

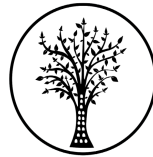
# HERITAGE IMPACT ASSESSMENT

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

## **Proposed development of the 14MW Harmony Central Plant Solar PV Facility, Virginia, Free State Province**

SAHRIS Ref:

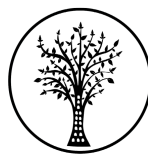
**Prepared by CTS Heritage**



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**For  
Savannah Environmental**

**July 2022**



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## EXECUTIVE SUMMARY

### 1. Site Name:

14MW Harmony Central Plant Solar PV Facility, Virginia, Free State Province

### 2. Location:

Farm Name	Portion Number
SAAIPLAAS 771	12
RUSTGEVONDEN 564	1

### 3. Locality Plan:

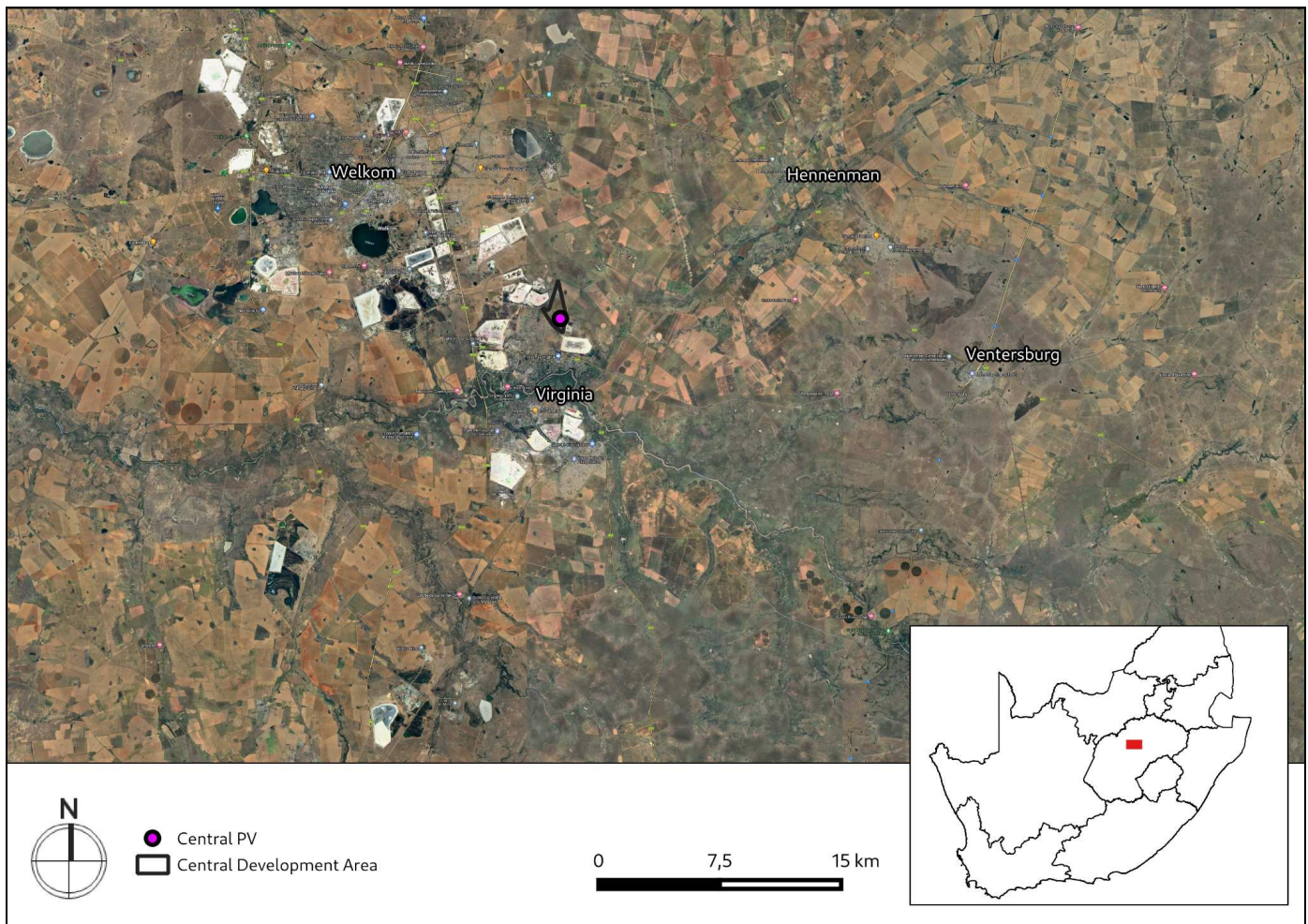
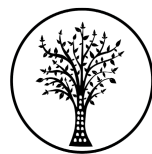


Figure 1: Location of the proposed study area



4. Description of Proposed Development:

The development of renewable energy facilities, overhead powerline and associated infrastructure is proposed by HARMONY GOLD MINING CO LTD. The project entails the development of a Photovoltaic (PV) Solar Energy Facility and associated infrastructure with a capacity of up to 14MW over 33.6 ha of land and will be known as Harmony Central Plant Solar PV, the facility will include a grid connection and other associated infrastructure.

Harmony Central Plant Solar PV is based near Harmony Gold Central Plant operations located ~6km North east of the town of Virginia and ~11km Southeast of the town of Welkom within the **Matjhabeng** Local Municipality respectively, and within the Lejweleputswa District Municipality, Free State Province.

5. Heritage Resources Identified in and near the study area:

Site No.	Site Name	Description	Period	Co-ordinates		Grading	Mitigation
CT1	Central 1	Isolated dolerite artefact: core with primary removals	ESA-MSA	-28.042365	26.87966896	NCW	NA
CT2	Central 2	Isolated quartz artefact: prepared platform flake, heavily rolled and weathered	ESA-MSA	-28.05414199	26.88064604	NCW	NA
CT3	Central 3	Isolated quartzite artefact: bifacial tool with alternating retouch on both faces	MSA	-28.05611903	26.88450398	NCW	NA
CT4	Central 4	Isolated quartzite artefact: core with primary removals	ESA-MSA	-28.06177103	26.88364198	NCW	NA

6. Anticipated Impacts on Heritage Resources:

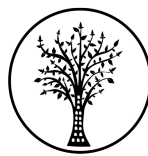
All of the areas surveyed as part of this assessment have been transformed through agricultural interventions and/or mining activity. No archaeological resources of scientific cultural value were identified within the area proposed for the Central PV Facility and its grid connection and as such, no impact to significant archaeological heritage resources is anticipated.

Furthermore, no impacts to significant palaeontological heritage is anticipated on condition that the attached Chance Fossil Finds Process is implemented and no impacts to the cultural landscape are anticipated.

7. Recommendations:

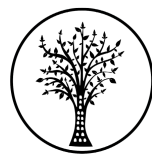
There is no objection to the proposed development in terms of impacts to heritage resources on condition that:

- The attached Chance Fossil Finds Procedure is implemented for the duration of construction activities
- 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



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Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.



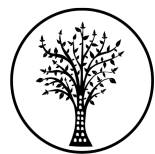
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### **Details of Specialist who prepared the HIA**

**Jenna Lavin**, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management, 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.

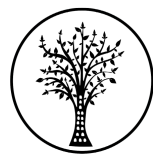
Jenna is a member of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 100 Heritage Impact Assessments throughout South Africa.



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## 1. INTRODUCTION

### 1.1 Background Information on Project

The development of renewable energy facilities, overhead powerline and associated infrastructure is proposed by HARMONY GOLD MINING CO LTD. The project entails the development of a Photovoltaic (PV) Solar Energy Facility and associated infrastructure with a capacity of up to 14MW over 33.6 ha of land and will be known as Harmony Central Plant Solar PV, the facility will include a grid connection and other associated infrastructure.

Harmony Central Plant Solar PV is based near Harmony Gold Central Plant operations located ~6km North east of the town of Virginia and ~11km Southeast of the town of Welkom within the **Matjhabeng** Local Municipality respectively, and within the Lejweleputswa District Municipality, Free State Province.

The details on the PV Facility and grid connection infrastructure are listed below:

#### PV Facility:

Farm Name	Portion Number
SAAIPLAAS 771	12
RUSTGEVONDEN 564	1

#### Grid connection infrastructure

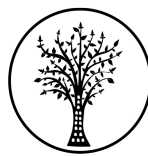
The projects will tie-in to the Harmony North (6.6/44kV) substation. The grid line will have a connection capacity of up to 132kV . The line connecting the PV facility to the respective substation will be up to 44kV.

### 1.2 Description of Property and Affected Environment

The potentially affected footprint related to the proposed PV facility and associated infrastructure is located across several previously ploughed agricultural camps, approximately 9.5km to the south-east of the town of Welkom. Overall the area is flat, and is heavily modified by modern land-use activities such as historical agriculture and prospecting. As a result of such disturbance, little of the original natural landscape - in terms of vegetation, geology and probably also archaeology - is visible today.

The northern portion (Central Plant PV Facility (Alternative 1)) of the affected area is characterised by ploughed agricultural camps. Agricultural activities have disturbed the upper ~0.5-1m of original quaternary sediments associated with this area.

An active high energy non-perennial braiding river with associated minor drainages is located in the south-eastern portion, and there are extensively ploughed fields in the south-western portion of Alternative 1. Several associated drainage channels expose fluvial deposits that are likely Pleistocene in origin. However, the spatial extent and life-history of the drainages are affected by the extensive modern disturbance related to

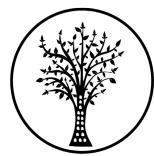


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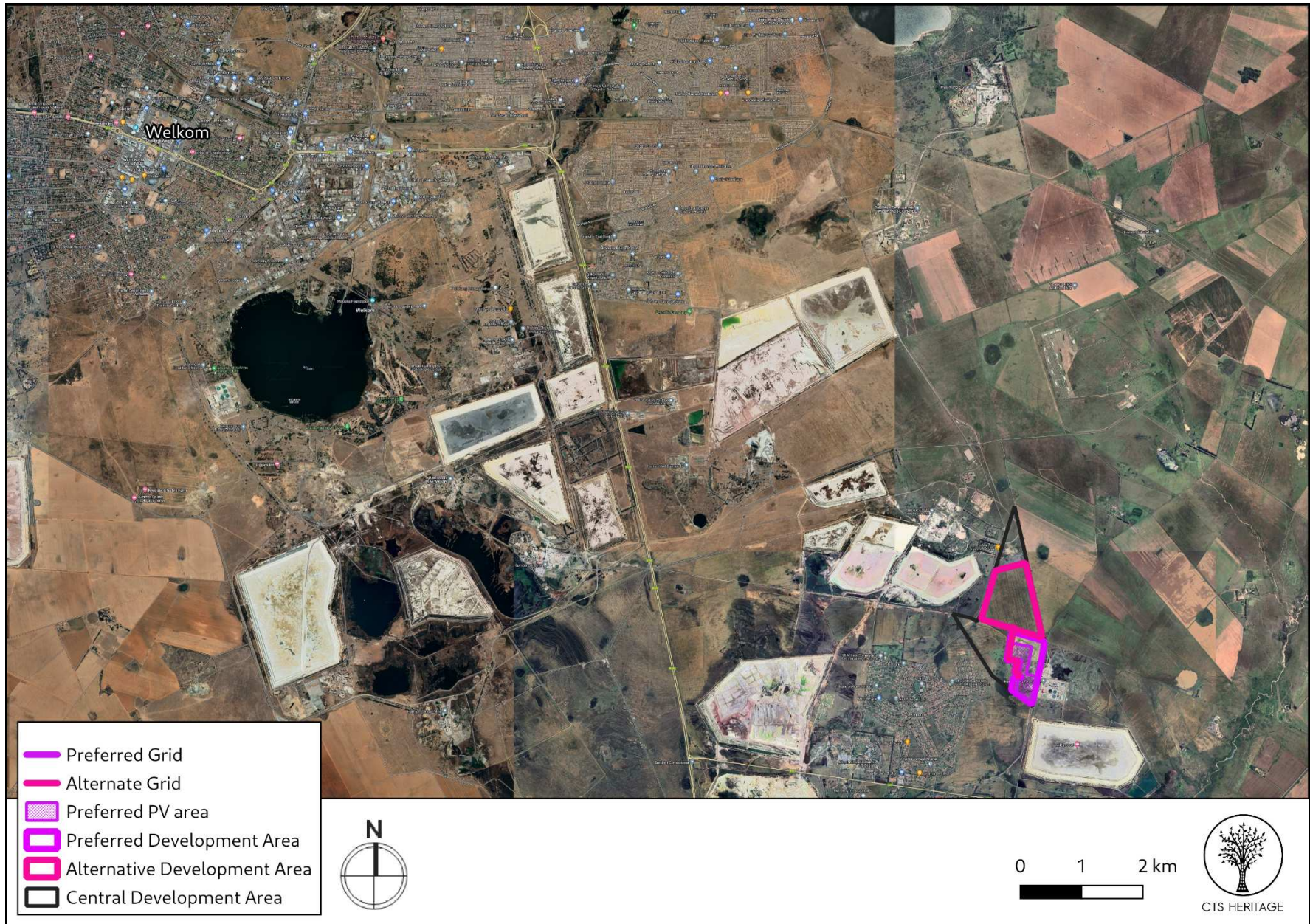
mining activity and prospection in the area (CCT1). Substantial fluvial deposits of riverine quartzite rocks, and other secondary deposits of sedimentary rocks that are characteristic of the parent formations of the broader goldfields region, are associated with these channels. A diversity of rocks is incorporated in the cobble deposits including quartz and indurated shales (Hornfels), many of which are artefact quality in terms of homogeneity and fracture characteristics.

The potentially affected area also has sporadic invasive vegetation including eucalyptus, occasional black Wattle and several Pine trees. Where the indigenous vegetation is evident, it comprises grassland and semi-arid shrubland typical of the southern African Grassland Biome in the summer-rainfall region, although indigenous vegetation has been removed across >70% of the affected area. In terms of fauna, only evidence for burrowing rodents (predominantly hares) was observed. Bioturbation relating to burrowing rodents may well affect any potential sub-surface archaeology (though no sub-surface remains were documented apart from the reworked isolated Pleistocene artefacts).





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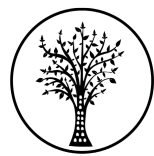


Map 1.1: The proposed development area

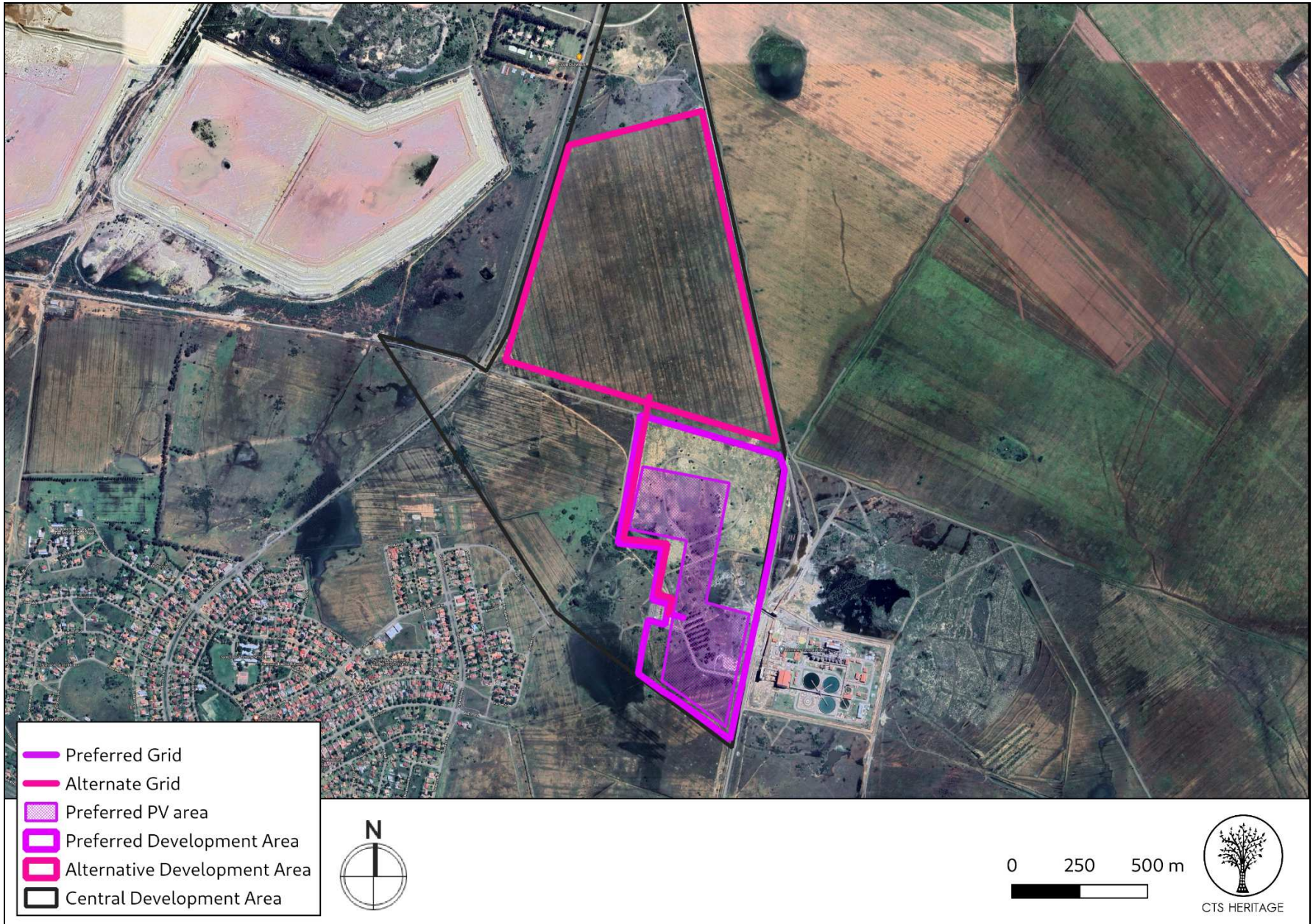
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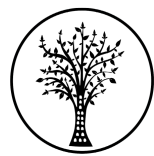


Map 1.2: The proposed development area

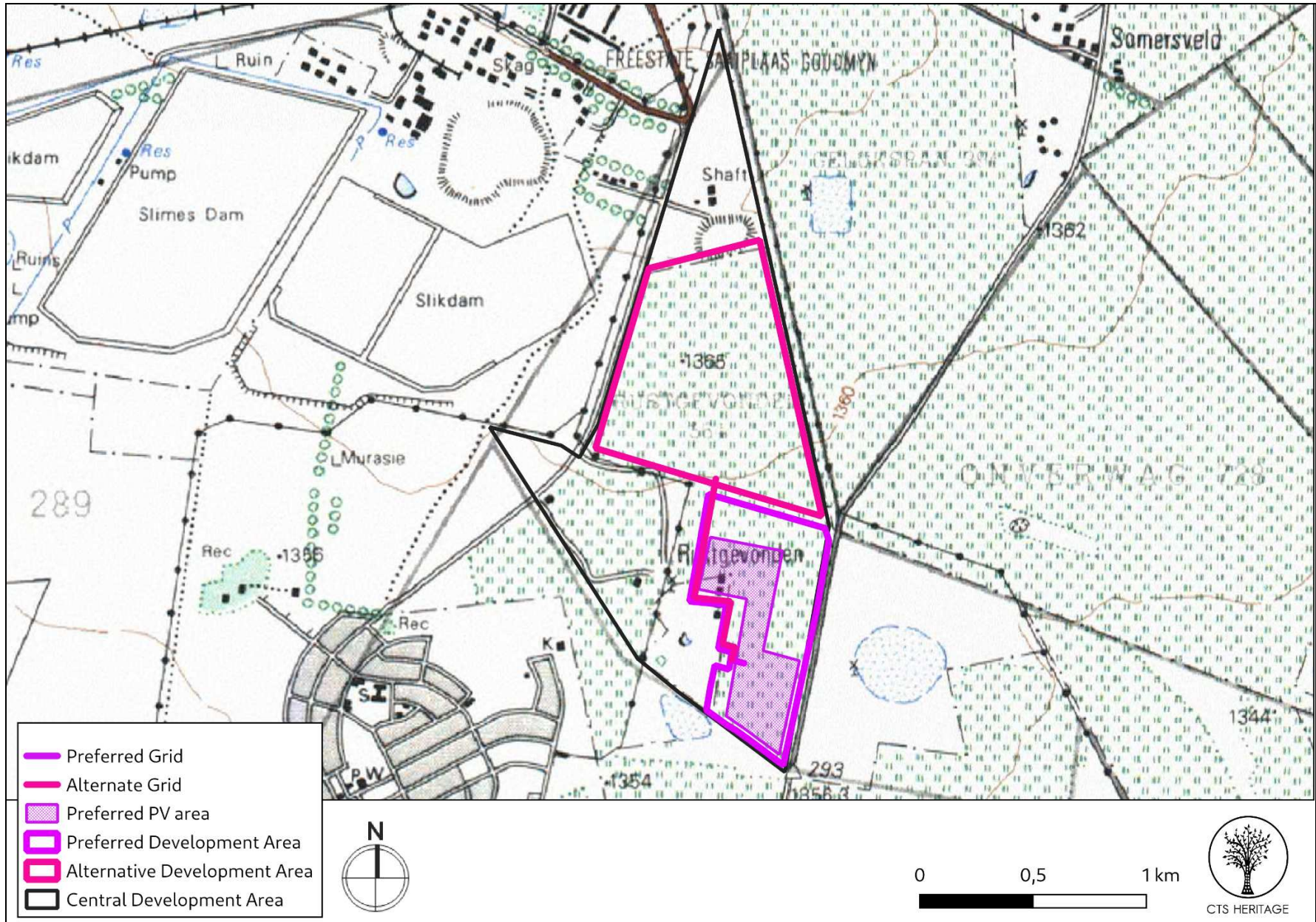
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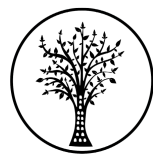


Map 1.3: Study Area reflected on the 1:50 000 Topo Map

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## 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) (Appendix 1)
- An archaeologist conducted an assessment of the broader study area in order to determine the archaeological resources likely to be disturbed by the proposed development. The archaeologist conducted her site visit on 2 June 2022 (Appendix 2)
- A Desktop Palaeontology Assessment was completed 6 July 2022, Appendix 3)
- The identified resources were assessed to evaluate their heritage significance and potential impacts to these resources were interrogated
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

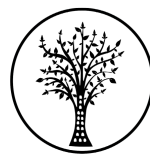
### 2.3 Assumptions and uncertainties

- 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

The area is heavily modified by modern land-use activities such as historical agriculture and prospecting. As a result of such disturbance, little of the original natural landscape - in terms of vegetation, geology and probably also archaeology - is visible today. Previous vegetation clearing activities through prospecting, and by farmers historically, may have affected evidence of surface archaeology including the possible above-surface presence of



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material evidence of graves (i.e. the removal of surface stone structures).

Dense grasses and occasional shrubland cover portions of the project area. This coverage significantly inhibited the visibility of surface archaeology. However, this is not regarded as a substantial problem in relation to the Stone Age archaeological remains, which in most cases look to have generally limited scientific importance due to the disturbed and deflated contexts they occur in. Additionally, even in the places that had optimal visibility, evidence of archaeology was sparse. It is clear that the Stone Age sensitivity and scientific potential of the project area has been comprehensively assessed.

The inability to assess some of the footprint area at ground surface level in some portions (due to modern vegetation cover), should be regarded as a constraint to the documentation of potential graves.

Access was inhibited in areas actively prospected or mined; however, any archaeology occurring in these areas would be *ex situ* in any case, and of limited scientific importance.

The team is confident that, despite these challenges, the work completed has provided a sufficient assessment of the heritage sensitivity of the area proposed for development.

## 2.5 Savannah Impact Assessment Methodology

Direct, indirect and cumulative impacts of the issues identified through the Basic Assessment process were assessed in terms of the following criteria:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high).
- The duration, wherein it will be indicated whether:
  - The lifetime of the impact will be of a very short duration (0 – 1 years) – assigned a score of 1.
  - The lifetime of the impact will be of a short duration (2 – 5 years) – assigned a score of 2.
  - Medium-term (5 – 15 years) – assigned a score of 3.
  - Long term (> 15 years) – assigned a score of 4.
  - Permanent – assigned a score of 5.
- The consequences (magnitude), quantified on a scale from 0 – 10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.



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- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1 – 5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high.
- The status, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

$$S = (E + D + M) \times P$$

S = Significance weighting

E = Extent

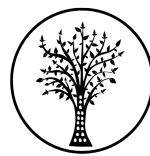
D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area).
- 30 – 60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated).
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).



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### 3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

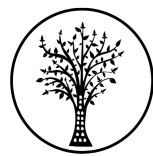
#### 3.1 Desktop Assessment

##### Background

This application is for the proposed development of a PV facility and associated grid infrastructure located approximately 15km from the town of Welkom and 16km from the town of Hennenman in the Free State Province. 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)”

*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. Van der Walt (2013) describes the development area as “extremely flat and is utilized for extensive agricultural purposes (crop farming).”

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 characterized 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.” 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.



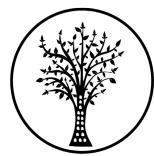
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## Archaeology

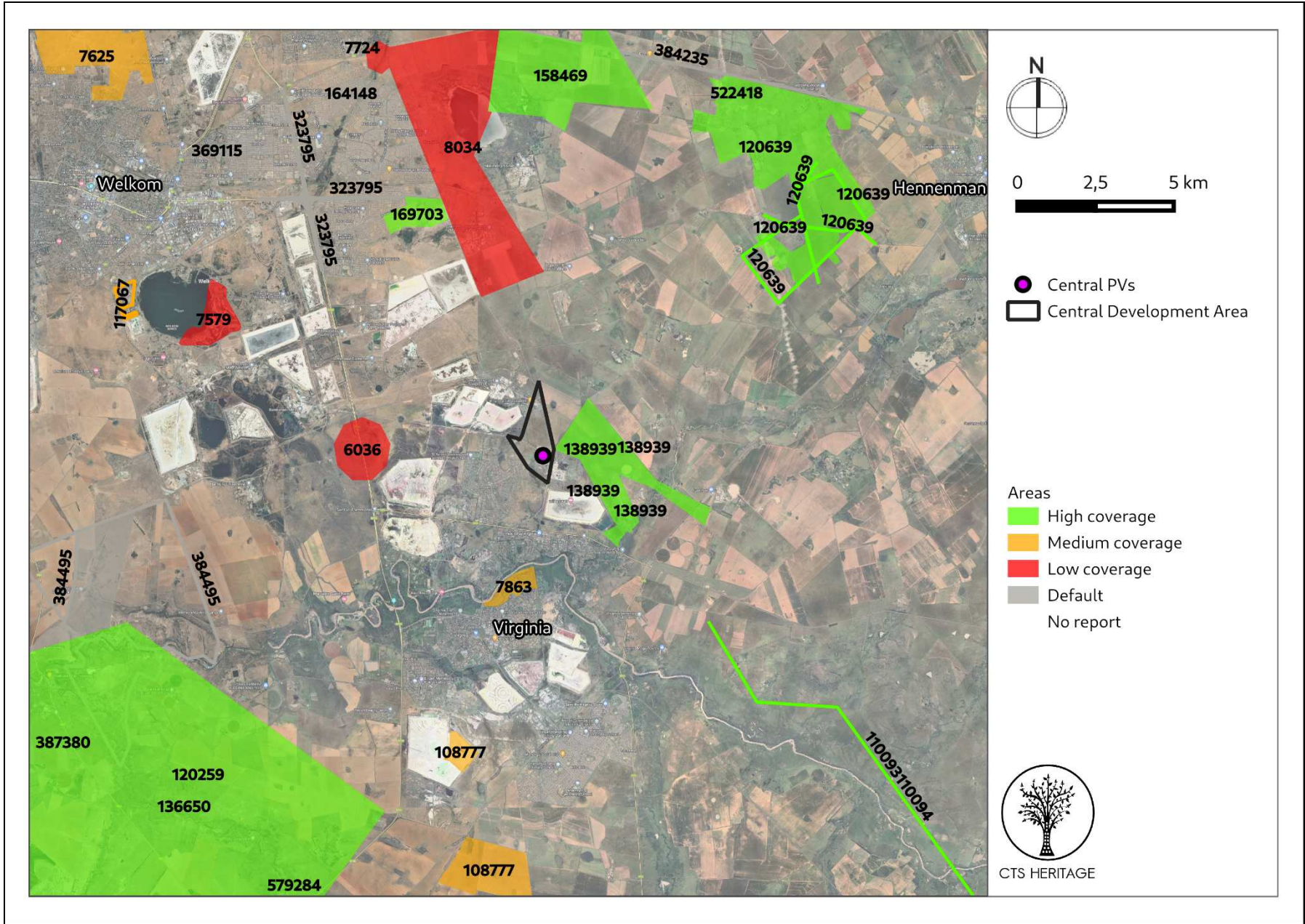
According to Fourie (2021), “The Free State has a rich archaeological and historical history going back millions of years and includes significant aspects such as Later Stone Age rock art, Battlefields and Iron Age stonewalled enclosures. The general surroundings of the study area became a melting pot of contact and conflict as it represents one of many frontiers where San hunter-gatherers, Nguni and Sotho-Tswana agro-pastoralists, Dutch Voortrekkers and British Colonists all came together. The ravages of war also swept across these plains, and in particular the South African War (1899-1902) as well as the Boer Rebellion (1914-1915).” No heritage resources of significance were identified by Van der Walt (2013) in his assessment of a nearby farm. 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)”.

In an assessment completed on the adjacent property, Van Ryneveld (2013) identified five historical structures on the property, but no archaeological heritage resources. Despite the high number of heritage impact assessments completed in the broader area (Figure 2, Appendix 2), no archaeological sites of significance have been identified in close proximity to the proposed development area. This is likely due to the extreme transformation of the area as a result of historic and ongoing gold mining activities. Based on the known archaeological sensitivity of the broader context, it is unlikely that the proposed development will impact on significant Stone Age or Iron Age archaeological heritage however it is possible that informal or unmarked graves may be present within the development area.





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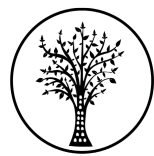


Map 2.1: Spatialisation of heritage assessments conducted in proximity to the broader study area

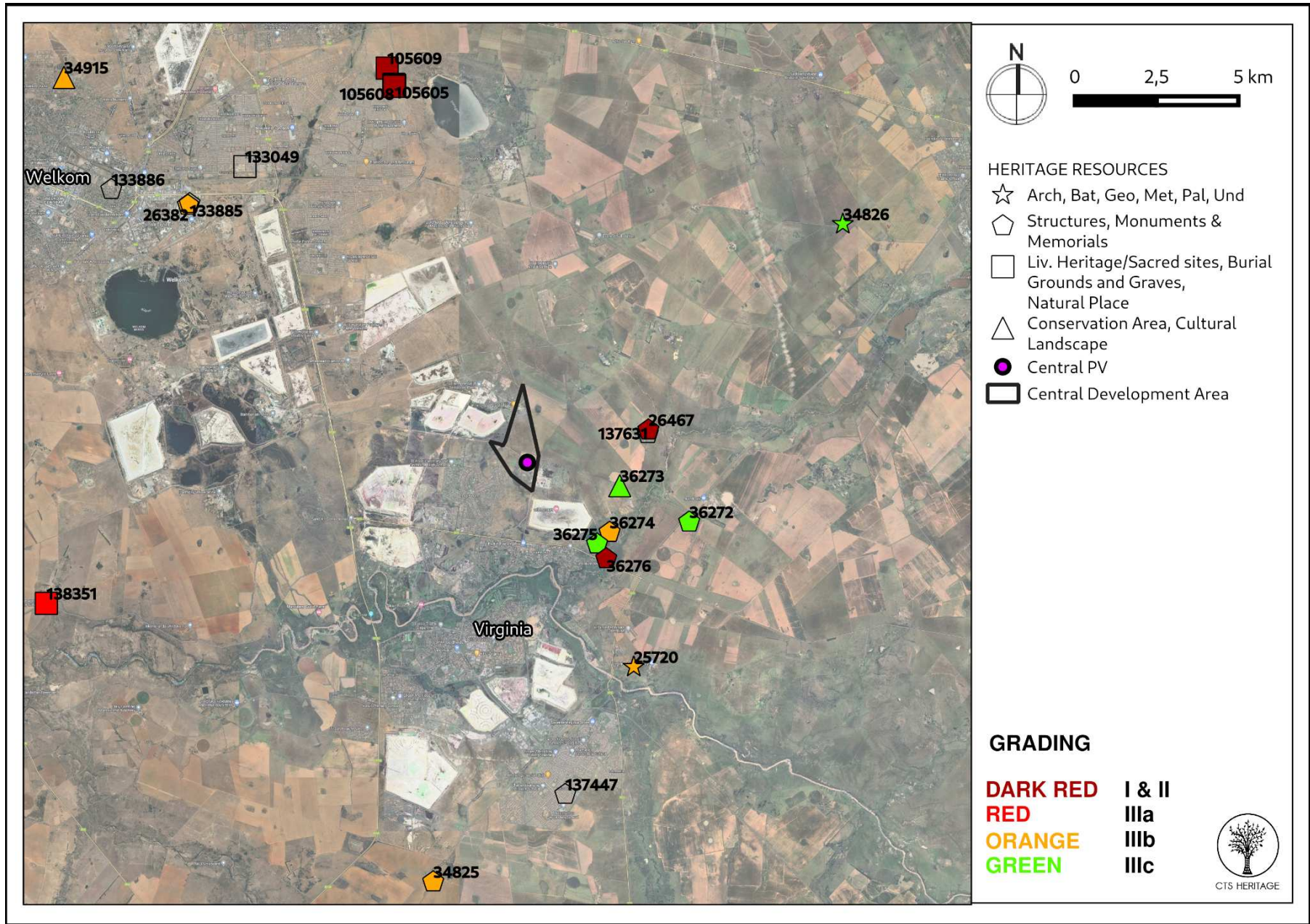
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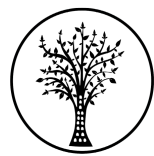


Map 2.1: Spatialisation of heritage resources known in proximity to the broader study area

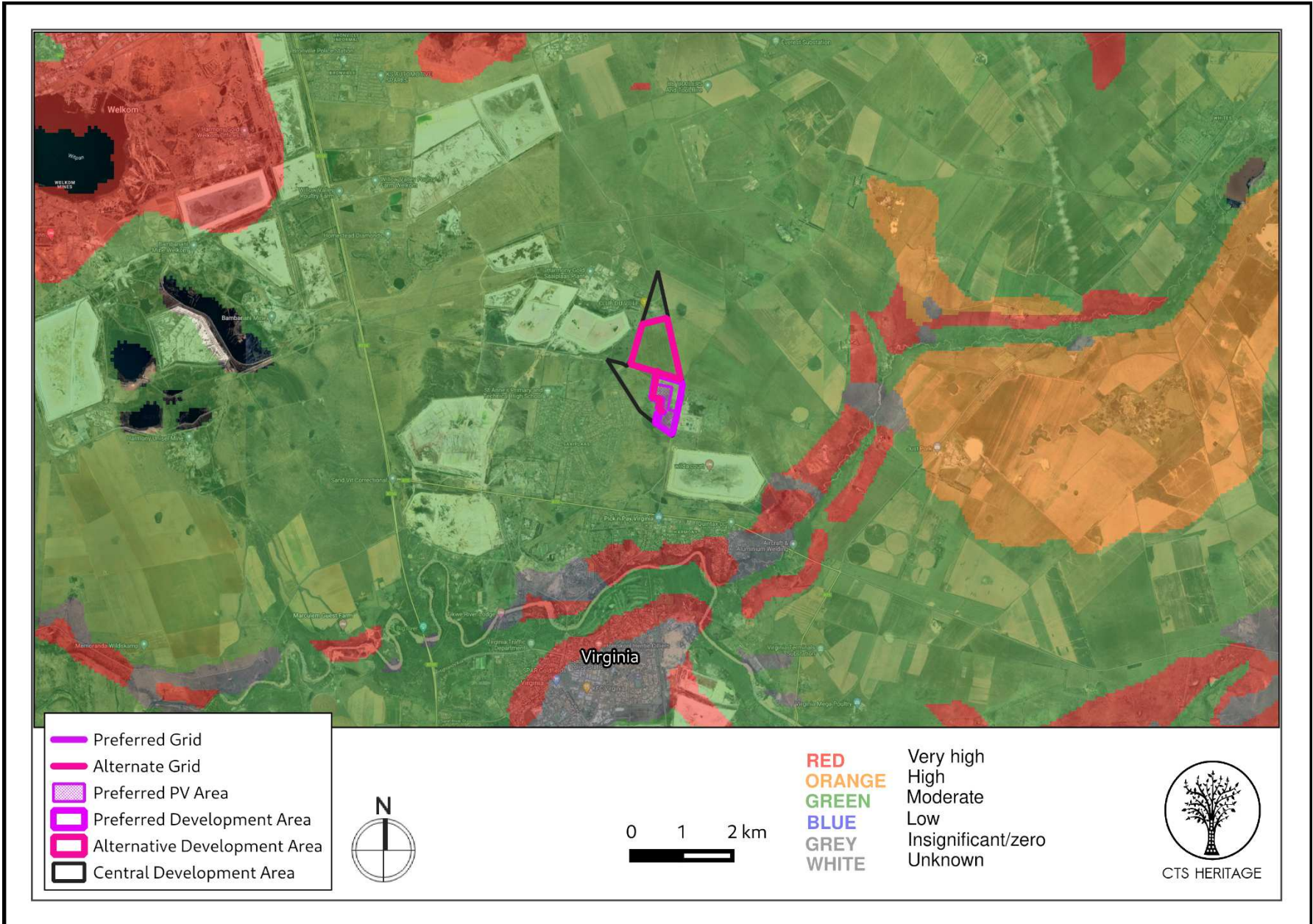
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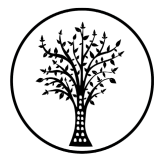
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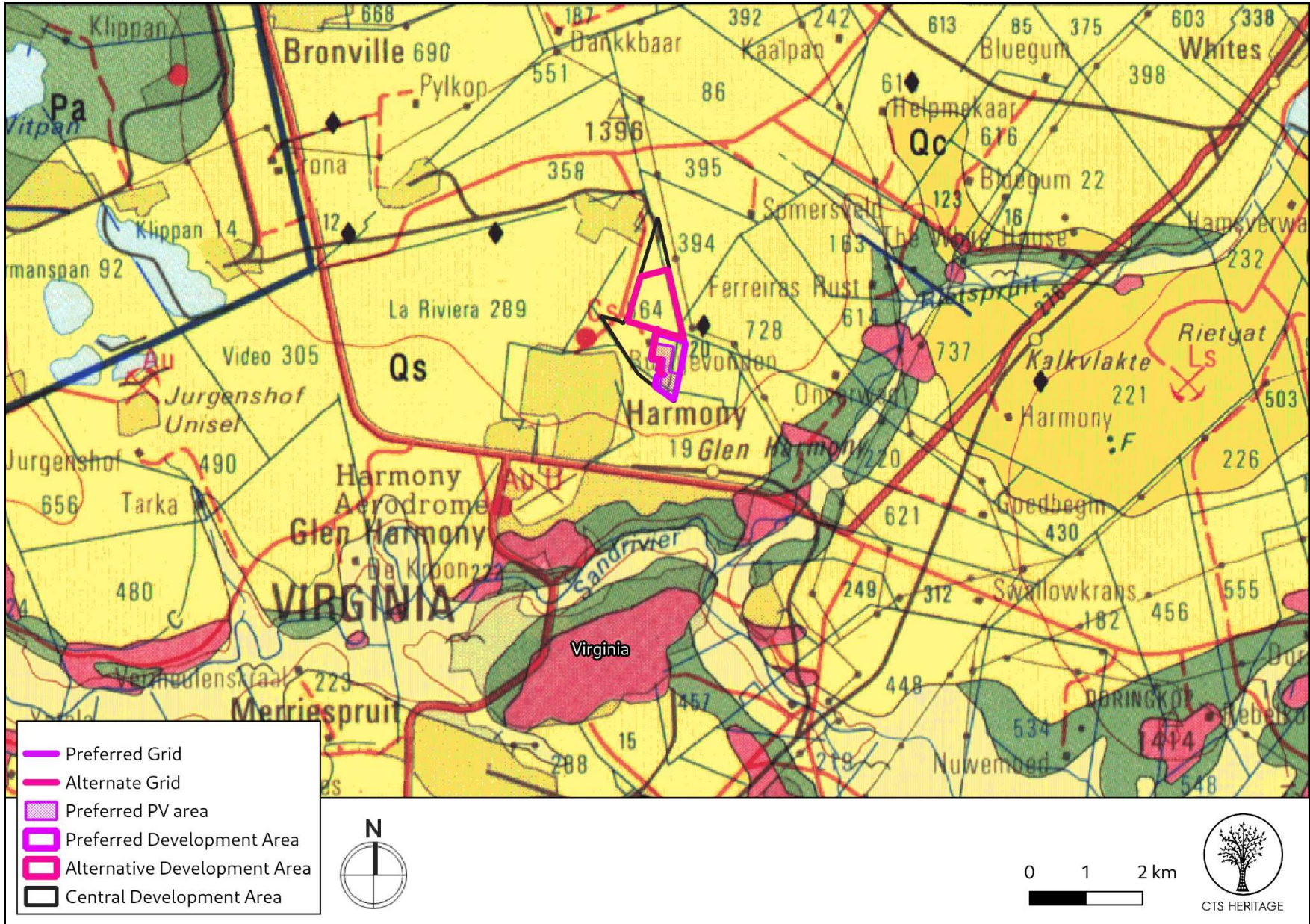
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Map 3.1: Palaeontological sensitivity of the area surrounding the broader study area



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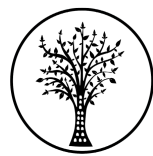


Map 3.2: Geology Map. Extract from the CGS 2826 Winberg Geology Map indicating that the development area is underlain by Quaternary Sands (Qs)

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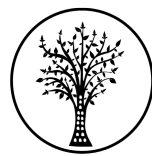


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### 3.2 Palaeontology

According to the SAHRIS Palaeosensitivity Map the development sites are underlain by sediments of moderate fossil sensitivity (Figure 3.1) consisting of caenozoic regolith according to the extract from the CGS 2826 Winberg Geology Map (Figure 3.2).

According to a Palaeontological assessment completed by Groenewald (2013) for a neighbouring development, “No fossils have been described from the quaternary aeolian deposits in the study area, although fossil finds have been recorded from similar aged sediments, for example: the Cornelia Formation in the north-eastern Free State (Johnson et al, 2006).” It is possible that sensitive sediments of the Adelaide Subgroup underly the Quaternary Sands. According to Groenewald (2013), “The Permian Adelaide Subgroup is interpreted as a meandering river deposit grading upwards into a lacustrine environment and is well known for containing fossils (Johnson et al, 2006). Although difficult to correlate the study area directly with more well-known outcrops of the lower part of the Adelaide Subgroup to the east, the subgroup is known to contain very good examples of Glossopteris flora as well as numerous remains of vertebrate fossils associated with the Dicynodon Assemblage Zone in the north-eastern part of the Karoo Basin (Groenewald, 1989 and 1996).” Groenewald (2013) concludes that “There is a possibility that fossils could be encountered during excavation into both the quaternary sand deposits and the Adelaide Subgroup sediments within the development footprint. The study area has been extensively modified through agricultural development and it is unlikely that fossils will be exposed in these developed areas.”



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## 4. IDENTIFICATION OF HERITAGE RESOURCES

### 4.1 Summary of findings of Specialist Reports

#### 4.1.1 Archaeology

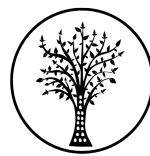
The survey was conducted primarily on foot but also involved driving between key targeted areas, and sought to assess the presence and significance of archaeological occurrences within the project area. Overall field assessment documented a sparse number of isolated stone artefacts in secondary and surface contexts, suggesting the area may have been traversed intermittently by Stone Age groups through periods in both the Middle Stone Age (MSA – ~300ka:~40ka), the Later Stone Age (LSA: ~40ka: ~2ka) in addition to individual bifacial tools potentially associated with the later ESA (~400~200ka), although artefacts that could be clearly linked with chrono-cultural periods were scarce.

The presence of small nodules of artefact-quality chert rocks, homogenous quartzites as well as high-quality riverine Hornfels and Quartz in the project areas in addition to relatively abundant standing water, were likely the resources that attracted groups to the broader region, and resulted in them leaving behavioural traces in the form of stone artefacts. Indeed the majority of the stone artefacts identified look to be the result of expedient ‘testing’ of rocks for quality, although several cores and tools associated with more extensive investment in production were identified. In this sense no evidence of substantial densities of finds or occupational debris were identified, and the stone artefacts present look to have been produced by mobile forager groups moving through the area.

At several localities within the development area, exposures of agriculturally reworked quaternary surface deposits are visible (CCT63), which include sparsely distributed Pleistocene stone artefacts in some places. These artefacts have been rolled, as evidenced by rounding and frequencies of edge-damage on all specimens, and are in heavily disturbed depositional contexts. Structural remains of past agricultural activities are also evident in close proximity to the ploughed areas. Ephemeral remnants of one modern Kraal were visible, however, this Kraal is likely not older than 60 years, thus offering little in terms of scientific or heritage value (CCT14).

Sparse Pleistocene artefacts are associated with these cobble deposits, and mostly comprise products from early on in core reduction, with one weathered bifacial tool indicative of an earlier Late Pleistocene or Middle-Pleistocene occupation of the region. This bifacial tool may be indicative of a broad minimum age for the original fluvial deposition of the cobbles and artefacts in this area. That said, the artefacts themselves could have been fluvially transported over substantial distances. The artefacts identified were all *ex-situ*, meaning that they cannot be dated or geochronologically associated with an encompassing deposit, so are limited in scientific value. All artefacts occur as isolated finds rather than scatters of associated archaeological materials.

Apart from the isolated Stone Age remains mentioned, there was no evidence of Iron Age archaeology within the footprint. No graves were identified within the survey and visibility was reasonably good for stone structures, although much of the surface sediments were only visible in disturbed contexts. Relevantly, the dense grass cover



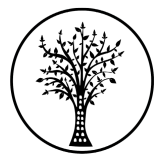
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was a pertinent constraint to documenting potential graves in the areas that were not disturbed. Agricultural and prospection activities may have removed surficial indicators of sub-surface archaeology such as burials, which needs to be considered in future development implicating excavation.

#### ***4.1.2 Palaeontology***

The site for development is on Quaternary sands. Six formations are recognised in the Kalahari Group but they are not often indicated on the geological maps. A more recent review by Botha (2021) attempts to correlate the Quaternary sediments but they are difficult to date or to determine their source. In this part of the Free State the Hoopstad Aeolian sands are present. According to Harmse (1963, in Botha, 2021) this extensive red and grey sandy soil cover is associated with three generations of aeolian sand sheets. Moreover, these generations of aeolian sand form the soil substrate in the heart of the nation's maize cultivation region, yet their geological origin and age remains understudied (Botha, 2021, p. 825).

Quaternary sands and alluvium do not preserve fossils because they are transported and porous. For preservation of fossils, a low energy deposit with sedimentation of fine grained silts or muds that exclude decomposing organisms such as bacteria, fungi and invertebrates is required to maintain a highly reducing environment (Cowan, 1995). Only if there are traps such as palaeo-pans or palaeo-springs that provide traps for water and fine sediments, would plants or bones be preserved and fossilised. No such features are visible in the satellite imagery in the project footprint.



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Figure 4.1: Dense grasses cover portions of the project area inhibiting the visibility of surface archaeology at Central: CCT2; CCT8; CCT11; CT2.



Figure 4.2: Areas of Central affected by mining activities: CCT1.



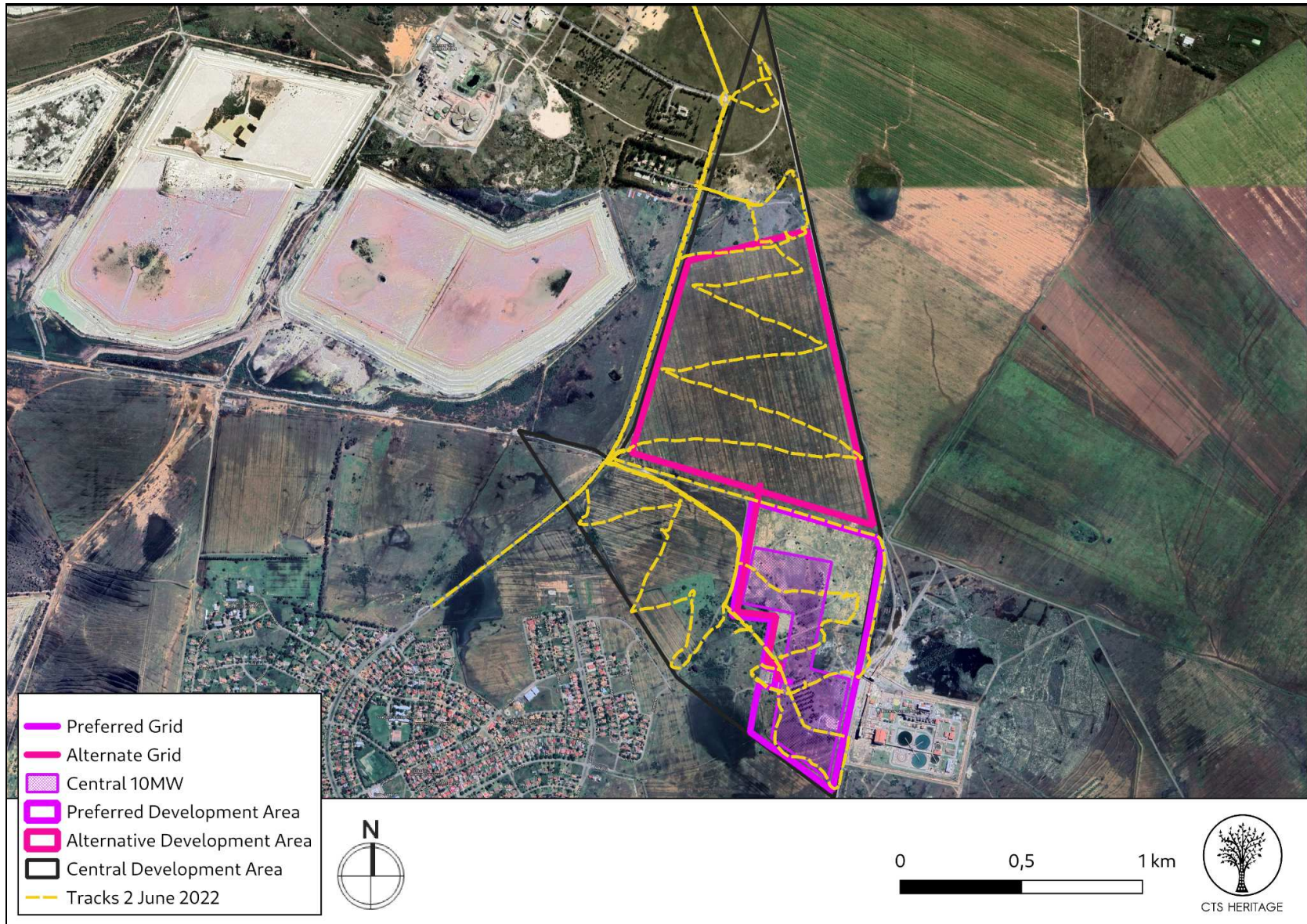
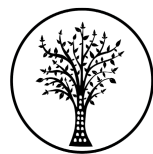


Figure 5.: Overall track paths of foot survey - Central PV Facility



## 4.2 Heritage Resources identified

Field assessment at Central documented 4 Stone Age occurrences in secondary contexts (CT1-CT4). Cumulatively these finds suggest the area was occupied or traversed intermittently by Stone Age groups through periods in the Middle Stone Age, and perhaps the terminal ESA/early MSA.

CT1 was an isolated dolerite core that had been exposed in an intensively ploughed area. The bidirectional nature of removals suggest that the core is probably Middle Stone Age. CT2 was a quartz flake with a prepared platform, also occurring in an area affected substantially by modern agricultural activity. Such platform preparation (CT2) is typical of the products of MSA techniques of flake production. CT3 was a bifacial tool associated with a drainage channel within the footprint, although it was also isolated so has limited scientific value as a single find in an ex-situ, redeposited context. In addition, CT3 had substantial edge damage and weathering indicating that it may have been deposited by a river. As CT3 is a larger bifacial tool, it may be representative of terminal Acheulean technological activity within the area.

**Table 2: Heritage resources identified from fieldwork 2022**

Site No.	Site Name	Description	Period	Co-ordinates		Grading	Mitigation
CT1	Central 1	Isolated dolerite artefact: core with primary removals	ESA-MSA	-28.042365	26.87966896	NCW	NA
CT2	Central 2	Isolated quartz artefact: prepared platform flake, heavily rolled and weathered	ESA-MSA	-28.05414199	26.88064604	NCW	NA
CT3	Central 3	Isolated quartzite artefact: bifacial tool with alternating retouch on both faces	MSA	-28.05611903	26.88450398	NCW	NA
CT4	Central 4	Isolated quartzite artefact: core with primary removals	ESA-MSA	-28.06177103	26.88364198	NCW	NA



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Figure 6: Isolated stone artefacts from Central: CT 1-core with primary removals, CT2-prepared weather platform flake, CT3- bifacial tool with alternating retouch on both faces, CT4-core with primary removals.

### 4.3 Mapping and spatialisation of heritage resources

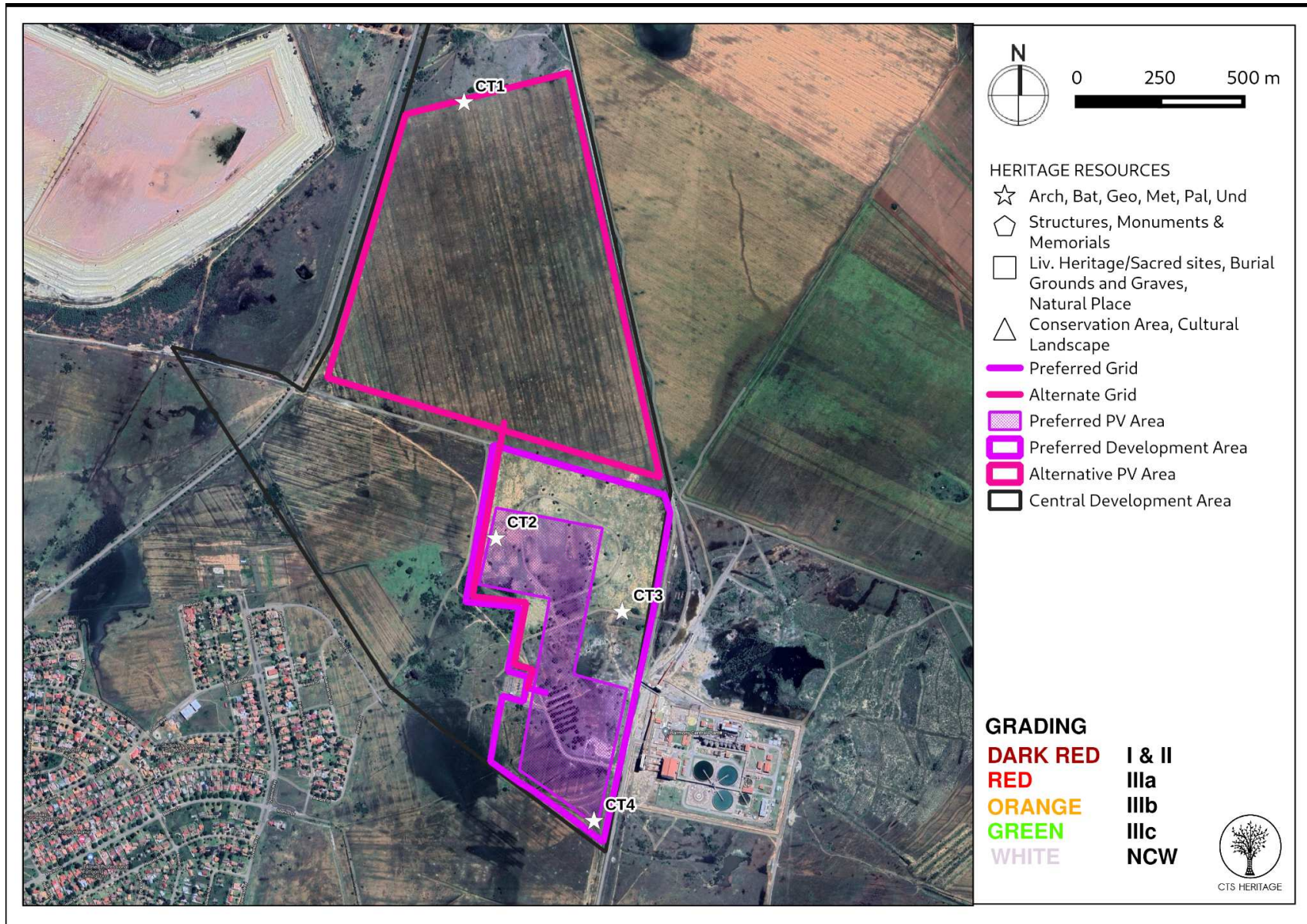
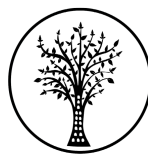


Figure 7: Map of heritage resources identified during the field assessment, relative to the proposed development



**5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT**

**5.1 Assessment of impact to Heritage Resources**

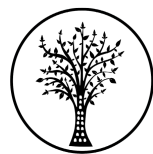
**5.1.1 Archaeology**

The potential for finding a dateable *in-situ* archaeological horizon at Central based on current surface observations outlined above appears to be low. The documented archaeology at Central is therefore classified as scientifically LOW SIGNIFICANCE.

Concerning the archaeology observed during the survey of the potentially affected area at Central, there are no objections to the authorization of the proposed development, provided that if any evidence of buried human remains are exposed during excavation, that development activities cease in the area of the identified remains.

**Table 4.1: Impacts of the proposed development on archaeological resources**

<b>NATURE:</b> It is possible that buried archaeological resources may be impacted by the proposed development in the preferred location				
		<b>Without Mitigation</b>		<b>With Mitigation</b>
<b>MAGNITUDE</b>	<b>L (2)</b>	No archaeological resources of significance were identified within the development area	<b>L (2)</b>	No archaeological resources of significance were identified within the development area
<b>DURATION</b>	<b>H (5)</b>	Where manifest, the impact will be permanent.	<b>H (5)</b>	Where manifest, the impact will be permanent.
<b>EXTENT</b>	<b>L (1)</b>	Limited to the development footprint	<b>L (1)</b>	Limited to the development footprint
<b>PROBABILITY</b>	<b>L (2)</b>	It is unlikely that significant heritage will be impacted	<b>L (1)</b>	It is unlikely that significant heritage will be impacted
<b>SIGNIFICANCE</b>	<b>L</b>	$(2+5+1) \times 2 = 16$	<b>L</b>	$(2+5+1) \times 1 = 8$
<b>STATUS</b>		Negative		Negative
<b>REVERSIBILITY</b>	<b>L</b>	Any impacts to heritage resources that do occur are irreversible	<b>L</b>	Any impacts to heritage resources that do occur are irreversible
<b>IRREPLACEABLE LOSS OF RESOURCES?</b>	<b>L</b>	Not Likely	<b>L</b>	Not Likely
<b>CAN IMPACTS BE MITIGATED</b>		NA		
<b>MITIGATION:</b> Should any previously unrecorded archaeological resources or possible burials be identified during the course of construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward.				
<b>RESIDUAL RISK:</b> None				



### 5.1.2 Palaeontology

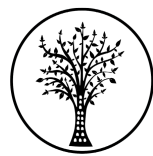
According to the Desktop Palaeontology Assessment, “based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the sandstones, shales and sands are typical for the country and might contain trapped fossils. The sands of the Quaternary period would not preserve fossils. The area has been disturbed from farming and mining so no fossils would be present on the surface.”

“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 the rocks are the right age to contain fossils but are covered by soils. Furthermore, the material to be excavated are soils and this does not preserve fossils. Since there is a small chance that fossils were trapped in pans that might occur below the soils and may be disturbed 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.”

“Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying sands and soils of the Quaternary. There is a very small chance that fossils may occur in pans or springs but no such feature is visible in the satellite imagery. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr.”

**Table 4.2: Impacts of the proposed development to palaeontological resources**

<b>NATURE:</b> It is possible that buried palaeontological resources may be impacted by the proposed development in the preferred location			
		<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>MAGNITUDE</b>	<b>M (5)</b>	According to the SAHRIS Palaeosensitivity Map (Figure 3.1), the area proposed for development of the PV facilities is underlain by sediments that have moderate palaeontological sensitivity.	<b>M (5)</b> According to the SAHRIS Palaeosensitivity Map (Figure 3.1), the area proposed for development of the PV facilities is underlain by sediments that have moderate palaeontological sensitivity.
<b>DURATION</b>	<b>H (5)</b>	Where manifest, the impact will be permanent.	<b>H (5)</b> Where manifest, the impact will be permanent.
<b>EXTENT</b>	<b>L (1)</b>	Limited to the development footprint	<b>L (1)</b> Limited to the development footprint
<b>PROBABILITY</b>	<b>L (1)</b>	It is unlikely that significant fossils will be impacted	<b>L (1)</b> It is unlikely that significant fossils will be impacted
<b>SIGNIFICANCE</b>	<b>L</b>	(5+5+1)x1=11	<b>L</b> (5+5+1)x1=11
<b>STATUS</b>		Negative	Negative
<b>REVERSIBILITY</b>	<b>L</b>	Any impacts to heritage resources that do occur are irreversible	<b>L</b> Any impacts to heritage resources that do occur are irreversible
<b>IRREPLACEABLE LOSS OF RESOURCES?</b>	<b>L</b>	Unlikely	<b>L</b> Not Likely
<b>CAN IMPACTS BE MITIGATED</b>		Yes	
<b>MITIGATION:</b> The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities Should any previously unrecorded palaeontological resources be identified during the course of construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward.			
<b>RESIDUAL RISK:</b> None			



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## **5.2 Sustainable Social and Economic Benefit**

TBA

## **5.3 Proposed development alternatives**

The alternatives assessed as part of this project have been mapped throughout the HIA. Based on the outcomes of this analysis, there is no preferred alternative from a heritage perspective as no impacts to significant heritage resources are anticipated.

## **5.4 Cumulative Impacts**

This application is for the proposed development of a solar energy facility and associated grid connection to facilitate activities at the Central Harmony Mine. The location of the proposed PV facility within an area with existing mining activities may lend itself to cumulative impacts. However, in terms of cumulative impacts to heritage resources, it is preferable that industrial-type infrastructure is clustered within an area in order to prevent the sprawl of industrial development across otherwise sensitive cultural landscapes.

As such, it is not anticipated that the proposed development will have a negative cumulative impact on significant heritage resources.

## **6. RESULTS OF PUBLIC CONSULTATION**

The public consultation process will be undertaken by the EAP during the EIA. No heritage-related comments have been received to-date. SAHRA is required to comment on this HIA and make recommendations prior to the granting of the Environmental Authorisation.

## **7. CONCLUSION**

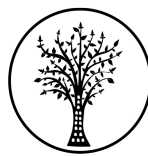
The areas surveyed as part of this assessment have been transformed through agricultural interventions and/or mining activity. No archaeological resources of scientific cultural value were identified within the area proposed for the Central PV Facility and its grid connection and as such, no impact to significant archaeological heritage resources is anticipated.

Furthermore, no impacts to significant palaeontological heritage is anticipated on condition that the attached Chance Fossil Finds Process is implemented and no impacts to the cultural landscape are anticipated.

## **8. RECOMMENDATIONS**

There is no objection to the proposed development in terms of impacts to heritage resources on condition that:

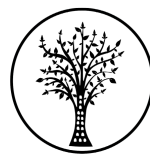
- The attached Chance Fossil Finds Procedure is implemented for the duration of construction activities



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- 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.

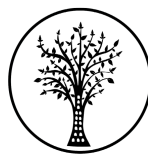




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## 9. REFERENCES

Heritage Impact Assessments				
NID	Author(s)	Date	Type	Title
108777	Heritage Impact Assessment Specialist Reports	Anton van Vollenhoven	30/11/2011	A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED WITS GOLD DBM PROJECT CLOSE TO VIRGINIA, FREE STATE PROVINCE
120259	PIA Desktop	Barry Millstead		Desktop Palaeontological Heritage Impact Assessment Report for the Oryx Solar Energy Facility
120639	Archaeological Specialist Reports	Jaco van der Walt	30/08/2013	Aracheological Impact Assessment report for the Proposed Everest Solar Energy Facility
124729	Heritage Scoping	Jaco van der Walt	08/05/2013	Archaeological Scoping Report for the Proposed Oryx Energy Facility
136650	Archaeological Specialist Reports	Jaco van der Walt	30/08/2013	Archaeological Impact Assessment report for the Oryx Solar Energy Facility
138939	Heritage Impact Assessment Specialist Reports	Karen Van Ryneveld, Gideon Groenewald	17/10/2013	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	Heritage Impact Assessment Specialist Reports	Karen Van Ryneveld	19/10/2013	PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT. THE THABONG SOLAR FARM, UITKYK 509, WELKOM, FREE STATE, SOUTH AFRICA
164148	Heritage Impact Assessment Specialist Reports	Lloyd Rossouw	06/12/2013	Phase 1 Palaeontological and Archaeological Impact Assessment of the proposed Phokeng Township extension at Thabong, Matjhabeng Local Municipality, Free State Province.
169703		Lloyd Rossouw		
186709	PIA Desktop	Gideon Groenewald	14/10/2013	PALAEONTOLOGICAL ASSESSMENT OF THE PROPOSED DEVELOPMENT OF A 75MW PHOTOVOLTAIC SOLAR FARM, ON THE FARM UITKYK 509, WELKOM, FREE STATE PROVINCE.
266924	Archaeological Specialist		26/01/2015	Archaeological Impact Assessment report for the Proposed Uitsig 5MW Solar Energy Facility close to Henneman in the Free State Province



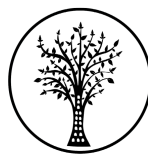
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	Reports			
334505		John Almond	22/07/2015	Palaeontological specialist assessment: desktop study for the proposed Hennenman 5MW solar energy facility.
369115	HIA Phase 1	Candice Keeling	09/09/2016	Heritage Impact Assessment of Ernest Oppenheimer Hospital, Erf 7186, Reitzpark, Welkom, Orange Free State. Proposed Upgrade of Existing Facilities - September 2016
6036	AIA Phase 1	Cobus Dreyer	15/09/2005	Archaeological and Historical Investigation of the Proposed New Filling Station at Virginia, Free State
7579	AIA Phase 1	Cobus Dreyer	10/03/2008	First Phase Archaeological and Cultural Heritage Investigation of the Proposed Oppenheimer Park Golf Estate, Welkom, Free State
7625	AIA Phase 1	Francois P Coetzee	01/02/2008	Cultural Heritage Survey of the Proposed Phakisa Housing Development, Welkom, Free State
7724	AIA Phase 1	Cobus Dreyer	20/06/2007	First Phase Archaeological and Cultural Heritage Assessment of the Proposed New MTN Cell Phone Mast at Pumlani Cemetery, Thabong, Welkom, Free State
7863	AIA Phase 1	Cobus Dreyer	30/08/2006	First Phase Archaeological and Cultural Heritage Investigation of the Proposed Sandrivier Golf Estate, Virginia, Free State
8034	AIA Phase 1	Cobus Dreyer	05/03/2004	Archaeological and Historical Investigation of the Graves at the Proposed Housing Developments near Thabong, Welkom, Free State
110093	PIA Desktop	Job M. Kibii		Palaeontological Impact Assessment Desktop Study Report for the Proposed Merapi (Excelsior) PV Solar Energy Facilities
110094	HIA Phase 1	Nkosinathi Godfrey Tomose		Heritage Impact Assessment Study for the Proposed PV Solar Energy Facilities, near Excelsior, Free State Province
117067	HIA Phase 1	Frans Prins	31/01/2013	Cultural Heritage Desktop Assessment of the proposed Bio-energy Facility, Harmony Gold Mine, Welkom, Free State Province
120639	Archaeological Specialist Reports	Jaco van der Walt	30/08/2013	Archaeological Impact Assessment report for the Proposed Everest Solar Energy Facility
323795	Heritage Impact Assessment Specialist Reports		31/03/2014	Cultural Heritage Impact Assessment Report for the Proposed SANRAL Thabong Interchange Development, Welkom Region, Free State Province
384235	AIA Phase 1	Lloyd Rossouw	30/09/2016	Phase 1 Archaeological Impact Assessment of a proposed new water pipeline and associated infrastructure between Ventersburg and the Koppie Alleen pump station, FS Province

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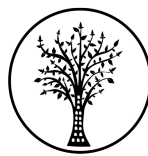
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384495	Heritage Scoping	Nkosinathi Godfrey Tomose	20/12/2016	Heritage Scoping Study for the Proposed Prospecting Rights Application on Farms Adamsons Vley 655, Jonkers Rust 72, Du Preez Leger 324 and Stillewoning 703
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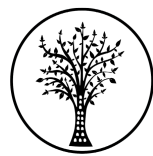
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## APPENDICES

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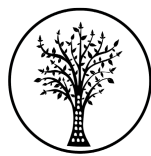
34 Harries Street, Plumstead, Cape Town

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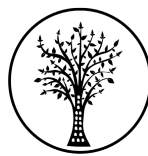
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## APPENDIX 1: Heritage Screening Assessment (2022)



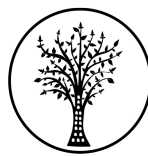
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## APPENDIX 2: Archaeological Assessment (2022)



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### APPENDIX 3: Palaeontological Assessment (2022)



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## APPENDIX 4: Chance Fossil Finds Procedure