HERITAGE IMPACT ASSESSMENT

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

Proposed development of Allepad PV Three, a solar PV facility and associated infrastructure on a site near Upington, in the Northern Cape Province.

Prepared by CTS Heritage

CTS HERITAGE

For

Savannah Environmental Consultants

February 2019

SAHRIS Case ID: 13047

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EXECUTIVE SUMMARY

Allepad Solar PV Three, a commercial solar PV energy generation facility and associated infrastructure, is proposed on a site near Upington, in the Northern Cape Province. The project is intended to be bid into the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, with the aim of evacuating power generated by the project into the Eskom national electricity grid. The project is proposed on a portion of the Remaining Extent of Erf 5315, located approximately 11km north-west of Upington. The area under investigation is approximately 3 889ha in extent and comprises a single agricultural property. The project site can be accessed directly via the N10 national road which borders the southern boundary of the site.

Archaeology

During the field assessment a number of archaeological resources were identified, the vast majority of which are of low contextual significance (Grade IIIC), and are not *in situ*. Two sites of some significance were identified:

- Site 0506: A possible burial (Grade IIIA)
- Site 0526: By far the largest number of artefacts – mostly MSA, but also some LSA including a large ESA flake/LCT. Majority flakes & chunks, but also a weathered core, among an extensive scatter of surface quartz, scraped topsoils, large piles of stone and gravel, & large scale diggings. Small dry pan with many tools lying about, in majority in quartzite, but also quartz, banded ironstone, chalcedony, hornfels/lydianite and 1-2 opaline (Grade IIIB)

Palaeontology

[John Almond 2018]

The overall impact significance of the proposed development is likely to be LOW because:

- Most of the study area is underlain by unfossiliferous igneous and metamorphic basement rocks (granites, gneisses etc.) or mantled by superficial sediments (wind-blown sands, alluvium etc.) of low palaeontological sensitivity;
- Extensive, deep excavations are unlikely to be involved in this sort of project. Significant negative impacts on local fossil heritage are therefore unlikely to result from the proposed development and in the author's opinion no further specialist palaeontological studies for this project are necessary.

Visual Impacts

The greater environment has a rural, undeveloped character and a natural appearance. These generally undeveloped landscapes are considered to have a high visual quality, except where urban development represents existing visual disturbances.

The anticipated visual impact of the proposed SEF on the regional visual quality, and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of low significance. This is due to the relatively low viewer incidence within close proximity to the proposed development site.

Recommendations

There is no objection to the proposed development on heritage grounds and the following is recommended:

- No mitigation is required prior to construction operations commencing.
- The archaeological site 0526, graded IIIB, must not be impacted by the proposed development and a 100m no-go buffer must be implemented around this site.
- The possible burial identified as site 0506 must not be impacted by the proposed development and a 30m no-go buffer must be implemented around it.
- Should any unmarked human remains or ostrich eggshell caches for example are exposed or uncovered during construction activities, or earth moving, operations during preparation of the site for development, work must cease and these must immediately be reported to the South Africa Heritage Resources Agency/SAHRA (Att: Ms Natasha Higgit tel 021 462 4502).
- The ECO must be briefed by an archaeologist prior to construction activities commencing.
- A Chance Fossil Finds Procedure must be implemented (see attached as part of Appendix 2)
- The above recommendations must be included in the Environmental Management Plan (EMP) for the project.

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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 on the Executive Committee 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). 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 30 Heritage Impact Assessments throughout South Africa.

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APPENDICES

1. INTRODUCTION

1.1 Background Information on Project

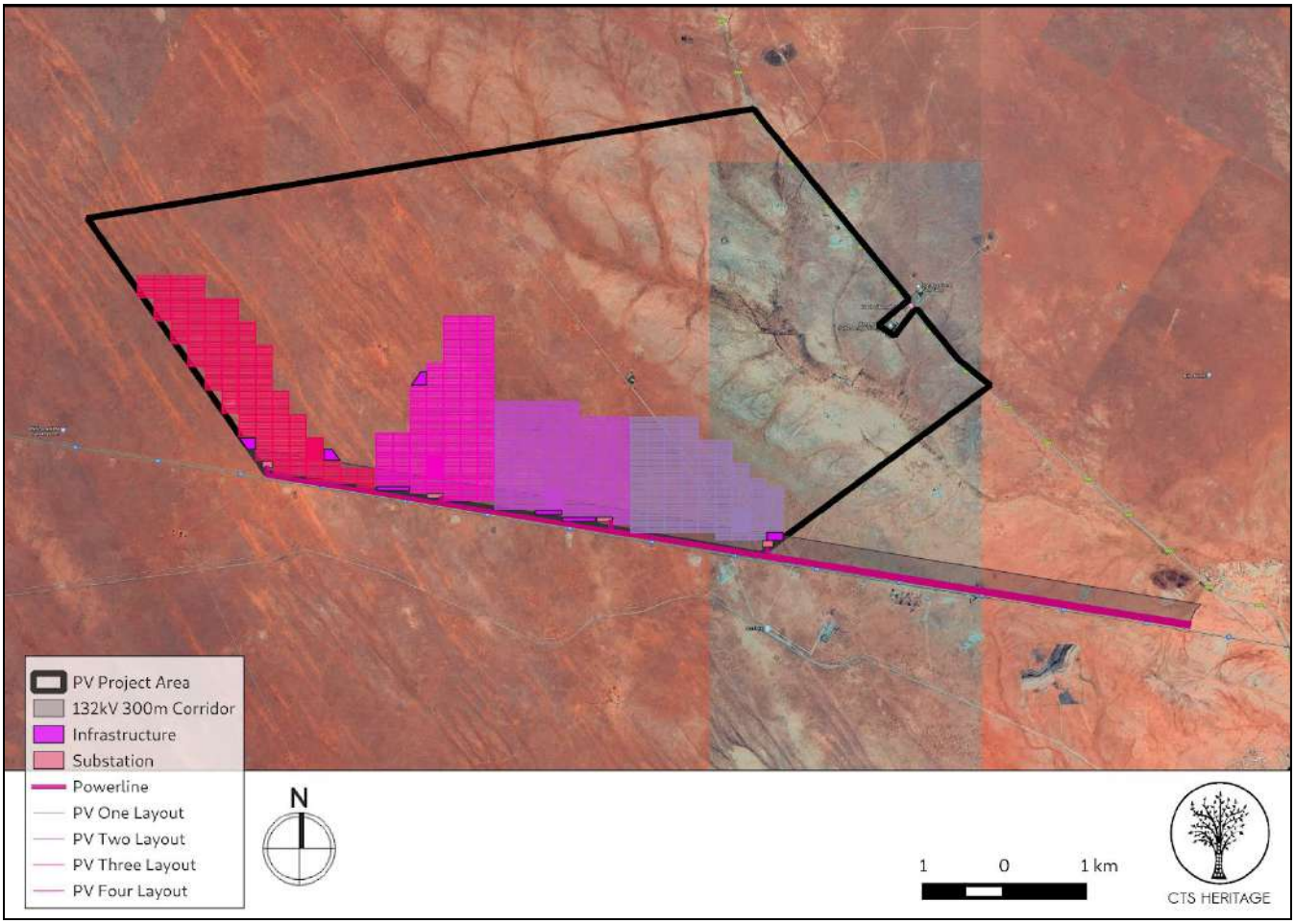
Allepad Solar PV Three, commercial solar PV energy generation facility and associated infrastructure, is proposed on a site near Upington, in the Northern Cape Province. The project is intended to be bid into the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, with the aim of evacuating power generated by the project into the Eskom national electricity grid. The project is proposed on a portion of the Remaining Extent of Erf 5315, located approximately 11km north-west of Upington. The area under investigation is approximately 3 889ha in extent and comprises a single agricultural property. The project site can be accessed directly via the N10 national road which borders the southern boundary of the site.

Photovoltaic (PV) technology is proposed for the generation of electricity. The solar energy facilities will have a contracted capacity of up to 100MW, and will make use of either fixed-tilt, single-axis tracking, or double axis tracking PV technology. The solar energy facility will comprise the following key infrastructure components:

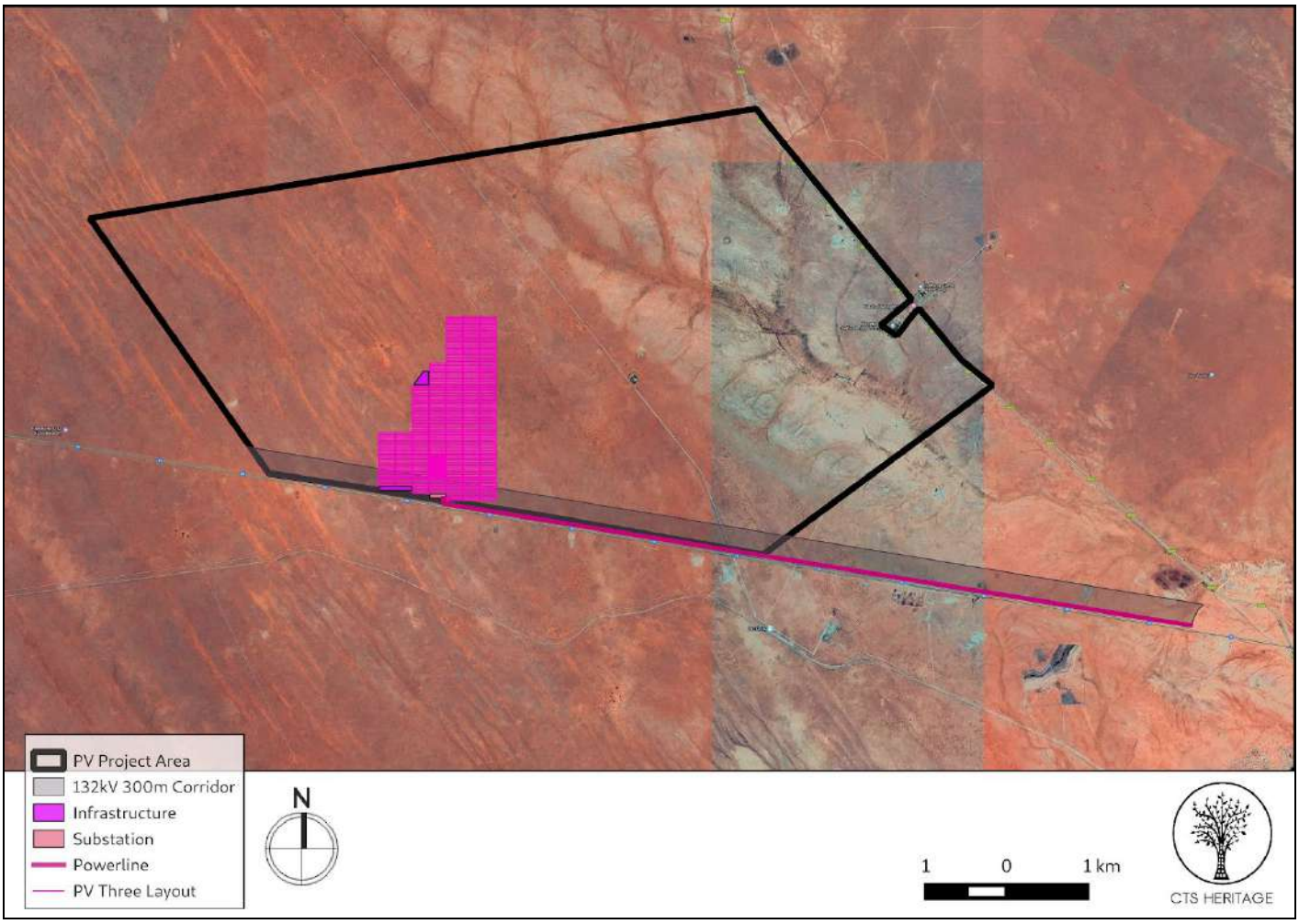
- Arrays of PV panels with a generation capacity of up to 100MW.
- Mounting structures to support the PV panels.
- Combiner boxes, on-site inverters (to convert the power from Direct Current (DC) to Alternating Current (AC)), and power transformers.
- An on-site substation up to 0.5ha in extent to facilitate the connection between the solar energy facility and the Eskom electricity grid.
- A new 132kV power line approximately 5km in length, between the on-site substation and Eskom grid connection point.
- Cabling between the project's components (to be laid underground where practical).
- Meteorological measurement station.
- Energy storage area of up to 2ha in extent.
- Access road and internal access road network.
- On-site buildings and structures, including a control building and office, ablutions and guard house.
- Perimeter security fencing, access gates and lighting.
- Temporary construction equipment camp up to 1ha in extent, including temporary site offices, parking and chemical ablution facilities.
- Temporary laydown area up to 1ha in extent, for the storage of materials during the construction.

Electricity generated by the project will feed into Eskom's national electricity grid via a new 132kV power line which

will connect the on-site substation to the upgraded 132kV double circuit power line running between the new Upington Main Transmission Substation (MTS) (currently under construction approximately 15km south of the project site), and the Gardonia Distribution Substation (located in Upington town). The point of connection is located approximately 5km east of the project site, and will make use of a loop-in and loop-out configuration. The proposed power line required for the project will be constructed within a 300m wide power line corridor which has been identified immediately north of, and which runs parallel to, the N10 national road. A total of four 100MW PV projects are proposed for development on the project site (i.e. Allepad PV One, Allepad PV Two, Allepad PV Three and Allepad PV Four). The full extent of the project site (i.e. 3 889ha) is being assessed as part of the EIA process, of which an area of approximately 250ha (equivalent to 6.4% of the total project area) would be required for the development of Allepad PV Three solar energy facility and associated infrastructure (purple-pink below)



Map 1a: The proposed development area indicating all four Allepad PV facilities



Map 1b: The proposed development area for Allepad PV Three

1.2 Description of Property and Affected Environment

The study area (PV Project Area) is located in the Kalahari Duneveld region of the Northern Cape.

The eastern sector is characterised by numerous drainage channels (Figure 1.1), on a substrate of compact red sands covered in extensive scatters of quartz pebbles, gravels and surface outcroppings of larger quartz boulders and some basaltic type rock. No significant rocky kopjes occur in the eastern sector.

The western sector of the study area comprises a generally flat, undulating landscape interspersed with occasional dunes. The plains are covered in deep red Kalahari sands, dense swathes of Driedoring vegetation, and

patches of tall Bushman grass in places (alongside the N10). A few sporadic Shephard Trees and Acacias occur in places. There is very little surface stone covering this portion of the farm. There, are no seasonal or permanent sources of water such as streams, springs or pans. A few outcroppings of granitic/basaltic rock occur in places. There are numerous twee-spoor tracks criss crossing the site. Existing infrastructure includes twee spoor sandy farm tracks, farm fencing, farm gates, cattle pens, and 2 small concrete dams. Current land use comprises grazing (cattle) where many of the wind deflated areas have been heavily trampled. Surrounding land use is vast tracts of vacant agricultural land, accommodation (Kalahari Monate Lodge), roads (N10 & R330), informal animal husbandry camps, informal housing alongside the N10.

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). In addition, in correspondence dated 8 November 2018, SAHRA required that an HIA be completed.

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 and palaeontologist were contracted to conduct an assessment of archaeological and palaeontological resources likely to be disturbed by the proposed development. The archaeologist conducted his site visit from 2 to 4 October 2018.
- The palaeontologist conducted a desktop assessment
- The identified resources were assessed to evaluate their heritage significance
- The VIA was integrated into the HIA in response to SAHRA's comments dated 8 November 2018.
- 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

1. Limited information supplied by the EAP by the time the archaeological field assessment took place (no final layout) meant that a more detailed and focussed assessment could not be carried out.
2. No site layout plan indicating the location/layout of the PV panels, laydown areas, construction camp site, internal access roads, etc, was provided by the EAP by the time the field assessment took place. A site layout plan was unofficially supplied by the farmer.
3. Massive swathes of Driedoring vegetation cover a large portion of the western sector resulting in low/poor archaeological visibility.

While the study was constrained by time, 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 Savannah Impact Assessment Methodology

Direct, indirect and cumulative impacts of the issues identified through the Scoping study, as well as all other issues identified in the EIA phase 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.

» 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) x 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).

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Previous Heritage Impact Assessments

Cultural Landscape

According to Van Schalkwyk (2014 SAHRIS NID 170520), "The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a pre-colonial (stone age) component and a later colonial (farmer) component. This rural landscape has always been sparsely populated. The second component is an urban one, consisting of a number of smaller towns, most of which developed during the last 150 years or less." According to Von Vollenhoven (2012 SAHRIS NID 117902), "the environment of the area is mostly undisturbed although it is being used for sheep farming… The natural topography… is reasonably flat, but in the north-west a hill dominates the area resulting in an even slope up to the crest. This area also is very rocky. The stones here are dark in colour and may be of a basaltic origin. However in the flat areas adjacent to the hill the rocks are white coloured and most likely are soft calcrete, which would not have been suitable for the manufacture of stone tools. Different non-perennial streams run through the area…" According to Fourie's assessment of the impacts of similar infrastructure in this area (2014), due to the landscape's topography the solar park infrastructure will be prominent in the landscape and alter the rural appearance. Due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

Archaeology and the Built Environment

Many farm portions in the immediate vicinity of the area proposed for development have been assessed in terms of impacts to heritage resources (Figure 2). It has been found that the area surrounding Upington has a rich historical and archaeological past (Fourie, 2014 SAHRIS NID 174335). Based on the outcomes of these assessments, it is noted that most of the heritage resources identified are stone age artefact scatters of varying significance. In Fourie's assessment (2014), the field work identified numerous areas where low density scatters of Middle and Later Stone Age lithics were found. As no context and *in situ* preservation were identified these sites were graded as having low heritage significance. In addition, one possible herder site was identified during the Fourie's (2014) survey, also of low heritage significance. No other material or deposits were identified but does not exclude the possibility of subsurface material. The ruins of old mining infrastructure were also identified. In Von Vollenhoven's assessment (2012 SAHRIS NID 117902), he identified a number of very interesting and significant rock art engravings depicting various animals including giraffes and an aardvark. In addition, he identified a significant historical site known as the "Rebellion Tree" as well as graves associated with farmers in this area.

Five sites of moderate local significance are located just beyond the border of the proposed development area (Figure 3f). These sites are highlighted in orange in Appendix 1. Site 24972 is linked to Von Vollenhoven's (2012) report and may well be the location of the rock art engravings described above. Site 45523 is described as consisting of ostrich egg shell fragments and stone flakes scattered around the base of a hill in low densities. Flakes are micro lithic supporting an ascription to the LSA utilising quartzite as raw material. A lead sealed bully beef can was also found here dated to the late 1800's or early 1900's. Sites 19977 to 19979 describe Middle Stone Age artefact scatter sites. In addition, there is a historical structure located within the development area of unknown heritage significance.

Palaeontology

According to the SAHRIS Palaeosensitivity Map (Figure 4), the extract from the CGS Sheet 2820 Figure 5.1 and 5.2) , this area is underlain by the Gordonia Formation (Quaternary coversands of moderate palaeontological sensitivity), the Bethesda Formation, the Jannelsepan Formation, the Keimoes Formation and the Straussburg Granite, of zero palaeontological sensitivity. The primary risk associated with impacts to palaeontological heritage is related to impacting fossils preserved within the Quaternary coversands of the Gordonia Formation (wind-blown alluvial sands).

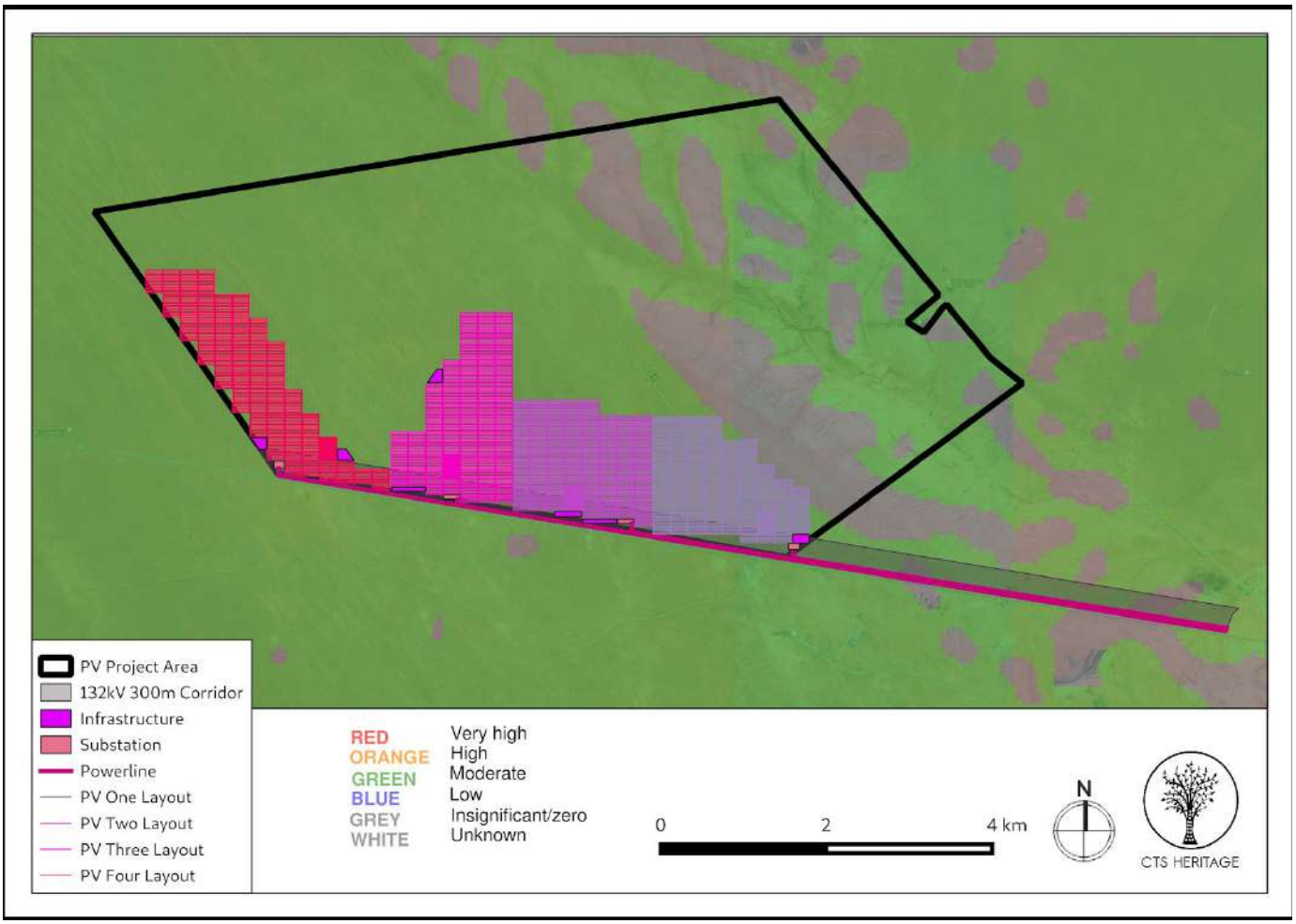
According to Almond's assessment for similar infrastructure development in this area (2011 SAHRIS NID 174335), "overall impact significance of the proposed solar park development is likely to be LOW because: Most of the study area is underlain by unfossiliferous igneous and metamorphic basement rocks (granites, gneisses etc.) or mantled by superficial sediments (wind-blown sands, alluvium etc.) of low palaeontological sensitivity; Extensive, deep excavations are unlikely to be involved in this sort of solar park project. Significant negative impacts on local fossil heritage are therefore unlikely to result from the proposed solar park development and in the author's opinion no further specialist palaeontological studies for this project are necessary."

3.2 Geomorphology, climate, vegetation

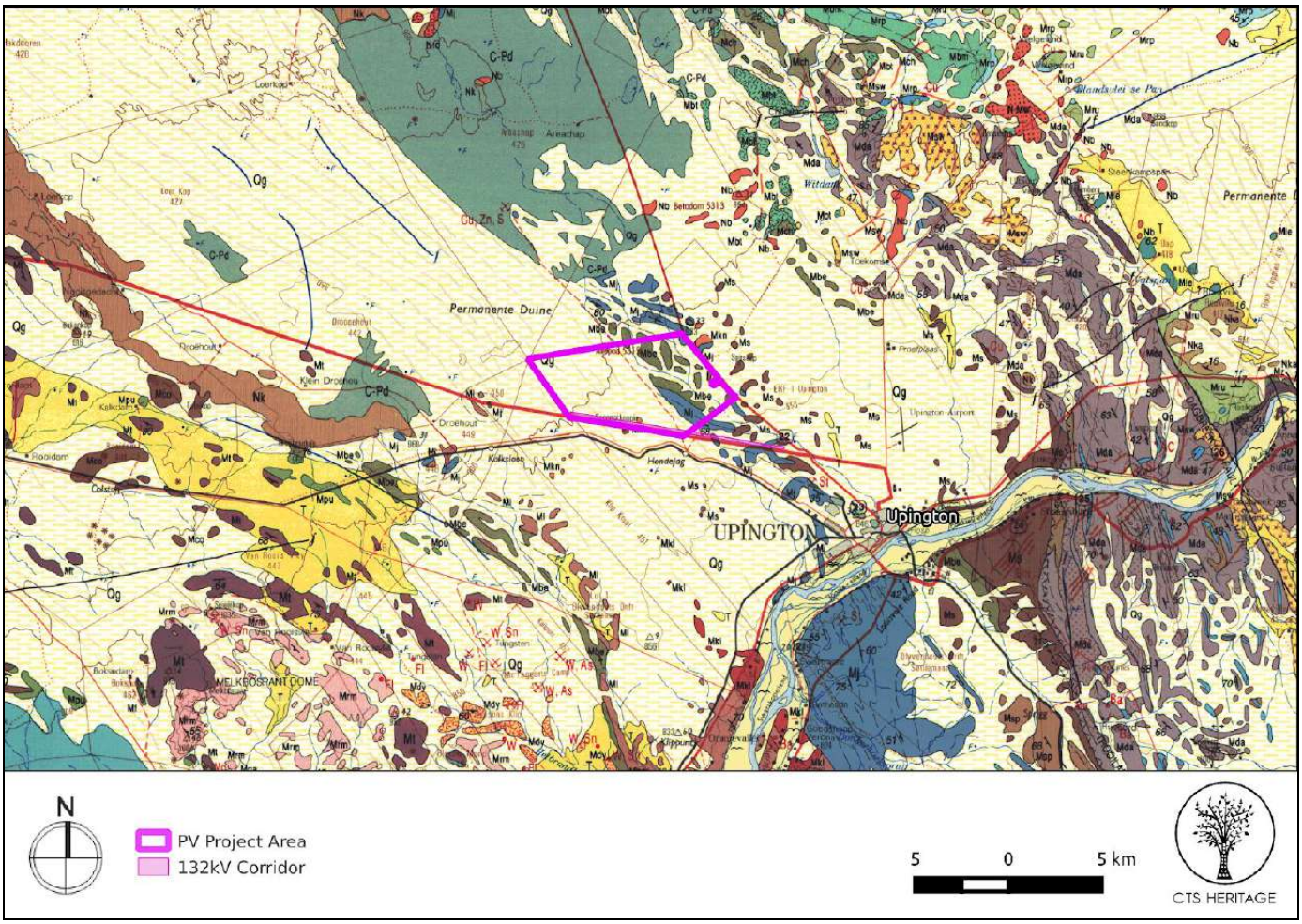
The eastern sector is characterised by numerous drainage channels (Figure 1.1), on a substrate of compact red sands covered in extensive scatters of quartz pebbles, gravels and surface outcroppings of larger quartz boulders and some basaltic type rock. No significant rocky kopjes occur in the eastern sector.

The western sector of the study area comprises a generally flat, undulating landscape interspersed with occasional dunes. The plains are covered in deep red Kalahari sands, dense swathes of Driedoring vegetation, and

patches of tall Bushman grass in places (alongside the N10). A few sporadic Shephard Trees and Acacias occur in places. There is very little surface stone covering this portion of the farm. There, are no seasonal or permanent sources of water such as streams, springs or pans. A few outcroppings of granitic/basaltic rock occur in places.



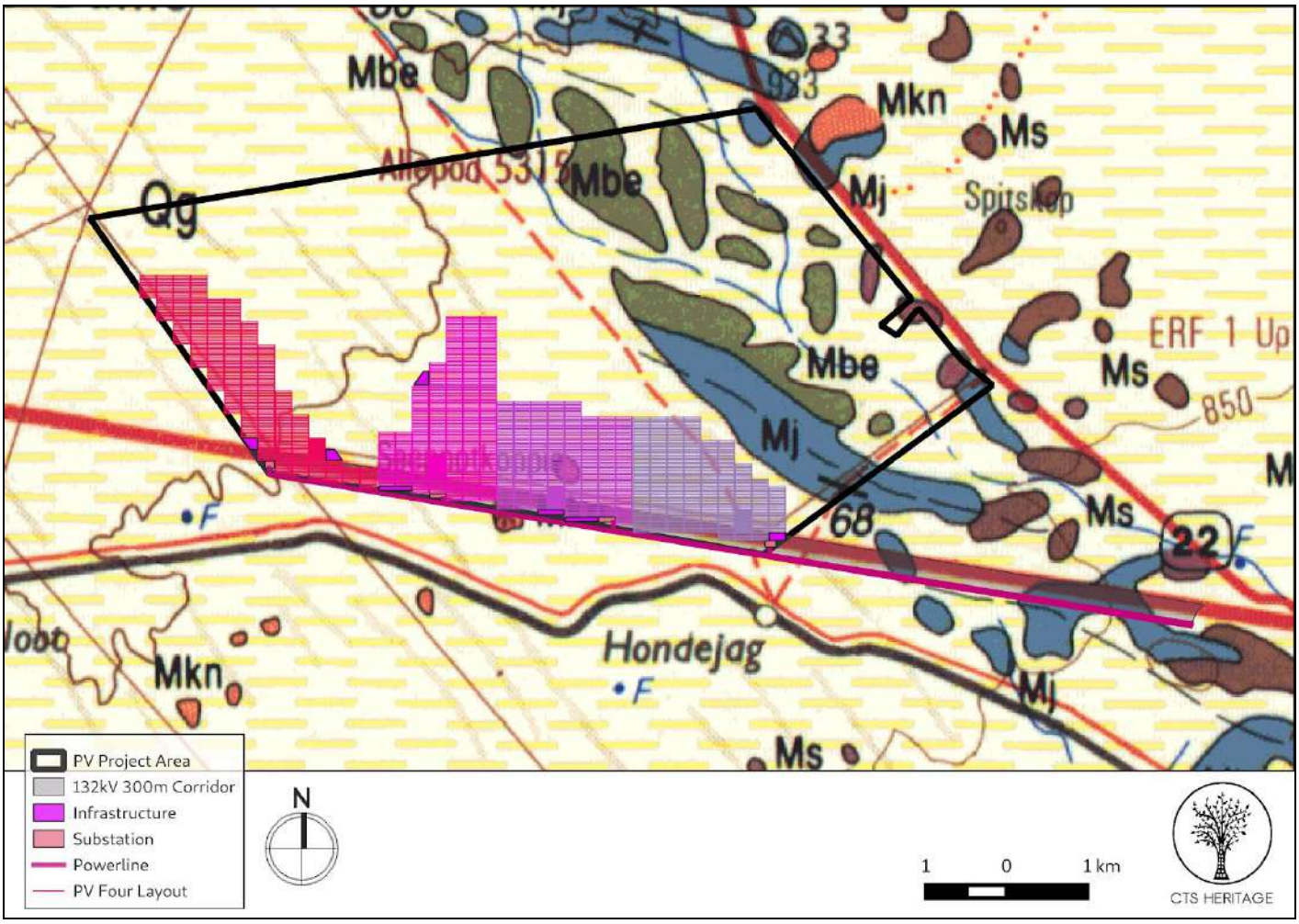
Map 2: Palaeontological sensitivity of the proposed development area



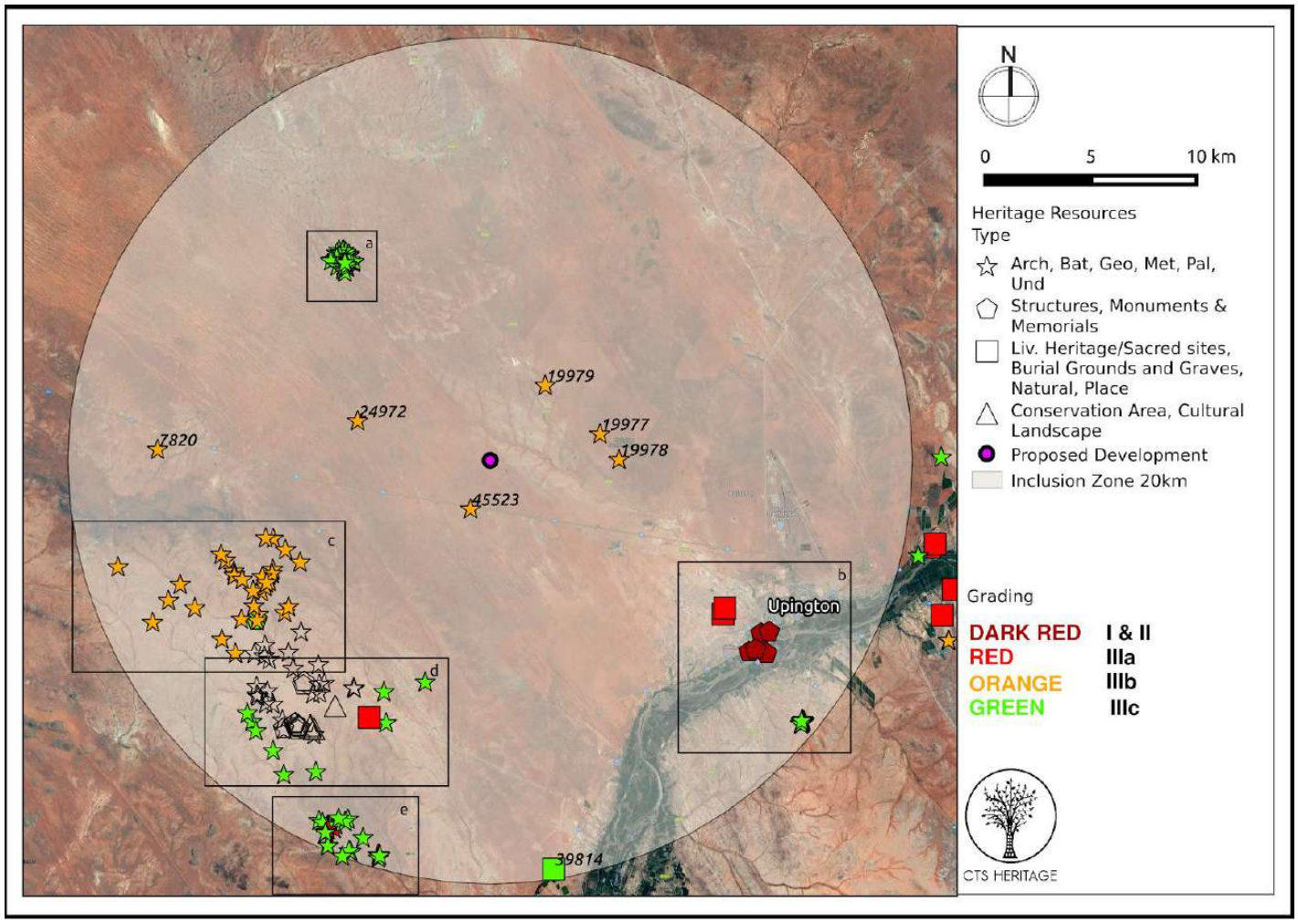
Map 3: Geology underlying the proposed development area extracted from the Council of Geoscience Map (1:250 000) 2820 Upington

Table 2: Explanation of symbols for the geological map and approximate ages

Symbol	Group/Formation	Lithology	Approximate Age
Qg	Gordonia Formation	Red brown wind blown sand and dunes	Pleistocene to Recent
Mkn	Keimoes Suite	Mesocratic, fine-grained and weakly foliated granites	Mid Proterozoic (Mokolian)
Mj	Jannelspan Formation	Amphibolite, amphibole gneiss, biotite gneiss, pelitic gneisses, lenses of calc-silicate rocks	~2 to 1 billion years old
Mbe	Bethesda Formation	Migmatitic biotite-rich and aluminous gneisses	~2 to 1 billion years old



Map 3a: Geology underlying the proposed development area extracted from the Council of Geoscience Map (1:250 000) 2820 Upington



Map 4: Spatialisation of heritage assessments conducted in proximity to the proposed development (see Appendices for insets)

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

Archaeology

PV Facilities

The whole of the PV Project Area was assessed. On a macro level - the main layer of the cultural landscape consists of stone tools assigned to the Middle Stone Age (MSA). It is estimated that more than 90% of recognisable tools recorded are assigned to the MSA. Limited numbers of Later Stone Age (LSA) resources were also recorded, while Earlier Stone Age (ESA) lithics were rare (confined to the eastern sector).

On a micro level – the vast majority of resources were recorded in the eastern sector of the study area. However, according to the landowner (pers. comm.), much of the eastern sector has been screened out of the proposed development. The eastern sector is characterised by numerous drainage channels, on a substrate of compact red sands covered in extensive scatters of quartz pebbles, gravels, and surface outcroppings of larger quartz boulders (some of which have been flaked). Indications are that the quartz (as a resource) was targeted by Stone Age hunter-gatherers for making stone tools. The source of quartzite (MSA flakes) is unknown. No significant rocky kopjes occur. The eastern sector appears to be quite heavily overgrazed, while diggings/excavations/removal of topsoils was also noted (refer to Site 0526 – where the largest single concentration of tools was found – however these all occur *ex situ,* in a degraded context). Indications are that the majority of the tools most likely represent discarded flakes and flake debris, spread thinly and unevenly across the landscape. No settlement sites, or evidence of human occupation was noted in the area searched. The drainage channels are quite heavily vegetated and the red floodplain (alluvial) sands have been `swept' clean. The majority of the lithics are in quartz and quartzite, but some tools in banded ironstone, hornfels/lydianite and CCS/opaline were also noted. These raw materials must have been introduced onto the site from elsewhere, although banded ironstone is prolific in the Northern Cape and was a favoured raw material among LSA hunter gatherers for its superior flaking qualities. No pottery, or ostrich eggshell (OES) was found.

A rare *in situ*, ESA quartz biface/handaxe and hammerstone was also found (Point 0586). ESA lithics, including Large Cutting Tools (LCTs) and a biface were also noted (Points 0456, 0486, 0526 & 0656).

A possible burial (Site 0506) was also located close to Site 0526 where a small dry pan was also noted.

The western sector of the study area comprises a generally flat undulating landscape interspersed with occasional dunes. The plains are covered in deep red Kalahari sands, dense swathes of Driedoring vegetation, and patches of tall Bushman grass in places (alongside the N10). A few sporadic Shephard Trees and Acacias occur in places. There is very little surface stone covering this portion of the farm. There, are no seasonal or permanent sources of water such as streams, springs or pans. A few outcroppings of granitic/basaltic rock occur in places. There are numerous sandy twee-spoor tracks criss crossing the site. Existing infrastructure in the western sector includes numerous twee spoor sandy tracks, fencing, farm gates, cattle pens, and 2 small concrete dams. Current land use comprises grazing (cattle) where many of the wind deflated areas have been heavily trampled. Surrounding land use comprises vast tracts of vacant agricultural land, tourist accommodation (Motata caravan/camping site), roads (N10 & R330) and animal husbandry camps and some informal housing alongside

the N10. A small scatter of tools was recorded in a wind deflated hollow (e. g. Site 10116), which may be the remains of a small campsite. No pottery or OES was found. A collection of large MSA quartzite flakes, chunks and a core was also recorded in a calcrete/limestone quarry (Site 11815) alongside the N10. According to the farmer the deposits were used as source material during construction of the road.

The vast majority of lithics in the Western Sector comprise mostly single, isolated MSA and LSA tools spread thinly and unevenly over the landscape. Indications are that these comprise mostly discarded flakes and chunks. No ESA tools were found in the western sector.

Larger numbers of tools (or more coherent scatters) appear to be concentrated around dune/dune ridges, deflated (heavily trampled) sands, and rock outcrops/surface bedrock (e. g. Points 0726, 0756, 0826, 0846, 0896, 10016, 11115, 12514, 1304, & 1473).

Powerline Corridor (300m)

The powerline corridor (alongside the N10) comprises a degraded and disturbed landscape (refer to pics). Mostly single or at most 4-5, isolated lithics were encountered along the route (refer to Table 1), in a variety of different contexts. For example, the route passes directly through an informal animal husbandry camp and large copse of Acacia Trees, before it finally ties in with an existing 132KV line alongside the N10 (km 5.2).

A low density scatter of tools (Point 1533, 1572 & 1592) among extensive scatters of quartz and outcroppings of quartz boulders may be sources of raw material when stone was procured and some flaking activity took place. Indications are that all the tools comprise discarded flakes and flake debris.

Palaeontology

[John Almond 2018]

The geology of the study area near Upington is shown on the 1: 250 000 geology map 2820 Upington (Council for Geoscience, Pretoria). A comprehensive sheet explanation for this map has been published by Moen (2007). The study area is underlain at depth by a range of ancient Precambrian basement rocks – largely high grade metamorphic rocks (*e.g.* gneisses, metapelites) and intrusive granitoids – that belong to the **Namaqua-Natal Province** of Mid Proterozoic (Mokolian) age (Cornell *et al.* 2006, Moen 2007). The bedrock units concerned include granites of the **Keimoes Suite** as well as various high grade metasediments (Schists, migmatites, amphibolites) of the **Areachap Group** (*e.g.* Bethesda and Jannelsepan Formations). These basement rocks are approximately two

to one billion years old and entirely unfossiliferous (Almond & Pether 2008). They only crop out regionally as small, isolated patches of basement rocks or low *Inselberge*. A large portion of the study area is covered by fine-grained aeolian (wind-blown) sands of the **Gordonia Formation** (**Qg**, pale yellow in Fig. 1), the youngest, Pleistocene to Recent, subunit of the **Kalahari Group** (Almond 2008, Almond & Pether 2008).

Visual Assessment

The final surface area (development footprint) to be utilised for the facility will be 250ha, and will depend on the type of technology selected, the final site layout and the placement of ancillary infrastructure.

The N14, N10 and R360 are the primary roads in the region and are the main link between Gauteng and Namibia, the Augrabies Falls National Park and the Kgalagadi Transfrontier National Park.

The N10 national road also forms the northern boundary of the Upington Renewable Energy Development Zone (REDZ). REDZ are described as: "*areas where large scale wind and solar PV energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the environment, while yielding the highest possible socio-economic benefits to the country.*"

The terrain surrounding the property is predominantly flat with an even south-eastern slope towards the Orange River valley that forms a distinct hydrological feature in the region. The Orange River has, to a large degree, dictated the settlement pattern in this arid region by providing a source of perennial water for the cultivation of grapes and other irrigated crops. This and the associated production of wine is the primary agricultural activity of this district.

Cattle and game farming practices also occur, although less intensive. An example of this is the Spitskop Farm east of the R360 arterial road. This farm is indicated on Google Earth as a private game farm. It is not a designated protected area in the South African Protected Areas Database (SAPAD) and it is not expected to be accessible to the public. Indications are that the farm is in the property market and not operating as a tourist lodge/destination, but rather as a private cattle and game ranch. The farm does have a rocky outcrop that appears to be (or have been) a favourite viewpoint from which to look out over the generally flat expanse surrounding it. It is expected that this viewpoint would be exposed to the proposed Allepad PV Three SEF (albeit from a distance of 4km at the closest), the other larger solar energy facilities (e.g. Khi Solar One SEF) and structures at the Upington Airport located within the region.

Another potential sensitive visual receptor is the Kalahari Monate Lodge located immediately west of the R360 arterial road, approximately 2.4km north-east of the proposed development site. This lodge provides self-catering and camping amenities and may also be exposed to the proposed Allepad PV One/Two/Three/Four SEF.

The majority of the study area is sparsely populated (less than 10 people per km^2) and consists of a landscape of wide-open expanses and vast desolation. The scarcity of water and other natural resources has dictated the settlement patterns of this region. The population distribution is primarily concentrated in Upington and the smaller towns/settlements along the Orange River. There are a very limited number of farm residences or homesteads within the remaining part of the study area. Some residential structures in closer proximity to the proposed Allepad PV Three SEF, south of the N10 national road, appear to be informal settlements.

4.2 Heritage Resources identified

Archaeology

During the field assessment a number of archaeological resources were identified, the vast majority of which are of low contextual significance (Grade IIIC), and are not *in situ*. Two sites of some significance were identified:

- Site 0506: A possible burial (Grade IIIA)
- Site 0526: By far the largest number of artefacts – mostly MSA, but also some LSA including a large ESA flake/LCT. Majority flakes and chunks, but also a weathered core, among an extensive scatter of surface quartz, scraped topsoils, large piles of stone and gravel, and large scale diggings. Small dry pan with many tools lying about, in majority in quartzite, but also quartz, banded ironstone, chalcedony, hornfels/lydianite and 1-2 opaline (Grade IIIB)

Palaeontology

[John Almond 2018]

The overall impact significance of the proposed development is likely to be LOW because:

- Most of the study area is underlain by unfossiliferous igneous and metamorphic basement rocks (granites, gneisses etc.) or mantled by superficial sediments (wind-blown sands, alluvium etc.) of low palaeontological sensitivity;
- Extensive, deep excavations are unlikely to be involved in this sort of project. Significant negative impacts on local fossil heritage are therefore unlikely to result from the proposed development and in the author's opinion no further specialist palaeontological studies for this project are necessary.

Visual Assessment

The proposed Allepad PV Three Solar Energy Facility is expected to have a fairly contained core area of visual exposure, generally restricted to a 1km radius of the site. Receptors located within this zone include observers travelling along the N10 national road and residents of the homestead located on the property earmarked for the PV facilities.

Visibility within 1-3km is more scattered and interrupted due to the undulating nature of the topography and the generally constrained height of the PV panel structures. Receptors located within this zone include observers at the Kalahari Monate Lodge, observers travelling along the N10 national and R360 arterial roads and residents of the informal settlements south of the N10.

The intensity of visual exposure is expected to subside within a 3-6km radius with the predominant visibility expected to the north-east. Other than the Spitskop viewpoint this zone includes limited potentially sensitive visual receptors and comprises mainly of vacant land and natural open space.

Visibility beyond 6km from the proposed development is expected to be negligible and highly unlikely due to the distance between the object (development) and the observer. The SEFs will not likely be visible from Upington.

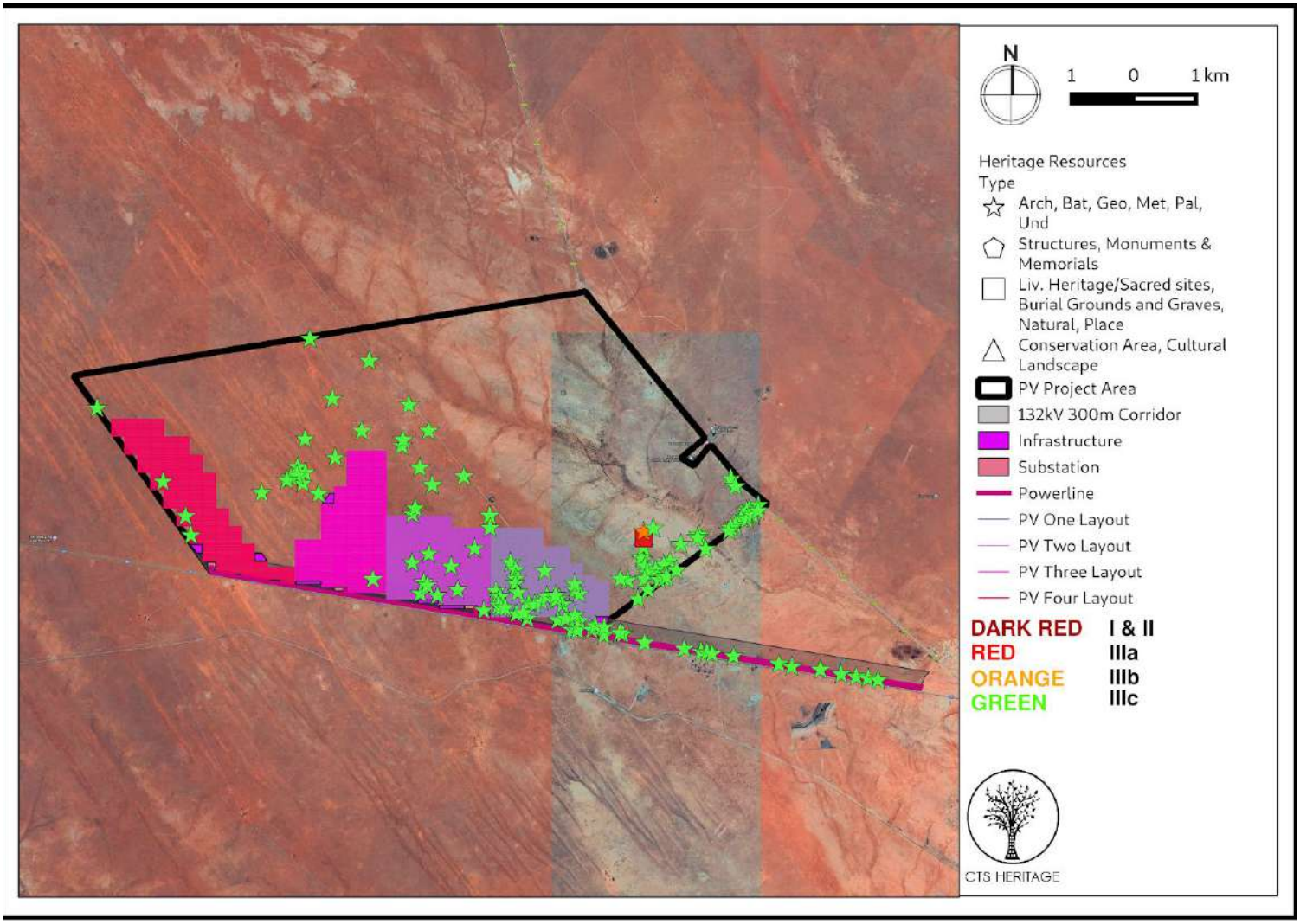
It is envisaged that the structures, where visible from shorter distances (e.g. less than 3km), may constitute a high visual prominence, potentially resulting in a high visual impact.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.), plays a significant role. An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

The greater environment has a rural, undeveloped character and a natural appearance. These generally undeveloped landscapes are considered to have a high visual quality, except where urban development represents existing visual disturbances.

The anticipated visual impact of the proposed SEF on the regional visual quality, and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of low significance. This is due to the relatively low viewer incidence within close proximity to the proposed project site.

4.3 Mapping and spatialisation of heritage resources



Map 6: Heritage resources in the vicinity of the proposed development

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

The development will require the extensive clearing of vegetation and levelling of the site in order to construct the PV facilities, and will involve considerable earthmoving operations that may have a negative impact on potentially important archaeological resources. However, the results of the study indicate that the impact of the proposed Allepad Two PV facility and the associated 300m powerline corridor on significant archaeological resources is likely to be low.

Neither site 0506 nor site 0526 will be impacted by the proposed development.

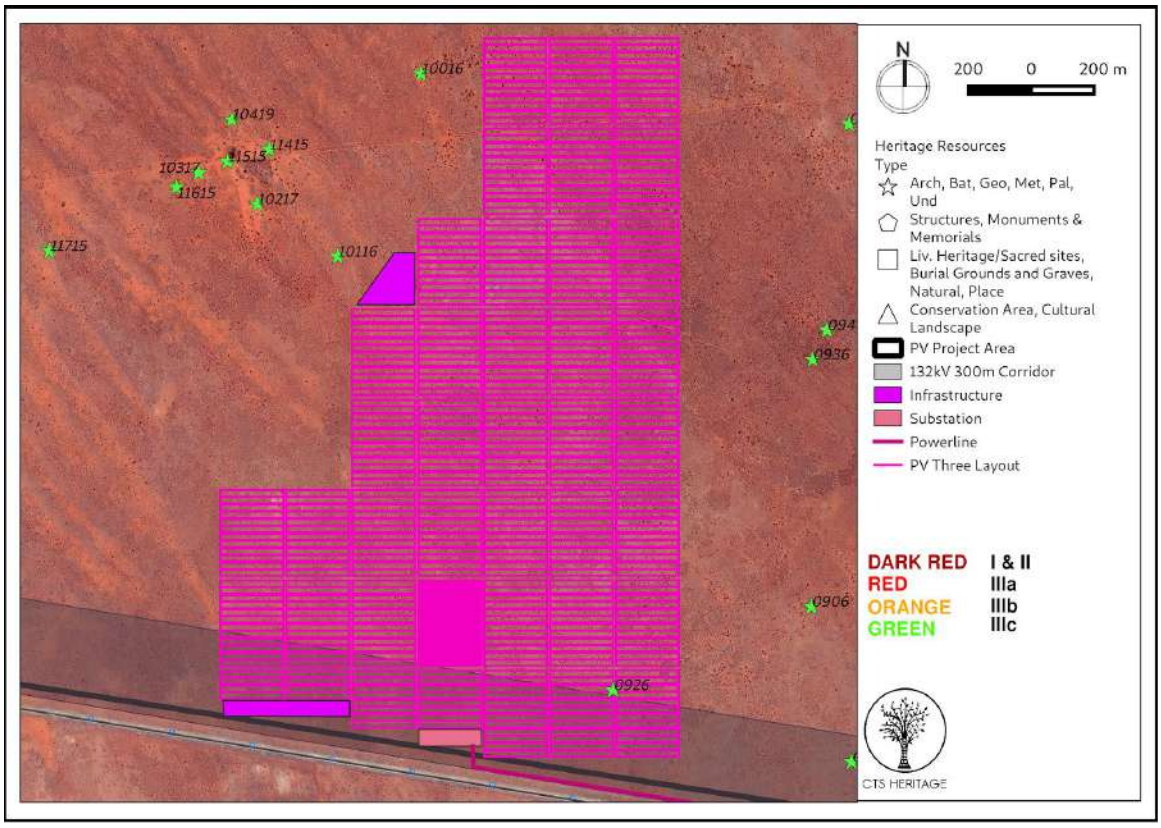
Unmarked graves and ostrich eggshell water containers for example, may be exposed or uncovered during sub-subsurface excavations. However, the probability of this occurring is rated as being moderate to low.

Overall, the significance of the visual impacts is expected to range from **moderate** to **low** as a result of the generally undeveloped character of the landscape. The facility would be visible within an area that incorporates certain sensitive visual receptors who may consider visual exposure to this type of infrastructure to be intrusive. Such visual receptors include people travelling along roads and residents of rural homesteads and settlements.

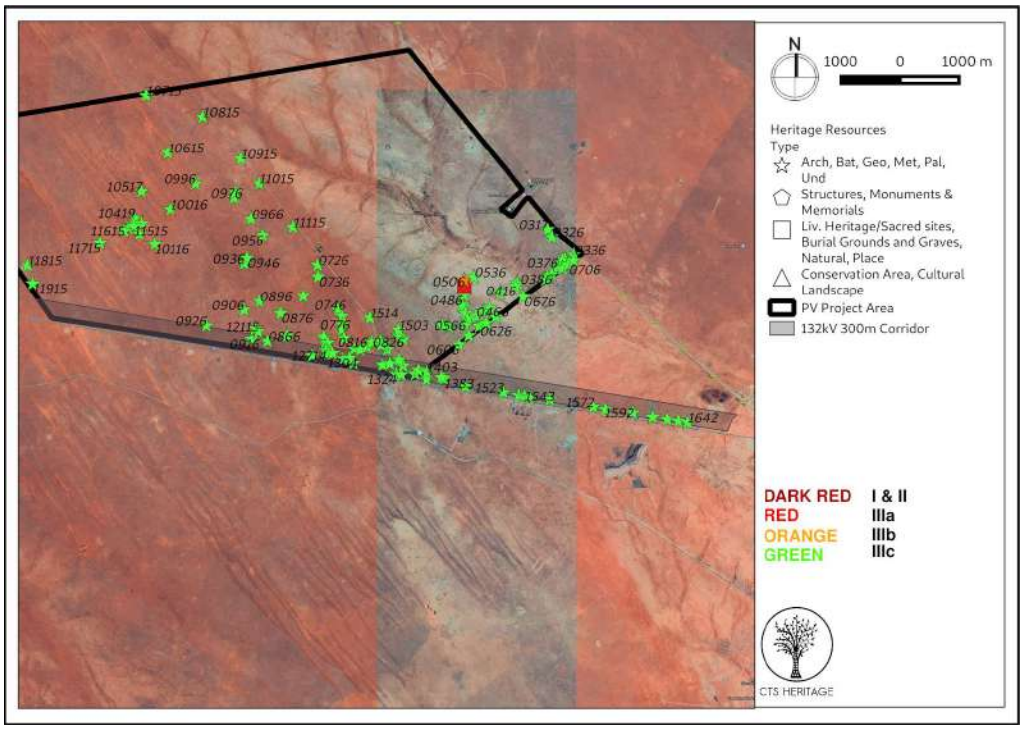
Table 4: Impacts of the Allepad Three PV facility and powerline corridor to heritage resources

NATURE: No heritage resources of significance were identified during the field assessments for archaeology and palaeontology within the development footprint for each facility				
		Archaeology		**Palaeontology**
MAGNITUDE	**L (2)**	No significant archaeological resources were identified within the development area, however a number of archaeological resources of low significance were identified	**L (2)**	Most of the study area is underlain by unfossiliferous igneous and metamorphic basement rocks (granites, gneisses etc.) or mantled by superficial sediments (wind-blown sands, alluvium etc.) of low palaeontological sensitivity; Extensive, deep excavations are unlikely to be involved in this sort of project. Significant negative impacts on local fossil heritage are therefore unlikely to result from the proposed development and in the author's opinion no further specialist palaeontological studies for this project are necessary.
DURATION	**H (5)**	Where manifest, the impact will be permanent.	**H (5)**	Where manifest, the impact will be permanent.

EXTENT	**L (1)**	Localised within the site boundary	**L (1)**	Localised within the site boundary.
PROBABILITY	**L (1)**	It is extremely unlikely that any significant archaeological resources will be impacted	**L (1)**	It is extremely unlikely that any fossils would be impacted
SIGNIFICANCE	**L**	(2+5+1)x1=8	**L**	(2+5+1)x1=8
STATUS		Neutral		Neutral
REVERSIBILITY	**L**	Any impacts to heritage resources that do occur are irreversible	**L**	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE LOSS OF RESOURCES?	**L**	Unlikely	**L**	Unlikely
CAN IMPACTS BE MITIGATED		NA		NA
MITIGATION: No impacts are anticipated and as such, no mitigation is required, however its is recommended that a Chance Fossil Finds Procedure be implemented during the construction phase of development.				
RESIDUAL RISK: Should any significant resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources				



Map 6a: Heritage resources in the vicinity of the proposed development of Allepad PV Three



Map 6b: Heritage resources in the vicinity of the proposed development of the 132kv powerline

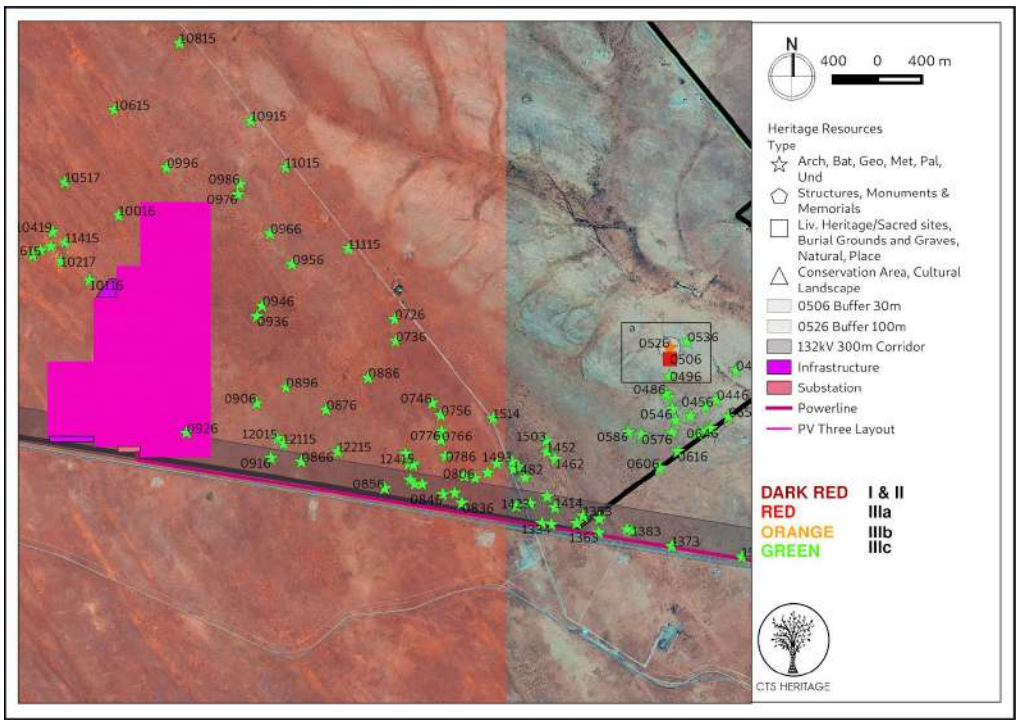


Figure 7: Significant heritage resources mapped with buffers

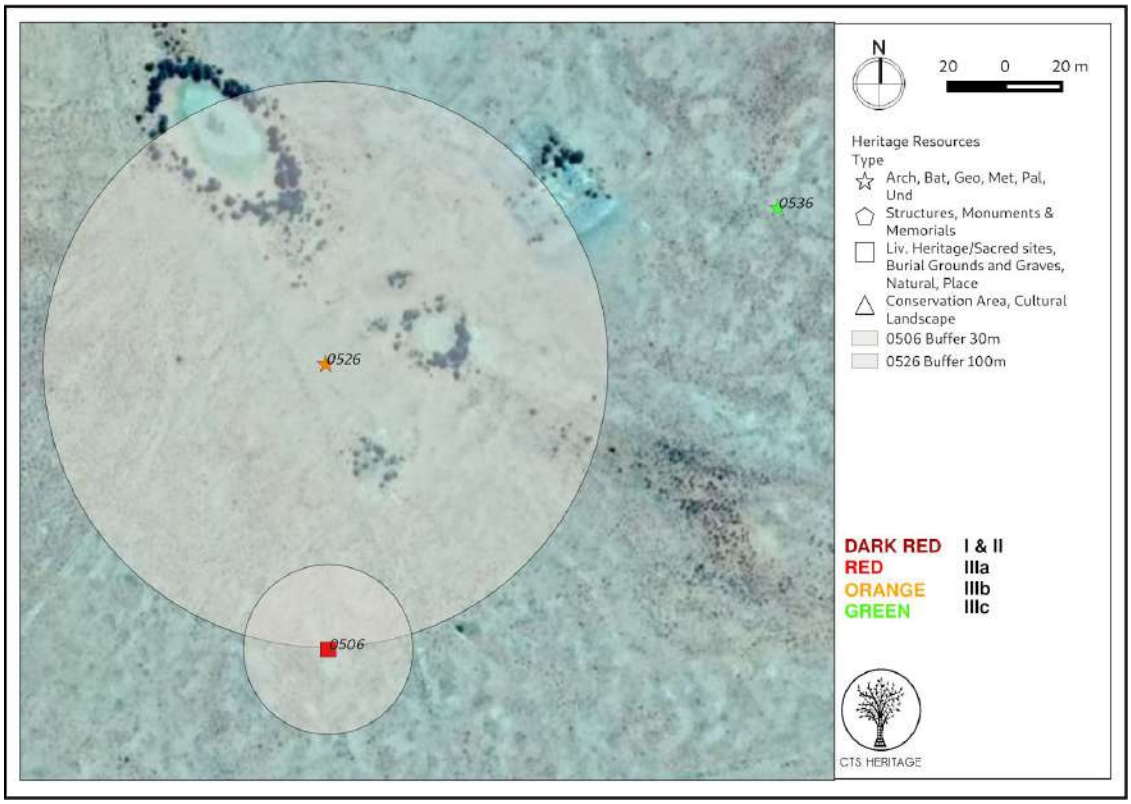


Figure 7a: Inset of sites with buffers mapped

5.2 Sustainable Social and Economic Benefit

The implementation of Allepad PV Two is not considered to be in contrast with the Dawid Kruiper Local Municipality Spatial Development Framework and the SPCs within which the project area is located. In addition, while application is being made to DEA for EA in terms of NEMA, DAFF, DRPW, and SANRAL are registered I&APs on the project.

The implementation of Allepad PV Two would contribute towards addressing the Dawid Kruiper LM's key issue regarding high levels of poverty and unemployment, skills shortage, and inequalities, through the creation of employment opportunities, the provision of skills training opportunities, and local economic growth, including growth in personal income levels of those community members who would be employed on the project. In addition, the REIPPP Programme requires preferred bidders to make contributions towards local economic development and social upliftment, to be focused on benefiting local communities within the vicinity of the project site.

The review of relevant legislation, policies and documentation pertaining to the energy sector indicate that renewable or green energy (i.e. energy generated by naturally occurring renewable resources), and therefore the establishment of Allepad PV Two, is supported at a national, provincial, and local level, and that the proposed project will contribute positively towards a number of targets and policy aims. Specifically those relating to employment creation, social and economic development and upliftment, and an increase in RE and electricity supply which has the potential to further improve individuals' standard of living.

5.3 Proposed development alternatives

No alternatives are being assessed as part of this proposal.

5.4 Cumulative Impacts

Cumulative impact in terms of heritage was assessed by reviewing the Heritage Impact Assessments completed within 20km of the proposed development area. Impacts to heritage result from all kinds of development and as such, this assessment of cumulative impacts to heritage was not limited to impact from SEFs. Of the 29 Heritage Assessments conducted within 20km of the proposed development area (Appendix 2), 8 are for Solar Energy/PV Facilities and 3 are for electrical infrastructure. The remaining assessments relate to mining infrastructure and residential township developments. At this stage, there is the potential for the cumulative impact of proposed solar energy facilities to negatively impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial, however, due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

Table 6: Development projects within 30km of the proposed development area

Nid	Report Type	Author/s	Date	Title
4101	AIA Phase 1	Peter Beaumont	22/10/2005	Archaeological Impact Assessment at and in the Vicinity of a Quartzite Quarry on Portion 4 of the Farm Droogehout 442 near Upington
4103	AIA Phase 1	Cobus Dreyer	10/03/2006	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Concentrated Solar Thermal Plant (Csp) at the Farms Olyvenhouts Drift, Upington, Bokpoort 390 and Tampansrus 294/295, Groblershoop, Northern Cape
4123	AIA Phase 1	Peter Beaumont	01/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Residential Development Flanking Dakota Drive in Upington, //Khara Hais Municipality, Northern Cape Province
4124	AIA Phase 1	Peter Beaumont	24/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension of the Rosedale Settlement in Upington, //Khara Hais Municipality, Northern Cape Province
4130	AIA Phase 1	Peter Beaumont	16/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension of the Louisvaleweg Township, //Khara Hais Municipality, Northern Cape Province
4131	AIA Phase 1	Peter Beaumont	18/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Township Extension Flanking

				Keimoesweg, //Khara Hais Municipality, Northern Cape Province
4132	AIA Phase 1	Peter Beaumont	18/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension Flanking Rondomstraat, //Khara Hais Municipality, Northern Cape Province
4133	AIA Phase 1	Peter Beaumont	19/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Township Extension Flanking Lemoendraai in Upington, //Khara Hais Municipality, Northern Cape Province
4134	AIA Phase 1	Peter Beaumont	19/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Industrial Area Expansion at Laboria, //Khara Hais Municipality, Northern Cape Province
4136	AIA Phase 1	Peter Beaumont	22/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension of Kalksloot Settlement, Siyanda District Municipality, Northern Cape
7841	AIA Phase 1	Peter Beaumont	17/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension of the Rosedale Township, //Khara Hais Municipality, Northern Cape Province
8366	AIA Phase 1	Karen Van Ryneveld	27/10/2005	Cultural Resources Management Impact Assessment: (Portion of) Areachap 426, Upington District, Northern Cape, South Africa
111142	HIA Phase 1	Johnny Van Schalkwyk	01/03/2012	Heritage Impact Assessment for the Proposed Development of an Agri-estate on the Farm Melkstroom East of Upington, Gordonia Magisterial District, Northern Cape Province
117902	HIA Phase 1	Anton van Vollenhoven	25/05/2012	A REPORT ON A HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED SASOL CSP PROJECT NEAR UPINGTON IN THE NORTHERN CAPE PROVINCE
119309	HIA Phase 1	Stephan Gaigher	10/10/2012	HERITAGE IMPACT ASSESSMENT REPORT Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province
124405	Heritage Impact Assessment Specialist Reports	Stephan Gaigher	29/10/2013	Heritage Impact Assessment Report for the Proposed Sirius Solar Project near Upington in the Northern Cape Province
124406	Palaeontological Specialist Reports	JF Durand	02/04/2013	Palaeontology Scoping Report
128281	Heritage Scoping	David Morris	30/07/2013	RE Capital 3 Solar Development on the property Dyasons Klip west of Upington, Northern Cape: Scoping phase Heritage Input
131589	Heritage Impact Assessment Specialist Reports	Stephan Gaigher	22/02/2013	Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province
158920	AIA Phase 1	David Morris	01/02/2013	RE Capital 3 Solar Development on the property Dyasons Klip west of Upington, Northern Cape: Archaeological Impact Assessment – proposed 'central' development footprint
159068	PIA Phase 1	John E Almond	07/03/2014	PALAEONTOLOGICAL HERITAGE BASIC ASSESSMENT: DESKTOP STUDY Proposed RE Capital 3 Solar Development on the property Dyason's Klip near Upington , Northern Cape
159203	Heritage Impact Assessment Specialist	Johnny Van Schalkwyk	11/03/2014	Cultural Heritage Impact Assessment Proposed Township development of Erf 1, UPINGTON, //KHARA HAIS MUNICIPALITY

	Reports			
159293	HIA Phase 1	Johnny Van Schalkwyk	12/03/2014	Cultural Heritage Impact Assessment for proposed township development, Louisvaleweg, UPINGTON
160008	HIA Phase 1	Johnny Van Schalkwyk	15/03/2014	Cultural Heritage Impact Assessment for the proposed township development, Paballelo, Upington, //Khara Hais Municipality
161427	HIA Phase 1	Stephan Gaigher	15/04/2014	Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province
166079	HIA Phase 1	Johnny Van Schalkwyk	12/03/2014	Proposed extension of Dakota Road, Upington
170520	Heritage Scoping	Johnny Van Schalkwyk	01/01/2014	Heritage Impact Assessment Report for the proposed 1GW Upington Solar Park within the // Khara Hais Municipality, Northern Cape Province
174335	HIA Phase 1	Wouter Fourie	24/03/2014	Heritage Impact Assessment for the proposed Solar Power Park for SolarReserve SA (Pty) Ltd, Farm Rooipunt 617, Gordonia RD, Siyanda District Municipal Region, Northern Cape.
289187	Heritage Scoping	Jaco van der Walt	01/06/2015	Heritage Scoping Report for the proposed Bloemsmond Solar 1 and Solar 2 PV Project, Keimoes, NC Province

Table 7: Cumulative Impact Table

NATURE: Cumulative Impact to the sense of place				
		Overall impact of the proposed project considered in isolation		**Cumulative impact of the project and other projects in the area**
MAGNITUDE	**L (4)**	Low	**L (4)**	Low
DURATION	**M (3)**	Medium-term	**H (4)**	Long-term
EXTENT	**L (1)**	Low	**L (1)**	Low
PROBABILITY	**L (2)**	Improbable	**H (3)**	Probable
SIGNIFICANCE	**L**	(4+3+1)x2=16	**L**	(4+4+1)x3=27
STATUS		Neutral		Neutral
REVERSIBILITY	**H**	High	**L**	Low
IRREPLACEABLE LOSS OF RESOURCES?	**L**	Unlikely	**L**	Unlikely
CAN IMPACTS BE MITIGATED		NA		NA
CONFIDENCE IN FINDINGS: High				
MITIGATION: No impacts are anticipated and as such, no mitigation is required				

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. Comments from SAHRA, the commenting authority in terms of section 38(8) of the NHRA, were received on 8 November 2018 requiring that this HIA be completed. This report addresses SAHRA's comments. SAHRA is required to comment on this HIA and make recommendations prior to the granting of the Environmental Authorisation.

7. CONCLUSION

Overall, from an archaeological perspective there are no fatal flaws, and provided that the recommendations are implemented, there are no objections to the proposed development proceeding. The results indicate that the receiving environment is not a sensitive, vulnerable or threatened archaeological landscape. While archaeological resources may be impacted by the proposed development, these are of low, contextual significance and are not *in situ*.

The archaeological site 0526, graded IIIB, must not be impacted by the proposed development and a 100m no-go buffer must be implemented around this site. This site and its buffer must be included in all development maps (as per Figure 7 and 7a)

The possible burial identified as site 0506 must not be impacted by the proposed development and a 30m no-go buffer must be implemented around it. This site and its buffer must be included in all development maps (as per Figure 7 and 7a).

8. RECOMMENDATIONS

There is no objection to the proposed development on heritage grounds and the following is recommended:

- No mitigation is required prior to construction operations commencing.
- The archaeological site 0526, graded IIIB, must not be impacted by the proposed development and a 100m no-go buffer must be implemented around this site (Figure 7 and 7a).
- The possible burial identified as site 0506 must not be impacted by the proposed development and a 30m no-go buffer must be implemented around it (Figure 7 and 7a).
- Should any unmarked human remains or ostrich eggshell caches for example are exposed or uncovered during construction activities, or earth moving, operations during preparation of the site

for development, work must cease and these must immediately be reported to the South Africa Heritage Resources Agency/SAHRA (Att: Ms Natasha Higgit tel 021 462 4502).

- The ECO must be briefed by an archaeologist prior to construction activities commencing.
- A Chance Fossil Finds Procedure must be implemented (see attached as part of Appendix 2)
- The above recommendations must be included in the Environmental Management Plan (EMP) for the project

9. REFERENCES

ALMOND, J.E. 2008. Fossil record of the Loeriesfontein sheet area (1: 250 000 geological sheet 3018). Unpublished report for the Council for Geoscience, Pretoria, 32 pp.

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APPENDICES

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APPENDIX 1: Archaeological Assessment

ARCHAEOLOGICAL SPECIALIST STUDY

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

Proposed development of Allepad PV One, / Allepad PV Two, / Allepad PV Three, / Allepad PV Four, a solar PV facility and associated infrastructure on a site near Upington, in the Northern Cape Province.

Prepared by

CTS HERITAGE

In Association with

Savannah

And

ACRM

October 2018

CTS HERITAGE

THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Jenna Lavin, as the appointed independent specialist hereby declare that I:

• act/ed as the independent specialist in this application;

• regard the information contained in this report as it relates to my specialist input/study to be true and correct, and

• do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• have and will not have no vested interest in the proposed activity proceeding;

• have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;

• have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

• have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

• have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;

• have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and

• am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Jenna Lavin
Signature of the specialist

CTS Heritage
Name of company

September 2018
Date

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34 Harries Street, Plumstead, Cape Town, 7800
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EXECUTIVE SUMMARY

Allepad Solar 1, Allepad Solar 2, Allepad Solar 3 and Allepad Solar 4, a commercial solar PV energy generation facility and associated infrastructure, is proposed on a site near Upington, in the Northern Cape Province. Photovoltaic (PV) technology is proposed for the generation of electricity. The solar energy facility will have a contracted capacity of up to 100MW, and will make use of either fixed-tilt, single-axis tracking, or double axis tracking PV technology. Electricity generated by the project will feed into Eskom's national electricity grid via a new 132kV power line which will connect the on-site substation to the upgraded 132kV double circuit power line running between the new Upington Main Transmission Substation (MTS) (currently under construction approximately 15km south of the project site), and the Gardonia Distribution Substation (located in Upington town).

The main layer of the cultural landscape consists of stone tools assigned to the Middle Stone Age (MSA). It is estimated that more than 90% of recognisable tools recorded are assigned to the MSA. Limited numbers of Later Stone Age (LSA) resources were recorded, while Earlier Stone Age (ESA) lithics were rare (confined to the eastern sector). The vast majority of resources were recorded in the eastern sector of the study area. The majority of the lithics are in quartz and quartzite, but tools made from banded ironstone, hornfels/lydianite and CCS/opaline were also noted. These raw materials must have been introduced onto the site from elsewhere, although banded ironstone is prolific in the Northern Cape and was a favoured raw material among LSA hunter-gatherers for its superior flaking qualities. No pottery, or ostrich eggshell (OES) was found. A rare *in situ*, ESA quartz biface/handaxe and hammerstone was found (Point 0586). ESA lithics, including Large Cutting Tools (LCTs) and a biface were also noted (Points 0456, 0486, 0526 & 0656). A possible burial (Site 0506) was located close to Site 0526 where a small dry pan was noted.

In the western sector, a small scatter of tools was recorded in a wind deflated hollow (e. g. Site 10116), which may be the remains of a small campsite. No pottery or OES was found. A collection of large MSA quartzite flakes, chunks and a core was also recorded in a calcrete/limestone quarry (Site 11815) alongside the N10. According to the farmer the deposits were used as source material during construction of the road. The vast majority of lithics in the Western Sector comprise mostly single, isolated MSA and LSA tools spread thinly and unevenly over the landscape. Indications are that these comprise mostly discarded flakes and chunks. No ESA tools were found in the western sector. Larger numbers of tools (or more coherent scatters) appear to be concentrated around dune/dune ridges, deflated (heavily trampled) sands, and rock outcrops/surface bedrock (e. g. Points 0726, 0756, 0826, 0846, 0896, 10016, 11115, 12514, 1304, & 1473).

In the 132kv alignment, mostly single or at most 4-5, isolated lithics were encountered along the route (refer to Table 1), in a variety of different contexts. For example, the route passes directly through an informal animal husbandry camp and large copse of Acacia Trees, before it finally ties in with an existing 132KV line alongside the N10 (km 5.2). A low density scatter of tools (Point 1533, 1572 & 1592) among extensive scatters of quartz and outcroppings of quartz boulders may be sources of raw material when stone was procured and some flaking activity took place. Indications are that all the tools comprise discarded flakes and flake debris.

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Overall, from an archaeological perspective there are no fatal flaws, and provided that the recommendations are implemented, there are no objections to the proposed development proceeding. The results indicate that the receiving environment is not a sensitive, vulnerable or threatened archaeological landscape. While archaeological resources may be impacted by the proposed development, these are of low, contextual significance and are not *in situ*. The archaeological site 0526, graded IIIB, must not be impacted by the proposed development and a 100m no-go buffer must be implemented around this site. The possible burial identified as site 0506 must not be impacted by the proposed development and a 30m no-go buffer must be implemented around it.

Recommendations

1. No mitigation is required prior to construction operations commencing.
2. The archaeological site 0526, graded IIIB, must not be impacted by the proposed development and a 100m no-go buffer must be implemented around this site.
3. The possible burial identified as site 0506 must not be impacted by the proposed development and a 30m no-go buffer must be implemented around it.
4. Should any unmarked human remains or ostrich eggshell caches for example are exposed or uncovered during construction activities, or earth moving, operations during preparation of the site for development, work must cease and these must immediately be reported to the South Africa Heritage Resources Agency/SAHRA (Att: Ms Natasha Higgit tel 021 462 4502).
5. The ECO must be briefed by an archaeologist prior to construction activities commencing.
6. The above recommendations must be included in the Environmental Management Plan (EMP) for the project.

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CTS HERITAGE

CONTENTS

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1. INTRODUCTION

1.1 Background Information on Project

Allepad Solar 1, Allepad Solar 2, Allepad Solar 3 and Allepad Solar 4, a commercial solar PV energy generation facility and associated infrastructure, is proposed on a site near Upington, in the Northern Cape Province. The project is intended to be bid into the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, with the aim of evacuating power generated by the project into the Eskom national electricity grid. The project is proposed on a portion of the Remaining Extent of Erf 5315, located approximately 11km north-west of Upington. The area under investigation is approximately 3 889ha in extent and comprises a single agricultural property. The project site can be accessed directly via the N10 national road which borders the southern boundary of the site.

Photovoltaic (PV) technology is proposed for the generation of electricity. The solar energy facility will have a contracted capacity of up to 100MW, and will make use of either fixed-tilt, single-axis tracking, or double axis tracking PV technology. The solar energy facility will comprise the following key infrastructure components:

- Arrays of PV panels with a generation capacity of up to 100MW.
- Mounting structures to support the PV panels.
- Combiner boxes, on-site inverters (to convert the power from Direct Current (DC) to Alternating Current (AC)), and power transformers.
- An on-site substation up to 0.5ha in extent to facilitate the connection between the solar energy facility and the Eskom electricity grid.
- A new 132kV power line approximately 5km in length, between the on-site substation and Eskom grid connection point.
- Cabling between the project's components (to be laid underground where practical).
- Meteorological measurement station.
- Energy storage area of up to 2ha in extent.
- Access road and internal access road network.
- On-site buildings and structures, including a control building and office, ablutions and guard house.
- Perimeter security fencing, access gates and lighting.
- Temporary construction equipment camp up to 1ha in extent, including temporary site offices, parking and chemical ablution facilities.
- Temporary laydown area up to 1ha in extent, for the storage of materials during the construction.

Electricity generated by the project will feed into Eskom's national electricity grid via a new 132kV power line which will connect the on-site substation to the upgraded 132kV double circuit power line running between the new Upington Main Transmission Substation (MTS) (currently under construction approximately 15km south of the project site), and the Gardonia Distribution Substation (located in Upington town). The point of connection is located approximately 5km east of the project site, and will make use of a loop-in and loop-out configuration. The proposed power line required for the project will be constructed within a 300m wide power line corridor which has been identified immediately north of, and

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which runs parallel to, the N10 national road. The full extent of the project site (i.e. 3 889ha) is being assessed as part of the EIA process, of which an area of approximately 250ha (equivalent to 6.4% of the total project area) would be required for the development of the solar energy facility and associated infrastructure.

1.2 Description of Property and Affected Environment

The study site is located in the Kalahari Duneveld region of the Northern Cape.

The eastern sector is characterised by numerous drainage channels (Figure 1.1), on a substrate of compact red sands covered in extensive scatters of quartz pebbles, gravels and surface outcroppings of larger quartz boulders and some basaltic type rock. No significant rocky kopjes occur in the eastern sector.

The western sector of the study area comprises a generally flat, undulating landscape interspersed with occasional dunes. The plains are covered in deep red Kalahari sands, dense swathes of Driedoring vegetation, and patches of tall Bushman grass in places (alongside the N10). A few sporadic Shephard Trees and Acacias occur in places. There is very little surface stone covering this portion of the farm. There, are no seasonal or permanent sources of water such as streams, springs or pans. A few outcroppings of granitic/basaltic rock occur in places. There are numerous twee-spoor tracks criss crossing the site. Existing infrastructure includes twee spoor sandy farm tracks, farm fencing, farm gates, cattle pens, and 2 small concrete dams. Current land use comprises grazing (cattle) where many of the wind deflated areas have been heavily trampled. Surrounding land use is vast tracts of vacant agricultural land, accommodation (Kalahari Monate Lodge), roads (N10 & R330), informal animal husbandry camps, informal housing alongside the N10.

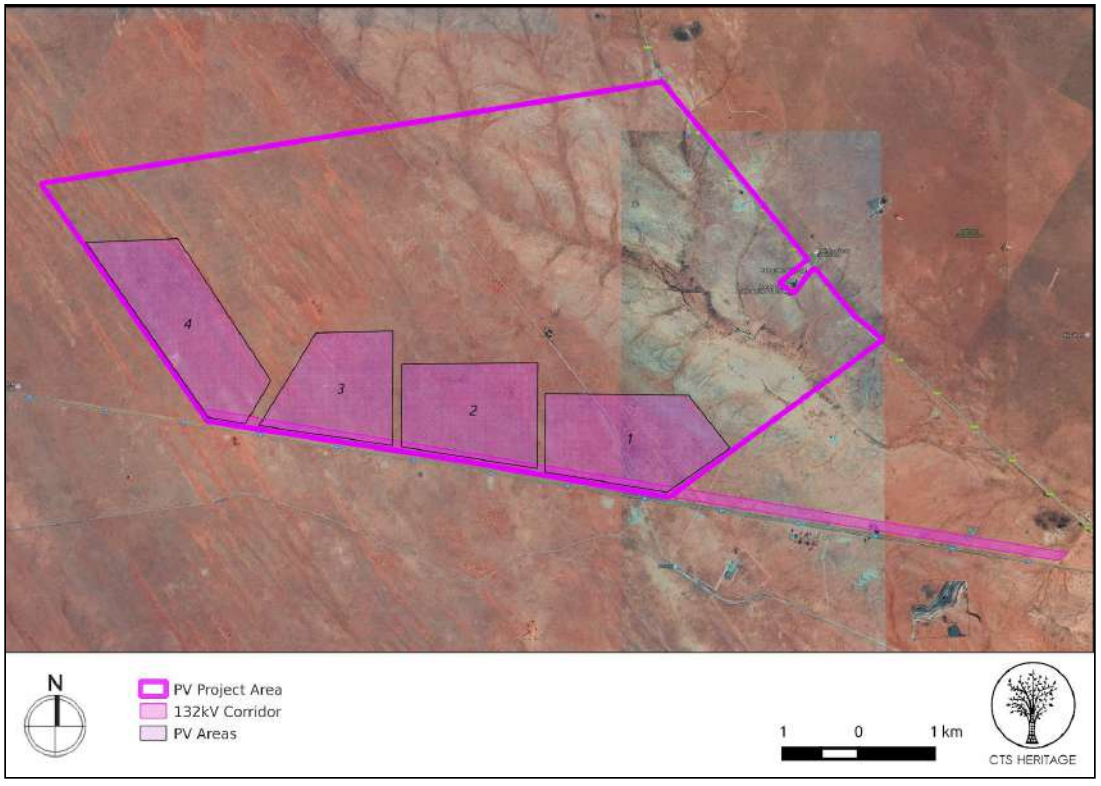

Figure 1.1: Close up satellite image indicating proposed location of development

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2. METHODOLOGY

2.1 Purpose of Archaeological Study

The purpose of this archaeological study is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999) in terms of impacts to archaeological resources.

2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs on 2, 3 and 4 October 2018 to determine what archaeological resources are likely to be impacted by the proposed development.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

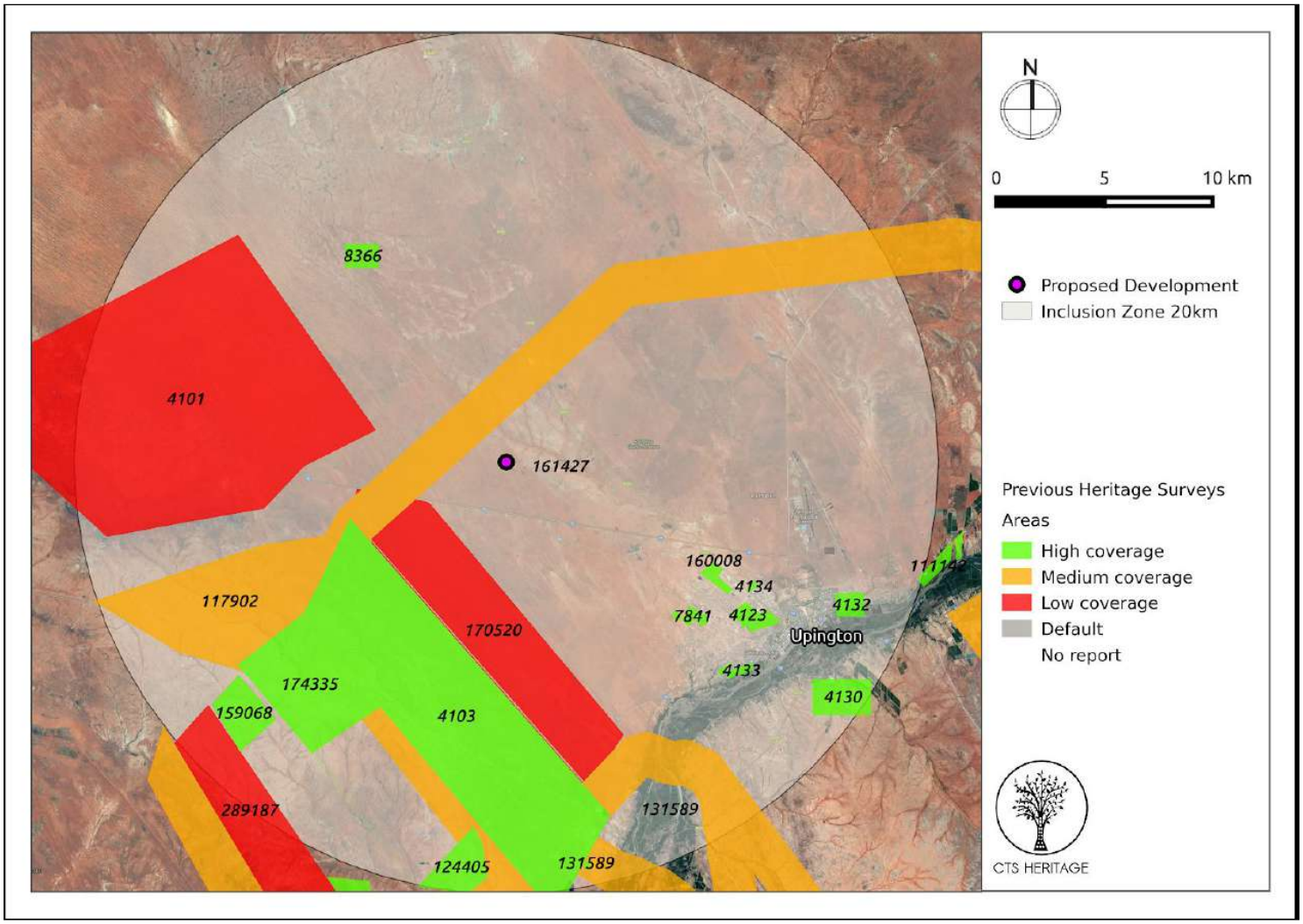

Figure 2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted

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2.3 Constraints & Limitations

1. Limited information supplied by the EAP meant that a more detailed and focussed assessment could not be carried out.
2. No site layout plan indicating the location/layout of the PV panels, laydown areas, construction camp site, internal access roads, etc, was provided by the EAP. A site layout plan was unofficially supplied by the farmer.
3. Massive swathes of Driedoring vegetation cover a large portion of the western sector resulting in low/poor archaeological visibility.

While the study was constrained by time, 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.

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

Allepad Solar 1, Allepad Solar 2, Allepad Solar 3 and Allepad Solar 4, a commercial solar PV energy generation facility and associated infrastructure, is proposed on a site near Upington, in the Northern Cape Province. The project is proposed on a portion of the Remaining Extent of Erf 5315, located approximately 11km north-west of Upington. The area under investigation is approximately 3 889ha in extent and comprises a single agricultural property. The project site can be accessed directly via the N10 national road which borders the southern boundary of the site. The purpose of this Scoping Report is to determine the main issues and potential impacts of the proposed project during the Scoping phase at a desktop level based on existing information.

Cultural Landscape

According to Van Schalkwyk (2014 SAHRIS NID 170520), "The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a pre-colonial (stone age) component and a later colonial (farmer) component. This rural landscape has always been sparsely populated. The second component is an urban one, consisting of a number of smaller towns, most of which developed during the last 150 years or less." According to Von Vollenhoven (2012 SAHRIS NID 117902), "the environment of the area is mostly undisturbed although it is being used for sheep farming… The natural topography… is reasonably flat, but in the north-west a hill dominates the area resulting in an even slope up to the crest. This area also is very rocky. The stones here are dark in colour and may be of a basaltic origin. However in the flat areas adjacent to the hill the rocks are white coloured and most likely are soft calcrete, which would not have been suitable for the manufacture of stone tools. Different non-perennial streams run through the area…" According to Fourie's assessment of the impacts of similar infrastructure in this area (2014), due to the landscape's topography the solar park infrastructure will be prominent in the landscape and alter the rural appearance. Due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

Archaeology and the Built Environment

Many farm portions in the immediate vicinity of the area proposed for development have been assessed in terms of impacts to heritage resources (Figure 2). It has been found that the area surrounding Upington has a rich historical and

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archaeological past (Fourie, 2014 SAHRIS NID 174335). Based on the outcomes of these assessments, it is noted that most of the heritage resources identified are stone age artefact scatters of varying significance. In Fourie's assessment (2014), the field work identified numerous areas where low density scatters of Middle and Later Stone Age lithics were found. As no context and *in situ* preservation were identified these sites were graded as having low heritage significance. In addition, one possible herder site was identified during the survey. No other material or deposits were identified but does not exclude the possibility of subsurface material. The ruins of old mining infrastructure were also identified. In Von Vollenhoven's assessment (2012 SAHRIS NID 117902), he identified a number of very interesting and significant rock art engravings depicting various animals including giraffes and an aardvark. In addition, he identified a significant historical site known as the "Rebellion Tree" as well as graves associated with farmers in this area.

Five sites of moderate local significance are located just beyond the border of the proposed development area (Figure 3f). These sites are highlighted in orange in Appendix 1. Site 24972 is linked to Von Vollenhoven's (2012) report and may well be the location of the rock art engravings described above. Site 45523 is described as consisting of ostrich egg shell fragments and stone flakes scattered around the base of a hill in low densities. Flakes are micro lithic supporting an ascription to the LSA utilising quartzite as raw material. A lead sealed bully beef can was also found here dated to the late 1800's or early 1900's. Sites 19977 to 19979 describe Middle Stone Age artefact scatter sites. In addition, there is a historical structure located within the development area of unknown heritage significance.

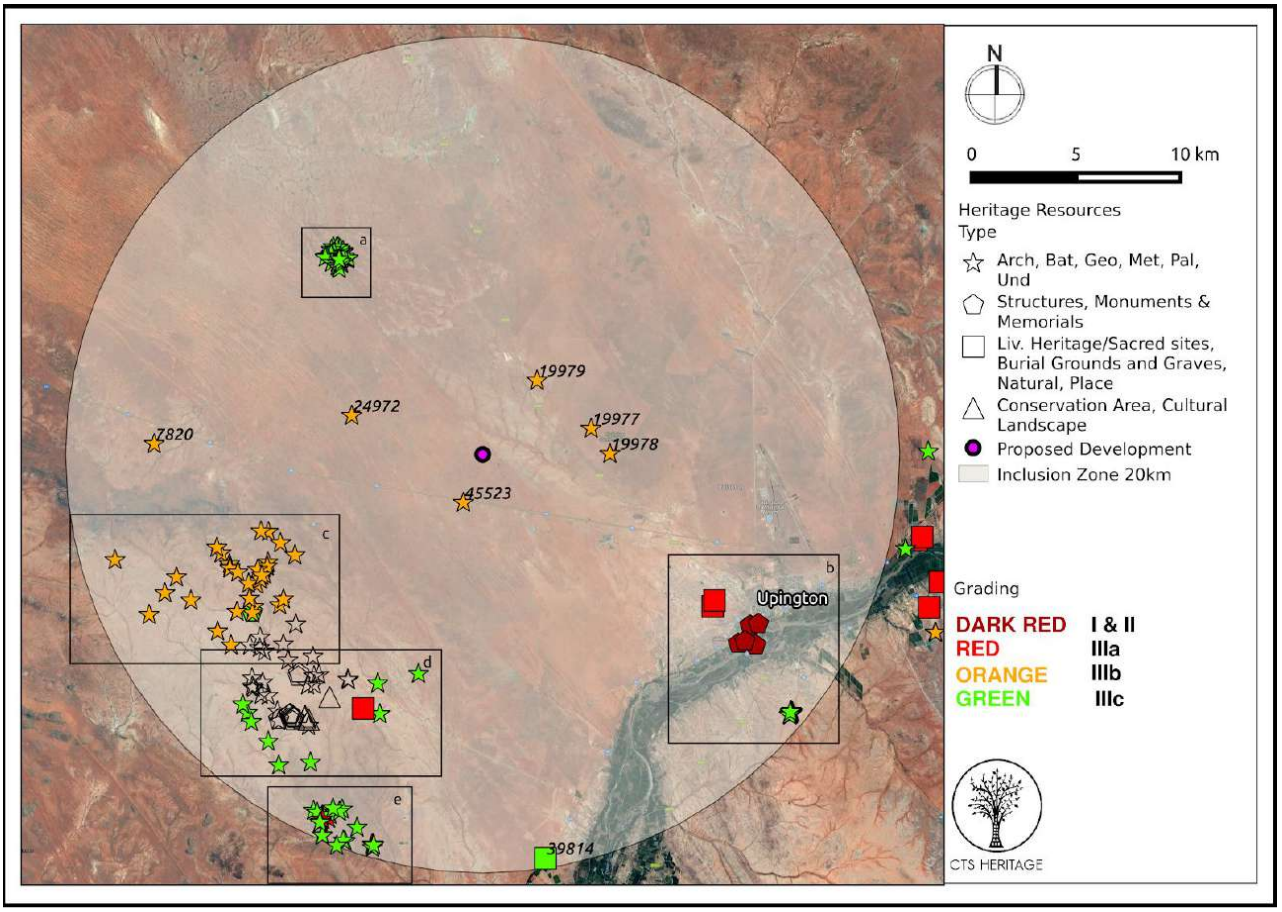

Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated

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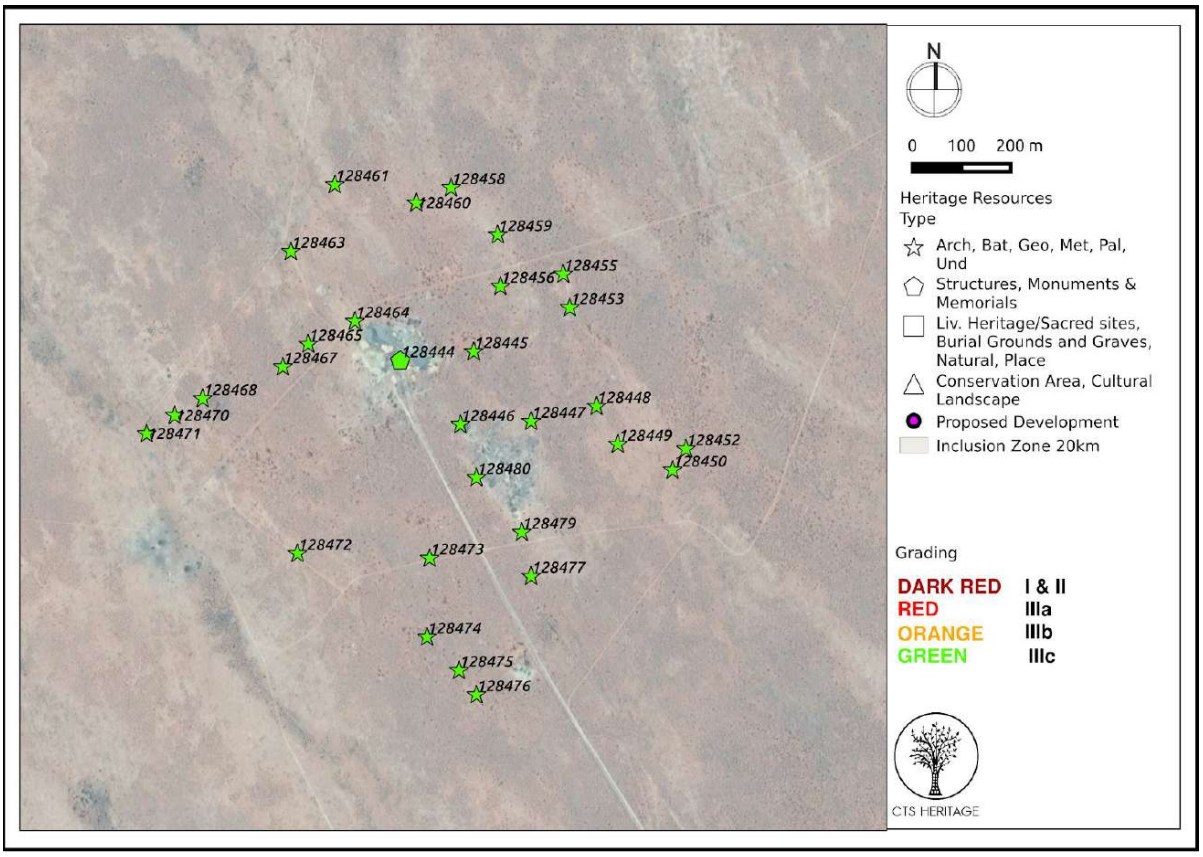

Figure 3a. Inset

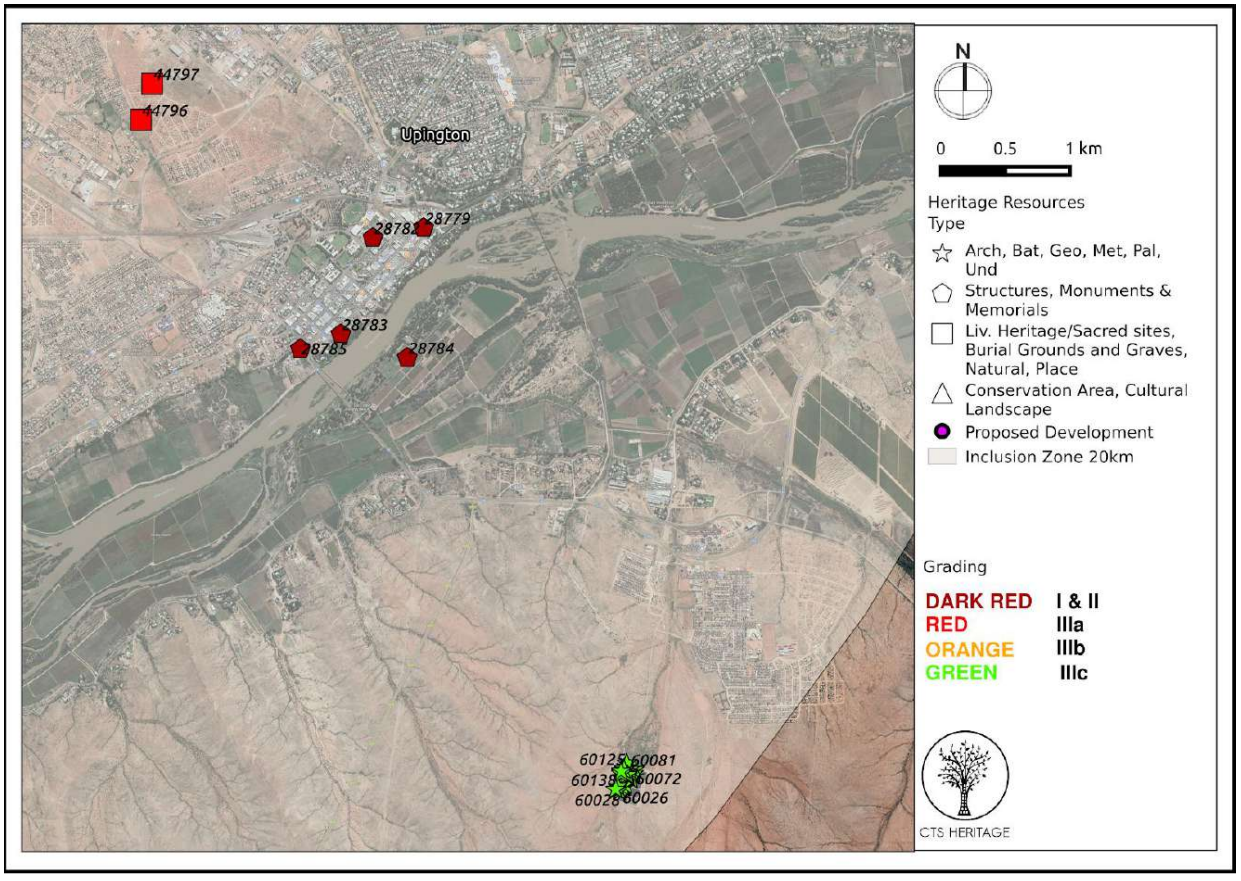

Figure 3b. Inset

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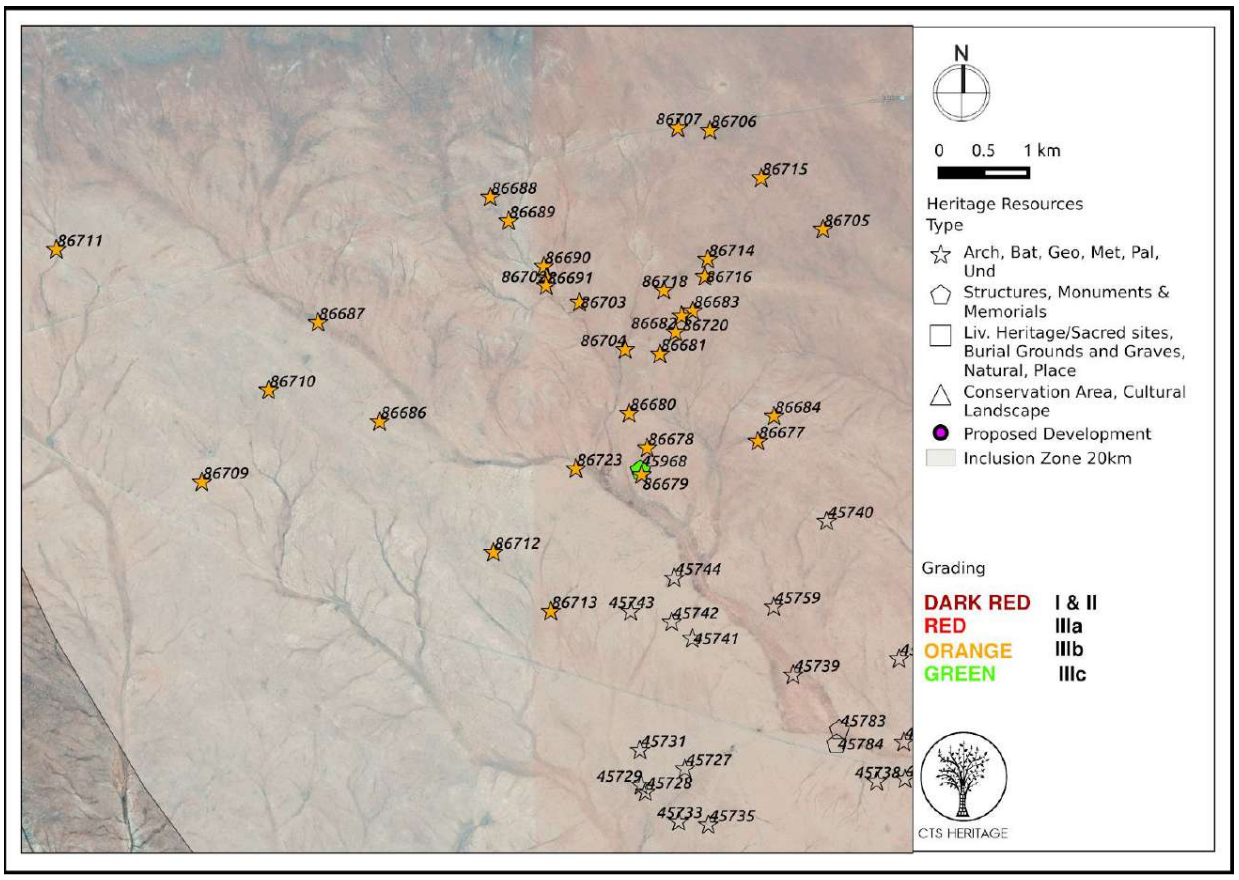

Figure 3c. Inset

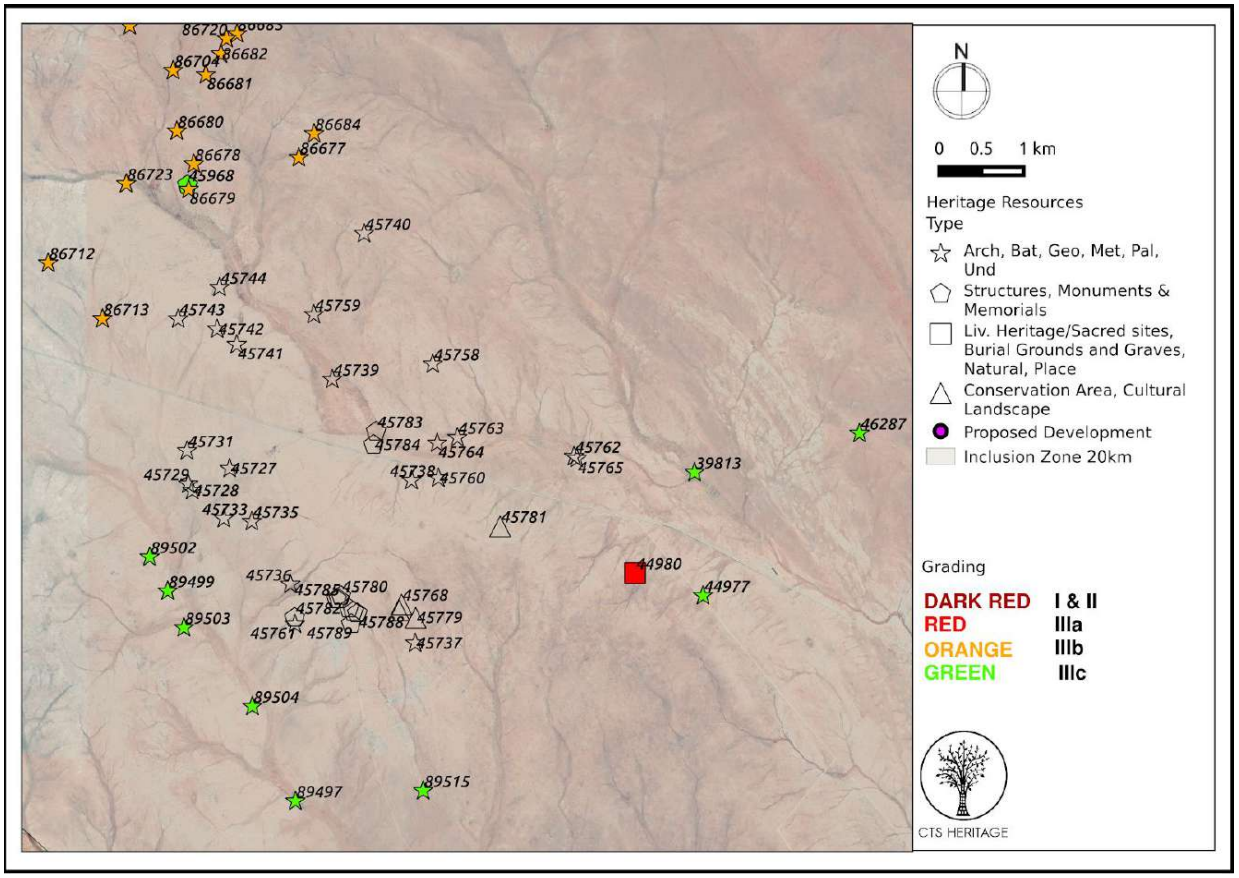

Figure 3d. Inset

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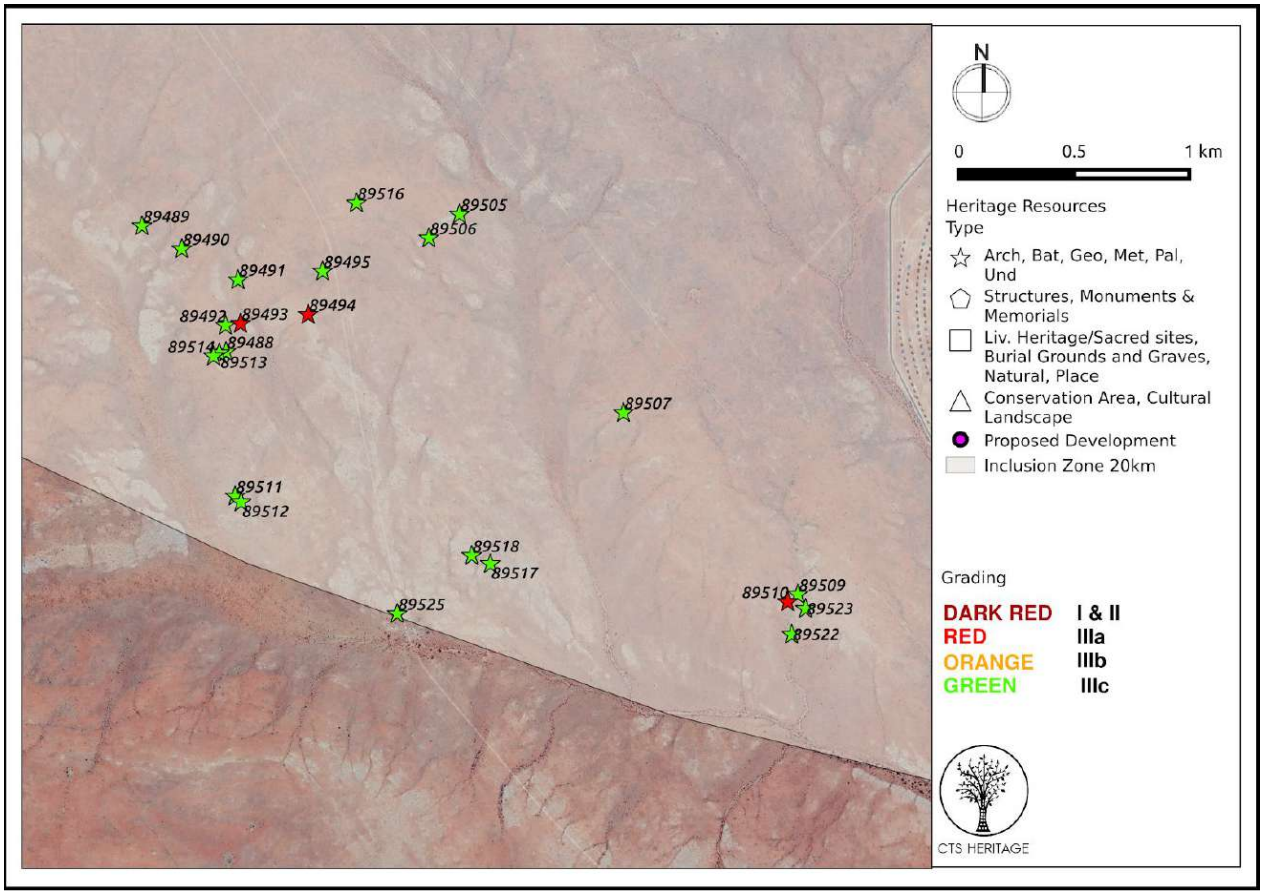

Figure 3e. Inset

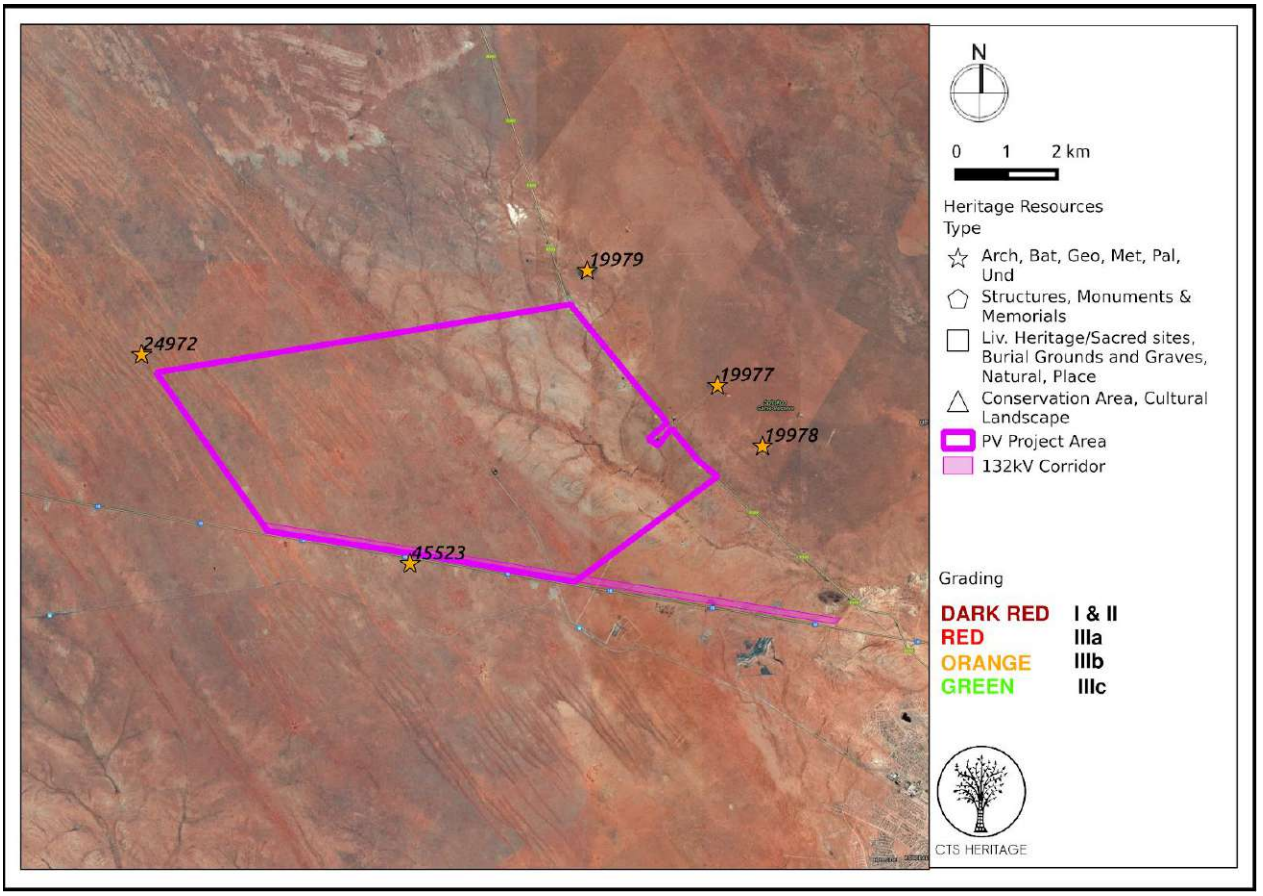

Figure 4. Known archaeological resources bordering on the development area

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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

Notwithstanding the sheer size of the study area (± 2500ha), and the limited number of days, assigned to the survey; apart from random survey/transacts covering as much as the study area as possible, the survey specifically targeted significant landscape features, i. e. areas where it was anticipated that `coherent' archaeological resources would be found, for example:

1. Dunes/dune slopes, wind deflated areas/hollows, in a mostly flat undulating landscape. LSA campsites are known to occur in these locales
2. Elevated stony ridges – possible sources of raw materials for making stone implements
3. Pans, dry streams, drainage channels – potential activity areas
4. Rock outcrops – possible sources of raw materials & rock engravings
5. Old excavation (borrow pit/quarry alongside N10) – visible cuttings/profiles/in-situ archaeological deposits

While the study was constrained by time, 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.

Figure 4.1: Contextual Images - PV Areas 1 and 2 facing north east

Figure 4.2: Contextual Images - PV Areas 2 and 3 facing north east

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Figure 4.3: Contextual Images - PV Area 4 along the N10

Figure 4.4: Contextual Images - PV Area 4 along the N10

Figure 4.5: Contextual Images - PV Area 4 along the N10

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Figure 4.6: Contextual Images - Powerline Route

Figure 4.7: Contextual Images - Powerline Route

Figure 4.8: Contextual Images - Powerline Route

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PV Facilities

On a macro level - the main layer of the cultural landscape consists of stone tools assigned to the Middle Stone Age (MSA). It is estimated that more than 90% of recognisable tools recorded are assigned to the MSA. Limited numbers of Later Stone Age (LSA) resources were also recorded, while Earlier Stone Age (ESA) lithics were rare (confined to the eastern sector).

On a micro level – the vast majority of resources were recorded in the eastern sector of the study area. However, according to the farmer (Mr A.V. van Schalkwyk, pers. comm.), much of the eastern sector has been screened out of the proposed development. The eastern sector is characterised by numerous drainage channels (Figure 1.1), on a substrate of compact red sands covered in extensive scatters of quartz pebbles, gravels, and surface outcroppings of larger quartz boulders (some of which have been flaked). Indications are that the quartz (as a resource) was targeted by Stone Age hunter-gatherers for making stone tools. The source of quartzite (MSA flakes) is unknown. No significant rocky kopjes occur. The eastern sector appears to be quite heavily overgrazed, while diggings/excavations/removal of topsoils was also noted (refer to Site 0526 – where the largest single concentration of tools was found – however these all occur *ex situ,* in a degraded context). Indications are that the majority of the tools most likely represent discarded flakes and flake debris, spread thinly and unevenly across the landscape. No settlement sites, or evidence of human occupation was noted in the area searched. The drainage channels are quite heavily vegetated and the red floodplain (alluvial) sands have been `swept' clean. The majority of the lithics are in quartz and quartzite, but some tools in banded ironstone, hornfels/lydianite and CCS/opaline were also noted. These raw materials must have been introduced onto the site from elsewhere, although banded ironstone is prolific in the Northern Cape and was a favoured raw material among LSA hunter-gatherers for its superior flaking qualities. No pottery, or ostrich eggshell (OES) was found.

A rare *in situ*, ESA quartz biface/handaxe and hammerstone was found (Point 0586). ESA lithics, including Large Cutting Tools (LCTs) and a biface were also noted (Points 0456, 0486, 0526 & 0656).

A possible burial (Site 0506) was located close to Site 0526 where a small dry pan was also noted.

The western sector of the study area comprises a generally flat undulating landscape interspersed with occasional dunes. The plains are covered in deep red Kalahari sands, dense swathes of Driedoring vegetation, and patches of tall Bushman grass in places (alongside the N10). A few sporadic Shephard Trees and Acacias occur in places. There is very little surface stone covering this portion of the farm. There, are no seasonal or permanent sources of water such as streams, springs or pans. A few outcroppings of granitic/basaltic rock occur in places. There are numerous sandy twee-spoor tracks criss crossing the site. Existing infrastructure in the western sector includes numerous twee spoor sandy tracks, fencing, farm gates, cattle pens, and 2 small concrete dams. Current land use comprises grazing (cattle) where many of the wind deflated areas have been heavily trampled. Surrounding land use comprises vast tracts of vacant agricultural land, tourist accommodation (Motata caravan/camping site), roads (N10 & R330) and animal husbandry camps and some informal housing alongside the N10. A small scatter of tools was recorded in a wind deflated hollow (e. g. Site 10116), which may be the remains of a small campsite. No pottery or OES was found. A

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collection of large MSA quartzite flakes, chunks and a core was also recorded in a calcrete/limestone quarry (Site 11815) alongside the N10. According to the farmer the deposits were used as source material during construction of the road.

The vast majority of lithics in the Western Sector comprise mostly single, isolated MSA and LSA tools spread thinly and unevenly over the landscape. Indications are that these comprise mostly discarded flakes and chunks. No ESA tools were found in the western sector.

Larger numbers of tools (or more coherent scatters) appear to be concentrated around dune/dune ridges, deflated (heavily trampled) sands, and rock outcrops/surface bedrock (e. g. Points 0726, 0756, 0826, 0846, 0896, 10016, 11115, 12514, 1304, & 1473).

Powerline servitude

The powerline servitude (alongside the N10) comprises a degraded and disturbed landscape (refer to pics). Mostly single or at most 4-5, isolated lithics were encountered along the route (refer to Table 1), in a variety of different contexts. For example, the route passes directly through an informal animal husbandry camp and large copse of Acacia Trees, before it finally ties in with an existing 132KV line alongside the N10 (km 5.2).

A low density scatter of tools (Point 1533, 1572 & 1592) among extensive scatters of quartz and outcroppings of quartz boulders may be sources of raw material when stone was procured and some flaking activity took place. Indications are that all the tools comprise discarded flakes and flake debris. .

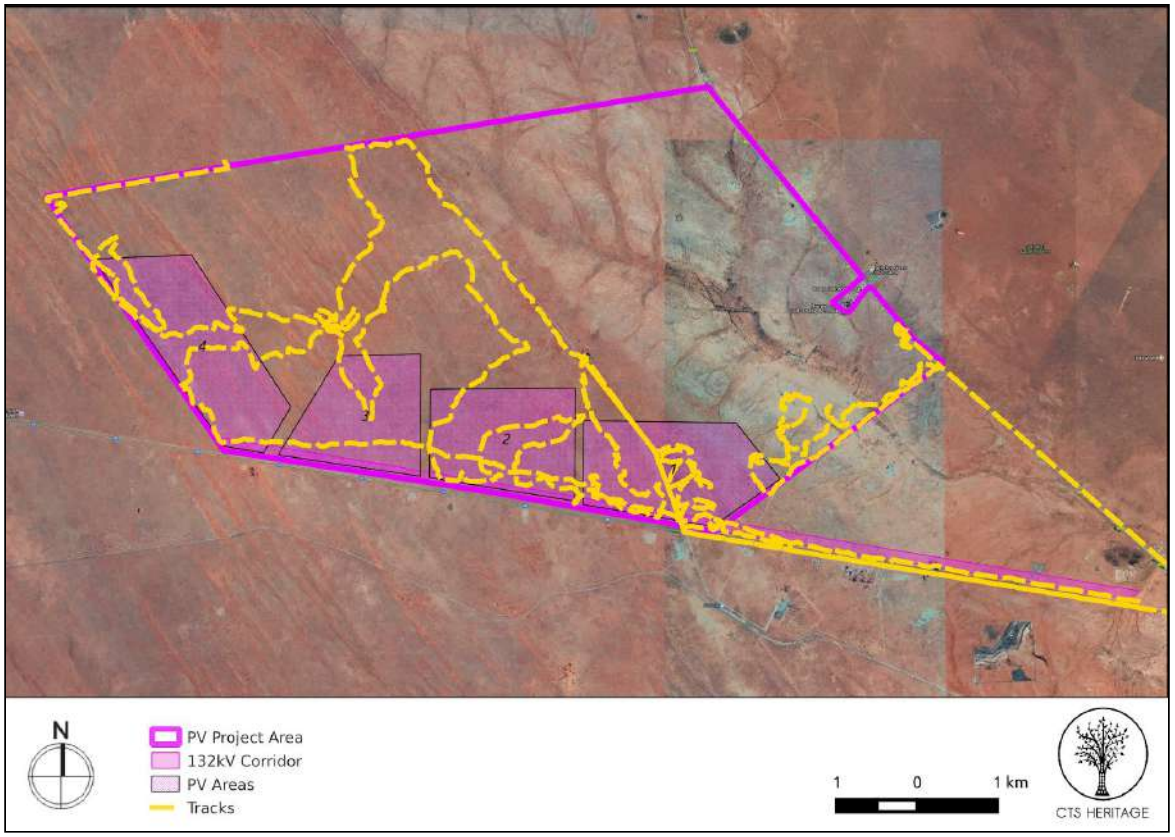

Figure 5: Overall track paths of foot survey

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4.2 Archaeological Resources identified

Table 2: Artefacts identified during the field assessment within the PV area

Point ID	Site No	Site Name	Description	Co-ordinates	Grading	Mitigation
317	ALP1	Allepad 1	Several quartz flakes and chunks found among a dispersed surface scatter and outcroppings, of quartz – possible source of raw material	S28° 22.976′ E21° 09.747′	IIIC	None required
326	ALP2	Allepad 2	Same as above – possible sources of raw material	S28° 23.043′ E21° 09.791′	IIIC	None required
336	ALP3	Allepad 3	Same as above, including quartzite MSA flake – possible sources of raw material	S28° 23.205′ E21° 10.017′	IIIC	None required
346	ALP4	Allepad 4	Quartz flake & chunk among surface outcropping of quartz – possible source of raw material	S28° 23.241′ E21° 09.924′	IIIC	None required
356	ALP5	Allepad 5	Same as above, including MSA quartzite flake	S28° 23.284′ E21° 09.900′	IIIC	None required
366	ALP6	Allepad 6	Quartz flake	S28° 23.253′ E21° 09.900′	IIIC	None required
376	ALP7	Allepad 7	Quartz flake and chunk	S28° 23.320′ E21° 09.850′	IIIC	None required
386	ALP8	Allepad 8	Quartzite chunk, quartz flake among a surface outcropping of quartz – source of raw material	S28° 23.381′ E21° 09.790′	IIIC	None required
396	ALP9	Allepad 9	Quartz flake, quartzite chunk, quartz flake among scatter of surface quartz stone	S28° 23.402′ E21° 09.744′	IIIC	None required
406	ALP10	Allepad 10	Quartz flake, x 2 quartz chunks among a dispersed scatter of quartz stone and limestone on red sands close to windmill/small camp	S28° 23.464′ E21° 09.433′	IIIC	None required
416	ALP11	Allepad 11	Dispersed scatter of quartz and several small and medium sized quartzite MSA flakes on extensive surface scatter of quartz – source of raw material	S28° 23.488′ E21° 09.415′	IIIC	None required
436	ALP12	Allepad 12	A few quartz and quartzite flakes and chunks on extensive scatter of surface quartz at `high' elevation overlooking floodplain / drainage channel	S28° 23.546′ E21° 09.252′	IIIC	None required
446	ALP13	Allepad 13	Quartz flake & chunks on scatter of surface quartz and outcropping of quartz	S28° 23.690′ E21° 09.143′	IIIC	None required
456	ALP14	Allepad 14	ESA Large Cutting Tool (LCT) and banded ironstone flake on scatter of surface quartz	S28° 23.722′ E21° 09.083′	IIIC	None required
466	ALP15	Allepad 15	Quartzite chunk, quartz chunk and flake	S28° 23.768′ E21° 09.000′	IIIC	None required
476	ALP16	Allepad 16	Quartzite chunk alongside fence	S28° 23.677′ E21° 08.875′	IIIC	None required
486	ALP17	Allepad 17	ESA broken biface and dolerite chunk alongside fence	S28° 23.661′ E21° 08.862′	IIIC	None required
496	ALP18	Allepad 18	MSA flake	S28° 23.574′ E21° 08.883′	IIIC	None required
506	ALP19	Allepad 19	Possible grave	S28° 23.491′ E21° 08.885′	IIIA	To be fenced
526	ALP20	Allepad 20	By far the largest number of artefacts – mostly MSA, but also some LSA including a large ESA flake/LCT. Majority flakes & chunks, but also a weathered core, among an extensive scatter of surface quartz, scraped topsoils, large piles of stone and gravel, &	S28° 23.436′ E21° 08.884′	IIIB	None required

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			large scale diggings. Small dry pan with many tools lying about, in majority in quartzite, but also quartz, banded ironstone, chalcedony, hornfels/lydianite and 1-2 opaline.			
536	ALP21	Allepad 21	Extensive scatter of surface quartzite and quartz boulders overlooking a drainage channel. Some quartzite and quartz noted	S28° 23.407′ E21° 08.982′	IIIC	None required
546	ALP22	Allepad 22	MSA quartzite flake in twee spoor road alongside fence	S28° 23.734′ E21° 08.898′	IIIC	None required
556	ALP23	Allepad 23	1-2 MSA quartzite flakes and quartz flakes on extensive scatter of surface quartz – possible source of raw material	S28° 23.790′ E21° 08.917′	IIIC	None required
566	ALP24	Allepad 24	MSA quartzite flake	S28° 23.847′ E21° 08.896′	IIIC	None required
576	ALP25	Allepad 25	Quartz flake and chunk, x 2 MSA quartzite flake, & chunk/?core	S28° 23.859′ E21° 08.728′	IIIC	None required
586	ALP26	Allepad 26	ESA quartz biface/handaxe and quartz hammerstone and several quartz and quartzite MSA flakes among extensive scatter of surface quartz	S28° 23.845′ E21° 08.656′	IIIC	None required
606	ALP27	Allepad 27	Quartzite utilized chunk/broken core	S28° 24.022′ E21° 08.828′	IIIC	None required
616	ALP28	Allepad 28	Flat MSA quartzite flake	S28° 23.941′ E21° 08.929′	IIIC	None required
626	ALP29	Allepad 29	Several MSA quartzite and quartz flakes among extensive scatter of surface quartz and larger quartz outcrops.	S28° 23.855′ E21° 09.040′	IIIC	None required
636	ALP30	Allepad 30	Chunky quartzite MSA flake	S28° 23.840′ E21° 09.086′	IIIC	None required
646	ALP31	Allepad 31	MSA quartzite flake alongside fence	S28° 23.828′ E21° 09.111′	IIIC	None required
656	ALP32	Allepad 32	ESA quartzite flake/?biface	S28° 23.772′ E21° 09.208′	IIIC	None required
666	ALP33	Allepad 33	MSA milky white quartz flake	S28° 23.587′ E21° 09.497′	IIIC	None required
686	ALP34	Allepad 34	MSA quartzite flake on red sands alongside fence	S28° 23.430′ E21° 09.726′	IIIC	None required
696	ALP35	Allepad 35	Quartz flakes and chunk and MSA quartzite flake among scatter of surface quartz alongside fence	S28° 23.326′ E21° 09.903′	IIIC	None required
706	ALP36	Allepad 36	MSA quartzite flake	S28° 23.294′ E21° 09.960′	IIIC	None required
715	ALP37	Allepad 37	Quartz flake, MSA quartzite flake and chunk among surface scatter of quartz on red sands	S28° 23.255′ E21° 10.013′	IIIC	None required
726	ALP38	Allepad 38	MSA utilized & retouched milky quartz flake, pointed quartz flake, broken MSA quartzite blade on soft red sands in shallow, trampled, deflated basin.	S28° 23.296′ E21° 07.362′	IIIC	None required
736	ALP39	Allepad 39	MSA milky white quartz flake	S28° 23.404′ E21° 07.367′	IIIC	None required
746	ALP40	Allepad 40	MSA edge utilized, quartzite flake in shallow wind deflated trampled hollow	S28° 23.706′ E21° 07.570′	IIIC	None required
756	ALP41	Allepad 41	Broken MSA quartz flake, several quartz chunks, fine grained MSA quartzite flake, in shallow wind deflated	S28° 23.764′ E21° 07.617′	IIIC	None required

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			basin, loose red sands. Many small unworked quartz nodules			
766	ALP42	Allepad 42	MSA quartzite core among pile of calcrete gravel alongside twee-spoor track	S28° 23.841′ E21° 07.621′	IIIC	None required
776	ALP43	Allepad 43	Quartzite chunk and milky white quartz flake.	S28° 23.886′ E21° 07.617′	IIIC	None required
786	ALP44	Allepad 44	Broken quartzite flake and quartz flake in shallow deflation hollow	S28° 23.964′ E21° 07.642′	IIIC	None required
796	ALP45	Allepad 45	Quartzite chunk on red sands	S28° 24.059′ E21° 07.748′	IIIC	None required
806	ALP46	Allepad 46	Broken quartzite core	S28° 24.070′ E21° 07.808′	IIIC	None required
816	ALP47	Allepad 47	Quartzite chunk and MSA quartz flake	S28° 24.043′ E21° 07.877′	IIIC	None required
826	ALP48	Allepad 48	Several quartz chunks and flakes in heavily trampled, shallow deflated basin. Extensive aardvark burrowing	S28° 23.999′ E21° 07.928′	IIIC	None required
836	ALP49	Allepad 49	Small, broken quartzite MSA flake	S28° 24.191′ E21° 07.736′	IIIC	None required
846	ALP50	Allepad 50	Several quartz chunks and flakes, small quartzite MSA flake & ?porphyritic MSA flake on soft red sands on slightly elevated dune. Extensive aardvark burrowing	S28° 24.150′ E21° 07.627′	IIIC	None required
856	ALP51	Allepad 51	Metal, glass, rusted metal tin, undecorated glazed ceramics, quartz, quartzite and CCS flakes & chunks, on a hard, trampled gritty sand surface surrounded by outcropping of boulders and surface ?granite	S28° 24.121′ E21° 07.306′	IIIC	None required
866	ALP52	Allepad 52	Small broken quartzite MSA flake	S28° 23.991′ E21° 06.847′	IIIC	None required
876	ALP53	Allepad 53	MSA triangular shaped quartz flake	S28° 23.737′ E21° 06.982′	IIIC	None required
886	ALP54	Allepad 54	Quartz flake, quartz chunk, CCS chunk in shallow wind deflated red sands against slightly elevated sand dune.	S28° 23.581′ E21° 07.215′	IIIC	None required
896	ALP55	Allepad 55	Small, triangular shaped, utilized vein quartz flake	S28° 23.628′ E21° 06.761′	IIIC	None require
906	ALP56	Allepad 56	Fragment of weathered OES	S28° 23.707′ E21° 06.598′	IIIC	None required
916	ALP57	Allepad 57	MSA quartzite flake among outcropping of surface bedrock	S28° 23.973′ E21° 06.676′	IIIC	None required
926	ALP58	Allepad 58	Quartzite chunk with utilized edge	S28° 23.850′ E21° 06.211′	IIIC	None required
936	ALP59	Allepad 59	MSA quartzite flake and chunk surrounded by extremely dense Driedoring	S28° 23.283′ E21° 06.600′	IIIC	None required
946	ALP60	Allepad 60	Snapped (butt) utilized quartzite flake	S28° 23.233′ E21° 06.628′	IIIC	None required
956	ALP61	Allepad 61	Thin pressure flaked utilised quartz flake	S28° 23.030′ E21° 06.796′	IIIC	None required
966	ALP62	Allepad 62	Broken quartzite flake	S28° 22.879′ E21° 06.672′	IIIC	None required
976	ALP63	Allepad 63	MSA quartzite flake and large quartz chunk	S28° 22.690′	IIIC	None required

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				E21° 06.495′		
986	ALP64	Allepad 64	Large, chunky weathered MSA quartz flake/blade in large open, trampled area surrounded by extremely thick Driedoring vegetation	S28° 22.638′ E21° 06.508′	IIIC	None required
996	ALP65	Allepad 65	Small MSA quartzite flake	S28° 22.560′ E21° 06.099′	IIIC	None required
10016	ALP66	Allepad 66	Small CCS chip/flake, small round quartz core, large quartzite chunk, quartzite flake, small CCS core on loose red sand in shallow, wind deflated basin. No pottery or OES – possible temporary campsite	S28° 22.793′ E21° 05.837′	IIIC	None required
10116	ALP67	Allepad 67	Utilized, convex shaped quartz cortex flake.	S28° 23.106′ E21° 05.674′	IIIC	None required
10217	ALP68	Allepad 68	2 quartz chunks, quartz flake and large MSA quartzite flake in large heavily cattle trampled wind deflated basin surrounded by red sand dunes, alongside concrete reservoir	S28° 23.017′ E21° 05.517′	IIIC	None required
10317	ALP69	Allepad 69	Small quartzite flake in wind deflated hollow, 15m from fence	S28° 22.963′ E21° 05.402′	IIIC	None required
10419	ALP70	Allepad 70	Sharp edged indurated shale chip	S28° 22.872′ E21° 05.467′	IIIC	None required
10517	ALP71	Allepad 71	Lovely pointed triangular shaped vein quartz flake	S28° 22.630′ E21° 05.539′	IIIC	None required
10615	ALP72	Allepad 72	Quartz chunk	S28° 22.279′ E21° 05.810′	IIIC	None required
10715	ALP73	Allepad 73	Quartz chunk, quartz flake, MSA quartzite flake, on gritty weathered sands surrounded by surface granitic bedrock surrounded by dense Driedoring	S28° 21.757′ E21° 05.587′	IIIC	None required
10815	ALP74	Allepad 74	MSA quartzite flake	S28° 21.952′ E21° 06.174′	IIIC	None required
10915	ALP75	Allepad 75	Large, chunky, pointed, weathered MSA quartzite flake	S28° 22.332′ E21° 06.566′	IIIC	None required
11015	ALP76	Allepad 76	Quartzite chunk	S28° 22.558′ E21° 06.759′	IIIC	None required
11115	ALP77	Allepad 77	High backed lydianite scraper, retouched lydianite flake/?end scraper, several quartz and MSA quartzite flakes, quartzite and quartz chunks, modern glass, some rusted metal on weathered gritty sands. Extensive aardvark burrowing.	S28° 22.955′ E21° 07.108′	IIIC	None required
11215	ALP78	Allepad 78	Quartz chunk	S28° 22.362′ E21° 03.486′	IIIC	None required
11315	ALP79	Allepad 79	Notched quartzite chunk	S28° 23.001′ E21° 04.135′	IIIC	None required
11415	ALP80	Allepad 80	Several quartz chunks in heavily trampled, wind deflated sandy basin/animal camp (refer to Point 10217)	S28° 22.923′ E21° 05.540′	IIIC	None required
11515	ALP81	Allepad 81	Large MSA quartzite flake in twee spoor sandy track alongside fence	S28° 22.944′ E21° 05.459′	IIIC	None required
11615	ALP82	Allepad 82	MSA quartzite flake/chunk	S28° 22.987′ E21° 05.359′	IIIC	None required
11715	ALP83	Allepad 83	Fragment of OES	S28° 23.097′ E21° 05.111′	IIIC	None required

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11815	ALP84	Allepad 84	Large MSA quartzite flakes, quartzite chunks & core, flaked chunk, broken flakes in calcrete borrow pit/quarry – source material for N10	S28° 23.301′ E21° 04.360′	IIIC	None required
11915	ALP85	Allepad 85	Small MSA quartzite flake	S28° 23.466′ E21° 04.413′	IIIC	None required
12015	ALP86	Allepad 86	Broken MSA quartzite flake	S28° 23.878′ E21° 06.713′	IIIC	None required
12115	ALP87	Allepad 87	MSA quartzite flake surrounded by rocky boulders and surface bedrock	S28° 23.904′ E21° 06.748′	IIIC	None required
12215	ALP88	Allepad 88	Snapped (on both end) CCS bladelet	S28° 23.942′ E21° 07.047′	IIIC	None required
12315	ALP89	Allepad 89	MSA quartzite flake, quartz chunk in clearing among surface bedrock	S28° 24.001′ E21° 07.442′	IIIC	None required
12415	ALP90	Allepad 90	Retouched quartz chunk	S28° 23.952′ E21° 07.424′	IIIC	None required
12514	ALP91	Allepad 91	Large MSA quartzite flake, quartz chunk, smaller MSA quartzite flake among outcrop of surface bedrock on slightly elevated dune top	S28° 24.001′ E21° 07.467′	IIIC	None required
12614	ALP92	Allepad 92	Quartz chunk	S28° 24.005′ E21° 07.467′	IIIC	None required
12714	ALP93	Allepad 93	Quartz chunk	S28° 24.078′ E21° 07.450′	IIIC	None required
12814	ALP94	Allepad 94	Several quartz chunks and flakes on red sands on slightly elevated dune top/ridge	S28° 24.100′ E21° 07.475′	IIIC	None required
12912	ALP95	Allepad 95	Quartz flake	S28° 24.100′ E21° 07.516′	IIIC	None required
1304	ALP96	Allepad 96	Several quartz chunks, quartz flake, on heavily trampled patch of red sand	S28° 24.142′ E21° 07.695′	IIIC	None required
1315	ALP97	Allepad 97	Quartz flake & chunk on gritty red sands alongside access road	S28° 24.207′ E21° 08.037′	IIIC	None required
1334	ALP98	Allepad 98	Quartz chunk	S28° 24.295′ E21° 08.229′	IIIC	None required
1344	ALP99	Allepad 99	Quartz flake in sandy road, quartz chunk among expanse of red sand dunes	S28° 24.289′ E21° 08.372′	IIIC	None required
1353	ALP100	Allepad 100	Quartz flake	S28° 24.254′ E21° 08.407′	IIIC	None required
1383	ALP101	Allepad 101	Quartz chunk	S28° 24.319′ E21° 08.649′	IIIC	None required
1392	ALP102	Allepad 102	MSA quartzite flake, quartz flake, quartz chunk, large quartzite chunk, quartz core on red sands	S28° 24.319′ E21° 08.649′	IIIC	None required
1403	ALP103	Allepad 103	Large quartz chunk	S28° 24.268′ E21° 08.496′	IIIC	None required
1414	ALP104	Allepad 104	MSA quartzite flake	S28° 24.214′ E21° 08.249′	IIIC	None required
1423	ALP105	Allepad 105	Quartz chunk	S28° 24.194′ E21° 08.113′	IIIC	None required
1433	ALP106	Allepad 106	Quartz chunk	S28° 24.161′ E21° 08.206′	IIIC	None required
1443	ALP107	Allepad 107	Quartz flake	S28° 24.067′ E21° 08.085′	IIIC	None required

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1452	ALP108	Allepad 108	Large `basalt' core, MSA quartzite flake, quartz chunk and flake in shallow, heavily trampled shallow deflated basin/red sands	S28° 23.944′ E21° 08.205′	IIIC	None required
1462	ALP109	Allepad 109	CCS flake, quartz flake	S28° 23.977′ E21° 08.250′	IIIC	None required
1473	ALP110	Allepad 110	Quartz chunk, MSA quartzite flake, modern glass on red sands in wind deflated basin surrounded by dense Driedoring vegetation	S28° 24.017′ E21° 08.049′	IIIC	None required
1482	ALP111	Allepad 111	Quartz flake	S28° 24.027′ E21° 08.022′	IIIC	None required
1493	ALP112	Allepad 112	Quartz flake & 2 quartz chunks	S28° 23.990′ E21° 08.013′	IIIC	None required
1503	ALP113	Allepad 113	Miscellaneous grindstone on large, flat granitic slab. Quartz chunk, and flake, bits of soft calcrete, next to bush on red sands behind dune ridge	S28° 23.890′ E21° 08.201′	IIIC	None required
1514	ALP114	Allepad 114	Quartz chunk on gritty red sand and patch of limestone.	S28° 23.779′ E21° 07.907′	IIIC	None required

Table 3: Artefacts identified during the field assessment within the powerline area

SAHRIS ID	Site No	Site Name	Description	Co-ordinates	Grading	Mitigation
1324	ALP115	Allepad 115	Quartz chunk	S28° 24.288′ E21° 08.178′	IIIC	None required
1363	ALP116	Allepad 116	Quartz chunk	S28° 24.336′ E21° 08.491′	IIIC	None required
1523	ALP117	Allepad 117	Quartz chunk on gritty red sands and patch of limestone	S28° 24.454′ E21° 09.285′	IIIC	None required
1533	ALP118	Allepad 118	Dispersed (i. e. low density) scatter of quartz flakes, chunks quartzite MSA flake, on extensive patch of quartz and limestone pebbles. Large quartz boulders possible source of raw materials	S28° 24.481′ E21° 09.451′	IIIC	None required
1543	ALP119	Allepad 119	Same as above	S28° 24.488′ E21° 09.509′	IIIC	None required
1553	ALP120	Allepad 120	Same as above, including quartz core, and banded ironstone flake	S28° 24.499′ E21° 09.561′	IIIC	None required
1563	ALP121	Allepad 121	Banded ironstone retouched blade on heavily overgrazed lands close to informal camp, some dumping	S28° 24.518′ E21° 09.771′	IIIC	None required
1572	ALP122	Allepad 122	Quartz chunk, 3 quartz flakes and many unworked quartz pebbles, large quartzite chunk/core , banded ironstone flake blade among extensive scatter of basaltic stone	S28° 24.586′ E21° 10.219′	IIIC	None required
1582	ALP123	Allepad 123	Occasional quartz chunk and flake & MSA quartzite flake on large patch of quartz surface stone.	S28° 24.611′ E21° 10.349′	IIIC	None required
1592	ALP124	Allepad 124	A few quartzite chunks, MSA quartzite flake, quartz chunk and flake, banded ironstone flake and chunk on extensive scatter of basaltic road below prominent kopje alongside N10 road	S28° 24.636′ E21° 10.631′	IIIC	None required
1602	ALP125	Allepad 125	Quartz chunk, MSA quartzite – extension of above	S28° 24.676′ E21° 10.833′	IIIC	None required
1613	ALP126	Allepad 126	Same as above	S28° 24.677′	IIIC	None required

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				E21° 10.834′		
1622	ALP127	Allepad 127	Lydianite chunk/core on extensive scatter of basaltic rock and quartz pebbles.	S28° 24.698′ E21° 10.984′	IIIC	None required
1632	ALP128	Allepad 128	Quartz flake among scatter of soft limestone	S28° 24.712′ E21° 11.100′	IIIC	None required
1642	ALP129	Allepad 129	Quartz chunk on gritty sands and scatter of soft limestone	S28° 24.712′ E21° 11.100′	IIIC	None required

4.3 Selected photographic record

Figure 6.1 and 6.2 Collection of tools from 0526

Figure 6.3 ESA Biface from 0656 and 6.4 Weathered core and point from 0526

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Figure 6.5 Possible burial from 0506 (Grade IIIA) and 6.6 Site 0526

Figure 6.7 Artefacts from 0726, 6.8 Artefacts from 0856 and 6.9 Artefacts from 0756

Figures 6.10. 6.11 and 6.12 Various collections of artefacts

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Figures 6.13. Quartz flake Point 0596, 6.14. Lower grindstone at point 1503 and 6.15. Notched chunk at point 11315

Figures 6.16. Quartz biface and hammerstone at point 0596

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

The development will require the extensive clearing of vegetation and levelling of the site in order to construct the PV facility, and will involve considerable earthmoving operations that may have a negative impact on potentially important archaeological resources. However, the results of the study indicate that the impact of the proposed Allepad PV facility on significant archaeological resources is likely to be low.

Unmarked graves and ostrich eggshell water containers for example, may be exposed or uncovered during sub-subsurface excavations. However, the probability of this occurring is rated as being moderate to low.

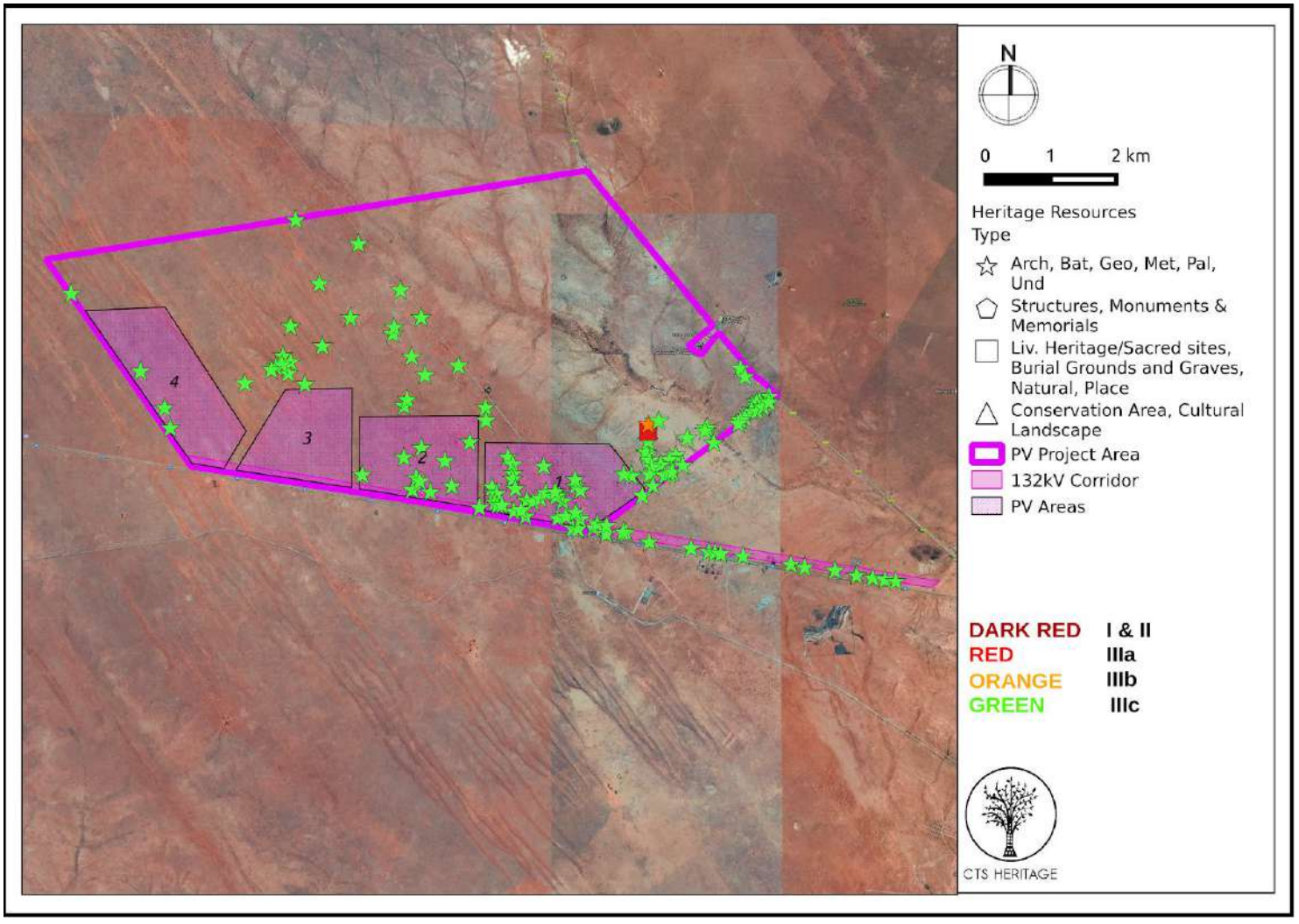

Figure 7: Map of heritage resources identified during the field assessment relative to the proposed development

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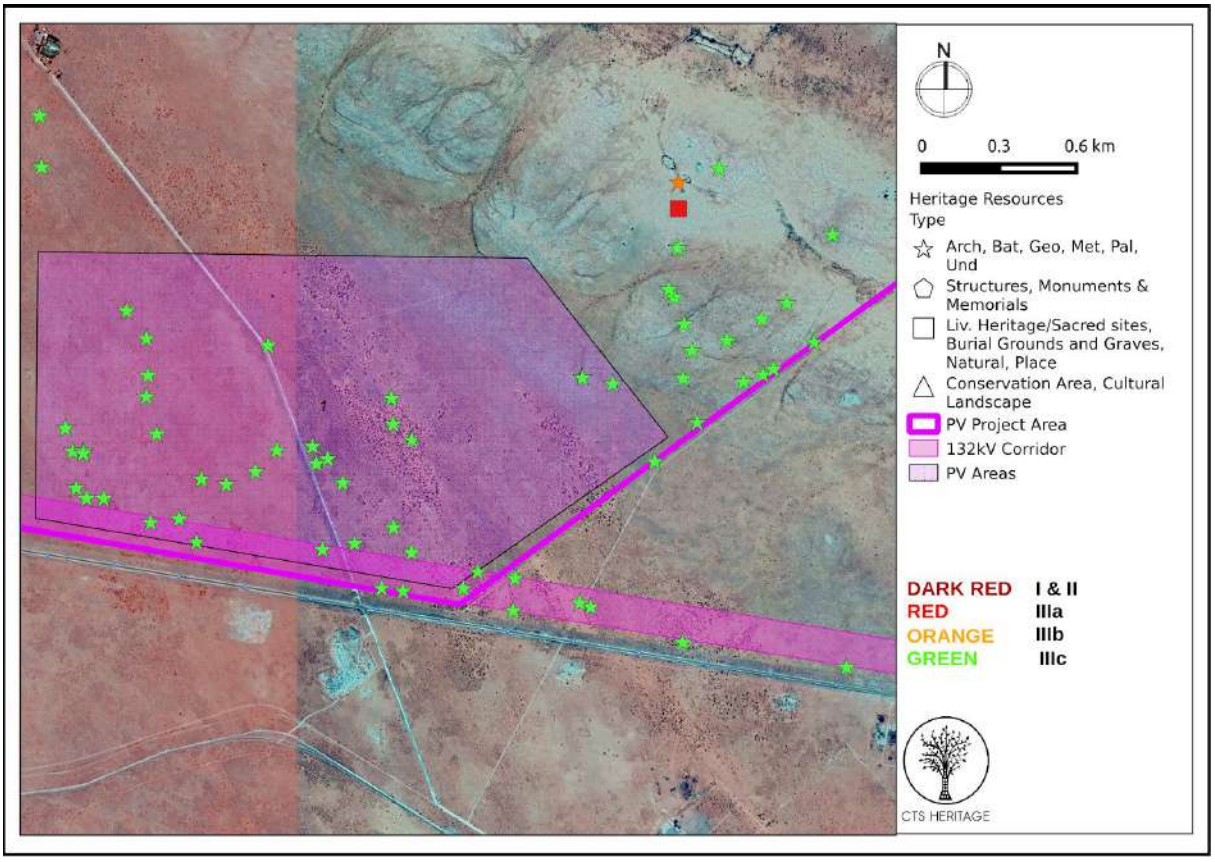

Figure 7.1: Map of heritage resources identified during the field assessment relative to the proposed development focussed on Allepad 1

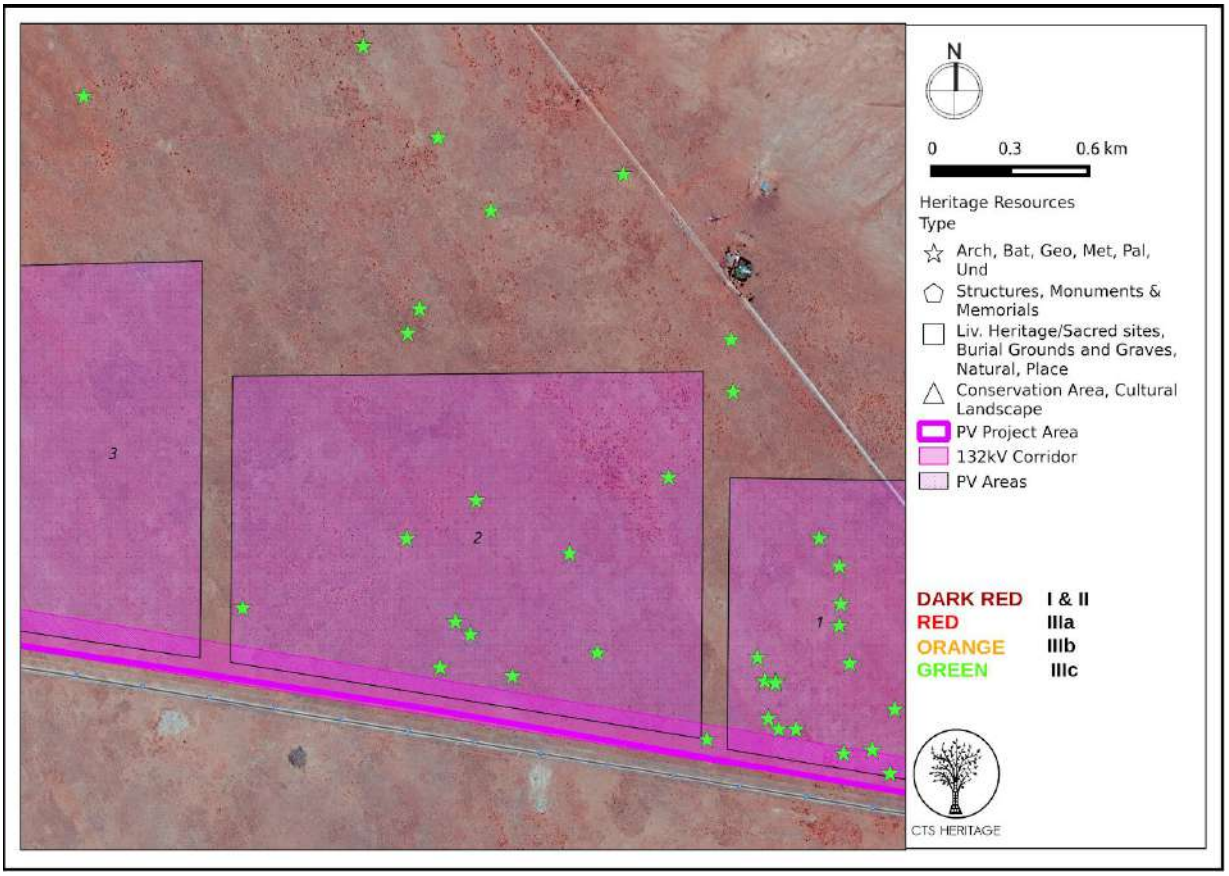

Figure 7.2: Map of heritage resources identified during the field assessment relative to the proposed development focussed on Allepad 2

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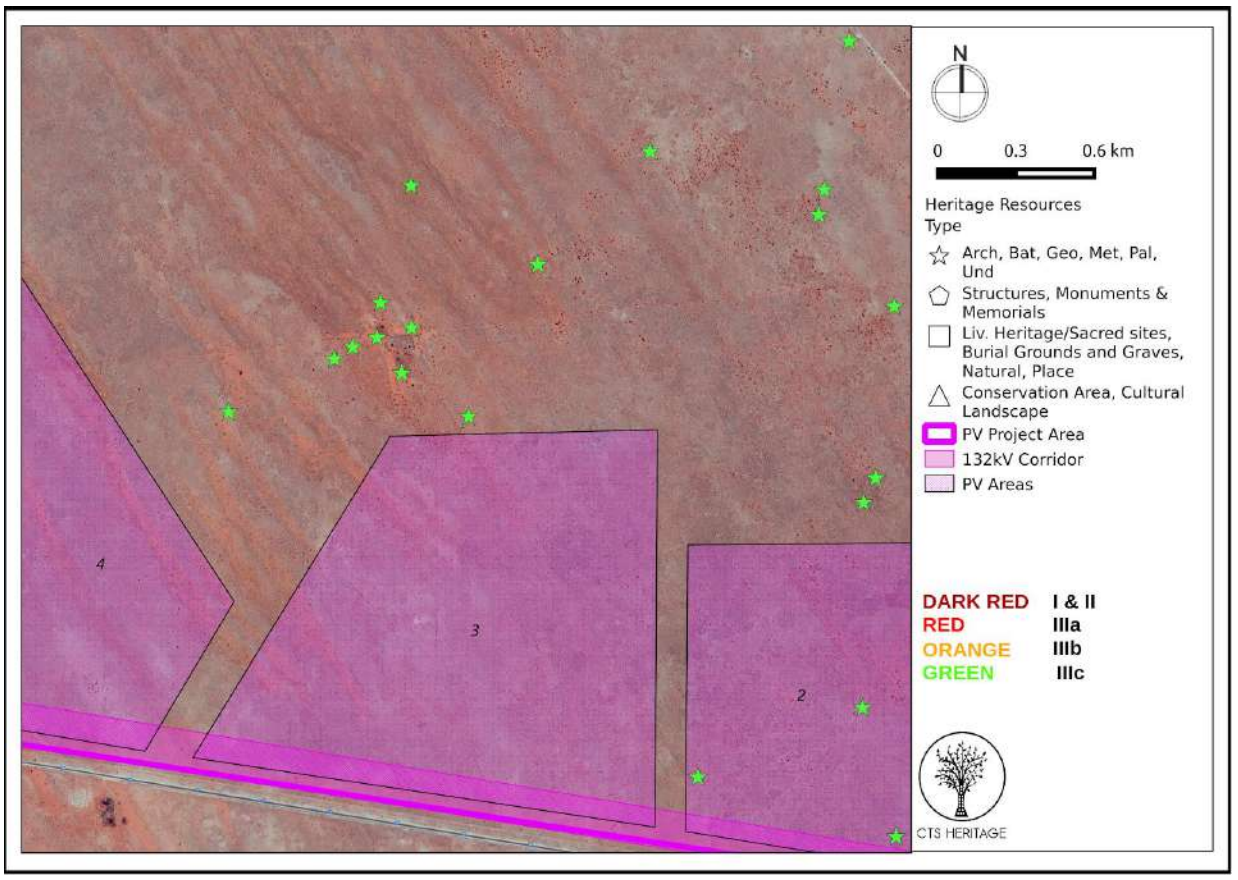

Figure 7.3: Map of heritage resources identified during the field assessment relative to the proposed development focussed on Allepad 3

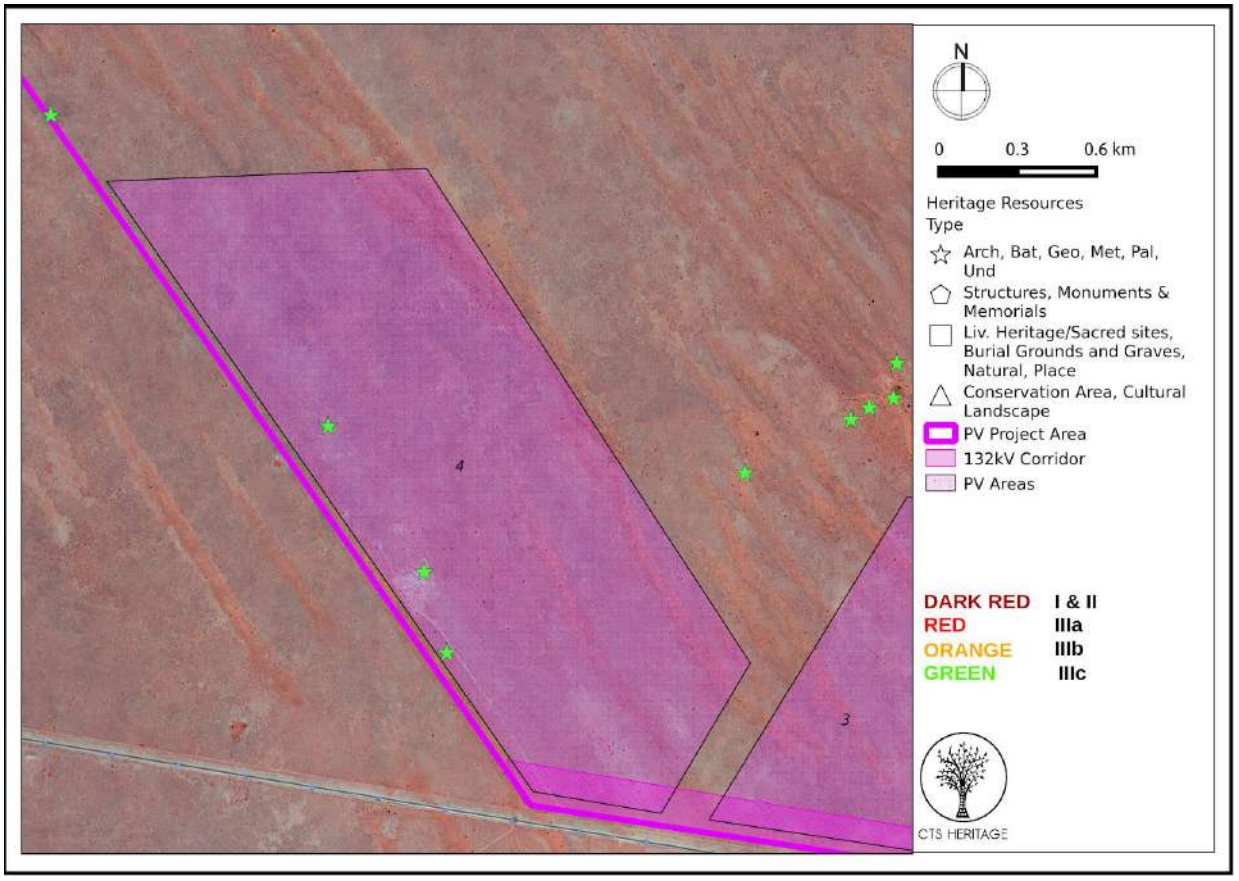

Figure 7.4: Map of heritage resources identified during the field assessment relative to the proposed development focussed on Allepad 4

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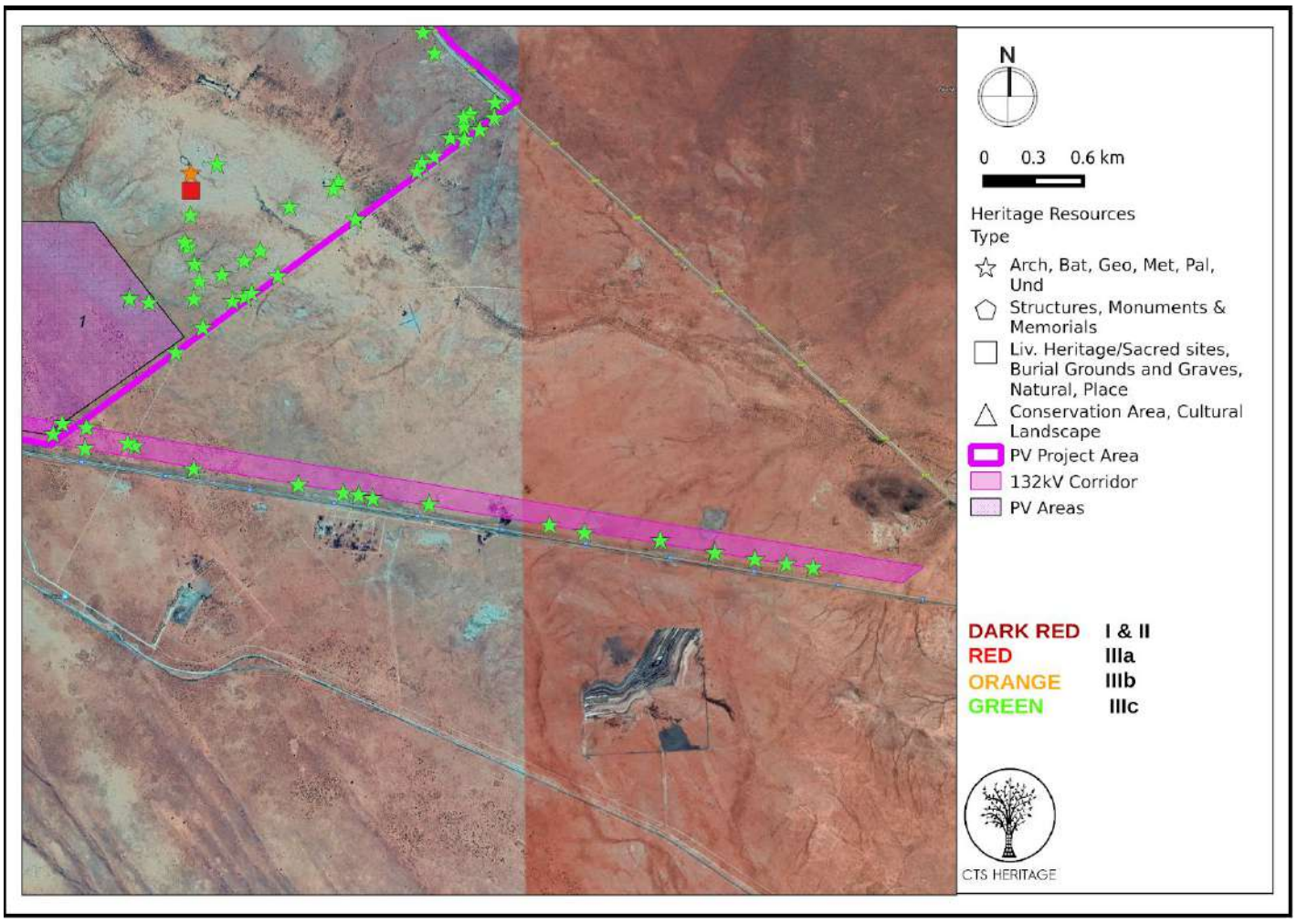

Figure 7.5: Map of heritage resources identified during the field assessment relative to the proposed development focussed on the 132kv alignment

6. CONCLUSION AND RECOMMENDATIONS

Overall, from an archaeological perspective there are no fatal flaws, and provided that the recommendations are implemented, there are no objections to the proposed development proceeding.

The results indicate that the receiving environment is not a sensitive, vulnerable or threatened archaeological landscape. While archaeological resources may be impacted by the proposed development, these are of low, contextual significance and are not *in situ*.

The archaeological site 0526, graded IIIB, must not be impacted by the proposed development and a 100m no-go buffer must be implemented around this site.

The possible burial identified as site 0506 must not be impacted by the proposed development and a 30m no-go buffer must be implemented around it.

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Recommendations

1. No mitigation is required prior to construction operations commencing.
2. The archaeological site 0526, graded IIIB, must not be impacted by the proposed development and a 100m no-go buffer must be implemented around this site.
3. The possible burial identified as site 0506 must not be impacted by the proposed development and a 30m no-go buffer must be implemented around it.
4. Should any unmarked human remains or ostrich eggshell caches for example are exposed or uncovered during construction activities, or earth moving, operations during preparation of the site for development, work must cease and these must immediately be reported to the South Africa Heritage Resources Agency/SAHRA (Att: Ms Natasha Higgit tel 021 462 4502).
5. The ECO must be briefed by an archaeologist prior to construction activities commencing.
6. The above recommendations must be included in the Environmental Management Plan (EMP) for the project.

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7. REFERENCES

Impact Assessment References				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
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4103	AIA	Cobus Dreyer	10/03/2006	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Concentrated Solar Thermal Plant (Csp) at the Farms Olyvenhouts Drift, Upington, Bokpoort 390 and Tampansrus 294/295, Groblershoop, Northern Cape
4123	AIA	Peter Beaumont	01/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Residential Development Flanking Dakota Drive in Upington, //Khara Hais Municipality, Northern Cape Province
4124	AIA	Peter Beaumont	24/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension of the Rosedale Settlement in Upington, //Khara Hais Municipality, Northern Cape Province
4130	AIA	Peter Beaumont	16/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension of the Louisvaleweg Township, //Khara Hais Municipality, Northern Cape Province
4131	AIA	Peter Beaumont	18/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Township Extension Flanking Keimoesweg, //Khara Hais Municipality, Northern Cape Province
4132	AIA	Peter Beaumont	18/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension Flanking Rondomstraat, //Khara Hais Municipality, Northern Cape Province
4133	AIA	Peter Beaumont	19/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Township Extension Flanking Lemoendraai in Upington, //Khara Hais Municipality, Northern Cape Province
4134	AIA	Peter Beaumont	19/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Industrial Area Expansion at Laboria, //Khara Hais Municipality, Northern Cape Province
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8366	AIA	Karen Van Ryneveld	27/10/2005	Cultural Resources Management Impact Assessment: (Portion of) Areachap 426, Upington District, Northern Cape, South Africa
111142	HIA	Johnny Van Schalkwyk	01/03/2012	Heritage Impact Assessment for the Proposed Development of an Agri-estate on the Farm Melkstroom East of Upington, Gordonia Magisterial District, Northern Cape Province
117902	HIA	Anton van Vollenhoven	25/05/2012	A REPORT ON A HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED SASOL CSP PROJECT NEAR UPINGTON IN THE NORTHERN CAPE PROVINCE
119309	HIA	Stephan Gaigher	10/10/2012	HERITAGE IMPACT ASSESSMENT REPORT Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province
124405	HIA	Stephan Gaigher	29/10/2013	Heritage Impact Assessment Report for the Proposed Sirius Solar Project near Upington in the Northern Cape Province
124406	PIA	JF Durand	02/04/2013	Palaeontology Scoping Report
128281	HIA	David Morris	30/07/2013	RE Capital 3 Solar Development on the property Dyasons Klip west of Upington, Northern Cape: Scoping phase Heritage Input

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131589	AIA	Stephan Gaigher	22/02/2013	Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province
158920		David Morris	01/02/2013	RE Capital 3 Solar Development on the property Dyasons Klip west of Upington, Northern Cape: Archaeological Impact Assessment – proposed 'central' development footprint
159068	PIA	John E Almond	07/03/2014	PALAEONTOLOGICAL HERITAGE BASIC ASSESSMENT: DESKTOP STUDY Proposed RE Capital 3 Solar Development on the property Dyason's Klip near Upington , Northern Cape
159203	HIA	Johnny Van Schalkwyk	11/03/2014	Cultural Heritage Impact Assessment Proposed Township development of Erf 1, UPINGTON, //KHARA HAIS MUNICIPALITY
159293	HIA	Johnny Van Schalkwyk	12/03/2014	Cultural Heritage Impact Assessment for proposed township development, Louisvaleweg, UPINGTON
160008	HIA	Johnny Van Schalkwyk	15/03/2014	Cultural Heritage Impact Assessment for the proposed township development, Paballelo, Upington, //Khara Hais Municipality
161427	HIA	Stephan Gaigher	15/04/2014	Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province
166079	HIA	Johnny Van Schalkwyk	12/03/2014	Proposed extension of Dakota Road, Upington
170520	HIA	Johnny Van Schalkwyk	01/01/2014	Heritage Impact Assessment Report for the proposed 1GW Upington Solar Park within the // Khara Hais Municipality, Northern Cape Province
174335	HIA	Wouter Fourie	24/03/2014	Heritage Impact Assessment for the proposed Solar Power Park for SolarReserve SA (Pty) Ltd, Farm Rooipunt 617, Gordonia RD, Siyanda District Municipal Region, Northern Cape.
289187	HIA	Jaco van der Walt	01/06/2015	Heritage Scoping Report for the proposed Bloemsmond Solar 1 and Solar 2 PV Project, Keimoes, NC Province

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APPENDIX 2: Palaeontological Assessment

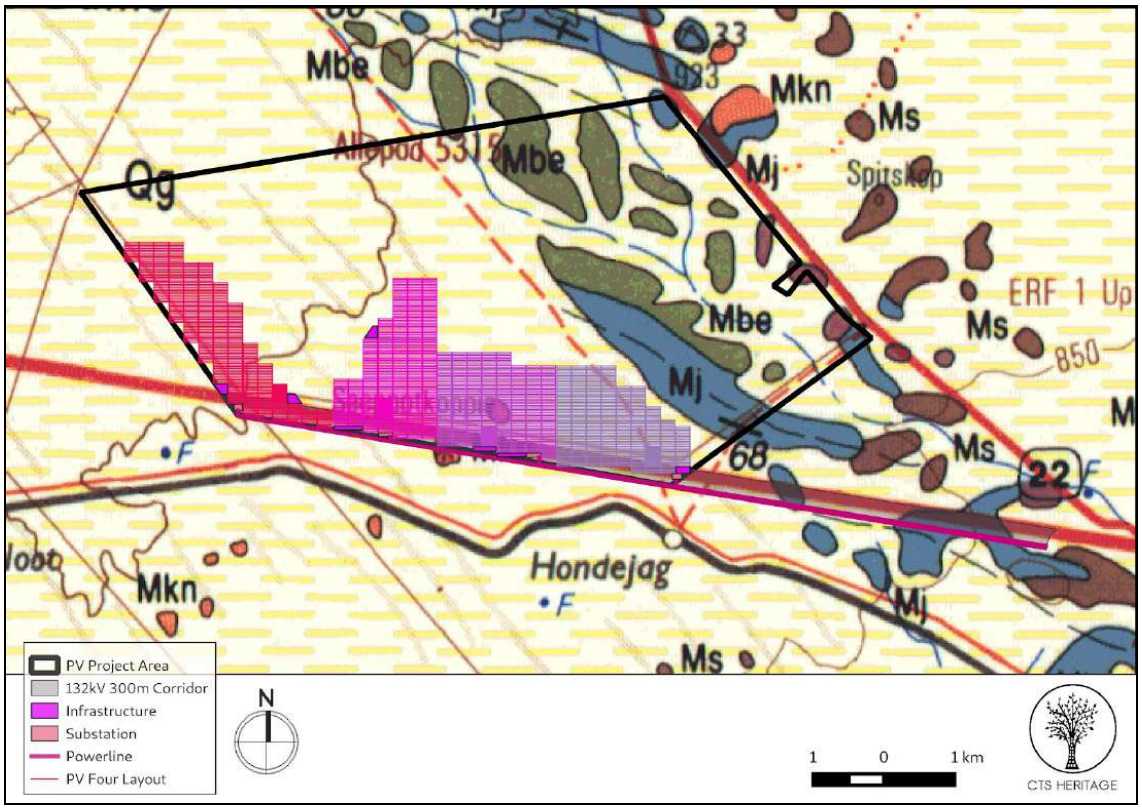
ALMOND PIA INPUT OCT 2018
Proposed development of Allepad PV One, / Allepad PV Two, / Allepad PV Three, /Allepad PV Four,a solar PV facility and associated infrastructure on a site near Upington, in the Northern Cape Province.

Introduction
Allepad Solar 1, Allepad Solar 2, Allepad Solar 3 and Allepad Solar 4, a commercial solar PV energy generation facility and associated infrastructure, is proposed on a site near Upington, in the Northern Cape Province. The project is intended to be bid into the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, with the aim of evacuating power generated by the project into the Eskom national electricity grid. The project is proposed on a portion of the Remaining Extent of Erf 5315, located approximately 11km north-west of Upington. The area under investigation is approximately 3 889ha in extent and comprises a single agricultural property. The project site can be accessed directly via the N10 national road which borders the southern boundary of the site.

Photovoltaic (PV) technology is proposed for the generation of electricity. The solar energy facility will have a contracted capacity of up to 100MW, and will make use of either fixed-tilt, single-axis tracking, or double axis tracking PV technology. The solar energy facility will comprise the following key infrastructure components:
» Arrays of PV panels with a generation capacity of up to 100MW.
» Mounting structures to support the PV panels.
» Combiner boxes, on-site inverters (to convert the power from Direct Current (DC) to Alternating Current (AC)), and power transformers.
» An on-site substation up to 0.5ha in extent to facilitate the connection between the solar energy facility and the Eskom electricity grid.
» A new 132kV power line approximately 5km in length, between the on-site substation and Eskom grid connection point.
» Cabling between the project's components (to be laid underground where practical).
» Meteorological measurement station.
» Energy storage area of up to 2ha in extent.
» Access road and internal access road network.
» On-site buildings and structures, including a control building and office, ablutions and guard house.
» Perimeter security fencing, access gates and lighting.
» Temporary construction equipment camp up to 1ha in extent, including temporary site offices, parking and chemical ablution facilities.
» Temporary laydown area up to 1ha in extent, for the storage of materials during the construction.

Electricity generated by the project will feed into Eskom's national electricity grid via a new 132kV power line which will connect the on-site substation to the upgraded 132kV double circuit

power line running between the new Upington Main Transmission Substation (MTS) (currently under construction approximately 15km south of the project site), and the Gardonia Distribution Substation (located in Upington town). The point of connection is located approximately 5km east of the project site, and will make use of a loop-in and loop-out configuration. The proposed power line required for the project will be constructed within a 300m wide power line corridor which has been identified immediately north of, and which runs parallel to, the N10 national road. The full extent of the project site (i.e. 3 889ha) is being assessed as part of the EIA process, of which an area of approximately 250ha (equivalent to 6.4% of the total project area) would be required for the development of the solar energy facility and associated infrastructure.



Map 3a: Geology underlying the proposed development area extracted from the Council of Geoscience Map (1:250 000) 2820 Upington

Table 1: Explanation of symbols for the geological map and approximate ages

Symbol	Group/Formation	Lithology	Approximate Age
Qg	Gordonia Formation	Red brown wind blown sand and dunes	Pleistocene to Recent
Mkn	Keimoes Suite	Mesocratic, fine-grained and weakly foliated granites	Mid Proterozoic (Mokolian)
Mj	Jannelspan Formation	Amphibolite, amphibole gneiss, biotite gneiss, pelitic gneisses, lenses of calc-silicate rocks	~2 to 1 billion years old
Mbe	Bethesda Formation	Migmatitic biotite-rich and aluminous gneisses	~2 to 1 billion years old

Comments on Palaeontology

The geology of the study area near Upington is shown on the 1: 250 000 geology map 2820 Upington (Council for Geoscience, Pretoria). A comprehensive sheet explanation for this map has been published by Moen (2007). The study area is underlain at depth by a range of ancient Precambrian basement rocks – largely high grade metamorphic rocks (e.g. gneisses, metapelites) and intrusive granitoids – that belong to the Namaqua-Natal Province of Mid Proterozoic (Mokolian) age (Cornell et al. 2006, Moen 2007). The bedrock units concerned include granites of the Keimoes Suite as well as various high grade metasediments (Schists, migmatites, amphibolites) of the Areachap Group (e.g. Bethesda and Jannelsepan Formations). These basement rocks are approximately two to one billion years old and entirely unfossiliferous (Almond & Pether 2008). They only crop out regionally as small, isolated patches of basement rocks or low Inselberge. A large portion of the study area is covered by fine-grained aeolian (wind-blown) sands of the Gordonia Formation (Qg, pale yellow in Fig. 1), the youngest, Pleistocene to Recent, subunit of the Kalahari Group (Almond 2008, Almond & Pether 2008)

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ALMOND, J.E. 2014b. Proposed RE Capital 3 Solar Development on the property Dyason's Klip near Upington , Northern Cape. Palaeontological heritage basic assessment: desktop study, 13 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. 2014c. Proposed construction of RE Capital 11 photovoltaic solar facility on the remainder of the Farm Dyasonsklip 454, Upington, Northern Cape. Recommended exemption from further palaeontological studies, 6 pp. Natura Viva cc, Cape Town.

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further palaeontological studies, 11 pp. Natura Viva cc, Cape Town.
ALMOND, J.E. & PETHER, J. 2008. Palaeontological heritage of the Northern Cape. Interim SAHRA technical report, 124 pp. Natura Viva cc., Cape Town.

MOEN, H.F.G. 2007. The geology of the Upington area. Explanation to 1: 250 000 geology Sheet 2820 Upington, 160 pp. Council for Geoscience, Pretoria.

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CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL

(Adopted from the HWC Chance Fossils Finds Procedure: June 2016)

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.Procedure to follow if it is likely that the material identified is a fossil:

- The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;
- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
    - The date
    - A description of the discovery
    - A description of the fossil and its context (e.g. position and depth of find)
    - Where and how the find has been stored
    - Photographs to accompany the preliminary report (the more the better):
        - A scale must be used
        - Photos of location from several angles
        - Photos of vertical section should be provided
        - Digital images of hole showing vertical section (side);
        - Digital images of fossil or fossils.

Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- If the find cannot be stabilised, the fossil may be collect with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

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FOSSIL DISCOVERIES: PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	*Lat:*	*Long:*
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	*Digital image of vertical section (side)*	
	Fossil from different angles	
	Wider context of the find	
Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil Name:		
Contact:		
Recorder Name:		
Contact:		
Photographer Name:		
Contact:		

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APPENDIX 3: Heritage Screening Assessment

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HERITAGE SCREENER

CTS Reference Number:	**CTS18_158**
SAHRA Case No:	**13047**
Client:	**Savannah**
Date:	**17 September 2018**
Author:	**Jenna Lavin**
Title:	**Proposed development of Allepad PV Three, a solar PV facility and associated infrastructure on a site near Upington, in the Northern Cape Province.**

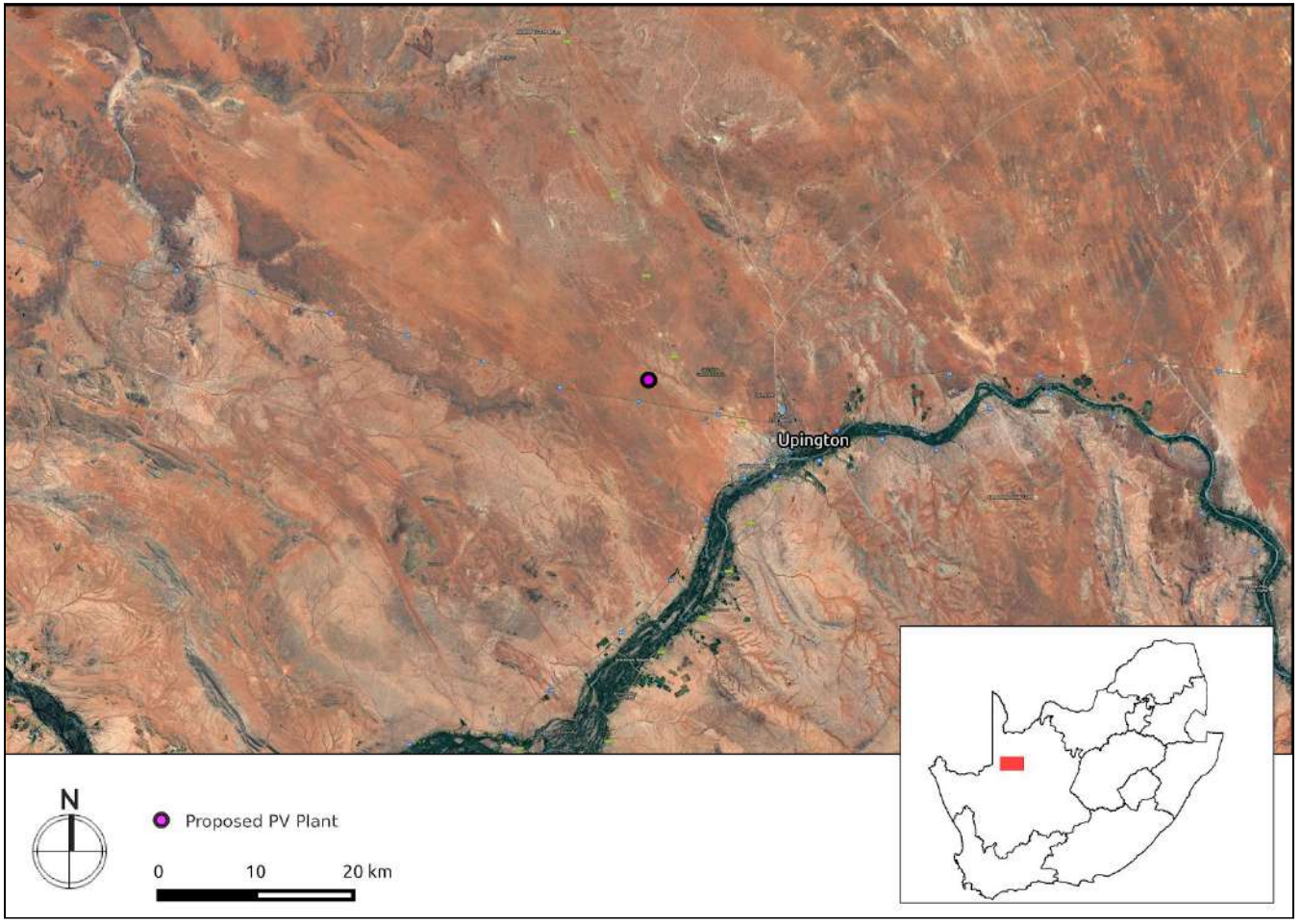

Figure 1a. Satellite map indicating the location of the proposed development in the Northern Cape Province

Recommendation by CTS Heritage Specialists	**RECOMMENDATION:** **The heritage resources in the area proposed for development are not sufficiently recorded.** **Based on the available information, including the scale and nature of the proposed development, it is likely that significant heritage resources will be impacted by the proposed development and as such it is recommended that an archaeological field assessment be conducted to inform a full Heritage Impact Assessment (see section 8 for details)**

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1. Proposed Development Summary

Allepad Solar 3, a commercial solar PV energy generation facility and associated infrastructure, is proposed on a site near Upington, in the Northern Cape Province. The project is intended to be bid into the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, with the aim of evacuating power generated by the project into the Eskom national electricity grid. The project is proposed on a portion of the Remaining Extent of Erf 5315, located approximately 11km north-west of Upington. The area under investigation is approximately 3 889ha in extent and comprises a single agricultural property. The project site can be accessed directly via the N10 national road which borders the southern boundary of the site.

Photovoltaic (PV) technology is proposed for the generation of electricity. The solar energy facility will have a contracted capacity of up to 100MW, and will make use of either fixed-tilt, single-axis tracking, or double axis tracking PV technology. The solar energy facility will comprise the following key infrastructure components:
» Arrays of PV panels with a generation capacity of up to 100MW.
» Mounting structures to support the PV panels.
» Combiner boxes, on-site inverters (to convert the power from Direct Current (DC) to Alternating Current (AC)), and power transformers.
» An on-site substation up to 0.5ha in extent to facilitate the connection between the solar energy facility and the Eskom electricity grid.
» A new 132kV power line approximately 5km in length, between the on-site substation and Eskom grid connection point.
» Cabling between the project's components (to be laid underground where practical).
» Meteorological measurement station.
» Energy storage area of up to 2ha in extent.
» Access road and internal access road network.
» On-site buildings and structures, including a control building and office, ablutions and guard house.
» Perimeter security fencing, access gates and lighting.
» Temporary construction equipment camp up to 1ha in extent, including temporary site offices, parking and chemical ablution facilities.
» Temporary laydown area up to 1ha in extent, for the storage of materials during the construction.

Electricity generated by the project will feed into Eskom's national electricity grid via a new 132kV power line which will connect the on-site substation to the upgraded 132kV double circuit power line running between the new Upington Main Transmission Substation (MTS) (currently under construction approximately 15km south of the project site), and the Gardonia Distribution Substation (located in Upington town). The point of connection is located approximately 5km east of the project site, and will make use of a loop-in and loop-out configuration. The proposed power line required for the project will be constructed within a 300m wide power line corridor which has been identified immediately north of, and which runs parallel to, the N10 national road. The full extent of the project site (i.e. 3 889ha) is being assessed as part of the EIA process, of which an area of approximately 250ha (equivalent to 6.4% of the total project area) would be required for the development of the solar energy facility and associated infrastructure.

2. Application References

Name of relevant heritage authority(s)	SAHRA
Name of decision making authority(s)	DEA

3. Property Information

Latitude / Longitude	28°23'8.36"S 21° 7'6.22"E
Erf number / Farm number	Erf 5315
Local Municipality	Dawid Kruiper
District Municipality	ZF Mgcawu
Previous Magisterial District	Gordonia
Province	Northern Cape
Current Use	None
Current Zoning	Agriculture
Total Extent	3889ha

4. Nature of the Proposed Development

Total Surface Area	250ha
Depth of excavation (m)	3m
Height of development (m)	3m
Expected years of operation before decommission	NA

5. Category of Development

x	**Triggers: Section 38(8) of the National Heritage Resources Act**
	Triggers: Section 38(1) of the National Heritage Resources Act
	1. Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.
	2. Construction of a bridge or similar structure exceeding 50m in length.
	3. Any development or activity that will change the character of a site-
x	a) exceeding 5 000m^2 in extent
	b) involving three or more existing erven or subdivisions thereof
	c) involving three or more erven or divisions thereof which have been consolidated within the past five years
	4. Rezoning of a site exceeding 10 000m^2
	5. Other (state):

6. Additional Infrastructure Required for this Development

It is proposed that the project connects to the upgraded 132kV double circuit line which runs approximately 5km east of the project site, between the new Upington MTS (currently under construction approximately 15km south of the project site) and the Gordonia Distribution substation (located in Upington town). Grid connection will make use of a “loop in-and-loop out” configuration. The shortest route is along the N10 in a 300m wide corridor, that connects all four projects.

7. Mapping (please see Appendix 3 and 4 for a full description of our methodology and map legends)

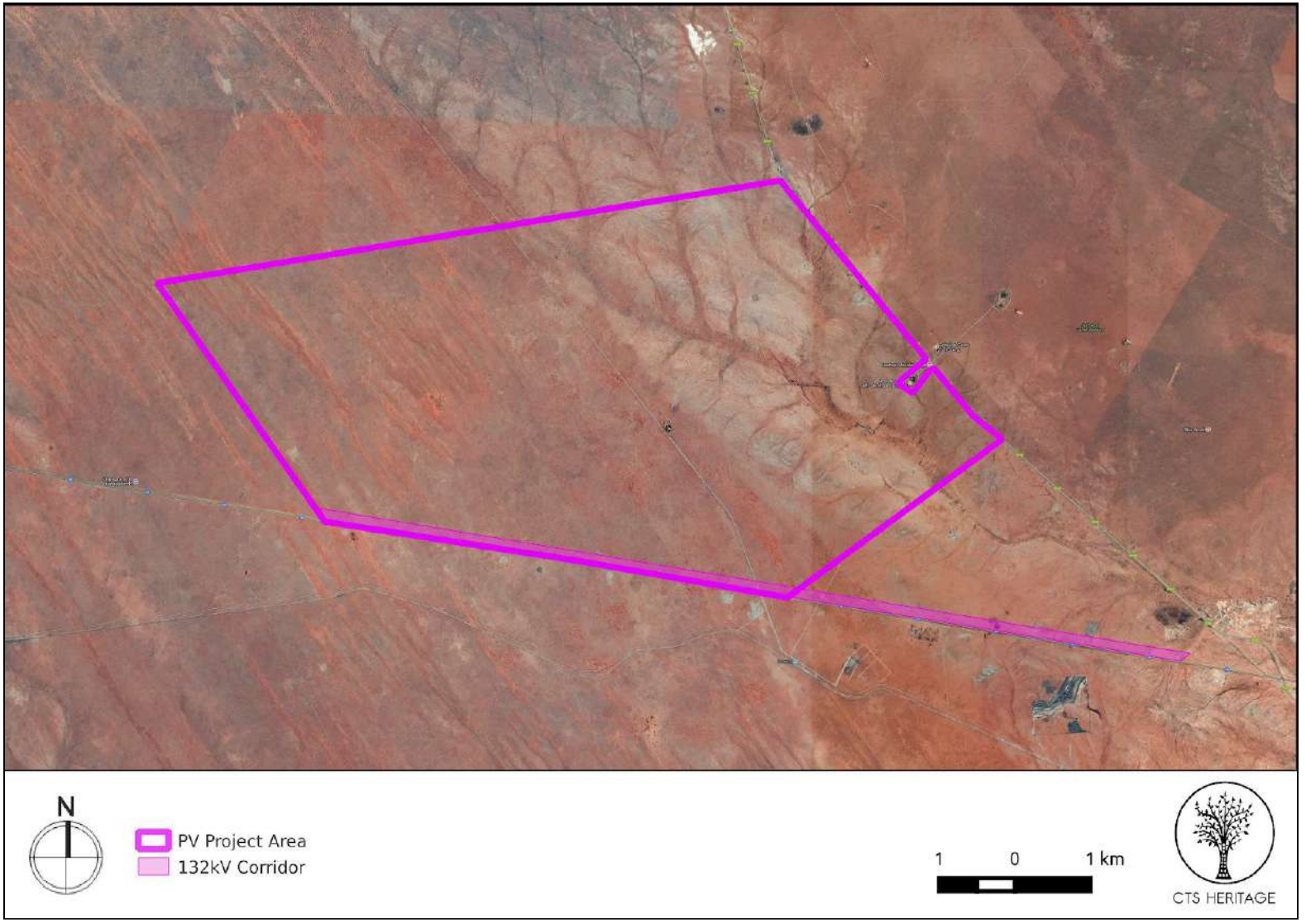

Figure 1b. Overview Map. Satellite image (2017) indicating the proposed development area at closer range.

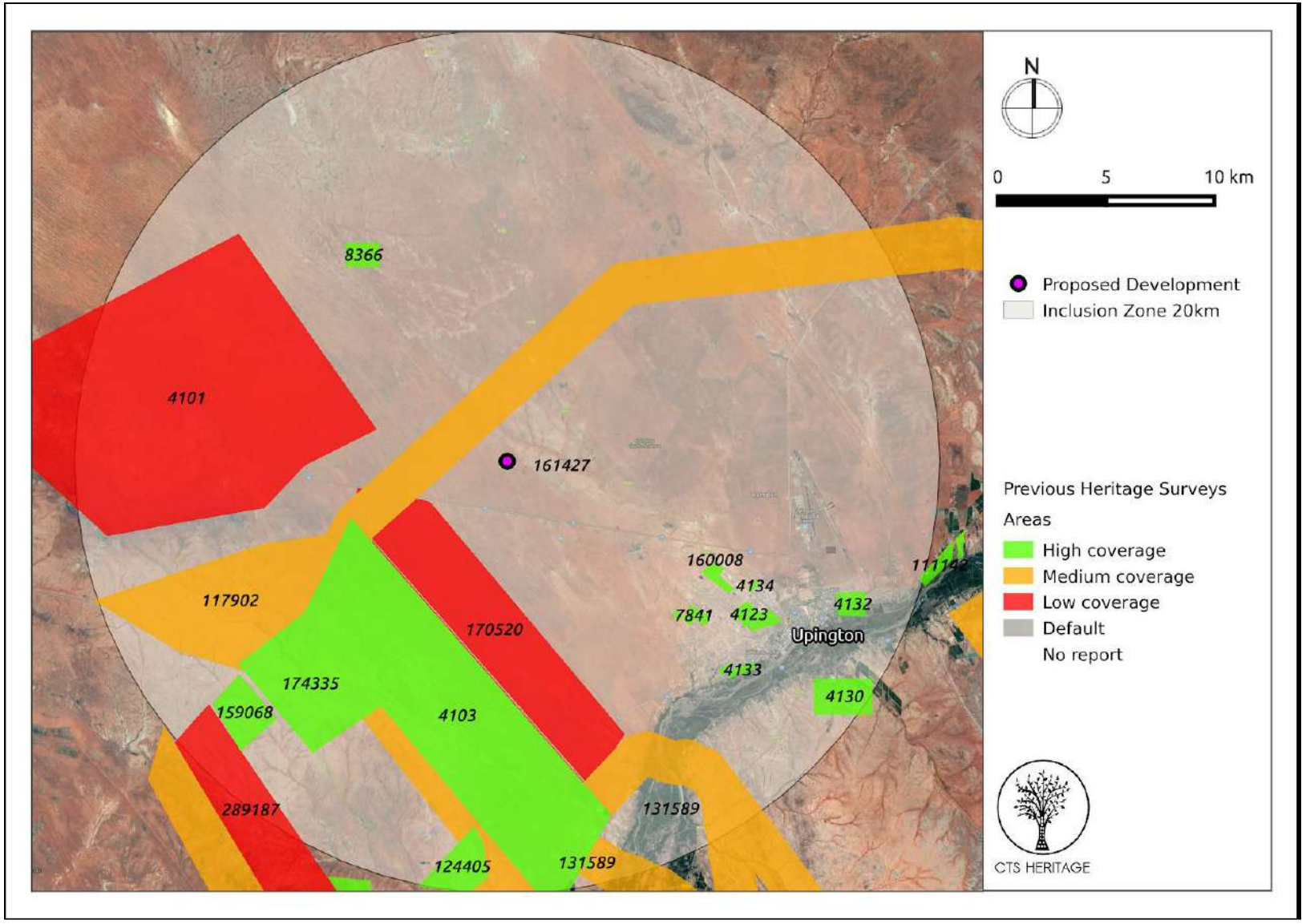

Figure 2. Previous HIAs Map. Previous Heritage Impact Assessments surrounding the proposed development area within 5km, with SAHRIS NIDS indicated. Please see Appendix 2 for full reference list.

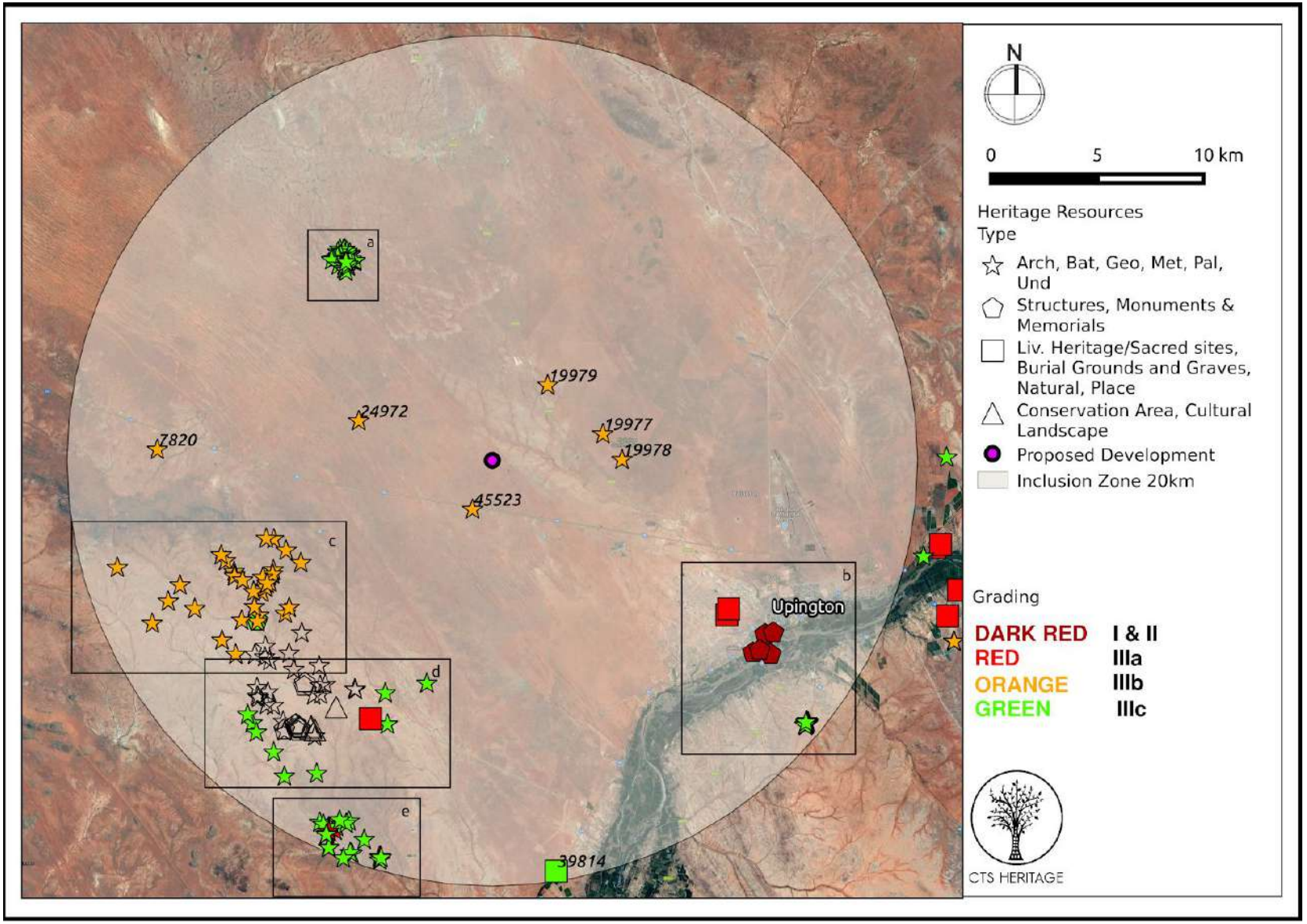

Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated (see Figure 3a for inset). Please See Appendix 4 for full description of heritage resource types.

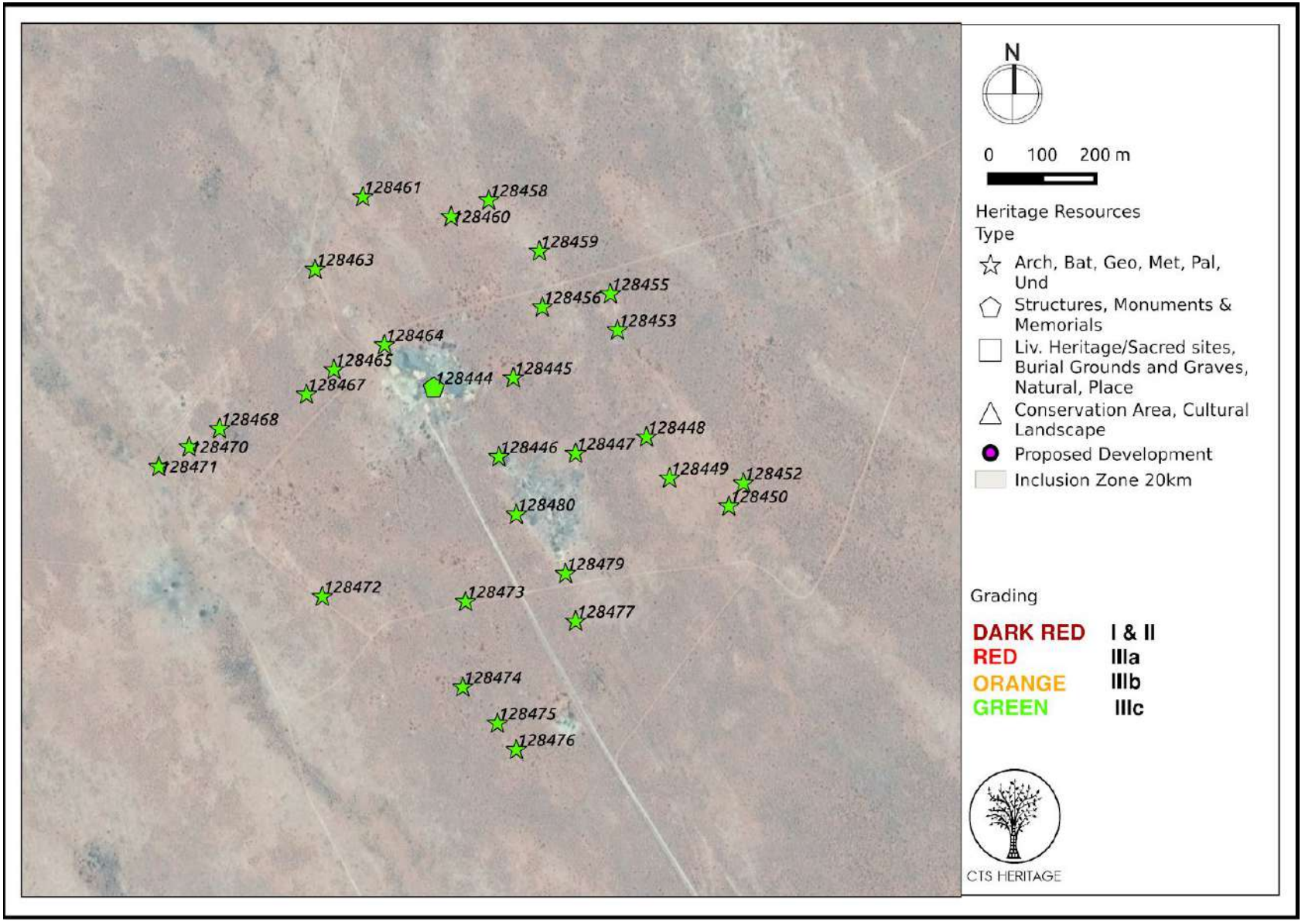

Figure 3a. Heritage Resources Map.

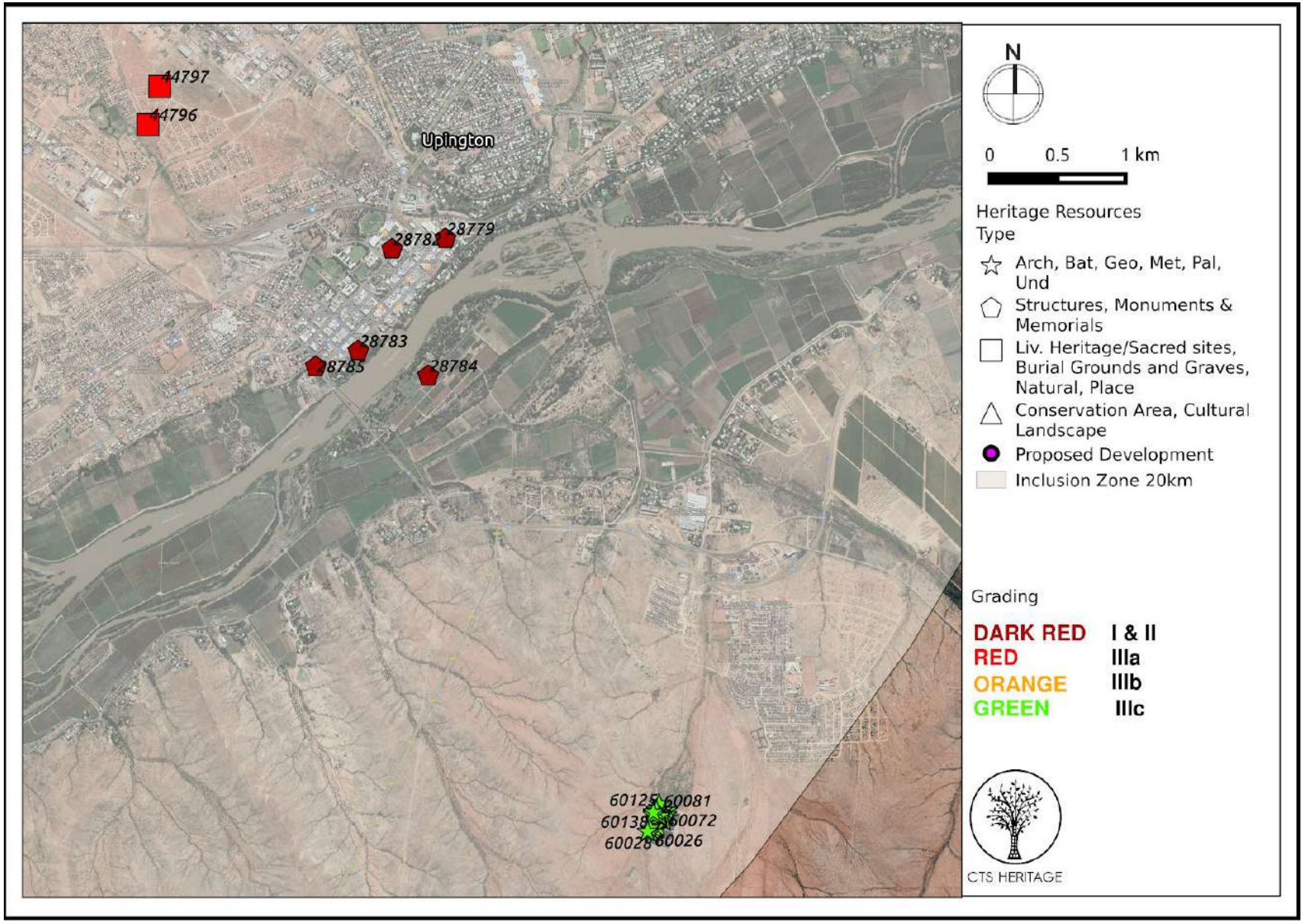

Figure 3b. Heritage Resources Map.

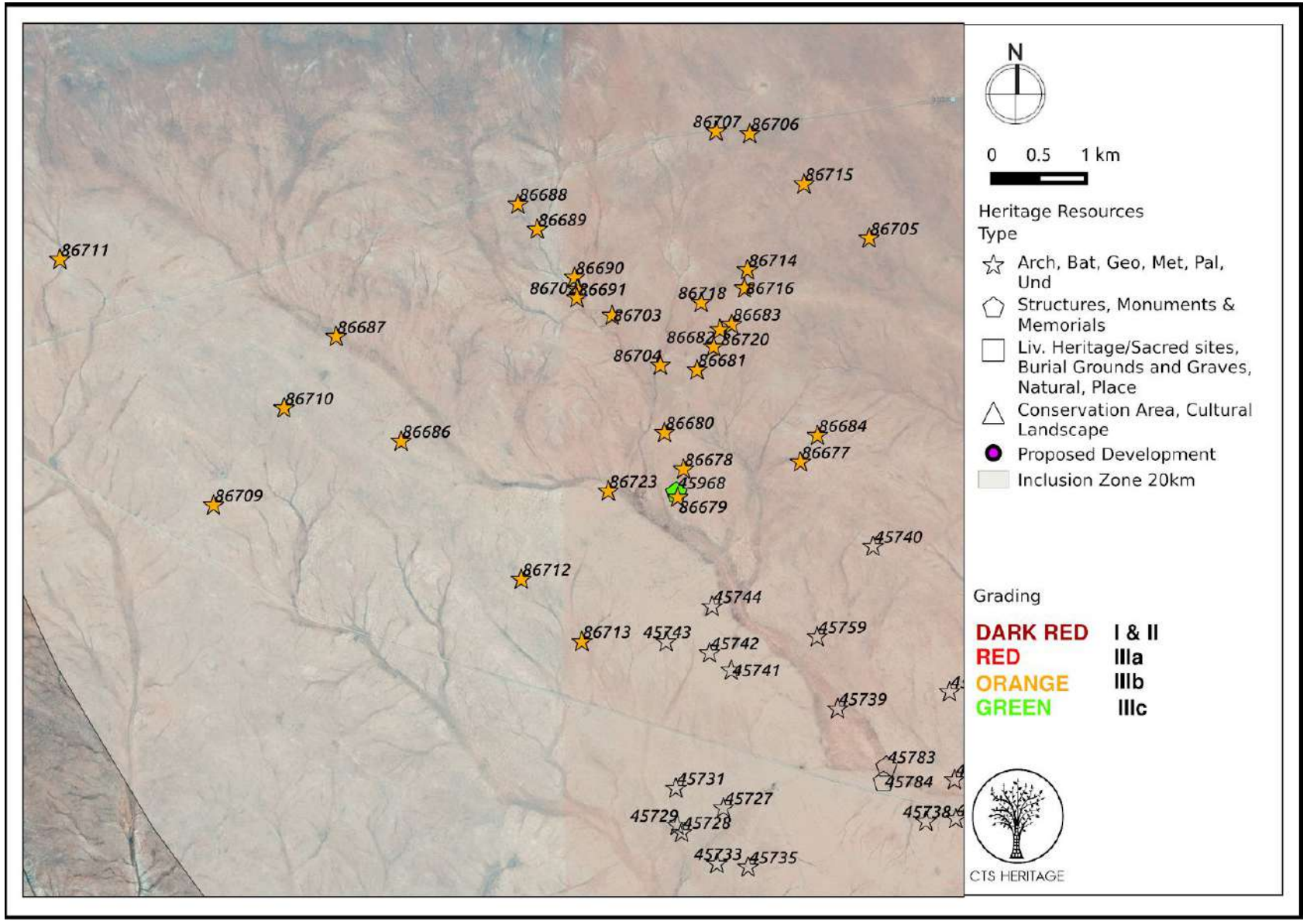

Figure 3c. Heritage Resources Map.

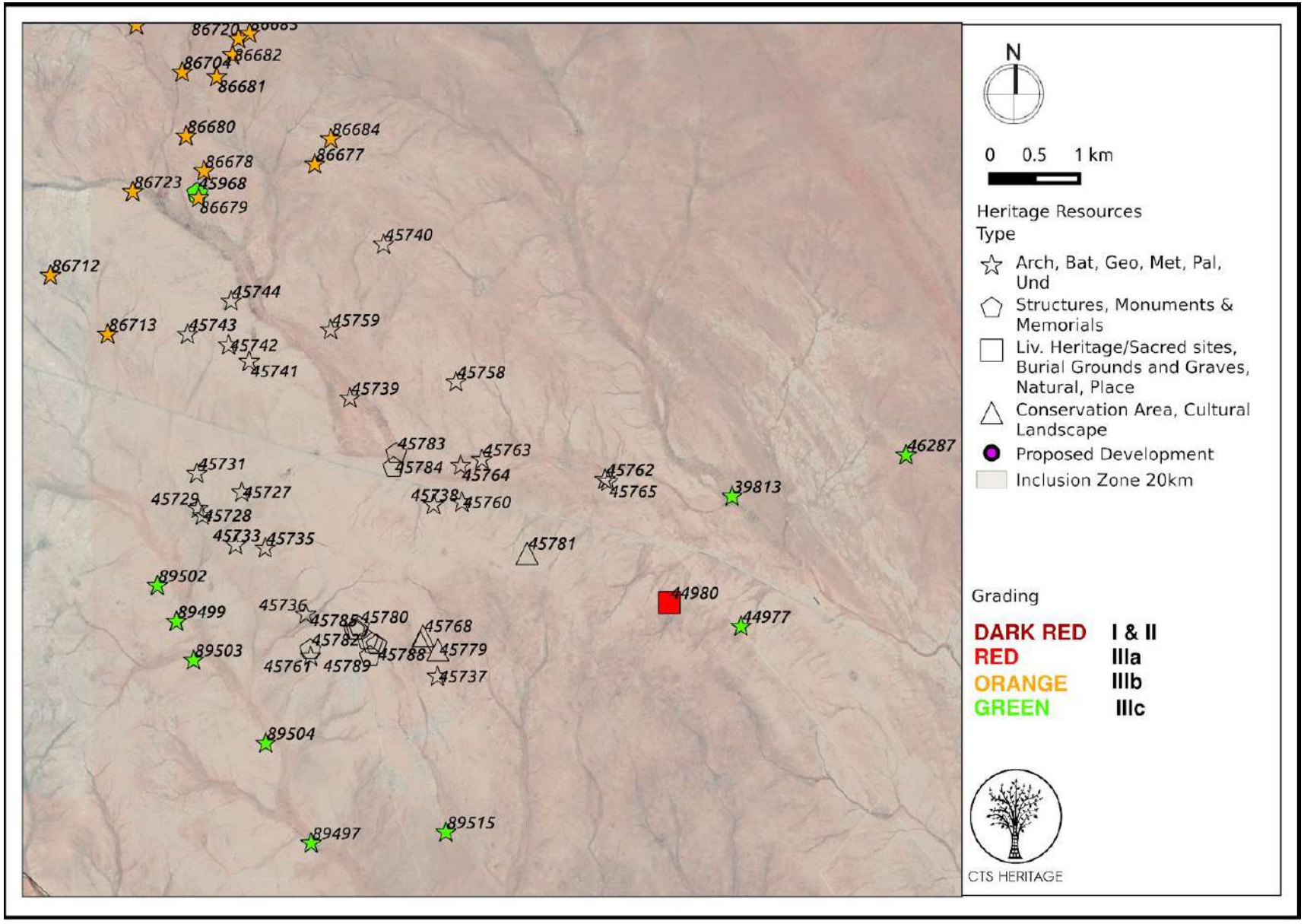

Figure 3d. Heritage Resources Map.

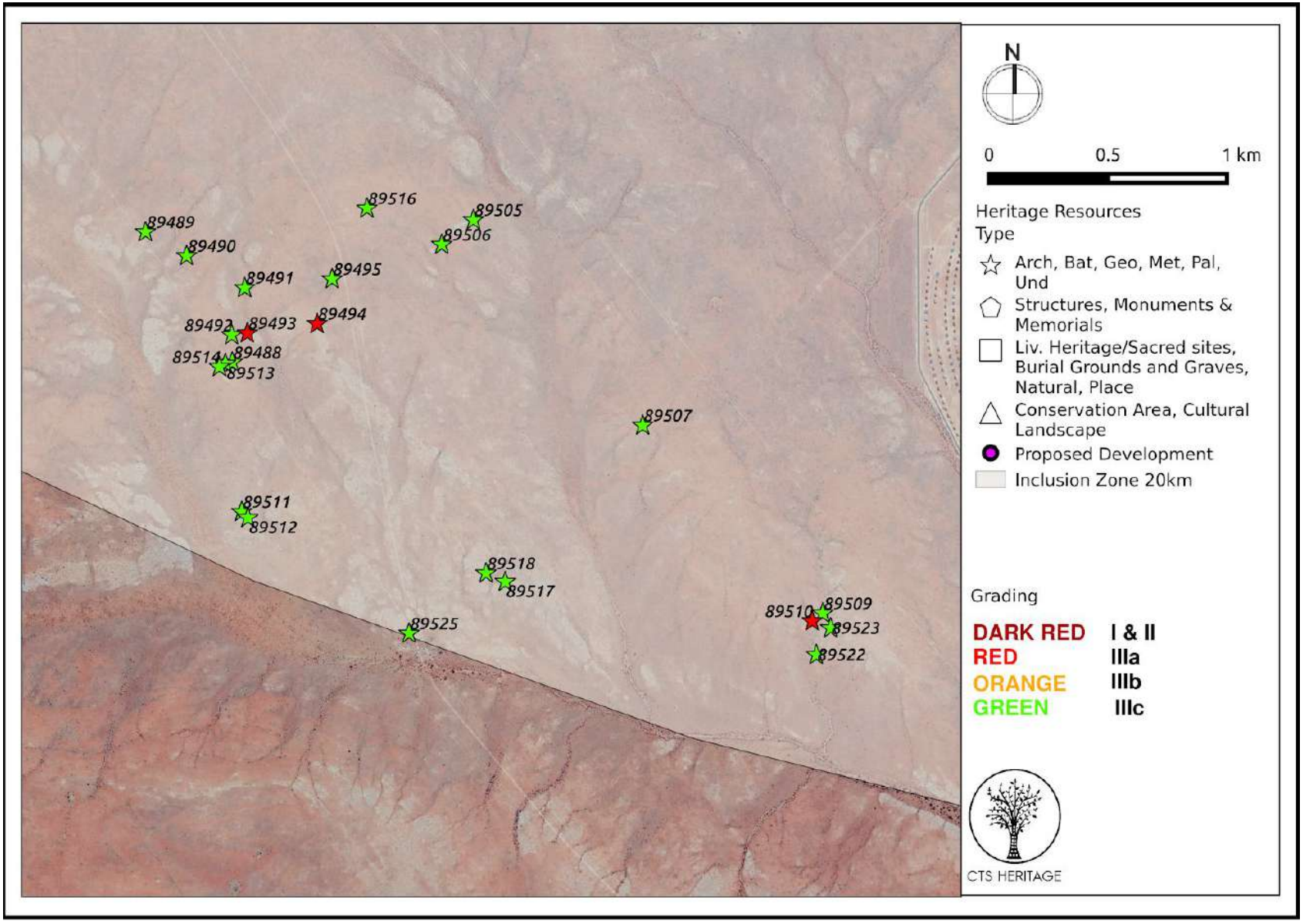

Figure 3e. Heritage Resources Map.

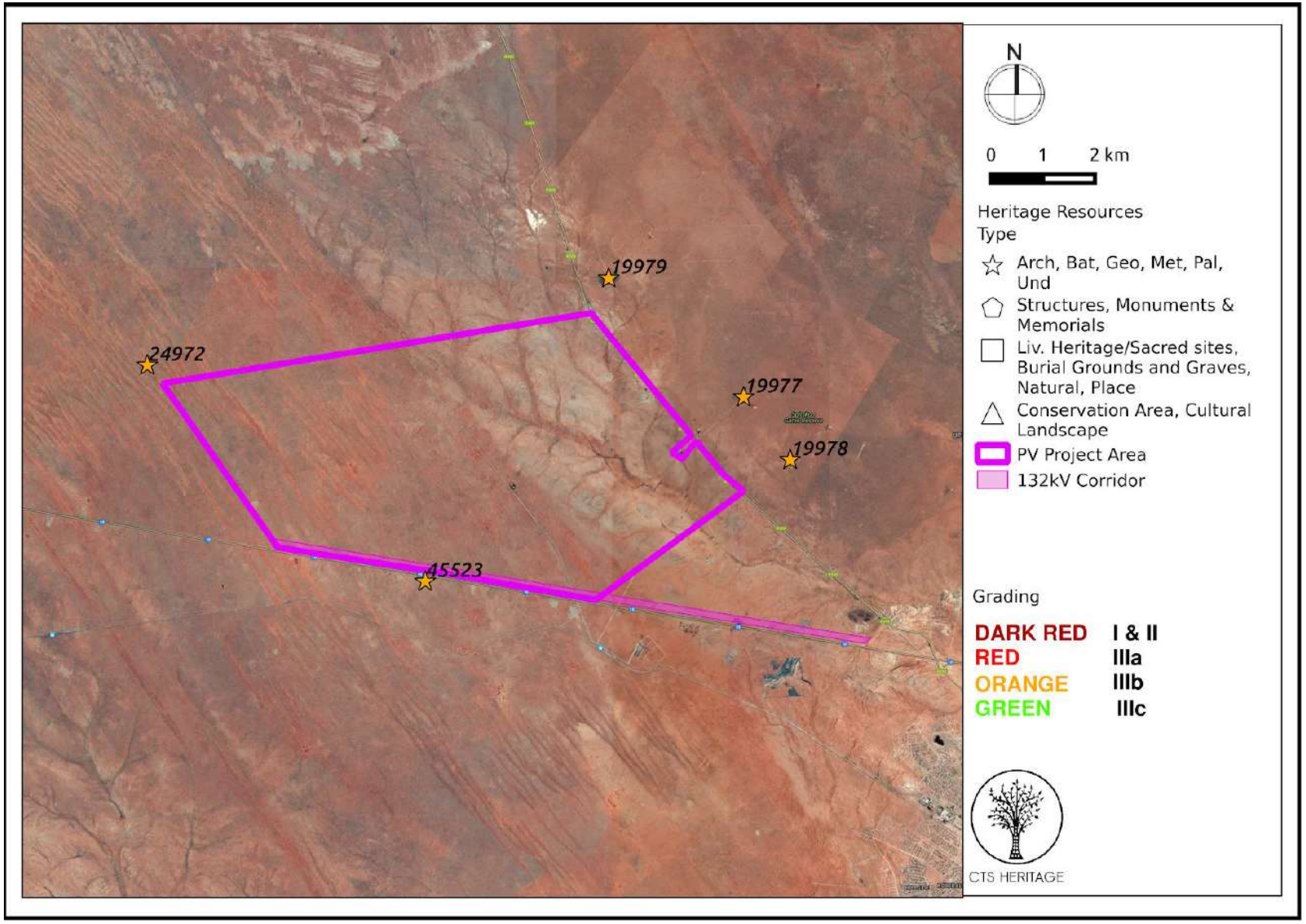

Figure 3f. Heritage Resources Map.

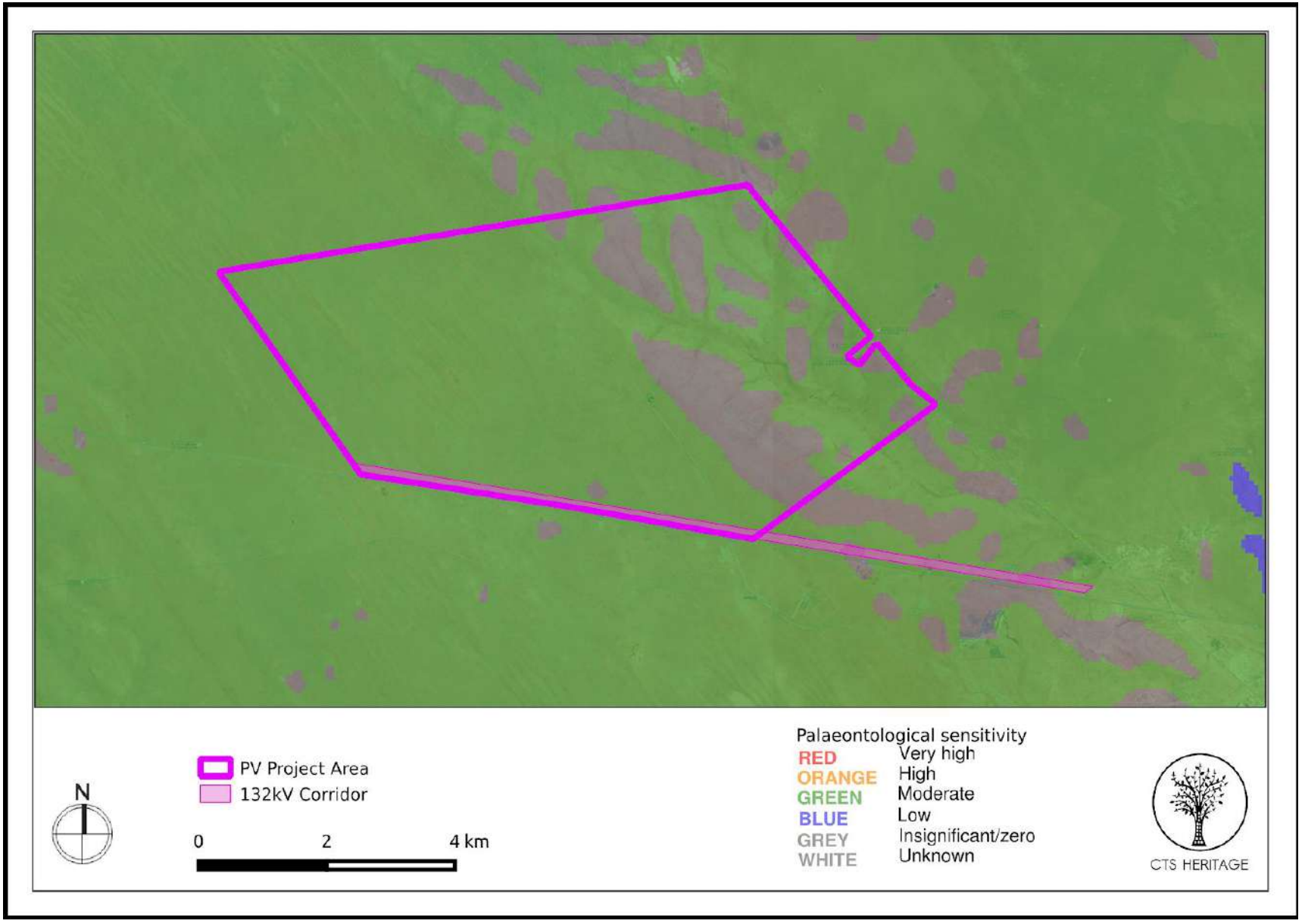

Figure 4. Palaeosensitivity Map. Indicating varied fossil sensitivity underlying the study area. Please See Appendix 3 for full guide to the legend.

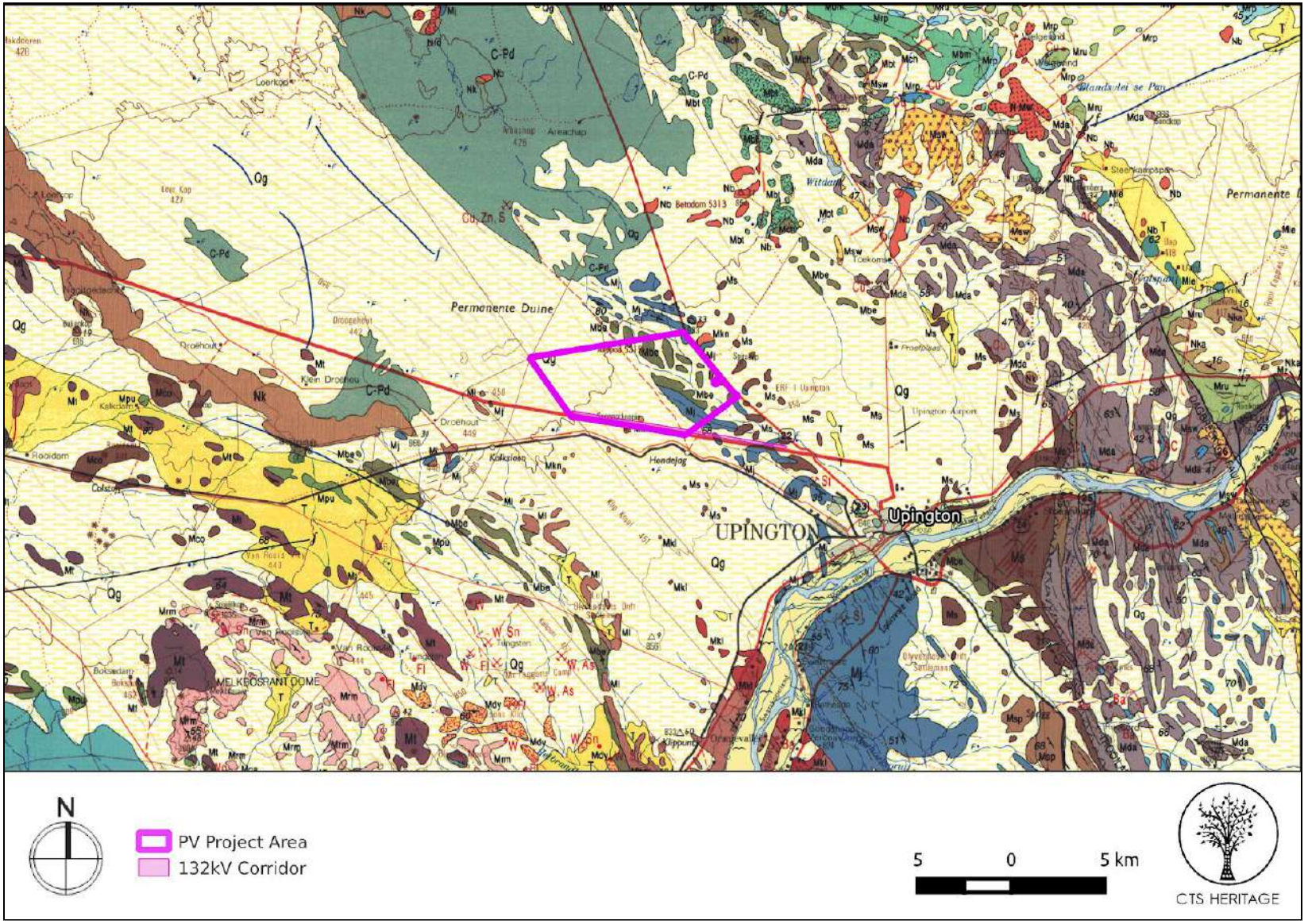

Figure 5.1 Extract from the 1:50 000 Geological Map of South Africa: Council of GeoScience Map 2820

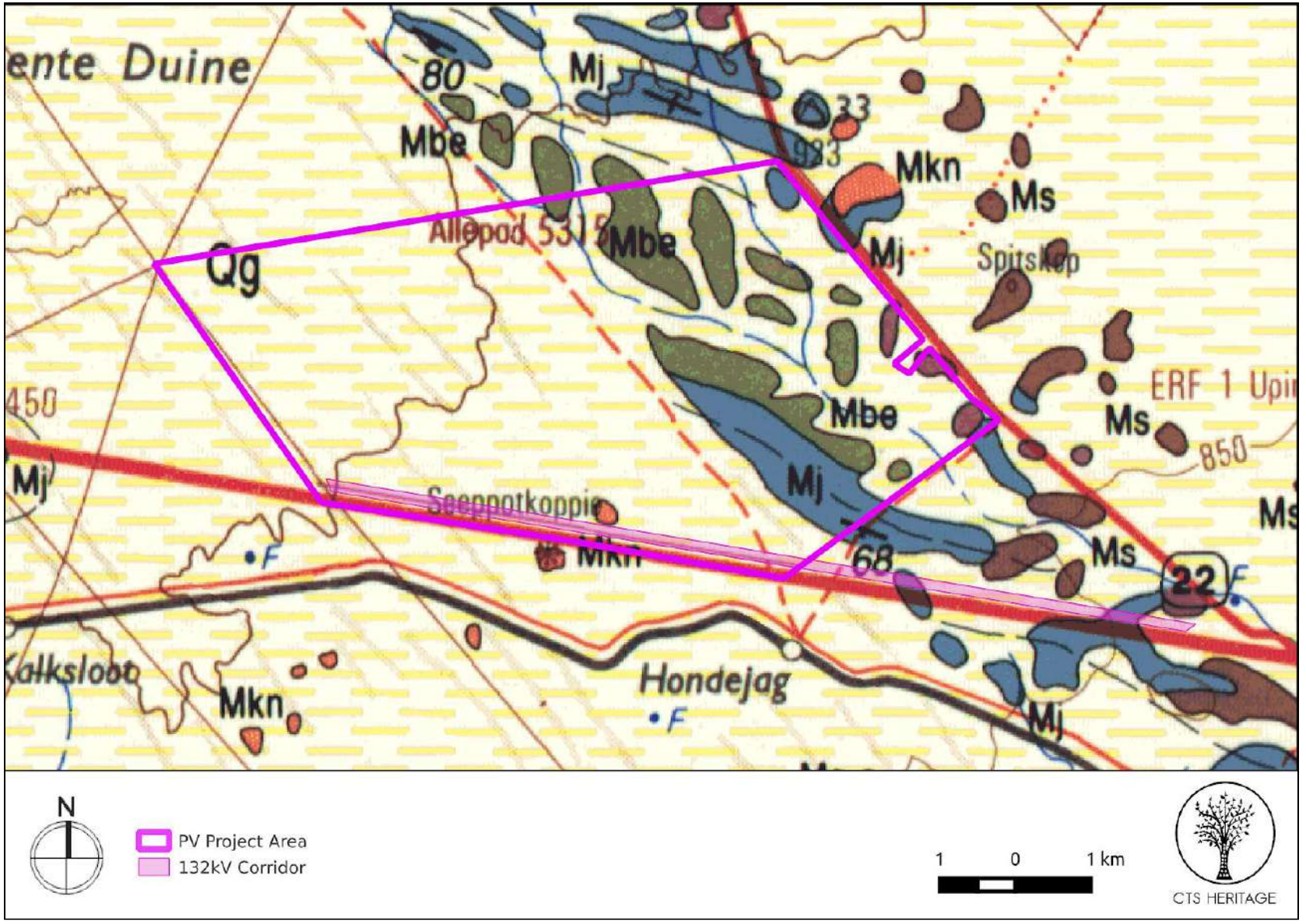

Figure 5.2 Extract from the 1:50 000 Geological Map of South Africa: Council of GeoScience Map 2820 Zoomed in. [Qg: Gordonia Formation (Quarternary coversands) Mbe: Bethesda Formation Mj: Jannelsepan Formation Mkn: Keimoes Formation Ms: Straussburg Granite]

8. Heritage statement and character of the area

Allepad Solar 3, a commercial solar PV energy generation facility and associated infrastructure, is proposed on a site near Upington, in the Northern Cape Province. The project is proposed on a portion of the Remaining Extent of Erf 5315, located approximately 11km north-west of Upington. The area under investigation is approximately 3 889ha in extent and comprises a single agricultural property. The project site can be accessed directly via the N10 national road which borders the southern boundary of the site. The purpose of this Scoping Report is to determine the main issues and potential impacts of the proposed project during the Scoping phase at a desktop level based on existing information.

Cultural Landscape

According to Van Schalkwyk (2014 SAHRIS NID 170520), "The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a pre-colonial (stone age) component and a later colonial (farmer) component. This rural landscape has always been sparsely populated. The second component is an urban one, consisting of a number of smaller towns, most of which developed during the last 150 years or less." According to Von Vollenhoven (2012 SAHRIS NID 117902), "the environment of the area is mostly undisturbed although it is being used for sheep farming... The natural topography… is reasonably flat, but in the north-west a hill dominates the area resulting in an even slope up to the crest. This area also is very rocky. The stones here are dark in colour and may be of a basaltic origin. However in the flat areas adjacent to the hill the rocks are white coloured and most likely are soft calcrete, which would not have been suitable for the manufacture of stone tools. Different non-perennial streams run through the area…" According to Fourie's assessment of the impacts of similar infrastructure in this area (2014), due to the landscape's topography the solar park infrastructure will be prominent in the landscape and alter the rural appearance. Due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

Archaeology and the Built Environment

Many farm portions in the immediate vicinity of the area proposed for development have been assessed in terms of impacts to heritage resources (Figure 2). It has been found that the area surrounding Upington has a rich historical and archaeological past (Fourie, 2014 SAHRIS NID 174335). Based on the outcomes of these assessments, it is noted that most of the heritage resources identified are stone age artefact scatters of varying significance. In Fourie's assessment (2014), the field work identified numerous areas where low density scatters of Middle and Later Stone Age lithics were found. As no context and *in situ* preservation were identified these sites were graded as having low heritage significance. In addition, one possible herder site was identified during the survey. No other material or deposits were identified but does not exclude the possibility of subsurface material. The ruins of old mining infrastructure were also identified. In Von Vollenhoven's assessment (2012 SAHRIS NID 117902), he identified a number of very interesting and significant rock art engravings depicting various animals including giraffes and an aardvark. In addition, he identified a significant historical site known as the "Rebellion Tree" as well as graves associated with farmers in this area.

Five sites of moderate local significance are located just beyond the border of the proposed development area (Figure 3f). These sites are highlighted in orange in Appendix 1. Site 24972 is linked to Von Vollenhoven's (2012) report and may well be the location of the rock art engravings described above. Site 45523 is described as consisting of ostrich egg shell fragments and stone flakes scattered around the base of a hill in low densities. Flakes are micro lithic supporting an ascription to the LSA utilising quartzite as raw material. A lead sealed bully beef can was also found here dated to the late 1800's or early 1900's. Sites 19977 to 19979 describe Middle Stone Age artefact scatter sites. In addition, there is a historical structure located within the development area of unknown heritage significance.

Based on the available information, it is likely that the proposed development will impact on significant archaeological resources such as Stone Age artefact scatters, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the development phase and disturbance during the operational phase. (see impact tables below).

Palaeontology

According to the SAHRIS Palaeosensitivity Map (Figure 4), the extract from the CGS Sheet 2820 Figure 5.1 and 5.2) , this area is underlain by the Gordonia Formation (Quarternary coversands of moderate palaeontological sensitivity), the Bethesda Formation, the Jannelsepan Formation, the Keimoes Formation and the Straussburg Granite, all of which have zero palaeontological sensitivity. The primary risk associated with impacts to palaeontological heritage is related to impacting fossils preserved within the Quarternary coversands of the Gordonia Formation (wind-blown alluvial sands). According to Almond's assessment for similar infrastructure development in this area (2011 SAHRIS NID 174335), "overall impact significance of the proposed solar park development is likely to be LOW because: Most of the study area is underlain by unfossiliferous igneous and metamorphic basement rocks (granites, gneisses etc.) or mantled by superficial sediments (wind-blown sands, alluvium etc.) of low palaeontological sensitivity; Extensive, deep excavations are unlikely to be involved in this sort of solar park project. Significant negative impacts on local fossil heritage are therefore unlikely to result from the proposed solar park development and in the author's opinion no further specialist palaeontological studies for this project are necessary."

As such, and for the same reasons, it is anticipated that the proposed development will not impact on significant palaeontological heritage and therefore no further assessment of impacts to palaeontological heritage is recommended.

Cumulative Impacts

Of the 29 Heritage Assessments conducted within 20km of the proposed development area (Appendix 2), 8 are for Solar Energy/PV Facilities and 3 are for electrical infrastructure. The remaining assessments relate to mining infrastructure and residential township developments. At this stage, there is the potential for the cumulative impact of proposed solar energy facilities to negatively impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial, however, due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

RECOMMENDATION:

The heritage resources in the area proposed for development are not sufficiently recorded.

Based on the available information, including the scale and nature of the proposed development, it is likely that significant heritage resources will be impacted by the proposed development and as such it is recommended that an archaeological field assessment be conducted to inform a full Heritage Impact Assessment.

9. Scoping Assessment Impact Table

Impact

- Impact to archaeological and built environment resources
- Impact to palaeontological resources
- Impact to Cultural Landscape
- Cumulative Impact

Desktop Sensitivity Analysis of the Site

- Impact to significant archaeological resources such as Stone Age artefact scatters, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the development phase and disturbance during the operational phase.
- Impacts to palaeontological resources are unlikely.
- There is the potential for the cumulative impact of proposed solar energy facilities to negatively impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial, however, due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact to significant archaeological resources such as Stone Age artefact scatters, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the development phase and disturbance during the operational phase.	Destruction of significant archaeological and other heritage resources resources	Local scale with broader impacts to scientific knowledge	To be identified through the field assessment.

Gaps in knowledge & recommendations for further study

The heritage resources in the area proposed for development are not sufficiently recorded.

Based on the available information, including the scale and nature of the proposed development, it is likely that significant heritage resources will be impacted by the proposed development and as such it is recommended that an **archaeological field assessment** be conducted to inform a full Heritage Impact Assessment. This field assessment will identify all heritage resources of significance within the development footprint, map them and grade them in terms of their significance. This will inform the Heritage Impact Assessment which will clarify the impacts anticipated and provide mitigation measures, recommendations and possible no-go zones, as well as an assessment of the proposed alternatives.

CTS HERITAGE

APPENDIX 1

List of heritage resources within the 20km Inclusion Zone

Site ID	Site no	Full Site Name	Site Type	Grading
89491	DYA004	DYASON'S KLIP 454/004	Artefacts	Grade IIIc
89492	DYA005	DYASON'S KLIP 454/005	Artefacts	Grade IIIc
89494	DYA007	DYASON'S KLIP 454/007	Artefacts	Grade IIIa
89495	DYA008	DYASON'S KLIP 454/008	Artefacts	Grade IIIc
89499	DYA010	DYASON'S KLIP 454/010	Artefacts	Grade IIIc
89502	DYA011	DYASON'S KLIP 454/011	Artefacts	Grade IIIc
89503	DYA012	DYASON'S KLIP 454/012	Artefacts	Grade IIIc
89504	DYA013	DYASON'S KLIP 454/013	Artefacts	Grade IIIc
89505	DYA014	DYASON'S KLIP 454/014	Artefacts	Grade IIIc
89506	DYA015	DYASON'S KLIP 454/015	Artefacts	Grade IIIc
89507	DYA016	DYASON'S KLIP 454/016	Artefacts	Grade IIIc
89509	DYA018	DYASON'S KLIP 454/018	Artefacts	Grade IIIc
89510	DYA019	DYASON'S KLIP 454/019	Artefacts	Grade IIIa
89511	DYA020	DYASON'S KLIP 454/020	Artefacts	Grade IIIc
89512	DYA021	DYASON'S KLIP 454/021	Artefacts	Grade IIIc
89514	DYA023	DYASON'S KLIP 454/023	Artefacts	Grade IIIc
89515	DYA024	DYASON'S KLIP 454/024	Artefacts	Grade IIIc
89516	DYA025	DYASON'S KLIP 454/025	Artefacts	Grade IIIc
89517	DYA026	DYASON'S KLIP 454/026	Artefacts	Grade IIIc
89518	DYA027	DYASON'S KLIP 454/027	Artefacts	Grade IIIc
89522	DYA031	DYASON'S KLIP 454/031	Artefacts	Grade IIIc
89488	DYA001	DYASON'S KLIP 454/001	Artefacts	Grade IIIc

89489	DYA002	DYASON'S KLIP 454/002	Artefacts	Grade IIIc
89490	DYA003	DYASON'S KLIP 454/003	Artefacts	Grade IIIc
89493	DYA006	DYASON'S KLIP 454/006	Artefacts	Grade IIIa
89497	DYA009	DYASON'S KLIP 454/009	Artefacts	Grade IIIc
89513	DYA022	DYASON'S KLIP 454/022	Artefacts	Grade IIIc
89523	DYA032	DYASON'S KLIP 454/032	Artefacts	Grade IIIc
128444	ACP001	Areachap 001	Structures	Grade IIIc
128445	ACP002	Areachap 002	Artefacts	Grade IIIc
128446	ACP003	Areachap 003	Artefacts	Grade IIIc
128447	ACP004	Areachap 004	Artefacts	Grade IIIc
128448	ACP005	Areachap 005	Artefacts	Grade IIIc
128449	ACP006	Areachap 006	Artefacts	Grade IIIc
128450	ACP007	Areachap 007	Artefacts	Grade IIIc
128452	ACP008	Areachap 008	Artefacts	Grade IIIc
128453	ACP009	Areachap 009	Artefacts	Grade IIIc
128455	ACP010	Areachap 010	Artefacts	Grade IIIc
128456	ACP011	Areachap 011	Artefacts	Grade IIIc
128458	ACP012	Areachap 012	Artefacts	Grade IIIc
128459	ACP013	Areachap 013	Artefacts	Grade IIIc
128460	ACP014	Areachap 014	Artefacts	Grade IIIc
128461	ACP015	Areachap 015	Artefacts	Grade IIIc
128463	ACP016	Areachap 016	Artefacts	Grade IIIc
128464	ACP017	Areachap 017	Artefacts	Grade IIIc
128465	ACP018	Areachap 018	Artefacts	Grade IIIc
128467	ACP019	Areachap 019	Artefacts	Grade IIIc

128468	ACP020	Areachap 020	Artefacts	Grade IIIc
128470	ACP021	Areachap 021	Artefacts	Grade IIIc
128471	ACP022	Areachap 022	Artefacts	Grade IIIc
128472	ACP023	Areachap 023	Artefacts	Grade IIIc
128473	ACP024	Areachap 024	Artefacts	Grade IIIc
128474	ACP025	Areachap 025	Artefacts	Grade IIIc
128475	ACP026	Areachap 026	Artefacts	Grade IIIc
128476	ACP027	Areachap 027	Artefacts	Grade IIIc
128477	ACP028	Areachap 028	Artefacts	Grade IIIc
128479	ACP029	Areachap 029	Artefacts	Grade IIIc
128480	ACP030	Areachap 030	Artefacts	Grade IIIc
86704	SASOL019	SASOL CSP 019	Artefacts	Grade IIIb
86705	SASOL020	SASOL CSP 020	Artefacts	Grade IIIb
86706	SASOL021	SASOL CSP 021	Artefacts	Grade IIIb
86707	SASOL022	SASOL CSP 022	Artefacts	Grade IIIb
86709	SASOL024	SASOL CSP 024	Artefacts	Grade IIIb
86710	SASOL025	SASOL CSP 025	Artefacts	Grade IIIb
86711	SASOL026	SASOL CSP 026	Artefacts	Grade IIIb
86712	SASOL027	SASOL CSP 027	Artefacts	Grade IIIb
28784	9/2/032/0015	Palm Tree Avenue, The Island, Upington	Building	Grade II
28785	9/2/032/0016	Old Watermill, Upington	Building	Grade II
28782	9/2/032/0017	Cathedral of St Augustine, Le Roux Street, Upington	Building	Grade II
28783	9/2/032/0018	Museum Complex, 4 Schroder Street, Upington	Building	Grade II
28779	9/2/032/0019	Dutch Reformed Church, Schroder Street, Upington	Building	Grade II
86713	SASOL028	SASOL CSP 028	Artefacts	Grade IIIb

86714	SASOL029	SASOL CSP 029	Artefacts	Grade IIIb
86715	SASOL030	SASOL CSP 030	Artefacts	Grade IIIb
86716	SASOL031	SASOL CSP 031	Artefacts	Grade IIIb
86718	SASOL032	SASOL CSP 032	Artefacts	Grade IIIb
86720	SASOL033	SASOL CSP 033	Artefacts	Grade IIIb
45727	ROOI001	Rooipunt 001	Artefacts	Grade IV
45728	ROOI002	Rooipunt 002	Artefacts	Grade IV
45729	ROOI003	Rooipunt 003	Artefacts	Grade IV
45731	ROOI004	Rooipunt 004	Artefacts	Grade IV
45733	ROOI005	Rooipunt 005	Artefacts	Grade IV
45735	ROOI006	Rooipunt 006	Artefacts	Grade IV
45736	ROOI007	Rooipunt 007	Artefacts	Grade IV
45737	ROOI008	Rooipunt 008	Artefacts	Grade IV
45738	ROOI009	Rooipunt 009	Artefacts	Grade IV
45739	ROOI010	Rooipunt 010	Artefacts	Grade IV
45740	ROOI011	Rooipunt 011	Artefacts	Grade IV
45741	ROOI012	Rooipunt 012	Artefacts	Grade IV
45742	ROOI013	Rooipunt 013	Artefacts	Grade IV
45743	ROOI014	Rooipunt 014	Artefacts	Grade IV
45744	ROOI015	Rooipunt 015	Artefacts	Grade IV
86723	SASOL034	SASOL CSP 034	Artefacts	Grade IIIb
45758	ROOI016	Rooipunt 016	Artefacts	Grade IV
45759	ROOI017	Rooipunt 017	Artefacts	Grade IV
45760	ROOI018	Rooipunt 018	Artefacts	Grade IV
45761	ROOI019	Rooipunt 019	Artefacts	Grade IV

45762	ROOI020	Rooipunt 020	Artefacts	Grade IV
45523	VRV01	Van Rooys Vlei 01	Artefacts	Grade IIIb
45763	ROOI021	Rooipunt 021	Artefacts	Grade IV
45764	ROOI022	Rooipunt 022	Artefacts	Grade IV
45765	ROOI023	Rooipunt 023	Stone walling	Grade IV
45766	ROOI024	Rooipunt 024	Structures	Grade IV
45767	ROOI025	Rooipunt 025	Conservation Area	Grade IV
45768	ROOI026	Rooipunt 026	Conservation Area	Grade IV
45779	ROOI027	Rooipunt 027	Conservation Area	Grade IV
45780	ROOI028	Rooipunt 028	Structures	Grade IV
45781	ROOI029	Rooipunt 029	Conservation Area	Grade IV
45782	ROOI030	Rooipunt 030	Structures	Grade IV
45783	ROOI031	Rooipunt 031	Structures	Grade IV
45784	ROOI032	Rooipunt 032	Structures	Grade IV
45785	ROOI033	Rooipunt 033	Structures	Grade IV
45786	ROOI034	Rooipunt 034	Structures	Grade IV
45787	ROOI035	Rooipunt 035	Structures	Grade IV
45788	ROOI036	Rooipunt 036	Structures	Grade IV
45789	ROOI037	Rooipunt 037	Structures	Grade IV
19979	SPITZ3	Spitzkop 3	Artefacts	Grade IIIb
46287	OLYV01	OLYVENHOUTS DRIFT 01	Artefacts	Grade IIIc
45968	SASOL001	SASOL CSP 001	Structures	Grade IIIc
86677	SASOL002	SASOL CSP 002	Artefacts	Grade IIIb
86678	SASOL003	SASOL CSP 003	Artefacts	Grade IIIb
44977	UP08	Upington 08	Artefacts	Grade IIIc

86679	SASOL004	SASOL CSP 004	Artefacts	Grade IIIb
86680	SASOL005	SASOL CSP 005	Artefacts	Grade IIIb
44980	UP09	Upington 09	Burial Grounds & Graves	Grade IIIa
86681	SASOL006	SASOL CSP 006	Artefacts	Grade IIIb
86682	SASOL007	SASOL CSP 007	Artefacts	Grade IIIb
86683	SASOL008	SASOL CSP 008	Artefacts	Grade IIIb
86684	SASOL009	SASOL CSP 009	Artefacts	Grade IIIb
60026	LOUI01	Louisevale 01	Artefacts	Grade IIIc
60028	LOUI02	Louisevale 02	Artefacts	Grade IIIc
60030	LOUI03	Louisevale 03	Artefacts	Grade IIIc
60032	LOUI04	Louisevale 04	Artefacts	Grade IIIc
60034	LOUI05	Louisevale 05	Artefacts	Grade IIIc
60036	LOUI06	Louisevale 06	Artefacts	Grade IIIc
60038	LOUI07	Louisevale 07	Artefacts	Grade IIIc
39813	SOA001	Solar-Aries 001	Artefacts	Grade IIIc
60040	LOUI08	Louisevale 08	Artefacts	Grade IIIc
39814	SOA002	Solar-Aries 002	Living Heritage/Sacred sites	Grade IIIc
60044	LOUI10	Louisevale 10	Artefacts	Grade IIIc
60042	LOUI09	Louisevale 09	Artefacts	Grade IIIc
44796	DAKOTA01	Dakota Drive, Upington 01	Artefacts, Burial Grounds & Graves	Grade IIIa
60070	LOUI11	Louisevale 11	Artefacts	Grade IIIc
60072	LOUI12	Louisevale 12	Artefacts	Grade IIIc
60074	LOUI13	Louisevale 13	Artefacts	Grade IIIc

44797	DAKOTA02	Dakota Drive, Upington 02	Burial Grounds & Graves	Grade IIIa
60075	LOUI14	Louisevale 14	Artefacts	Grade IIIc
60077	LOUI15	Louisevale 15	Artefacts	Grade IIIc
60079	LOUI16	Louisevale 16	Artefacts	Grade IIIc
60081	LOUI17	Louisevale 17	Artefacts	Grade IIIc
60083	LOUI18	Louisevale 18	Artefacts	Grade IIIc
60085	LOUI19	Louisevale 19	Artefacts	Grade IIIc
60086	LOUI20	Louisevale 20	Artefacts	Grade IIIc
60125	LOUI22	Louisevale 22	Artefacts	Grade IIIc
60127	LOUI23	Louisevale 23	Artefacts	Grade IIIc
86688	SASOL013	SASOL CSP 013	Artefacts	Grade IIIb
60129	LOUI24	Louisevale 24	Artefacts	Grade IIIc
60137	LOUI27	Louisevale 27	Artefacts	Grade IIIc
60143	LOUI31	Louisevale 31	Artefacts	Grade IIIc
89525	DYA033	DYASON'S KLIP 454/033	Artefacts	Grade IIIc
60140	LOUI29	Louisevale 29	Artefacts	Grade IIIc
60133	LOUI25	Louisevale 25	Artefacts	Grade IIIc
86689	SASOL014	SASOL CSP 014	Artefacts	Grade IIIb
86690	SASOL015	SASOL CSP 015	Artefacts	Grade IIIb
60124	LOUI21	Louisevale 21	Artefacts	Grade IIIc
60135	LOUI26	Louisevale 26	Artefacts	Grade IIIc
86691	SASOL016	SASOL CSP 016	Artefacts	Grade IIIb
19978	SPITZ2	Spitzkop 2	Artefacts	Grade IIIb
60138	LOUI28	Louisevale 28	Artefacts	Grade IIIc
19977	SPITZ1	Spitzkop 1	Artefacts	Grade IIIb

60145	LOUI30	Louisevale 30	Artefacts	Grade IIIc
86686	SASOL011	SASOL CSP 011	Artefacts	Grade IIIb
86687	SASOL012	SASOL CSP 012	Artefacts	Grade IIIb
7820	2830BD 317		Ruin > 100 years	Grade IIIb
86702	SASOL017	SASOL CSP 017	Artefacts	Grade IIIb
86703	SASOL018	SASOL CSP 018	Artefacts	Grade IIIb
24972	Van Roois Vley	Van Roois Vlei Stone Age sites	Artefacts	Grade IIIb

APPENDIX 2

Reference List

Heritage Impact Assessments

Nid	Report Type	Author/s	Date	Title
4101	AIA Phase 1	Peter Beaumont	22/10/2005	Archaeological Impact Assessment at and in the Vicinity of a Quartzite Quarry on Portion 4 of the Farm Droogehout 442 near Upington
4103	AIA Phase 1	Cobus Dreyer	10/03/2006	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Concentrated Solar Thermal Plant (Csp) at the Farms Olyvenhouts Drift, Upington, Bokpoort 390 and Tampansrus 294/295, Groblershoop, Northern Cape
4123	AIA Phase 1	Peter Beaumont	01/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Residential Development Flanking Dakota Drive in Upington, //Khara Hais Municipality, Northern Cape Province
4124	AIA Phase 1	Peter Beaumont	24/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension of the Rosedale Settlement in Upington, //Khara Hais Municipality, Northern Cape Province
4130	AIA Phase 1	Peter Beaumont	16/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension of the Louisvaleweg Township, //Khara Hais Municipality, Northern Cape Province
4131	AIA Phase 1	Peter Beaumont	18/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Township Extension Flanking Keimoesweg, //Khara Hais Municipality, Northern Cape Province
4132	AIA Phase 1	Peter Beaumont	18/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension Flanking Rondomstraat, //Khara Hais

				Municipality, Northern Cape Province
4133	AIA Phase 1	Peter Beaumont	19/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Township Extension Flanking Lemoendraai in Upington, //Khara Hais Municipality, Northern Cape Province
4134	AIA Phase 1	Peter Beaumont	19/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Industrial Area Expansion at Laboria, //Khara Hais Municipality, Northern Cape Province
4136	AIA Phase 1	Peter Beaumont	22/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension of Kalksloot Settlement, Siyanda District Municipality, Northern Cape
7841	AIA Phase 1	Peter Beaumont	17/08/2006	Phase 1 Heritage Impact Assessment Report on a Planned Extension of the Rosedale Township, //Khara Hais Municipality, Northern Cape Province
8366	AIA Phase 1	Karen Van Ryneveld	27/10/2005	Cultural Resources Management Impact Assessment: (Portion of) Areachap 426, Upington District, Northern Cape, South Africa
111142	HIA Phase 1	Johnny Van Schalkwyk	01/03/2012	Heritage Impact Assessment for the Proposed Development of an Agri-estate on the Farm Melkstroom East of Upington, Gordonia Magisterial District, Northern Cape Province
117902	HIA Phase 1	Anton van Vollenhoven	25/05/2012	A REPORT ON A HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED SASOL CSP PROJECT NEAR UPINGTON IN THE NORTHERN CAPE PROVINCE
119309	HIA Phase 1	Stephan Gaigher	10/10/2012	HERITAGE IMPACT ASSESSMENT REPORT Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province
124405	Heritage Impact Assessment Specialist Reports	Stephan Gaigher	29/10/2013	Heritage Impact Assessment Report for the Proposed Sirius Solar Project near Upington in the Northern Cape Province
124406	Palaeontological Specialist Reports	JF Durand	02/04/2013	Palaeontology Scoping Report
128281	Heritage Scoping	David Morris	30/07/2013	RE Capital 3 Solar Development on the property Dyasons Klip west of Upington, Northern Cape: Scoping phase Heritage Input
131589	Heritage Impact	Stephan Gaigher	22/02/2013	Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province

	Assessment Specialist Reports			
158920	AIA Phase 1	David Morris	01/02/2013	RE Capital 3 Solar Development on the property Dyasons Klip west of Upington, Northern Cape: Archaeological Impact Assessment – proposed 'central' development footprint
159068	PIA Phase 1	John E Almond	07/03/2014	PALAEONTOLOGICAL HERITAGE BASIC ASSESSMENT: DESKTOP STUDY Proposed RE Capital 3 Solar Development on the property Dyason's Klip near Upington , Northern Cape
159203	Heritage Impact Assessment Specialist Reports	Johnny Van Schalkwyk	11/03/2014	Cultural Heritage Impact Assessment Proposed Township development of Erf 1, UPINGTON, //KHARA HAIS MUNICIPALITY
159293	HIA Phase 1	Johnny Van Schalkwyk	12/03/2014	Cultural Heritage Impact Assessment for proposed township development, Louisvaleweg, UPINGTON
160008	HIA Phase 1	Johnny Van Schalkwyk	15/03/2014	Cultural Heritage Impact Assessment for the proposed township development, Paballelo, Upington, //Khara Hais Municipality
161427	HIA Phase 1	Stephan Gaigher	15/04/2014	Proposed Establishment of Several Electricity Distribution Lines within the Northern Cape Province
166079	HIA Phase 1	Johnny Van Schalkwyk	12/03/2014	Proposed extension of Dakota Road, Upington
170520	Heritage Scoping	Johnny Van Schalkwyk	01/01/2014	Heritage Impact Assessment Report for the proposed 1GW Upington Solar Park within the // Khara Hais Municipality, Northern Cape Province
174335	HIA Phase 1	Wouter Fourie	24/03/2014	Heritage Impact Assessment for the proposed Solar Power Park for SolarReserve SA (Pty) Ltd, Farm Rooipunt 617, Gordonia RD, Siyanda District Municipal Region, Northern Cape.
289187	Heritage Scoping	Jaco van der Walt	01/06/2015	Heritage Scoping Report for the proposed Bloemsmond Solar 1 and Solar 2 PV Project, Keimoes, NC Province

CTS HERITAGE

APPENDIX 3 - Keys/Guides

Key/Guide to Acronyms

AIA	Archaeological Impact Assessment
DARD	Department of Agriculture and Rural Development (KwaZulu-Natal)
DEA	Department of Environmental Affairs (National)
DEADP	Department of Environmental Affairs and Development Planning (Western Cape)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism (Eastern Cape)
DEDECT	Department of Economic Development, Environment, Conservation and Tourism (North West)
DEDT	Department of Economic Development and Tourism (Mpumalanga)
DEDTEA	Department of economic Development, Tourism and Environmental Affairs (Free State)
DENC	Department of Environment and Nature Conservation (Northern Cape)
DMR	Department of Mineral Resources (National)
GDARD	Gauteng Department of Agriculture and Rural Development (Gauteng)
HIA	Heritage Impact Assessment
LEDET	Department of Economic Development, Environment and Tourism (Limpopo)
MPRDA	Mineral and Petroleum Resources Development Act, no 28 of 2002
NEMA	National Environmental Management Act, no 107 of 1998
NHRA	National Heritage Resources Act, no 25 of 1999
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
VIA	Visual Impact Assessment

Full guide to Palaeosensitivity Map legend

	RED:	VERY HIGH - field assessment and protocol for finds is required
	ORANGE/YELLOW:	HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely
	GREEN:	MODERATE - desktop study is required
	BLUE/PURPLE:	LOW - no palaeontological studies are required however a protocol for chance finds is required
	GREY:	INSIGNIFICANT/ZERO - no palaeontological studies are required
	WHITE/CLEAR:	UNKNOWN - these areas will require a minimum of a desktop study.

CTS HERITAGE

APPENDIX 4 - Methodology

The Heritage Screener summarises the heritage impact assessments and studies previously undertaken within the area of the proposed development and its surroundings. Heritage resources identified in these reports are assessed by our team during the screening process.

The heritage resources will be described both in terms of **type**:

- Group 1: Archaeological, Underwater, Palaeontological and Geological sites, Meteorites, and Battlefields
- Group 2: Structures, Monuments and Memorials
- Group 3: Burial Grounds and Graves, Living Heritage, Sacred and Natural sites
- Group 4: Cultural Landscapes, Conservation Areas and Scenic routes

and **significance** (Grade I, II, IIIa, b or c, ungraded), as determined by the author of the original heritage impact assessment report or by formal grading and/or protection by the heritage authorities.

Sites identified and mapped during research projects will also be considered.

DETERMINATION OF THE EXTENT OF THE INCLUSION ZONE TO BE TAKEN INTO CONSIDERATION

The extent of the inclusion zone to be considered for the Heritage Screener will be determined by CTS based on:

- the size of the development,
- the number and outcome of previous surveys existing in the area
- the potential cumulative impact of the application.

The inclusion zone will be considered as the region within a maximum distance of 50 km from the boundary of the proposed development.

DETERMINATION OF THE PALAEONTOLOGICAL SENSITIVITY

The possible impact of the proposed development on palaeontological resources is gauged by:

- reviewing the fossil sensitivity maps available on the South African Heritage Resources Information System (SAHRIS)
- considering the nature of the proposed development
- when available, taking information provided by the applicant related to the geological background of the area into account

DETERMINATION OF THE COVERAGE RATING ASCRIBED TO A REPORT POLYGON

Each report assessed for the compilation of the Heritage Screener is colour-coded according to the level of coverage accomplished. The extent of the surveyed coverage is labeled in three categories, namely low, medium and high. In most instances the extent of the map corresponds to the extent of the development for which the specific report was undertaken.

Low coverage will be used for:

- desktop studies where no field assessment of the area was undertaken;
- reports where the sites are listed and described but no GPS coordinates were provided.
- older reports with GPS coordinates with low accuracy ratings;
- reports where the entire property was mapped, but only a small/limited area was surveyed.
- uploads on the National Inventory which are not properly mapped.

Medium coverage will be used for

- reports for which a field survey was undertaken but the area was not extensively covered. This may apply to instances where some impediments did not allow for full coverage such as thick vegetation, etc.
- reports for which the entire property was mapped, but only a specific area was surveyed thoroughly. This is differentiated from low ratings listed above when these surveys cover up to around 50% of the property.

High coverage will be used for

- reports where the area highlighted in the map was extensively surveyed as shown by the GPS track coordinates. This category will also apply to permit reports.

RECOMMENDATION GUIDE

The Heritage Screener includes a set of recommendations to the applicant based on whether an impact on heritage resources is anticipated. One of three possible recommendations is formulated:

(1) The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.

This recommendation is made when:

- enough work has been undertaken in the area
- it is the professional opinion of CTS that the area has already been assessed adequately from a heritage perspective for the type of development proposed

(2) The heritage resources and the area proposed for development are only partially recorded - The surveys undertaken in the area have not adequately captured the heritage resources and/or there are sites which require mitigation or management plans. Further specific heritage work is recommended for the proposed development.

This recommendation is made in instances in which there are already some studies undertaken in the area and/or in the adjacent area for the proposed development. Further studies in a limited HIA may include:

- improvement on some components of the heritage assessments already undertaken, for instance with a renewed field survey and/or with a specific specialist for the type of heritage resources expected in the area
- compilation of a report for a component of a heritage impact assessment not already undertaken in the area

- undertaking mitigation measures requested in previous assessments/records of decision.

(3) The heritage resources within the area proposed for the development have not been adequately surveyed yet - Few or no surveys have been undertaken in the area proposed for development. A full Heritage Impact Assessment with a detailed field component is recommended for the proposed development.

Note:
The responsibility for generating a response detailing the requirements for the development lies with the heritage authority. However, since the methodology utilised for the compilation of the Heritage Screeners is thorough and consistent, contradictory outcomes to the recommendations made by CTS should rarely occur. Should a discrepancy arise, CTS will immediately take up the matter with the heritage authority to clarify the dispute.

The compilation of the Heritage Screener will not include any field assessment. The Heritage Screener will be submitted to the applicant within 24 hours from receipt of full payment. **If the 24-hour deadline is not met by CTS, the applicant will be refunded in full.**

CTS HERITAGE

APPENDIX 4: Specialist CVs and Declaration of Independence

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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

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

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

PROJECT TITLE

Allepad PV Three, 100MW photovoltaic (PV) solar energy generation facility and associated infrastructure near Upington, Northern Cape Province

Kindly note the following:

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

Departmental Details

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

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

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

1. SPECIALIST INFORMATION

Specialist Company Name:	CTS Heritage			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	
Specialist name:	Jenna Lavin			
Specialist Qualifications:	MSc Archaeology, MPhil Conservation of BE (incomplete)			
Professional affiliation/registration:	ASAPA, APHP			
Physical address:	34 Harries Street, Plumstead			
Postal address:	34 Harries Street, Plumstead			
Postal code:	7801	Cell:	083 619 0854	
Telephone:	087 073 5739	Fax:		
E-mail:	Jenna.lavin@ctsheritage.com			

2. DECLARATION BY THE SPECIALIST

I, ____Jenna Lavin_____, declare that –

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

Signature of the Specialist

CTS Heritage

Name of Company:

10 October 2018

Date

CURRICULUM VITAE

Jenna Lavin

Tel: 083 619 0854 (c)
E-mail address: jenna.lavin@gmail.com
ID number: 8512050014089

Address: 7 Carey Street, Woodstock, cape Town

EDUCATION:

Tertiary

2014	M.Phil in Conservation of the Built Environment (University of Cape Town) - Not completed as of 2017
2011	Continued Professional Development Course in Urban Conservation Management (University of Cape Town) Part I and Part II
2010	M.Sc. with Distinction in Archaeology (University of Cape Town) Title: *Palaeoecology of the KBS member of the Koobi Fora Formation: Implications for Pleistocene Hominin Behaviour*.
2007	B.Sc. Honours in Archaeology (University of Cape Town) Title: *The Lost Tribes of the Peninsula: An Investigation into the historical distribution of Chacma baboons (Papio ursinus) at the Cape Peninsula, South Africa.* Koobi Fora Field School, Rutgers University (U.S.A.)/ National Museums of Kenya
2006	B.Sc. Archaeology (University of Cape Town) B.Sc. Environmental and Geographic Science (University of Cape Town)

Secondary

1999-2003	Rustenburg High School for Girls Firsts in English, Afrikaans, Mathematics HG, Biology HG, History HG, Entrepreneurship.

EMPLOYMENT HISTORY:

PROFESSIONAL DEVELOPMENT
Environmental and Heritage Management:

- **Director: Heritage for CTS heritage and member of OpenHeritage NPC.**

July 2016 to present

I am a member of the senior management of the company. I am responsible for project management and quality control on all of our heritage-related projects. I provide specialist heritage expertise when required and assist with the drafting of management plans, impact assessments and other specialist reports. I liaise with clients, authorities and other specialists to ensure the highest quality product from CTS Heritage. I manage the budgets and financial compliance for all our projects and for the business in general. In addition, I manage a specialist team of two archaeologists. We have recently been involved in developing the online map for the National Resistance and Liberation Heritage Route with DAC.

Through OpenHeritage, I have been intimately involved with the development, and successful implementation of, of a digital heritage objects management system for the National Museum in Kenya as well as Tristan da Cuhna.

- **Assistant Director for Policy, Research and Planning at Heritage Western Cape (HWC).**

August 2014 to June 2016

As a member of the management structure of HWC, I was responsible for the drafting of new heritage related policy, the grading and declaration of Provincial Heritage Sites, the development of Conservation Management Plans, facilitating the development of inventories of heritage resources through local authorities as well as managing the development of the Western Cape's Heritage Information Management System (HIMS). I was also responsible for managing the project to nominate the Modern Human Origins proposed World Heritage Site.

I performed the role of Acting Deputy Director for HWC from April to December 2015, including financial management responsibilities, problem solving and the training of new staff.

- **Heritage Officer for Palaeontology and for the Mpumalanga Province at the South African Heritage Resources Agency (SAHRA).**

January 2013 to June 2014

Responsibilities include managing palaeontological permit applications in terms of Section 35 of the NHRA and development applications in terms of Section 38 of the NHRA. Projects included the development of a National Palaeotechnic Report identifying significant palaeontological deposits throughout SA, as well as developing professional relationships between SAHRA and the Palaeontological Society of South Africa (PSSA) and the Geological Society of South Africa (GSSA). During this time, I was part of the team that developed the digitised National Palaeontological Sensitvity Map, the first of its kind in the world.

- **Heritage Officer for Archaeology, Palaeontology and Meteorites at Heritage Western Cape (HWC).**

September 2010 to December 2012

HWC is a Public Entity that forms part of the Heritage Resource Management Component of the Provincial Governments' Department of Cultural Affairs and Sport (DCAS). Projects included the declaration of Pinnacle Point and the West Coast Fossil Park as Provincial Heritage Sites (PHSs), the management of the development of the Baboon Point PHS Conservation Management Plan as well as an educational outreach program as part of the DCAS MOD Centre Project.

- **Heritage Officer for the Archaeology, Palaeontology and Meteorites Unit of the South African Heritage Resources Agency (SAHRA) as part of a three month contract.**

January 2010 to March 2010

- **Environmental Control Officer, Amathemba Environmental Management Consulting**

Part time: 2007 to 2009

Field Work Experience:

2008-2009	Field Assistant, Dr. D. Braun, Elandsfontein Excavation Locality, University of Cape Town (UCT)
	Field Assistant, Dr. D. Braun, Koobi Fora Research Project (Kenya), Rutgers University, New Jersey
2006	Field Assistant, Damiana Ravasi (PhD), Zoology Department, University of Cape Town.
2005	Research Assistant, Dr. Becky Ackerman, Archaeology Department, University of Cape Town
2004	Field Assistant, Prestwich Place Excavation Locality, Archaeology Contracts Office, UCT

Teaching Positions:

2017	Guest Lecturer, South African Heritage Legislation, George Washington University Heritage Management Field School
2016	Guest Lecturer, South African Heritage Legislation, Archaeology Honours Course, University of Cape Town
2015	Guest Lecturer, South African Heritage Legislation, Archaeology Honours Course, University of Cape Town
2014	Guest Lecturer, South African Heritage Legislation, Archaeology Honours Course, University of Cape Town
2013	Guest Lecturer, South African Heritage Legislation, Archaeology Honours Course, University of Cape Town
2010	Teaching Assistant, Langebaanweg Field School, Arizona State University
2009	Demonstrator, Archaeology in Practice, University of Cape Town (AGE3013H)
	Demonstrator, Introduction to Geography, Earth and Environmental Science, University of Cape Town (GEO1009F)
	Teaching Assistant, Koobi Fora Field School (Kenya), Rutgers University, New Jersey
	Lecturer, Introduction to Geography, Earth and Environmental Science: Supplementary Course, University of Cape Town (EGS1004S)
	Demonstrator, Elandsfontein Honours Field School, University of Cape Town (AGE4000W)
2008	Demonstrator, Introduction to Geography, Earth and Environmental Science, University of Cape Town (ERT1000F)
	Demonstrator, Elandsfontein Honours Field School, University of Cape Town (AGE4000W)
	Teaching Assistant, Koobi Fora Field School (Kenya), Rutgers University, New Jersey

Conferences and Papers

2017	ASAPA, Pretoria, RSA: "*Using Heritage Data to Guide Responsible Development: Tools to ensure high quality recording of heritage sites"*
	ICAHM, Bagomoyo, Tanzania: "*OpenHeritage: Development and implementation of national heritage management systems - Lessons from South Africa, Namibia and Kenya"*
2016	ICAHM, Salalah, Oman: "*Straight to the (Baboon) Point: A look at the Conservation of Archaeological Landscapes in South Africa using Baboon Point as a Case Study*"
2015	Leakey Foundation, Sonoma County, San Fransisco, USA: ""*Straight to the (Baboon) Point: A look at the Conservation of Archaeological Landscapes in South Africa using Baboon Point as a Case Study*"
2012	PSSA, Johannesburg, RSA: *"SAHRIS Palaeosensitivity Map - Methodology and Implementation"*

Other

In 2013 I was asked to join the panel of judges for the Ministerial awards for Heritage in the Western Cape. From 2013 to July 2014, I was a member of the Heritage Western Cape Archaeology, Palaeontology and Meteorites Committee and I currently sit on the Heritage Western Cape Inventories, Gradings and Interpretations Committee.

In November 2013, I was awarded a bursary from the Department of Arts and Culture to complete a Masters in Philosophy in Conservation of the Built Environment through the UCT Faculty of Engineering and the Built Environment in 2014 and 2015. I was in the process of finalising this degree in 2017, however the arrival of my son has temporarily halted my progress.

I am a paid up member of the Association for Southern African Professional Archaeologists (ASAPA), the Association of Professional Heritage Practitioners (APHP) and I have been a member of the Executive Council of APHP since 2014.

In June 2017, I was selected as Chair of APHP. I am a member of the Palaeontological Society of South Africa (PSSA) and ICOMOS South Africa, for which I am Vice-President of the Board. I am also a member of the International Committee for Archaeological Heritage Management (ICAHM), a committee of UNESCO.

I am an active participant in a not-for-profit company called OpenHeritage which is dedicated to opening access to heritage resources through digital innovation. To this end, we have been involved in a number of projects including Wikipeadia Training with Africa Centre, the development and implementation of a Collections Management System for the National Museums of Kenya and the development of a digital Inventory of the Vernacular Architecture of the Eastern Cape.

Referees

Mary Leslie
mleslie.za@gmail.com
082 733 2611

Janette Deacon
janette@conjunction.co.za
082 491 5067

Laura Robinson
ctht@hertage.org.za
083 463 4765

Andrew Hall
waitabout191@gmail.com
(Currently based in Oman)

Wendy Black
wblack@iziko.org.za
021 481 3883

PROJECT	PROJECT DESCRIPTION	DURATION
SKA Scoping Project	**Provision of Heritage Specialist Assessment Services for SKA Scoping Phase**	09/2015 - 09/2016
National Liberation & Khoisan Heritage Routes	**Development of online mapping interface to promote national liberation and Khoisan heritage routes**	02/2017 - present
Western Cape Coastal Access Strategy	**Heritage statements describing changing utilisation of Western Cape coast through time**	01/2016 - 02/2017
Robben Island PV Facility	**Heritage survey, Heritage Impact Assessment, monitoring, mapping, report writing**	01/2016 - 02/2017
Stawelklip Rock Art Conservation Management Plan	**Site documentation, stakeholder consultation, CMP compilation, development of signage**	10/2015 - 01/2016
Phillipskop Rock Art Conservation Management Plan	**Site documentation, stakeholder consultation, CMP compilation, development of signage**	04/2016 - 08/2016
Cape Winelands Heritage Inventory	**Data processing, heritage management and mapping services**	08/2016 - 09/2017

CTS Heritage Impact Assessments

HIA Title	Date Completed
HIA: Brakke Kuyl Sand Mine	05/12/2016
HIA: Gouritz Abalone Farm	28/10/2016
HIA: Malmesbury Granite Quarry	28/11/2016
HIA: Expansion of Jacobsbaai Abalone Farm	26/08/2016
HIA: Mutsho Power Project near Makhado	02/02/2017
HIA: Vanrhynsdorp Prospecting	06/03/2017
HIA: Spitskop Power Lines	02/03/2007
Desktop HIA Namakwa Prospecting	21/06/2017
HIA: San Miguel Citrus	26/04/2017
HIA : Ash River Hydro	In process
HIA: 22kv Powerlines Eastern Cape	22/08/2017
HIA: Langa Telecommunications Mast	18/08/2017
HIA: Ouwerf HF Radar Wave Monitoring Antennae	In process

CURRICULUM VITAE

Name: Jonathan Michael Kaplan

Profession: Archaeologist/Heritage Practitioner

Date of Birth: 23-09-1961

Name of Company: Agency for Cultural Resource Management (ACRM)

Position: Director

Nationality: South African

ID Number: 6109235177089

Marital status: Married with two children

Languages:
First language: English
Other: Afrikaans

Contact details: 5 Stuart Road
Rondebosch
7700
Phone/Fax (021) 685 7589
Mobile 082 321 0172
E-mail acrm@wcaccess.co.za

Qualifications:
- MA (Archaeology) University of Cape Town, 1989.

Professional registration:
- Association of Southern African Professional Archaeologists (ASAPA) Membership No. 253
- Registered with the South African Heritage Resources Agency (SAHRA)
- Association of Professional Heritage Practitioners (APHP)

Publications:
- Jerardino, A., Halkett, D., Hart, T., Kaplan, J., Navarro, R, & Nilssen, P. 2016 (in press). Filling-in the gaps and testing past scenarios on the central West Coast: hunter-gatherer subsistence and mobility at 'Deurspring 16' shell midden, Lamberts Bay, South Africa. South African Archaeological Bulletin
- Kaplan, J. & Mitchell, P. 2012. The archaeology of the Lesotho Highlands Water Project Phases 1A and 1 B. South African Humanities 24:1-32. KwaZulu Natal Museum.
- Sealy, J., Maggs, T., Jerardino, A. & Kaplan, J. 2004. Excavations at three shell middens at Melkbosstrand: variability among herder sites on Table Bay. South African Archaeological Bulletin 59:17-28.
- Kaplan, J. 1993. The state of archaeological information in the coastal zone from the Orange River to Ponta do Ouro. Report prepared for the Department of Environmental Affairs and Tourism. Agency for Cultural Resource Management.
- Kaplan, J. 1990. The Umhlatuzana Rock Shelter sequence: 100 000 years of Stone Age history. Natal Museum Journal of Humanities 2:1-94.

- Kaplan, J. 1989. 45 000 years of hunter-gatherer history at Umhlatuzana Rock Shelter: South African Archaeological Society Goodwin Series 6:7-16
- Kaplan, J. 1987. Settlement and Subsistence at Renbaan Cave. In Parkington, J. & Hall, M (Eds). Papers in the Prehistory of the Western Cape, South Africa. British Archaeological Reports International Series 332:237-261

Countries of work experience:
South Africa, Lesotho, Swaziland, Namibia, Botswana, Mozambique

Services offered:
- Archaeological Impact Assessments
- Heritage Impact Assessments
- Heritage Management Plans
- Heritage tourism
- Rock art recording
- Excavation and data analysis
- Monitoring of construction activities

Company profile:
ACRM was founded by Jonathan Kaplan in 1992 and is one of the oldest heritage consultancies in the country. Jonathan has completed more than 1500 Archaeological and Heritage Impact Assessments (HIA & AIAs), specialising in Stone Age, rock art and herder studies. He has undertaken baseline studies on large infrastructure projects, including the Lesotho Highlands Water Project, Maguga Dam (Swaziland), Namibia/Botswana Water Transfer Project, Sasol/ACO Gas Pipeline (South Africa & Mozambique), Corridor Sands (Mozambique) and numerous utility projects for Eskom, the Department of Transport and Public Works, local and provincial authorities, as well as private developers. Since 2010, ACRM has conducted baseline studies (Scoping and full EIA) on a large number of alternative energy (wind and photo-voltaic) projects in the Western and Northern Cape Provinces.

Jonathan has a MA degree in Archaeology (UCT 1989) and is an Association of Southern African Professional Archaeologists (ASAPA) accredited Cultural Resources Management (CRM) practitioner (Membership No 253).

ACRM has been registered since 1992.

Declaration:

I confirm that the above CV is an accurate description of my experience and qualifications.

Signature **Date**: 15 January, 2016

CURRICULUM VITAE: JOHN EDWARD ALMOND

Name:	JOHN EDWARD ALMOND
Profession:	PALAEONTOLOGIST / GEOLOGIST / EDUCATOR
Date of Birth:	27 MAY 1959
Parent Company:	*NATURA VIVA* CC, PO Box 124 10 Mill Street, CAPE TOWN 8010, RSA
Position in Company:	MANAGING MEMBER
Years with Company:	17
Years of experience:	35 (palaeontological and geological research)
Nationality:	UK (RSA Permanent Resident)
HDI Status:	White male
Education:	Dorking County Grammar School, Surrey, UK
	BA (Hons.) Natural Sciences (Zoology), University of Cambridge, 1980
	Part II (Hons.) Natural Sciences (Geology), University of Cambridge, 1981
	PhD (Palaeontology), University of Cambridge, 1986

Professional Qualifications: PhD in Earth Sciences (Palaeontology), University of Cambridge, UK (1986).

Languages:	Reading	Speaking	Writing
English:	Good	Good	Good
German:	Good	Fair	Fair
Spanish:	Good	Fair	Limited
French:	Fair	Limited	Limited
Afrikaans:	Fair	Limited	Limited

- Deutsche Mittelstufeprufung (Goethe-Institut, Schwäbisch-Hall)
- Curso de Espaňol (Superior Alto), Universidad de Salamanca

Membership of Professional Bodies:

- Palaeontological Society of South Africa (PSSA)

- Geological Society of South Africa (Western Cape)
- Association of Heritage Assessment Practitioners (AHAP)

BRIEF SUMMARY OF WORK EXPERIENCE:

1981-1990
- Visiting Scientist to various academic institutions (universities, museums) in the USA, Czech Republic, France, South Africa, Sudan, Germany: palaeontological research (Palaeozoic invertebrates)

1985-1988
- Research Fellow, Corpus Christi College, Cambridge University: palaeontological research (Palaeozoic invertebrates)
- Undergraduate teaching (course supervisor), extra mural lecturing (Workers Educational Association)

1989-1990
- Humboldt Foundation Postdoctoral Research Fellow, University of Tübingen, Germany: palaeontological research (Palaeozoic invertebrates and trace fossils)
- Deutsche Mittelstufeprufung (Goethe-Institut, Schwäbisch-Hall)

1991-1998
- Scientific Officer (Palaeontology), Council for Geoscience, South Africa: palaeontological field work and research in Western and Northern Cape, Namibia (Late Precambrian – Palaeozoic fossil biotas), collaboration with foreign scientists, curation of Bellville fossil collections, member of SACS Biostratigraphy Committee, Chairman of Western Cape Branch of Geological Society of SA
- Adult education (*e.g.* UCT and SA Museum Summer School Programmes)

1998-2000
- Field guide registration and training in South Africa (FGASA, Field Guides Association of South Africa) and Namibia (NATH)
- Curso de Espaňol (Superior Alto), Universidad de Salamanca
- Palaeontological research (Palaeozoic fish and trace fossils)
-

2000-2015
- Establishment of private company *Natura Viva* cc (Cape Town), specializing in natural history excursions, adult educational courses (geology / palaeontology / botany / astronomy / zoology *etc*), public lectures, developing databases for nature reserves - especially in the arid west of southern Africa (RSA, Namibia), palaeontological heritage assessments, palaeontological and geological consultancy
- Development of science educational materials for schools in geology / fossils / evolution: textbooks, teacher training courses (new GET, FET science curricula)
- Scientific research: Late Proterozoic to Palaeozoic invertebrates, trace fossils, fish of RSA and S. Namibia; Mid Palaeozoic glacial events (Cape Supergroup); trace fossils, invertebrates, petrified wood and vertebrate remains, Karoo Supergroup; geobotanical relationships in arid areas (Great and Little Karoo)

- Field supervision of undergraduate geology mapping projects (University of Cambridge)
- Re-organisation of W. Cape fossil collections, Council for Geoscience (Bellville)
- Reviews of regional palaeontological records on a provincial basis (W. Cape, E. Cape, N. Cape) for South African Heritage Resources Agency (SAHRA), Heritage Western Cape (HWC);
- Geological and palaeontological contributions to 1: 250 000 geology sheet explanations for Council for Geoscience (Clanwilliam, Loeriesfontein, Alexander Bay sheets)
- Organization of 15th Biennial Conference of the Palaeontological Society, Matjiesfontein (Laingsburg), September 2008.
- Geological and palaeontological fieldwork in Madagascar with team from the Council for Geoscience (2012)
- Fossil heritage conservation and management in the Cape region, RSA (Archaeology, Palaeontology & Meteorites Committee, Heritage Western Cape); numerous palaeontological heritage assessment studies for developments in Western, Northern and Eastern Cape, Free State, Mpumalanga, Gauteng, Limpopo and Northwest

Selected publications and reviewed research reports

(*excluding* the great majority of palaeontological impact assessment reports):

- ALMOND, J.E. 1985a. The Silurian-Devonian fossil record of the Myriapoda. Philosophical Transactions of the Royal Society, London B309, 227-237, pl. 1.
- ALMOND, J.E. 1985b. A vermiform problematicum from the Dinantian of Foulden, Berwickshire, Scotland. Transactions of the Royal Society of Edinburgh (Earth Sciences) 76, 41-47.
- ALMOND, J.E. 1985c. Les arthropleurides du Stephanien de Montceau-les-Mines, France. Bull. Hist. Soc. nature. Autun 115, 59-60.
- ALMOND, J.E. 1986. Studies on Palaeozoic Arthropoda, 322pp, 21 pls. Unpublished PhD thesis, University of Cambridge, UK.
- WHITTINGTON, H.B. & ALMOND, J.E. 1987. Appendages and habits of the Upper Ordovician trilobite *Triarthrus eatoni*. Philosophical Transactions of the Royal Society, London B317, 1-46, pls. 1-10.
- KLITZSCH, E., ALMOND, J., BARAZI, N., EL HASSAN, A., MANSOUR, N. & SEMTNER, A. 1990. Short note on recently discovered Paleozoic strata of NE Sudan (Red Sea Hills). Berliner geowissenschaftliche Abhandlungen (A) 120.1, 87-88.
- BRIGGS, D.E.G. & ALMOND, J.E. 1994. The arthropleurids from the Stephanian (Late carboniferous) of Montceau-les-Mines (Massif Central,

France). In: Poplin, C. & Heyler, D. (Eds.) Quand le Massif Central était sous l'équateur. Un écosystème carbonifère à Montceau-les-Mines, 127-135. Paris.

- ALMOND, J.E. & EVANS, F.J. 1996. Early - Middle Devonian fish faunas from the Bokkeveld Group, South Africa. Abstracts, 9th Biennial Conference of the Palaeontological Society of South Africa, September 1996, Stellenbosch, 1p.
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