HERITAGE IMPACT ASSESSMENT

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

Proposed Litha Solar PV Project development near Henneman in the Free State

Prepared by CTS Heritage

CTS HERITAGE

Jenna Lavin

For

Solis Environmental

July 2023

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EXECUTIVE SUMMARY

1. Site Name:

Litha Solar Power Plant

2. Location:

The Remaining Extent of the Farm Schaapvlakte No. 489

The Remaining Extent of the Farm Meijers Rust No. 168

The Remaining Extent of the Farm Commandants Pan Zuid No. 142

3. Locality Plan:

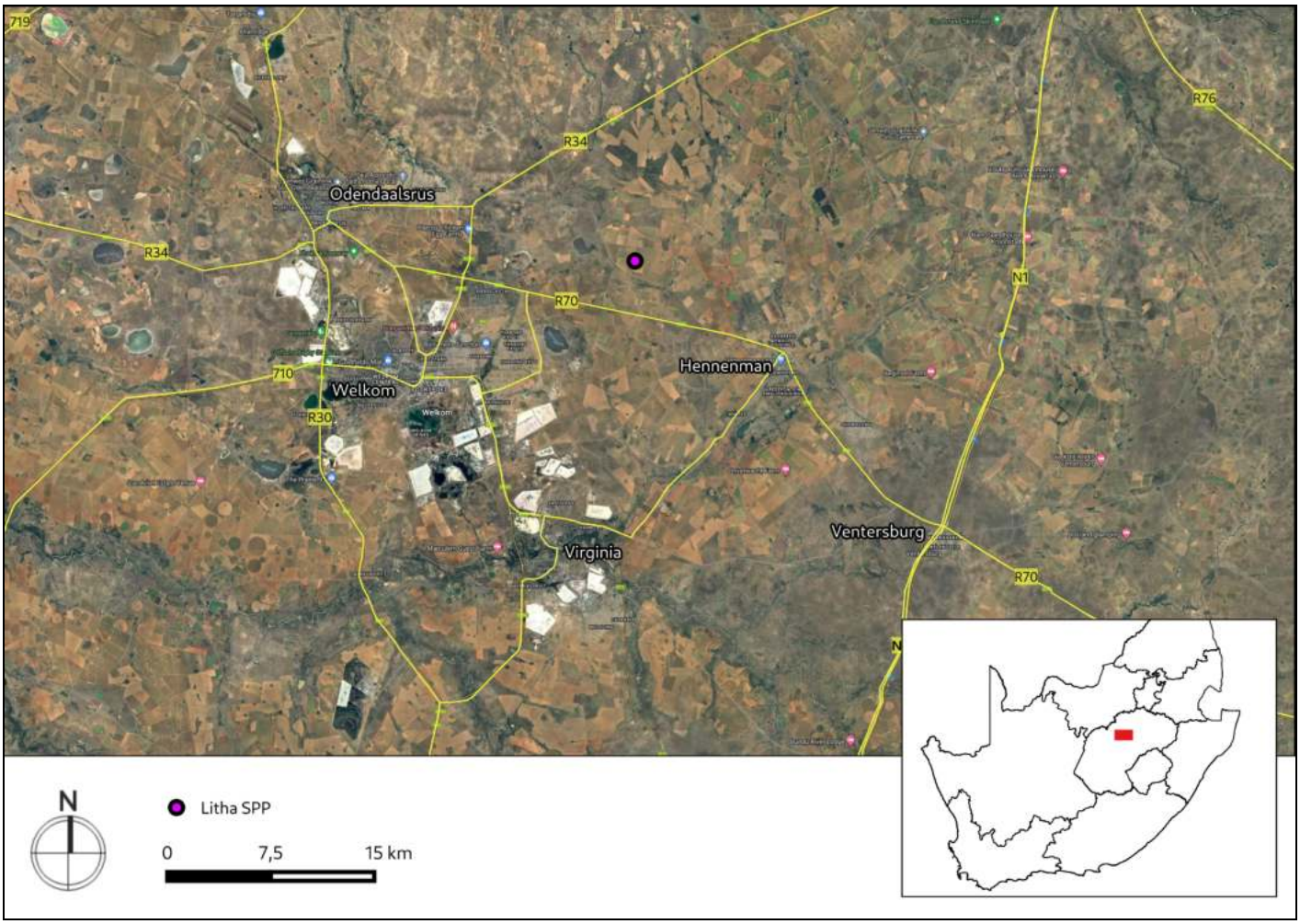

Figure A: Location of the proposed development area

4. Description of Proposed Development:

CTS Heritage was appointed by Solis Environmental to assist with the heritage compliance process for the proposed development of the Litha Solar Power Plant located near Henneman in the Free State. This report specifically assesses the impacts to heritage resources anticipated from the Litha Solar Power Plant.

5. Heritage Resources Identified:

Heritage Resources identified in close proximity to the development area

Obs#	Description	Type	Period	Density	Latitude	Longitude	Grade	Mitigation
002	Graves in open veld. Emily Soluwe, 1960, clearly marked by headstone, fencing. At least 3, possibly more, other graves, stone markers and a cross headstone.	Graves/ Burial Grounds	Historic, Modern	n/a	-27.880356	26.936919	IIIA	100m Buffer
010	Granville graveyard, about 50 graves, surrounded by fence	Graves/ Burial Grounds	Historic, Modern	n/a	-27.930352	26.937691	IIIA	100m Buffer
011	2 graves, marked with headstones, overgrown with vegetation next to grassland. 1970 date	Graves/ Burial Grounds	Historic, Modern	n/a	-27.933379	26.943109	IIIA	100m Buffer
013	Graves in thick patch of grass in between agricultural fields, 20th c.	Graves/ Burial Grounds	Historic, Modern	n/a	-27.9302	26.918973	IIIA	100m Buffer
014	About 10 graves, not fenced off, no names. 20th c.	Graves/ Burial Grounds	Historic, Modern	n/a	-27.92056	26.915641	IIIA	100m Buffer
017	Englishmen's graves location from South African (Boer) War, apparently relocated.	Graves/ Burial Grounds	Historic	n/a	-27.954602	26.9415	IIIA	100m Buffer
019	Historical oven built from stone. Honiball family lived here, but the werf is ruined	Ruin	Historic	n/a	-27.954523	26.960774	IIIB	250m Buffer
020	About 5 graves, mid 20th c.	Graves/ Burial Grounds	Historic, Modern	n/a	-27.975994	26.954493	IIIA	100m Buffer
022	Stone kraal	Ruin	Historic	n/a	-27.970932	26.950171	IIIC	100m Buffer
024	Middelpunt werf, 1956. Piggeries, silos. Some modern buildings and additions	Structure	Historic, Modern	n/a	-27.956978	26.932252	IIIC	100m Buffer

Heritage Resources identified within the development area

Development Area	Heritage Resource	Werf Association	Mitigation
Litha SPP	Meyersrus Ruin	Meyersrus	NA

6. Anticipated Impacts on Heritage Resources:

The survey proceeded with no major constraints and limitations, and the project area was comprehensively surveyed for heritage resources. No archaeological material remains were documented within the area proposed for development. However, as was noted in the desktop assessment, the historic agricultural landscape is represented by a number of features in this area including intact and ruined farm werfs and their associated infrastructure including burial grounds and graves. The relationship between the identified burial grounds and their associated farm werfs has significance. Many of the burial grounds identified are located within cultivated fields and as such, are challenging to identify. Due to the high local levels of spiritual and social significance associated with human remains and burials, these sites are all graded IIIA. It is recommended that a minimum no-development buffer of 100m is implemented around these sites.

Furthermore, it is recommended that where the relationship between the burial ground and an existing farm werf (intact or ruined) is established, that this spatial relationship be kept intact. This can be achieved through either an open visual corridor between the werf and its associated burial ground or a linking path between the werf and its associated burial ground. Based on the final layouts received for the Litha SPP, this linkage remains intact in the layouts provided.

In terms of impacts to palaeontological heritage, the entire footprint of the proposed development area has been modified for agricultural purposes and is covered by dense grasses. As noted above, no fossiliferous outcrop was detected in the proposed development during the field assessment. This could be attributed to the lack of outcrops as well as the lush grassy vegetation in the area. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare, however it is recommended that the attached Chance Fossil Finds procedure is implemented for the duration of the construction phase.

7. Recommendations:

Based on the outcomes of this report, this project is supported from a heritage perspective as it is not anticipated that the proposed development of the solar energy facility and its associated grid connection infrastructure will negatively impact on significant heritage resources on condition that:

- The mitigation measures indicated in Table 3 and 5 are implemented
- Where the relationship between the burial ground and an existing farm werf (intact or ruined) is established, that this spatial relationship be kept intact. This can be achieved through either an open visual corridor between the werf and its associated burial ground or a linking path between the werf and its associated burial ground. Based on the final layouts received for the Litha SPP, this linkage remains intact in the layouts provided.

- The attached Chance Fossil Finds procedure is implemented for the duration of the construction phase.
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, 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.

Details of Specialist who prepared the HIA

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, heads up the heritage division of the organisation since 2016, 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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2 Palaeontological Impact Assessment 2023
3 Heritage Screening Assessment

1. INTRODUCTION

1.1 Background Information on Project

CTS Heritage was appointed by Solis Environmental to assist with the heritage compliance process for the proposed development of the Litha SPP located near Henneman in the Free State. This report specifically assesses the impacts to heritage resources anticipated from the development of the Litha Solar Power Plant. The key components of the proposed project are described below:

- PV Panel Array - To produce up to 240MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility. The PV panels will be tilted at an optimum angle in order to capture the most sun.
- Wiring to Inverters - Sections of the PV array will be wired to inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.
- Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from 480V to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into step up transformers to 132kV. An onsite substation will be required on the site to step the voltage up to 132kV, after which the power will be evacuated into the national grid via the proposed power line. It is expected that generation from the facility will connect to the national grid via the Everest Substation (preferred) or an alternative substation to be identified (alternative). The grid connection route will be assessed within a 250m wide corridor. The Project will inject up to 240MW into the National Grid. The installed capacity will be approximately 202MW. The Electrical Grid Infrastructure (EGI) will be assessed as part of a separate Basis Assessment process.
- Electrical reticulation network – An internal electrical reticulation network will be required and will be lain 2-4m underground as far as practically possible.
- Supporting Infrastructure – The following auxiliary buildings with basic services including water and electricity will be required on site:
    - Operations & Maintenance Building / Office
    - Switch gear and relay room
    - Staff lockers and changing room
    - Security control
    - Offices
- Battery storage – Battery Storage Facilities with a maximum height of 5m and a capacity of 2500MWh will be installed in a 4.5-hectare area.

- Roads - Access is most likely to be obtained via R70 Regional Road. This will be confirmed in the Traffic Impact Assessment which has been commissioned. An internal site road network will also be required to provide access to the solar field and associated infrastructure.
- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. Fencing with a height between 3 and 4.5 meters will be used.

Table 1: Technical details for the proposed facility

Component	Description / dimensions
Height of PV panels	4.5 metres
Area of PV Array	The development footprint is 512ha (surface area) but the laydown area of PV is 320ha
Area occupied by inverter / transformer stations / substations / BESS	BESS: Up to 4.5 ha Switching Substation: Up to 1 ha Collector Substation: Up to 1 ha
Capacity of on-site substation	132kV
Capacity of the power line	132kV
Area occupied by both permanent and construction laydown areas	Up to 4 ha
Area occupied by buildings	A 33 kV switch room, a gate house, ablutions, workshops, storage and warehousing areas, site offices and a control centre: Up to 12.5 ha
Battery storage facility	Maximum height: ~5m Storage capacity: 2500MWh
Length of internal roads	Final length of internal roads only determined during the detailed design phase. Usually after preferred bidder award.

1.2 Description of Property and Affected Environment

The proposed development area lies between Hennenman and Welkom in the Free State Province. The R70 main road linking Welkom to Hennenman separates the northernmost farms earmarked for solar PV areas from a stretch of farms to the south of the R70 as well as another cluster further southwest immediately adjacent to the large Everest substation.

A number of overhead powerlines ranging from 132 to 400kV span the area and service the large gold mining industry which has built up the Welkom area since the late 19th century. There are also a few old chalk mines neighbouring some of the farms assessed for the solar PV project. The predominant land use is for maize farming, with soya planted in alternating years to restore the nitrogen content of the nutrient poor soils that rely on extensive use of fertilisers. The corporate agri-businesses in the area are complemented with smaller cattle farms and game farming for leisure tourism, breeding and hunting. The Whistler Rum headquarters are also based on one of the farms chosen for solar PV facilities.

The terrain is nearly entirely flat except for some higher ground at Goldsmiths Folly on the Vredesverdrag farm. This is also the location of a large gravel quarry. A number of the farms have been abandoned over the last 20-30 years and this has left a marked impact on the landscape. This has partly occurred due to the increasing mechanisation of farming and the amalgamation of farms as well as the closure of some of the chalk mines.

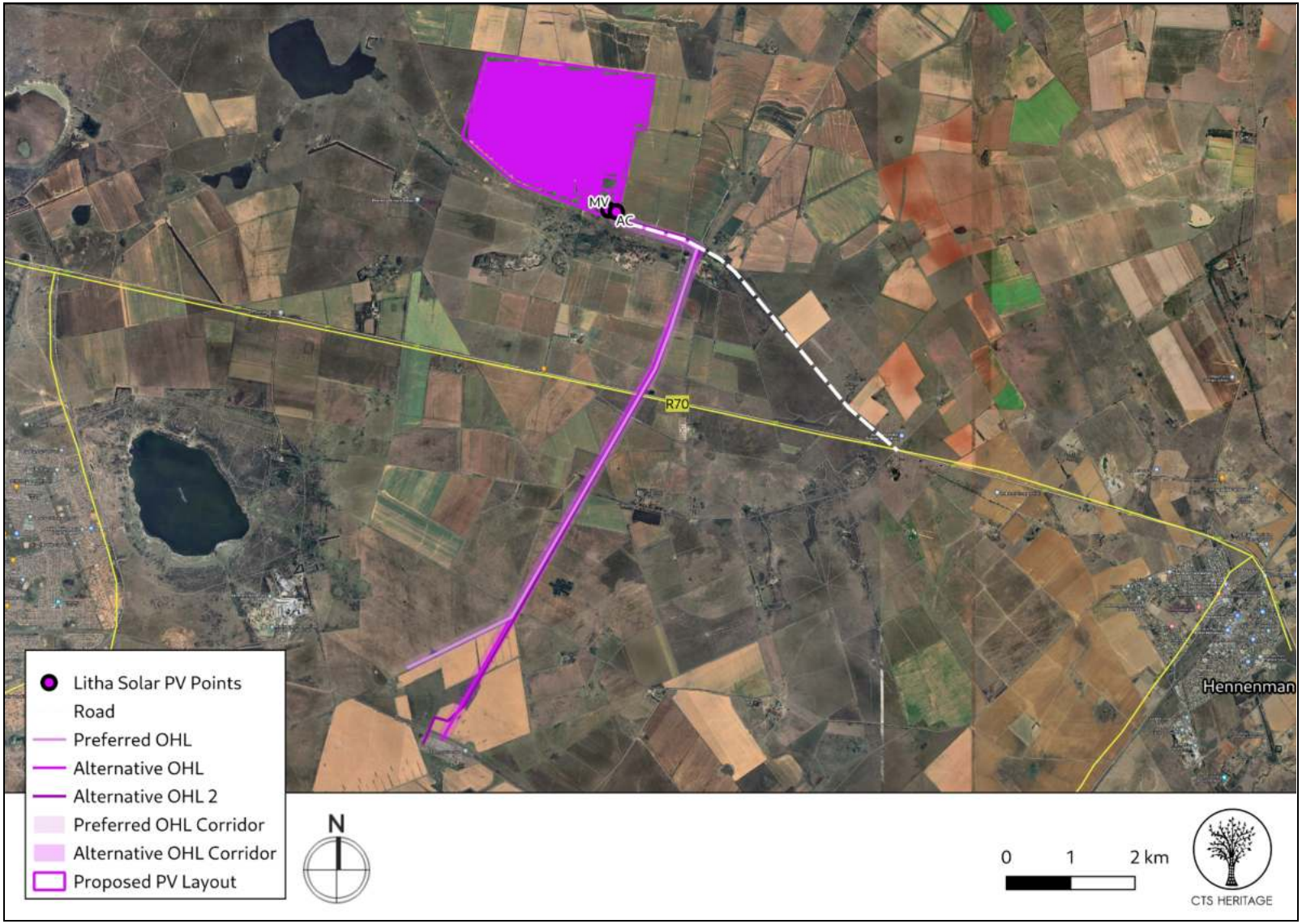


Figure 1.1: The proposed development layout of the Litha SPP assessed in this report

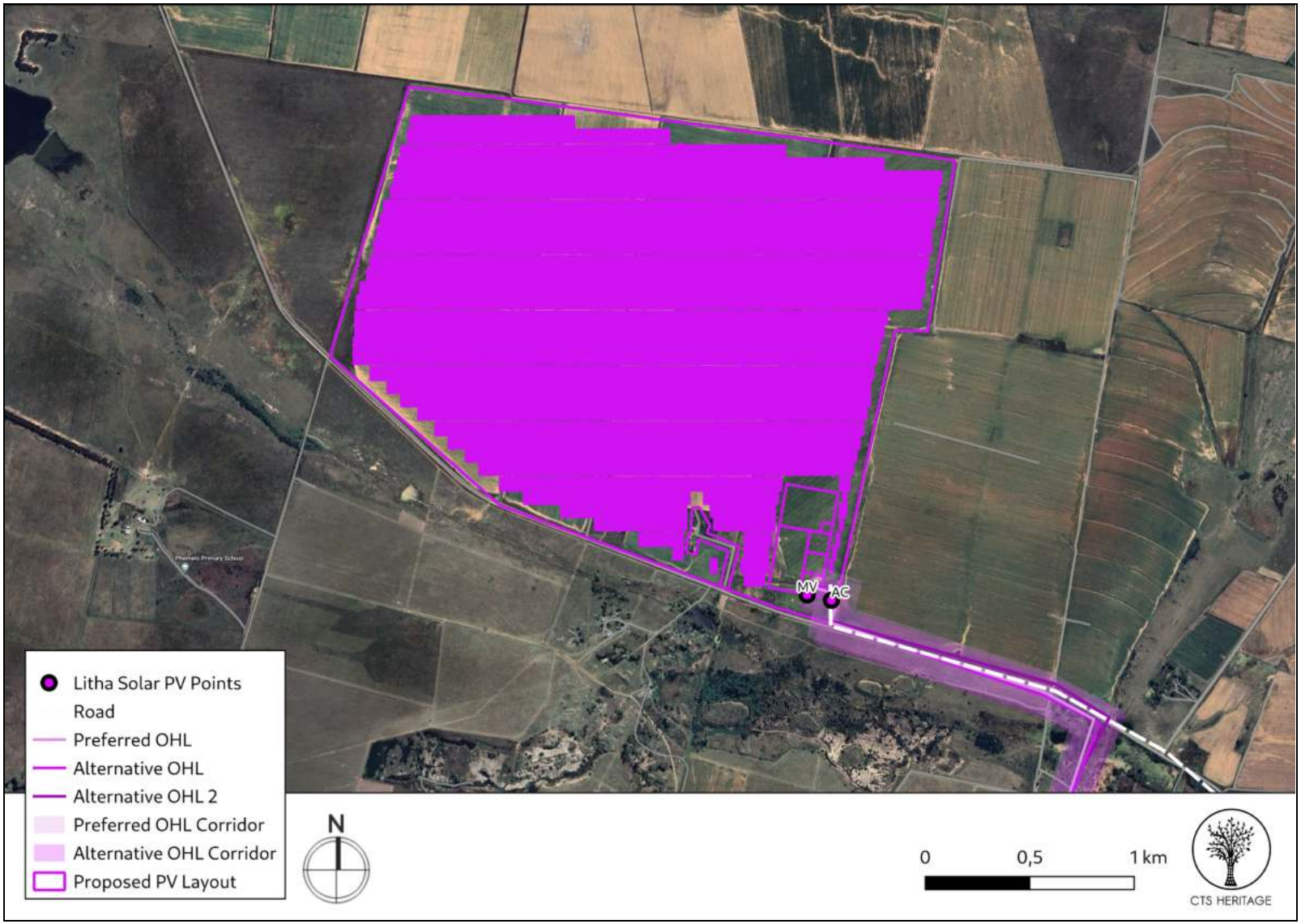


Figure 1.4: The proposed development layout of the Litha SPP

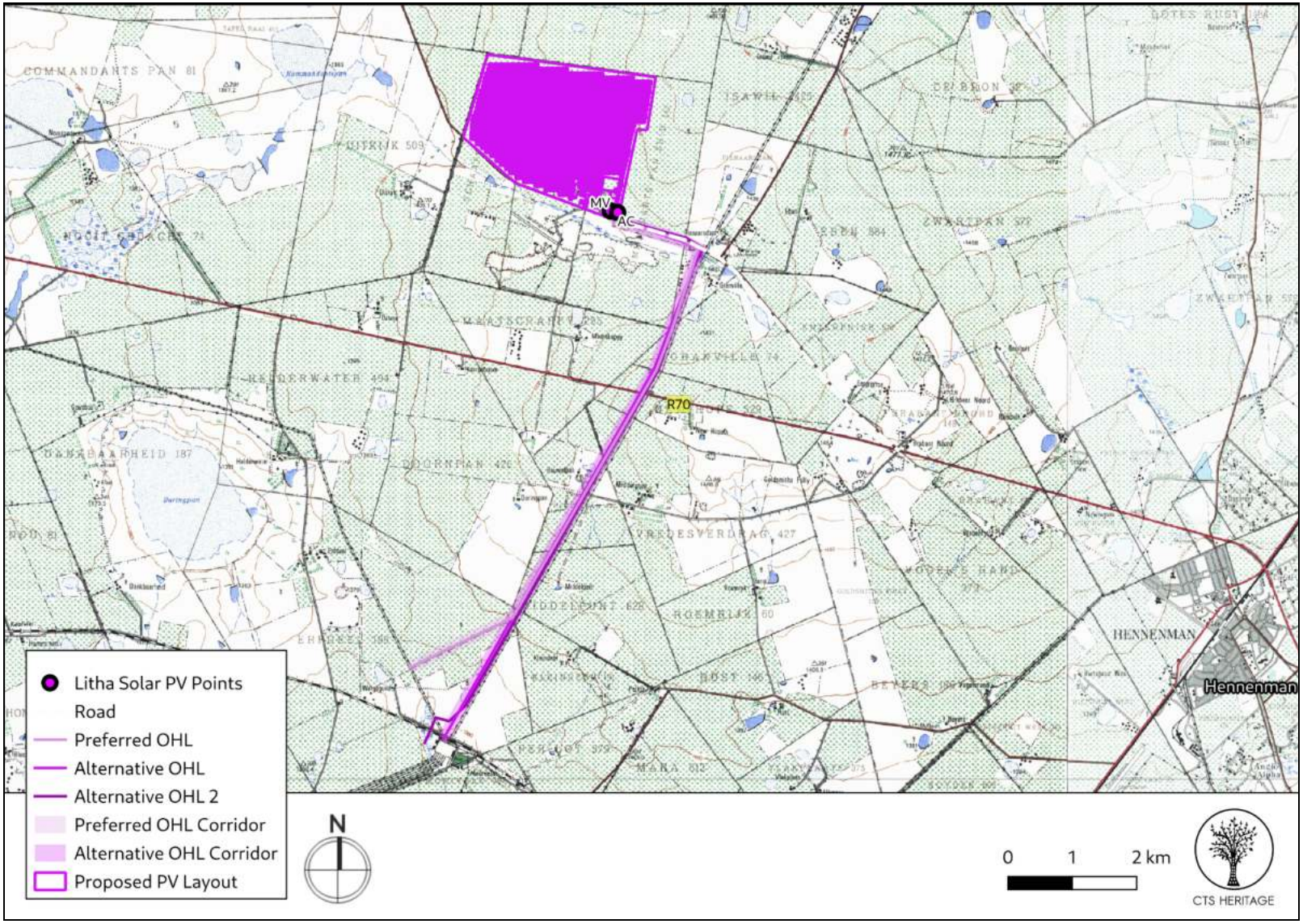


Figure 1.5: The proposed development layout on an extract of the 1:50 000 Topo Map of the Litha SPP

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 archaeologist conducted her site visit on 25 to 27 April 2023.
- A palaeontologist conducted an assessment of palaeontological resources likely to be disturbed by the proposed development on 29 April 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
- The name of the project was changed from Everest Solar PV 2 to Litha SPP after the completion of the AIA and PIA.

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

Almost all the properties surveyed had been ploughed for maize and soya agriculture or had been covered in grassland that has been maintained for cattle grazing. Heavy rains over the last couple of years have led to water logged areas and deep vegetation which obscured the surface visibility of Stone Age material that may be present in the area. However, given the intensity of maize farming, very little Iron Age and Stone Age remains will have survived in situ and it was therefore unsurprising that these were rarely observed during this study.

The experience of the heritage practitioner, and observations made during the study, allow us to predict with some accuracy the archaeological sensitivity of the receiving environment.

2.5 Solis Environmental Impact Assessment Methodology

The environmental assessment aims to identify the various possible environmental impacts that could result from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

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 the Table below.

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.

Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- 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 should also be included. The rating

system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact the following criteria is used:

Table 2: The rating system

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.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
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		
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).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact 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 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 – 30 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 indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
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. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact 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		
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 is result in a complete loss of all resources.
CUMULATIVE EFFECT		

This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects

SIGNIFICANCE

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. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) 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
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	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".
74 to 96	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

Background:

This application is for the proposed development of a PV facility and associated grid infrastructure located in between the towns of Henneman and Welkom in the Free State Province. Henneman is situated in what was previously the Goldfields, but interestingly enough does not have a gold mine in the vicinity. Hennenman is however a very important railway junction and the town boasts large cement factories.

Much of the history of Welkom is centred around the discovery of gold in the northwestern Free State. It was proclaimed a town in 1948, nine years after a major gold discovery was made in Odendaalsrus, just north of Welkom. The proposed development is intended to supply the existing gold mining infrastructure in and near Welkom with electricity. According to Van der Walt (2015), "One of the earliest monuments at Welkom is located at the place where the Voortrekkers established a lookout post on the bank of the Sand River in the 1800s. This was in order to protect the Voortrekkers from Matabele cattle marauders. The establishment of the town was approved in 1946, and it developed very quickly thereafter. The town was named after one of the farms on which it was established. By the 1980s Welkom was a well-developed city. By 1982 13 large gold mines were located in a circumference of 23 kilometres from Welkom. (Niehaber et al. 1982: 71-72)"

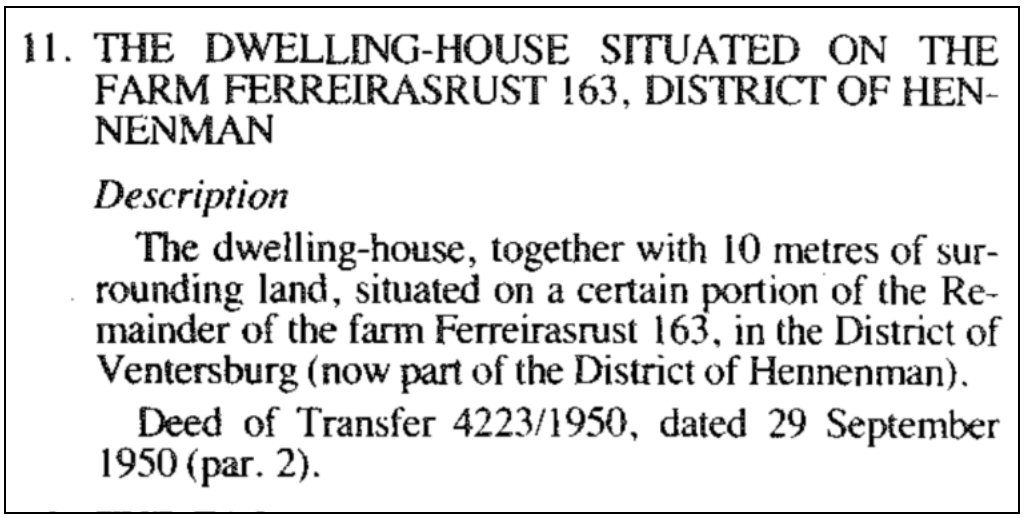
Cultural Landscape

Hennenman, which was built as a single railway station, was formerly denoted as *Ventersburg Road*. In 1927, it was renamed after local Afrikaner P.F. Hennenman, from Swartpan Farm. In 1944, black South Africans were confined to a segregated enclave in southern Hennenman. During apartheid, this area was cleared by order of the government and nearly all then-residents relocated to a new township some fifteen kilometres away, *Vergenoeg* (Afrikaans for "Far enough", now *Phomolong*). An area located immediately adjacent to the PV development was previously assessed by Van der Walt (2013) as part of a different development application for the Everest PV Facility. Van der Walt (2013) describes the development area as "extremely flat and is utilised for extensive agricultural purposes (crop farming). The entire study area used to be cultivated land. No structures or farming infrastructure occur within the development footprint. The study area falls within the bioregion described by Mucina et al (2006) as the Dry Highveld Grassland Bioregion with the vegetation described as Vaal-Vet Sandy Grassland within a Grassland Biome. Land use in the general area is characterised by mining and agriculture, dominated by crops and cattle farming. The study area is characterised by deep sandy to loamy soils based on the extensive agricultural activities."

The area proposed for development falls within an area that has been subject to cultivation since the early occupation of the area. As such, the area proposed for development includes a number of historic farm werfs and

their associated infrastructure, including family burial grounds. Importantly, located just outside of the area proposed for the development of the Southern PV Facilities 5, is located an old National Monument. This old National Monument is described as a single storey sandstone building with a pitched corrugated iron roof. In the 1890s the house was built for Thomas Minter, owner of the Kaal Valley mine. This site was declared as a National Monument in 1988 under the National Monuments Act (1969).

While the grading of the Ferreirasrust Farm Werf could be disputed in terms of the cultural significance values described in the NHRA (Act 25 of 1999), the site remains protected as a Provincial Heritage Site in terms of section 27(18) of the NHRA. Precedent has been established elsewhere that it is appropriate to require a no-development buffer of at least 1km around Provincial Heritage Sites to ensure that they are not negatively impacted by any proposed development activities. This recommendation is supported here.



11. THE DWELLING-HOUSE SITUATED ON THE FARM FERREIRASRUST 163, DISTRICT OF HENNENMAN

Description

The dwelling-house, together with 10 metres of surrounding land, situated on a certain portion of the Remainder of the farm Ferreirasrust 163, in the District of Ventersburg (now part of the District of Hennenman).

Deed of Transfer 4223/1950, dated 29 September 1950 (par. 2).

Figure 2.1: Extract from the Gazette Notice for the Ferreiras Rust Farm Werf National Monument

According to Fourie (2021), "Existing surrounding land uses associated with the project area include a combination of mining related infrastructure and developments, powerlines, refuse dumps and dirt roads." As the area proposed for development is located within an existing mining area, it is very unlikely that significant built environment heritage will be impacted by the proposed development. Furthermore, the history of Welkom is intimately linked with the gold mining industry and as such, it is unlikely that the proposed PV development will negatively impact on this unique cultural landscape as it is proposed to support the gold mining industry. That being said, in order to ensure that the proposed renewable energy infrastructure does not overwhelm the agricultural cultural landscape elements that make up this landscape, sufficient space around significant farm werfs is recommended.

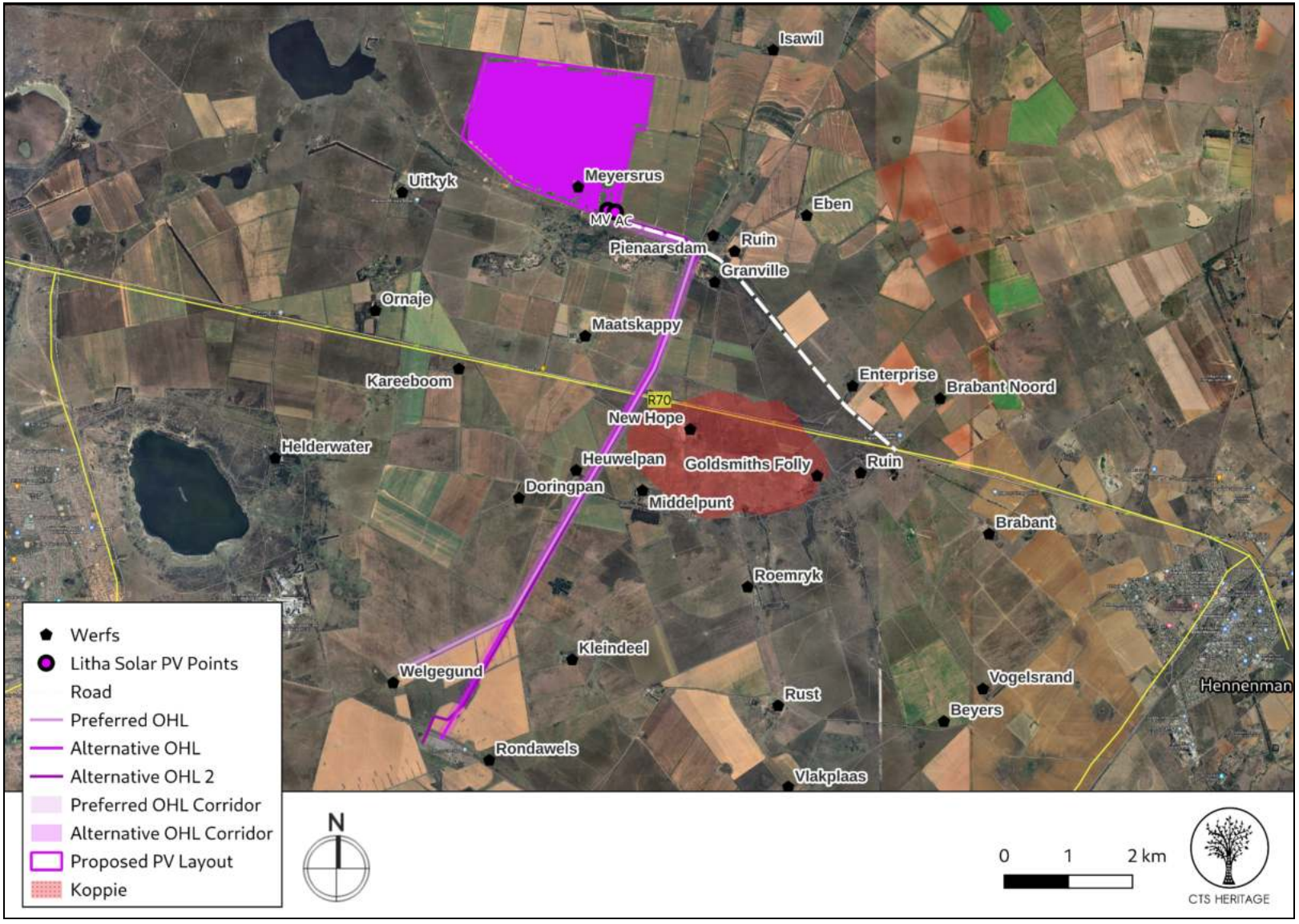


Figure 2.2. Cultural Landscape Elements Map. for Litha SPP

Archaeology

In his summary of the archaeological heritage of the area, Rossouw (2019) notes that "The archaeological footprint in the region is primarily represented by Stone Age surface occurrences, structural remnants dating back to the Anglo Boer War and its aftermath, graveyards and other historical structures older dating more than 60 years ago." The Stone Age archaeological record of the broader area spans back to the early Middle Stone Age. Prehistoric archaeological remains previously recorded in the region include stone tools and mammal fossil remains from sealed and or exposed contexts.

Tomose (2013) notes that the earliest evidence of Iron Age communities in the Free State is documented in the south-eastern region of the Free State where they came into contact with the San people. Most of the existing evidence about the Iron Age communities in the Free State dates to the 16th and 18th when they moved across the Vaal River coming into contact with the San hunter-gather people (Klatzow 1994). Numerous stone wall structures and pottery dating to this period have been recorded and lie on the frontier zone where the San people come into contact with agro-pastoralist (Thorp 1996). Stonewalls are one major characteristic of the Iron Age people. However, they are not the only characteristic features of the Iron Age. Huffman (1982) described cattle dug, both vitrified and unverified, as one of the Iron Age traits. He also included pits and burials, with some located inside the cattle kraals (ibid)."

Archaeological sites spanning the Earlier, Middle and Later Stone Age have been found in the region despite the extensive agricultural transformation of the area. However, no heritage resources of significance were identified by Van der Walt (2013) in his assessment of the adjacent farm. Additionally, no significant archaeological sites have been recorded in the vicinity of the project area on SAHRIS. Van der Walt (2013) notes that "some MSA finds might be possible around pans on the farm. It is important to note that the lack of sites can be attributed to a lack of sustainable water sources (no pans exist in the development footprint) in the development area as well as the lack of raw material for the manufacturing of stone tools. No Sites dating to the Early or Middle Iron Age have been recorded or are expected for the study area. The same goes for the Later Iron Age period where the study area is situated outside the western periphery of distribution of Late Iron Age settlements in the Free State. However to the north of the study area, ceramics from the Thabeng facies belonging to the Moloko branch of the Urewe tradition were recorded at Oxf 1 and Platberg 32/71 (Maggs 1976, Mason 1986). Similarly to the east Makgwareng ceramics belonging to the Blackburn Branch of the Urewe tradition were recorded (Dreyer 1992 and Maggs 1976). There is however a low likelihood of finding sites dating to this period in the study area."

In a recent heritage assessment completed by CTS Heritage (2022) for an adjacent PV Facility, no evidence of Stone or Iron Age archaeology was identified. No graves were identified within the survey and visibility was reasonably good for stone structures, so the latter finding could be considered comprehensive. However, the

substantial grass cover and soil formation across the entire footprint was a pertinent constraint to documenting stone artefacts and other smaller potential surface remains such as ceramics.

Palaeontology

According to the SAHRIS Palaeosensitivity Map the development sites are underlain by sediments of moderate and Very High fossil sensitivity (Figure 4). The Adelaide Formation of the Beaufort Group is the very highly sensitive formation and caenozoic regolith is the moderately sensitive formation underlying the development area according to the extract from the CGS 2726 Kroonstad Geology Map (Figure 5). A desktop Palaeontological assessment (2013) was completed by Millsteed for an adjacent development which is of relevance here. Millsteed (2013) notes that "The Cainozoic regolith and the Adelaide Subgroup are both potentially fossiliferous and their stratigraphic equivalents are known to contain scientifically important fossil assemblages elsewhere in South Africa. Accordingly, it may be reasonably expected that significant fossils may be present within the project area." He goes on to note that "Thus, the historical farming processes have probably destroyed any fossil materials that may have been present at surface in these areas. Similarly, where present the regolith cover would hide any fossils contained within the underlying Adelaide Subgroup from discovery. The potential for a negative impact on the fossil heritage of the area can be quantified in the following manner. Any fossil materials that may have been present at/or near the surface in the cultivated regolith will have been historically destroyed and the likelihood of any negative impact is categorised as negligible. The possibility of a negative impact on the depth interval between the maximum depth of ploughing and the maximum depth of excavations within the regolith is categorised as low (due to the scarcity of fossils in general)." Millsteed (2013) recommends that a palaeontological assessment be conducted to assess possible impacts to significant fossil heritage.

In a desktop assessment completed by Chapelle (2022), she notes that "Although the presence of Adelaide Subgroup would normally require a field scoping study be conducted before excavation takes place, the entire footprint of the proposed development has been modified for agricultural purposes and is covered by dense grasses. This makes it unlikely that a field scoping study would provide any more information on the likelihood of the project resulting in irreversible loss of the palaeontological heritage. Based on this, along with the presence of Quaternary superficial deposits covering half of the fossiliferous sediments (Beaufort Group), and the lack of fossils finds in the SAHRIS list of heritage resources within close proximity to the development area, it is anticipated that the impact of the development will mainly be LOW to MODERATE."

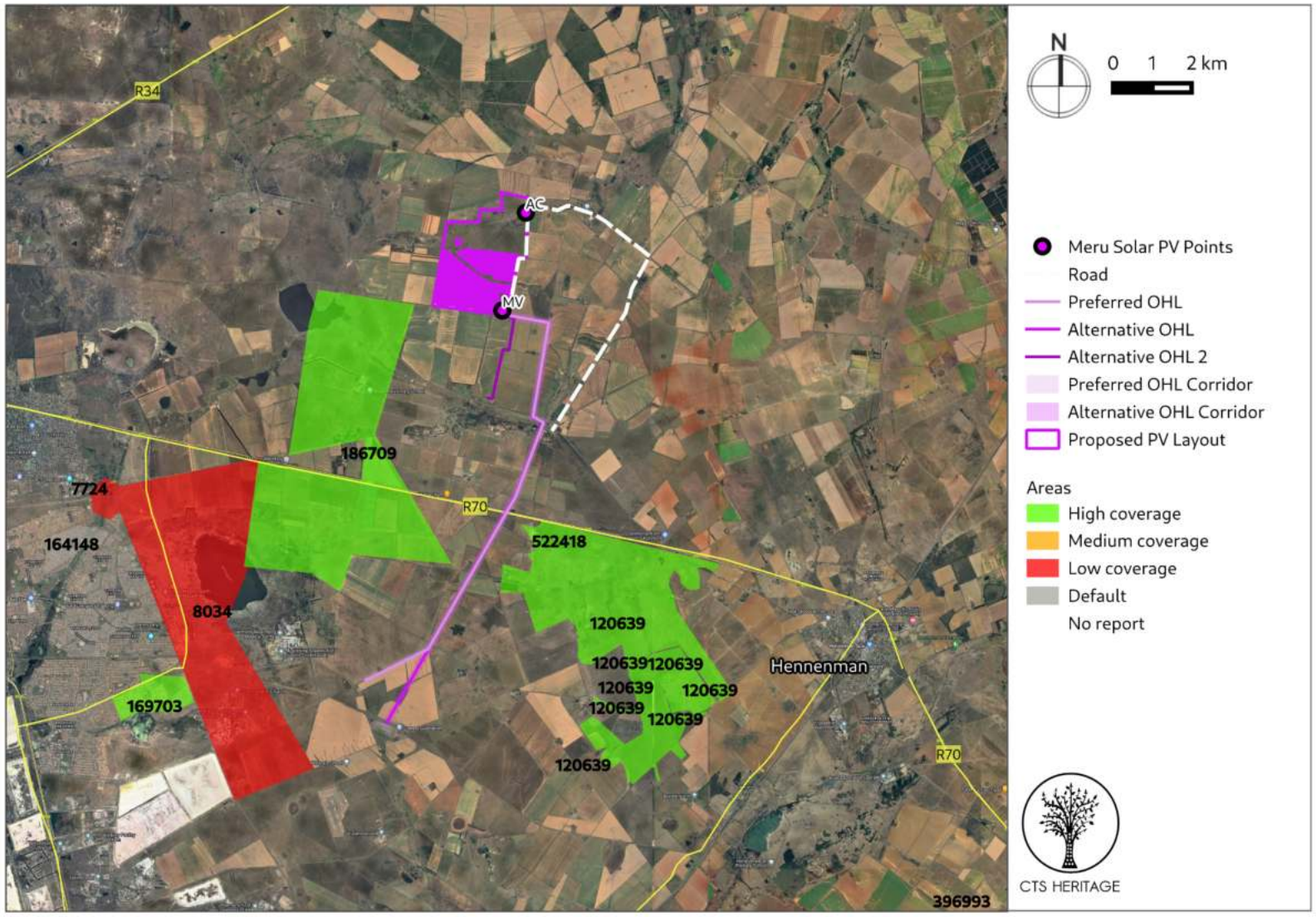


Figure 2.4: Spatialisation of heritage assessments conducted in proximity to the proposed development

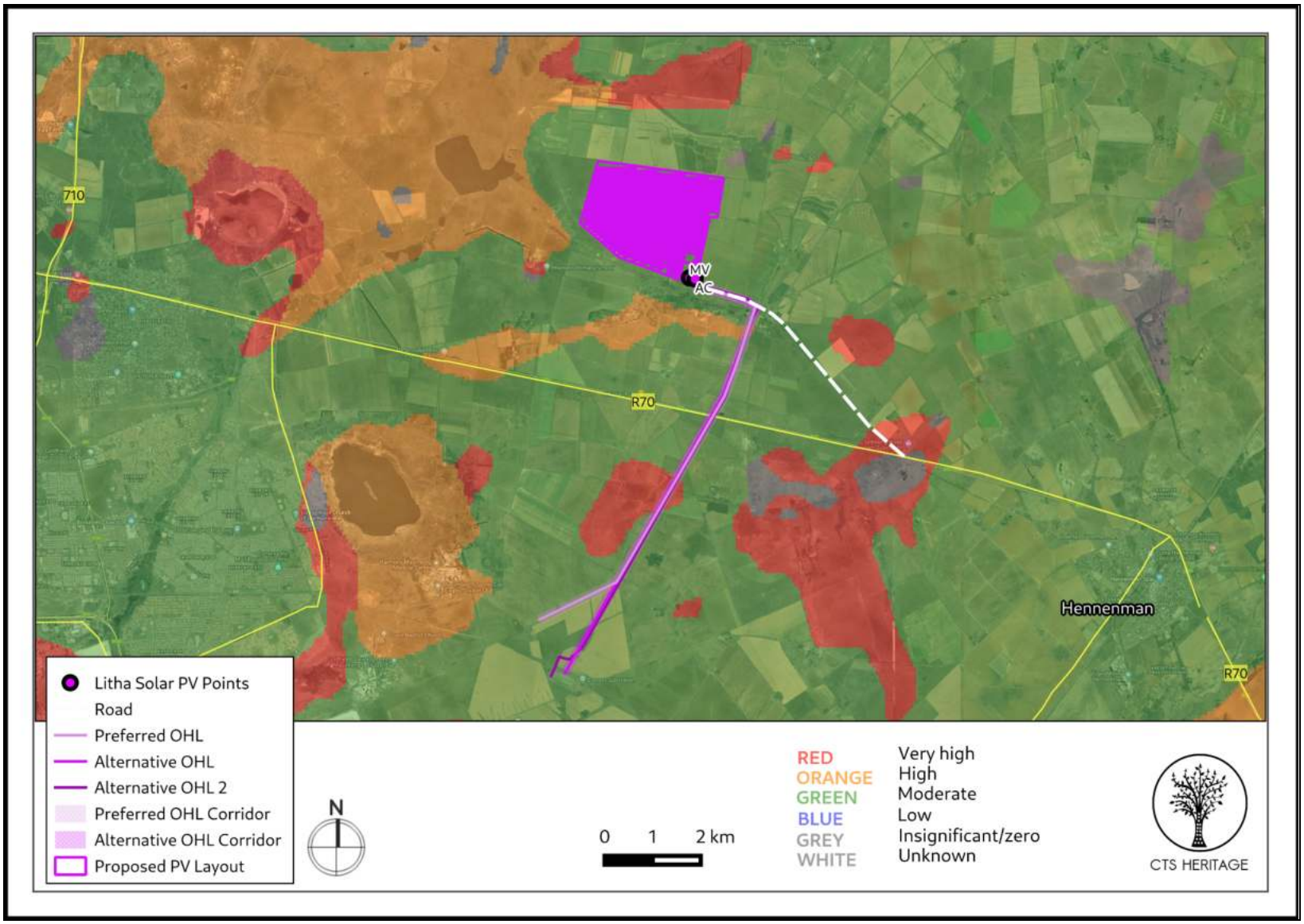


Figure 3.1: Palaeontological sensitivity of the proposed development area

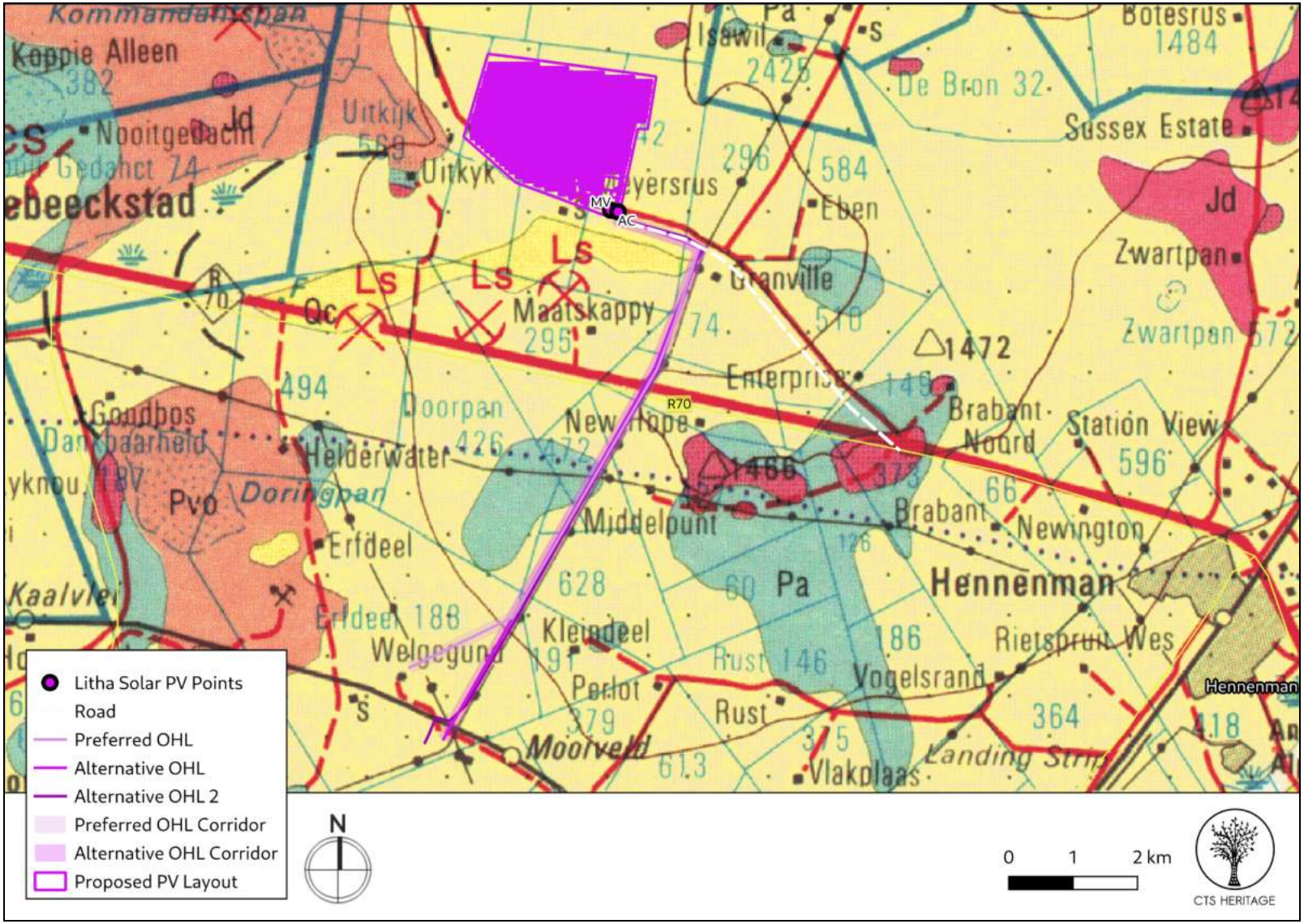


Figure 3.2: Geology Map. Extract from the CGS 2726 Kroonstad Geology Map indicating that the development area is underlain by sediments of the Adelaide Subgroup of the Beaufort Group (Pa), Jurassic dolerite (Jd) and Quaternary Sands

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

Archaeology (Appendix 1)

The field assessment produced nearly 40 observations across the entire assessment area which extends beyond the area proposed for this development. These results are important as they provide the context within which the relevant resources are located. The identified resources mainly included ruins and structures that are related to the 20th century farming and mining occupation of the area. In many instances the ruins were from workers' cottages that have been abandoned as the viability of smaller farms decreased when larger corporate farms bought these over. In other areas old chalk mines have been closed and the associated labourers' quarters have fallen into disrepair.

The most significant heritage resource lies at the Ferreirasrust farm where a Provincial Heritage Site was declared (formerly a National Monument) in 1988. The main homestead was built in the 1890s by Thomas Minter and has impressive sandstone walls and most of the original features still intact (ceilings, cornices, floors etc). This site is located well away from the area proposed for the Litha SPP development.

A total of 10 graveyards, some informal and unfenced, were also documented on the various farms within the project area. The koppie at Vredesverdrag (or Peace Agreement) farm was the site of a skirmish between Boer and British soldiers in May 1900 that resulted in at least 20 deaths.

"In the action on the Zand River on 10 May 1900, a squadron of the 6th Dragoons, one of the 2nd Dragoons, one of Australian Horse and two troops of the 6th Dragoon Guards were sent to attack Boer positions on a ridge which commanded a wide area. Although the crest of the southern end was gained, the force retired in the face of a strong counterattack. The position was taken later in the day when Maj-Gen Dickson's 4th Cavalry Brigade turned its flank and the burghers were forced to retire".[1] The owner took us to the location of some of the graves that had apparently been dug up for reburial in a formal cemetery elsewhere.

Palaeontology (Appendix 2)

The proposed development is largely underlain by Quaternary deposits with small areas underlain by Jurassic dolerite and the Adelaide Subgroup (Beaufort Group, Karoo Supergroup). The Quaternary deposits is represented by very small areas underlain by alluvium near the Rietspruit while the rest of the Quaternary deposits comprise of sand and calcrete. Outcrops of the Permian aged sandstone and shale of the Adelaide Subgroup is present in the south as well as the western area of the development. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of Quaternary alluvium is

[1] https://www.angloboerwar.com/forum/5-medals-and-awards/28158-medals-to-the-6th-dragoon-guards accessed on 18 May 2023

Moderate, that of the Jurassic dolerite is Zero as it is igneous in origin and that of the Adelaide Subgroup (Beaufort Group) is Very High (Almond and Pether, 2009; Almond *et al.*, 2013, Groenewald et al 2014). Updated Geology (Council of Geosciences) refined the geology and indicate that the proposed development is mainly underlain by alluvium, colluvium, elluvium and gravel, calcrete, surface limestone and hardpan, as well as the Balfour Formation (Adelaide Subgroup, Beaufort Group), and the Volksrust Formation (Ecca Group).

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 29 April 2023. No fossiliferous outcrop was detected in the proposed development. This could be attributed to the lack of outcrops as well as the lush grassy vegetation in the area. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare.

4.2 Heritage Resources identified

Table 3: Heritage Resources identified in close proximity to the development area

Obs#	Description	Type	Period	Density	Latitude	Longitude	Grade	Mitigation
010	Granville graveyard, about 50 graves, surrounded by fence	Graves/ Burial Grounds	Historic, Modern	n/a	-27.930352	26.937691	IIIA	100m Buffer
011	2 graves, marked with headstones, overgrown with vegetation next to grassland. 1970 date	Graves/ Burial Grounds	Historic, Modern	n/a	-27.933379	26.943109	IIIA	100m Buffer
013	Graves in thick patch of grass in between agricultural fields, 20th c.	Graves/ Burial Grounds	Historic, Modern	n/a	-27.9302	26.918973	IIIA	100m Buffer
014	About 10 graves, not fenced off, no names. 20th c.	Graves/ Burial Grounds	Historic, Modern	n/a	-27.92056	26.915641	IIIA	100m Buffer
017	Englishmen's graves location from South African (Boer) War, apparently relocated.	Graves/ Burial Grounds	Historic	n/a	-27.954602	26.9415	IIIA	100m Buffer
019	Historical oven built from stone. Honiball family lived here, but the werf is ruined	Ruin	Historic	n/a	-27.954523	26.960774	IIIB	250m Buffer
020	About 5 graves, mid 20th c.	Graves/ Burial Grounds	Historic, Modern	n/a	-27.975994	26.954493	IIIA	100m Buffer
022	Stone kraal	Ruin	Historic	n/a	-27.970932	26.950171	IIIC	100m Buffer
024	Middelpunt werf, 1956. Piggeries, silos. Some modern buildings and additions	Structure	Historic, Modern	n/a	-27.956978	26.932252	IIIC	100m Buffer

4.3 Mapping and spatialisation of heritage resources

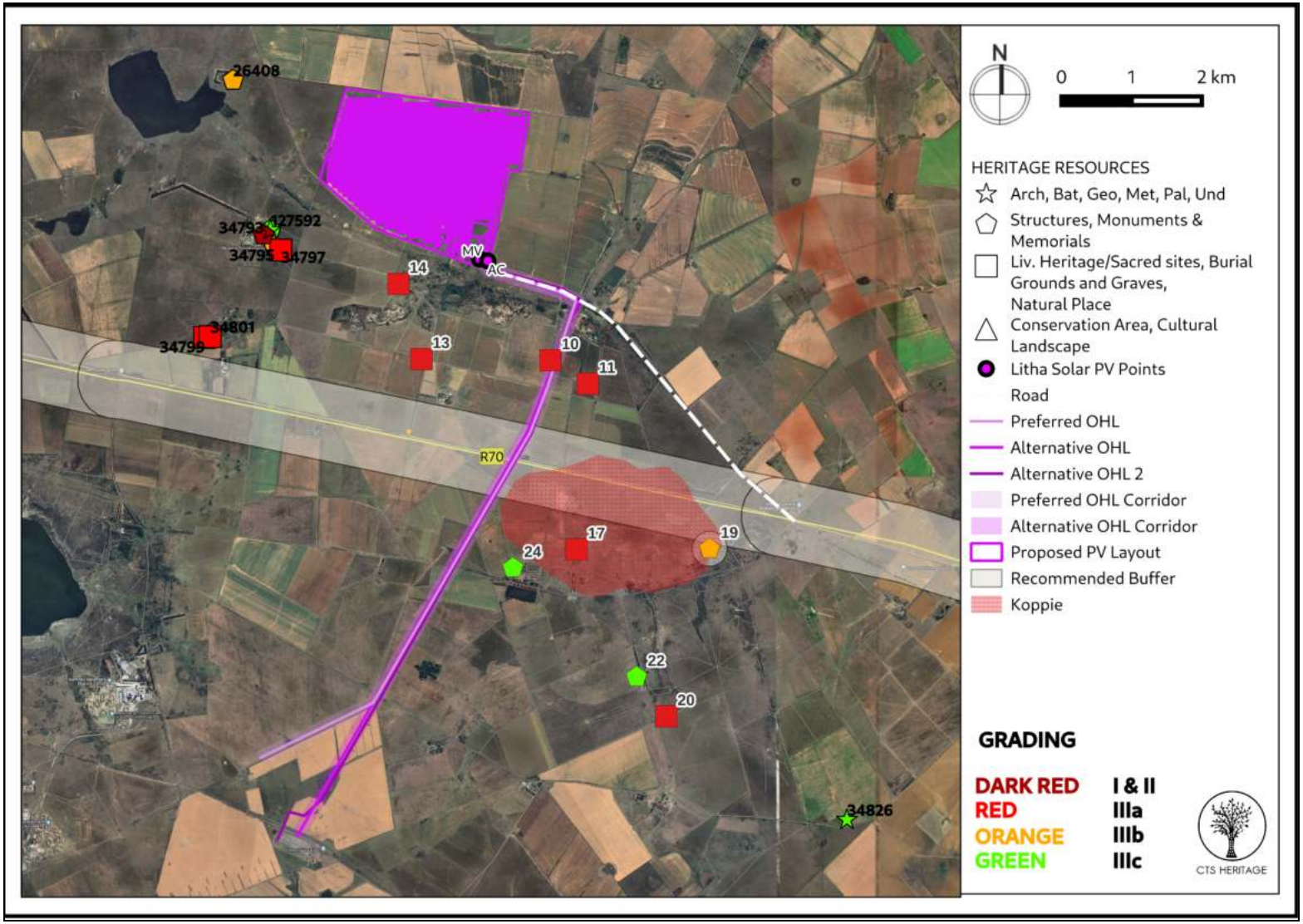


Figure 4.1. Significant Heritage Resources identified during the field assessment

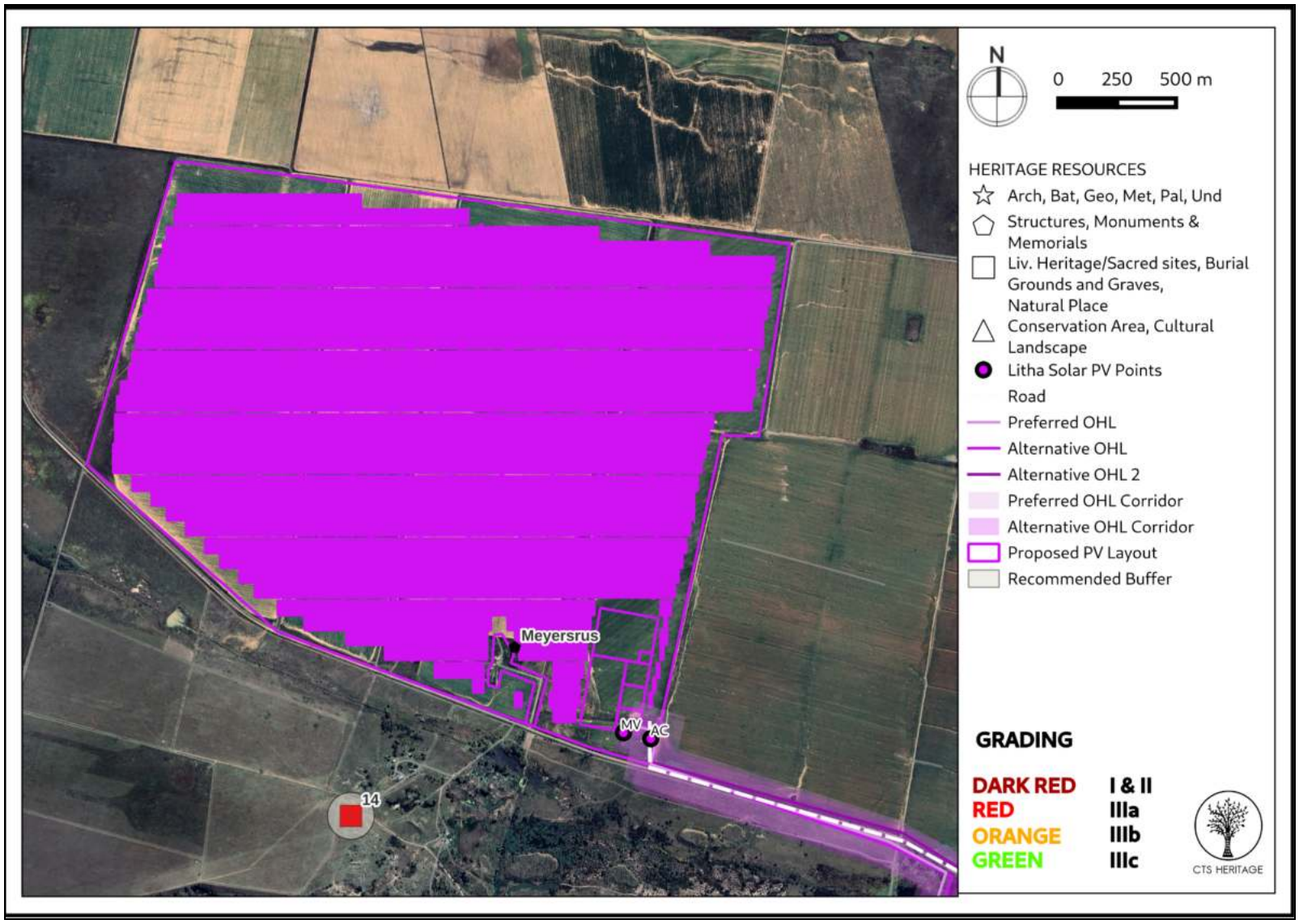


Figure 4.2. Significant Heritage Resources identified during the field assessment

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

Due to the nature of heritage resources, impacts to archaeological and palaeontological heritage resources are unlikely to occur during the PLANNING, OPERATIONAL and DECOMMISSIONING phases of the project. Potential impacts to the cultural landscape throughout the OPERATIONAL phase are discussed in the section below that deals with Cumulative Impacts. The impacts discussed here pertain to the CONSTRUCTION phase of the project.

No Stone Age or Iron Age archaeological resources were identified within the area proposed for development of the Litha SPP. The heritage resources that were identified all relate to the historic farming activities conducted here and include farm werfs (intact and ruined), farming infrastructure such as kraals, sheds, dams and workers cottages as well as family burial grounds.

Cultural landscape heritage resources have been mapped including farmsteads and other built environment features, routes, landscape features, as well as important views and threshold conditions. Buffers have been allocated to each resource depending on its nature and degree of heritage significance and are informed by the heritage indicators set out below with emphasis on the placement of PV infrastructure.

Table 4: Table identifying development sensitivities relevant to the proposed development (adapted from Winter and Wilson, 2022 and Oberholzer, 2020)

RESOURCE	NO-GO AREAS	HIGH SENSITIVITY	MEDIUM SENSITIVITY
Cultural landscapes including natural reserves - formally protected or worthy of formal protection.	0 – 3 km	3 – 5 km radius	5 – 10km
Settlements (towns, villages and hamlets) - formally protected or worthy of formal heritage protection.	0 - 2km radius	2 - 4km radius	4 – 6km
Historic scenic linkage routes.	0 – 1km buffer either side	1 – 2.5km	2,5 - 5km
Heritage sites worthy of Grade I, II and IIIA heritage status.	0 – 1km radius	1 – 2km	2- 5 km
Heritage sites worthy of grade IIIB and IIIC heritage status.	0 - 500m radius	500m – 1km	1 – 2km
Water features (rivers, wetlands and dams)	0 - 250m buffer either side/ surrounding water feature	250 - 500m	
Topographical features (ridgelines, peaks, scarps)	0 - 250m radius buffer from peak/apex	250 - 500m	

Steep slopes	>1:4 slopes	>1:10 slopes	<1:10 slopes

The desktop assessment completed for this project identified a number of farm werfs from the historic 1:50 000 Topographic Map (see Desktop Assessment) and made various recommendations regarding appropriate buffers. The field assessment then determined which of those werfs are still in use or are in a ruined state. Of the Farm werfs identified in the desktop assessment, the following have been determined to have heritage significance:

- Gold Smiths Folly (Grade IIIB)
- Middelpunt (Grade IIIC)
- Rosemary (Grade IIIC)
- Alkmaar (Grade IIIC)
- Helpmekaar (Grade IIIC)
- Ferreiras Rust (Provincial Heritage Site)

None of these are located within the area proposed for the Litha SPP development.

What is also clear from the field assessment is that the burial grounds identified are all related to the historic farm werfs and as such, the relationship between the identified burial grounds and their associated farm werfs has significance. Many of the burial grounds identified are located within cultivated fields and as such, are challenging to identify. Due to the high local levels of spiritual and social significance associated with human remains and burials, these sites are all graded IIIA. It is recommended that a minimum no-development buffer of 100m is implemented around these sites.

Furthermore, it is recommended that where the relationship between the burial ground and an existing farm werf (intact or ruined) is established, that this spatial relationship be kept intact. This can be achieved through either an open visual corridor between the werf and its associated burial ground or a linking path between the werf and its associated burial ground. Based on the final layouts received for the Litha SPP, this linkage remains intact in the layouts provided.

The following impacts are identified:

Table 5: Heritage Resources identified per development area

Development Area	Heritage Resource	Werf Association	Mitigation
Litha SPP	Meyersrus Ruin	Meyersrus	NA

In terms of impacts to palaeontological heritage, the entire footprint of the proposed development area has been modified for agricultural purposes and is covered by dense grasses. As noted above, no fossiliferous outcrop was detected in the proposed development during the field assessment. This could be attributed to the lack of outcrops as well as the lush grassy vegetation in the area. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare.

A medium Palaeontological Significance has been allocated for the construction phase of the PV development pre-mitigation and a low significance post mitigation. The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases.

As the geology underlying the area proposed for the Litha SPP facility remains is determined to have moderate sensitivity for impacts, it is recommended that the attached Chance Fossil Finds Procedure be implemented throughout the construction phase.

Table 6: Assessment of impacts

NATURE		
Destruction of significant archaeological and palaeontological heritage during the construction phase of development.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
PROBABILITY		
This describes the chance of occurrence of an impact.		
4	Definite	Impact will certainly occur ((Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
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 indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
2	Medium	Impact alters the quality, use and integrity of the system/component but the system/component still continues to function in a moderately

		modified way and maintains general integrity (some impact on integrity).
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
4	Complete loss of resources	The impact results in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
3	Medium cumulative impact	The impact would result in minor cumulative effects.
SIGNIFICANCE		
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. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) 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**
20 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.

Table 7: Impacts and mitigation measures for the Construction Phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Heritage Impact Assessment	Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries – Grave/ Burial sites and Farmstead	40	15	A 1km no development buffer is implemented around Ferreiras Rust PHS A 100m no development buffer is implemented around sites 026, 027, 028 and 029
Palaeontological Impact Assessment	Disturbance, damage or destruction of legally protected fossil heritage within the development footprint during the construction phase	40	15	The attached Chance Fossil Finds procedure is implemented for the duration of the construction phase.

Table 8: Impacts and mitigation measures for the Operational Phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Heritage Impact Assessment	Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries – Grave/ Burial sites and Farmstead	40	15	A Conservation Management Plan is developed for the ongoing management and conservation of the significant resources located within the development area
Palaeontological Impact Assessment	Disturbance, damage or destruction of legally protected fossil heritage within the development footprint during the operational phase			NA

5.2 Sustainable Social and Economic Benefit

According to information received from the client, "the proposed Litha SPP has the potential to generate additional income and employment opportunities for Hennenman and the surrounding communities. This benefit could be particularly significant to reduce the dependency of job opportunities in the mining sector, with the majority of the economic development and working opportunities associated with the mining activities. Additionally, the mining sector has seen a significant decrease in activity which could lead to dramatic reduction in employment under the mining sector. As a whole, unemployment in South Africa is significantly high and additional job opportunities would not only benefit the region but the overall South African employment ratio. Positive impacts can be associated with the Everest Solar PV Project One with regard to additional renewable energy facilities and reducing the current load on existing Eskom power generation facilities."

- The development of the Litha SPP will generate employment opportunities for individuals from the surrounding communities. During the construction phase, approximately 300 job opportunities will be created, providing a temporary source of employment. Specifically, this would benefit the Matjhabeng LM as a large proportion of the population is not economically active (38%) or is unemployed (21.2%). Following the construction phase, a limited number of job opportunities will be available during the operational phase. By reducing the region's dependency and boosting overall quality of life, the Everest Solar PV Project One will contribute significantly to the community's economic growth. Additionally, this would create jobs outside of the mining sector which is currently the main job opportunity creator in the region.
- The implementation of the Litha SPP is expected to enhance the skill development in the community and lead to better employment opportunities. This, in turn, will equip the workers with valuable knowledge and skills that can be beneficial for their future professional endeavours. Consequently, the overall educational level of the people residing in the Matjhabeng LM is expected to improve.
- The Matjhabeng LM's economy has the potential to benefit from the proposed project by fostering entrepreneurial growth and opportunities, particularly for local businesses in Hennenman. These businesses, involved in the provision of general materials, goods, and services during both the construction and operational phases, are likely to experience positive impacts. Furthermore, the cumulative effects of developing additional solar facilities to the currently proposed facilities could amplify these benefits.
- The proposed development of the Litha SPP represents an investment in non-polluting and renewable energy infrastructure. In comparison to energy generated through the combustion of fossil fuels, this presents a favourable social benefit for society.

- It should be noted that the perceived benefits associated with the Litha SPP, which include renewable energy generation and local economic and social development, outweigh the perceived impacts associated with the project.
- The proposed development of the Litha SPP could reduce current loadshedding associated with the country, specifically reducing the current strain on Eskom power generation facilities. Not only would it increase our green energy generation, but reduce strain imposed on companies as a result of loadshedding. In return this could lead current future work opportunities to be of a more stable nature and not impose additional strain on companies.

As such, on condition that the recommended mitigation measures are implemented, the impacts to heritage resources are outweighed by the anticipated socio-economic benefits to be derived from the project.

5.3 Proposed development alternatives

The DEAT 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives namely, the no-go, location, activity, and design alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer and EAP, which in some instances culminates in a single preferred project proposal. An initial site screening was conducted by the developer; the affected properties and the farm portions were found favourable due to its proximity to grid connections, solar radiation, ecology and relatively flat terrain. These factors were then taken into consideration and avoided as far as possible.

The following alternatives were considered in relation to the proposed activity and all specialists should also make mention of these:

<u>No-go alternative</u>

This alternative considers the option of 'do nothing' and maintaining the status quo. The site is currently zoned for agricultural land uses. Should the proposed activity not proceed, the site will remain unchanged and will continue to be used for agricultural purposes. The potential opportunity costs in terms of alternative land use income through rental for energy facility and the supporting social and economic development in the area would be lost if the status quo persist.

<u>Location alternatives</u>

No other possible sites were identified on the Remainder of farm Schaapvlakte No.498 (RE/489) nor the Remainder of farm Meijers Rust No.168 (RE/168) nor the Remainder of the farm Commodants Pan Zuid NO.142

(RE/142). This site is referred to as the preferred site. The Everest Substation is located approximately 8.8 km from the preferred site. Connection to the grid plays a vital role in the site location for renewable energy facilities. The location of the preferred site shortens the length of the required grid connection in order to evacuate energy into the national grid. There are some limited sensitive features that occur on the site. However, the size of the site makes provision for the exclusion of any sensitive environmental features that may arise through the EIA process and will ensure that potential impacts are adequately mitigated.

Battery storage facility

It is proposed that a nominal up to 2500 MWh Battery Storage Facility for grid storage would be housed in stacked containers, or multi-storey building, with a maximum height of 5m with associated operational, safety and control infrastructure. Three types of battery technologies are being considered for the proposed project: Lithium-ion, Sodium-sulphur or Vanadium Redox flow battery. The preferred battery technology is Lithium-ion.

Battery storage offers a wide range of advantages to South Africa including renewable energy time shift, renewable capacity firming, electricity supply reliability and quality improvement, voltage regulation, electricity reserve capacity improvement, transmission congestion relief, load following and time of use energy cost management. In essence, this technology allows renewable energy to enter the base load and peak power generation market and therefore can compete directly with fossil fuel sources of power generation and offer a truly sustainable electricity supply option.

Design and layout alternatives

Design alternatives will be considered throughout the planning and design phase and specialist studies are expected to inform the final layout of the proposed development.

Technology alternatives

There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon (Mono-facial and Bi-facial) and thin film. The technology that (at this stage) proves more feasible and reasonable with respect to the proposed solar facility is crystalline silicon panels, due to it being non-reflective, more efficient, and with a higher durability. However, due to the rapid technological advances being made in the field of solar technology the exact type of technology to be used, such as bifacial panels, will only be confirmed at the onset of the project.

5.4 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.

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 may therefore result in unacceptable risk or loss, as the proposed development may result in a change to the sense of place of the area as this development is located outside of a REDZ 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. The route which runs along the southern boundary of the broader development area is a significant access route - the R70 - through this agricultural context. In order to ensure that the proposed development does not overwhelm the experience of the broader context, it is recommended that a no development buffer of 500m for PV infrastructure is implemented along this route. This recommendation does not apply to the proposed development of the Litha SPP due to its distance from the R70.

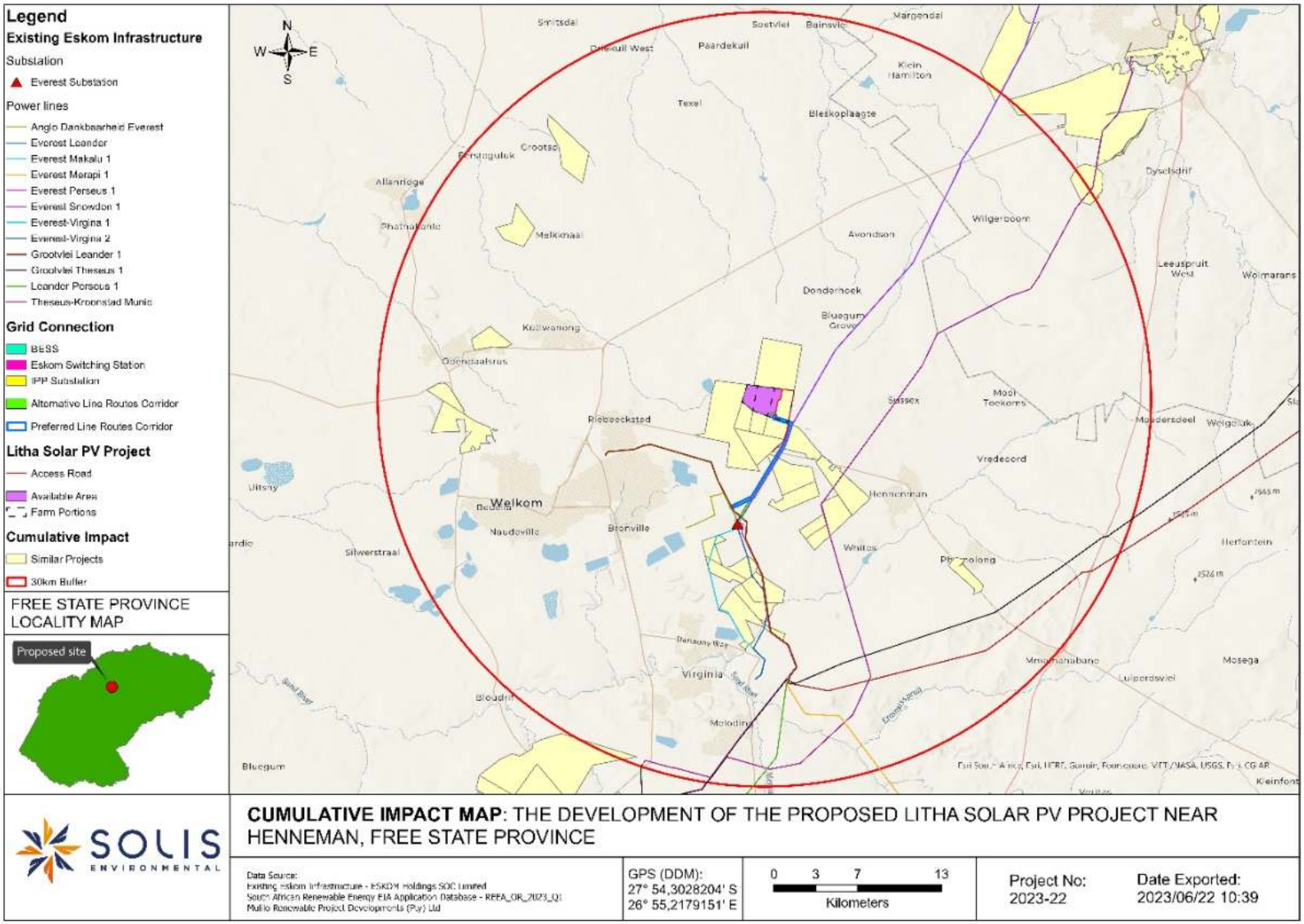


Figure 8: Approved REF projects within 50km of the proposed development area

5.5 Site Verification

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 is high with significant heritage resources identified (MODERATE)
- Some significant archaeological resources including burial grounds and graves were identified within the development area (HIGH)
- No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is 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 HIGH. This evidence is provided in the body of this report and in the appendices (Appendix 1, 2 and 3).

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

The survey proceeded with no major constraints and limitations, and the project area was comprehensively surveyed for heritage resources. No archaeological material remains were documented within the area proposed for development. However, as was noted in the desktop assessment, the historic agricultural landscape is represented by a number of features in this area including intact and ruined farm werfs and their associated infrastructure including burial grounds and graves. The relationship between the identified burial grounds and their associated farm werfs has significance. Many of the burial grounds identified are located within cultivated fields and as such, are challenging to identify. Due to the high local levels of spiritual and social significance associated with human remains and burials, these sites are all graded IIIA. It is recommended that a minimum no-development buffer of 100m is implemented around these sites.

Furthermore, it is recommended that where the relationship between the burial ground and an existing farm werf (intact or ruined) is established, that this spatial relationship be kept intact. This can be achieved through either an open visual corridor between the werf and its associated burial ground or a linking path between the werf and its

associated burial ground. Based on the final layouts received for the Litha SPP, this linkage remains intact in the layouts provided.

In terms of impacts to palaeontological heritage, the entire footprint of the proposed development area has been modified for agricultural purposes and is covered by dense grasses. As noted above, no fossiliferous outcrop was detected in the proposed development during the field assessment. This could be attributed to the lack of outcrops as well as the lush grassy vegetation in the area. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare, however it is recommended that the attached Chance Fossil Finds procedure is implemented for the duration of the construction phase.

8. RECOMMENDATIONS

Based on the outcomes of this report, this project is supported from a heritage perspective as it is not anticipated that the proposed development of the solar energy facility and its associated grid connection infrastructure will negatively impact on significant heritage resources on condition that:

- The mitigation measures indicated in Table 3 and 5 are implemented
- Where the relationship between the burial ground and an existing farm werf (intact or ruined) is established, that this spatial relationship be kept intact. This can be achieved through either an open visual corridor between the werf and its associated burial ground or a linking path between the werf and its associated burial ground. Based on the final layouts received for the Litha SPP, this linkage remains intact in the layouts provided.
- The attached Chance Fossil Finds procedure is implemented for the duration of the construction phase.
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, 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.

9. REFERENCES

Heritage Impact Assessments				
NID	**Author(s)**	**Date**	**Type**	**Title**
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138939	Karen Van Ryneveld, Gideon Groenewald	17/10/2013	Heritage Impact Assessment Specialist Reports	Phase 1 Archaeological Impact Assessment & Palaeontological Assessment Lebone Solar Farm The Remaining Extent of the Farm Onverwag No. 728 and Portion 2 of the Farm Vaalkranz Np. 220, Welkom, Free State Province
158469	Karen Van Ryneveld	19/10/2013	Heritage Impact Assessment Specialist Reports	PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT. THE THABONG SOLAR FARM, UITKYK 509, WELKOM, FREE STATE, SOUTH AFRICA
164148	Lloyd Rossouw	06/12/2013	Heritage Impact Assessment Specialist Reports	Phase 1 Palaeontological and Archaeological Impact Assessment of the proposed Phokeng Township extension at Thabong, Matjhabeng Local Municipality, Free State Province.
169703	Lloyd Rossouw		HIA	Thabong Homestead Phase 1 HIA
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7579	Cobus Dreyer	10/03/2008	AIA Phase 1	First Phase Archaeological and Cultural Heritage Investigation of the Proposed Oppenheimer Park Golf Estate, Welkom, Free State
7625	Francois P	01/02/2008	AIA Phase 1	Cultural Heritage Survey of the Proposed Phakisa Housing

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7724	Cobus Dreyer	20/06/2007	AIA Phase 1	First Phase Archaeological and Cultural Heritage Assessment of the Proposed New MTN Cell Phone Mast at Pumlani Cemetery, Thabong, Welkom, Free State
8034	Cobus Dreyer	05/03/2004	AIA Phase 1	Archaeological and Historical Investigation of the Graves at the Proposed Housing Developments near Thabong, Welkom, Free State

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APPENDICES

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APPENDIX 1: Archaeological Assessment (2023)

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APPENDIX 2: Palaeontological Assessment (2023)

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APPENDIX 3: Heritage Screening Assessment