HERITAGE IMPACT ASSESSMENT

In terms of Section 38(8) of the NHRA for the

Proposed development of the Roos PV Facility and associated grid infrastructure near Belfast, Mpumalanga Province

Prepared by CTS Heritage

CTS HERITAGE

For

SiVEST

May 2023

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EXECUTIVE SUMMARY

1. Site Name:

Roos PV and Grid Connection

2. Location:

The project will be located on various land parcels located in the western part of Mpumalanga, in the Emakhazeni Local Municipality. The land parcels for the entire facility are listed below:

- RE of the Farm Leeuwbank No 427
- Portion 3 of the Farm No 426
- Portion 4 of the Farm Leeuwbank No 427
- Portion 5 of the Farm Leeuwbank No 427
- Portion 6 of the Farm Zoekop No 426
- Portion 8 of the Farm Wintershoek No 423
- Portion 8 of the Farm Wintershoek No 390
- Portion 9 of the Farm Wintershoek No 390
- Portion 9 of the Farm Zoekop No 426
- Portion 14 of the Farm Generaalsdraai No 423
- Portion 16 of the Farm Zoekop No 426
- Portion 17 of the Farm Leeuwbank No 427
- Portion 19 of the Farm Leeuwbank No 427
- Portion 38 of the Farm Leeuwbank No 427

3. Locality Plan:

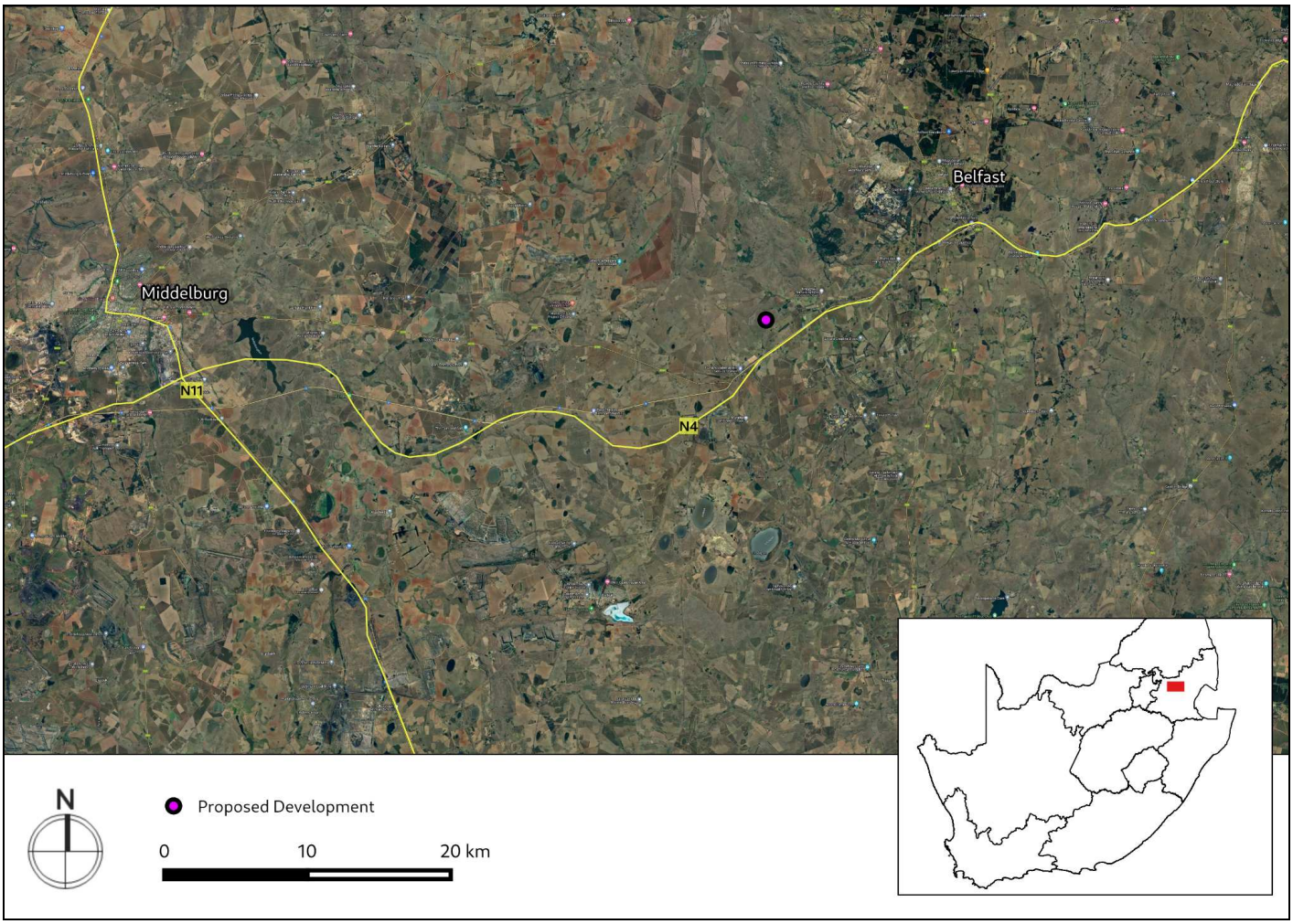

Figure A: Location of the proposed development area

4. Description of Proposed Development:

juwi South Africa (Pty) Ltd (hereafter referred to as juwi) is proposing to develop a renewable energy facility, located on various land parcels in the western part of Mpumalanga, in the Emakhazeni Local Municipality. All of the projects fall within the Emalahleni Renewable Energy Development Zone (REDZ) but outside of the strategic transmission corridor.

The Roos PV facility is envisioned to be the solar PV component of a wind and solar facility The intention is to develop (through one BA process) a solar PV facility with a maximum output capacity of 50MW and associated infrastructure on the property, depending on site sensitivities. The PV facility will be located on the portions of the properties not used for wind energy development. So far these are in the west of the area. This will be confirmed prior to commencement of the EIA process – overall 270Ha of PV development area (indicated in white shading

below) should be authorised. The associated infrastructure would include a BESS, site camp, substation and OHL, and O&M building as well as roads, fencing, civil works and bulk services.

5. Anticipated Impacts on Heritage Resources:

As noted in the desktop assessment, the broader area surrounding this proposed for this development is known for a variety of kinds of heritage resources including Stone Age and Iron Age archaeology, significant structures and living heritage sites such as significant baobab trees as well as burial grounds and graves. The survey results confirm these findings. The survey proceeded with limited constraints and limitations, and the project area was comprehensively surveyed for heritage resources.

The Iron Age remains identified in the field assessment likely reflect a much more extensive past settlement and as such, CTS Heritage has mapped out the areas of high archaeological sensitivity associated with this. These areas are reflected in RED in the maps above and must be considered strict no-development areas as the likelihood of impacting significant archaeological heritage in these areas is VERY HIGH.

6. Recommendations:

There is no objection to the proposed development from a heritage perspective on condition that:

- A no development buffer of 100m is implemented around site 004. This is largely respected in the final layout provided.
- A no development buffer of 100m is implemented around site 003 and 009. This is respected in the final layout provided.
- The identified sensitive archaeology areas in Figure 6.1 and 6.2 are not impacted by the development of any new infrastructure, including fencing. This is largely respected in the final layout provided.
- A Heritage Management Plan and Heritage Agreement are drafted for the ongoing conservation of the significant Iron Age resources identified.
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

Details of Specialist who prepared the HIA

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, currently heads up the heritage division of the organisation, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is a member of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009.

Since 2016, Jenna has drafted over 250 Screening and Heritage Impact Assessments throughout South Africa.

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1. INTRODUCTION

1.1 Background Information on Project

juwi South Africa (Pty) Ltd (hereafter referred to as juwi) is proposing to develop a renewable energy cluster, located on various land parcels in the western part of Mpumalanga, in the Emakhazeni Local Municipality. All of the projects fall within the Emalahleni Renewable Energy Development Zone (REDZ) but outside of the strategic transmission corridor.

The Roos PV facility is envisioned to be the solar PV component of a wind and solar facility The intention is to develop (through one BA process) a solar PV facility with a maximum output capacity of 50MW and associated infrastructure on the property, depending on site sensitivities. The PV facility will be located on the portions of the properties not used for wind energy development. So far these are in the west of the area. This will be confirmed prior to commencement of the EIA process – overall 270Ha of PV development area (indicated in white shading below) should be authorised. The associated infrastructure would include a BESS, site camp, substation and OHL, and O&M building as well as roads, fencing, civil works and bulk services.

According to the results of the DFFE Screening Tool, the area proposed for development has LOW sensitivity for impacts to archaeology and cultural heritage and VERY HIGH sensitivity for impacts to palaeontology.

The site is located within the Renewable Energy Development Zone (REDZ) but outside the Power Corridor.

Table 1: Refer to the table below for the key project information. The facility consists of the following:

TECHNICAL DETAILS	
PV panels	▪ Mounting: Fixed-tilt PV, single-axis tracking PV or double-axis tracking PV. ▪ Module type: mono- or bi-facial ▪ up to approx. 3.5m PV panels
Access roads	▪ Main site access: Up to 8m, during construction and operation ▪ Internal roads: Approx. 4 - 5m, during construction and operation ▪ Existing roads will be utilised as far as reasonably possible and upgraded where necessary. Upgraded width: Up to 8m.
On-site Substation	▪ Substation will generally be stepping up from 22kV or 33kV to 88kV or 132kV. ▪ Maximum height of on-site substations: up to 10 m ▪ The proposed project will include one on-site substation hub incorporating the facility substation, switchyard, collector infrastructure, battery energy storage system (BESS) and associated O&M buildings.). ▪ Onsite substation size: Up to 4ha (for on-site substation hub)
Construction camp	▪ No construction camps would be developed, and labour would be sourced from nearby areas, as per relevant procurement requirements.

Temporary construction laydown / staging area	▪ Temporary Laydown Area: up to approximately 7 ha. ▪ Locations: TBC
Operation and Maintenance (O&M) buildings	▪ All Auxiliary buildings to be developed include, but are not limited to: O&M building, site office, staff lockers, bathrooms, warehouses, etc. ▪ Footprint up to 0.5 ha (i.e., 5000 m^2) Height (m): Up to 10 m
On-site IPP Electrical infrastructure	▪ *"Cables will be laid underground wherever technically feasible, with overhead 33kV lines grouping PV areas to crossing valleys and ridges to get to the on-site substation."* ▪ The proposed project will include one on-site substation hub incorporating the facility substation, switchyard, collector infrastructure, battery energy storage system (BESS) and associated O&M buildings.). ▪ Internal underground lines of up to 33 kV (22kV or 33kV). ▪ Substation will generally be stepping up from 22kV or 33kV to 88kV or 132kV. ▪ Depth (m): Up to 1.5 m
Fencing	▪ Height: Up to 3m ▪ The entire perimeter of the proposed facility will be secured. ▪ Length: TBC ▪ Type: Could be Palisade or mesh or fully electrified.
Boreholes and storage tanks (if applicable)	▪ If required, a 10,000l storage tank may be located on site for water storage.
Battery Energy Storage Systems	▪ Capacity in MWh: Up to 500MW/ 500MWh ▪ Size in hectare - A BESS would be developed within the substation/electrical infrastructure hub footprint, if required. ▪ Height: Up to 8 m ▪ Technology type (i.e.: Li-Ion solid state/Redox flow) Electrochemical Batteries including: a. Lead Acid and Advanced Lead Acid b. Lithium ion, NiCd, NiMH-based Batteries c. High Temperature (NaS, Na-NiCl2, Mg/PB-Sb) d. Flow Batteries (VRFB, Zn-Fe, Zn-Br) The BESS would therefore comprise the selected batteries together with chargers, inverters and related equipment.
Estimated number of employment opportunities generated by each PV project	▪ Construction phase: 100 (skills split would be in line with applicable procurement requirements but would be roughly 60% low-skilled, 25% semi-skilled and 15% skilled) ▪ Operational phase: 10 (skills split would be in line with applicable procurement requirements but would be roughly 70% low skilled, 25% semi-skilled and 5% skilled ▪ Decommissioning phase: unknown

Construction: Methodology	▪ The facility would be constructed in the following sequence: 1) Final design and micro-siting of the infrastructure based on topographical conditions and environmental sensitivities, and following obtaining required environmental permits. 2) Vegetation clearance and construction of access roads (where required) 3) Construction of foundations 4) Assembly and erection of infrastructure on site 5) Stringing of inverters 6) Rehabilitation of disturbed areas 7) Continued maintenance
Construction: Duration and start date	Up to 12-18 months, start date is dependent upon award of a bid. Construction activities could take place concurrently.

1.2 Description of Property and Affected Environment

The proposed Roos solar PV project lies about 15km southwest of eMakhazeni (Belfast) in Mpumalanga and lies immediately adjacent to the N4 highway. The AFGRI Wonderfontein Silo and PUMA Service Station are situated a little further southwest along the N4 from the development area and the main railway line between eMakhazeni and Wonderfontein splits the northern part of the study area. A smaller PV area lies south of the N4 around the Winchester werf and old Leeuwbank farm while the bulk of the PV assessment areas within the study site lie north of the N4 around the Vaalkop werf.

The southern PV area is entirely covered in maize fields. The terrain slopes gently in a southerly direction and crops are generally rotated between soya and maize with convenient access to the AFGRI storage facilities across the road from the farm. The northern PV areas around Vaalkop consist of a mix of maize fields lining the eastern end and grassland veld for cattle grazing. Light to larger scale industrial works have a left a strong footprint such as the abandoned railway line route bordering the very large stand of gum trees, the ruined airstrip and the various large agricultural storage hubs. A fairly large housing development has grown to the west of the study site on the other side of the railway line and borrow pits from previous roadworks straddle the immediate zone bordering the highway. The area north of the railway line near Vaalkop marks a boundary in the landscape character as the relatively level plateau surrounding the highway breaks up into hillier ground cut through by streams feeding into Generalsdraai farm. This area is actively devoted to cattle farming and older werfs, now ruined, lie in the clumps of gum trees as well as ruins of Iron Age settlements.

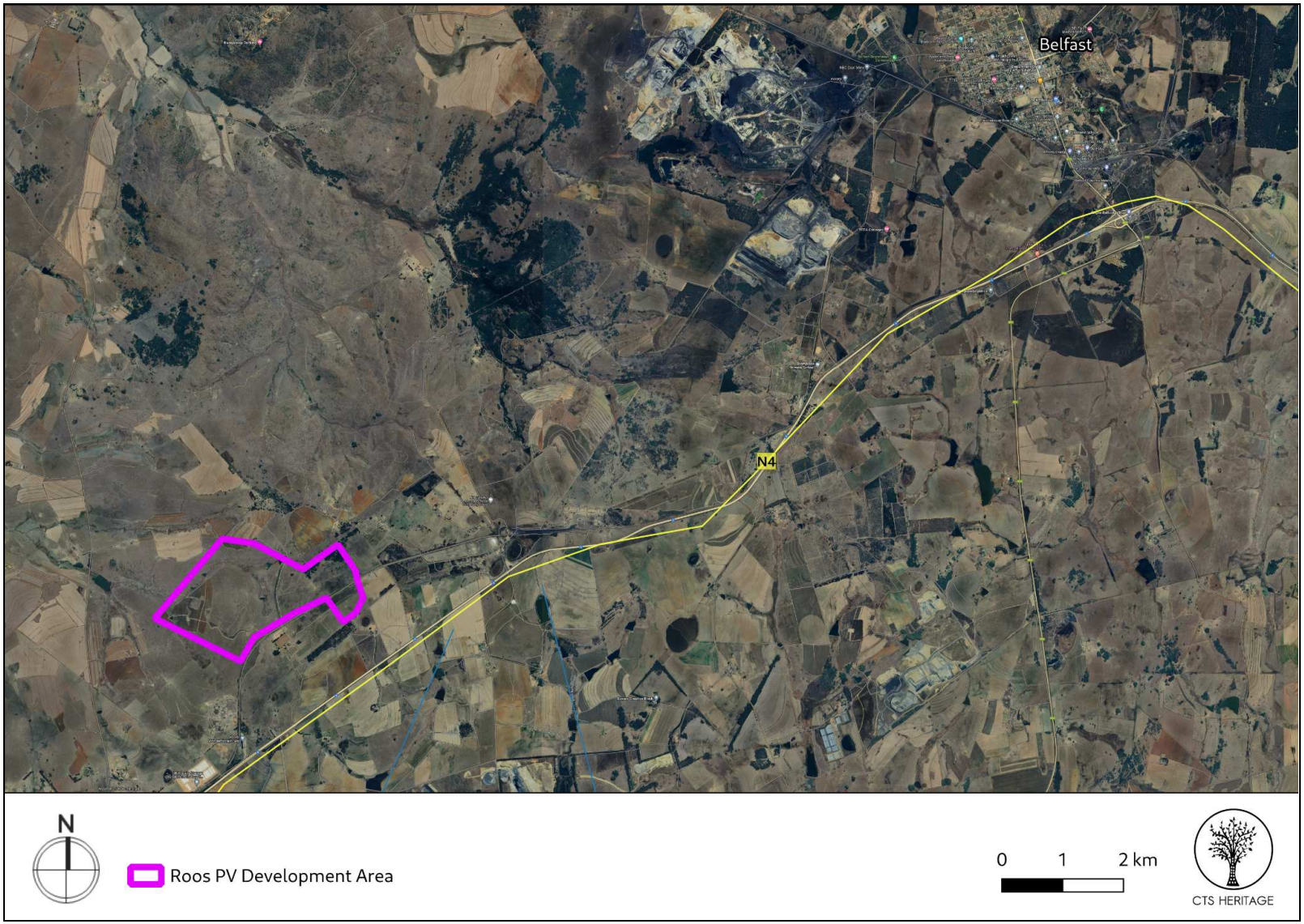

Figure 1.1: The location of the proposed development

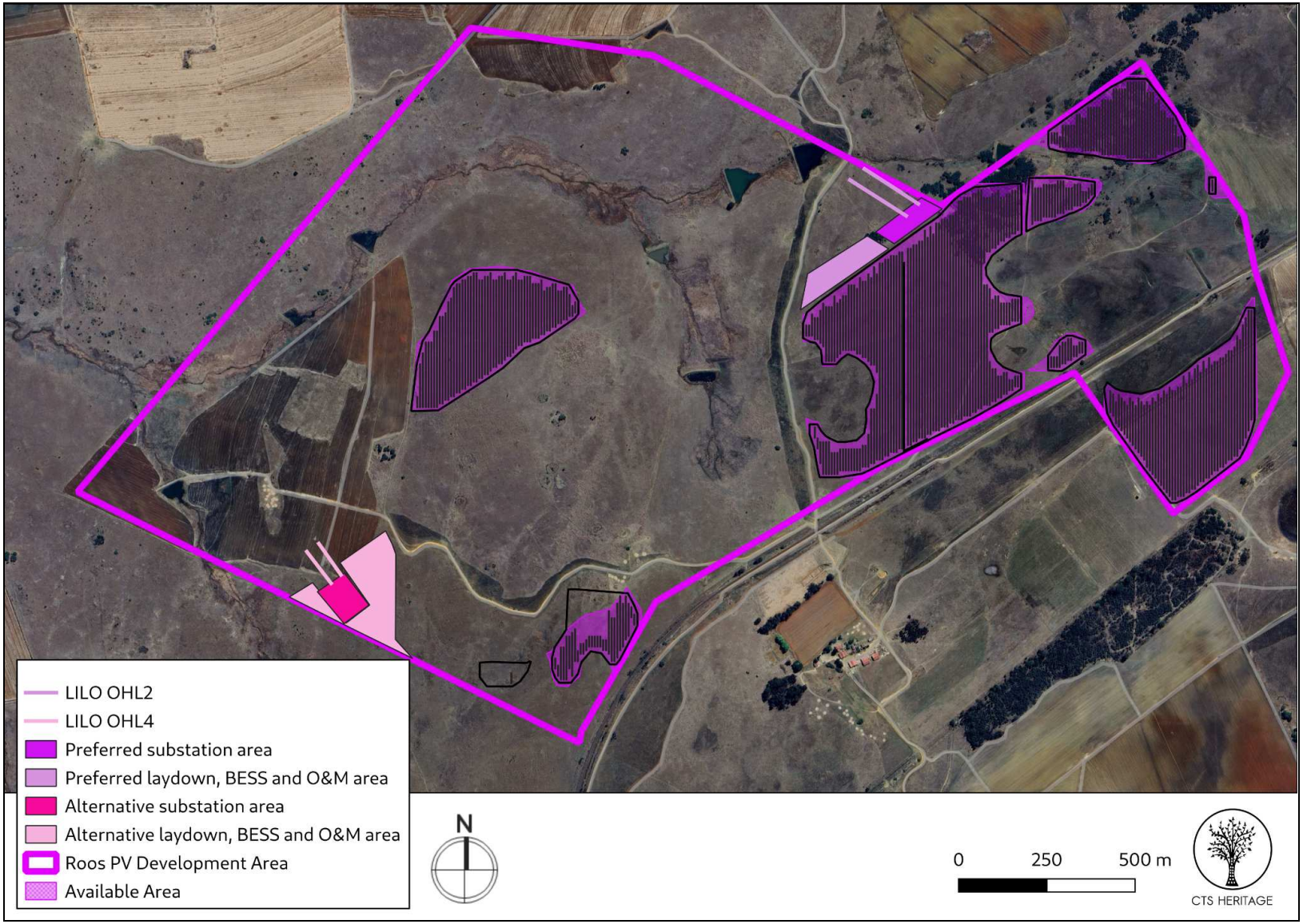

Figure 1.2: The final development layout of the PV facility

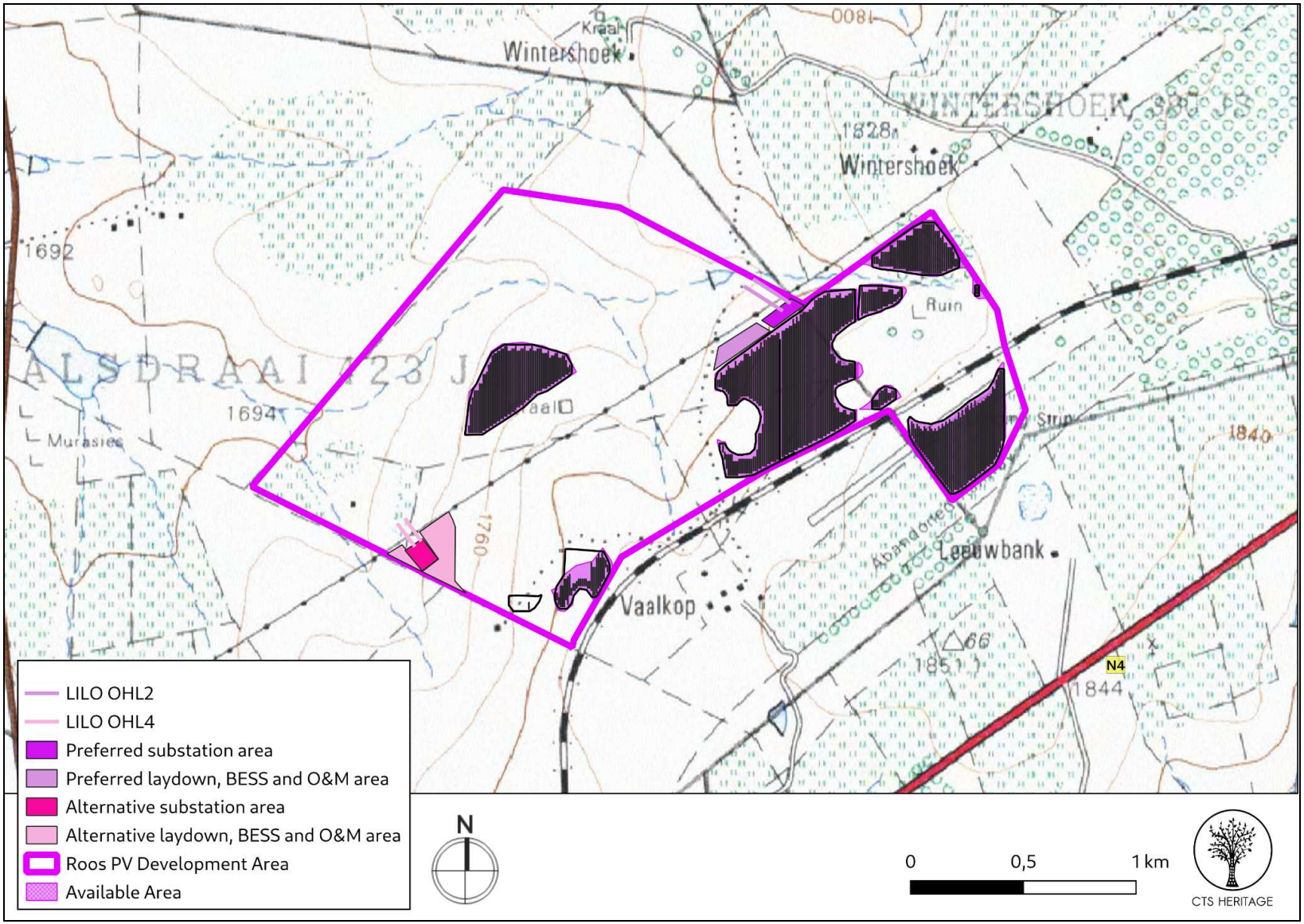

Figure 1.3: The final development layout of the PV facility on an extract of the 1:50 000 Topo Map

2. METHODOLOGY

2.1 Purpose of HIA

The purpose of this Heritage Impact Assessment (HIA) is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999).

2.2 Summary of steps followed

- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used)
- An archaeologist conducted an assessment of archaeological resources likely to be disturbed by the proposed development. The archaeologists conducted their site visit on 26 March 2023
- A palaeontologist conducted a field assessment of palaeontological resources likely to be disturbed by the proposed development on 21 March 2023.
- The identified resources were assessed to evaluate their heritage significance and impacts to these resources were assessed.
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

2.3 Assumptions and uncertainties

- The *significance* of the sites and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

- It should be noted that archaeological and palaeontological deposits often occur below ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted, and it would be required that the heritage consultants are notified for an investigation and evaluation of the find(s) to take place.

However, despite this, sufficient time and expertise was allocated to provide an accurate assessment of the heritage sensitivity of the area.

2.4 Constraints & Limitations

Heavy vegetation cover is present throughout the study site, either in the form of active maize and soya crops at the time of survey, or in the extensive grassland covering the grazing areas. This significantly reduces the visibility of surface material from the Stone Age and Iron Age. However, the various ruined Iron Age stone walled

structures are prominent and are relatively well defined once located in the veld. A combination of desktop studies was used to include satellite aerial photography from different years and seasons to aid the on-site survey as areas had become overgrown with the recent heavy rains.

The experience of the archaeologist and the coverage of the survey has given us enough confidence to accurately account for the heritage sensitivities observed within the study site.

2.5 SiVEST Impact Assessment Methodology

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

2.5.1 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in **Table 1**.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

2.5.2 Impact Rating System

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

- Planning;
- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

Table 1: Rating of impacts criteria

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity.		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence)
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.

IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact results in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
SIGNIFICANCE (S)		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:		

Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	**Impact Significance Rating**	**Description**
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

The area proposed for this Renewable Energy Development is located immediately in the area between Middelburg and Belfast in Mpumalanga. This area is known for its agriculture, rolling hills and extensive granite and coal mine infrastructure. Middelburg was initially established as a halfway station between Lydenburg and Pretoria by the Republic of Lydenburg in 1860.

Cultural Landscape

Angel (2017) notes that "Early farming communities moved into the Mpumalanga area around AD 500. These early farmers used metal tools and pottery and lived in fairly permanent agricultural villages. The most well known EIA site in the area is the Lydenburg Heads site in the Sterkstroom Valley." She goes on to note that "Late Farmer societies developed extensive stone settlements around Lydenburg, Badfontein, Sekhukhuneland, Roossenekal and Steelpoort. The greater Belfast area specifically, is known for its large complexes of LIA stonewalling." Hardwick and Du Pisanie (2019) note that "migration, population growth, climatic variation and trade to the east significantly impacted the Pedi, Koni and other groups on the Mpumalanga Highveld. The rise of power blocs, including violent displacement and political centralisation, characterised this time." They go on to note that "As a result of social and political upheaval, the Mpumalanga Highveld was vulnerable to intrusive groups including the Swazi and the Voortrekkers."

Hardwick and Du Pisanie (2019) note that "Soon after settling in the Mpumalanga Highveld area, the Trekboers (now farmers) discovered and exploited the Highveld Coalfields. The Boers originally used the coal as a domestic resource; however the discovery of gold in the Witwatersrand in 1886 created an enormous demand for this coal." This continued until the out-break of the South African War in 1899. Hardwick and Du Pisanie (2019) identify two notable battles associated with this war within the broader study area - the Battles of Lake Chrissie (February 6th, 1900) and Bakenlaagte (October 30th, 1901). It has been reported that three concentration camps were situated in the town. Many battles and skirmishes took place in the First and Second Anglo-Boer Wars, including Berg-en-Dal (also known as the Battle of Dalmanutha), Helvetia, and the Battle of Leliefontein[1]. Van Schalkwyk (2017) notes that "The cultural landscape qualities of the region essentially consist of two components. The first is made up of a pre-colonial (Stone Age and Iron Age) occupation. The second component is a rural settlement largely based on farming, but also in which coal mining activities in recent years contributed to a densification of settlement and concurrent business development."

This brief history points to the layered cultural landscape that is present in this area. Furthermore, it is evident from the known heritage resources located in proximity to the development area (Figure 3 and Appendix 1) that

[1] https://lowvelder.co.za/782428/mpumalanga-heritage-society-takes-the-road-less-travelled-through-belfast/

the known heritage resources are dominated by burial grounds and graves, structures and stone walling. Due to the scale of the proposed development, and the potential for cumulative impact, it is likely to change the sense of place associated with this landscape, and may impact the way that this historic landscape reads by obscuring layers of the past. Cognisance must be taken of this unique cultural landscape, consisting of farm werfs etc in the proposed layout. Based on the desktop assessment, this area has MODERATE sensitivity for impacts to the cultural landscape. In order to mitigate this impact, it is recommended that a 500m no development be implemented around the N4 route between Middelburg and Belfast. This recommendation is based on best-practice precedent for PV development.

Archaeology

None of the area proposed for development has been previously assessed in any heritage impact assessment process. Heritage Impact Assessments have been completed nearby for projects near to Belfast and these can be used to infer the archaeological sensitivity in the development area. Hardwick and Du Pisanie (2019) note that there are no known Stone Age sites located within the broader study area; however MSA and LSA resources are known from other places in Mpumalanga. In an assessment completed for a mining project located adjacent to the area proposed for development, Angel (2017) notes that "An Earlier Stone Age (ESA) site is located at Maleoskop near Groblersdal. Concentrations of ESA stone tools were found in erosion gullies along the Rietspruit (Esterhuysen & Smith, 2007). Evidence for the Middle Stone Age (MSA) period has been excavated from Bushman Rock Shelter, situated on the farm Klipfonteinhoek in the Ohrigstad District. The MSA layers indicated that the cave was visited repeatedly over a long period, between approximately 40 000 years ago and 27 000 years Before Present (Esterhuysen & Smith, 2007). Two Later Stone Age (LSA) sites were found at the farm Honingklip near Badplaas in the Carolina District, (Esterhuysen & Smith, 2007)."

Angel (2017) notes that the greater Belfast area specifically, is known for its large complexes of LIA stonewalling. Surveys of aerial photographs from the general area were undertaken in the 1960s and 1970 and identified a vast number of such settlements between Lydenburg and Machadodorp. These are not evenly distributed over the area, largely for topographical reasons (Evers, 1975). Angel (2017) notes that these settlements typically consisted of three interrelated elements: homesteads, with cattle kraals surrounded by enclosures for human habitation; stone-edged paths or roadways, probably for movement of cattle; and stone terraces, for agricultural cultivation. Most of the homesteads were built in symmetrical patterns, some of which were reproduced in rock engravings found close to these settlements (Delius and Hay; 2009).

According to Van Schalkwyk's report completed for a project located just outside of Belfast (2021), "Archaeological sites identified in the region date to the Late Iron Age, and it seems as if they can be divided into two distinct categories. The older of these are sites with quite high walls and are conventionally linked with the

Koni-group of people that have been settled in the region since the 1600s. The second groups of sites also have stone walling, but this is in most cases much less developed, in many cases making them difficult to detect. This latter group of sites probably date to a later period and can also be linked to settlement during early historic times of Ndebele- and Swazi-speakers in the region. The large and complex site of Kwasimkhulu west of the project area, is associated with the Ndebele occupation of the region and date from the mid-1600s. According to oral tradition this was the first site settled by Ndzundza-Ndebele when they arrived in the region."

While no known sites have been formally recorded within or near the development area, aerial imagery has enabled us to identify a number of features that are very likely to be associated with Late Iron Age occupation of the area. As the development area has not previously been assessed, these features require ground-truthing however, based on the available information it is very likely that the proposed development will impact negatively on archaeological resources associated with the Late Iron Age and also likely burial grounds and graves as well as stone age archaeological resources. Areas of high archaeological sensitivity based on a survey of aerial imagery as well as the topographic map for the area have been mapped in the desktop heritage screening assessment (Appendix 3). This area was further investigated in the field assessment completed.

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for the development of the Roos PV Facility is predominantly underlain by sediments of zero palaeontological sensitivity however some of the southern sections may impact on sediments which have very high palaeontological sensitivity (Figure 4a). According to the extract from the Council of Science Map for Pretoria 2528 (Figure 4b), the geology underlying this development area is ascribed to the Dullstroom Formation (Zero sensitivity) and the Vryheid Formation (Very High sensitivity). Groenewald (2014, SAHRIS NID 167013) completed a field-based palaeontological assessment for the Waaihoek WEF in which he interrogates the palaeontological sensitivity of this formation. In this assessment, Groenewald (2014) notes that "The Vryheid Formation consists of interbedded very coarse-grained sandstone and mudstone that yields plant and trace fossils as well as some prominent coal seams." In this assessment, Groenewald (2014) made the following recommendations for the WEF development within the Vryheid Formation "The PEA and CEO be made aware of the possibility of finding fossils in the Vryheid and Volksrust Formation sediments during excavation of the foundations for the turbines and other infrastructure. A professional palaeontologist is appointed to monitor possible palaeontological finds during excavation of turbine foundations and infrastructure where turbine positions and infrastructure fall on Vryheid and Volksrust Formation sediments." The sediments underlying the development area have very high levels of palaeontological sensitivity, the nature of the excavations associated with Renewable Energy facilities tends to be deep and as such, the likelihood of impacting intact Vryheid Formation sediments is high.

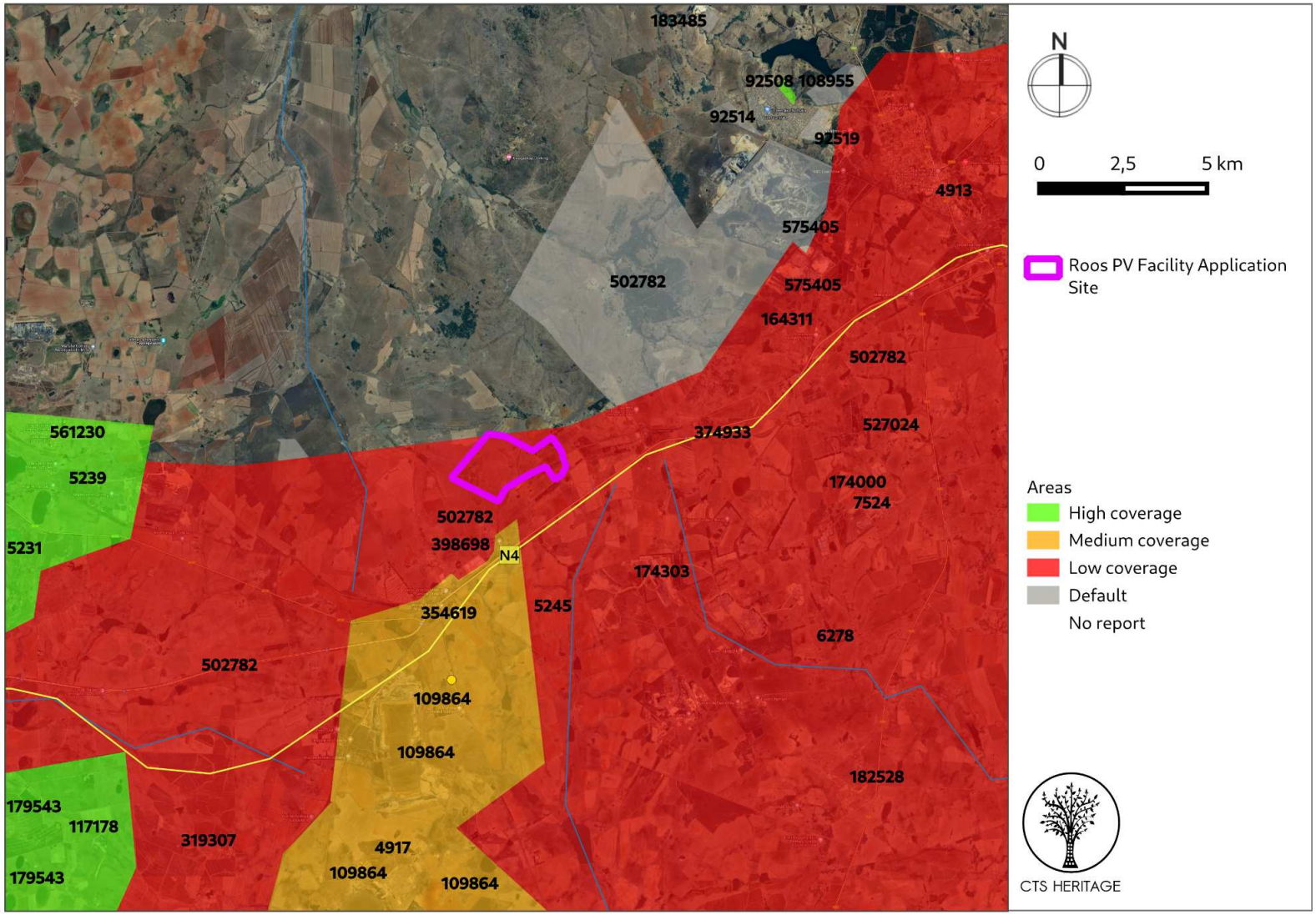

Figure 2: Spatialisation of heritage assessments conducted in proximity to the proposed development

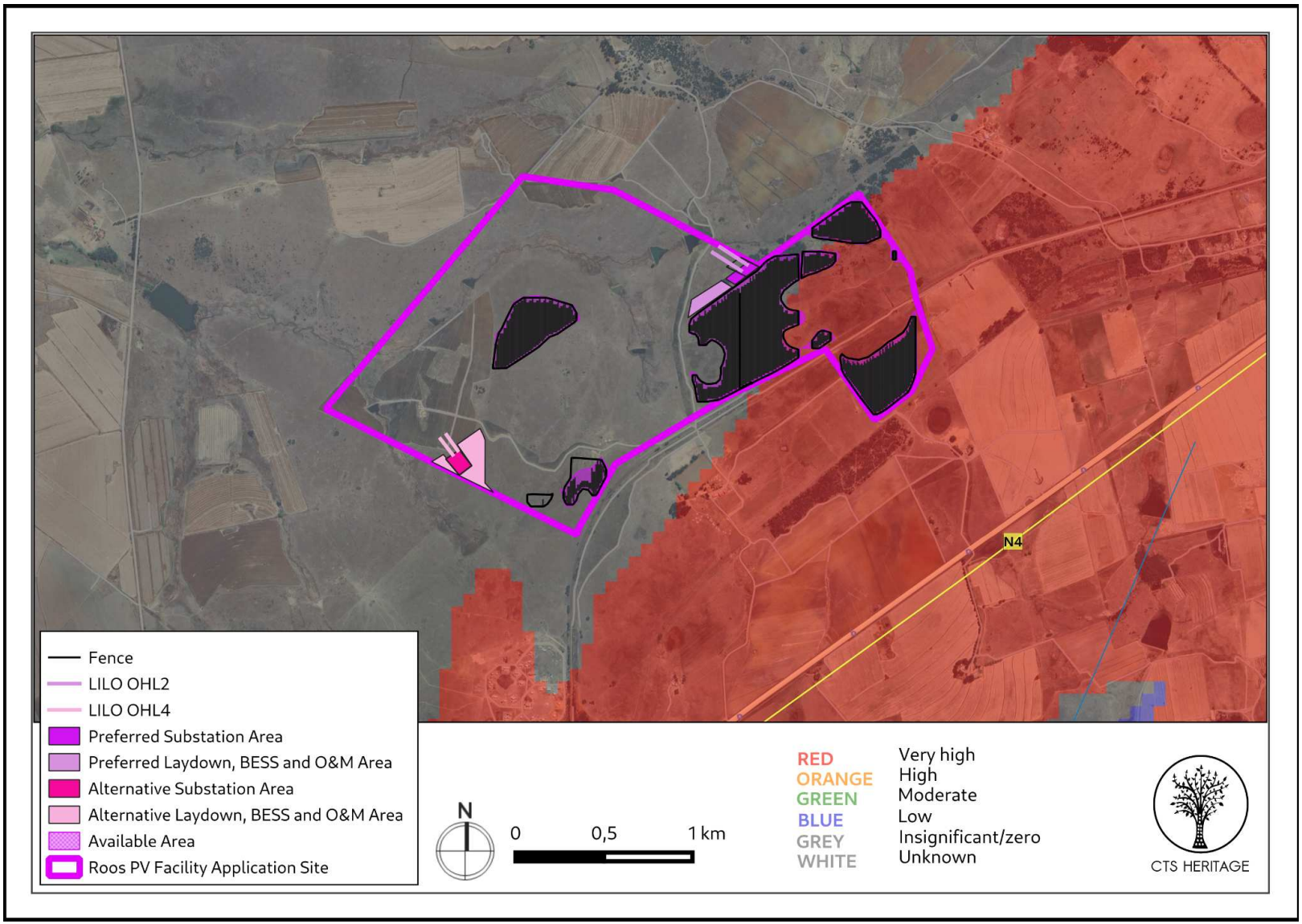

Figure 3.1: Palaeontological sensitivity of the proposed development area

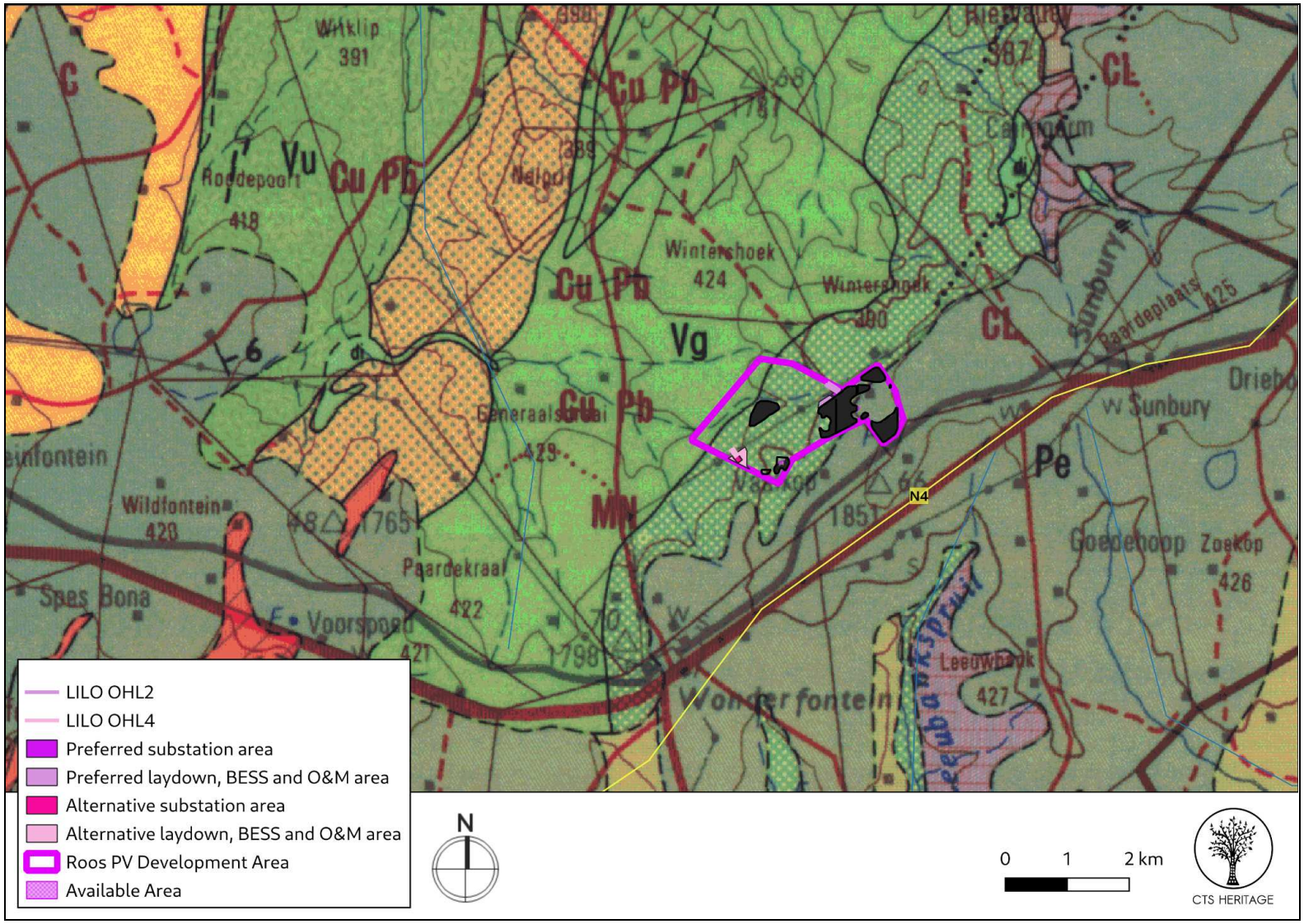

Figure 3.2. Geology Map. Extract from the CGS 2528 Pretoria Map indicating that the development area for the REF development is underlain by sediments of Vg: Rustenburg Suit sediments and Pe: Ecca Group sediments (Vryheid Formation)

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

Archaeology (Appendix 1)

The most important heritage resources recorded lie north of the railway line in the northern zone of the project site. A series of Iron Age stone walled settlements were located in two clusters. A small cluster lies in the northeastern corner of the study area and has been affected by maize farming in the past with recent ploughing running right up to the boundaries of the walling. The larger and better preserved site lies in view of the northeastern cluster at roughly the same elevation on a larger slope on the southwestern side of the small valley between the clusters. The walling is extensive in this area and a number of areas were completely overgrown by bush and veld. Rectangular stone walling features are also present which are more recent, possibly late 19th century to early 20th century farming kraals.

Besides the Iron Age settlements, an historical homestead was also recorded which is ruined amongst clumps of trees near Winterhoek. Ruined stables, the homestead complex and entrance ways were recorded and much of the features are still relatively intact.

Palaeontology (Appendix 2)

The palaeontological sensitivity of the area under consideration is presented in Figure 5 and lies on the norite and leucogranites of the Rustenburg Layered Suite and on the Vryheid Formation (Ecca Group, Karoo Supergroup). The Bushveld Igneous Complex rocks are intrusive volcanic rocks that have been metamorphosed. They do not preserve any fossils.

The Vryheid Formation lies on the uneven topography of pre-Karoo or Dwyka Group rocks in the northern and northwestern margins, but lies directly on the Pietermaritzburg Formation in the central and eastern part. The lithofacies show a number of upward-coarsening cycles, some very thick, and they are essentially deltaic in origin. There are also delta-front deposits, evidence of delta switching, and fluvial deposits with associated meandering rivers, braided streams, back swamps or interfluves and abandoned channels (Cadle et al., 1993; Cairncross, 1990; 2001; Johnson et al., 2006). Coal seams originated where peat swamps developed on broad abandoned alluvial plains, and less commonly in the backswamps or interfluves. Most of the economically important coal seams occur in the fluvial successions (ibid). In the east (Mpumalanga and northern KwaZulu Natal), the Vryheid formation can be subdivided into a lower fluvial-dominated deltaic interval, a middle fluvial interval, and an upper fluvial-dominated deltaic interval again (Taverner-Smith et al., 1988).

The Vryheid Formation preserves the distinctive Gondwanan flora, the *Glossopteris* flora. As the climate warmed up and the huge continent drifted polewards the land was rapidly colonised by luxuriant vegetation, in some parts.

Peats formed in waterlogged environments and over time were buried, preserved and altered by heat and pressure to eventually form the coal seams typical of this formation and abundant in Mpumalanga and KwaZulu Natal coalfields. Coals themselves do not preserve the original plant structures, but plant impressions or compressions can be preserved in the lenses between the coals or in fine grained sediments. The flora is composed of the dominant *Glossopteris* plants (leaves, seeds, reproductive structures, roots and wood). Other plants are lycopods, sphenophytes, ferns, cordaitaleans and other early gymnosperms. Vertebrates are not found with the fossil plants because they require a different set of conditions for preservations. Plants require rapid burial in a reducing and anoxic environment, while bones can be preserved in oxidizing environments (Cowan, 1995).

4.2 Heritage Resources identified

In terms of the heritage resources identified in the archaeological field assessment, see Table 2 below and Appendix 1 for full descriptions and images.

Table 2: Artefacts identified during the field assessment development area

POINT ID	Description	Type	Period	Density	Co-ordinates		Grading	Mitigation
003	Ruined stone walled Stables, kraal, four columns still in good condition	Ruin	Historic	n/a	-25.769016	29.926346	IIIC	50m Buffer
004	Ruined sandstone homestead, overgrown by trees, was quite a large and well built building	Ruin	Historic	n/a	-25.768213	29.926725	IIIB	100m Buffer
006	Northeastern Iron Age ruins amongst boulders	Ruin	Iron Age	n/a	-25.76402	29.914532	IIIC	50m Buffer
008	Main Iron Age site spanning the ridgeline and plunging down the slope	Ruin	Iron Age	n/a	-25.778	29.911048	IIIB	See mapped area of high sensitivity
009	Large rectangular historical kraal, stone walls	Ruin	Historic	n/a	-25.771752	29.911457	IIIC	50m Buffer

4.3 Mapping and spatialisation of heritage resources

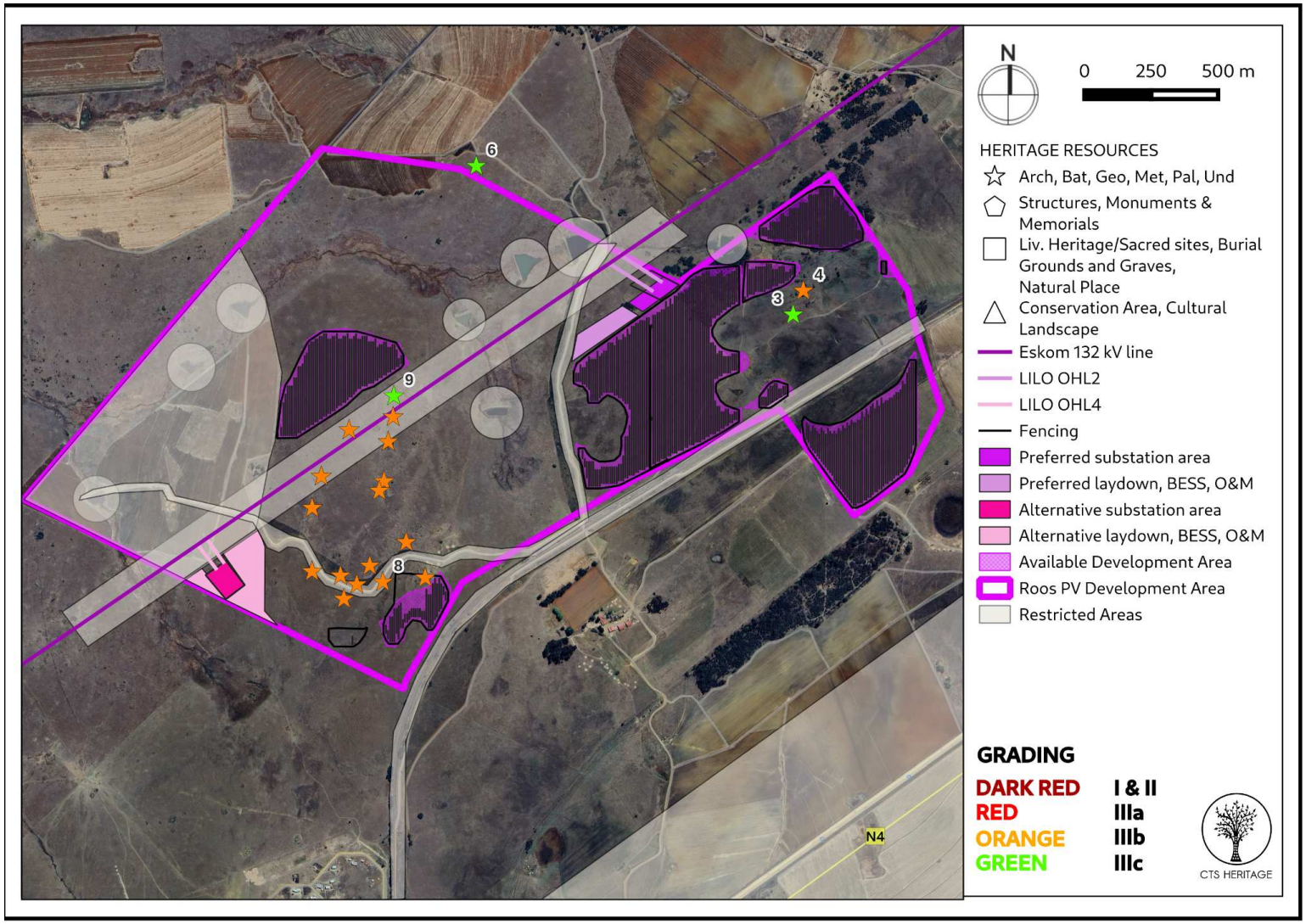

Figure 5.1: All heritage resources within proximity to the development area

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

5.1.1 Cultural Landscape and VIA

According to the VIA Sensitivity Report completed for this project, "The scenic quality of the proposed development site is rated Medium. Landform is rated Medium to Low, as while there are steep slopes that do add local scenic quality, they are not topographically significant. The grassland vegetation depicts some variety, but only one of two major types. Water is apparent in the landscape in the form of a series of small farm dams linked by the two small drainage lines. These features add to the site landscape character. Colours are predominantly grassland related, with khaki browns being the dominant colour. The adjacent scenery is dominated by undulating grassland, and moderately enhances the overall visual quality. Scarcity is rated Medium as the local landscape is distinctive, though somewhat similar to the others within the region."

Table 3: Landscape Elements

Landscape Element	Mitigation	Motivation
Steep slope areas, ridgeline and steep sided valley.	Exclusion	The steep slope areas to the central south should be excluded from the development area.
Farm labour dwelling buffer 50m	Exclusion	Farm labour dwellings were located on the southern portion of the proposed development area. These area should be excluded from development (subject to SIA findings)
Dams and drainage lines	Exclusion	Numerous small farm dams occur in the two drainage lines. These features are a key aspect of the local landscape and should be excluded from the development area.

The VIA Sensitivity Report finds that "the proposed PV development is not a Fatal Flaw, but that there are aspects of the proposed development site that would need to be excluded. A full VIA is there-fore recommended to ensure that local landscape and visual resources are not further degraded."

In terms of impacts to the cultural landscape, the findings of the VIA Site Sensitivity Report are supported from a heritage perspective to mitigate negative impacts to the cultural landscape.

5.1.2 Archaeology

The results of the field assessment confirm the findings of the desktop assessment and a number of features that are very likely to be associated with Late Iron Age occupation of the area have been identified (Observation 008 and 006). The proposed development will impact negatively on archaeological resources associated with the Late Iron Age and also likely burial grounds and graves as well as stone age archaeological resources. Areas of high archaeological sensitivity based on a survey of aerial imagery as well as the topographic map for the area and the results of the field assessment have been mapped in Figure below. Based on the results of the field assessment, this demarcated area has HIGH sensitivity for impacts to archaeological heritage.

Of the 8 archaeological observations made during the field assessment, observations 001, 002, 005 and 007 are structures that have been determined to have no cultural value and are therefore considered to be Not Conservation-Worthy from a heritage perspective and are not considered further here. Of the remaining sites, Observation 004 represents an historic homestead of some stature and architectural value and as such, this site is graded IIIB. It is recommended that this site be buffered from the proposed by the implementation of a 100m no development area around the structure to retain some sense of place and to ensure that no buried archaeology associated with the structure is negatively impacted by the development.

The remaining sites - 003 and 009 - represent historic kraals associated with the historical farming practices of the area. It is recommended that a no development buffer of 50m be implemented around these sites to ensure their conservation.

As noted above, the Iron Age remains identified in the field assessment as Site 008 likely reflect a much more extensive past settlement and as such, CTS Heritage has mapped out the areas of high archaeological sensitivity associated with this. These areas are reflected in RED in the maps below and must be considered strict no-development areas as the likelihood of impacting significant archaeological heritage in these areas is VERY HIGH. This directly impacts the proposed layout for PV Site 1. It is recommended that the layout for PV Site 1 be adjusted to ensure that the area marked as HIGH SENSITIVITY is not impacted by any development activities.

Sites 003 and 004 are located within the PV Site 4. It is recommended that the layout for PV Site 4 be adjusted to ensure that the buffer areas identified are not impacted by any development activities.

No significant heritage resources were identified within the areas proposed for PV Site 2 and PV Site 3.

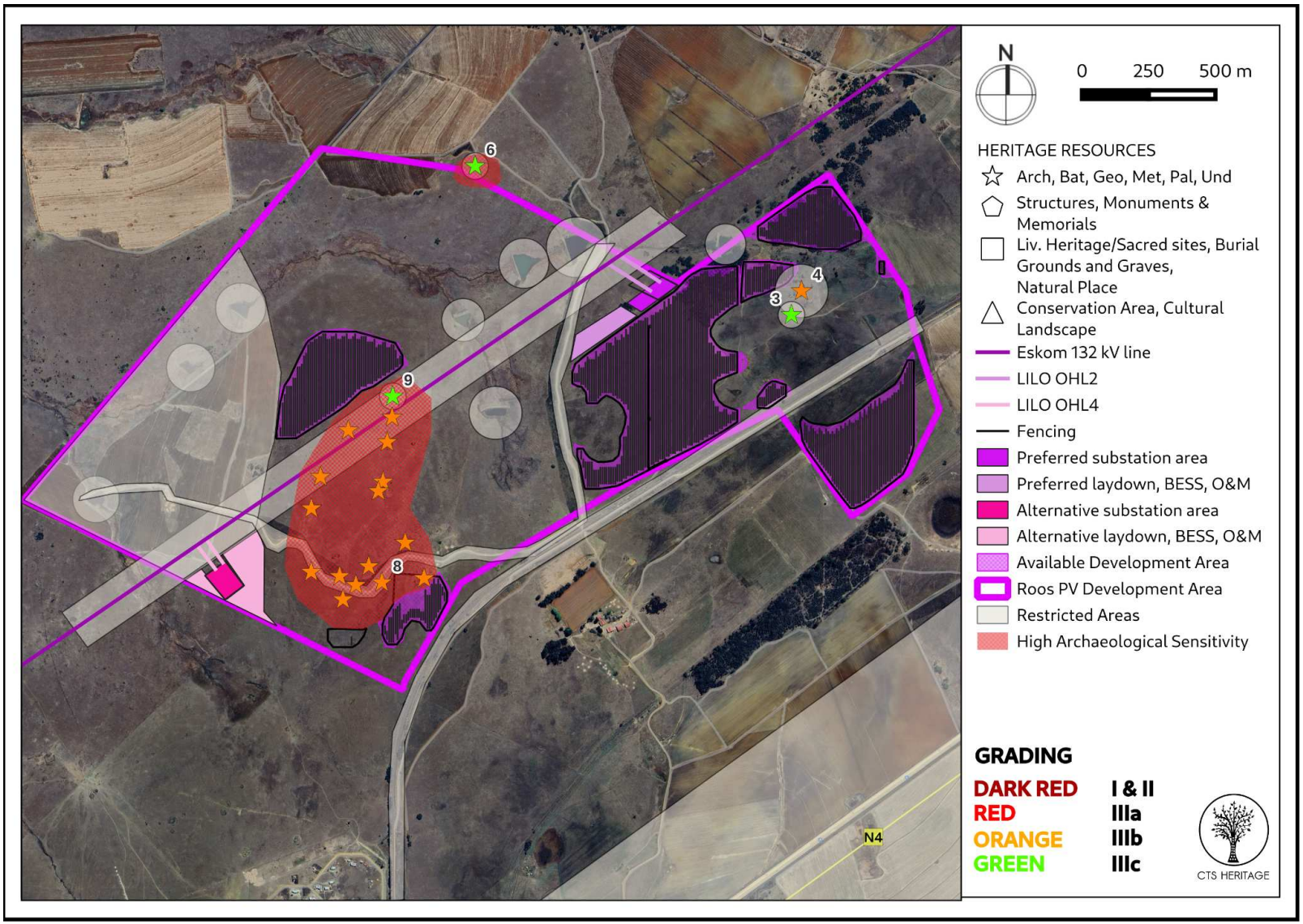

Figure 6.1: All heritage resources within proximity to the development area

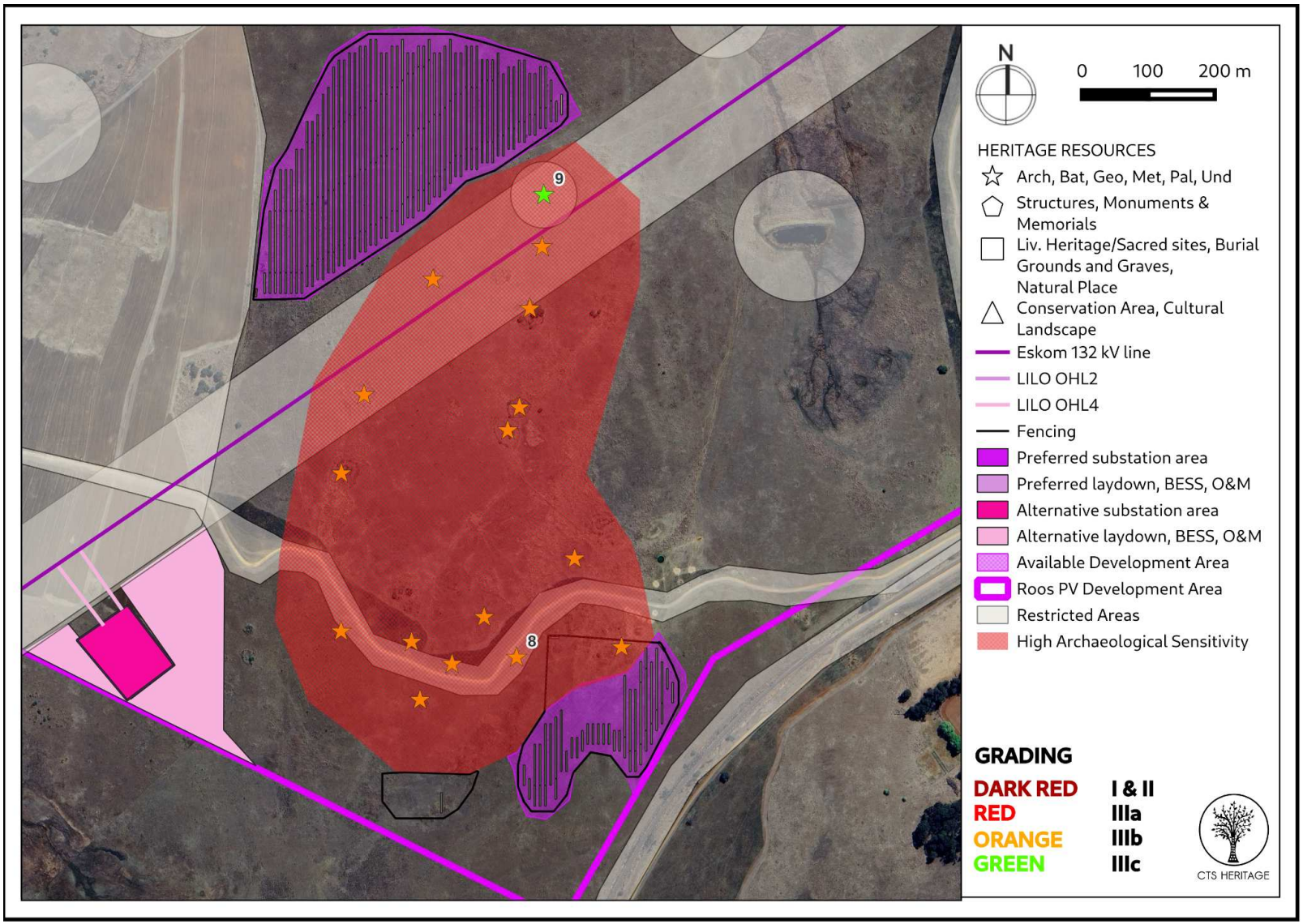

Figure 6.2: All heritage resources within proximity to the development area

5.1.3 Palaeontology

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that some of the rocks are the correct age and type to preserve fossils. The site visit and walk through confirmed that there were NO FOSSILS of any significance in the project footprint. Furthermore, the surface material to be excavated is soil and this does not preserve fossils. Since there is a small chance that fossils from the Vryheid Formation might occur below ground and might be disturbed when excavations commence for foundations and infrastructure, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low to moderate.

The northern part of the project is on non-fossiliferous rocks of the Rustenburg Layered Suite but was surveyed. Based on the fossil record but confirmed by the site visit and walk through there are NO FOSSILS of any significance such as those of recognisable *Glossopteris* floral elements, even though fossils have been recorded from rocks of a similar age and type in South Africa. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Vryheid Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the contractor, environmental officer, or other responsible person, once excavations and drilling have commenced for the foundations and infrastructure, then they should be rescued and SAHRA notified so that a palaeontologist can be called to assess and collect a representative sample.

5.2 Sustainable Social and Economic Benefit

There is increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmental impact, climate change and the need for sustainable development. Despite the worldwide concern regarding Greenhouse Gas (GHG) emissions and climate change, South Africa continues to rely heavily on coal as its primary source of energy, while most of the country's renewable energy resources remain largely untapped (DME, 2003). There is therefore an increasing need to establish a new source of generating power in SA within the next decade.

The use of renewable energy technologies, as one (1) of a mix of technologies needed to meet future energy consumption requirements, is being investigated as part of Eskom's long-term strategic planning and research process. It must be remembered that solar energy is plentiful, renewable, widely distributed, clean and reduces GHG emissions when it displaces fossil-fuel derived from electricity. In this light, renewable solar energy can be seen as desirable.

The proposed development has the potential to stimulate the demand for other industries, among others construction services, engineering service, transport services, steel structures, cement and other aggregates, and electrical equipment. At the local level, an increase in demand for accommodation, personal services, perishable and non-perishable goods is expected, which will stimulate the local economies of the towns and settlements, where labour will be procured from or where migrant workers will be temporarily located.

Some of the local businesses could benefit from subcontracting opportunities. Furthermore, the demand for hospitality services (including accommodation in nearby towns) is expected to increase and provide a much-needed stimulus for the local economy.

Solar energy projects create both temporary and permanent job opportunities in South Africa for both skilled and unskilled workers. The project will create employment opportunities for both skilled and unskilled workers during the construction stage. If recruitment processes are efficiently managed, work opportunities can be localised as much as possible, with a trend visible in the industry that local people will be most ready to take up unskilled jobs, while employment requiring specialised skills tends to attract specialists from across the country. Business opportunities associated with the construction phase may also be open for local enterprises, especially in the supply of goods and services, such as food and other essential supplies.

In addition to those benefiting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will, in turn, stimulate consumer spending, creating another round of multiplier effect, positively impacting on the employment situation in the area.

In addition to job creation, there are valuable opportunities for skills enhancement/development/ training and knowledge transfer as quite often input from experts are required in this field. Therefore, opportunities for guiding and training local workers are created.

Should the significant archaeological heritage resources identified be destroyed through activities associated with this project, then the anticipated socio-economic benefits outlined above do not outweigh the negative impacts to heritage resources. Should impacts to significant resources be avoided and appropriately managed into the future

5.3 Proposed development alternatives

Location Alternatives

No other activity alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view and a solar energy installation is more suitable for the site due to the high solar resource.

Need and Desirability

- Increased surety of supply
- Lesser dependence on fossil fuel generated power
- Growing demand for electricity fueled by economic growth, lack of generation capacity by Eskom etc.
- REIPP program opportunities
- Need for cleaner electricity/ CDM project etc.
- Employment opportunities etc.

Technology Alternatives

No other technology alternatives are being considered.

Design or layout Alternatives

Layout alternatives will be considered and assessed as part of the BA Process. These will include alternatives for the Substation locations, BESS locations and also for the construction / laydown areas.

There are no preferred design alternatives from a heritage perspective in terms of the location of the substation and the laydown, BESS and O&M areas.

No-Go Alternative

The 'no-go' alternative is the option of not undertaking the proposed grid connection infrastructure project. Hence, if the 'no-go' option is implemented, there would be no development. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report.

5.4 Site Verification Statement

According to the DFFE Screening Tool analysis, the development area has Very High levels of sensitivity for impacts to palaeontological heritage and Low levels of sensitivity for impacts to archaeological and cultural heritage resources. The results of this assessment in terms of site sensitivity are summarised below:

- The cultural value of the broader area has some significance in terms of its mining and agricultural history (Moderate)
- Significant archaeological resources have been identified within the development area (Very High)
- No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is very sensitive for impacts to significant fossils (Moderate)

As per the findings of this assessment, and its supporting documentation, the outcome of the sensitivity verification disputes the results of the DFFE Screening Tool for Palaeontology - this should be considered to be Moderate - and disputes the results of the screening tool for archaeology and cultural heritage - this should be considered to be Very High and Moderate. This evidence is provided in the body of this report and in the appendices (Appendix 1 and 2).

5.5 Cumulative Impacts

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. It is important to note that the cumulative impact assessment for a particular project, like what is being done here, is not the same as an assessment of the impact of all surrounding projects. The cumulative assessment for this project is an assessment only of the impacts associated with this project, but seen in the context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within the context of the overall impact. But it is not simply the overall impact itself.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The cumulative impact is affecting an environment that has been declared a Renewable Energy Development Zones (REDZ) precisely because it is an environment that can accommodate numerous renewable energy developments. In REDZ areas, there is a reasonable expectation that the cultural landscape of an area will be changed to be dominated, or at least heavily altered, by renewable energy development. In fact, this is the intention of the REDZ areas.

In terms of cumulative impacts to heritage resources, impacts to archaeological and palaeontological resources are sufficiently dealt with on a case by case basis. The primary concern from a cumulative impact perspective

would be to the cultural landscape. The cultural landscape is defined as the interaction between people and the places that they have occupied and impacted. In some places in South Africa, the cultural landscape can be more than 1 million years old where we find evidence of Early Stone Age archaeology (up to 2 million years old), Middle Stone Age archaeology (up to 200 000 years old), Later Stone Age archaeology (up to 20 000 years old), evidence of indigenous herder populations (up to 2000 years old) as well as evidence of colonial frontier settlement (up to 300 years old) and more recent agricultural layers.

Modern interventions into such landscapes, such as renewable energy development, constitute an additional layer onto the cultural landscape which must be acceptable in REDZ areas. The primary risk in terms of negative impact to the cultural landscape resulting from renewable energy development lies in the eradication of older layers that make up the cultural landscape. There are various ways that such impact can be mitigated.

In terms of impacts to heritage resources, it is preferred that this kind of infrastructure development is concentrated in one location and is not sprawled across an otherwise agricultural landscape. The proposed development is therefore unlikely to result in unacceptable risk or loss, nor will the proposed development result in a complete change to the sense of place of the area or result in an unacceptable increase in impact due to its location within the Emalahleni REDZ, an area that has been pre-identified as suitable for renewable energy development and as such, cumulative impact is expected in this area.

The landscape within which the proposed project areas are located, is not worthy of formal protection as a heritage resource and has the capacity to accommodate such development from a heritage perspective.

6. RESULTS OF PUBLIC CONSULTATION

As this application is made in terms of NEMA, the public consultation on the HIA will take place with the broader public consultation process required for the Environmental Impact Assessment process and will be managed by the lead environmental consultants on the project.

7. CONCLUSION

As noted in the desktop assessment, the broader area surrounding this proposed for this development is known for a variety of kinds of heritage resources including Stone Age and Iron Age archaeology, significant structures and living heritage sites such as significant baobab trees as well as burial grounds and graves. The survey results confirm these findings. The survey proceeded with limited constraints and limitations, and the project area was comprehensively surveyed for heritage resources.

The Iron Age remains identified in the field assessment likely reflect a much more extensive past settlement and as such, CTS Heritage has mapped out the areas of high archaeological sensitivity associated with this. These areas are reflected in RED in the maps above and must be considered strict no-development areas as the likelihood of impacting significant archaeological heritage in these areas is VERY HIGH.

8. RECOMMENDATIONS

There is no objection to the proposed development from a heritage perspective on condition that:

- A no development buffer of 100m is implemented around site 004. This is largely respected in the final layout provided.
- A no development buffer of 100m is implemented around site 003 and 009. This is respected in the final layout provided.
- The identified sensitive archaeology areas in Figure 6.1 and 6.2 are not impacted by the development of any new infrastructure, including fencing. This is largely respected in the final layout provided.
- A Heritage Management Plan and Heritage Agreement are drafted for the ongoing conservation of the significant Iron Age resources identified.
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

Table 4: Input to the EMPr for the Construction Phase

Impact/Aspect	Mitigation/Management Actions	Responsibility	Methodology	Mitigation/Management Objectives and Outcomes	Frequency
Impact to significant archaeology	If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.	ECO	NA	Conservation of significant resources	Daily
Impact to significant palaeontology	If Palaeontological Heritage is uncovered during surface clearing and excavations ECO should be informed immediately. Fossil discoveries ought to be protected and the ECO/site manager must report to South African Heritage Resources Agency (SAHRA) so that mitigation (recording and collection) can be carried out.	ECO	NA	Conservation of significant resources	Daily

9. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
108955	AIA Phase 1	Johnny Van Schalkwyk	01/10/2011	Heritage Impact Assessment for the Proposed Development of the High Altitude Sports Centre , Belfast, Mpumalanga Province
109864	HIA Phase 1	Julius CC Pistorius	01/08/2008	A PHASE I HERITAGE IMPACT ASSESSMENT (HIA) STUDY FOR THE PROPOSED WONDERFONTEIN COLLIERY NEAR BELFAST IN THE MPUMALANGA PROVINCE OF SOUTH AFRICA
110569	HIA Phase 1	Julius CC Pistorius	01/02/2013	A REVISED PHASE I HERITAGE IMPACT ASSESSMENT (HIA) STUDY FOR THE PROPOSED WONDERFONTEIN COLLIERY NEAR BELFAST IN THE MPUMALANGA PROVINCE OF SOUTH AFRICA
117178	HIA Phase 1	Wouter Fourie	02/10/2009	Heritage Assessment The Kwagga North Project, Optimum Coal, Arnot, Mpumalanga
119156	Significance Report	Sidney Miller	01/03/2013	A phase 2 architectural documentation of two farmyards on the farm Wonderfontein 428 JS district Belfast, Mpumalanga Province.
119484	HIA Phase 2	Wouter Fourie	09/09/2012	FOLLOW-UP EVALUATION AS REQUIRED BY HIA COMPILED FOR OPTIMUM COLLIERY â€“ KWAGGA NORTH PROJECT
120255	HIA Phase 1	Anton Pelser	13/05/2013	A REVISION OF PHASE 1 HIA FOR THE PROPOSED WONDERFONTEIN COLLIERY NEAR BELFAST IN MPUMALANGA
124289	PIA Desktop	Gideon Groenewald	07/07/2013	PALAEONTOLOGICAL DESKTOP ASSESSMENT FOR THE KWAGGA NORTH PROJECT: AN EXTENSION OF THE OPTIMUM COLLIERY NEAR THE TOWN OF ARNOT, STEVE TSHWETE LOCAL MUNICIPALITY, NKANGALA DISTRICT MUNICIPALITY, MPUMALANGA
162667	AIA Phase 1	Wouter Fourie		Archaeological Impact Assessment: Northern Coal Portion 15 and 16 of the farm Weltevreden 381 JT, Belfast, Mpumalanga
164311	PIA Desktop	Rose Prevec	01/07/2012	Exxaro Paardeplaats Palaeontological Scoping Report: Desktop level
164350	Heritage Impact Assessment Specialist Reports	Jennifer Kitto	26/10/2012	Exxaro Paardeplaats Project: Heritage Impact Assessment Report
164351		Jennifer Kitto	26/07/2012	EXXARO PAARDEPLAATS PROJECT Heritage Impact Assessment Report
169668	Heritage Statement	M Naude	01/06/2013	HERITAGE ASSESSMENT (ARCHITECTURAL) OF BUILDINGS ON THE FARM MOOIFONTEIN â€“ MIDDELBURG-ARNOT (MPUMALANGA PROVINCE)

174000	HIA Phase 1	Natasha Higgitt, Shahzaadee Karodia Khan	25/08/2014	Environmental Impact Assessment for the Weltevreden Open Cast Coal Mine, Weltevreden 381JT, Belfast, Mpumalanga Province: Heritage Impact Assessment
174303	HIA Phase 1	R. C. De Jong	31/12/2009	Heritage Impact Assessment Report: Proposed Belfast Mining Project located on portions of the farms Leeuwbank 427 JS, Blyvooruitzicht 383 JT, Zoekop 426 JS, south of Wonderfontein and Belfast, Mpumalanga
179543	HIA Phase 1	Julius CC Pistorius	30/09/2011	A Phase 1 Heritage Impact Assessment (HIA) Study for the Consolidated Environmental Management Programme Report (Consolidated EMPR) for Arnot Coal on the Eastern Highveld in the Mpumalanga Province
180527	Burial Grounds and Graves Specialist Reports	Johan Nel	17/10/2014	Exxaro Arnot Mooifontein Expansion Project. Burial Grounds and Graves: Social Consultation and Entitlement Framework Report.
319306	HIA Phase 1	Anton van Vollenhoven	30/04/2015	A Report on an Archaeological and Built Environment Heritage Impact Assessment for a Proposed Piggery on Portion 19 of the Farm Grootlaagte 449 JS, Close to Middelburg, Mpumalanga Province.
319307	PIA Phase 1	Dr. Heidi Fourie	02/07/2015	Palaeontological Impact Assessment: Phase 1 Field Study. The Construction and Operation of a Breeder Sow Unit and Associated Infrastructure, Steve Tshwete Local Municipality, Mpumalanga Province. Farm: Portion 19 Grootlaagte 449 JS, Middelburg.
323331	HIA Phase 1	Christine Van Wyk Rowe	30/04/2015	A PHASE 1 ARCHAEOLOGICAL / HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED ESTABLISHMENT OF A WASTE TRANSFER AND SORTING FACILITY AT SIKHULULIWE VILLAGE, ON PORTION 9 OF THE FARM SPRINGBOKLAAGTE 416JS, EAST OF MIDDELBURG (STEVE TSHWETE LOCAL MUNICIPALITY)
333541	Palaeontological Monitoring	Heidi Fourie	28/09/2015	Protocol for Finds
354619	HIA Letter of Exemption	Anton van Vollenhoven	18/01/2016	Letter for HIA Exemption Request: Wonderfontein Portion 24
373944	BGG Phase 2	Johan Nel	06/10/2016	Burial Grounds and Graves: Grave Relocation Report. Exxaro Arnot Mooifontein Expansion Project
374933	AIA Phase 1	JP Cilliers	10/03/2016	Phase 1 Archaeological Impact Assessment for the Belfast Implementation Project: Resettlement Site, Mpumalanga Province
4913	AIA Phase 1	Johnny Van Schalkwyk	10/01/2005	Heritage Impact Assessment: Belfast Extension 6 Township

4917	HIA Phase 1	Anton Pelser, Jaco van der Walt	01/11/2008	A Report on a Heritage Impact Assessment for the Proposed OpenCape Archaeological Survey CCt Coal Mining Operations for the Klippan Colliery on the Farm Klippan 452 JS (Emachibini), Wonderfontein, Mpumalanga
5231	AIA Phase 1	Johnny Van Schalkwyk	01/06/2002	A Survey of Cultural Resources for the Arnot Mining Development, Middleburg District
5239	AIA Phase 1	McEdward Murimbika	01/04/2006	Phase 1 Cultural and Archaeological Heritage Assessment Specialist Study: Proposed Two Eskom Power Lines and Construction of Mafube Substation at Springboklaagte Farm 416 JS Steve Tshwete Local Municipality, Mpumalanga Province
5245	AIA Phase 1	Johnny Van Schalkwyk	01/09/2007	Heritage Impact Scoping Report for the Planned Hendrina-Marathon Power Line, Mpumalanga Province
6278	AIA Phase 1	Anton van Vollenhoven	01/02/2012	Report on the Phase II heritage Investigation of a Farmstead on the farm Blijvooruitzicht 383 JT near Belfast in Mpumalanga Province
7524	AIA Phase 1	Wouter Fourie	22/07/2008	Archaeological Impact Assessment: Northern Coal Portion 15 and 16 of the Farm Weltevreden 381 JT, Belfast, Mpumalanga
92508	AIA Phase 1	Christine Van Wyk Rowe	01/02/2012	Phase 1 Archaeological/Heritage Impact Assessment for proposed residential township: extention 7 of portion 5 (a portion of portion 2) of the farm Weltevreden 386 JS, Belfast
92514	AIA Phase 1	Christine Van Wyk Rowe	01/02/2012	Phase 1 Archaeological/Heritage Impact Assessment for proposed residential township: extension 5 of portion 13 of the farm Klipfontein 385JS, Belfast
92519	AIA Phase 1	Christine Van Wyk Rowe	01/02/2012	Phase 1 Archaeological/Heritage Impact Assessment for proposed residential township: extension 8(4) & 6 of portion 79 (a Portion of Portion 3) of the farm Tweefontein 357JT, Belfast.

APPENDICES

APPENDIX 1: Archaeological Assessment (2022)

APPENDIX 2: Palaeontological Assessment (2022)

CTS HERITAGE

APPENDIX 3: Heritage Screening Assessment