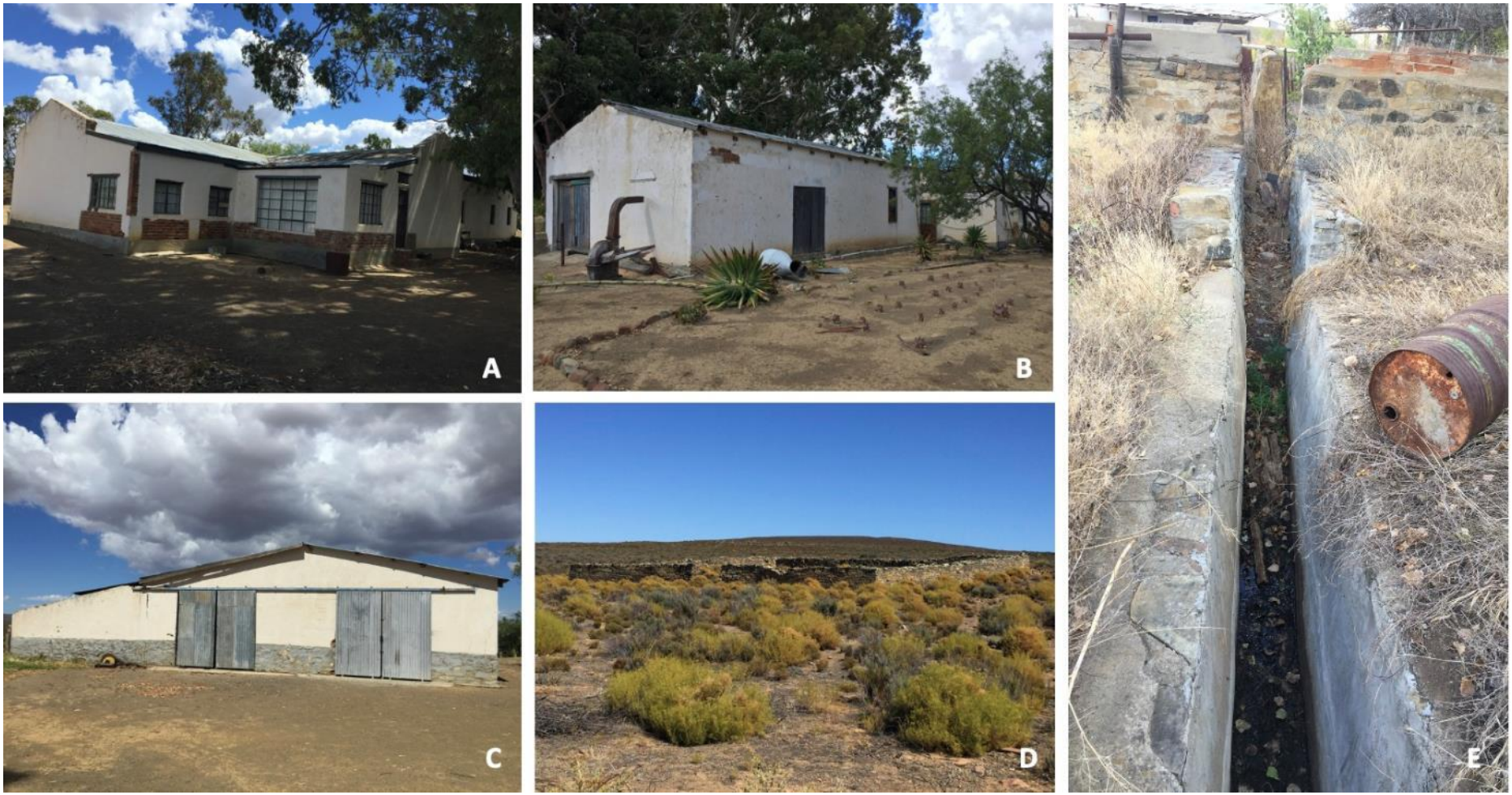

Plate 6: Aanstoot farm complex. A = farmhouse (J028); B = barn (J029); C = barn (J0271); D = stone-walled kraal (J001); E = sheep dip (Photos: J Gribble).

The Leeuwenfontein farm werf (Figure 8 and Plate 7) is larger and appears to be older than that on Aanstoot. It consists of a large farmhouse with attached a barn (J002). A more modern corrugated iron shed has been affixed to the front of the barn. Part of the barn was originally a stone-walled kraal. A portion of this original kraal still exists behind the building and there is a well-preserved packed stone sheep dip with associated cobbled area adjacent to it (J008). A large stone-walled kraal occupies the rise behind the house (J007), with a smaller, much modified kraal situated below and to the south of the house (J004). A circular, stone threshing floor was recorded approximately 130 m south of the house (J005) and a small, circular shepherd's hut (J009) is built on the far side of the river north of the house. Two historical ash heaps containing ceramics, glass, bone and metal were recorded at J003 and J006.

Approximately 900 m to the south-east of this farm complex is a very large, square stone-walled structure covering an area of roughly 150 x 120 m (Figure 9). The structure is walled on three side but not on the side which abuts the river. Its rocky substrate suggests that is unlikely to have been a field, and has thus been interpreted as a kraal, also associated with the Leuuwenfontein farm complex.

Figure 8: The historical farm complex on Remainder of Farm Leeuwenfontein 71. The historical graveyard is shown as point J014 (circled) (Source: Google Earth).

Plate 7: Leeuwenfontein farm complex: A = farmhouse (J002); B & D = kraal built into barn (J008); C = shepherd's hut (J009); E = sheep dip; F = threshing floor (J005) (Photos: J Gribble).

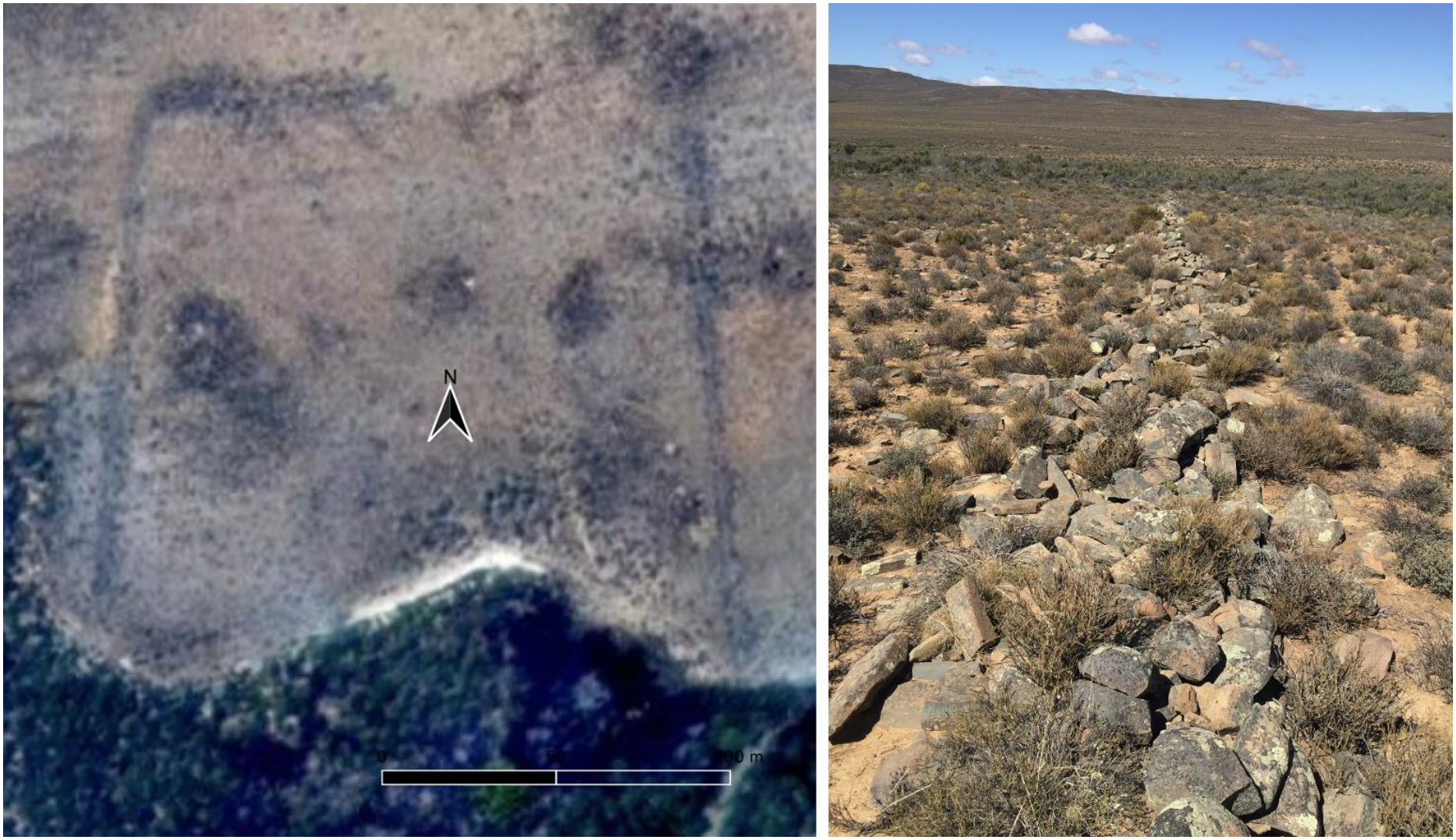

Figure 9: Google Earth image of the large stone stucture near Leeuwenfontein (left) and one of the walls (right) (Source: Google Earth and J Gribble).

The second, unnamed farm complex is situated at the at the extreme eastern edge of WEF expansion site (Figure 10 and Plate 8) at the confluence of three watercourses. Now largely ruinous, the complex consists of a flat-roofed, packed stone house, a large kraal on a hill behind (J019), a smaller kraal below the house (J022) and a series of walled fields on the river flood plain below the house (J024 & J027). A long packed stone wall lines the cliff edge behind the house and adjacent to the large kraal (J020). The foundations of a small, square building were recorded some distance from the house, and have been interpreted as a shepherd's hut (J026). Lastly, what appears to the a roughly built rectangular kraal is located approximately 200 m south of the house. Although no ash heap was found during the survey, a number of 19th century ceramics were recorded on the rocks upslope form the house, and ceramics, glass, bone and ostrich eggshell were recorded around the possible shepherd's hut.

Figure 10: Unnamed historical farm complex at the extreme eastern edge of Portion 1 of Farm Leeuwenfontein 71 (Source: Google Earth).

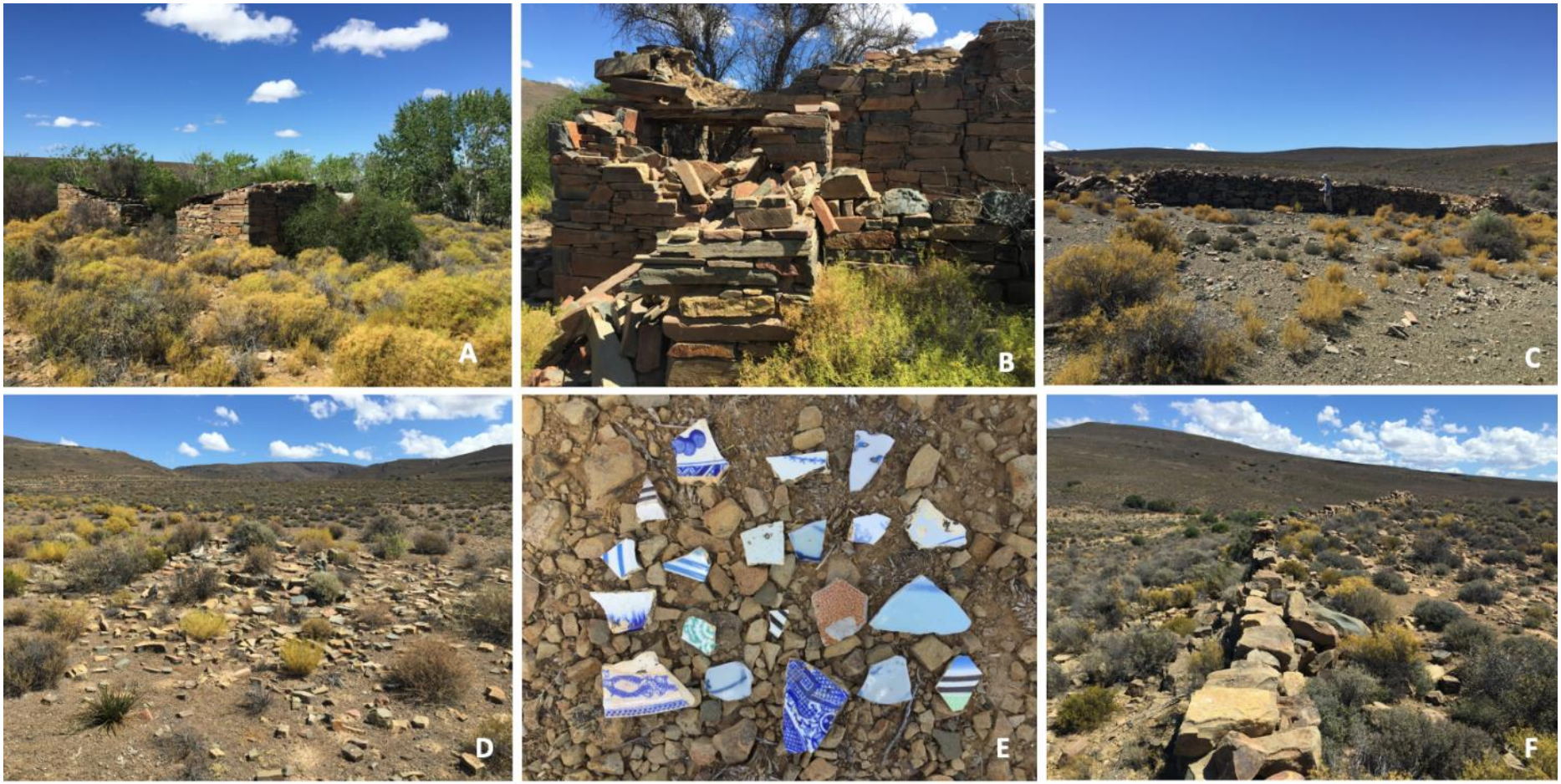

Plate 8: Unnamed farm complex: A & B = ruined farmhouse; C = kraal (J019); D = shepherd's hut (J026); E = 19th century ceramics noted on site; F = wall above cliff (J020) (Photos: J Gribble).

Two remote shepherd's posts, each consisting of a small dwelling structure and a small nearby kraal were recorded, both potentially linked to the Leeuwenfontein farm complex.. J011 is a small rectangular shepherd's hut, situated in the north of the expansion site on the slopes above the Komsberg substation (Plate 9). This hut is interesting in that it appears to have had a pitched roof, the apex of which was probably less that 1.8 m above the ground. The hut is built directly above a small steam. Some ceramics, glass and metal fragments were noted on the slope below the structure. A small kraal, was found approximately 400 m away, tucked in below cliffs next to the stream.

Plate 9: A-C = Shepherd's hut (J011); D = kraal below cliff (Photos: J Gribble & G Euston-Brown).

The second shepherds' post was located by John Almond and Madelon Tusenius during the palaeontological assessment. It is located up a remote valley approximately 2 km south-west of the Leeuwenfontein complex and consists of a low-walled, circular, stone-built hut (A001), and a small circular packed stone kraal (A002) nearby (Plate 10).

Plate 10: Circular, stone-built hut (A001) and associated circular packed stone kraal (A002) (Photos: M Tusenius).

6.4 Cemeteries and Graves

A small farm graveyard was identified approximately 300 m south east of the main house on the Leeuwenfontein farm complex (Figure 8).

At least five graves could be identified on the site. Two were marked with plastered brick surrounds and three by shale slabs (Plate 11 and Plate 12).

Plate 11: Farm graveyard at Leeuwenfontein. Note the cement plasters grave surrounds left and right and the less formal slate grave markers centre (Photo: G Euston-Brown).

Plate 12: Examples of grave marked with slate and stone (left) and plastered brick surround (right) (Photos: G Euston-Brown).

6.5 Visual

The study area for the VIA encompasses an area of approximately 2,400 km² and includes a minimum 20 km buffer zone around the proposed WTG structures.

A visibility analysis was undertaken from each of the proposed WTGs in the Esizayo expansion project at an offset of 250 m, the approximate maximum blade-tip-height above ground level.

The results of the viewshed analysis are displayed in Figure 11 below and indicate the potential areas of visual exposure, as well as the potential frequency of exposure arising from the proposed expansion of the Esizayo WEF. The frequency of exposure indicates the number of turbines that may be exposed (i.e. more turbines may be visible in the darker orange areas than in the yellow areas). Land that is more elevated is typically more exposed to the proposed WEF, whilst lower lying areas such as valleys are shielded, or not as exposed.

The topography of the study area greatly influences the viewshed pattern of the proposed Esizayo WEF expansion project. The core, uninterrupted area of visual exposure of the wind turbines is largely contained within a 5 - 10km radius of the wind turbine structures. This is due to the Appelfontein se Rant ridge to the north and north-east of the proposed development site. The Spitskop and Brandkop hills to the west, the Kranskop, Ramkop and Droëberg hills to the south, and the Losper se Berg, Langkloof se Berg, Kranskop and Bokberg hills to the south-east, similarly contains the visual exposure within a 5 – 10 km radius.

Visual exposure within a 10 - 20 km radius (to the north-east and east) is largely restricted to the south and west-facing slopes of the mountains and ridges of the Perdeplaas se Berg, Eiffel and Winterbos se Berge. Most of the valleys within this zone are shielded from the

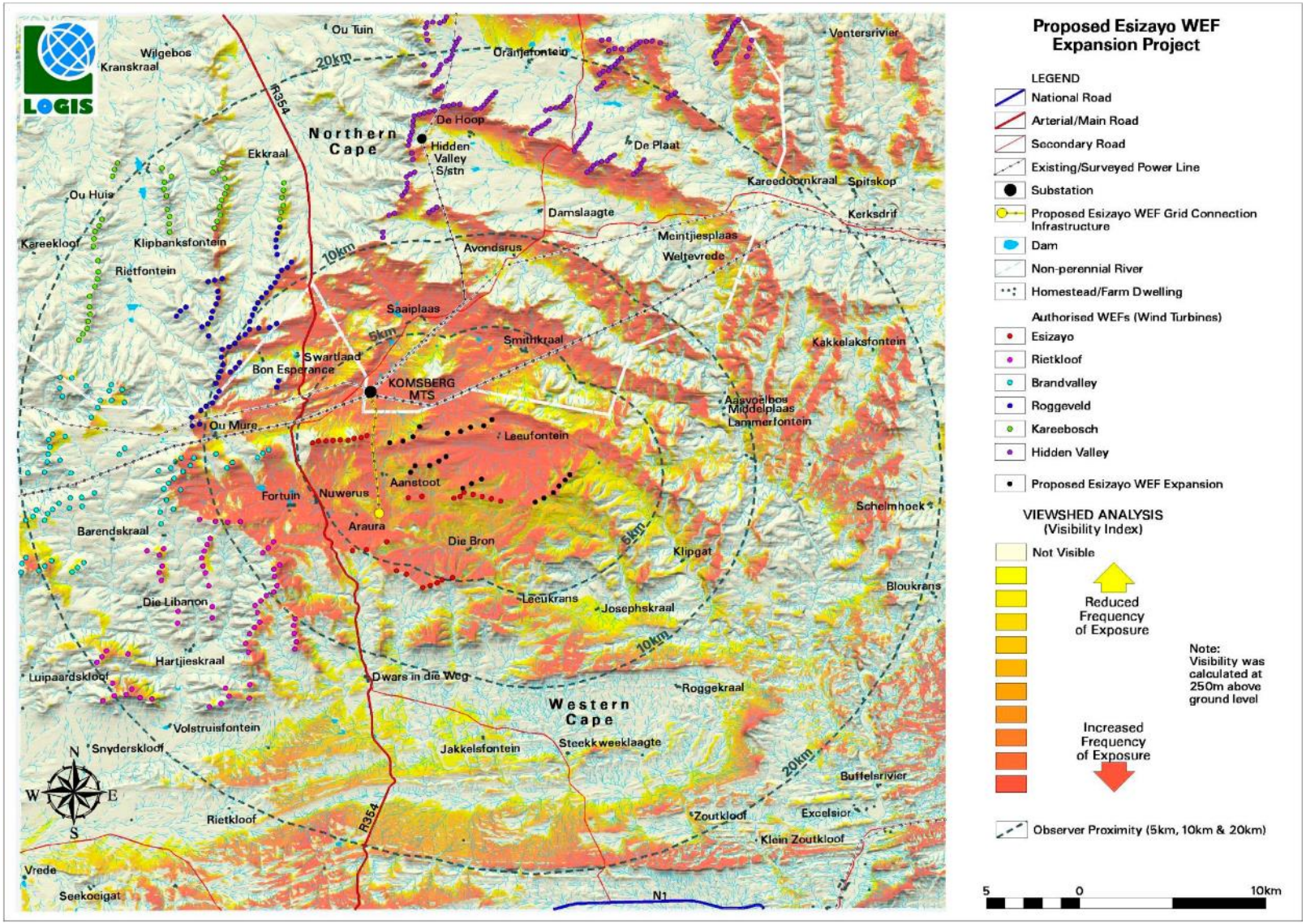

Figure 11: Viewshed analysis of the proposed Esizayo WEF Expansion Project (After Du Plessis, 2022).

wind turbine structures and visual exposure below the Klein Roggeveldberge escarpment is highly unlikely.

Visibility beyond 20 km from the turbine structures will primarily be to the north-east along the south-west-facing slopes of the Langberg, Die Helfte se Berg, Die Kop and Graskop. Visibility to the south, towards the N1 national road, will be contained by the Soutkloof se Berg.

Winter & Oberholzer (2013) identify the R354 between Matjiesfontein and Sutherland an area of high scenic and rural value. It is an important tourism route to the Sutherland Observatory and is considered of Route III significance (Figure 12). Based on the results of the VIA, the construction of the Esizayo WEF expansion project will affect the R354 with elements of the WEF being visible in places from the road.

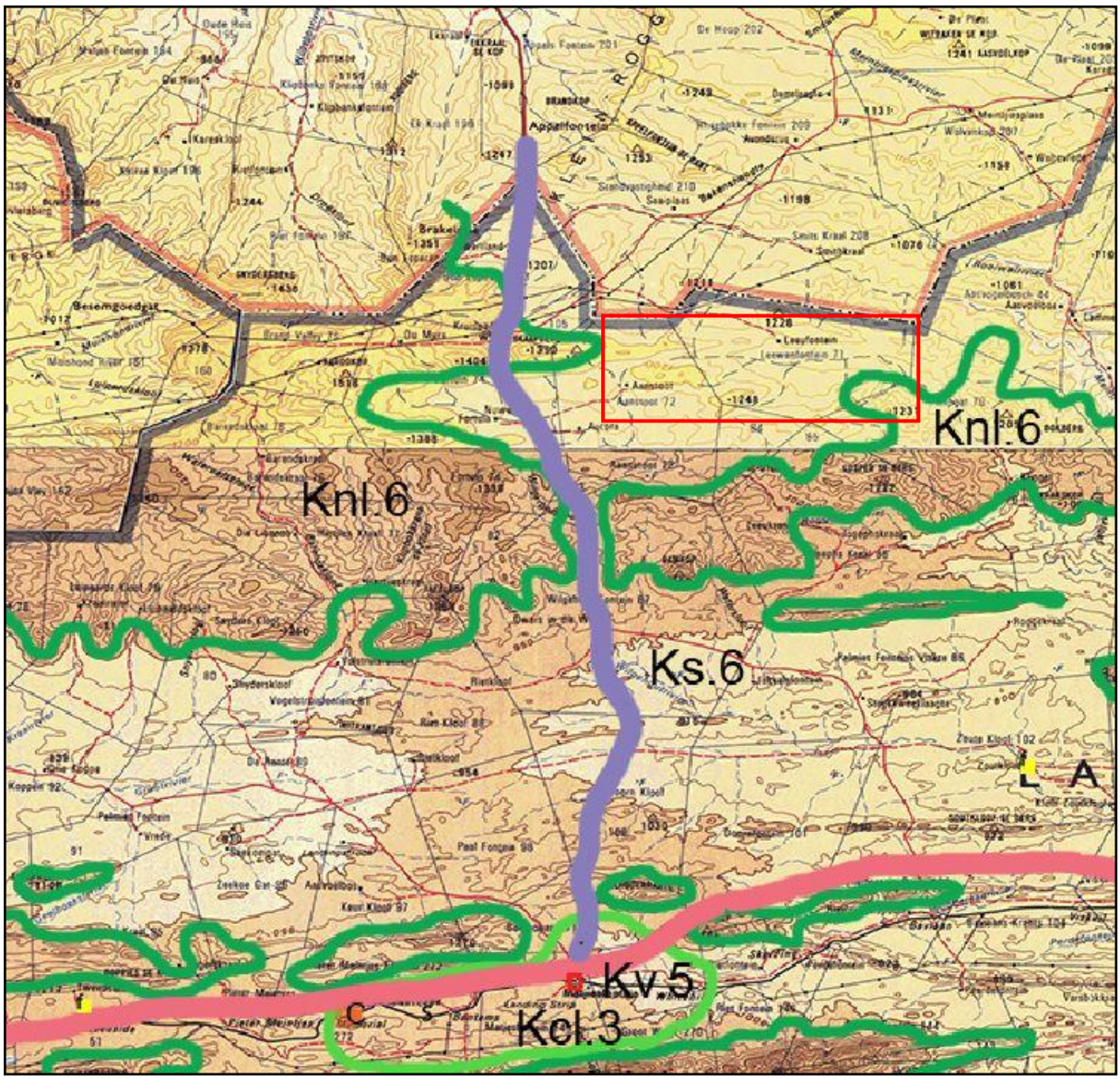

Figure 12: Extract of map from Winter & Oberholzer (2013) showing the R354 (purple line) as a route of high scenic and rural value and an important tourist route to Sutherland (Route III). The position of the Esizayo expansion site is marked by the red rectangle and the distance of the nearest WTG to the R354 is approximately 5 km.

6.6 Cultural Landscape

The concept of “cultural landscapes” finds expression in Article 1 of the World Heritage Convention 1972 where it is defined as a category of cultural heritage site which is representative of the "combined works of nature and of man”.

A consideration of any proposed development within the context of the cultural landscape within which it is proposed has become a standard requirement of HIA’s in South Africa.

The term "cultural landscape" embraces a diversity of manifestations of the interaction between humankind and its natural environment. Cultural landscapes are thus illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (https://whc.unesco.org/en/culturallandscape/#1).

The Operational Guidelines (2008) of the World Heritage Convention define three main categories of cultural landscape, namely:

- **Clearly defined landscapes designed and created intentionally by people**. This embraces garden and parkland landscapes constructed for aesthetic reasons which are often (but not always) associated with religious or other monumental buildings and ensembles.
- **Organically evolved landscapes**. These result from an initial social, economic, administrative, and/or religious imperative and have developed their present form by association with and in response to their natural environment. Such landscapes reflect that process of evolution in their form and component features. They fall into two sub-categories:
    - **a relict (or fossil) landscape** in which an evolutionary process came to an end at some time in the past, either abruptly or over a period. Its significant distinguishing features are, however, still visible in material form.
    - **a continuing landscape**, which retains an active social role in contemporary society closely associated with the traditional way of life, and in which the evolutionary process is still in progress. At the same time it exhibits significant material evidence of its evolution over time.
- **Associative cultural landscapes**. The inclusion of such landscapes on the World Heritage List is justifiable by virtue of the powerful religious, artistic or cultural associations of the natural element rather than material cultural evidence, which may be insignificant or even absent.

In respect of the physical landscape within which the WEF expansion will be occur, the VIA for the authorised Esizayo WEF (Gebhardt, 2017) notes that the “climate of the area together with its geology, has resulted in rugged landforms with low-growing, Karoo shrub extending over an expansive, undulating landscape and the uninhabited nature of the wide-open spaces gives a feeling of remoteness and isolation”.

Furthermore, Gebhardt (2017:20) states that the land-use in the surrounding area "does not significantly alter the natural visual character. The study area is remote and sparsely populated. The patterns created by the winding power lines, fences and roads, with few dwellings or other man-made structures add to the sense of wilderness and isolation". This description of the landscape can also be applied to the proposed WEF expansion area.

In respect of the cultural landscape of the proposed Esizayo expansion project this can best described as a relict landscape in which the human imprint refers back to a use of and interaction with the land – both in the pre-colonial and colonial eras – which no longer survives. This is certainly true of the pre-colonial period, but is also increasingly true of colonial era as people have moved away from the farms, resulting in the abandonment of the historical farms complexes with their houses, outbuildings and kraals and the way of interaction with the landscape they represented.

It is perhaps also true that a new cultural landscape is evolving in the portion of the Roggeveld which falls within the Komsberg REDZ: one in which the concentration of renewable power generation projects which include Roggeveld, Karusa, Soetwater and which is seeing the development of a new cultural landscape of a more industrial character.

7 SUSTAINABLE SOCIAL AND ECONOMIC BENEFITS

Section 38(3)(d) of the NHRA requires that a heritage impact assessment must "evaluate the impact of [a] development on heritage resources relative to the sustainable social and economic benefits to be derived from the development".

The very few heritage resources identified within the expansion area and the fact that the bulk are within the Exclusion Area, means that the Esizayo WEF expansion project is unlikely to have a significant impact on heritage resources.

The potential sustainable social and economic benefits that are likely to accrue from the contribution the expanded Esizayo WEF will make to the development of a sustainable energy supply for South Africa and the Western Cape will outweigh any impacts to heritage resources.

8 IMPACT ASSESSMENT

8.1 Methodology

The following impact assessment methodology, supplied by WSP, has been applied to this HIA.

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked

against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct and cumulative impacts.

Direct impacts are those that arise directly from activities that form an integral part of the project and cumulative impacts are those impacts arising from the combination of multiple impacts from existing projects, the project and/or future projects.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria presented in Table 4.

Table 4: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

8.1.1 Impact Mitigation

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in Figure 13 below

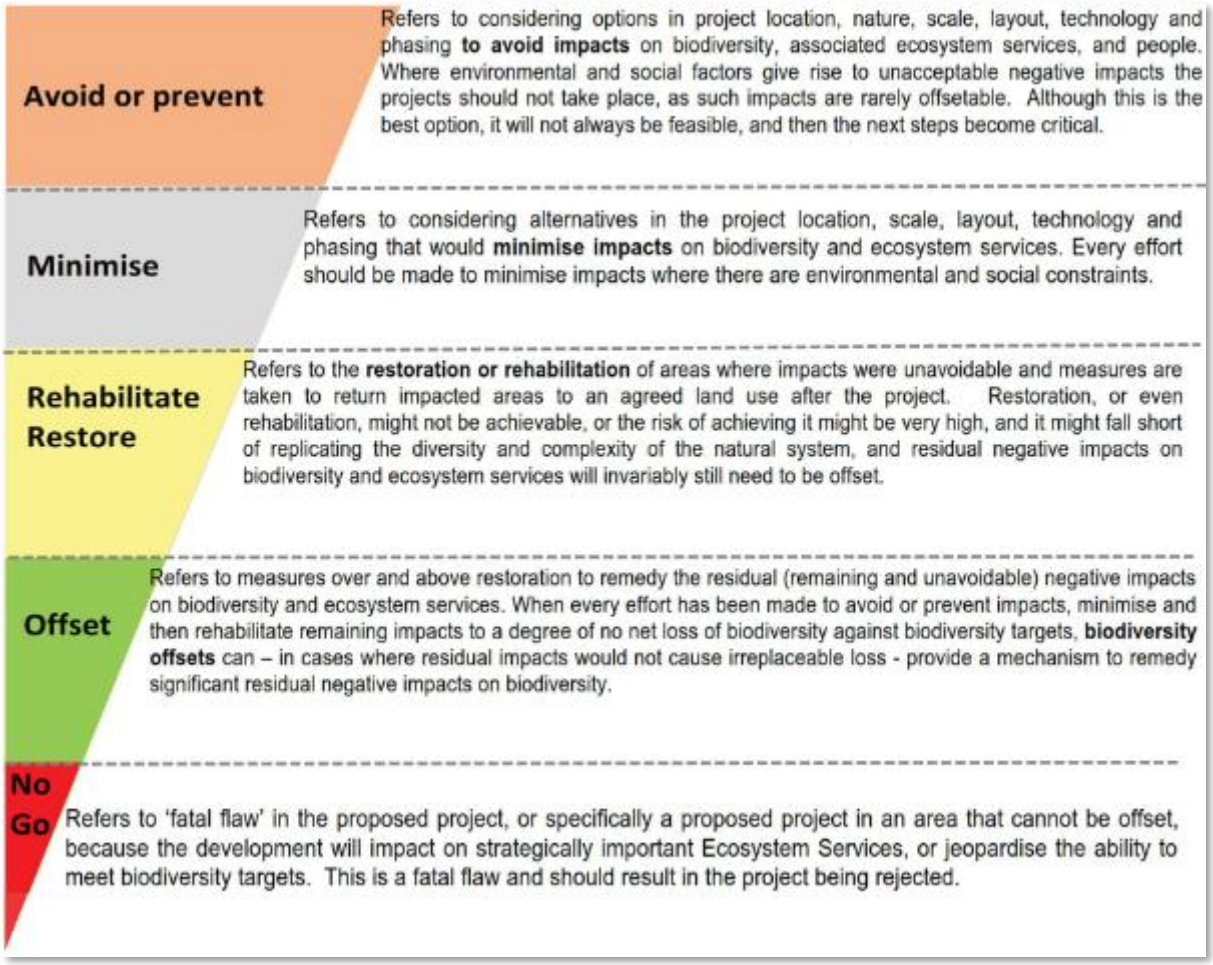

Figure 13: Mitigation Sequence/Hierarchy

8.2 Palaeontology

Given the very uniform underlying geology (and hence expected palaeontological resources) within the Esizayo WEF expansion project area, the PIA indicates that this assessment of impacts is likely to apply equally to all the layout options under consideration.

The construction phase of the proposed WEF expansion will entail extensive surface clearance (e.g. for internal roads, pylon footings) as well as excavations into the superficial sediment cover and also into the underlying bedrock (e.g. for wind turbine foundations).

These activities have the potential to impact fossil heritage (including microfossils, invertebrate trace fossils and plant debris) which occur widely within the project area. These impacts will be limited to the site (development footprint) and are generally direct, negative and of permanent effect (irreversible).

Direct impacts on the known fossil sites within the WEF expansion are not anticipated.

Significant impacts on palaeontological resources during the construction, operational and de-commissioning phases of the Esizayo WEF expansion project are thus not anticipated but should they occur, they are assessed as follows:

Table 5: Assessment of project impacts on palaeontological resources

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M)		Low			
Impact Extent (E)	Site				
Impact Reversibility (R)					Irreversible
Impact Duration (D)					Permanent
Probability of Occurrence (P)		Low Probability			
Significance (S)	(2 + 1 + 5 + 5) x 2 = 26				
IMPACT SIGNIFICANCE RATING					
Total Score	**16 to 30**				
Environmental Significance Rating (Negative (-))	**Low**				
Environmental Significance Rating (Positive (+))	**Low**				

8.3 Archaeology

Where project activities such as the construction of access roads, the creation of WTG laydown areas, the excavation of foundations for the WTGs and trenching for electrical cabling intersect with archaeological sites and material, impacts will occur.

However, the development Exclusion Area referred to above covers the principal drainages on the proposed WEF expansion site where there is the greatest likelihood of archaeological sites and material occurring. This means that there will be no impacts on archaeological resources in the area of the development site which had the greatest (albeit low, based on the survey results) potential archaeological sensitivity.

Impacts to archaeological sites and materials on the higher ground where the WTGs are to be installed are unlikely given the proven paucity of archaeological material on the higher ground in the area.

Significant impacts on archaeological resources during the construction, operational and de-commissioning phases of the Esizayo WEF expansion project are thus not anticipated but should they occur, they are assessed as follows:

Table 6: Assessment of project impacts during construction, operation and decommisioning on archaeological

resources

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M)	Very low				
Impact Extent (E)	Site				
Impact Reversibility (R)					Irreversible
Impact Duration (D)					Permanent
Probability of Occurrence (P)		Low Probability			
Significance (S)	**(1 + 1 + 5 + 5) x 2 = 24**				
IMPACT SIGNIFICANCE RATING					
Total Score	**16 to 30**				
Environmental Significance Rating (Negative (-))	**Low**				
Environmental Significance Rating (Positive (+))	**Low**				

8.4 Built Environment

It is unlikely that there will be any direct impacts to the Leeuwenfontein and unnamed farm complexes. The former is located within the Exclusion Area and will thus be exempt from direct impacts.

Although the unnamed farm complex is outside the Exclusion Area it is located at the extreme eastern edge of the expansion area, and since access roads to service the expansion area will develop from those to be built for the authorised Esizayo WEF, there is unlikely to be any direct impact on this remote farmstead from the construction, operation or decommissioning of the WEF expansion.

Similarly, it is unlikely that WEF expansion-related activities will occur in proximity to either of the two shepherds' hut and associated kraals, despite both being located outside the Exclusion Area. No impacts to these features are anticipated.

Depending on the routing of the access roads, there is the potential for the Aanstoot farm complex to be impacted by the proposed expansion of the Esizayo WEF. Once the proposed alignment of the access roads for the WEF expansion are known the potential for impacts to the Aanstoot farmstead may need to be re-assessed.

The significance of potential impacts on the known historical built environment feature within the expansion area are assessed as follows:

Table 7: Assessment of project impacts during construction, operation and decommisioning on the historical built environment

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M)		Low			
Impact Extent (E)	Site				
Impact Reversibility (R)					Irreversible
Impact Duration (D)					Permanent
Probability of Occurrence (P)		Low Probability			
Significance (S)	(2 + 1 + 5 + 5) x 2 = 26				
IMPACT SIGNIFICANCE RATING					
Total Score	**16 to 30**				
Environmental Significance Rating (Negative (-))	**Low**				
Environmental Significance Rating (Positive (+))	**Low**				

8.5 Graves and Burials

There are unlikely to be any impacts to the graveyard identified at the Leeuwenfontein farmstead because it lies within the project Exclusion Area.

Although considered unlikely, it is possible that currently unknown graves or burials may be affected by the expansion of the Esizayo WEF. Provided the mitigation measures recommended below are implemented the significance of potential impacts on graves and burials within the expansion area is assessed as follows:

Table 8: Assessment of project impacts during construction, operation and decommisioning on graves and burials

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M)		Low			
Impact Extent (E)	Site				
Impact Reversibility (R)					Irreversible
Impact Duration (D)					Permanent

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Probability of Occurrence (P)		Low Probability			
Significance (S)	(2 + 1 + 5 + 5) x 2 = 26				
IMPACT SIGNIFICANCE RATING					
Total Score	**16 to 30**				
Environmental Significance Rating (Negative (-))	**Low**				
Environmental Significance Rating (Positive (+))	**Low**				

8.6 Visual & Cultural Landscape

The findings of the Visual Impact Assessment undertaken for the proposed Esizayo WEF Expansion Project is that the visual environment surrounding the site, especially within a 5km radius (and potentially up to 10km), will be visually impacted upon for the anticipated operational lifespan of the facility (i.e. 20 - 25 years).

The impacts can be summarised as follows:

- Construction activities may potentially result in a **moderate** temporary visual impact both before and after mitigation.
- The operation of the Esizayo WEF expansion project is expected to have a **high** visual impact on observers / visitors residing at homesteads within a 5km radius of the wind turbine structures. No mitigation of this impact is possible.
- The operation of the Esizayo WEF expansion project is expected to have a **high** visual impact on observers traveling along the public roads within a 5km radius of the wind turbine structures. No mitigation of this impact is possible.
- The operation of the Esizayo WEF expansion project could have a **moderate** visual impact on sensitive visual receptors within the region (5-10km radius of the wind turbine structures). No mitigation of this impact is possible.
- The Esizayo WEF expansion project could have a **moderate** visual impact on residents of (or visitors to) homesteads within a 10 - 20km radius of the wind turbine structures.
- There are no places of residence within a 1,000 m buffer from the wind turbine structures. The significance of shadow flicker is therefore anticipated to be **low** to **negligible**.
- The anticipated night-time lighting impact is likely to be of **high** significance and may be mitigated to **moderate**, provided that *needs-based aircraft warning lights* (if permitted by the CAA and deemed feasible), are installed.
- The anticipated visual impact resulting from ancillary infrastructure is likely to be of **low** significance both before and after mitigation.

- The significance of the visual impacts on the sense of place within the region (i.e. beyond a 20km radius of the development and within the greater region) is expected to be of **low** significance.

8.7 Cumulative Impacts

For the purposes of this report, cumulative impacts are defined as 'direct and indirect impacts that act together with existing or future potential impacts of other activities or proposed activities in the area / region that affect the same resources and / or receptors'.

For the most part, cumulative effects or aspects thereof are too uncertain to be quantifiable, due mainly to a lack of data availability and accuracy. This is particularly true of cumulative effects arising from potential or future projects, the design or details of which may not be finalised or available and the direct and indirect impacts of which have not yet been assessed.

For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognised as important on the basis of scientific concerns and/or concerns of affected communities.

Multiple human activities in the surrounding landscape, of which the proposed expansion of Esizayo WEF is the latest, can erode the integrity of these heritage resources through their physical damage or destruction. At an individual project level these impacts may not appear to be significant, but the cumulative effects of multiple developments on heritage resources are expected to be moderate (negative). The implementation of measures at individual project level can, however, do much to mitigate and reduce cumulative impacts to low (negative).

With regard to cumulative visual impacts, the VIA finds that the cumulative impacts of the proposed Esizayo WEF expansion and the six authorised WEFs in the vicinity is expected to be of **high** significance. Despite this, the cumulative visual impact is still considered to be within acceptable limits, due to the generally remote location of the Komsberg REDZ and the limited number of affected sensitive visual receptors.

There are not many mitigation measures that can significantly reduce the cumulative visual impact of the introduction of renewable energy projects into a rural landscape, but the consistent implementation of mitigation measures across all projects can help to reduce visual impact to some extent. Additionally the dissected nature of the topography that comprises the Komsberg REDZ breaks up views and will partially obscure developments from viewpoints.

8.8 The No-Go Alternative

If the project were not implemented, then the site would stay as it currently is (impact significance of **neutral**).

Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is more significant and suggests that the No-Go option is less desirable.

8.9 Levels of Acceptable Change

Any impact to an archaeological, palaeontological, built environment resource or grave and burials is deemed unacceptable until such time as the resource has been inspected and studied further, and mitigated, if necessary.

Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many vantage points is undesirable. The nature of the proposed Esizayo expansion, suggests that such an impact is likely.

9 RECOMMENDATIONS AND PROPOSED MITITGATION MEASURES

The following recommendations with respect heritage resources are made and must be included in the EMPr for the project:

- The Exclusion Area proposed by the developer must be implemented and no WEF-related activities may take place within the area. Should this not be the case, then the assessment of potential impacts on heritage resources in this report will need to be revisited and new measures to protect heritage resources or mitigate impacts to them will be required.
- Once the layout of the access roads is available, they will need to be surveyed for heritage resources and the results incorporated into the Final BA report, or the EMPr.
- If any archaeological material or human burials are uncovered during the course of the construction of the WEF expansion, then work in the immediate area must be halted. The find must be reported to Heritage Western Cape and may require inspection and mitigation by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

With respect to palaeontological resources, the PIA makes the following specific recommendations:

- Given the scarcity of scientifically important, unique fossil heritage recorded within the Esizayo WEF expansion project area, no further specialist palaeontological studies or mitigation are recommended for this development, pending the potential discovery of significant new fossils before or during the construction phase.
- The following general palaeontological mitigation measures apply to the construction phase of the WEF expansion:
    - Monitoring of all surface clearance and substantial excavations (>1 m deep) by the ECO / ESO for fossil material (e.g. bones, teeth, fossil wood) on an on-going basis during the construction phase.
    - Safeguarding of chance fossil finds (preferably in situ) during the construction phase by the responsible ECO / ESO, followed by reporting of finds to HWC.
    - Recording and judicious sampling of significant chance fossil finds by a qualified palaeontologist, together with pertinent contextual data (stratigraphy, sedimentology, taphonomy) (Phase 2 mitigation).

    - Curation of fossil material within an approved repository (museum / university fossil collection) and submission of a Phase 2 palaeontological heritage report to HWC by a qualified palaeontologist.
- Mitigation of significant chance fossil finds reported by the ECO / ESO would involve the recording, sampling and / or collection of fossil material and associated geological data by a professional palaeontologist during the construction phase of the development (See summarized Chance Fossil Finds Protocol in Appendix 4).
- The palaeontologist concerned with potential mitigation work (Phase 2) would need to submit a Work Plan for approval by Heritage Western Cape while any material collected would have to be curated in an approved depository (e.g. museum or university collection).
- All palaeontological fieldwork and reporting should meet the minimum standards outlined by HWC (2021) and SAHRA (2013).

The implementation of the visual mitigation measures recommended in the VIA (see Appendix 5) will go some way to reducing the visual impacts and mitigating the impacts of the WEF expansion project on the cultural landscape.

10 CONCLUSION

This assessment has found that the area identified for the proposed Esizayo WEF expansion is a heritage environment of low sensitivity and that significant impacts on heritage resources arising from the construction of the project are unlikely.

It is our considered opinion that, provided the recommended mitigation measures are implemented, the overall impact and significance of the Esizayo expansion on heritage resources will be negligible and the proposed activity is acceptable.

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11.1 Online Resources

Cultural Landscape Categories and Subcategories (Accessed online on 15 March 2022) https://whc.unesco.org/en/culturallandscape/#1.

National Geo-Spatial Information (Accessed online on 15 March 2022) www.ngi.gov.za

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South African Heritage Resources Information System (Accessed online on 15 March 2022). http://www.sahra.org.za/sahris.

SAHRA Palaeo-sensitivity Map (Accessed online on 15 March 2022) https://sahris.sahra.org.za/map/palaeo

APPENDIX 1: HERITAGE WESTERN CAPE NID RESPONSE

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APPENDIX 2: EVIDENCE OF PUBLIC PARTICIPATION – COMMENTS AND RESPONSE REPORT

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APPENDIX 3: HERITAGE SITES RECORDED DURING THE 2022 FIELD SURVEY FOR THE ESIZAYO WEF EXPANSION PROJECT HIA

Site	Lat S	Lon E	Type	Description	Significance
J001	-32.973435°	20.599871°	Stone structure	Square packed stone kraal at the Aanstoot farm werf. ± 40 x 40 m^2 in extent.	3B
J002	-32.955840°	20.667662°	Building	Farmhouse on Leeuwenfontein farm complex. Animal shed / stable attached to northern side under the same roof. Large corrugate iron shed added on the front of the animal shed / stable	3B
J003	-32.956080°	20.667604°	Historic midden	Ash heap ± 20m^2 in extent. South of farmhouse and behind stone kraal (J004). Abundant bone and ash in animal burrows. Glass, some metal, 19th century ceramics including spongeware, blue and white transfer prints and a piece of coarse Chinese porcelain (possibly from the ginger jar).	3C
J004	-32.956093°	20.667755°	Stone structure	Square packed stone kraal adjacent to ash heap. ± 20 x 30 m in extent. Entrance on the eastern wall. Small brick lean-to added inside north-eastern corner and a mudbrick and mud plastered structure ± 7 3 m in extent added outside wall.	3B
J005	-32.956862°	20.668364°	Stone structure	Circular threshing floor walled by stone. ± 15 m across	3B
J006	-32.956436°	20.667726°	Historic midden	Ash mound ± 10 m across and 1 m high at its centre. Very ashy with bone but little cultural material noted. One piece of coarse porcelain recorded.	3C
J007	-32.956066°	20.666909°	Stone structure	Large square packed stone kraal on rise behind farmhouse (J002). ± 40 m^2.	3B
J008	-32.955630°	20.667589°	Stone structure	Small square packed stone kraal attached to the animal shed / stable at the northern end of the farmhouse. Roughly 6 m^2 with a cement-plastered sheep dip outside and under northern wall. A cobbled stone area, likely associated with the sheep dip, is outside and next to the west wall of the kraal.	3B
J009	-32.955361°	20.667837°	Stone structure	Circular stone-walled hut with roughly 1,8 x 1,5 m interior dimensions. Entrance on east side. Possible shepherd's hut	3B
J010	-32.955490°	20.667674°	Stone artefact	Single MSA flake found in streambed. Heavily patinated and worn but some possible retouch noted.	NCW
J011	-32.944640°	20.635834°	Stone structure	Square, packed stone shepherd's hut with roughly 2 x 2,5 m interior dimensions. Southern end wall appears to be standing to full height, ± 1,5 m, and has a small window opening. This wall indicates the hut was roofed with	3B

				a pitched roof, but one which was low off the ground. Located next to a small stream. Bone, green and white bottle glass and undecorated white ceramics noted around hut.	
J012	-32.945140°	20.634708°	Stone structure	Square stone packed kraal ± 5m^2. Below cliff face next to streambed and approximately 120 m from shepherd's hut J011, with which is likely associated.	3C
J013	-32.957762°	20.669124°	Stone structure	Packed cobble dam wall on steam that passes the Leeuwenfontein farmstead	3C
J014	-32.957959°	20.669859°	Graveyard	Small graveyard on Leeuwenfontein farmstead consisting of at least five marked graves. Two marked by plastered brick grave surrounds and the remaining three marked by stone. Unclear if there are any unmarked graves present	3B
J015	-32.961040°	20.676353°	Stone structure	Large walled area roughly 650 m from the Leeuwenfontein farm complex. Packed cobbles. Too rocky underfoot to be an arable field so probably a large kraal but open and unwalled along the side the front onto the river.	3C
J016	-32.961093°	20.675707°			
J017	-32.962144°	20.675594°			
G0011	-32.961141°	20.677134°			
G002	-32.962324°	20.677258°			
J018	-32.958995°	20.701558°	Artefact scatter	ESA (?) core on river cobble and a handful of LSA lithics found on a sandy area in the bend of the river. Endscraper on white chert and a handful of chert and agate chips 1 x silcrete flake.	3C
J019	-32.967640°	20.725665°	Stone structure	Large packed stone kraal on rise behind ruined farmhouse. Approximately 25 m^2 with walls still standing to 1,8 m in places.	3B
J020	-32.967815°	20.725208°	Stone structure	Packed stone and cobble wall along the top of a cliff edge above the ruined farmhouse. Extends from the kraal J019 for approximately 170 m. Has at least one small roomlike structure built into the wall, about 1,5 m^2. Defensive? SA War-related?	3B
J021					
J022	-32.968197°	20.725265°	Stone structure	Small square stone kraal between the ruined farmhouse and the river.. Entrance on enastern wall. Walls up to 1,6 m high in places.	3C
J023	-32.968275°	20.725492°	Building	Packed stone dwelling house. Although partially collapsed the corrugated iron roof is still present on half the building and indicates that it was flat-roofed. Appears to have two separate parts with partially built-in alley between. Some joinery still present. Collapsed hearth and bread oven.	3B
J024	-32.969576°	20.725395°	Stone structure	Stone walling, probably representing field boundaries. Between the river and the current farm road.	3C

J027	-32.969009°	20.725395°			
J025	-32.970309°	20.724901°	Stone structure	Large rectangular kraal on the side of an eroded shale gully. Constructed of large rocks and split into two by a transverse diving wall roughly halfway down its length.	3C
J026	-32.969220°	20.725355°	Stone structure	Square stone foundation ± 1,8 m^2. Collapsed walling surrounding it. Probably shepherd's hut. Cultural material scattered around northern side of structure. Bone, green and white bottle glass, stoneware fragment, Annular ware and ostrich eggshell fragments.	3B
J0271	-32.973157°	20.600951°	Building	Barn / shed on the Aanstoot farmstead. Double bay. Corrugated iron roof. Animals stall on the eastern side of the building under lean-to roof.	3B
J028	-32.972962°	20.600978°	Building	Dwelling house. Originally possibly L-shaped longhouse but the L has since been infilled to make the house square and a room has been added at the northern end of the building around the original hearth and chimney	3B
J029	-32.972808°	20.601077°	Building	Barn / shed. Older than J0271 and possibly contemporary with the original core of the house. Contains 3 x small sash windows in eastern wall. Two rooms on the rear (southern) end of the building.	3B
J030	-32.972672°	20.600794°	Building	Modern labourer's cottage. Single room. Flat roofed.	3C
J031	-32.973242°	20.601659°	Stone structure	Kraal complex below the farmhouse. Stone bult with some more recent brick additions. Includes a cemented sheep dip.	3C
A001	-32.969200°	20.654924°	Stone structure	Shepherd's hut. Packed stone. Circular	3C
A002			Stone structure	Small, packed stone kraal	3C

APPENDIX 4: PALAEONTOLOGICAL IMPACT ASSESSMENT

(See separate PDF file)

APPENDIX 5: VISUAL IMPACT ASSESSMENT

(See separate PDF file)

APPENDIX 6: CURRICULUM VITAE: JOHN GRIBBLE

Name:	John Gribble
Profession:	Archaeologist (Maritime)
Date of Birth:	15 November 1965
Parent Firm:	ACO Associates cc
Position in Firm:	Senior Archaeologist
Years with Firm:	3+
Years of experience:	30
Nationality:	South African
HDI Status:	n/a

Education:

1979-1983	Wynberg Boys' High School
1986	BA (Archaeology), University of Cape Town
1987	BA (Hons) (Archaeology), University of Cape Town
1990	Master of Arts, (Archaeology) University of Cape Town

Employment:

- September 2017 – present: ACO Associates, Senior Archaeologist and Consultant
- 2014-2017: South African Heritage Resources Agency, Manager: Maritime and Underwater Cultural Heritage Unit
- 2012-2018: Sea Change Heritage Consultants Limited, Director
- 2011-2012: TUV SUD PMSS (Romsey, United Kingdom), Principal Consultant: Maritime Archaeology
- 2009-2011: EMU Limited (Southampton, United Kingdom), Principal Consultant: Maritime Archaeology
- 2005-2009: Wessex Archaeology (Salisbury, United Kingdom), Project Manager: Coastal and Marine
- 1996-2005: National Monuments Council / South African Heritage Resources Agency, Maritime Archaeologist
- 1994-1996: National Monuments Council, Professional Officer: Boland and West Coast, Western Cape Office

Professional Qualifications and Accreditation:

- Member: Association of Southern African Professional Archaeologists (ASAPA) (No. 043)
- Principal Investigator: Maritime and Colonial Archaeology, ASAPA CRM Section
- Field Director: Stone Age Archaeology, ASAPA CRM Section
- Class III Diver (Surface Supply), Department of Labour (South Africa) / UK (HSE III)

Experience:

I have more than 30 years of professional archaeological and heritage management experience. After completing my postgraduate studies and a period of freelance archaeological work in South Africa and aboard, I joined the National Monuments Council (NMC) (now the South African Heritage Resources Agency (SAHRA)) in 1994. In 1996 I become the NMC's first full-time maritime archaeologist and in this regulatory role was responsible for the management and protection of underwater cultural heritage in South Africa under the National Monuments Act, and subsequently under the National Heritage Resources Act.

In 2005 I moved to the UK to join Wessex Archaeology, one of the UK's biggest archaeological consultancies, as a project manager in its Coastal and Marine Section. In 2009 I joined Fugro EMU Limited, a marine geosurvey company to set up their maritime archaeological section. I then spent a year at TUV SUD PMSS, an international renewable energy consultancy, where I again provided maritime archaeological consultancy services to principally the offshore renewable and marine aggregate industries.

In August 2012 I established Sea Change Heritage Consultants Limited, a maritime archaeological consultancy. Sea Change traded until 2018, providing archaeological services to a range of UK maritime sectors, including marine aggregates and offshore renewable energy. Relevant experience includes specialist archaeological consultancy for more than two dozen offshore renewable energy projects and aggregate extraction licence areas in UK waters including:

- Lynn and Inner Dowsing OWF;
- Humber Gateway OWF;
- Sheringham Shoal OWF;
- Race Bank OWF;
- Docking Shoal OWF;
- Triton Knoll OWF;
- Neart na Gaoithe OWF;
- Dogger Bank OWF;
- Hornsea OWF;
- Navitus Bay OWF;
- Aggregate Area 392/393, Hilbre Swash;
- Area 478, East English Channel;
- Area 372/1, North Nab;
- Areas 401 & 2;

- Area 466, North West Rough; and
- Area 447, Cutline.

In the UK I was also involved in strategic projects which developed guidance and best practice for the UK offshore industry with respect to the marine historic environment. This included the principal authorship of two historic environment guidance documents for COWRIE and the UK renewable energy sector (*Historical Environment Guidance for the Offshore Renewable Energy Sector* (2007) and *Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector* (2010)). I was also manager and lead author in the development of the archaeological elements of the first Regional Environmental Assessments for the UK marine aggregates industry, and in the 2009 *UK Continental Shelf Offshore Oil and Gas and Wind Energy Strategic Environmental Assessment* for Department of Energy and Climate Change. More recently I undertook a review of the potential impacts of marine mining on South Africa's palaeontological and archaeological heritage resources for the Council for Geoscience, on behalf of the Department of Mineral Resources. In 2013-14 I was lead author and project co-ordinator on *The UNESCO Convention on the Protection of the Underwater Cultural Heritage 2001: An Impact Review for the United Kingdom* and in 2016 I was co-author of a Historic England / Crown Estate / British Marine Aggregate Producers Association funded review of marine historic environment best practice guidance for the UK offshore aggregate industry.

I returned to South African in mid-2014 where I was re-appointed to my earlier post at SAHRA: Manager of the Maritime and Underwater Cultural Heritage Unit. In July 2016 I was appointed as Acting Manager of SAHRA's Archaeology, Palaeontology and Meteorites Unit.

I left SAHRA in September 2017 to join ACO Associates as Senior Archaeologist and Consultant. Since being at ACO I have carried out a number of offshore impact assessments (see list of recent projects below) and authored a review of the potential impacts of marine mining on South Africa's palaeontological and archaeological heritage for the Council for Geoscience, on behalf of the Department of Mineral Resources.

I have been a member of the Association of Southern African Professional Archaeologists (No. 043) for more than twenty years and am accredited by ASAPA's Cultural Resource Management section.

I have been a member of the ICOMOS International Committee for Underwater Cultural Heritage since 2000 and served as a member of its Bureau between 2009 and 2018.

Since 2010 I have been a member of the UK's Joint Nautical Archaeology Policy Committee.

I am a member of the Advisory Board of the George Washington University / Iziko Museums of South Africa / South African Heritage Resources Agency / Smithsonian Institution 'Southern African Slave Wrecks Project' and serve on the Heritage Western Cape Archaeology, Palaeontology and Meteorites Committee.

Selected Project Reports:

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Gribble, J. 2017. *Archaeological Assessment of Bosjes Phase 2, Farm 218 Witzenberg*. Unpublished report prepared for Farmprops 53 (Pty) Ltd. ACO Associates.

Gribble, J. 2017. *Canal Precinct, V&A Waterfront: Heritage Impact Assessment*. Unpublished report prepared for Nicolas Baumann Urban Conservation and Planning. ACO Associates.

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Gribble, J. 2018. *Maritime Heritage Impact Assessment: Expansion of Diamond Coast Aquaculture Farm on Farm 654, Portion 1, Kleinzee, Northern Cape*. Unpublished report prepared for ACRM. ACO Associates.

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