ARCHAEOLOGICAL SPECIALIST STUDY

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

Proposed Development of the Dealesville Solar Projects

Prepared by

CTS HERITAGE

In Association with

Environamics

September 2022

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EXECUTIVE SUMMARY

Notsi PV(Pty) Ltd are interested in developing 10 x 100 MW solar PV facilities and associated infrastructure of an area located on Farm 1623 Ebenhaezer, approximately 16 km south west of the centre of Dealesville in the Free State Province. Each project will include a solar PV facility with standard infrastructure of a PV facility including PV arrays; cabling; inverters; on-site substation and grid connection; battery storage; auxiliary buildings; access and internal roads; temporary laydown areas; and fencing. 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.

The field assessment for the proposed development identified that most of the area under assessment has been previously disturbed through extensive agricultural activity. Stone Age archaeological heritage resources were identified within the area proposed for development, however these were largely in disturbed contexts. One very significant *in situ* archaeological site (DV2) was identified adjacent to the pan site located in the west of the development area. It is important that the proposed PV layouts be amended to avoid impact to this significant site.

Other significant heritage resources identified within the development area are associated with the colonial history of the area. The burial grounds identified within the development area have very high levels of local value due to their substantial social cultural significance. It is important that the burial grounds identified, and their context, are not impacted by the proposed development. Furthermore, it is important that the significant archaeological heritage resources (DV2) and the burial grounds (DV3 and DV5) are pro-actively managed into perpetuity. As such, it is recommended that a Heritage Agreement and Conservation Management Plan be developed for the ongoing management of these resources.

Overall, however, the archaeological sensitivity of the area proposed for development is low except for the sites identified. There is no objection to the proposed development here on condition that the recommendations outlined below are implemented.

Recommendations

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

- A no development buffer area of 100m must be implemented around sites DV2, DV3 and DV5
- A no development buffer area of 20m must be implemented around sites DV1, DV4, DV6, DV7 and DV8
- A Heritage Agreement and Conservation Management Plan be developed for the ongoing management of these resources.
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

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1. INTRODUCTION

1.1 Background Information on Project

Notsi PV(Pty) Ltd are interested in developing 10 x 100 MW solar PV facilities and associated infrastructure of an area located on Farm 1623 Ebenhaezer, approximately 16 km south west of the centre of Dealesville in the Free State Province. Each project will include a solar PV facility with standard infrastructure of a PV facility including PV arrays; cabling; inverters; on-site substation and grid connection; battery storage; auxiliary buildings; access and internal roads; temporary laydown areas; and fencing.

1.2 Description of Property and Affected Environment

The footprint of the proposed Dealesville Solar Projects, and associated infrastructure, is located across several private agricultural camps approximately 20 km southwest of the town of Dealesville, in the grassland biome of the summer rainfall region of the Free State Province, South Africa.

This is a region well-known archaeologically for its abundant paleo-river terraces, springs and seasonal lake pan sites. Water was the common attractor for hominins and fauna to these landscape features and, when eroded through natural or anthropogenic processes, they often yield material remains pertaining to human-environment interactions throughout the Pleistocene, with frequently abundant stone artefacts and fossils. The area surrounding the footprint in question is no exception, and has abundant pans and erosional dongas. Importantly though, only one seasonal pan was identified that encroaches on the footprint itself, which marginally abuts the north-western margin of the potentially affected area. During wetter phases of the Pleistocene, pans tended to support large herbivore communities which were also exploited by foragers attracted to the same water sources. The potentially affected area is ~12 km north of the Modder River – which has reasonably abundant fossiliferous and artefact rich paleo-terraces at certain points - and ~30km west of the world-renowned later Pleistocene fossil and artefact bearing locality of Florisbad.

Where retained and unaffected by agriculture, the natural vegetation within the footprint comprises grassland and shrubland typical of the Free State Grassland Biome, interspersed with marginally denser indigenous foliage along modern seasonal wetland margins in the eastern portions of the area, that also have substantial standing water. Indigenous wildlife is generally sparse due to the area's current use for cattle and other stock farming, but game is more abundant in the areas that retain more extensive coverage of indigenous vegetation. Smaller antelope (such as Duiker and Steenbok), abundant indigenous fowl including francolin, spurfowl and guineafowl , as well as some traces of burrowing rodents (molerats, hares and meerkats) were documented in the project footprint.

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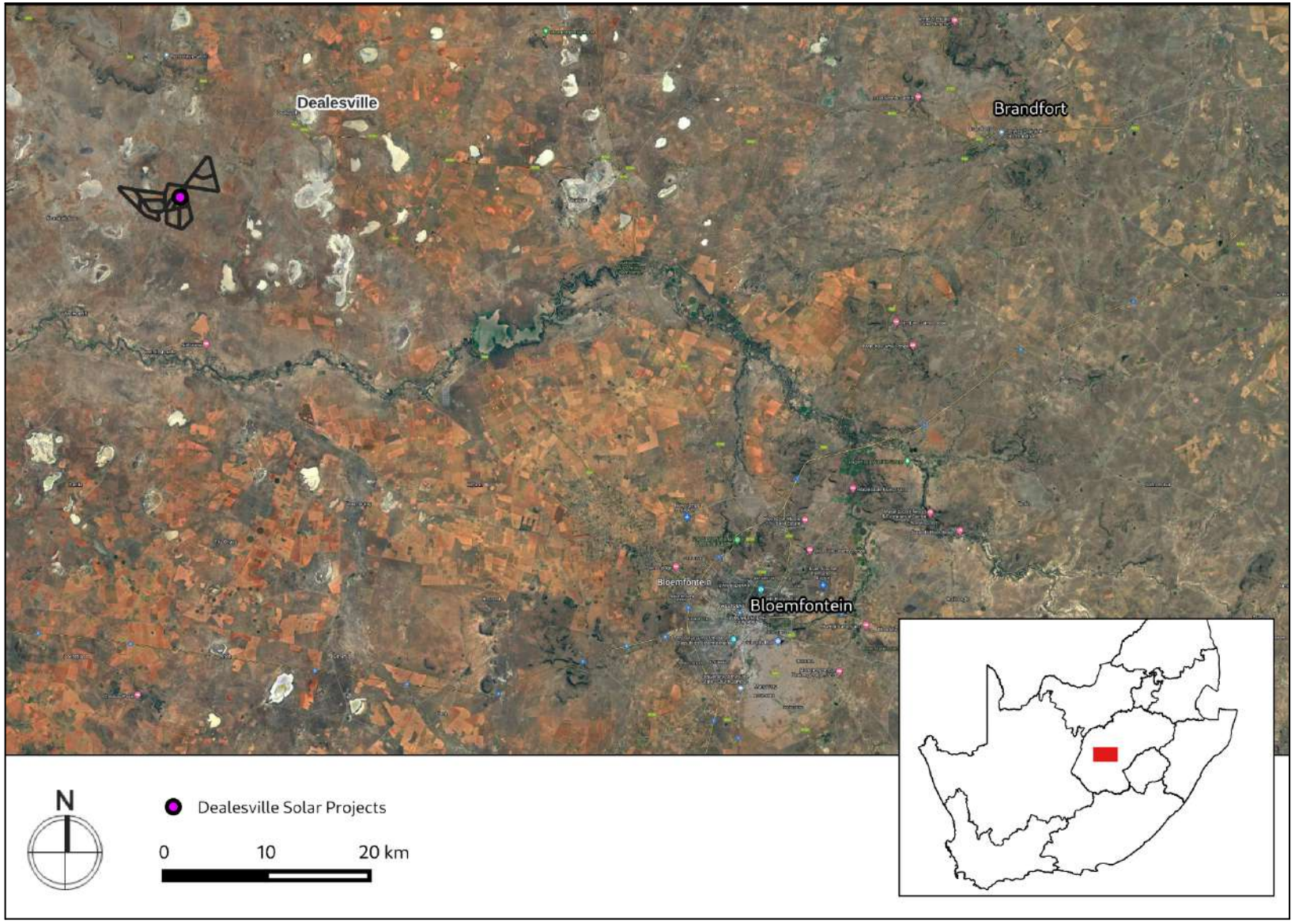

Figure 1.1: Close up satellite image indicating proposed location of study area

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Figure 1.2: Study Area

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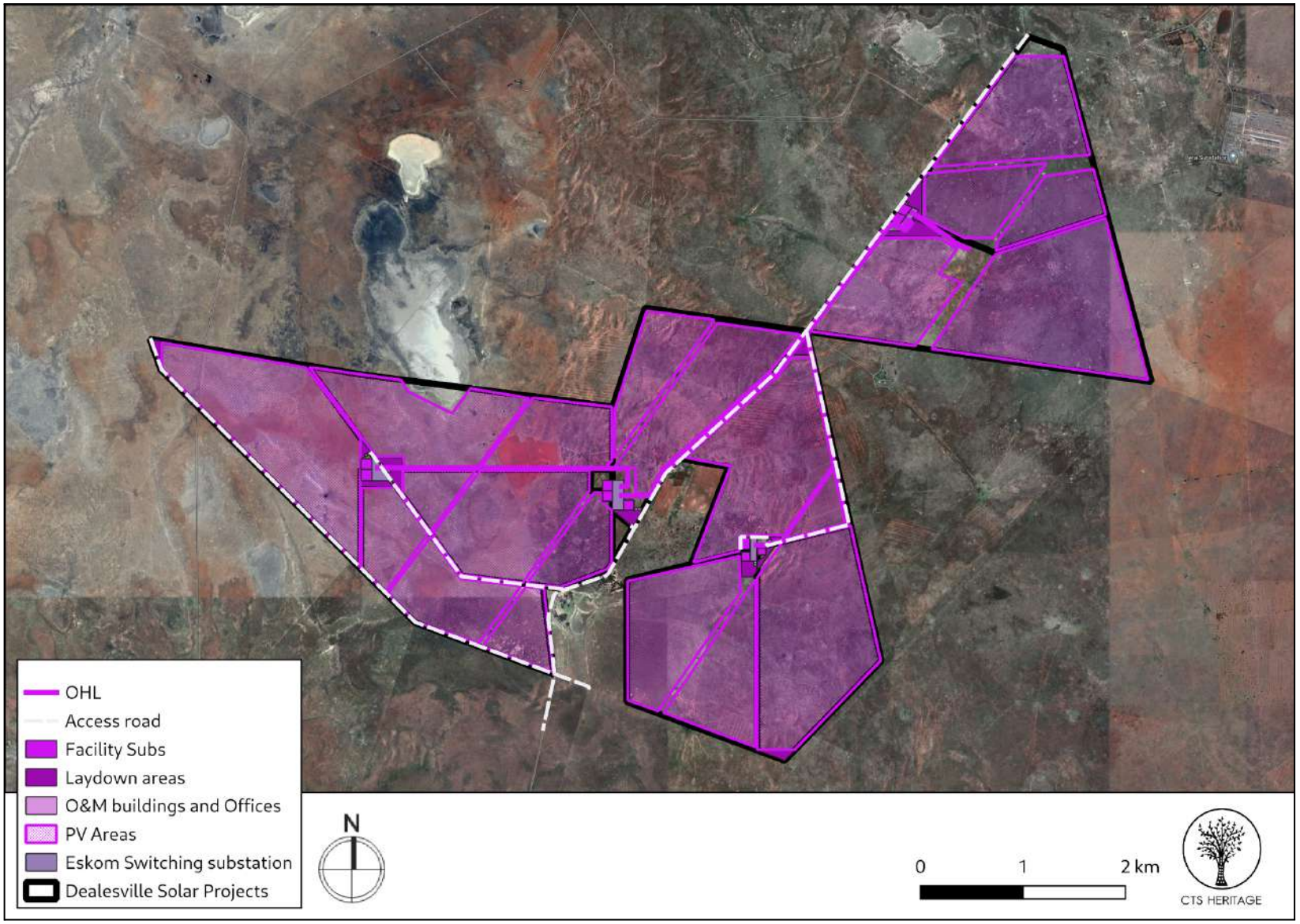

Figure 1.3: Study Area - proposed layout

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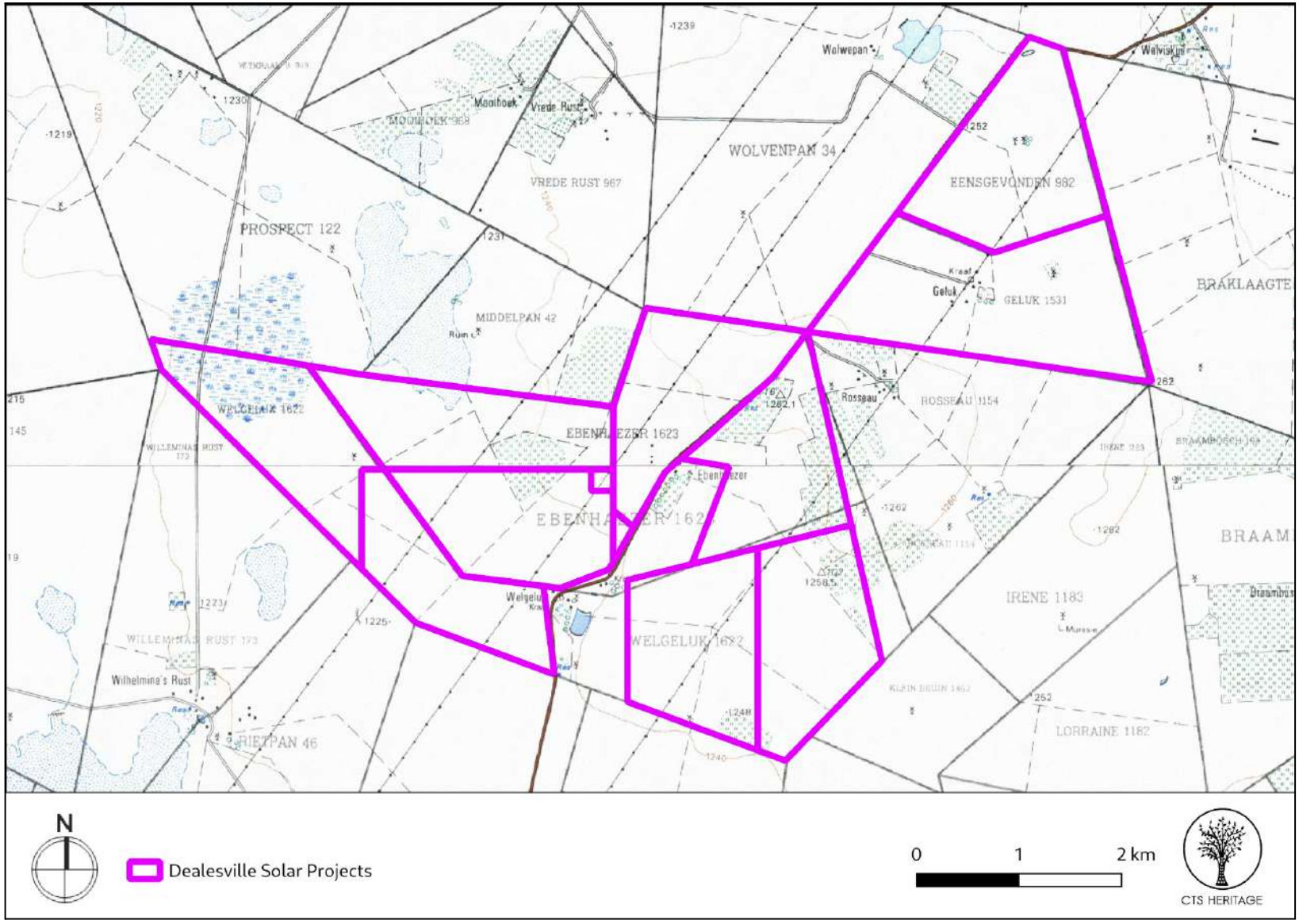

Figure 1.4: Study Area reflected on the 1:50 000 Topo Map

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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 12 to 14 August 2022 to determine what archaeological resources are likely to be impacted by the proposed development.
- The study area was assessed on foot in transects, photographs of the context and finds were taken, and tracks were recorded using a GPS.
- 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.

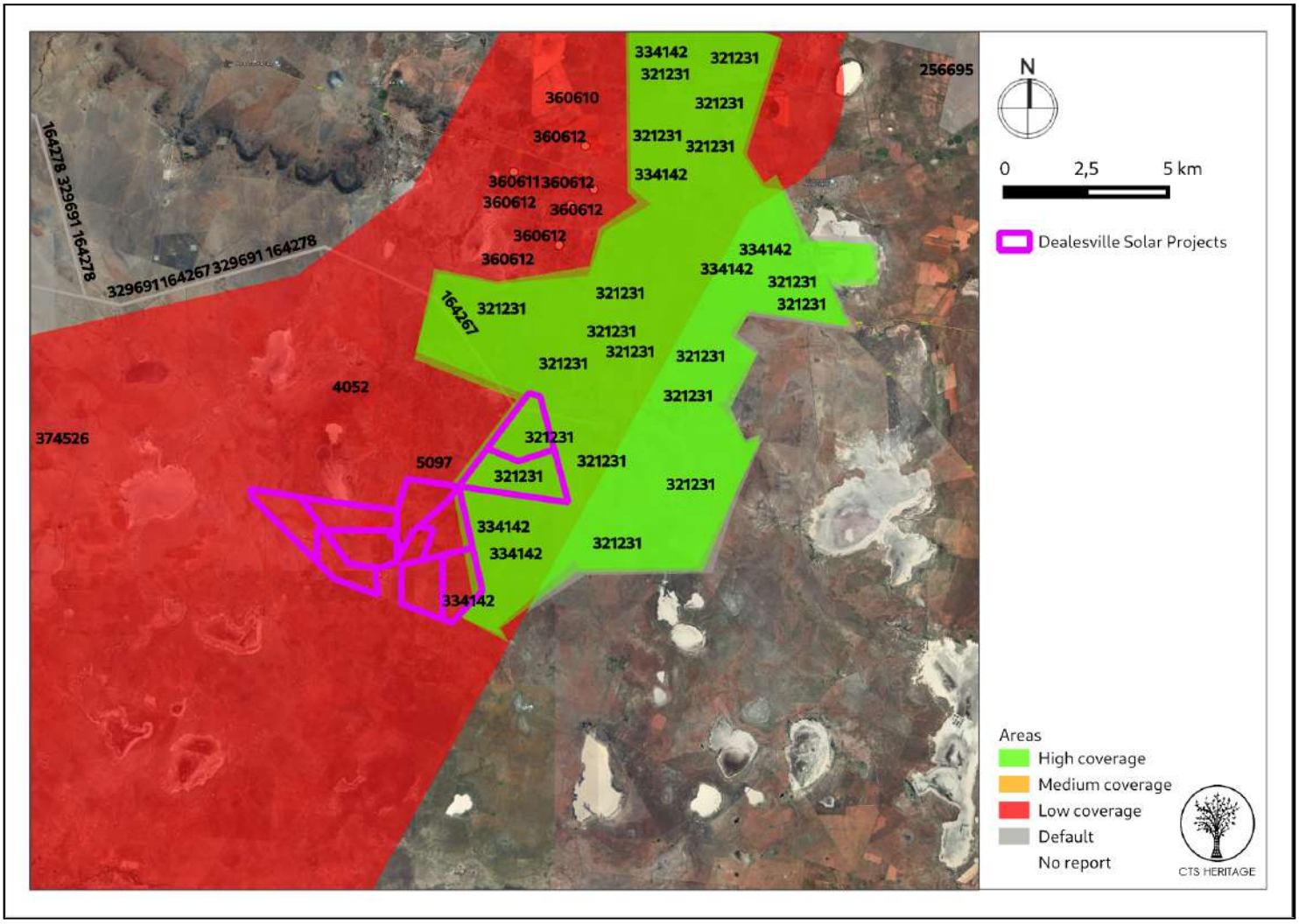

Figure 2: Close up satellite image indicating proposed location of the study area in relation to heritage studies previously conducted

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2.3 Constraints & Limitations

(1) Dense grasses and occasional shrubs cover portions of the project area. This coverage inhibited the visibility of surface archaeology, although this is not regarded as a major problem in relation to the Stone Age archaeological remains, which in most cases look to have generally limited scientific importance due to the disturbed and deflated contexts they occur in. An exception is the context of the archaeology at DV2, which occurs in a potentially dateable context. The context of DV2 suggests that *in situ* Stone Age archaeology in the area is likely predominantly sub-surface.

(2) A portion of the footprint area was challenging to comprehensively assess at ground surface level (due to modern vegetation cover). This should be regarded as a constraint to the documentation of potential graves as it has been established that there are graves in the area.

(3) Previous vegetation clearing activities by farmers may have affected evidence of surface archaeology including the possible above-surface presence of structures relating to graves around the areas that have modern dwelling structures (i.e. the removal of surface stone structures).

(4) Upper sediments are disturbed in the portions of the potentially affected area that have historically been used as enclosures for animals, inhibiting visibility.

(5) Access was not possible in areas wherein people are actively living in dwelling structures today; however, any archaeology occurring in these areas apart from graves would probably be *ex situ* and of limited scientific importance.

Despite these constraints, a comprehensive assessment of the likely impacts to significant archaeological heritage resources was achieved.

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3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

Unfortunately, as no direct archaeological or palaeontological survey information is available for the development area, all indications of sensitivity have to be inferred from the results of archaeological and palaeontological assessments completed in the vicinity and known archaeological and palaeontological sites in the area. We have also used information from satellite imagery as well as the 1:50 000 topo map to identify areas that may have heritage sensitivity. Orton (2015 SAHRIS ID 321231) completed a comprehensive Heritage Impact Assessment located immediately north of the study area and his results provide excellent insight into the heritage sensitivities of this study area (Figure 2). All of the findings of Orton (2015) have been mapped along with all other known heritage resources in close proximity to the study area in Figure 3. His assessment is referred to extensively below.

Archaeology

Scattered throughout the Karoo is evidence of historic and prehistoric occupation in the form of Early, Middle and Later Stone Age lithics and other material remains. The descendants of the historic and prehistoric occupants of the region are found in the indigeous Khoe and San, as well as modern inhabitants of the area. According to Orton (2015 SAHRIS ID 321231), “The general vicinity of Dealesville is very flat with extensive tracts of open grassland and numerous large pans. However, close to and southwest of the town there are a number of rocky koppies. The soil is orange, coloured by the dolerite that breaks the surface in many areas. Calcrete is also common just beneath the surface with exposures visible at times where the cover sands have eroded away. The landscape is quite strongly characterised by electrical infrastructure…”

Orton (2015) also notes that “There are some important fossil sites in the greater region and thus the chance of finding material of significance does exist. Florisbad is a very well-known fossil locality lying some 35 km to the east of the present study area. Here an early human cranium was recovered in 1932 (Dreyer 1935; Rightmire 1978) while mid-Pleistocene fauna and Middle Stone Age stone artefacts have also been recovered (Brink 1987; Dreyer 1938). Because of its importance in terms of both palaeontology and archaeology, Florisbad has been declared a Provincial Heritage Site (SAHRIS n.d.). Erfkroon is another important fossil site that lies along the Modder River some 5 km southwest of the southern end of the present study area. The fossils occur over a large area and are revealed in erosion gullies. Stone artefacts from the earlier part of the Middle Stone Age (MSA) and from the Later Stone Age (LSA) have also been found associated with the bones in places (Churchill et al. 2000).”

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

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to Orton (2015), "Stone-walled settlements dating to the Iron Age have been widely documented in parts of the Free State and adjacent Northern Cape (Maggs 1976a, 1976b) but the Iron Age appears to be absent from the immediate study area and its surrounds. Later Stone Age stone-built dwellings occur along the Riet River to the west (Humphreys 1972, 2009). With the exception of the rich MSA deposits of Florisbad (Kuman et al. 1999) and the MSA and LSA stone artefact assemblages from Erfkroon (Churchill et al. 2000), archaeological resources appear to be quite rare in this flat, open and well-grassed landscape." Webley (2010) surveyed an area to the east of the present study area and reported a complete absence of any archaeological material of any sort. She further noted that stone suitable for the manufacture of flaked tools was not present and that the quantity of other rock available on the surface was insufficient to allow for the construction of stone dwellings. This can be explained by the preference to settle close to water sources that is prevalent across much of the relatively dry interior of southern Africa.

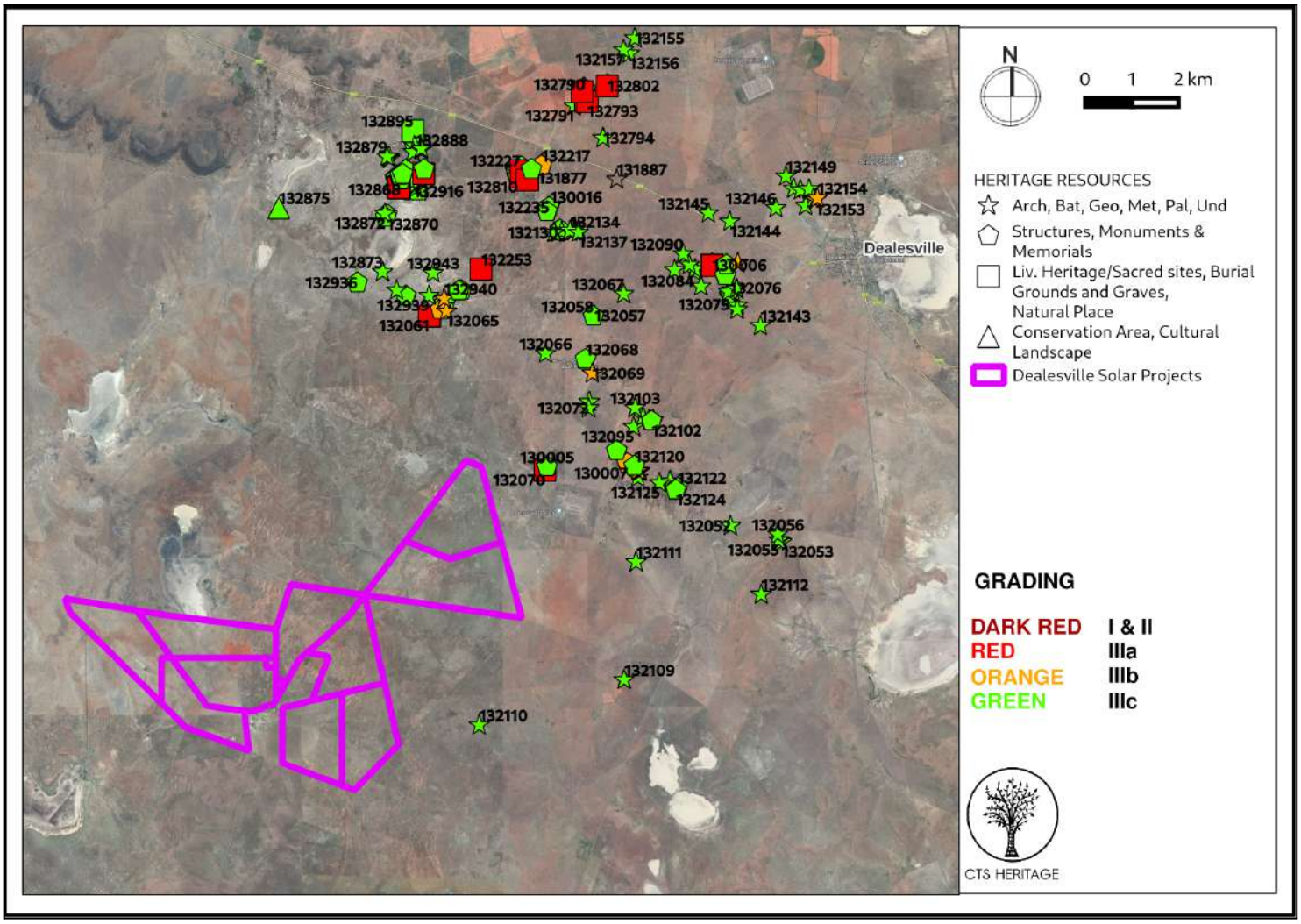

Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated

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Figure 4.1: Pleistocene pan sediment erosion (CDV8)

Figure 4.2: Vegetational context at CDV2

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Figure 4.3: Modern pan formation at CDV6

Figure 4.4: Characteristic grassland cover with land surface exposure through overgrazing at CDV10.

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Figure 4.5: Characteristic grassland cover at CDV15.

Figure 4.6:Characteristic grassland cover at CDV18.

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Figure 4.7: Characteristic grassland coverage with marginal surface exposure at CDV15.

Figure 4.4: Characteristic grassland cover at CDV14.

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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

The survey was conducted on foot and by vehicle, and sought to assess the presence and significance of archaeological occurrences within the project area. Field assessment documented a number of stone artefacts in both primary (in situ) and secondary contexts in an eroded pan, as well as isolated finds in deflated open landscape settings. These sites suggest the area may have been traversed by Stone Age groups potentially through periods in both the Middle Stone Age (MSA – ~300ka:~40ka) and the Later Stone Age (LSA: ~40ka: ~2ka). The presence of artefact-quality raw-materials in the project area as well as relatively abundant standing water (including sedimentary evidence for standing water in the past) were likely the resources that attracted groups there, and resulted in them leaving behavioural traces in the form of stone artefacts in the Pleistocene.

The archaeological remains present in the affected area are generally sparse but, in terms of *in situ* remains, were densest in the north-western portion, relating to the abovementioned seasonal pan margin in this area, in addition to the relatively minimal impact of modern agricultural activities. In the north-western portion, donga formation was relatively intensive in some places around the pan which is potentially underpinned by a combination of historical overgrazing, climatic factors, and potentially also tectonic elements that are thought to drive Pleistocene pan formation in some parts of the Free State. Erosional processes associated with pan formation have exposed Pleistocene sediments and related archaeology in one locality (DV2).

Shales outcrop in several locations in the eastern portion of the affected property, which relate in origin to the formation of the raw-materials that were used also to manufacture artefacts found in the project area (Hornfels or indurated shales). Scant scatters of other secondary sedimentary rocks that derive from the parent formations of the broader goldfields region were also present in the north-western portion of the affected area. Other rocks incorporated in the fluvially deposited sediments include quartz and quartzites, many of which were artefact manufacturing quality in terms of homogeneity and lithic fracture properties, though archaeological remains were only documented on Hornfels.

The topography of the project area is generally flat, with disturbances in the form of bioturbation relating to rodent activity, low energy flooding in lower lying areas to the east as well as substantial cattle and other stock rotation farming. The sandy upper sediments across the north-western portion (~0.5-2.5m in maximum thickness, where exposed) have been fluvially deposited through low energy processes, with lithic and calcareous inclusions (~1-3cm clasts in maximum diameter [excluding stone artefacts that were anthropogenically introduced]) evident in both recently and historically deposited sediments.

The historical use of the landscape for agricultural purposes, and recently abandoned structures in two areas (DV6-7), in addition to currently occupied dwellings, raise the potential for graves and isolated burials and indeed several were identified (DV3 and DV5). Due to unusual recent Free State winter rainfall in June and July, grass coverage was a pertinent constraint to documenting graves where the above surface material indicators may be partially or completely obstructed. Grass cover made potential grave locations challenging to exhaustively assess across the project area (particularly in cases where above surface material indicators may have been removed through crop

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related activities or through trampling related to stock farming).

The graves identified are listed in the relevant tables (see below). Buffer zones around each grave, or set of graves, are recommended.

4.2 Archaeological Resources identified

Table 2: Observations noted during the field assessment

Site No.	Description	Density/m²	Period	Co-ordinates		Grading	Mitigation
DV1	Stone Age palimpsest of probable Later and Middle Stone Age artefacts.	~3-6/m²	LSA/MSA	-28.741873959079300	25.610159989446400	IIIC	20m Buffer
DV2	Contextualised Middle Stone Age site in probable dateable context.	Sub-surface and surface context off ~6/m²	MSA	-28.745823008939600	25.623247995972600	IIIA	100m Buffer
DV3	Historical graves of several adults (~5-6 identifiable individuals although several eroded surface structures)	~5-6 identifiable individuals although several eroded surface structures	Recent historical	-28.752805972471800	25.644082976505100	IIIA	100m Buffer
DV4	Stone Age palimpsest of probable Later and Middle Stone Age artefacts.	~3-6/m²	LSA/MSA	-28.756456039845900	25.663071004673800	IIIC	20m Buffer
DV5	Historical grave of at least 1 adult individual.	1 clear adult grave with potential for additional structures.	Recent historical	-28.761470010504100	25.638956017792200	IIIA	100m Buffer
DV6	Sandstone ruin, no roof and only walls remaining. No evidence of associated burials	NA	Recent historical	-28.760048020631000	25.639273021370100	IIIC	20m Buffer
DV7	Ruined Victorian farm house. No evidence of associated burials	NA	Recent historical	-28.734387997537800	25.676143001765000	IIIC	20m Buffer
DV8	Stone Age palimpsest of probable Later and Middle Stone Age artefacts.	~3-6/m²	LSA/MSA	-28.733059968799300	25.677087977528500	IIIC	20m Buffer

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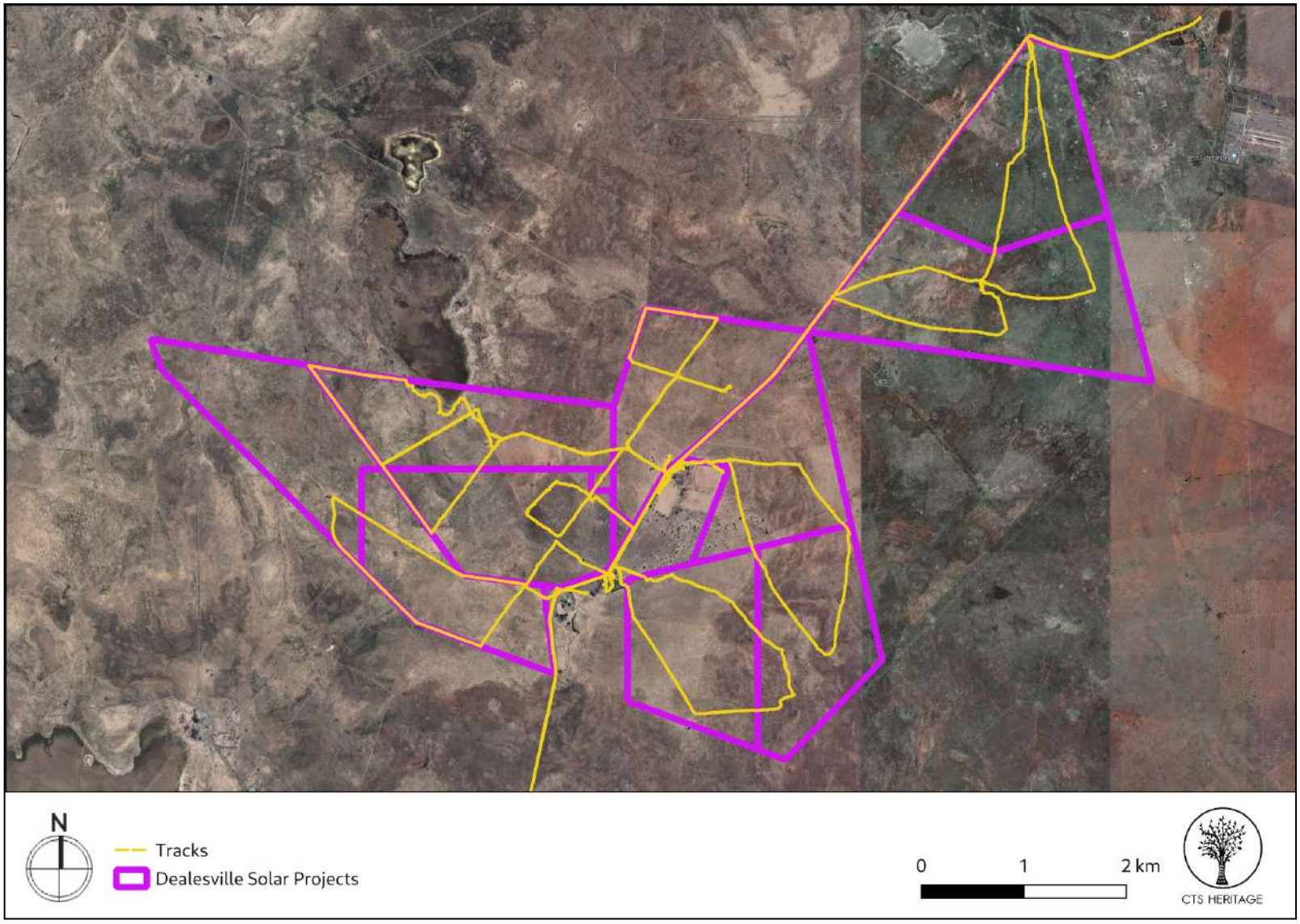

Figure 5.: Overall track paths of foot surveys conducted

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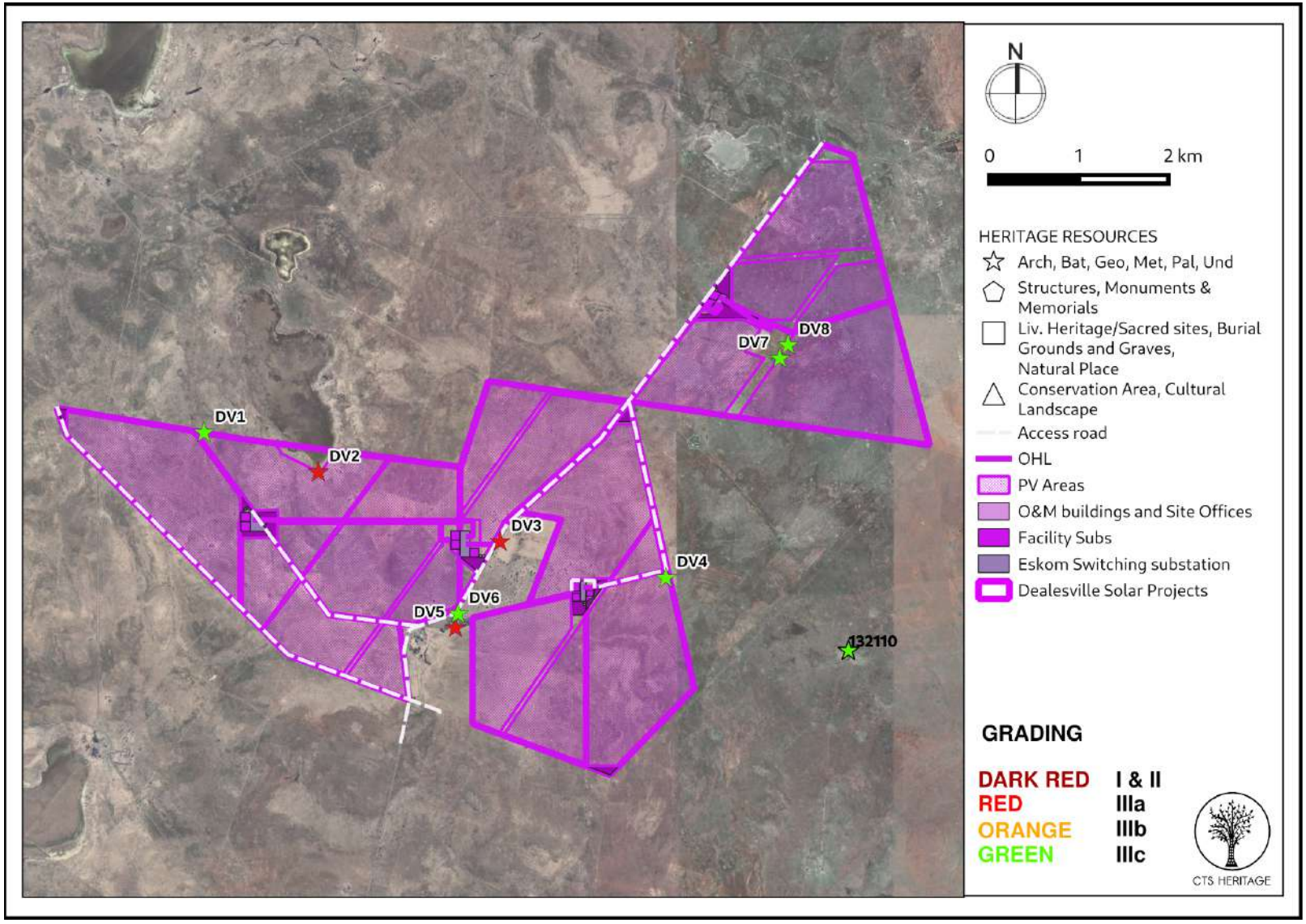

Figure 6.1: Map of field observations relative to the proposed development

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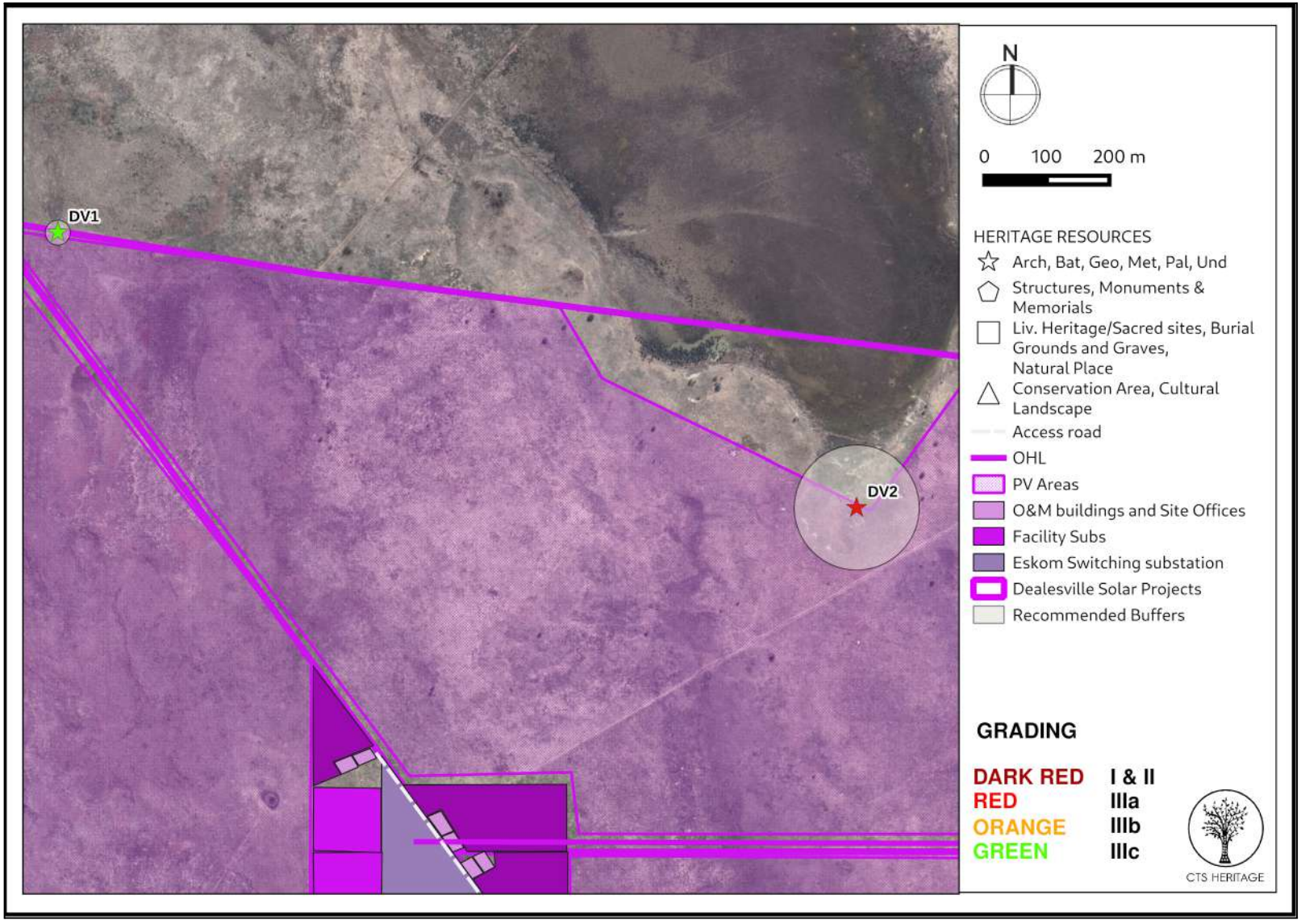

Figure 6.2: Map indicating recommended buffer areas

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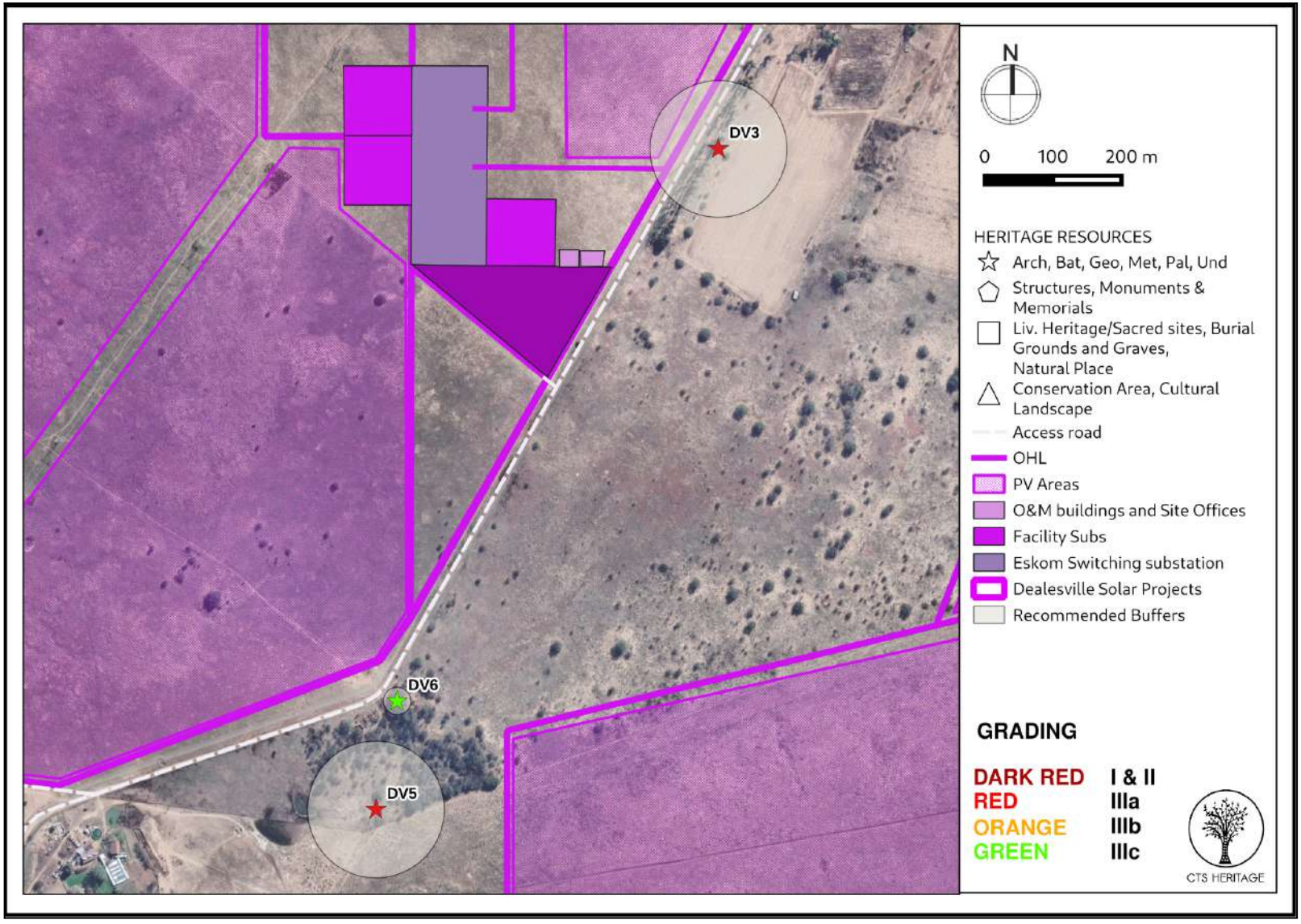

Figure 6.3: Map indicating recommended buffer areas

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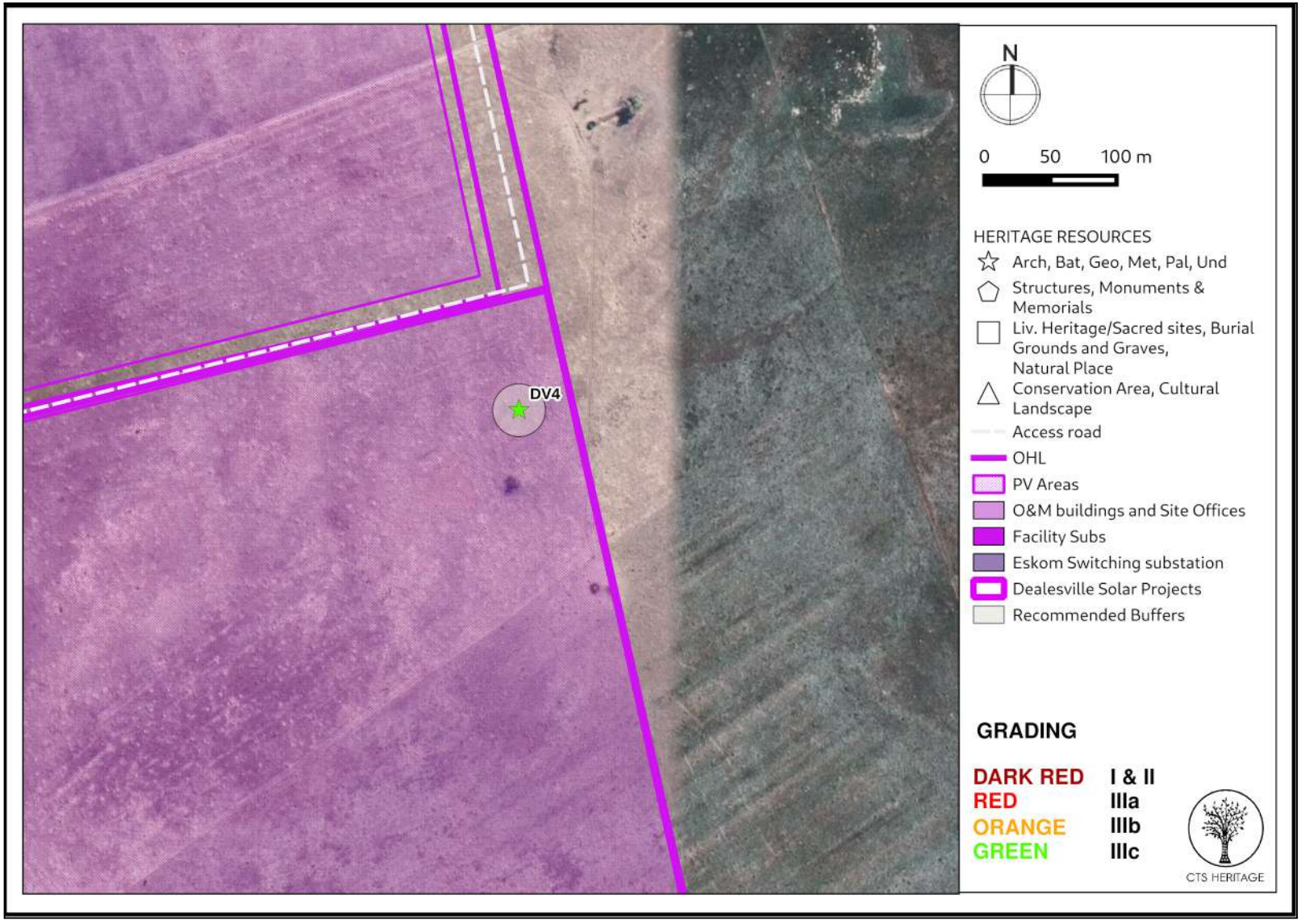

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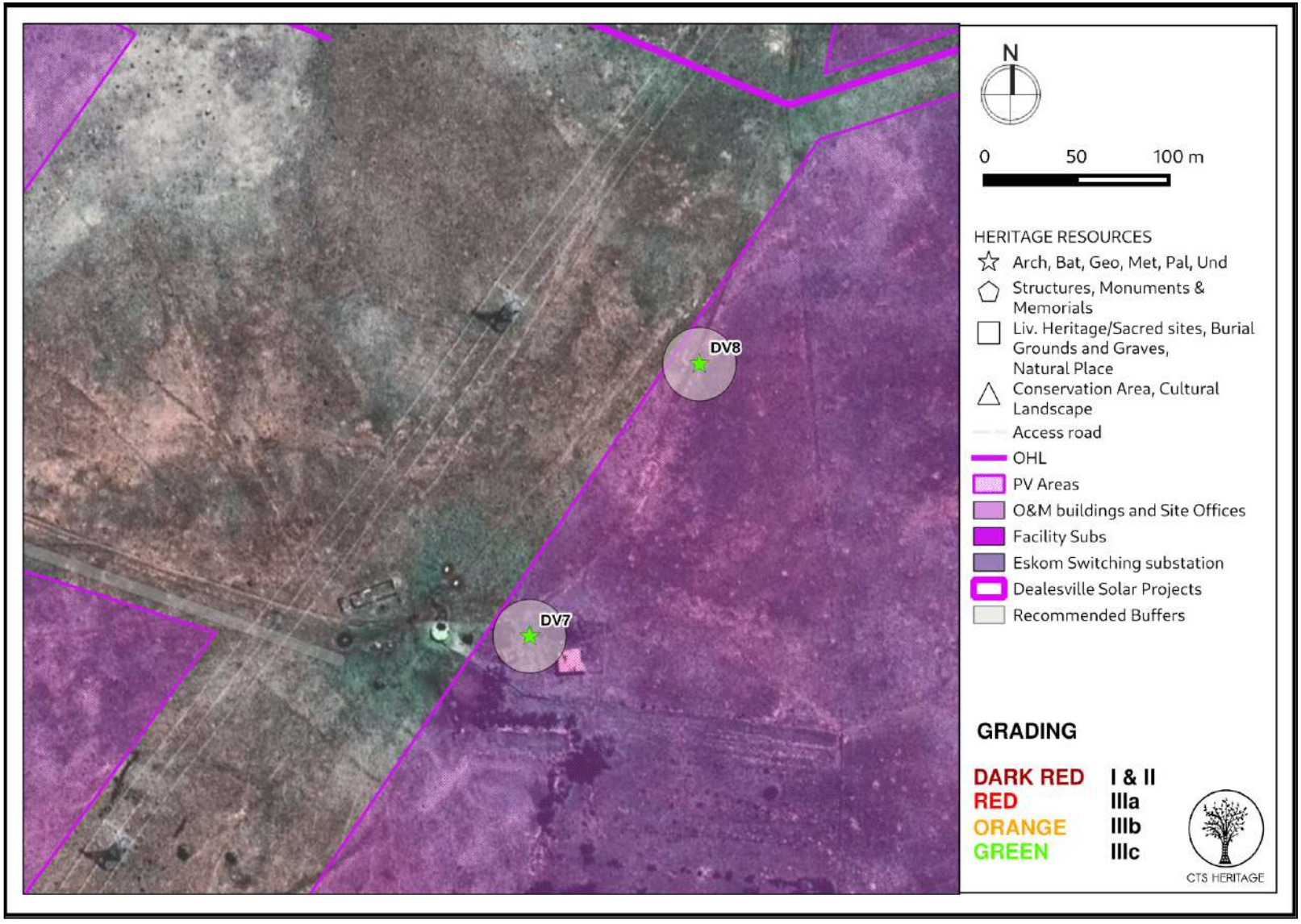

Figure 6.5: Map indicating recommended buffer areas

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4.3 Selected photographic record

(a full photographic record is available upon request)

Figure 7.1: Middle Stone Age artefacts at DV4. Convergent Levallois point on Hornfels with faceted platform.

Figure 7.2: Middle Stone Age artefacts at DV4. Scraper on Hornfels flake with faceted platform

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Figure 7.3: Stone Age artefacts at DV1. Proximal bladlette.

Figure 7.4: Stone Age artefacts at DV1. Medial blade fragment.

Figure 7.5: Stone Age artefacts at DV1. Scraper on broken blade.

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Figure 7.6: Context of artefact scatter at DV1.

Figure 7.7: Middle Stone Age artefacts at DV2. Prepared core flakes. Note the calcareous nodules in the contextual sediments that may be indicative of fossil preservation in the area.

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Figure 7.8: Middle Stone Age artefacts at DV2. Prepared core flakes.

Figure 7.9: Middle Stone Age artefacts at DV2. Retouched flake.

Figure 7.10: Middle Stone Age artefacts at DV2. Unifacially worked point.

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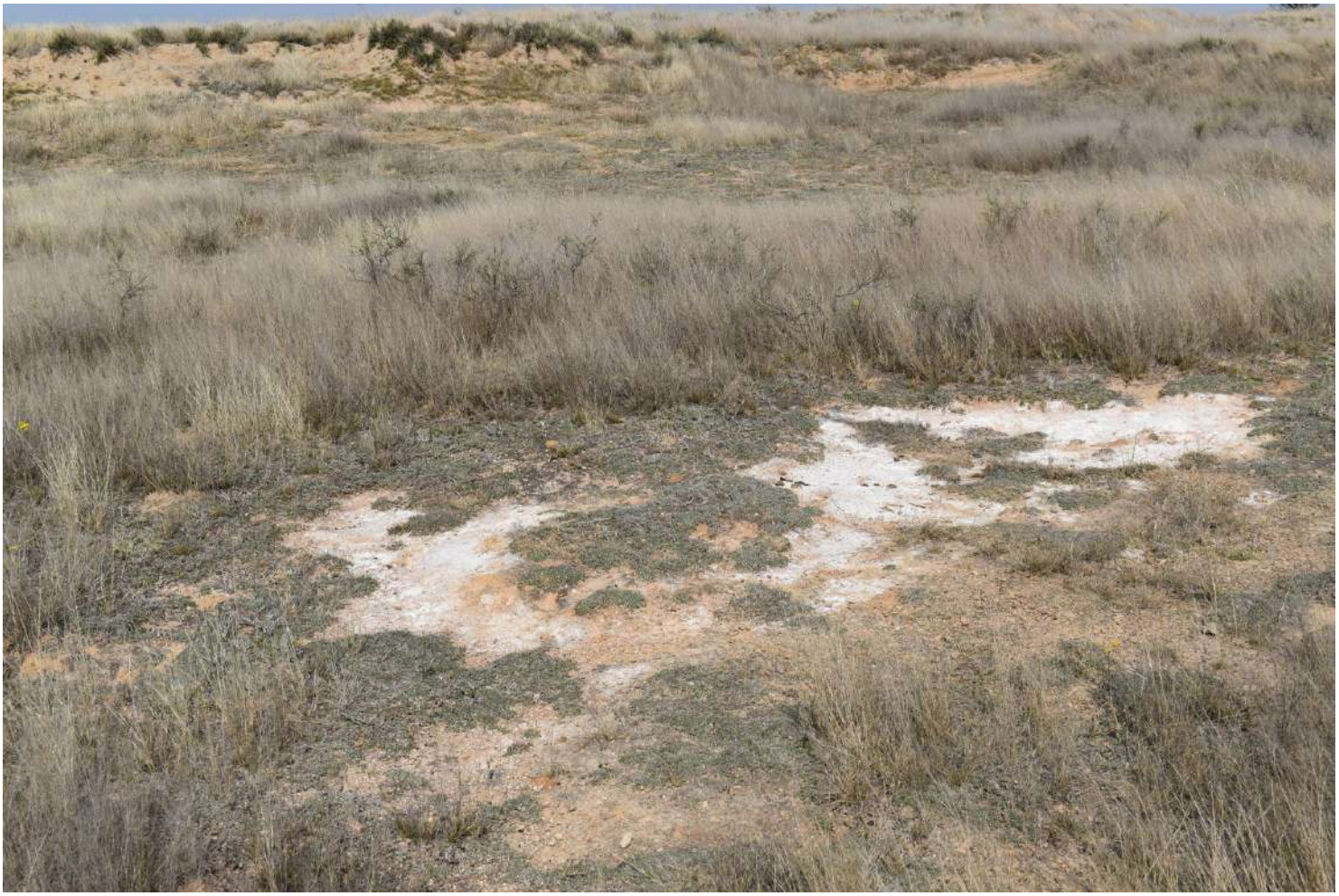

Figure 7.11: Context of Middle Stone Age site at DV2. Artefacts eroding out of Pleistocene pan deposits in the background.

Figure 7.12: Graves at DV3.

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Figure 7.13: Graves at DV3.

Figure 7.14: Graves at DV5.

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Figure 7.15: Historical building at DV6

Figure 7.16: Historical building at DV6

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Figure 7.17: Historical building at DV6

Figure 7.18: Historical building at DV7.

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Figure 7.19: Historical building at DV7

Figure 7.20: Middle and Later Stone Age artefacts at DV8.

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Figure 7.21: Middle and Later Stone Age artefacts at DV8.

Figure 7.22: Middle and Later Stone Age artefacts at DV8.

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

Field assessment of the footprint of the proposed Dealesville Solar Projects documented several stone artefact scatters in secondary contexts and one site in a close to primary context that needs to be avoided (DV2). The stone artefacts at DV4, DV1 and DV8 are *ex-situ* and occur in a disturbed deflated context, whereas the MSA occupation of the Pleistocene pan margin at DV2 needs to be avoided.

The proposed development is unlikely to affect the scientific potential of the deflated stone artefacts as they do not occur in contexts that can be dated or excavated, whereas the *in situ* remains at DV2 are sensitive and scientifically valuable. Cumulatively these finds suggest the area was occupied or traversed intermittently by Stone Age groups through periods in the Middle and Later Stone Age, as well as historical periods associated with more recent occupations of the region (DV3, DV5, DV6 and DV7).

The sites of DV1, DV4 and DV8 comprise predominantly MSA artefacts that occur in *ex-situ* contexts, and the weathering of the artefact edges suggests that they have been exposed for substantial periods and have limited scientific value. DV2 is an MSA site associated with Pleistocene occupation of a paleo-pan terrace, which may have been a lake in wetter (inter-glacial) periods in the past. The artefacts at DV2 are eroding out of low energy fluvial deposits that document the depositional history of a seasonal wetland/lake system, as well as the associated prehistoric occupation of the pan margins by MSA hominins. A marginally trimmed unifacial point and converging Levallois points with faceted platforms were identified, which are characteristically MSA technologies. Given the depositional history of the seasonal pan documented at DV2 and its association with anthropogenic activity, it is advised that the ENTIRE PAN MARGIN be avoided with the guidance of a buffer zone for development. The pan terrace deposits may be dateable with luminescence techniques, although the direct association of the archaeology with the fluvial stratigraphy would require further investigation to establish.

The historical structures located at DV6-7 were documented, but are largely in a ruined state and may have limited scientific value. However the graves need to be COMPLETELY AVOIDED (DV3 and DV5).

Based on surface observations of the footprint of the proposed Dealesville Solar Projects, excavation associated with the development should be aware of the potential for sub-surface Stone Age materials if excavation encroaches on the pan margin in the general region of DV2, which is clearly visible on Google Earth. Apart from DV2 and the graves at DV3 and DV5, the documented archaeology at Dealesville is classified as scientifically LOW SIGNIFICANCE.

Concerning the Stone Age archaeology within the footprint of the proposed Dealesville Solar Projects, there are no objections to the authorization of the proposed development provided that the buffering described above is adhered to. Further, that if any evidence of human remains are exposed during excavation that development activities cease in the area of the identified remains.

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6. CONCLUSION AND RECOMMENDATIONS

The field assessment for the proposed development identified that most of the area under assessment has been previously disturbed through extensive agricultural activity. Stone Age archaeological heritage resources were identified within the area proposed for development, however these were largely in disturbed contexts. One very significant *in situ* archaeological site (DV2) was identified adjacent to the pan site located in the west of the development area. It is important that the proposed PV layouts be amended to avoid impact to this significant site.

Other significant heritage resources identified within the development area are associated with the colonial history of the area. The burial grounds identified within the development area have very high levels of local value due to their substantial social cultural significance. It is important that the burial grounds identified, and their context, are not impacted by the proposed development. Furthermore, it is important that the significant archaeological heritage resources (DV2) and the burial grounds (DV3 and DV5) are pro-actively managed into perpetuity. As such, it is recommended that a Heritage Agreement and Conservation Management Plan be developed for the ongoing management of these resources.

Overall, however, the archaeological sensitivity of the area proposed for development is low except for the sites identified. There is no objection to the proposed development here on condition that the recommendations outlined below are implemented.

Recommendations

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

- A no development buffer area of 100m must be implemented around sites DV2, DV3 and DV5
- A no development buffer area of 20m must be implemented around sites DV1, DV4, DV6, DV7 and DV8
- A Heritage Agreement and Conservation Management Plan be developed for the ongoing management of these resources.
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

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7. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
321231	Heritage Impact Assessment	Jayson Orton	05/05/2015	Heritage impact assessment for eleven Solar PV Facilities and Supporting Electrical Infrastructure near Dealesville in the Free State Province Proposed by Mainstream Renewable Power Developments (Pty) Ltd.
334142	PIA Desktop	Lloyd Rossouw	03/02/2015	Palaeontological Desktop Assessment for 12 new Solar Photovoltaic facilities near Dealesville, Free State Province
360358	HIA Phase 1	Jayson Orton	01/02/2016	HERITAGE IMPACT ASSESSMENT: Scoping and Environmental Impact Assessment for the proposed development of the Marconi PV 100 MW Photovoltaic Facility near Dealesville, Free State
360609	HIA Phase 1	Jayson Orton	01/02/2016	HERITAGE IMPACT ASSESSMENT: Scoping and Environmental Impact Assessment for the proposed development of the Maxwell PV 100 MW Photovoltaic Facility near Dealesville, Free State
360610	HIA Phase 1	Jayson Orton	01/02/2016	HERITAGE IMPACT ASSESSMENT: Scoping and Environmental Impact Assessment for the proposed development of the Faraday PV 100 MW Photovoltaic Facility near Dealesville, Free State
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360612	Heritage Impact Assessment	Lloyd Rossouw	31/01/2016	Palaeontological Desktop Assessment of 5 new Solar Photovoltaic facilities to be established over nine farms near Dealesville, Free State Province.
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