



ASHA Consulting (Pty) Ltd
23 Dover Road
Muizenberg
7945
22 August 2022

Attention: Project Directors
Unit B1 Mayfair Square
Century Way
Century City
Western Cape
7441

RE: CONFIRMATION THAT THE HERITAGE SPECIALIST ASSESSMENT OF THE SPRINGHAAS GRID CONNECTION PROJECT HAS MET THE REQUIREMENTS OF THE STANDARD FOR THE DEVELOPMENT AND EXPANSION OF POWER LINES AND SUBSTATIONS WITHIN IDENTIFIED GEOGRAPHICAL AREAS, 2022

This letter is presented as a preface to the specialist report:

HERITAGE IMPACT ASSESSMENT: PROPOSED DEVELOPMENT OF COLLECTOR SUBSTATION B WITHIN THE PROPOSED SPRINGHAAS GRID CONNECTION CORRIDOR NEAR DEALESVILLE IN THE FREE STATE PROVINCE (J. Orton, June 2022)

PURPOSE OF THIS LETTER

This letter serves to confirm and demonstrate that the specialist assessment undertaken for the project:

Springhaas Grid Connection: Collector Substation B, a Collector/ Switching/ Transformation Substation with a Capacity of up to 400kV and associated infrastructure, near Dealesville, Bloemfontein, Free State (Collector Substation B)

has met the requirements of the Standard for the Development and Expansion of Power Lines and Substations within Identified Geographical Areas, 2022 (Revision 2), as gazetted by GN 2313 of 2022 and promulgated under the National Environmental Management Act (Act 59 of 2008), as amended.

BACKGROUND

The above-mentioned "Standard" was promulgated on 27 July 2022, and saw certain listed activities, as listed in Environmental Impact Assessment Regulations Listing Notices 1 and 2, become no longer applicable under certain conditions, and instead be replaced by the need to register certain qualifying developments in terms of the Standard, and demonstrate compliance with the provisions of the Standard. The project described above is affected by this change. The site is located within the Kimberley Renewable Energy Development Zone and is also located within the Central Strategic Transmission Corridor.

This specialist assessment described above (and subsequent draft report) was commenced prior to this change in July 2022 and hence the draft specialist report does not specifically reference the Standard. This letter, which serves as a subsequent preface to the specialist report, presents information demonstrating that the specialist has subsequently considered this Standard.

CONSIDERATION OF THE STANDARD

The Standard presents four key sections relevant to specialist assessments:

- Procedural Requirements (Chapter 2). These are the procedural steps that are to be followed in the registration process,
- General Environmental Principles (Chapter 3). These are principles that must be adhered to when planning a powerline route or locating a substation position,
- Environmental Specifications (Appendix A). These actions need to be carried out to verify the environmental sensitivity of the site,
- Specialist Confirming Statements (Appendix B). A statement by the specialist confirming that certain key aspects have been considered. As per the requirements of the Standard, this statement is to be prepared after the public participation process, as it references input from Interested & Affected parties (I&APs).

The tables below indicate how the requirements of these four sections have been considered in the specialist study:

Table 1. Procedural Requirement that must be followed when planning a powerline or sub-station. Note, only those applicable to specialists are listed.

No.	Requirement	Comment
7	The proponent must ensure that the EAP and <u>specialists</u> identify through their specialist knowledge and site verifications/walkthrough as necessary, a proposed route and/or the substation location/s (where a substation or substations are relevant) within the <i>preliminary corridor</i> based on: a) consideration and implementation of the mitigation hierarchy, b) environmental sensitivity identified using the methodologies or processes as stipulated in Chapter 3 of this Standard, and c) engineering constraints.	The specialist has considered the location of the site through site verifications and walkthroughs. a) The mitigation hierarchy has been considered: <ul style="list-style-type: none"> • Avoid: The footprint of Collector Substation B avoids sensitive heritage resources. Avoidance of high sensitivity areas has been achieved. • Minimise: No known resources will be impacted. The specialist has provided recommendations to minimise the impact of the development on heritage resources at all stages of the development. These measures have been incorporated into the generic EMPr. • Rehabilitate: No specific rehabilitation measures, in relation to heritage impacts, have been deemed necessary. • Offset: No offsets are required as no high sensitivity heritage resources are impacted by Collector Substation B. b) Sensitivities were identified using methodologies as stipulated in Chapter 3, General Environmental Processes. This is demonstrated in Table 2 below. c) Engineering constraints were considered. The overall grid connection corridor is considered appropriate, and the location of the project therein is also acceptable for the following key reasons: <ul style="list-style-type: none"> - No known resources will be impacted. - The landscape is not particularly sensitive.
10. (e)	A discussion by the <u>specialists</u> and/or EAP of the process used to confirm that the proposed route and/or substation location has applied the principles stipulated in Chapter 3, and the process used to confirm that the site sensitivity of the proposed route and/or substation location is of low or medium environmental sensitivity.	A field survey was carried out. Sensitivity data was provided to the developer so that a layout that was sensitive to the heritage constraints could be developed. In this way, all known resources on site were successfully avoided. Furthermore, Table 2 below lists the principles stipulated in Chapter 3 and confirms that the process of confirming the proposed route, and the site sensitivity, has considered the General environmental Principle stipulated in Chapter 3.

Table 2. General Environmental Principles that must be adhered to when planning a powerline.

No.	Requirement	Comment
22	There must be no removal of threatened plant species.	Not applicable to the heritage assessment
23	There must be no impact on Tier 1 plant species identified through the screening process and site verification process	Not applicable to the heritage assessment
24	Clear-cutting during construction must be kept to a maximum of 8 m.	Not applicable to the heritage assessment
25	Wetlands must be avoided or, where wetland crossing is unavoidable, the power line should be routed over the narrowest part of the wetland. For the most part, wetlands and rivers can be traversed by the power line with little to no impact by placing the pylons outside of the wetland	Not applicable to the heritage assessment
26	Avoid all known Blue Swallow breeding habitat by a 2.5 km buffer. Should the full extent of the buffering not be practically possible, a thorough investigation must be conducted by a suitably experienced avifaunal specialist with experience of Blue Swallows to identify any potential nesting holes, which must then be appropriately buffered, in consultation with Ezemvelo KwaZulu-Natal Wildlife and BirdLife South Africa to prevent destruction of the nest holes.	Not applicable to the heritage assessment
27	Avoid Cape Vulture and White-backed Vulture breeding colonies by a 5 km buffer. In addition, it would require management of the potential impacts on the breeding birds once construction commences, which would necessitate the involvement of the avifaunal specialist and the environmental control officer (ECO).	Not applicable to the heritage assessment
28	Avoid Lappet-faced Vulture and Bearded Vulture restaurants by a 5 km buffer. Should the full extent of the buffering at vulture restaurants not be practically possible, the vulture restaurant should be relocated in consultation with the owner of the restaurant	Not applicable to the heritage assessment
29	The power line alignment or substation footing shall not be located within 500m of the edge of waterbodies found to be suitable for Greater Flamingo, Black Stork, Blue Crane, Great White Pelican, Lesser Flamingo and African Marsh-harrier	Not applicable to the heritage assessment
30.	The power line alignment or substation shall not be located within 1 km of major piggeries and poultry farms.	Not applicable to the heritage assessment

Table 3. Specifications required ito of the Standard for the Development and Expansion of Power Lines and Substations within Identified Geographical Area (DFFE, 2022)

Standard No.	Specification	Comment
18	Where required, a heritage impact assessment (HIA) will be undertaken in compliance with Section 38(1) to 38(4) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) as well as any Minimum Standards or Guidelines published in relation to Section 38(3) .	A HIA has been undertaken by the specialist.
19	The HIA must be submitted to the South African Heritage Resources Agency and applicable Provincial Heritage Authorities for decision making procedures.	The HIA report will submitted to the South African Heritage Resources Agency and applicable Provincial Heritage Authorities for decision making procedures.
20	The applicable recommendations or requirements from the South African Heritage Resources Agency and applicable Provincial Heritage Authorities must be documented in the final environmental sensitivity report.	The applicable recommendations from these authorities are to be documented in the final environmental sensitivity report.

Table 4. Confirming Statement by specialist

No.	Requirement	Comment
51	A description of the affected environment in terms of heritage resources and palaeontology, and an indication of existing heritage and palaeontological impacts within the preliminary corridor based on the site verification inspection and walk through.	The heritage environment is described in Section 5 of the HIA and existing impacts are considered in Section 6.6.
52	Identification of heritage resources and palaeontological areas to be avoided within the preliminary corridor, including buffers;	Addressed in specialist report (see Appendix 3)
53	A heritage sensitivity map overlaid with the proposed development footprint (i.e. pylon placement and power line route, as well as supporting infrastructure) based on most recently obtainable and available desktop data, such as the information on the screening tool and the South African Heritage Resources Information System, site verification inspection and walk through (where necessary);	Addressed in specialist report (see Appendix 3)
54	Where required, a written comment or letter of no objection from the South African Heritage Resources Agency and/or applicable provincial heritage authority confirming that there is no unacceptable impact on heritage resources and palaeontology;	SAHRA comment to come.
55	Confirmation that any recommendations as required by the South African Heritage Resources Agency and/or applicable provincial heritage authority have been incorporated and considered;	To be completed after receipt of SAHRA comment.
56	A description on how the identified environmental sensitivity pertaining to heritage resources and palaeontology has been considered in determining the proposed route;	All heritage resources have been avoided. The grassland areas I general are of very low sensitivity and no further resources are expected to occur in the proposed footprint.
57	A description of the implementation of the mitigation hierarchy in order to determine the proposed route and/or substation location;	See Table 1
58	How the inputs of I&APs were considered when determining the final pre-negotiated route and/or substation location; and	To be updated post Public Participation Process.
59	A statement confirming that: a. impact management actions as contained in the pre-approved Generic EMPr template are sufficient for the avoidance, management and mitigation of impacts and risks; or b. where required, specific impact management outcomes and actions are required and have been provided as part of the site specific EMPr.	Because all significant heritage resources have been avoided, the impact management actions in the generic EMPr for substations and powerlines are considered appropriate and suitable for this project.

CONCLUDING STATEMENT

The proposed project, in the location specified and assessed in the report, is supported.

Should you have any queries, feel free to contact the undersigned.

Yours sincerely



Jayson Orton
22 August 2022

SPECIALIST DETAILS –

Table 5. Specialist Details

No.	Requirement	Comment
1	Contact Information	See Appendix 1
2	Relevant qualifications	See Appendix 1
3	Curriculum vitae	See Appendix 1
4	Description of expertise in preparing the statement;	Dr Orton has been a professional heritage consultant since 2004 with experience across the western half of South Africa. He has conducted assessments for a large number of renewable energy facilities and associated electrical infrastructure. See report Section 1.4 and CV in Appendix 1.

APPENDIX 1 – SPECIALIST DECLARATION TEMPLATE

APPENDIX D - SPECIALIST DECLARATION TEMPLATE

Specialist Company Name:	ASHA Consulting (Pty) Ltd		
Specialist name:	Dr Jayson Orton		
Specialist Qualifications:	D.Phil (Archaeology, Oxford, UK) MA (Archaeology, UCT)		
Professional affiliation/registration ³²	ASAPA CRM member No. 233 APHP member No. 043		
Physical address:	23 Dover Road, Muizenberg, 7945		
Postal address:	23 Dover Road, Muizenberg		
Postal code:	7945	Cell:	083 272 3225
Telephone:	021 788 1025	Fax:	n/a
Email:	jayson@asha-consulting.co.za		

DECLARATION BY THE SPECIALIST

I, JAYSON ORTON, declare that –

- I act as the independent specialist in this Standard registration process;
- I have performed the work relating to the specialist assessment and/or route or substation location confirmation in an objective manner;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist input and confirming statement relevant to this request for registration, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, 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 proponent all material information in my possession that reasonably has or may have the potential of influencing compliance with the Standards registration process; and
- all the particulars furnished by me in this form are true and correct.

Signature of the Specialist:



Name of Company:

ASHA CONSULTING (PTY) LTD

Date:

22 AUGUST 2022

³² A copy of the most recent registration certificate must be appended to this declaration

APPENDIX 2 – SPECIALIST CV (SHORT)



Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 23 Dover Road, Muizenberg, 7945
Telephone: (021) 788 1025
Cell Phone: 083 272 3225
Email: jayson@asha-consulting.co.za

Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English, Afrikaans, basic French

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science)	1997
University of Cape Town	B.A. (Honours) (Archaeology) [First Class]	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

- Association of Southern African Professional Archaeologists (ASAPA) membership number: 233
- ASAPA CRM Section member with the following accreditation:
 - Principal Investigator: Coastal shell middens (awarded 2007)
Stone Age archaeology (awarded 2007)
Grave relocation (awarded 2014)
 - Field Director: Rock art (awarded 2007)
Colonial period archaeology (awarded 2007)
- Association of Professional Heritage Practitioners (APHP) membership number: 43
 - Accredited Professional Heritage Practitioner

Memberships and affiliations:

- South African Archaeological Society Council member 2004 – 2016
- Assoc. Southern African Professional Archaeologists (ASAPA) member 2006 –
- UCT Department of Archaeology Research Associate 2013 – 2017
- Heritage Western Cape APM Committee member 2013 –
- UNISA Department of Archaeology and Anthropology Research Fellow 2014 –
- Fish Hoek Valley Historical Association 2014 –
- Kalk Bay Historical Association 2016 –
- Association of Professional Heritage Practitioners member 2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
 - Notification of Intent to Develop applications
 - Heritage Impact Assessments
 - Self-standing assessments under Section 38(1) of the NHRA
 - Assessments under NEMA and Section 38(8) of the NHRA
 - Archaeological specialist studies
 - Strategic assessments
 - Phase 1 archaeological test excavations in historical and prehistoric sites
 - Archaeological research projects

- Development types
 - Mining and borrow pits
 - Roads (new and upgrades)
 - Residential, commercial and industrial development
 - Agricultural developments
 - Dams and pipe lines
 - Power lines and substations
 - Renewable energy facilities (wind, solar and hydro-electric)

Phase 2 mitigation and research excavations:

- ESA open sites
 - Duinefontein, Gouda, Namaqualand
- MSA rock shelters
 - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
 - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
 - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
 - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
 - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
 - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
 - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
 - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

Awards:

1998: Frank Schweitzer memorial book prize for an outstanding student.

2015/2016: Western Cape Government Cultural Affairs Awards: Best Heritage Project.



Association of Professional Heritage Practitioners

MEMBERSHIP CERTIFICATE

THIS CERTIFIES THAT

Dr. Jayson Orton

MEMBERSHIP NUMBER: 0043

has been awarded membership as a

PROFESSIONAL HERITAGE PRACTITIONER (PHP)

This membership is subject to the *Standards for Membership and Code of Conduct*, referred to in Sections 2 and 3 of the APHP Constitution respectively. The definition of a PHP may be found at: www.aphp.org.za/membership

Please contact us via info@aphp.org.za should further information be required.

THIS CERTIFICATE IS VALID FROM 1 JUNE 2022 – 1 JULY 2023

CHAIRPERSON

[Issued by the Association of Professional Heritage Practitioners Executive Committee]
Image Source: Photographer G McLachlan at central Kouga Mountains

Association of Professional Heritage Practitioners
info@aphp.org.za
www.aphp.org.za

<< archaeologists

THE ASSOCIATION OF SOUTHERN AFRICAN PROFESSIONAL ARCHAEOLOGISTS



Dr Jayson Orton

CRM

233

Accredited professional archaeologist for the SADC region

Further CRM accreditation

Level	Specialist areas
Principal Investigator	Coastal shell middens, Stone Age archaeology
Field Director	Rock art, Colonial period archaeology, Grave relocation

This card is subject to the conditions stated to the card holder. The card remains the property of ASAPA and must be surrendered on request. If found please return to: ASAPA, P.O. Box 172, Wals, 2010, RSA.

ASHA Consulting (Pty) Ltd

Reg. no.: 2013/220482/07 | Directors: Jayson Orton & Carol Orton

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**HERITAGE IMPACT ASSESSMENT:
PROPOSED DEVELOPMENT OF COLLECTOR SUBSTATION B
WITHIN THE PROPOSED SPRINGHAAS GRID CONNECTION CORRIDOR
NEAR DEALESVILLE IN THE FREE STATE PROVINCE**

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999)
as part of a Heritage Impact Assessment.

SAHRA Case No: XX

Report for:

GIBB Environmental (Pty) Ltd
P.O. Box 63703, Greenacres, 6057
Email: kflood@gibbenvironmental.co.za

On behalf of:

ABO Wind renewable energies (Pty) Ltd



Dr Jayson Orton
ASHA Consulting (Pty) Ltd
23 Dover Road, Muizenberg, 7945
Tel: (021) 788 1025 | 083 272 3225
Email: jayson@asha-consulting.co.za

1st draft: 11 June 2022
Final report: 20 June 2022

SUMMARY

ASHA Consulting (Pty) Ltd was appointed by ABO Wind renewable energies (Pty) Ltd to assess the potential impacts to heritage resources that might occur through the proposed development of Collector Substation B to be located to the southwest of Dealesville, Free State. A centre point for the study area is at S28° 47' 37.2" E25° 41' 54.4". The project is to be known as Collector Substation B. A corridor was considered for the project, although a specific footprint has been assessed.

The site was subjected to a survey prior to the development of the facility layouts. The survey revealed few Stone Age resources with these generally being likely Middle and Later Stone Age scatters, largely with pans (all located outside the corridor within which the proposed development is located). Most finds consisted of historical archaeological resources in various states of demolition and/or degradation with one historical farmstead occurring along the southern edge of the corridor and an earthen dam overlapping the edge of the corridor in the southwest. A number of graves were also encountered in small informal graveyards but all are outside the corridor. No finds occurred within the proposed footprint. The landscape is of limited concern due to the other electrical infrastructure already occurring as well as the several solar facilities due for construction in the near future.

It is recommended that the proposed Collector Substation B should be authorised but subject to the conditions shown below.

- No materials may be removed from any of the ruined and/or demolished structures anywhere in the wider study area;
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

Glossary

Background scatter: Artefacts whose spatial position is conditioned more by natural forces than by human agency.

Handaxe: A bifacially flaked, pointed stone tool type typical of the Early Stone Age Acheulian Industry. It is also referred to as a large cutting tool.

Holocene: The geological period spanning the last approximately 10-12 000 years.

Hominid: a group consisting of all modern and extinct great apes (i.e. gorillas, chimpanzees, orangutans and humans) and their ancestors.

Later Stone Age: Period of the Stone Age extending over the last approximately 20 000 years.

Middle Stone Age: Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

Pleistocene: The geological period beginning approximately 2.5 million years ago and preceding the Holocene.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

BESS: Battery Energy Storage System

CRM: Cultural Resources Management

DFFE: Department of Forestry, Fisheries and the Environment

EA: Environmental Authorisation

EGI: Electricity Grid Infrastructure

GP: General Protection

GPS: global positioning system

HIA: Heritage Impact Assessment

HV: High Voltage

LiLo: Loop In-Loop Out

LSA: Later Stone Age

MSA: Middle Stone Age

NEMA: National Environmental Management Act (No. 107 of 1998)

NHRA: National Heritage Resources Act (No. 25) of 1999

REDZ: Renewable Energy Development Zone

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

Contents

SUMMARY	ii
Glossary	iii
Abbreviations	iii
1. INTRODUCTION	1
1.1. The proposed project.....	2
1.1.1. Project description.....	2
1.1.2. Identification of alternatives.....	6
1.1.3. Aspects of the project relevant to the heritage study.....	6
1.2. Terms of reference.....	6
1.3. Scope and purpose of the report.....	6
1.4. The author.....	6
1.5. Declaration of independence.....	7
2. LEGISLATIVE CONTEXT	7
2.1. National Heritage Resources Act (NHRA) No. 25 of 1999.....	7
3. METHODS	9
3.1. Literature survey and information sources.....	9
3.2. Field survey.....	9
3.3. Specialist studies.....	10
3.4. Impact assessment.....	10
3.5. Grading.....	11
3.6. Consultation.....	11
3.7. Assumptions and limitations.....	11
4. PHYSICAL ENVIRONMENTAL CONTEXT	11
4.1. Site context.....	11
4.2. Site description.....	12
5. FINDINGS OF THE HERITAGE STUDY	16
5.1. Palaeontology.....	16
5.2. Archaeology.....	17
5.2.1. Desktop study.....	17
5.2.2. Site visit.....	18
5.3. Graves.....	22
5.4. Historical aspects and the Built environment.....	22
5.4.1. Desktop study.....	22
5.4.2. Site visit.....	23
5.5. Cultural landscapes and scenic routes.....	23
5.6. Statement of significance and provisional grading.....	25
5.7. Summary of heritage indicators.....	26
6. ASSESSMENT OF IMPACTS	26
6.1. Construction Phase.....	26
6.1.1. Impacts to the cultural landscape.....	26
6.2. Operation Phase.....	28

6.2.1. Impacts to the cultural landscape.....	28
6.3. Decommissioning Phase.....	29
6.3.1. Impacts to the cultural landscape.....	29
6.4. Cumulative impacts.....	30
6.5. Evaluation of impacts relative to sustainable social and economic benefits	33
6.6. Existing impacts to heritage resources	33
6.7. The No-Go alternative.....	34
6.8. Levels of acceptable change	35
7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM	35
8. CONCLUSIONS	36
8.1. Reasoned opinion of the specialist	36
9. RECOMMENDATIONS	36
10. REFERENCES.....	37
APPENDIX 1 – Curriculum Vitae.....	40
APPENDIX 2 – List of heritage resources	42
APPENDIX 3 – Mapping	51
APPENDIX 4 – Site Sensitivity Verification.....	54
APPENDIX 5 – Compliance with Appendix 6 of the 2014 EIA Regulations	56

1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by the ABO Wind renewable energies (the Applicant) to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of a substation to be known as Collector Substation B on Alsace 1181 and Oertel's Rest 1184 to the southwest of Dealesville, Free State (Figures 1 to 3). A new section of access roads measuring approximately 75m in length and up to 6m wide will be required to Collector Substation B. This access road is located on Farm Oertel's Rest. The project would form part of the grid connection solution for seven solar energy facilities already assessed elsewhere. A centre point for the study area is at S28° 47' 37.2" E25° 41' 54.4".

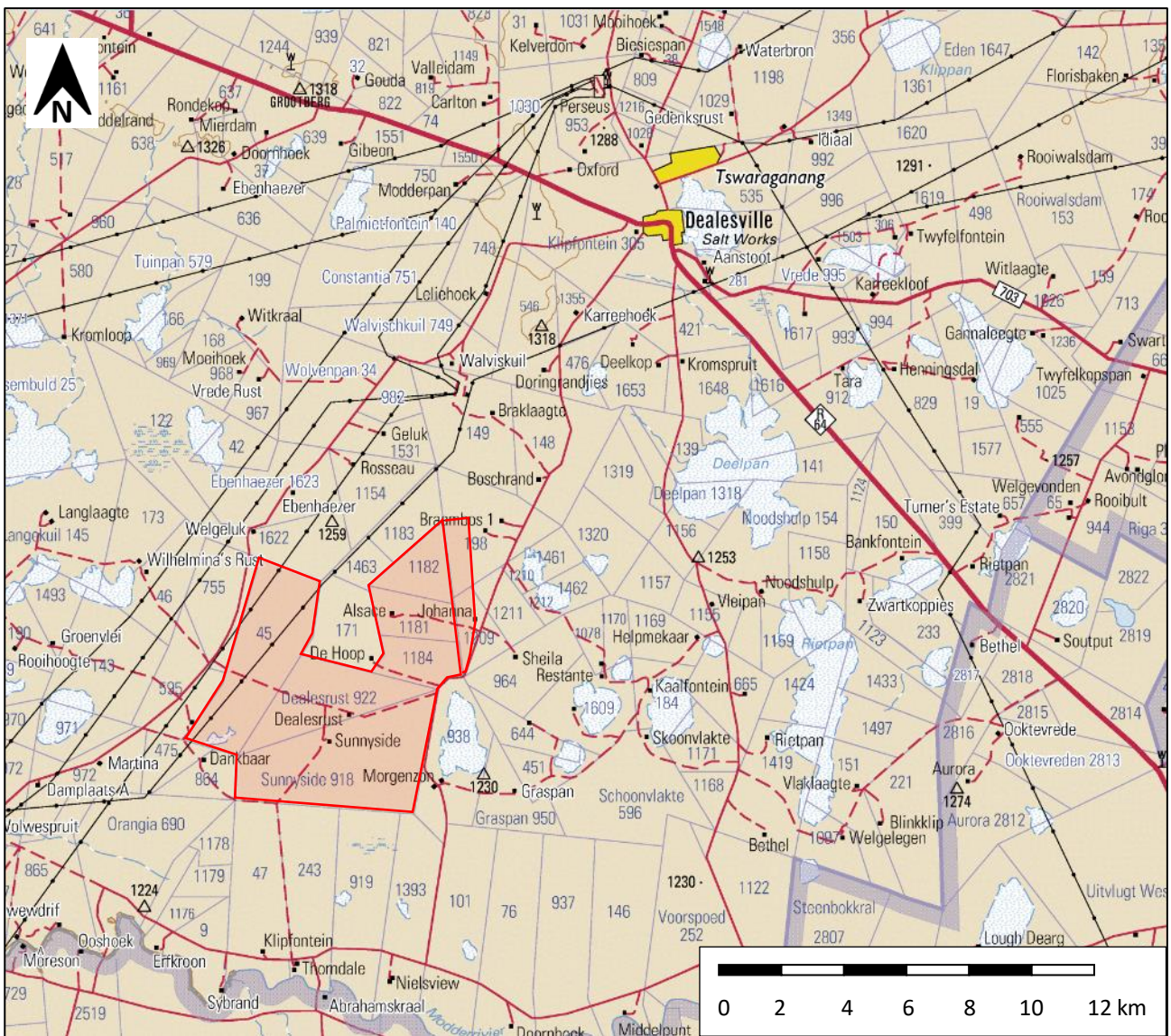


Figure 1: Extract from 1:250 000 topographic map 2824 showing the location of the broader study area (red shaded polygon) relative to Dealesville and the R64 in the northeast and the Modder River along the southern edge of the map. Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.

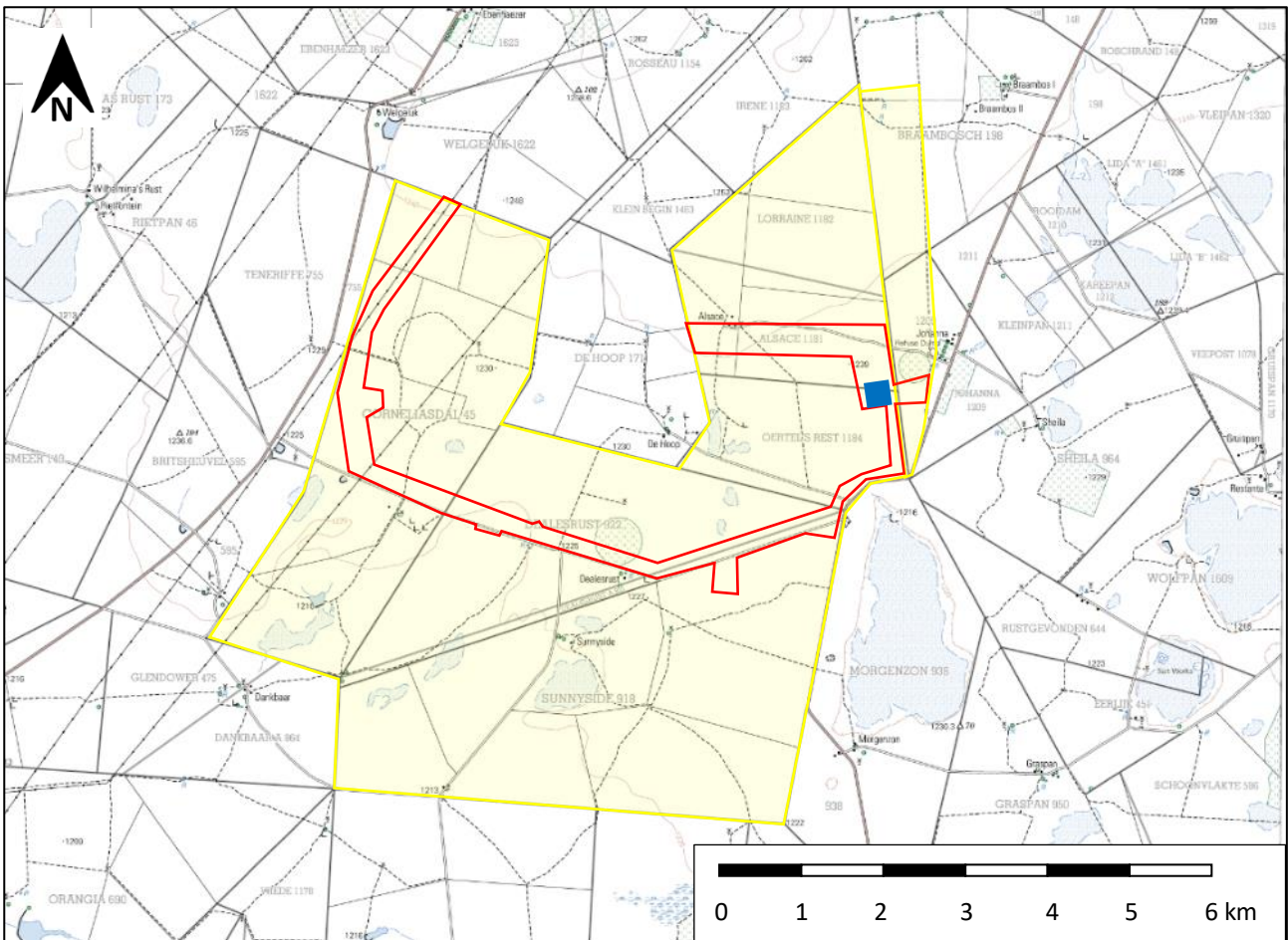


Figure 2: Extract from 1:50 000 topographic map 2825FC showing the location of the affected properties. The PV area is in yellow, the grid connection corridor in red and Collector Substation B (assessed in this report) in blue. Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.

1.1. The proposed project

1.1.1. Project description

ABO Wind renewable energies (Pty) Ltd proposes the construction and operation of a grid connection to connect the Springhaas solar PV facilities located south-west of Dealesville in the Free State Province to add new capacity to the national electricity grid. In order for the Springhaas Solar PV facilities to evacuate the generated solar power to the national grid, a connection must be established between the solar PV facilities and the existing Eskom 400kV lines, namely the Beta/Delphi and Beta/Hydra lines located to the east and west of the solar PV facilities respectively.

The project is known as the Springhaas Grid Connection and would include development of the following components, each of which would require a separate Environmental Authorisation (EA) and is assessed in separate reports:

- 1) Up to two Collector sub-stations/switching stations and associated auxiliary buildings (i.e. for control/storage/electrical infrastructure/components) with a development footprint of up to 8Ha for the collector station (this includes the auxiliary buildings), including but not limited to the construction of a new platform with an earth mat and civil works, as well as

- new infrastructure such as feeder bay/s, line bay/s, busbar/s, circuit breaker/s, bussection/s, and/or transformer/s, with various protection equipment. [Table 1; TWO EAs]
- 2) Up to seven overhead lines connecting the Springhaas Solar PV Facilities to the collector/switching/transformation sub-stations, via single/double-circuit up to 275kV, mono pole lines, complete with structures, foundations, conductor, fibre layout, insulation, and assemblies. [Table 2; SEVEN EAs]
 - 3) Up to two LiLo connections into the existing Eskom 400kV line, via a single/double-circuit power line of up to 400kV between the collector/switching/transformation substation/s and the Eskom 400kV line, complete with structures, foundations, conductor, fibre layout, insulation, and assemblies. [Table 3; TWO EAs]

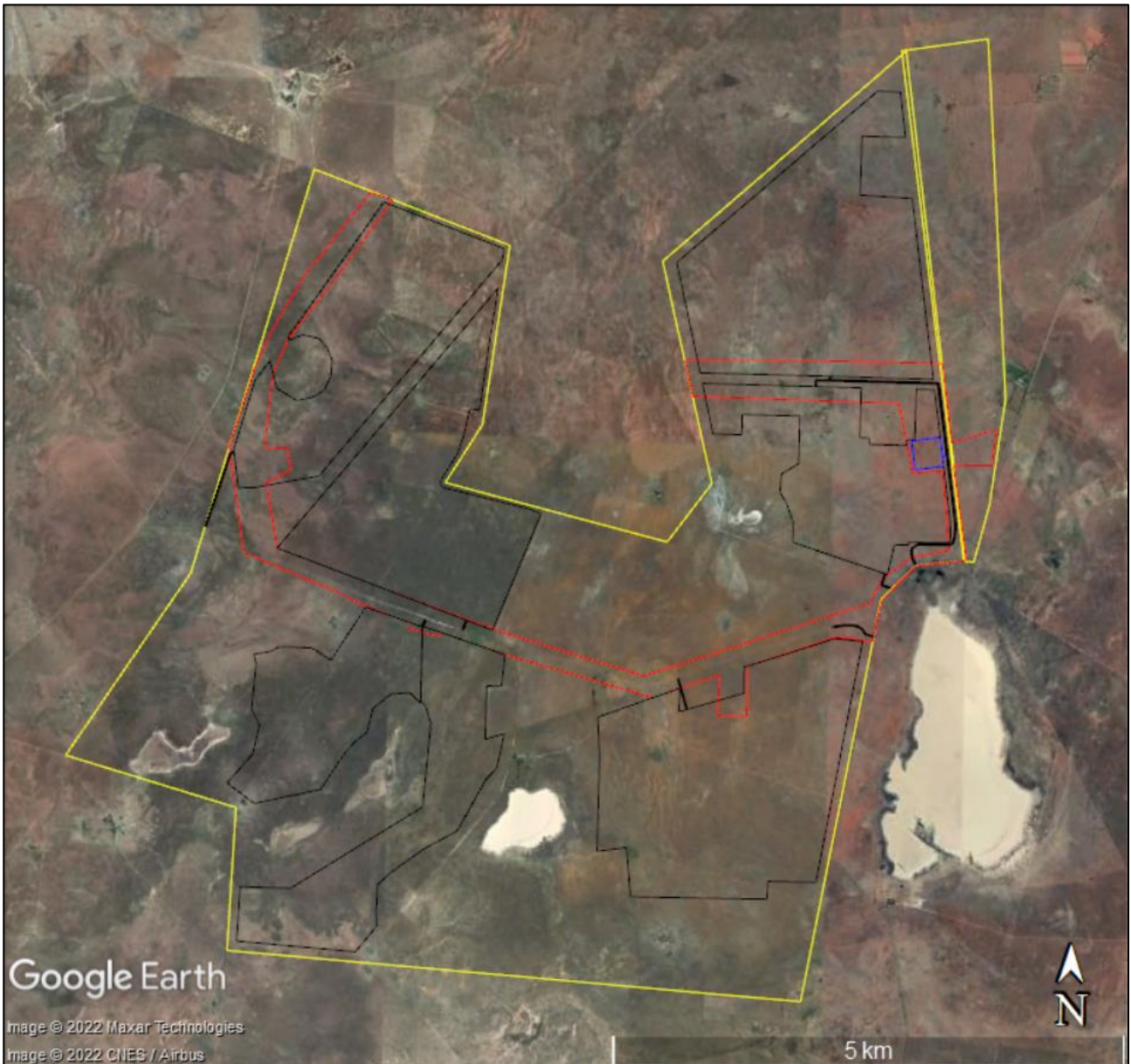


Figure 3: Aerial view of the study area showing the broader study area (yellow polygons), the PV locations and their access roads (black) and the proposed grid connection corridor (red). Collector B (assessed in this report) is shown in blue.

Table 1: Details of Collector/Switching Stations (each to receive separate decision). The blue highlighted one is assessed in the present report.

Name	Location	Connection	Capacity	Footprint	Height
Springhaas Collector/switching / transformation substation A (and auxiliary buildings)	western edge of Farm Corneliasdal No. 45	Will collect multiple up to 275 kV overhead lines (located within the grid corridor), potentially step-up to 400 kV (if required), consolidated overhead lines would leave the collector sub-station for connection to the existing Eskom 400 kV lines.	Up to 400 kV	Up to 8 Ha (this includes Aux buildings)	Up to 10 m
Springhaas Collector/switching / transformation substation B (and auxiliary buildings)	eastern edge of Farm Alsace No. 1181				

Access
Access: Each sub-station would be accessed by an up to 6m wide access road. Access Road details: Collector/switching/transformation sub-station A- via the access roads for Springhaas Solar Facility 8 (which is included in the facility Basic Assessment scope)
Collector/switching/transformation sub-station B- via the main access road for Springhaas Solar Facilities 1 and 3 (noting that this is within the facility Basic Assessment scope), with an additional road of up to 6m wide and 75m long required extending from the facilities main access road to the sub-station.

Table 2: Details of Overhead Lines to Collector Stations (each to receive separate decision)

Power Line Route Description	Capacity	Length	Type of Line*
Line 1: Springhaas Solar Facility 1 to Springhaas Collector/switching/transformation sub-station B	Up to 275 kV	Up to 1.8km	Overhead Line
Line 2: Springhaas Solar Facility 3 to Springhaas Collector/switching/transformation sub-station B	Up to 275 kV	Up to 1.7km	Overhead Line
Line 3: Springhaas Solar Facility 4 to Springhaas Collector/switching/transformation sub-station A	Up to 275 kV	Up to 3km	Overhead Line
Line 4: Springhaas Solar Facility 5 to Springhaas Collector/switching/transformation sub-station A	Up to 275 kV	Up to 2.5km	Overhead Line
Line 5: Springhaas Solar Facility 6 to Springhaas Collector/switching/transformation sub-station B	Up to 275 kV	Up to 3.8km	Overhead Line
Line 6: Springhaas Solar Facility 8 to Springhaas Collector/switching/transformation sub-station A	Up to 275 kV	Up to 0.3km	Overhead Line
Line 7: Springhaas Solar Facility 9 to Springhaas Collector/switching/transformation sub-station A	Up to 275 kV	Up to 2.6km	Overhead Line
<p>The following specifications apply to all seven proposed lines:</p> <ul style="list-style-type: none"> Foundation: The type of terrain will determine the choice of foundation. The size of the footprint area will range from 0.6m x 0.6m to 1.5m x 1.5m. The minimum working area required around a structure pylon position is 20 m x 20 m. Pylon/Tower: up to 275 kV steel monopole or lattice towers. 			

- Tower type: Self-supporting and/or Angle strain towers.
- Height: up to 40 m.
- Span length: minimum 200m up to 375 m.
- Servitude width: up to 47m (i.e., 23.5 m on either side of the power line). Note: wider corridor for all the power lines listed above will be assessed, in order to identify sensitivities and features that need to be avoided.
- Service Road: There would be a jeep track (up to 4m wide) within the development footprint/ servitude of the line (underneath the line), where possible.

Table 3: Details of Grid Connections (each to receive separate decision).

Components	Specifications	Location
LiLo 1: LiLo into Beta/Hydra 400kV overhead line	<p>Type: Overhead Line</p> <p>Connection: Loop in-Loop out (LiLo) connection to existing Eskom 400kV overhead Line</p> <p>Capacity: up to 400 kV</p> <p>Length: up to 1.5km</p> <p>Height: up to approx. 60m</p> <p>Servitude width: up to 55m</p> <p>Tower Spacing/span length: 300m up to 400m</p> <p>Service Road: There would be a jeep track (up to 4m wide) within the development footprint/ servitude of the line (underneath the line), i.e., a centre line track, where possible.</p>	Western half of Farm Corneliasdal No. 45
LiLo 2: LiLo into Beta/Delphi 400kV overhead line	<p>Type: Overhead Line</p> <p>Connection: Loop in-Loop out (LiLo) connection to existing Eskom 400kV overhead Line</p> <p>Capacity: up to 400 kV</p> <p>Length: up to 80m</p> <p>Height: up to approx. 60m</p> <p>Servitude width: up to 55m</p> <p>Tower Spacing/span length: 300m up to 400m</p> <p>Service Road: There would be a jeep track (up to 4m wide) within the development footprint/ servitude of the line (underneath the line), i.e., a centre line track, where possible.</p>	<p>Southern area of Farm Johanna No. 1209</p> <p>Two Collector and LiLo alternatives to be assessed for the eastern connection, namely the Collector B (preferred) and the Alternative Eastern Collector and LiLo alternative.</p>

Each of the above eleven components is assessed within a grid connection corridor ranging from approximately 100 m to approximately 575 m wide and 16 km in length. The assessment of a corridor allows for the optimisation of the grid connection infrastructure to accommodate and avoid any environmental sensitivities identified through the assessment, noting, however, that the corridor itself has been intentionally located to avoid environmentally sensitive areas as far as

possible and to rather locate the corridor in previously disturbed areas. The entire extent of the grid connection corridor is within the Kimberley Renewable Energy Development Zone (REDZ) as well as within the Central Electricity Grid Infrastructure (EGI) Corridor.

1.1.2. Identification of alternatives

The only alternative being considered is the no-go alternative. It is noted that the location of the project is based on the environmental sensitivities generated during the assessment of the broader study area.

1.1.3. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant, since excavations for foundations and/or services may impact on archaeological and/or palaeontological remains, while all above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

1.2. Terms of reference

ASHA Consulting was asked to conduct a field survey of the broader study area and to provide sensitivity data that could guide the development of layouts for the seven proposed powerlines, the two collector substations and the two LiLo connections. The survey was to consider all relevant aspects of heritage.

Eleven heritage impact assessment (HIA) reports were to be compiled, one assessing the potential impacts of each of the eleven proposed projects.

ASHA was also asked to subcontract a palaeontological specialist to provide a separate palaeontological assessment.

1.3. Scope and purpose of the report

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued by them for consideration by the National Department of Forestry, Fisheries and Environment (DFFE) who will review the Basic Assessment (BA) and grant or refuse authorisation. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

1.4. The author

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting Heritage Impact Assessments and archaeological specialist studies in South Africa (primarily in the Western Cape and Northern Cape provinces) since 2004 (please see curriculum vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is an accredited heritage

practitioner with the Association of Professional Heritage Practitioners (APHP; Member #43) and also holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

1.5. Declaration of independence

ASHA Consulting (Pty) Ltd and its consultants have no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

2. LEGISLATIVE CONTEXT

2.1. National Heritage Resources Act (NHRA) No. 25 of 1999

The NHRA protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: “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”;
- Palaeontological material: “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”;
- Archaeological material: a) “material 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”; b) “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, including any area within 10m of such representation”; c) “wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation”; and d) “features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found”;
- Grave: “means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place”; and

- Public monuments and memorials: “all monuments and memorials a) “erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government”; or b) “which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual.”

Section 3(3) describes the types of cultural significance that a place or object might have in order to be considered part of the national estate. These are as follows:

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

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. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to a BA. The present report provides the heritage component. Free State Heritage Resources Authority (FSHRA; for built environment and cultural landscapes) and the South African Heritage Resources Agency (SAHRA; for archaeology and palaeontology) are required to provide comment on the proposed projects in order to facilitate final decision making by the DFFE.

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources used in this report are presented in Table 4. Data were also collected via a field survey. The data used is deemed of suitable quality to provide meaningful input into the study.

Table 4: 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
Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
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. Refer to Section 10 for further details
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, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage. Refer to Section 10 for further details

3.2. Field survey

The overall site for both the present project as well as the previously assessed PV facilities was subjected to a detailed foot survey on 3 to 7 October 2021. This was during spring and before the summer rains had set in which meant that ground visibility for the archaeological survey was slightly

better than in summer when the grass gets denser. Parts of the area had recently burned which also offered improved visibility. Other heritage resources are not affected by seasonality. During the survey the positions of finds and survey tracks were recorded on a hand-held Garmin Global Positioning System (GPS) receiver set to the WGS84 datum (Figure 4). Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.



Figure 4: Aerial view of the study area (key as per Figure 3) showing the survey tracks (light blue lines).

It should be noted that amount of time between the dates of the field inspection and final report do not materially affect the outcome of the report.

3.3. Specialist studies

A separate palaeontological specialist study was commissioned. The palaeontological report is submitted separately but should be read in tandem with the present report.

3.4. Impact assessment

For consistency among specialist studies, the impact assessment was conducted through application of a scale supplied by GIBB Environmental.

3.5. Grading

S.7(1) of the NHRA provides for the grading of heritage resources into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade I and II resources are intended to be managed by the national and provincial heritage resources authorities respectively, while Grade III resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended under S.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. SAHRA (2007) has formulated its own system¹ for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action).

3.6. Consultation

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of an EIA which includes a public participation process (PPP), no dedicated consultation was undertaken as part of the HIA. Interested and affected parties would have the opportunity to provide comment on the heritage aspects of the project during the PPP. The basic assessment report and HIA will be made available for a period of 30 days for interested and affected parties to review and provide comment on. Any comments received related to the HIA will be included in the final HIA.

3.7. Assumptions and limitations

The field study was carried out at the surface only and hence any completely buried archaeological sites would not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. The site is very large and coverage is low, although it is assumed that all the main heritage features will have been located and recorded. There is, however, always the chance that other finds will be made later such as the graves reported by the environmental consultant after the heritage survey. Nonetheless, the level of confidence in the findings remains high.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The site lies in a rural context dominated by the raising of livestock. Farm complexes and their associated tree clusters occur sporadically in the landscape, and local roads south of the R64 are all gravel. Electrical infrastructure is abundant and consists of many high voltage (HV) powerlines and

¹ The system is intended for use on archaeological and palaeontological sites only.

two large substations. Beta Substation is located 4.5 km north of the study area, while Perseus is 14 km to the north. Two HV lines cross the western part of the study area and another runs past its eastern edge (Figure 5).



Figure 5: Existing HV lines (green) in the vicinity of the broader study area (yellow) and grid connection corridor (red).

4.2. Site description

The wider site is generally flat and coated in grass (although part of it had burnt prior to the site visit). Trees are largely absent from the area but dense clusters do occur at the farm complexes, one of which lies along the southern edge of the corridor. Areas of water ponding were observed with some of these looking like semi-permanent wetland areas. Rock outcrops are minimal with occasional patches of ephemeral dolerite gravel visible at the surface and just one low dolerite ridge being present (just south of the western part of the corridor). Several pans occur in the southern part of the broader study area and a number of natural swales occur but have been avoided by the corridor. The swales and some pans had grassed bases, while other pans had mud bases. Figures 6 to 13 show a selection of views within the overall grid connection corridor.



Figure 6: View towards the east in the north-western part of the corridor.



Figure 7: View towards the east from the south-western part of the corridor.



Figure 8: View towards the north through the southern part of the grid corridor.



Figure 9: View towards the east through the southern part of the corridor showing the only trees within it. They lie alongside an old farm complex



Figure 10: View towards the east through the south-eastern part of the corridor.



Figure 11: View towards the northwest from the road adjacent to the south-eastern edge of the corridor.



Figure 12: View towards the north along the eastern edge of the corridor through the grid connection area that falls outside of the broader study area.



Figure 13: View towards the east through the north-eastern part of the corridor.

5. FINDINGS OF THE HERITAGE STUDY

This section describes and illustrates a selection of the heritage resources recorded in the broader study area during the course of the project. Appendix 2 lists and describes all resources and they are mapped in Appendix 3.

5.1. Palaeontology

The SAHRIS PalaeoSensitivity map shows the site to be largely of high palaeontological sensitivity (Figure 14). This sensitivity is likely linked to the calcrete that underlies the surface over much of the study area. No fossils were seen on site and it is unlikely that any would be visible at the surface in this environment. A desktop palaeontological study has been undertaken to determine what measures may need to be incorporated into the Environmental Management Program (EMPr) for the project. Palaeontology will not affect the feasibility or layout of the project.

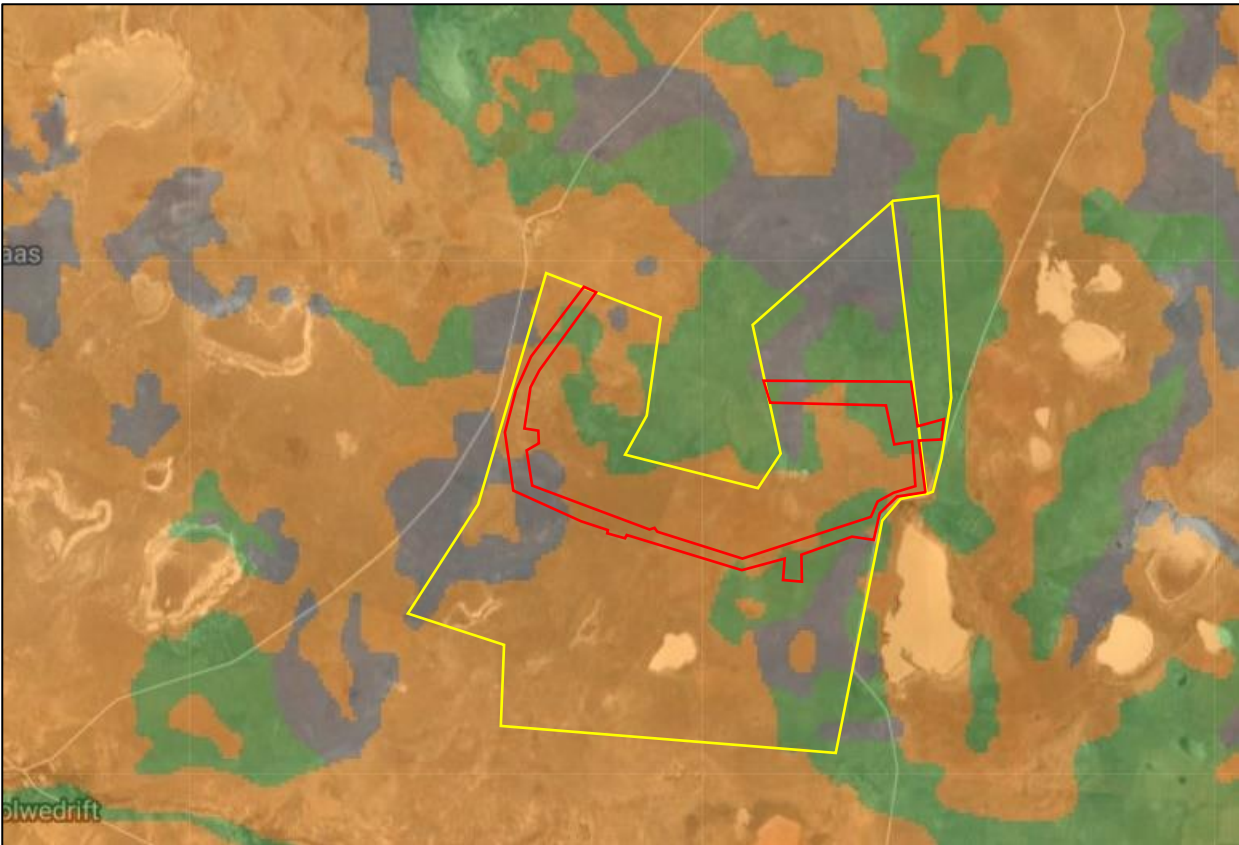


Figure 14: Extract from the SAHRIS PalaeoSensitivity map showing the broader study area (yellow polygons) and proposed grid connection corridor (red polygon) to be of variably zero (grey), moderate (green) and high (orange) sensitivity (source: <https://sahris.sahra.org.za/map/palaeo>).

5.2. Archaeology

5.2.1. Desktop study

Stone Age material occurs widely across southern Africa, while the Iron Age, which only occurred within the last 2000 years, is present only in the eastern parts where summer rainfall allowed for the cultivation of summer crops. Stone-walled settlements dating to the Iron Age have been widely documented in parts of the Free State and adjacent Northern Cape (Maggs 1976a, 1976b) but, from the many Cultural Resources Management (CRM) surveys in the area, the Iron Age appears to be absent from the vicinity of Dealesville. Later Stone Age stone-built dwellings are known from along the Riet River about 100 km to the southwest (Humphreys 1972, 2009). With the exception of the rich Middle Stone Age (MSA) deposits of Florisbad (36 km east of the present study area; Kuman *et al.* 1999) and the MSA and Later Stone Age (LSA) stone artefact assemblages from Erfkroon (along the Modder River some 4.5 km south of the study area, Churchill *et al.* 2000), significant archaeological resources appear to be quite rare in this flat, open and well-grassed landscape. Archaeological material is, however, more common along the major rivers where artefacts are revealed in the river terrace gravels (e.g. Erfkroon).

Webley (2010) surveyed an area to the east of the present development area and reported a complete absence of archaeological material. She further noted that stone suitable for the manufacture of flaked tools was not present and that the quantity of other rock available on the surface was insufficient to allow for the construction of stone dwellings. Hutten's (2011) survey of

land to the north of Boshof showed similar results but in that case a pan was present with a large scatter of MSA and LSA artefacts present alongside it. The same applied to a survey close to the R64 to the north of the present study area where many thousands of artefacts were found adjacent to a pan (Orton 2016a). This demonstrates the preference to settle close to water sources that is prevalent across much of the relatively dry interior of southern Africa. Orton's (2015) survey of large areas to the north of the present development area showed heritage resources to be quite common. They included built structures, artefact scatters and a number of rock engravings. The vast majority of resources were located in close proximity to the rock outcrop areas closer to Dealesville, while further south into the grasslands (and towards the present study area) the archaeology dropped off significantly. The majority of artefacts located by Orton (2015) were attributable to Pleistocene-aged MSA background scatter and were associated with gravel exposures. They did not constitute *in situ* living sites. However, some artefacts dating to the Holocene LSA were also noted. Just north of the R64, Orton (2021) located a scatter of artefacts that appeared to be from the early part of the MSA since it included several small handaxes. This early part of the MSA is often referred to as the 'Fauresmith' period, and is generally thought to be characterised by small handaxes (Underhill 2011). The site lay at the edge of a wide, low dolerite hill. Even further north, Kaplan (2020, 2021) also found artefacts ascribable to the MSA, with higher densities being present alongside pans.

Rock engravings occur widely in the interior of South Africa where suitable rock exists. Many sites are located in the Free State with the National Museum, Bloemfontein (2014) listing numerous examples that may be visited by the public. However, no sites seemed to be on record for the Dealesville area prior to Orton's (2015; see also Orton 2016b) survey. He located engravings dating within the last 2000 years and attributable by their geometric style to the Khoekhoe as well as figurative engravings done by the San. The former were found on a small dolerite hill 11.5 km north of the present study area where flaked stone artefacts and ground patches on the dolerite were also recorded. Dolerite rocks with shallow grinding grooves and ground cupules have also been recorded in the area (Orton 2016a, 2016b).

The remains of a historical stone-walled kraal also occur alongside the engraved outcrop described above (Orton 2015). Another stone-walled kraal and house ruin were recorded by Orton (2016a, b) close to the R64, while Kaplan (2020) found historical stone-walled ruins further to the north.

5.2.2. Site visit

A brief synopsis of the archaeology seen in the broader study area is presented with some of those from within the corridor illustrated. A full list of resources within the broader study area is presented in Appendix 2. Their locations are mapped in Appendix 3.

Stone artefacts were seen in a number of places across the broader study area but these were almost all associated with water sources. Some artefacts (especially those with more patina) are likely to be from the MSA, while others are from the LSA. Few fresh, black hornfels artefacts were seen which is somewhat surprising. No stone artefacts were seen within the corridor. The only other Stone Age resources seen were some dolerite rocks with evidence of grinding and two ephemeral clearings in rocky areas. All of these were on the dolerite ridge to the southwest of the corridor.

More commonly encountered were historical archaeological sites. Surprisingly, artefacts were almost entirely absent from these sites. A number of ephemeral remains of older structures were also seen. These varied in nature but all would have related to the earlier farm complexes of the

area. Most are likely 19th century in age, but it is possible that some might be from the early 20th century.

A number of water reservoirs were seen. These are hollows in the ground that have been lined with rocks, and presumably also clay which has now weathered away. Some of these reservoirs had defunct wind pumps standing alongside them which, in the absence of any other source of water, is an indication of their age post-dating the mid-19th century introduction of wind pumps to South Africa (Walton & Pretorius 1998). A shallow earth dam lies at, and largely outside, the south-western corner of the corridor but it is not under threat from any infrastructure. Barely visible on the ground, it was far easier to see from the air (Figure 15).



Figure 15: Aerial view of the earthen dam at waypoint 387.

Several historical farm complexes were seen in varying states of repair, with a few of the structures perhaps better suited to reporting as built environment features. However, to keep them together, they will all be discussed here. These are undoubtedly the most significant archaeological remains in the broader study area and illustrate the traditional building techniques and styles of the 19th and early 20th century. One of these complexes lies on the edge of the corridor and, although only a few of its features lie within the corridor, most of them are described and illustrated.

Figure 16 shows a small cottage at waypoint 293 (just outside the corridor) built with the typical double skin method. Interestingly, while the outer skin is made almost entirely from dolerite cobbles with rare calcrete inclusions, the inner skin is the reverse pattern (Figure 17). This may have been due to the availability of stone but, given that calcrete does appear in the outer skin of this and several other ruins, it seems more likely to have been a stylistic decision. The door frame is missing but the wooden window frame survives. The flat roof is entirely missing.



Figure 16: Stone ruin at waypoint 293.



Figure 17: Detail at waypoint 293.

Another small gabled stone cottage with a loft under a tin roof was better preserved, although an addition to its west face was partially collapsed (waypoint 294 just outside the corridor; Figure 18). There are again patterns in the walling. The lowermost 1 m is almost all of calcrete, while above this there is a mix of calcrete, dolerite and shale. Shale blocks have been used for the windowsill and display some wear (Figure 19). Alongside this cottage was a brick ruin with at least half its walls collapsed and its roof missing (waypoint 295 on the edge of the corridor; Figures 20 to 22). This was undoubtedly the main house of this farm complex. The bricks, being softer than stone, have dissolved in the rain with the result that this ruin is far more poorly preserved than the stone ruins. Nearby is another outbuilding built of calcrete. Its function is indeterminate as it is too poorly preserved but it may have been a kraal (waypoint 298 just outside the corridor; Figure 23).

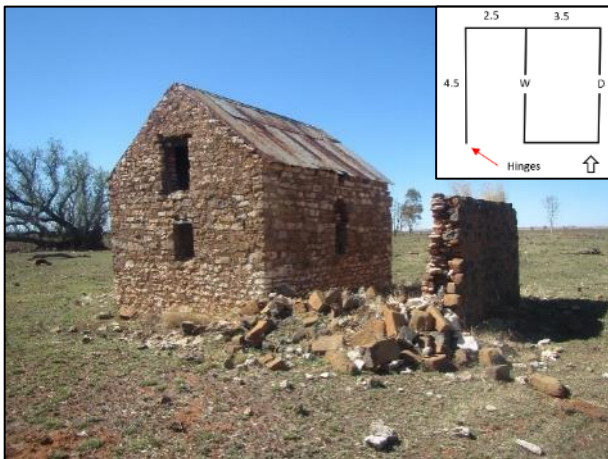


Figure 18: Stone ruin at waypoint 294. Inset: plan view showing door hinge location.



Figure 19: Windowsill in the cottage at waypoint 294.



Figure 20: View of the farm complex with associated trees at waypoint 294 (roofed ruin) and 295 (red brick ruin). A line of cypress trees stands in the foreground, just behind the fence. Left inset: Brick wall on stone plinth. Right inset: southwest corner of house.

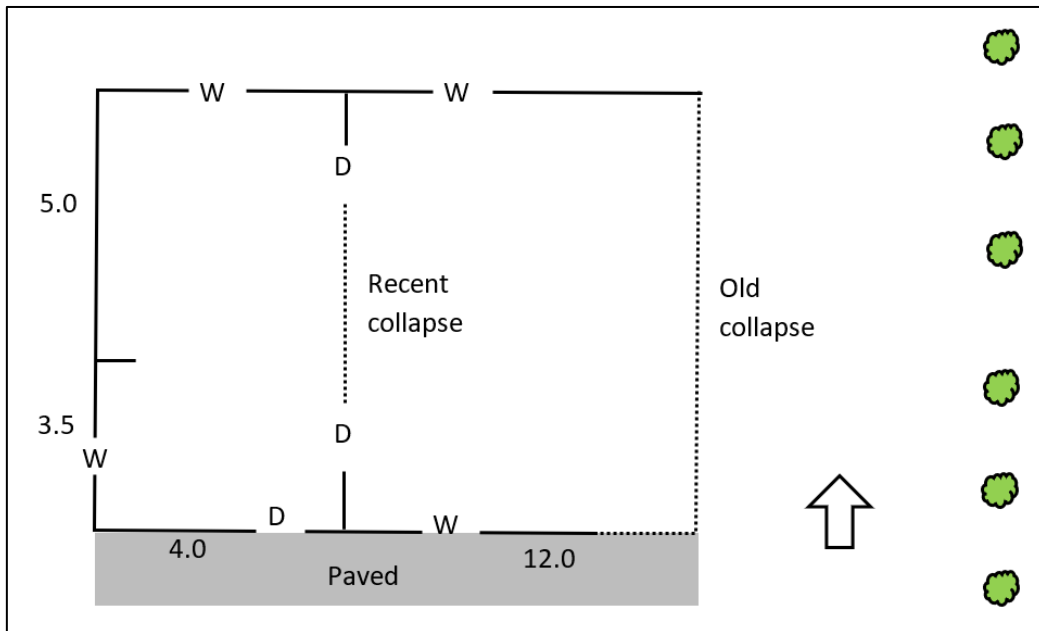


Figure 21: Plan of the remains of the house at waypoint 295. Six cypress trees (now dead) stand to the east of the house.



Figure 22: Interior of the brick house at waypoint 295.



Figure 23: The remains of a calcrete-walled structure at waypoint 298.

5.3. Graves

Graves were seen in four locations in the broader study area, with another marked as a possible grave. Only the latter is relevant here as it lies very close to, but just outside of, the grid connection corridor and well away from the proposed development. This was a loose pile of stones with no apparent function (waypoint 384; Figure 24) but, being located very close to a ruined structure, it seems unlikely to be a grave but, for precautionary reasons, it has been treated as one.



Figure 24: Possible grave at waypoint 384.

5.4. Historical aspects and the Built environment

5.4.1. Desktop study

Historical resources will be primarily associated with farmsteads, although most are likely to be fairly recent, perhaps dating to the late 19th or early 20th centuries. Several such resources – buildings, ruins and artefact scatters (the latter two both covered under archaeology) were located in the area by Orton (2015). The town of Dealesville is relatively recent, dating to 1899 (Raper n.d.). It was laid

out on the farm Klipfontein belonging to John Henry Deale and was awarded municipal status in 1914.

The second Anglo-Boer War (1899-1902) played a significant role in South African History, particularly in the interior of the country. Many battles were fought between the British and Boer forces. Significant battles in proximity to the present development area include the Battles of Modder River and Magersfontein 100 km to the southwest and west respectively, the Battle of Paardeberg 60 km to the southwest and the Battle of Driefontein just outside Bloemfontein, some 60 km to the southeast. Graves, graveyards and memorials across the central interior of South Africa serve as reminders of the war.

5.4.2. Site visit

Other than the partially to fully ruined structures described above, no historical structures were found to occur within the study area and, aside from two modern buildings (shed and labourer's cottage) located just outside the north-eastern part of the corridor and thus the proposed development footprint, all intact standing structures are at least 490 m beyond the boundary of the corridor with the nearest being on the neighbouring farm to the east. None of these structures outside the broader study area were examined, but it is noted that they are generally located within well-established groves of mature trees.

5.5. Cultural landscapes and scenic routes

As described above, the landscape is strongly rural in nature. Occasional arable lands occur, including a centre pivot field just north of the southern section of the corridor, but the vast majority is grassland used for grazing. Aerial imagery indicates that many areas were ploughed in the recent past and have probably been left to recover naturally due to drought conditions over the last several years. No evidence of this ploughing was seen on the ground though, with the only arable land in the broader study area being the centre pivot. The cultural landscape features scattered homesteads – either occupied, unoccupied and derelict, or completely ruined archaeological sites – in a sea of grass. These homesteads are often, but not always, marked by groves of trees. Figure 25 shows a view of the farm complex located along the southern edge of the corridor.



Figure 25: View of the farm complex at waypoints 291-298 showing the mature trees which mark the existence of the complex.

Figures 26 and 27 show aerial views of the broader study area from 1956. Some change is evident over the last 65 years. The ruin at waypoint 388 (just outside the corridor) was still in use and the adjacent modern house and shed were not yet built. The waypoint 398-401 complex (outside

corridor) was already disused (as indicated by the lack of desire lines in the grass) and had probably already been in ruin for some time. The same applies to the one at waypoints 315-324 (outside corridor), although its dam was still intact. The complexes at waypoints 368-377 (just outside corridor), 299-307 (outside corridor) and 291-298 (along southern edge of corridor) appear to have been still fully functional. All three of these are now completely ruined. The latter is shown as having had a single labourer's cottage to the west with another to the north and a third to the east. While a ruin marks the location of the eastern one, the other two have both been completely removed. It is evident from these images that structures built without cement can deteriorate very quickly once their roofs are removed. It is likely that joinery and rocks were frequently removed for reuse elsewhere which greatly exacerbates the degradation.



Figure 26: Aerial photograph from 1956 (377_002_05062) showing three farmsteads in the north-eastern part of the broader study area outside the grid connection corridor and proposed development footprint (waypoint numbers indicated).

It should be noted that the corridor and thus the proposed development falls within a Renewable Energy Development Zone (REDZ) and within an Electricity Grid Infrastructure (EGI) corridor. With the approval of many solar energy facilities in the area and the current existence of two large substations and many HV powerlines, electrical infrastructure should thus be an expected component of the landscape. There is going to be an inevitable shift in the nature of the landscape towards one increasingly dominated by electrical infrastructure.

There are no scenic or tourist routes in the vicinity of the study area. The R64 is located too far to the north to be of concern and, in any case, there are many HV lines and a large substation visible in that area with many solar energy facilities approved on both sides of the road. However, the

small, private Nielsview Nature Reserve abuts the broader study area immediately to the south of its eastern part and extends to the Modder River. This reserve lies 2.8 km away from the corridor and is not of further concern.

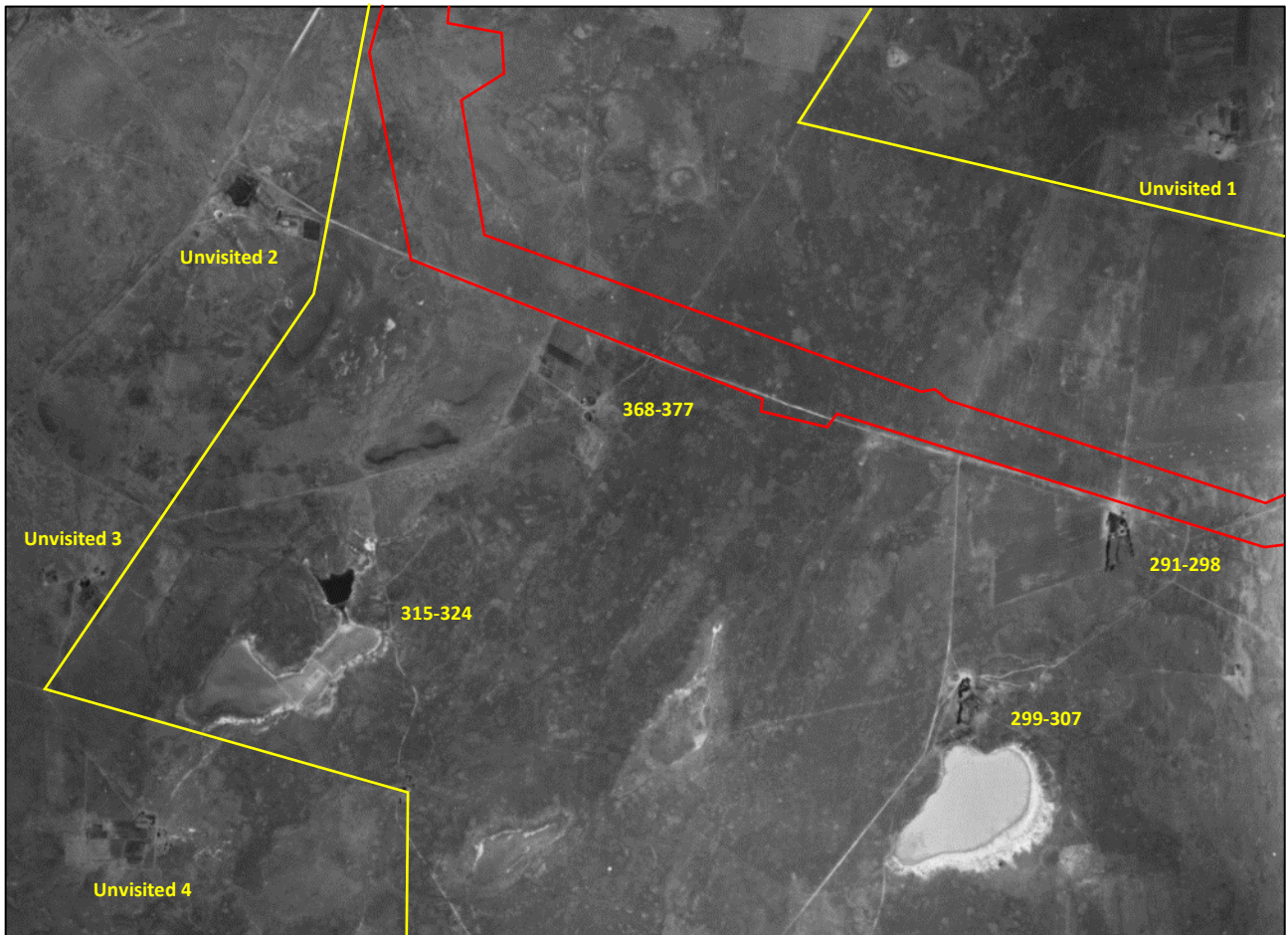


Figure 27: Aerial photograph from 1956 (377_003_05103) showing four farmsteads in the southern part of the broader study area (waypoint numbers indicated).

5.6. Statement of significance and provisional grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA (see Section 2 above).

The archaeological resources in the broader study area (including those few ruins that may be complete enough to describe as structures) are deemed to have up to medium-high cultural significance at the local level for their architectural, historical, scientific, social and technological values. The most significant is graded IIIB, although the highest graded ruin in the corridor is rated as GPA.

Graves are deemed to have high cultural significance at the local level for their social value. They are allocated a grade of IIIA. None occur within the corridor or proposed development footprint but a possible grave lies just outside the southern edge of the corridor.

The cultural landscape is a rural landscape with aesthetic value and is rated as having medium cultural significance at the local level. Closer to Dealesville where the density of electrical infrastructure increases, the landscape is of lesser significance.

Mapping of all the heritage resources by grade is shown in Appendix 3.

5.7. Summary of heritage indicators

The archaeological resources within the broader study area are fragile and easily susceptible to damage. The ruined farm complexes are best avoided by the development since mitigation would be time consuming.

- Indicator: No significant archaeological sites should be damaged or destroyed prior to appropriate study and recording as appropriate beforehand.

Graves are of high significance and must be protected *in situ*.

- Indicator: All graves should be avoided with a buffer of at least 50 m around them.

The cultural landscape is generally susceptible to change through the addition of inappropriate development. However, the REDZ and EGI Corridor and other approved electrical facilities and infrastructure in the area are acknowledged.

- Indicator: The proposed infrastructure should not dominate views from multiple viewpoints.

6. ASSESSMENT OF IMPACTS

Although a few heritage resources occur within the grid connection corridor, none occur within the area of the proposed Collector Substation B. The only heritage issue of further concern is the cultural landscape.

6.1. Construction Phase

6.1.1. Impacts to the cultural landscape

Because no landscape features such as hills and pans will be impacted by the project, the impacts relate to the presence in the rural landscape of construction equipment and vehicles, as well as to all the expected activity. Impacts to the cultural landscape will occur during the construction phase and last as long as construction lasts (anticipated to be about 12 months). Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a change in landscape character and sense of place. The impact significance is rated to **very low negative** before mitigation. Mitigation measures essentially only involve best practice measures such as minimising construction duration and ensuring that rehabilitation of any areas not needed during operation happens timeously and effectively. These measures are not expected to lower the significance which thus remains **very low negative** after mitigation (Table 7). Because of the many electrical features already in the landscape (substations and powerlines) and the fact that the study area falls within a REDZ and EGI Corridor (with the implication that such features are

to be expected), the cumulative impacts are of limited concern. There are no fatal flaws in terms of construction phase impacts to the landscape.

Table 7: Assessment of construction phase impacts to the cultural landscape.

CULTURAL LANDSCAPE IMPACTS				
PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Alteration of the rural landscape character through the introduction of construction equipment and vehicles and all the associated activities on site</i>			
INDIRECT IMPACT	<i>None</i>			
CUMULATIVE IMPACT	<i>Impacts will be greater with multiple components of the broader project being constructed at once</i>			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-5	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-15	very low negative		
PROPOSED MITIGATION MEASURES				
<i>Keep construction period as short as possible.</i>				
<i>Rehabilitate any areas not needed during operation as soon as possible.</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-5	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-15	very low negative		
CONFIDENCE LEVEL				

6.2. Operation Phase

6.2.1. Impacts to the cultural landscape

Because any physical impacts to the landscape would already have occurred during the construction phase, landscape impacts relate only to the presence of the project in what is otherwise a rural landscape. Impacts to the cultural landscape will occur during the operation phase and last as long as the lifetime of the project. Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a change in landscape character and sense of place. The impact significance is rated to **low negative** before mitigation. Mitigation measures essentially only involve best practice measures such as ensuring that all maintenance work remains within the authorised footprint and minimising night-time light pollution. These measures are not expected to lower the significance which thus remains **low negative** after mitigation (Table 8). Because of the many electrical features already in the landscape (substations and powerlines) and the fact that the study area falls within a REDZ and EGI Corridor (with the implication that such features are to be expected), the cumulative impacts are of limited concern. There are no fatal flaws in terms of operation phase impacts to the landscape.

Table 8: Assessment of operation phase impacts to the cultural landscape.

CULTURAL LANDSCAPE IMPACTS				
PROJECT PHASE	<i>Operation Phase</i>			
DIRECT IMPACT	<i>Alteration of the rural landscape character through the presence of a collector substation</i>			
INDIRECT IMPACT	<i>None</i>			
CUMULATIVE IMPACT	<i>Impacts will be greater with multiple facilities being present</i>			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-7	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-21	low - negative		
PROPOSED MITIGATION MEASURES				
<i>Keep all maintenance work within the authorised footprint.</i>				
<i>Minimise night-time light pollution in the area (visual recommendations to be followed to achieve this).</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will</i>	-7	3

		<i>last more than 5 years and as such is rated as Long Term</i>		
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
<i>High</i>				

6.3. Decommissioning Phase

6.3.1. Impacts to the cultural landscape

Decommissioning phase impacts relate to the presence in the rural landscape of construction equipment and vehicles, as well as to all the expected activity. Impacts to the cultural landscape will occur during the decommissioning phase and last as long as decommissioning lasts (anticipated to be less than 12 months). Because of the flat terrain, the impacts would not be experienced over great distances because intervening vegetation and buildings would offer partial screening. Nonetheless, the immediately surrounding area will experience a change in landscape character and sense of place. The impact significance is rated as **low negative** before mitigation. Mitigation measures essentially only involve best practice measures such as minimising decommissioning duration and ensuring that full and effective rehabilitation takes place with the present land use being reinstated. Because of the return to the current rural landscape, these measures are expected to lower the significance to **very low negative** after mitigation (Table 9). There are no cumulative impact concerns. There are no fatal flaws in terms of decommissioning phase impacts to the landscape.

Table 9: Assessment of decommissioning phase impacts to the cultural landscape.

CULTURAL LANDSCAPE IMPACTS				
PROJECT PHASE	<i>Decommissioning Phase</i>			
DIRECT IMPACT	<i>Alteration of the rural landscape character through the presence of construction equipment and vehicles and all the associated activities on site</i>			
INDIRECT IMPACT	<i>None</i>			
CUMULATIVE IMPACT	<i>Impacts will be greater with multiple facilities being decommissioned at once</i>			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-5	3

EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
PROPOSED MITIGATION MEASURES				
<i>Keep decommissioning period as short as possible.</i>				
<i>Remove all infrastructure and foundations and rehabilitate all areas on completion of decommissioning.</i>				
<i>Reinstate the present land use (grazing and/or agriculture).</i>				
POST-MITIGATION				
DURATION	1	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	very low negative		
CONFIDENCE LEVEL				
<i>High</i>				

6.4. Cumulative impacts

Cumulative impacts can occur to all types of heritage during any phase of development and are assessed at two levels – the entire corridor (i.e. all 11 projects to be located within the corridor) and the wider area extending up to 30 km from the corridor (projects considered are listed in Table 10). However, the only type of heritage resource of concern here is the cultural landscape as no other heritage will be affected by the development.

Table 10: List of approved electrical projects considered for the assessment of cumulative impacts.

No	EIA Reference No	Classification	Status of application	Distance from proposed area (km)
1	14/12/16/3/3/1/2156	Solar PV	Approved	21.2
2	14/12/16/3/3/2/726	Solar PV	Approved	3.7
3	14/12/16/3/3/2/718	Solar PV	Approved	8.8
4	14/12/16/3/3/2/721	Solar PV	Approved	15
5	12/12/20/1972/2	Solar PV	Approved	26.2

6	14/12/16/3/3/1/2155	Solar PV	Approved	21.2
7	14/12/16/3/3/2/719	Solar PV	Approved	11.3
8	14/12/16/3/3/2/728	Solar PV	Approved	0
9	14/12/16/3/3/2/720	Solar PV	Approved	15.6
10	14/12/16/3/3/2/851	Solar PV	Approved	11.7
11	14/12/16/3/3/1/2154	Solar PV	Approved	21.2
12	12/12/20/1972/1	Solar PV	Approved	27.3
13	14/12/16/3/3/2/855	Solar PV	Approved	11.5
14	14/12/16/3/3/2/717	Solar PV	Approved	7.5
15	14/12/16/3/3/2/722	Solar PV	Approved	3.8
16	14/12/16/3/3/2/854	Solar PV	Approved	11.7
17	12/12/20/1972	Solar PV	Approved	26.2
18	14/12/16/3/3/2/727	Solar PV	Approved	3.7
19	14/12/16/3/3/2/852	Solar PV	Approved	11.5
20	14/12/16/3/3/2/723	Solar PV	Approved	19.3
21	14/12/16/3/3/2/755	Solar PV	Approved	15
22	14/12/16/3/3/2/724	Solar PV	Approved	3.7
23	14/12/16/3/3/2/853	Solar PV	Approved	11.7

Considering all 11 projects to be constructed within the corridor leads to a significance before mitigation of **moderate negative**. With mitigation, which involves keeping the construction duration as short as possible and ensuring effective rehabilitation, the impact significance is reduced to **low negative** (Table 11).

Table 11: Assessment of cumulative impacts to the cultural landscape for all eleven projects within the grid connection corridor.

HERITAGE IMPACTS				
PROJECT PHASE	<i>All phases</i>			
DIRECT IMPACT	<i>Alteration of the cultural landscape</i>			
INDIRECT IMPACT	<i>None</i>			
CUMULATIVE IMPACT	<i>With multiple developments in a small area there is the potential to lose a larger number of heritage resources and for the landscape to be overwhelmingly altered.</i>			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-42	moderate - negative		

PROPOSED MITIGATION MEASURES				
<i>Minimise construction periods as far as possible.</i>				
<i>Ensure effective rehabilitation of any areas not needed during operation and after decommissioning.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-7	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				

Many other solar PV developments and associated infrastructure have been proposed in the area with a number already authorised and preparing for construction. Such impacts are generally long term and affect the development sites and their immediate surroundings. Overall, the cumulative impact significance is rated as moderate negative. With mitigation, which involves keeping the construction duration as short as possible and ensuring effective rehabilitation, the impact significance is reduced to low negative (Table 12).

Table 12: Assessment of cumulative impacts to the cultural landscape for all projects within 30 km of the study area.

HERITAGE IMPACTS				
PROJECT PHASE	<i>All phases</i>			
DIRECT IMPACT	<i>Alteration of the cultural landscape</i>			
INDIRECT IMPACT	<i>None</i>			
CUMULATIVE IMPACT	<i>With multiple developments in the wider area there is the potential for the landscape to be overwhelmingly altered.</i>			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified</i>	Moderately Detrimental	Definite

		<i>way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>		
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-42	moderate - negative		
PROPOSED MITIGATION MEASURES				
<i>Minimise construction periods as far as possible.</i>				
<i>Ensure effective rehabilitation of any areas not needed during operation and after decommissioning.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-7	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-21	low - negative		
CONFIDENCE LEVEL				
<i>High</i>				

6.5. Evaluation of impacts relative to sustainable social and economic benefits

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development.

The project would provide jobs to the local community during the construction period and about nine jobs are expected to be created during operation. The provision of a more reliable and diverse electricity supply is of considerable benefit to the country as a whole and, given the relatively limited expected impacts to heritage resources, these socio-economic benefits outweigh the impacts.

6.6. Existing impacts to heritage resources

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect the ruins and archaeological materials. Trampling from grazing animals and/or farm/other vehicles could also occur. These impacts would be of **negligible negative** significance. There are existing electrical features in the landscape (substations and high voltage powerlines) and these do alter the sense of place to some degree. This impact can be considered to be of **low negative** significance.

6.7. The No-Go alternative

If the project were not implemented then the site would stay as it currently is with permitted agricultural uses continuing (impact significance of **very low negative**; Table 11). Although the heritage impacts with implementation would be greater than the existing impacts (but still generally low), the loss of socio-economic benefits is more significant and suggests that the No-Go option is less desirable.

Table 11: Assessment of the No-Go option.

HERITAGE IMPACTS				
PROJECT PHASE	n/a			
DIRECT IMPACT	Alteration of the cultural landscape			
INDIRECT IMPACT	None			
CUMULATIVE IMPACT	None expected			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-12	very low negative		
PROPOSED MITIGATION MEASURES				
None required				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		

SIGNIFICANCE	-12	very low negative
CONFIDENCE LEVEL		
High		

6.8. Levels of acceptable change

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many publicly accessible vantage points is undesirable. Because of the relatively limited use of the nearby gravel roads, such an impact to the landscape is not envisaged.

7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

The conditions listed in the DFFE Generic Environmental Management Programme (EMPr) for the Development and Expansion of Substation Infrastructure for the Transmission and Distribution of Electricity must be adhered to for all project stages. The actions recorded in Table 12 should be included in the generic environmental management program (EMPr) for the project. Conditions for the EA are included in Section 10 (Recommendations).

Table 12: Heritage considerations for inclusion in the EMPr.

Impact	Mitigation / management objectives & outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Impacts to archaeology and graves					
Impacts to archaeological sites or graves	Rescue information, artefacts or burials before extensive damage occurs	Reporting chance finds as early as possible, protect <i>in situ</i> and stop work in immediate area	Inform staff and carry out Inspections of new excavations	Ongoing basis	Construction Manager or Contractor
				Whenever on site (at least weekly until excavations and surface disturbances are complete)	ECO
	Preserve sites in current condition	Mark sensitive sites close to development areas as No-Go zones	Inform staff and carry out inspections of ruins to ensure no materials are being removed	Ongoing basis	Construction Manager or Contractor
				Whenever on site	ECO
Impacts to the cultural landscape					
Visible landscape scarring	Minimise landscape scarring	Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas	Monitoring of surface clearance relative to approved layout	Ongoing basis	Construction Manager or Contractor
				As required	ECO

		not needed during operation.			
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8. CONCLUSIONS

Due to the heritage survey being undertaken prior to the development of project layouts, all heritage resources have been avoided by the project. There are no highly significant heritage issues. Table 12 indicates how the project has responded to the heritage indicators.

Table 12: Heritage indicators and project responses.

Indicator	Project Response
No significant archaeological sites should be damaged or destroyed prior to appropriate study and recording as appropriate beforehand.	All significant sites have been avoided by the proposed project.
All graves should be avoided with a buffer of at least 50 m around them.	All graves have been avoided by more than 50 m (none occur within the corridor or project footprint).
The proposed infrastructure should not dominate views from multiple viewpoints.	Given the flat landscape and lack of main roads in the immediate area, such impacts are not expected.

8.1. Reasoned opinion of the specialist

The project has avoided all known heritage resources in the area and impacts to the landscape would be minimal in the context of the PV projects that Collector Substation B is intended to support. Significant heritage impacts are therefore not expected to occur and it is thus the opinion of the heritage specialist that the proposed project may be authorised in full.

9. RECOMMENDATIONS

It is recommended that the proposed Collector Substation B should be authorised but subject to the conditions shown below.

- No materials may be removed from any of the ruined and/or demolished structures anywhere in the broader study area;
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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APPENDIX 1 – Curriculum Vitae



Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 23 Dover Road, Muizenberg, 7945
Telephone: (021) 788 1025
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Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science) 1997	
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

Association of Southern African Professional Archaeologists (ASAPA) membership number: 233

CRM Section member with the following accreditation:

- Principal Investigator: Coastal shell middens (awarded 2007)
Stone Age archaeology (awarded 2007)
Grave relocation (awarded 2014)
- Field Director: Rock art (awarded 2007)
Colonial period archaeology (awarded 2007)

Association of Professional Heritage Practitioners (APHP) membership number: 43

- Accredited Professional Heritage Practitioner

➤ **Memberships and affiliations:**

South African Archaeological Society Council member	2004 – 2016
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
UCT Department of Archaeology Research Associate	2013 –
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –
Kalk Bay Historical Association	2016 –
Association of Professional Heritage Practitioners member	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
 - Notification of Intent to Develop applications (for Heritage Western Cape)
 - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
 - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
 - Archaeological specialist studies
 - Phase 1 archaeological test excavations in historical and prehistoric sites
 - Archaeological research projects
- Development types
 - Mining and borrow pits
 - Roads (new and upgrades)
 - Residential, commercial and industrial development
 - Dams and pipe lines
 - Power lines and substations
 - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

- ESA open sites
 - Duinefontein, Gouda, Namaqualand
- MSA rock shelters
 - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
 - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
 - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
 - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
 - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
 - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
 - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
 - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

Awards:

Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.

APPENDIX 2 – List of heritage resources

Note that where doubt as to the age of a site exists it has been given a heritage grade for precautionary reasons.

Waypoint	Location	Description	Significance (grade)
291	S28 48 58.6 E25 39 57.2	A gum tree grove, probably seeded from the tree line at 292.	Low-medium
292	S28 48 55.7 E25 39 56.7	A double windrow of large gum trees.	Low-medium
293	S28 48 52.2 E25 39 58.7	A rectangular one-room cottage of 2.5 x 3 m with a door facing east and a window in the west wall. The door frame has been removed but the window frame is still present. The walls are built of calcrete, and both dressed and undressed dolerite. The walls are of two skins and the outside one has very little calcrete included while the inside has very little dolerite. The wall blocks have mud mortar in between them but some cement has been applied to the outside in places. The inside is plastered with mud mortar. The flat roof slopes down towards the west.	Medium (GPA)
294	S28 48 51.3 E25 39 59.1	A rectangular cottage with a pitched roof with gables to north and south. The door faces east and there are windows to the north and west. There is also a small loft door in the northern gable. The walls are a mix of calcrete, shale and dolerite but the lowermost 1 m is mostly calcrete. The walls are made with mud mortar but some cement has been applied to the outside as well. The inside walls are plastered with mud mortar to ceiling height only. The front door frame is gone but the other three openings still have their frames. The southern gable is severely cracked and will collapse soon. There are seven beams inside with two being planed and the other five rough, thin gum poles. There is a small wooden corner shelf in the south-western corner of the room. There are three small cavities in the southern inside wall which may have held fittings. The window sill is worm smooth and has a scratched section, possibly to smooth it deliberately. There is a corrugated iron roof. An L-shaped room has been added to the west side with its southern end open. Its floor is paved with dolerite and cement.	Medium (GPA)
295	S28 48 51.0 E25 39 59.6	A brick house ruin with about 50% of its walls collapsed. It is built on a dolerite plinth and had gables to north and south with a relatively low-angled pitched roof. The outside walls have grey cement plaster on them. There is dolerite paving along the southern side of the house. One small window facing south has a frame, while another window and a door in the south wall have wooden lintels but no frames. There are two windows in the north wall, one of which has only a wooden lintel remaining. The south-western room has a cement floor but the rest of the floor cannot be seen due to collapsed walling. The inside walls were plastered with mud mortar. The brick courses alternate at 90° to one another. The lower walls to	Medium (GPA)

Waypoint	Location	Description	Significance (grade)
		ceiling height are 1.5 brick-lengths thick, while the gable walls above are just one brick-length thick. The western part of the house was added to the rest but given that all materials are the same this must have happened soon after the original construction. All bricks have frogs in the and look to have been locally made. The firing was variable as evidenced by the variability in the degree of weathering of the bricks. One commercially sourced "Coronation" brick was seen on the grass outside the house. A gigantic pepper tree to the north has partially collapsed onto the house. There are six cypress trees outside the front (east) side, equally spaced with three each side of where the front path would have been, assuming a central doorway. There is calcrete garden detailing around the trees. Five have died with just one retaining some small shoots. There is another large pepper tree about 35 m to the southeast of the house. It is notable that no glass or ceramics were seen anywhere around this complex.	
296	S28 48 50.0 E25 39 59.1	The ephemeral remains of a calcrete structure with wide walls, possibly a water reservoir.	Very low (GPC)
297	S28 48 49.4 E25 39 57.2	A set of five large gum trees that align with the double windrow at waypoint 292.	Low-medium
298	S28 48 50.7 E25 39 56.7	A stone structure of about 9 x 15 m built against a fence. There is a smaller room of 4 x 5 m built on the west side of the northern end wall. The fence and a pepper tree lie along the eastern wall. The structure was likely a kraal. It is built of calcrete blocks.	Low (GPB)
299	S28 49 14.5 E25 39 31.2	A low circular reservoir built of calcrete and dolerite.	Low (GPB)
300	S28 49 14.7 E25 39 29.8	A kraal built of calcrete and cement and with a corrugated iron pitched roof shed built on its southern edge. The eastern wall of the shed has collapsed and been removed and been replaced by a corrugated iron wall. The rest of its walls are of red brick. There are two sets of three small, loophole-type openings in the southern wall of the shed. The kraal is somewhat derelict with some damaged sections but wooden fences inside and a new brick and cement entrance at the north-eastern corner betray some more recent use. There is also a loading ramp.	Medium-high (IIIB)
301	S28 49 15.5 E25 39 30.8	A house ruin set amidst a grove of enormous pepper trees and one other species. The house layout is described via its plan drawing below. The stoep seems to have had its eastern enclosing wall built at a later date with newer materials, but the room to the south and the wall to the north are original walls. The stoep roof may have had other supports originally. The original walls are of locally made red frog bricks with mud mortar in between them. The outside is plastered with stippled cement. The inside walls are plastered with mud mortar over which whitewash has been painted. The original northwestern room has green painted walls over a soft grey plaster. The centre-western room has green paint around the window and the remnants of wallpaper in two places (one of which	Medium-high (IIIB)

Waypoint	Location	Description	Significance (grade)
		includes the word “wallpaper” which was left behind from the back of the paper. The front door of the house had a fanlight above it and there are vestiges of cement plaster over the mud plaster on the eastern wall of the voorkamer. There are the remains of metal gutters and downpipes in some places. The small outside room on the south-western corner appears to have been original, but the bathroom was added to the north-western corner at a later stage and was built using different materials and has slightly higher doors. The bathroom has a basin and bath in it and one can see where a gas water heater was mounted alongside the bath on the east wall of the bathroom. There is part of an ambulance behind the house and a small, circular calcrete structure with an entrance facing the house occurs right behind the back wall of the house.	
302	S28 49 17.0 E25 39 30.5	An outside toilet (long-drop)(built of red frog bricks, mud mortar and whitewash, although there is a thin band of cement around the base of the wall and around the top. It has a corrugated iron roof sloping down to the west and its door open to the east.	Low (GPB)
303	S28 49 19.2 E25 39 30.0	A stone feature of unknown function with a narrow, deep channel built of dolerite blocks and areas of calcrete paving at each end.	Low (GPB)
304	S28 49 19.8 E25 39 30.2	A line of huge pepper trees that have been badly burnt and largely killed in a recent fire.	Low
305	S28 49 19.4 E25 39 33.4	The ephemeral remains of a calcrete-walled water reservoir with a derelict wind pump alongside it. A hornfels flake and core were also seen here.	Very low (GPC)
306	S28 49 17.5 E25 39 34.8	A modern brick building with steel beam and IBR roof sheets. 1956 aerial photograph shows it present.	Low
307	S28 49 18.7 E25 39 37.2	A stone feature of dolerite amongst some trees. It likely represents a pile of rocks dumped there.	Very low (GPC)
308	S28 49 26.0 E25 39 37.8	A widespread, moderate density scatter of hornfels artefacts in the northern edge of a large pan. All are variably patinated but are still a shade of grey rather than red/brown. Age indeterminate but colour suggests more likely older LSA.	Low (GPB)
309	S28 49 25.2 E25 39 31.7	An area with high density hornfels artefact scatter inside the northern edge of the pan. All are variably patinated but are still a shade of grey rather than red/brown. Age indeterminate but colour suggests more likely older LSA. It is notable that around the north and west sides of the pan there are artefacts on the pan surface but minimal artefacts at the base of the slope leading out of the pan and none further up where the calcrete is or above the slope. In the south and east there is extensive pan dune accumulation and either the archaeology is buried or else this part of the pan was not favoured for occupation. There were very few artefacts in this area. The occupation seems to have focused in the north where the pan is deepest and water accumulates first. Just one ostrich eggshell fragment was seen on the pan dune in the southeast.	Medium (GPA)
310	S28 49 38.0 E25 39 45.2	A calcrete stone alignment on the pan dune and leading into the pan. It might once have been the base of a fence.	Very low (GPC)

Waypoint	Location	Description	Significance (grade)
311	S28 49 29.0 E25 37 50.4	An ephemeral scatter of LSA hornfels artefacts in an area near some natural swales. The scatter includes a lightly patinated duckbill endscraper and a rotated bipolar core.	Very low (GPC)
312	S28 49 27.6 E25 37 47.6	An ephemeral scatter of LSA hornfels artefacts in an area near some natural swales. There are also a few red-patinated background scatter artefacts.	Very low (GPC)
313	S28 49 15.7 E25 37 32.7	A U-shaped dolerite stone feature on the grassy base of a large pan. The walling has badly tumbled, or perhaps been deliberately pulled apart. The arms of the U are about 9 m long, while the section between them is about 22 m long. Historical aerial photography suggests that there was some activity here in the past, perhaps agriculture.	Very low (GPC)
314	S28 49 12.5 E25 37 33.2	An ephemeral scatter of hornfels artefacts along the northern edge of a large grassy pan. All are variably patinated but are still a shade of grey rather than red/brown.	Very low (GPC)
315	S28 49 04.1 E25 37 36.8	These points represent the ends of a large stone-lined dam wall that has breached in the middle. It dams the inlet to a large grassy pan. Some historical glass, ceramics and bone (mostly burnt) have been dug out of animal burrows in the middle of the wall.	Low (GPB)
316	S28 49 02.7 E25 37 40.6		
317	S28 49 04.2 E25 37 42.6	A rectangular foundation of calcrete blocks measuring 3 x 4 m and overlooking the pan. There is a scatter of calcrete and dolerite blocks and bricks around the foundation.	Low (GPB)
318	S28 49 03.3 E25 37 43.7	These four points represent a square stone foundation. The east and west walls are built of two skins of calcrete blocks, but the southern wall is just a single line of stones. The walling fades out at waypoints 318 and 321 but there are corners at 319 and 320.	Low (GPB)
319	S28 49 06.6 E25 37 43.3		
320	S28 49 07.2 E25 37 47.4		
321	S28 49 04.5 E25 37 47.4		
322	S28 49 01.6 E25 37 48.7	A calcrete and dolerite stone-packed mound measuring 1 x 2 m and aligned north-south.	Very low (GPC)
323	S28 49 00.8 E25 37 48.7	A calcrete and dolerite mound of rocks with ephemeral traces of walling measuring 3 x 3 m. There is also a piece of an iron bed amongst the rocks.	Low (GPB)
324	S28 49 01.3 E25 37 46.3	A rectangular structure of calcrete and dolerite measuring about 9 x 15 m and which was probably a water reservoir.	Low (GPB)
325	S28 48 55.0 E25 37 13.7	Ephemeral traces of an old track visible as a long, straight, shallow depression in the grass.	Very low (GPC)
326	S28 48 40.1 E25 37 44.4	A dolerite boulder on a dolerite dyke with very ephemeral traces of scratching on it.	Very low (GPC)
327	S28 48 40.3 E25 37 44.6	A dolerite boulder with a lightly ground patch on it.	Very low (GPC)
328	S28 48 40.7 E25 37 44.3	A circular stone enclosure of about 4 m diameter formed by clearing the dolerite rocks to the edge of the circle. One red-patinated background scatter artefact was seen inside. Otherwise no associated artefacts.	Low (GPB)

Waypoint	Location	Description	Significance (grade)
329	S28 48 40.7 E25 37 44.6	A circular stone enclosure of about 4 m diameter formed by clearing the dolerite rocks to the edge of the circle. No associated artefacts.	Low (GPB)
330	S28 48 40.3 E25 37 44.8	A dolerite boulder with a lightly ground patch on it.	Very low (GPC)
331	S28 48 40.5 E25 37 46.7	A dolerite cairn on the crest of the dyke.	Very low (GPC)
332	S28 48 40.4 E25 37 48.3	A dolerite boulder with three ground patches on it.	Very low (GPC)
333	S28 48 40.1 E25 37 48.6	A dolerite boulder with ephemeral unpatinated scratches on it.	Very low (GPC)
334	S28 48 39.8 E25 37 48.4	A dolerite boulder with a ground patch on it.	Very low (GPC)
335	S28 48 39.7 E25 37 49.9	A dolerite boulder with a ground patch on it.	Very low (GPC)
336	S28 48 40.1 E25 37 49.9	A stone feature made with seven dolerite rocks placed in a C-shape.	Very low (GPC)
337	S28 48 39.3 E25 37 51.5	A dolerite boulder with a ground patch on it, but it is well-enough ground that the patch is almost a shallow groove.	Very low (GPC)
338	S28 48 39.0 E25 37 54.0	A dolerite boulder with a ground patch on it.	Very low (GPC)
339	S28 48 38.9 E25 37 54.2	A dolerite boulder with a ground patch on it.	Very low (GPC)
340	S28 48 39.7 E25 37 55.3	A rectangular stone foundation of dolerite blocks measuring about 3.5 x 10 m. A dividing wall separates a 3 m long section in the south from a 7 m long section in the north. There was one plain white vitreous ceramic fragment alongside the ruin and several fragments of green, brown and pink glass were seen on the slope to the north.	Low (GPB)
341	S28 48 38.6 E25 37 55.9	A dolerite boulder with a ground patch on it.	Very low (GPC)
342	S28 48 38.4 E25 37 57.0	An overgrown enclosure built with large dolerite blocks. It is about 6 x 6 m.	Low (GPB)
343	S28 48 38.2 E25 37 58.1	Two dolerite rocks with pecked lettering about 15 cm high. One says "TAB" while the other is less well-preserved but probably says the same thing. Very likely not old enough to be archaeological.	Very low (GPC)
344	S28 48 38.3 E25 37 58.6	Two dolerite rocks, one with pecked lettering saying "TOMMY" and the other with an indeterminate motif. Very likely not old enough to be archaeological.	Very low (GPC)
345	S28 48 38.6 E25 37 59.8	A dolerite rock with "FN" scratched on it.	Very low (GPC)
346	S28 48 37.5 E25 37 59.1	The southern end of an ephemeral dolerite stone alignment/wall. This and next several points form a single stone-walled complex that is assumed to be historical in age.	Medium (GPA)
350	S28 48 37.2 E25 37 57.6	Ephemeral stone walling continuing on from 346.	
351	S28 48 36.7 E25 37 57.6	Ephemeral stone walling.	
352	S28 48 36.0 E25 37 56.4	Ephemeral stone walling. There is also a rock with a ground patch on it here.	
353	S28 48 36.2 E25 37 56.1	Stone walling.	

Waypoint	Location	Description	Significance (grade)
354	S28 48 36.2 E25 37 55.8	A large dolerite cairn on the summit of the dyke.	
355	S28 48 36.6 E25 37 55.7	The south-western end of the wall extending from 352, past 353 to this point. A stone mound/cairn forms a corner point for the stone-walled complex here.	
356	S28 48 36.6 E25 37 56.1	A heavily overgrown stone-walled structure with thick walls. The base of a black case bottle was seen just to the north.	
357	S28 48 36.9 E25 37 55.7	A 9 x 9 m square enclosure with thick walls of dolerite blocks. The walls are made with two skins and a rubble fill.	
359	S28 48 37.4 E25 37 58.7	Another point on the walling at a slight bend.	
347	S28 48 37.7 E25 37 58.8	A dolerite rock with a scratched indeterminate motif. Very likely not old enough to be archaeological.	Very low (GPC)
348	S28 48 37.9 E25 37 58.7	A dolerite rock with "JAB" pecked onto it in large lettering. There are also some scratches here. Another rock has "YP", "NB", "EP" and some other indeterminate letters scratched on it. Another rock has "N Blay" scratched on it and "TAB" pecked on it. The latter is poorly preserved. Very likely not old enough to be archaeological.	Very low (GPC)
349	S28 48 37.7 E25 37 58.2	A dolerite rock with "YP" scratched on it. Another rock has some scratches and peck marks. Very likely not old enough to be archaeological.	Very low (GPC)
358	S28 48 36.1 E25 37 54.3	A dolerite boulder with a ground patch on it.	Very low (GPC)
360	S28 48 32.0 E25 37 58.2	A dolerite boulder with a ground patch on it.	Very low (GPC)
361	S28 48 32.0 E25 38 01.8	A dolerite boulder with a ground patch on it.	Very low (GPC)
362	S28 48 28.4 E25 38 09.0	A set of six graves, one of them bearing a date of 1923 on its almost illegible inscription. Four of them are just stone-packed mounds. The other one's inscription is completely illegible.	High (IIIA)
363	S28 48 26.2 E25 38 08.6	A small enclosure made with various metal poles and pieces of metal including car parts and a spring mattress around the sides. Likely less than 100 years old.	Very low (GPC)
364	S28 48 25.5 E25 38 09.0	A brick ruin demolished to ground level built with red frog bricks and with some cement visible around the outside. Many bricks as well as some dolerite blocks and metal sheets are lying about. Likely less than 100 years old.	Low (GPB)
365	S28 48 24.2 E25 38 08.9	A dump of c. 1960s bottles, rocks and metal.	n/a
366	S28 48 23.0 E25 38 11.1	A modern brick and cement cottage with internal corner hearth, steel doorframe and a concrete plinth.	n/a
367	S28 48 27.3 E25 38 16.1	The ephemeral remains of a dolerite-lined water reservoir of about 20 x 30 m. There is a round, brick water tank on the eastern end. A newer cement and brick dam occurs alongside to the northwest and the 1956 aerial photograph shows it to have already been present at that time.	Low (GPB)
368	S28 48 29.5 E25 38 20.7	A dolerite- and calcrete-walled square ruin with several openings, some doors and some windows.	Medium (GPA)

Waypoint	Location	Description	Significance (grade)
		Some of them have been partially filled in. The walls are double skin walls and on the outside dolerite has been used around the bottom and up the corners with calcrete filling in the rest. Inside is mixed.	
369	S28 48 30.0 E25 38 20.7	A circular water well of about 3 m diameter. It is only about 1.5 m deep, perhaps filled in over the years. It is cut into the calcrete and dolerite. There is a potential for archaeology in the base of the well.	Medium (GPA)
370	S28 48 32.6 E25 38 22.1	A circular stone feature of about 5 m diameter and of indeterminate function. A copper plate with stamped text lies next to it.	Low (GPB)
371	S28 48 33.3 E25 38 22.2	A square stone ruin of 1.5 m diameter. The walls are built of dressed dolerite blocks.	Low (GPB)
372	S28 48 33.9 E25 38 23.2	A stone-line reservoir of about 20 x 25 m.	Low (GPB)
373	S28 48 32.6 E25 38 22.9	A poorly preserved dolerite and brick ruin. Just an L-shaped wall still standing with the lower half built of dolerite and the upper half of brick.	Low (GPB)
374	S28 48 32.0 E25 38 22.9	A very poorly preserved house ruin built with brick and dolerite. Wall sections are the same material to full height with brick and dolerite sections adjoining one another. The hearth area is still standing and the hearth has a reinforced concrete slab over it with a hole at the back, presumably indicating a dover stove with flue.	Low (GPB)
375	S28 48 31.9 E25 38 23.4	A dolerite and brick enclosure with poorly preserved internal plastering. It has no entrance and was probably a water reservoir. It is about 5 x 8 m. The lower walls are of dolerite and the upper walls are thinner and of brick. Fairly intact but for one damaged corner.	Medium (GPA)
376	S28 48 31.0 E25 38 25.3	Two fenced graves with the names Anna Elizabeth van Heerden (1858-1935) and Pieter Willem van Heerden (1854-1928).	High (IIIA)
377	S28 48 32.1 E25 38 26.6	A dolerite and calcrete ruin with two rooms and another wall extending off towards the east.	Low (GPB)
378	S28 48 52.1 E25 37 35.1	A dolerite and cement-lined water reservoir that has calcrete rocks around the outside. It is about 5 x 10 m in size.	Low (GPB)
379	S28 49 08.6 E25 37 21.7	A light hornfels scatter on the north edge of a pan. All are variably patinated but are still a shade of grey rather than red/brown.	Very low (GPC)
380	S28 49 16.1 E25 37 27.4	A widespread but very ephemeral scatter of hornfels artefacts occurs on the grassy surface of the pan. All are variably patinated but are still a shade of grey rather than red/brown. Age indeterminate but colour suggests more likely older LSA.	Very low (GPC)
381	S28 49 10.7 E25 37 48.2	A small fenced graveyard containing nine visible graves and possibly up to three more graves where isolated stones lie. One grave has no stones but a granite headstone is present with the name of Jacob Petrus Britz 1882-1914. One grave has some bricks on top of it and the other seven all have calcrete stone toppings. The graveyard is heavily burrowed and a scapula fragment lies on the surface. It is not possible to confirm whether it is human or not.	High (IIIA)

Waypoint	Location	Description	Significance (grade)
382	S28 49 13.0 E25 40 20.6	The remains of a dolerite-lined reservoir next to a wind pump. The reservoir is represented only by a depression with a single line of stones around it.	Very low (GPC)
383	S28 48 53.8 E25 40 10.0	A small enclosure of metal poles and wire fencing with piles of calcrete on two sides.	Very low (GPC)
384	S28 48 53.5 E25 40 08.8	An oval-shaped packed stone feature of about 1 m by 1.5 m. Its long axis is aligned east-west, but it is very close to a ruined structure, perhaps too close to be a grave. It is treated as IIIA for precautionary reasons but could be tested if necessary to determine whether it is indeed a grave or not.	High (IIIA)
385	S28 48 52.7 E25 40 08.2	A collapsed brick structure. There are also some calcrete rocks in amongst the bricks as well as three concrete lintels. One of them is broken and shows reinforcing with barbed wire, presumably suggesting that they were made locally. There is also a dolerite lower grindstone amongst the rubble. The bricks are red frog bricks of two types. One has "WEGO" on the frog.	Low (GPB)
386	S28 48 17.0 E25 38 03.0	The remains of a square stone structure about 6 x 6 m. The dolerite rocks are quite well dispersed, but one can still see the wall footing in places.	Low (GPB)
387	S28 48 11.8 E25 37 50.7	A shallow earth dam.	Very low (GPC)
388	S28 47 05.4 E25 40 47.4	A red brick and mud mortar cottage on a stone (shale) plinth and with a corrugated iron roof. There are reinforced cement lintels and windowsills. The inside and outside walls were plastered with mud mortar but there is almost nothing left on the outside. The door and window frames have been removed. The internal walls have largely been demolished, perhaps to facilitate use of the cottage as a store room. A short section of guttering sits above the east-facing front door. A door in the north gable has been filled in with the same materials as the walls suggesting it to have been done shortly after construction. The main cottage is rectangular and a smaller room has been built on the north end of the west side. The latter room is partly collapsed. 20 th century age built using more traditional methods to save costs.	Low (GPB)
389	S28 47 07.5 E25 40 51.1	The poorly preserved remains of a dolerite-lined dam.	Very low (GPC)
390	S28 47 07.3 E25 40 47.7	An ash and rubbish midden with only modern materials on it. There is a chance that there could be older material below but this seems unlikely given the dearth of historical artefacts throughout the broader study area. Not considered a heritage resource. The site is between a modern occupied cottage and a ruin that is likely early-20 th century.	---
391	S28 47 43.5 E25 40 40.0	A largely silted up earth dam alongside a now derelict wind pump.	Very low (GPC)
392	S28 47 48.1 E25 40 37.8	This seems like the site of an old spring. Some earthworks have been carried out to direct the flow of water and it seems that what was probably a pan in the past just to the east of the spring has been excavated out to result in a shallow dam.	Very low (GPC)

Waypoint	Location	Description	Significance (grade)
393	S28 47 52.6 E25 40 32.3	A small derelict cottage located just outside the study area. It was not visited but appears from a distance to have been built with cement blocks.	Low (GPB)
394	S28 47 58.5 E25 40 45.9	A light scatter of patinated, but still dark grey and black, hornfels flakes, chunks and a blade located in the north-western part of a pan. This area is grassy.	Very low (GPC)
395	S28 47 56.7 E25 40 52.8	Another concentration of hornfels flakes and chunks but in the north-eastern part of the pan where the surface is silty.	Very low (GPC)
396	S28 47 59.9 E25 40 50.1	Another concentration of hornfels flakes and chunks but this time on the southern part of the pan on the silty surface. Also an irregular core seen here.	Very low (GPC)
397	S28 47 56.9 E25 40 48.0	Another concentration of hornfels flakes and chunks but in the northern part of the pan where the surface is grassy.	Very low (GPC)
398	S28 47 50.8 E25 40 52.7	A very poorly preserved dolerite and calcrete ruin with its long axis north-south. A small piece of flat metal was present.	Low (GPB)
399	S28 47 50.0 E25 40 52.8	A very poorly preserved calcrete ruin lying immediately to the north of 398. It was made with two skins and a rubble fill and also has its long axis north-south. The two structures were built on the same alignment.	Low (GPB)
400	S28 47 50.6 E25 40 53.6	An oval-shaped mound capped with calcrete with its long axis east-west. There is a scattering of other rocks around the area and it is very close to the house ruin (about 20 m from where its front door would have been), both of which suggest the feature is not a grave. It was not photographed because of being heavily overgrown with grass.	Very low (GPC)
401	S28 47 53.3 E25 40 52.7	A calcrete and dolerite kraal with two primary enclosures and a very small one attached to the south-eastern corner. The main enclosure is about 26 x 15 m. The secondary one about 8 x 8 m and the smallest 2 x 2 m.	Medium (GPA)
402	S28 48 23.6 E25 40 57.5	Very ephemeral background scatter of hornfels artefacts in an area of dolerite gravel exposure. Only three artefacts seen. Probably MSA.	Very low (GPC)
403	S28 48 32.3 E25 40 41.7	Piles of dolerite rocks have been removed from the old ploughed lands and dumped in the pan at this location. Not a heritage resource.	---
404	28 49 12.2 25 39 49.2	Set of graves found by another consultant. From the photographs, four graves appear to be present. Two have dolerite cappings and two calcrete with one of the latter also having a small cement headstone with a date of 1915 on it (this might be a birth date though).	IIIA

APPENDIX 3 – Mapping

Key:

Project components:

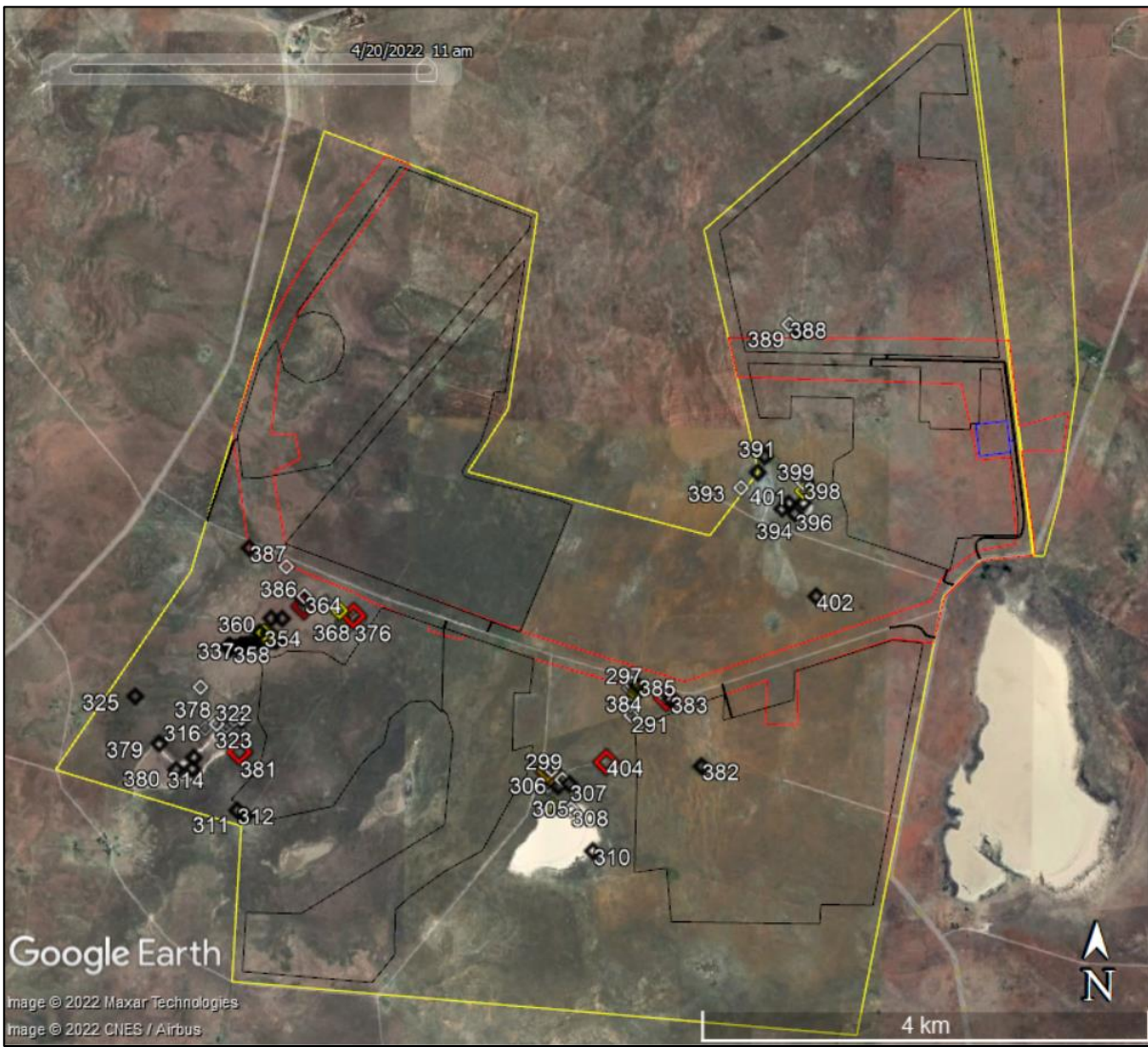
- Yellow = broader study area
- Red = grid connection corridor
- Black = PV areas
- Blue = electrical infrastructure assessed in this report

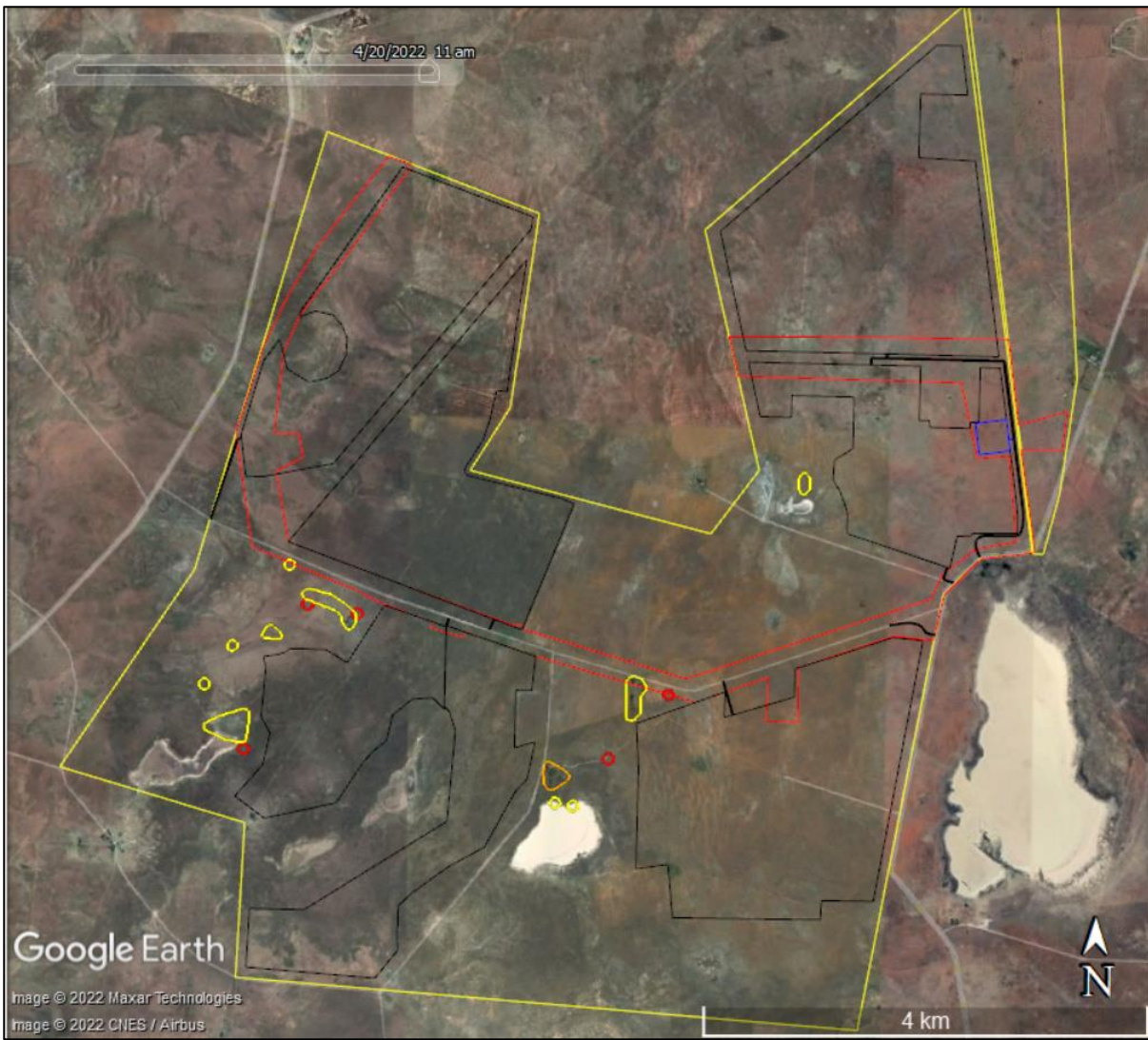
Heritage resources:

- Red diamonds = Grade IIIA
- Orange diamonds = Grade IIIB
- Yellow diamonds = Grade GPA
- White diamonds = Grade GPB
- Black diamonds = Grade GPC.

Heritage sensitivity:

- Red polygons = high
- Orange polygons = medium
- Yellow polygons = low sensitivity





APPENDIX 4 – Site Sensitivity Verification

A site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area. The details of the site sensitivity verification are noted below:

Date of Site Visit	3 to 7 October 2021
Specialist Name	Dr Jayson Orton
Professional Registration Number	ASAPA: 233; APHP: 043
Specialist Affiliation / Company	ASHA Consulting (Pty) Ltd

- Provide a description on how the site sensitivity verification was undertaken using the following means:

- (a) desk top analysis, using satellite imagery;
- (b) preliminary on-site inspection; and
- (c) any other available and relevant information.

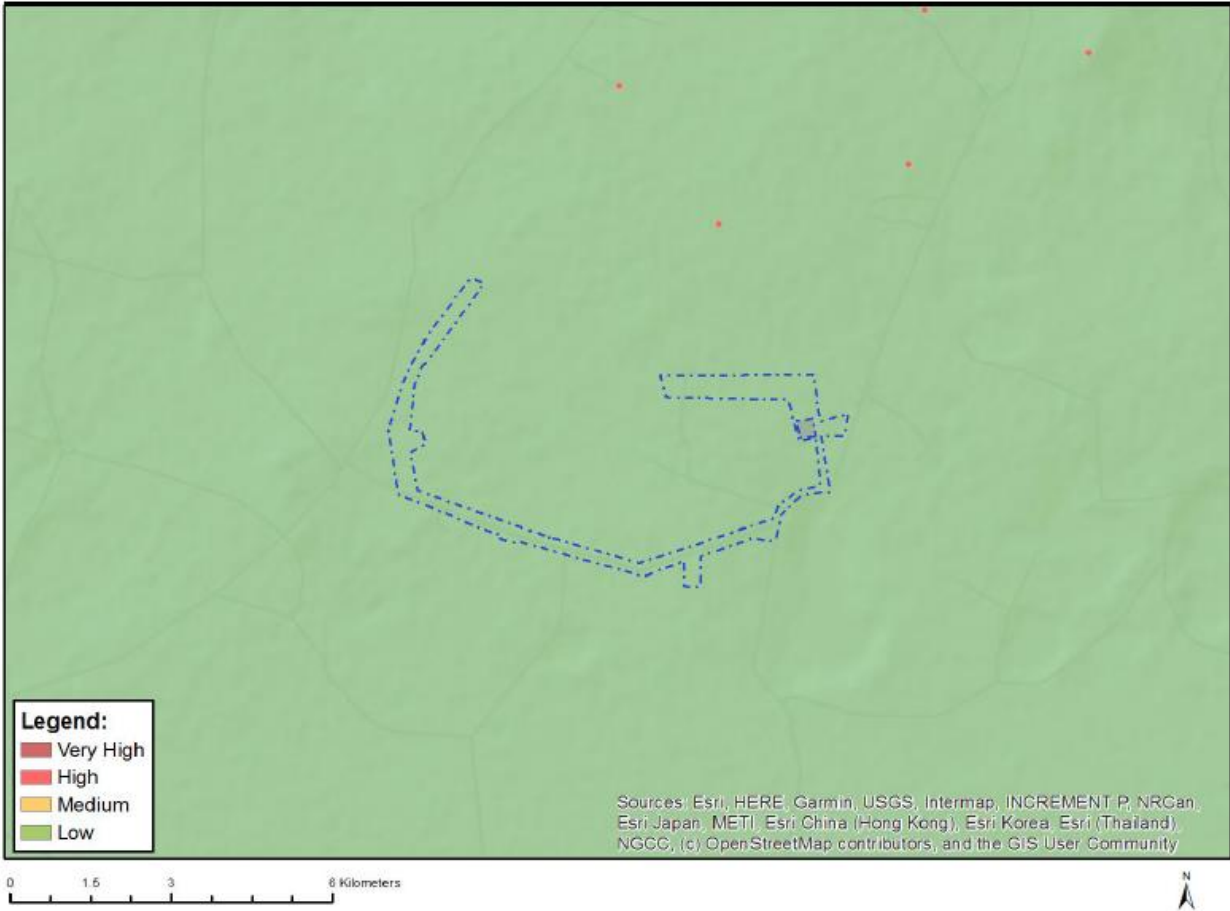
Initial work was carried out using satellite aerial photography in combination with the author's accumulated knowledge of the local landscape. This was used to identify potentially sensitive locations in the landscape. Subsequent fieldwork served to ground truth the site, including those areas identified as potentially sensitive. Desktop research was also used to inform on the heritage context of the area. Both the field and desktop data are presented in the report (Section 5).

- Provide a description of the outcome of the site sensitivity verification in order to:

- (a) confirm or dispute the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.; and
- (b) include a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.

The map below is extracted from the screening tool report and shows the archaeological and heritage sensitivity to be low. The site visit showed that in fact the majority of the site is of low sensitivity but with several pockets (where archaeological resources and graves were found) considered to be of medium and high sensitivity. Only one of these areas encroaches very slightly into the grid connection corridor but none of them would be affected by the project itself. Archaeologically sensitive areas are mapped in Appendix 3. A photographic record and description of the relevant heritage resource is contained within the impact assessment report (Section 5 and Appendix 2). The heritage specialist thus disputes the screening tool report since there are a number of areas of medium to high sensitivity scattered through the broader study area, although only a small section of the corridor is affected. The footprint of Collector Substation B, which avoids all known heritage resources is however confirmed to be low sensitivity.

MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY



APPENDIX 5 – Compliance with Appendix 6 of the 2014 EIA Regulations

Requirements of Appendix 6 – GN R326 (7 April 2017)	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	Section 1.4 Appendix 1
a) details of-	
i. the specialist who prepared the report; and	
ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix 7
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.3
(cA) an indication of the quality and age of base data used for the specialist report;	Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Sections 6.6, 6.4 & 6.8
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3.2
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 3
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 alternatives;	Sections 1.1.3 & 5 Appendix 3
g) an identification of any areas to be avoided, including buffers;	n/a
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;	Appendix 3
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3.7
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 5 Section 9
k) any mitigation measures for inclusion in the EMPr;	Section 7
l) any conditions for inclusion in the environmental authorisation;	Section 10
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 7
n) a reasoned opinion-	Sections 9.1 & 10
i. whether the proposed activity, activities or portions thereof should be authorised;	
(iA) regarding the acceptability of the proposed activity and activities; and	
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 where applicable, the closure plan;	
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	n/a
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	n/a
q) any other information requested by the competent authority.	n/a
2. Where a government notice gazetted by the Minister provides for any protocol of minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply	Part A of the Assessment Protocols published in Government Notice No. 320 on 20 March 2020 is applicable (i.e. Site sensitivity verification requirements where a specialist assessment is required but no specific assessment protocol has been prescribed).

APPENDIX 5 – Compliance with Appendix 6 of the 2014 EIA Regulations

Requirements of Appendix 6 – GN R326 (7 April 2017)	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	Section 1.4 Appendix 1
r) details of-	
iii. the specialist who prepared the report; and	
iv. the expertise of that specialist to compile a specialist report including a curriculum vitae;	
s) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix 7
t) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.3
(cA) an indication of the quality and age of base data used for the specialist report;	Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Sections 6.6, 6.4 & 6.8
u) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3.2
v) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 3, Appendix 6
w) 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 alternatives;	Sections 1.1.3 & 5 Appendix 3
x) an identification of any areas to be avoided, including buffers;	Section 8
y) 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;	Appendix 3
z) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3.7
aa) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 5 Section 9
bb) any mitigation measures for inclusion in the EMPr;	Section 7
cc) any conditions for inclusion in the environmental authorisation;	Section 10
dd) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 7
ee) a reasoned opinion-	Sections 8.1 & 9
iii. whether the proposed activity, activities or portions thereof should be authorised;	
(iA) regarding the acceptability of the proposed activity and activities; and	
iv. 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 where applicable, the closure plan;	
ff) a description of any consultation process that was undertaken during the course of preparing the specialist report;	n/a
gg) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	n/a
hh) any other information requested by the competent authority.	n/a
2. Where a government notice gazetted by the Minister provides for any protocol of minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply	Part A of the Assessment Protocols published in Government Notice No. 320 on 20 March 2020 is applicable (i.e. Site sensitivity verification requirements where a specialist assessment is required but no specific assessment protocol has been prescribed).

APPENDIX 6 – Impact Assessment Methodology

Impact Assessment Methodology

The objective of the assessment of potential impacts is to identify and assess all the significant, potential impacts that may arise as a result of the project.

For each of the main project phases the existing and potential future impacts and benefits (associated only with the project) will be described using the criteria listed below. The assignment of ratings has been undertaken based on past experience of the team, as well as through research. Subsequently, mitigation measures will be identified and considered for each impact and the assessment repeated in order to determine the significance of the residual impacts (the impact remaining after the mitigation measure has been implemented).

Table 6.1: Impact Assessment Criteria

Criteria	Rating Scales	Notes
Nature	Positive	An evaluation of the effect of the impact related to the proposed development
	Negative	
Extent	Footprint	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur
	Site	The extent of the impact is rated as site as it will affect only the development area
	Local	The extent of the impact is rated as Local as it affects the development area and adjacent properties
	Regional	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries
	National	The extent of the impact is rated as National as the effects of the impact extends beyond more than 2 regional/ provincial boundaries
	International	The extent of the impact is rated as International as the effect of the impact extends beyond country borders
Duration	Temporary	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary
	Short term	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term
	Medium term	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term
	Long term	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term
Severity	High negative	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.
	Moderate negative	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected
	Low negative	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected
	Low positive	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved
	Moderate positive	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected
	High positive	The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.

Criteria	Rating Scales	Notes
Potential for impact on irreplaceable resources	No	No irreplaceable resources will be impacted.
	Yes	Irreplaceable resources will be impacted.
Consequence	Extremely detrimental	A combination of extent, duration, intensity and the potential for impact on irreplaceable resources
	Highly detrimental	
	Moderately detrimental	
	Slightly detrimental	
	Negligible	
	Slightly beneficial	
	Moderately beneficial	
	Highly beneficial	
Extremely beneficial		
Likelihood of the impact occurring	Unlikely	It is highly unlikely or less than 50 % likely that an impact will occur.
	Likely	It is between 50 and 75 % certain that the impact will occur.
	Definite	It is more than 75 % certain that the impact will occur or it is definite that the impact will occur.
Significance	Very high - negative	A function of Consequence and Likelihood
	High - negative	
	Moderate - negative	
	Low - negative	
	Very low	
	Low - positive	
	Moderate - positive	
	High - positive	
Very high - positive		

Table 6.2: Impact Assessment Criteria and Rating Scales

Duration		Extent		Irreplaceable Resources		Severity		Consequence = (Duration + Extent + Irreplaceable Resources) x Severity		Likelihood		Significance (Consequence x Likelihood)		Confidence
1	Temporary	1	Footprint	1	Yes	-3	High - negative	-25 to -33	Extremely detrimental	1	Unlikely	-73 to -99	Very high - negative	Low
2	Short term	2	Site	0	No	-2	Moderate - negative	-19 to -24	Highly detrimental	2	Likely	-55 to -72	High - negative	Medium
3	Medium term	3	Local			-1	Low -negative	-13 to -18	Moderately detrimental	3	Definite	-37 to -54	Moderate - negative	High
4	Long term	4	Regional					-7 to -12	Slightly detrimental			-19 to -36	Low - negative	
		5	National			1	Low -positive	0 to -6	Negligible			0 to -18	Very low - negative	
		6	International			2	Moderate - positive							
						3	High - positive	0 to 6	Negligible			0 to 18	Very Low - positive	
								7 to 12	Slightly beneficial			19 to 36	Low - positive	
								13 to 18	Moderately beneficial			37 to 54	Moderate - positive	
								19 to 24	Highly beneficial			55 to 72	High - positive	
								25 to 33	Extremely beneficial			73 to 99	Very high - positive	

Ascribing Significance for Decision-Making

The best way of expressing these cost benefit implications for decision-making is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood)² of that event. Many risks are accepted or tolerated on a daily basis because even if the consequence of the event is serious, the likelihood that the event will occur is low. A practical example is the consequence of a parachute not opening, is potentially death but the likelihood of such an event happening is so low that parachutists are prepared to take that risk and hurl themselves out of an airplane. The risk is low because the likelihood of the consequence is low even if the consequence is potentially severe.

It is also necessary to distinguish between the event itself (as the cause) and the consequence. Again using the parachute example, the consequence of concern in the event that the parachute does not open is serious injury or death, but it does not necessarily follow that if a parachute does not open that the parachutist will die.

Various contingencies are provided to minimise the likelihood of the consequence (serious injury or death) in the event of the parachute not opening, such as a reserve parachute. In risk terms this means distinguishing between the inherent risk (the risk that a parachutist will die if the parachute does not open) and the residual risk (the risk that the parachutist will die if the parachute does not open but with the contingency of a reserve parachute) i.e. the risk before and after mitigation.

Consequence

The ascription of significance for decision-making becomes then relatively simple. It requires the consequences to be ranked and likelihood to be defined of that consequence.

In **Table 6.3** below a scoring system for consequence ranking is shown. Two important features should be noted in the table, namely that the scoring doubles as the risk increases and that there is no equivalent ‘high’ score in respect of benefits as there is for the costs. This high negative score serves to give expression to the potential for a fatal flaw where a fatal flaw would be defined as an impact that cannot be mitigated effectively and where the associated risk is accordingly untenable. Stated differently, the high score on the costs, which is not matched on the benefits side, highlights that such a fatal flaw cannot be ‘traded off’ by a benefit and would render the proposed project to be unacceptable.

Table 6.3 Ranking of Consequence

Environmental Cost	Inherent risk
Human health – morbidity/ mortality, loss of species	High
Material reductions in faunal populations, loss of livelihoods, individual economic loss	Moderate – High
Material reductions in environmental quality – air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate
Nuisance	Moderate – Low
Negative change – with no other consequences	Low
Environmental Benefits	Inherent benefit
Net improvement in human health and welfare	Medium – High
Improved environmental quality – air, soil, water. Improved individual livelihoods	Moderate
Economic development	Moderate – Low
Positive change – with no other benefits	Low

Likelihood

Although the principle is one of probability, the term ‘likelihood’ is used to give expression to a qualitative rather than quantitative assessment, because the term ‘probability’ tends to denote a mathematical/empirical expression. A set of likelihood descriptors that can be used to characterise the likelihood of the costs and benefits occurring, is presented in the table below.

² Because ‘probability’ has a specific mathematical/empirical connotation the term ‘likelihood’ is preferred in a qualitative application and is accordingly the term used in this document.

Table 6.4 Likelihood Categories and Definitions

Likelihood Descriptors	Definitions
Highly unlikely	The possibility of the consequence occurring is negligible
Unlikely but possible	The possibility of the consequence occurring is low but cannot be discounted entirely
Likely	The consequence may not occur but a balance of probability suggests it will
Highly likely	The consequence may still not occur but it is most likely that it will
Definite	The consequence will definitely occur

It is very important to recognise that the likelihood question is asked twice. The first time the question is asked is the likelihood of the cause and the second as to the likelihood of the consequence. In the tables that follow the likelihood is presented of the cause and then the likelihood of the consequence is presented. A high likelihood of a cause does not necessarily translate into a high likelihood of the consequence. As such the likelihood of the consequence is not a mathematical or statistical ‘average’ of the causes but rather a qualitative estimate in its own right.

Residual Risk

The residual risk is then determined by the consequence and the likelihood of that consequence. The residual risk categories are shown in **Table 6.5** where consequence scoring is shown in the rows and likelihood in the columns. The implications for decision-making of the different residual risk categories are shown in **Table 6.6** below.

Table 6.5 Residual Risk Categories

Consequence	High	Moderate	High	High	Fatally flawed	
	Moderate – high	Low	Moderate	High	High	High
	Moderate	Low	Moderate	Moderate	Moderate	Moderate
	Moderate – low	Low	Low	Low	Low	Moderate
	Low	Low	Low	Low	Low	Low
		Highly unlikely	Unlikely but possible	Likely	Highly likely	Definite
		Likelihood				

Table 6.6: Implications for Decision-Making of the different Residual Risk Categories

Rating	Nature of implication for Decision – Making
Low	Project can be authorised with low risk of environmental degradation
Moderate	Project can be authorised but with conditions and routine inspections
High	Project can be authorised but with strict conditions and high levels of compliance and enforcement
Fatally Flawed	The project cannot be authorised

APPENDIX 7- Specialist Declaration



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

File Reference Number:	(For official use only)
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

THE PROPOSED CONSTRUCTION OF SPRINGHAAS COLLECTOR B SUBSTATION A COLLECTOR / SWITCHING / TRANSFORMATION SUBSTATION WITH A CAPACITY OF UP TO 400kV AND ASSOCIATED INFRASTRUCTURE. NEAR DEALESVILLE, BLOEMFONTEIN, FREE STATE

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

<p>Postal address: Department of Environmental Affairs Attention: Chief Director: Integrated Environmental Authorisations Private Bag X447 Pretoria 0001</p> <p>Physical address: Department of Environmental Affairs Attention: Chief Director: Integrated Environmental Authorisations Environment House 473 Steve Biko Road Arcadia</p> <p>Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at: Email: EIAAdmin@environment.gov.za</p>
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1. SPECIALIST INFORMATION

Specialist Company Name:	ASHA Consulting (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			0
Specialist name:	Dr Jayson Orton		
Specialist Qualifications:	D.Phil (Archaeology, Oxford, UK) MA (Archaeology, UCT)		
Professional affiliation/registration:	ASAPA CRM member No. 233 APHP member No. 043		
Physical address:	23 Dover Road, Muizenberg, 7945		
Postal address:	23 Dover Road, Muizenberg		
Postal code:	7945	Cell:	083 272 3225
Telephone:	021 788 1025	Fax:	n/a
E-mail:	jayson@asha-consulting.co.za		

2. DECLARATION BY THE SPECIALIST

I, JAYSON ORTON, 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

ASHA CONSULTING (PTY) LTD

Name of Company:

Date

20 JUNE 2020

Details of Specialist, Declaration and Undertaking Under Oath

HT

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, JAYSON ORTON, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist 

ASHA CONSULTING (PTY) LTD
Name of Company

20 JUNE 2022
Date

7174227-1
H.T. GIVA HENRY THANDIKHAYA GIVA
Signature of the Commissioner of Oaths

2022-06-20
Date





environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

THE PROPOSED CONSTRUCTION OF SPRINGHAAS COLLECTOR B SUBSTATION A COLLECTOR / SWITCHING / TRANSFORMATION SUBSTATION WITH A CAPACITY OF UP TO 400kV AND ASSOCIATED INFRASTRUCTURE. NEAR DEALESVILLE, BLOEMFONTEIN, FREE STATE

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

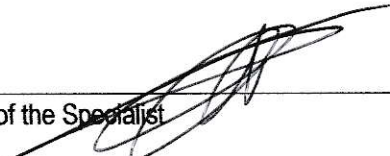
Specialist Company Name:	ASHA Consulting (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			0
Specialist name:	Dr Jayson Orton		
Specialist Qualifications:	D.Phil (Archaeology, Oxford, UK) MA (Archaeology, UCT)		
Professional affiliation/registration:	ASAPA CRM member No. 233 APHP member No. 043		
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E-mail:	jayson@asha-consulting.co.za		

2. DECLARATION BY THE SPECIALIST

I, JAYSON ORTON, 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;
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- 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



ASHA CONSULTING (PTY) LTD

Name of Company:

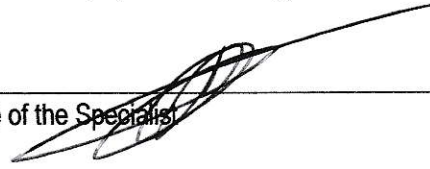
20 JUNE 2022

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, JAYSON ORTON, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist



Name of Company

ASHA CONSULTING (PTY) LTD

Date

20 JUNE 2022

Signature of the Commissioner of Oaths

7714227-1 H.T. GIVA HENRY IMANDIKHAYA GIVA

Date

2022-06-20

