

ARCHAEOLOGICAL SPECIALIST STUDY

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

Proposed Great Karoo Renewable Energy Facility development near Richmond in the Northern Cape

Prepared by



CTS HERITAGE

In Association with

Savannah Environmental

October 2021



CTS HERITAGE

EXECUTIVE SUMMARY

Great Karoo Renewable Energy (Pty) Ltd is proposing the development of 2 x wind energy facilities, 3 x solar energy facilities and 5 x grid connections on sites near Richmond, Northern Cape. The cluster of projects is known as Great Karoo Renewable Energy (GKRE). As the projects fall outside of a REDZ, a full Scoping & EIA process would be required for the facilities and BA processes for the associated grid connections.

Project details are as follows:

Project Name Technology Capacity Affected farm names

- Angora Wind Energy Facility Wind (140MW) on Rem. 85 Rondavel, 86 Annex Rondavel and Rem. 84 Vogelstruisfontein
- Merino Wind Energy Facility Wind (140MW) on Land Rem. 85 Rondavel, 86 Annex Rondavel and Rem. 84 Vogelstruisfontein
- Nku Solar PV Solar PV (100MW) on Rem. 85 Rondavel & 86 Annex Rondavel and Rem. 84 Vogelstruisfontein
- Moriri Solar PV Solar PV (100MW) on Rem. 85 Rondavel, 86 Annex Rondavel and Rem. 84 Vogelstruisfontein
- Kwana Solar PV Solar PV (100MW) on Rem. 85 Rondavel, 86 Annex Rondavel and Rem. 84 Vogelstruisfontein

Grid connection infrastructure associated with each of the above-mentioned projects will include a 132kV onsite substation and 132kV overhead power line.

The findings of this assessment largely correlate with the findings of other assessments completed in the vicinity such as the findings of the ACO (2013, SAHRIS NID 503074) who note that “Because of the scarcity of caves and shelters, more than 90% of Karoo archaeological sites are open sites of stone artefacts, ostrich eggshell fragments and occasionally, pottery. Bone remains are rarely preserved. Artefacts of both the Early and Middle Stone Age are widespread and may generally be described as an ancient litter that occurs at a low frequency across the landscape.” This same archaeological signature has been identified within the development footprint.

It is noted that high numbers of quarried stone artefacts predominantly from the Middle Stone Age period were found on this property which is consistent with observations on neighbouring farms through impact assessments and research surveys. These artefacts are particularly visible in deflated open sites where the top soil has washed away onto a harder gravel surface. Despite the large number of dolerite outcrops, no engravings were found. We are not currently aware of a large number of Stone Age engravings in this area and the lack of sites found might possibly be due to the routes chosen for the access roads and turbine positions. It was noted in the field assessment that the archaeology located around the dolerite ridges is very dense and exposed and as such, we would recommend caution should changes be made to turbine positions or access roads.

One archaeological site of significance was identified, Site GK048 (Grade IIIB). It is recommended that a no-go development buffer of 50m is implemented around this site to ensure that it is not impacted. The other significant resources identified include stone wall ruins (GK037, GK074 and GK105) graded IIIB and two significant farm werfs



CTS HERITAGE

(GK038 and GK100) and a burial ground (GK101) graded IIIA. No-go development buffers are recommended around these sites to ensure that no impact takes place. These are illustrated in Figure 11 below.

Recommendations

Based on the outcomes of this report, it is not anticipated that the proposed development of the renewable energy facilities and its associated grid connection infrastructure will negatively impact on significant archaeological heritage on condition that::

- A 50m no-go development buffer is implemented around site GK048 (Figure 11.5)
- A 500m no-go development buffer is implemented around site GK037 (Figure 11.1), GK074 (Figure 11.2), GK105 (Figure 11.4) and GK101 (Figure 11.3)
- A 1km no-go development buffer is implemented around site GK038 (Figure 11.1) and GK100 (Figure 11.4)
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.



CTS HERITAGE

CONTENTS

1. INTRODUCTION	4
1.1 Background Information on Project	4
1.2 Description of Property and Affected Environment	4
2. METHODOLOGY	6
2.1 Purpose of Archaeological Study	6
2.2 Summary of steps followed	6
2.3 Constraints & Limitations	7
3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT	8
4. IDENTIFICATION OF HERITAGE RESOURCES	12
4.1 Field Assessment	12
4.2 Archaeological Resources identified	21
4.3 Selected photographic record	26
5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT	33
5.1 Assessment of impact to Archaeological Resources	33
6. CONCLUSION AND RECOMMENDATIONS	49
7. REFERENCES	56



CTS HERITAGE

1. INTRODUCTION

1.1 Background Information on Project

Great Karoo Renewable Energy (Pty) Ltd is proposing the development of 2 x wind energy facilities, 3 x solar energy facilities and 5 x grid connections on sites near Richmond, Northern Cape. The cluster of projects is known as Great Karoo Renewable Energy (GKRE). As the projects fall outside of a REDZ, a full Scoping & EIA process would be required for the facilities and BA processes for the associated grid connections.

Project details are as follows:

Project Name Technology Capacity Affected farm names

- Angora Wind Energy Facility Wind (140MW) on Rem. 85 Rondavel, 86 Annex Rondavel and Rem. 84 Vogelstruisfontein
- Merino Wind Energy Facility Wind (140MW) on Land Rem. 85 Rondavel, 86 Annex Rondavel and Rem. 84 Vogelstruisfontein
- Nku Solar PV Solar PV (100MW) on Rem. 85 Rondavel & 86 Annex Rondavel and Rem. 84 Vogelstruisfontein
- Moriri Solar PV Solar PV (100MW) on Rem. 85 Rondavel, 86 Annex Rondavel and Rem. 84 Vogelstruisfontein
- Kwana Solar PV Solar PV (100MW) on Rem. 85 Rondavel, 86 Annex Rondavel and Rem. 84 Vogelstruisfontein

Grid connection infrastructure associated with each of the above-mentioned projects will include a 132kV onsite substation and 132kV overhead power line.

1.2 Description of Property and Affected Environment

The majority of the proposed solar PV and WEF infrastructure is located on Rondavel and Vogelstruisfontein farms which lie on the northern and western end of the N1 highway about 30km southwest of Richmond in the Northern Cape. A further 14 turbine positions and their associated access roads are envisaged to the south side of the N1 across the way from Rondavel farm. Rondavel is a working sheep farm but is also a prominent guest farm. In the last two decades the N1 has become increasingly flooded with heavy trucking traffic due to the decreasing use of the railway system and the growth of the South African economy.

The terrain is a mixture of nearly perfectly level ground where the solar PV installations are positioned while the wind turbine locations are mainly situated on the tops of a series of moderately high dolerite ridges and koppies. A few turbine positions are proposed on slightly elevated ground surrounding the solar PV areas. The area falls within the Eastern Upper Karoo region and the vegetation consists of a mix of grass and shrub dominated vegetation types. Acacia thorn trees are found in the riverine zones and much of the shrubland is currently in a very poor state due to the extended 5 year drought afflicting the area. Aeolian sands and floodplains form a thick (>1m) layer of overburden in many places surrounding the dolerite ridges and there has been extensive burial and re-surfacing of Middle Stone Age material. Later Stone Age was relatively well represented in the study area and most of the MSA and LSA material was concentrated around the lower slopes of the dolerite ridges and koppies. The dominant agricultural activity is sheep farming and a number of windmills with small farm dams were recorded that feature on the built landscape. The



CTS HERITAGE

western end of the properties hold the main route of South Africa's 765kV powerline infrastructure linking up the Western Cape to the coal-fired power stations in Mpumalanga and Gauteng.

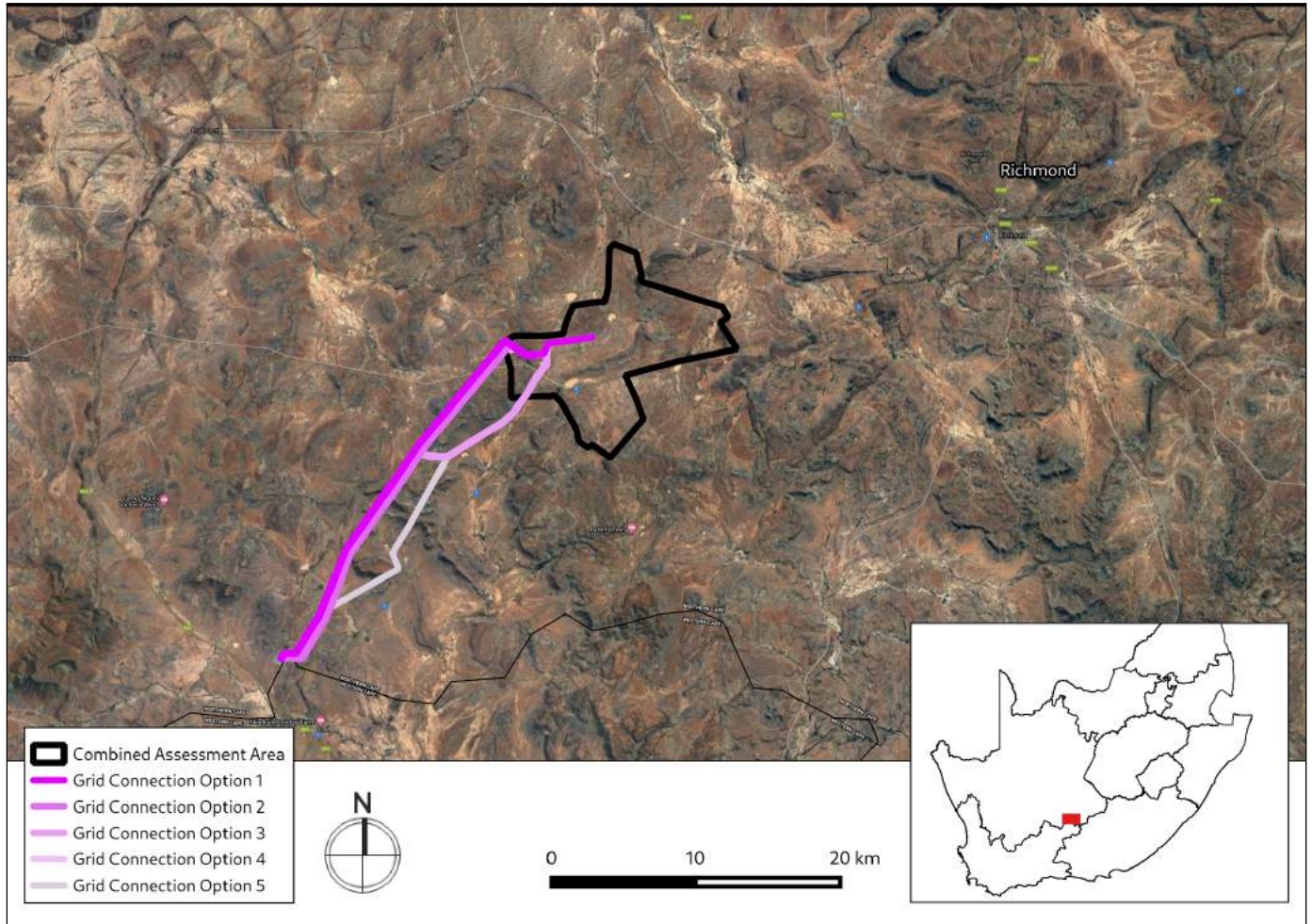


Figure 1.1: Satellite image indicating proposed location of development



CTS HERITAGE

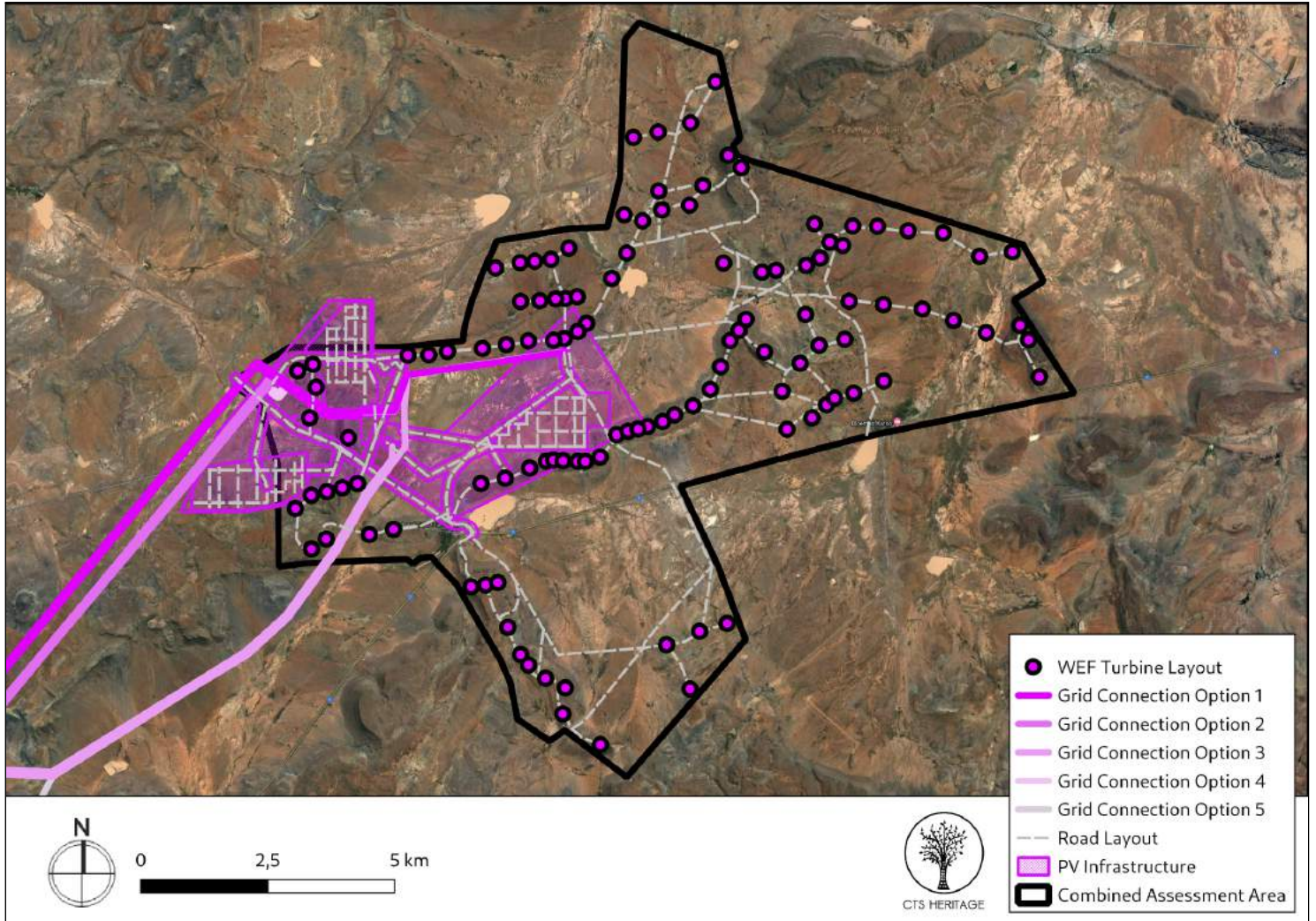


Figure 1.2: Proposed project boundary

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 from 11-16 September 2021 to determine what archaeological resources are likely to be impacted by the proposed development.
- The area proposed for development was assessed on foot, 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.



CTS HERITAGE

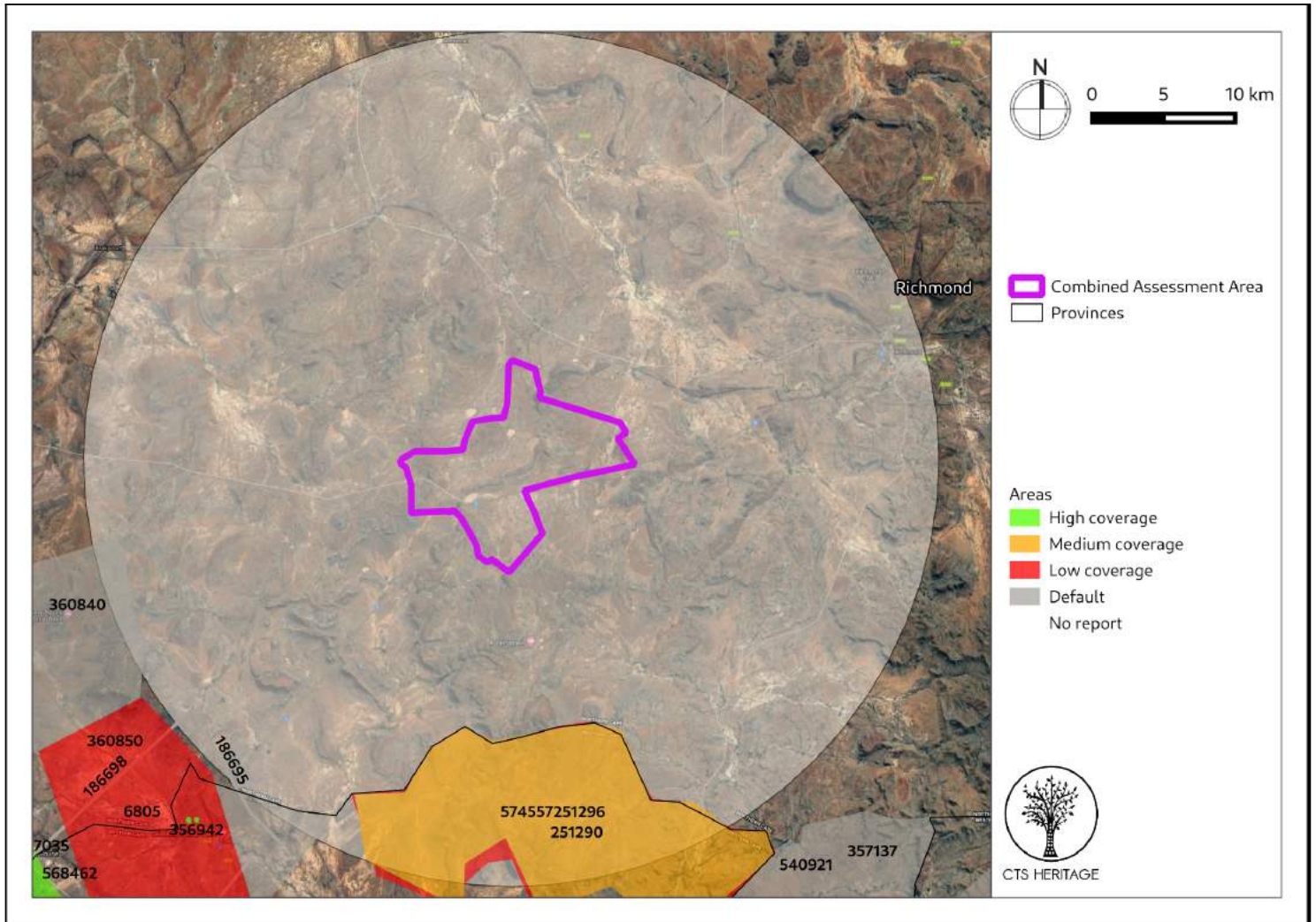


Figure 2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted

2.3 Constraints & Limitations

The current extended drought has led to poor conditions in the veld but this has also provided very good visibility of archaeological material exposed on the surface. A series of dongas were inspected to test whether archaeological material may be buried by aeolian and flooding events and this was confirmed in some places where exposed lines of gravels containing MSA artefacts were found buried over 1m below the surface. However, the exposure of MSA and LSA material was clearly evident on the lower slopes of the dolerite koppies and this provided a fair characterisation of the buried artefacts.

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.



CTS HERITAGE

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

Background:

The area proposed for the Great Karoo Renewable Energy Facility Projects including this proposed Wind Energy Facility is located approximately 20km southwest of Richmond in the Northern Cape, and 40km east of Victoria West outside of the identified Beaufort West REDZ (Figure 2b) along the N1. The town of Richmond was established in 1843 to service the needs of the growing farming community. It was renowned as a resort town in the 1800s for European aristocrats suffering lung disease due to its clean air and mineral-rich waters.

Archaeology

Very few heritage assessments have been completed within close proximity to the area proposed for development (Figure 2a). According to Nilssen (2014, SAHRIS NID 504763), “The Karoo houses a long and rich archaeological record dating from the earliest stages of Stone Age technology that are over a million years old, to the historic period that consists of the last few hundred years of human occupation (see Nilssen 2011 and references therein). Archaeological sites include caves and rock shelters, open air artefact scatters, rock engravings and historic structures with their associated cultural materials.” According to ACO (2013, SAHRIS NID 503074), “Because of the scarcity of caves and shelters, more than 90% of Karoo archaeological sites are open sites of stone artefacts, ostrich eggshell fragments and occasionally, pottery. Bone remains are rarely preserved. Artefacts of both the Early and Middle Stone Age are widespread and may generally be described as an ancient litter that occurs at a low frequency across the landscape. Where definable scatters of Early and Middle Stone Age material occur, they are considered to be significant heritage sites. More intensive occupation of the Karoo started around 13 000 years ago during the Later Stone Age, which is essentially the heritage of Khoisan groups who lived throughout the region. The legacy of the San includes numerous open sites while traces of their presence can also be found in most large rock shelters, often in the form of rock art. They frequently settled a short distance from permanent water sources (springs or waterholes) and made use of natural shelters such as rock outcrops or large boulders or even large bushes. In the Great Karoo natural elevated features such as dolerite dykes and ridges played a significant role in San settlement patterns.” It is likely that similar archaeological heritage exists within the areas proposed for development and as such, impact to these resources must be assessed.



CTS HERITAGE

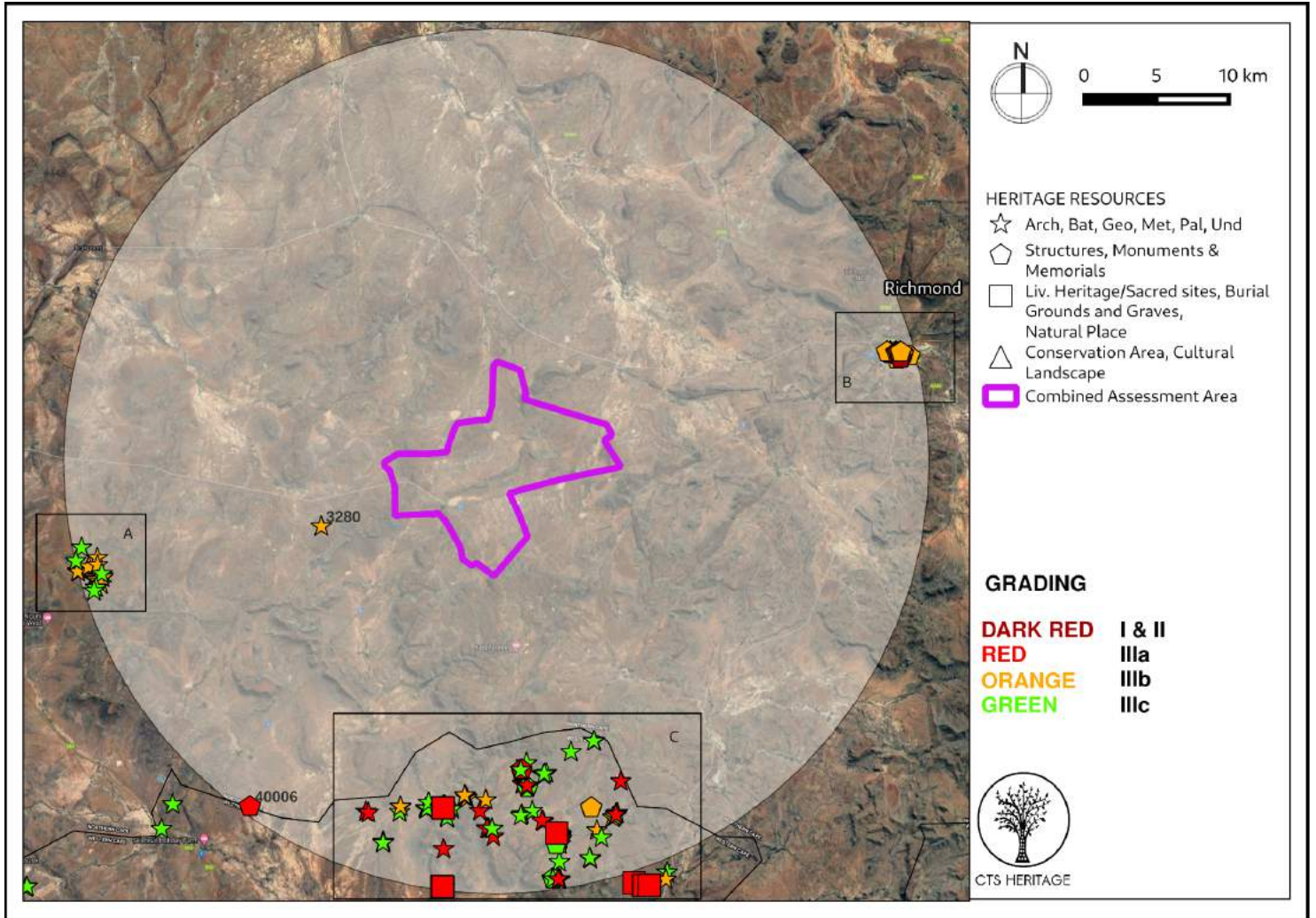


Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated



CTS HERITAGE

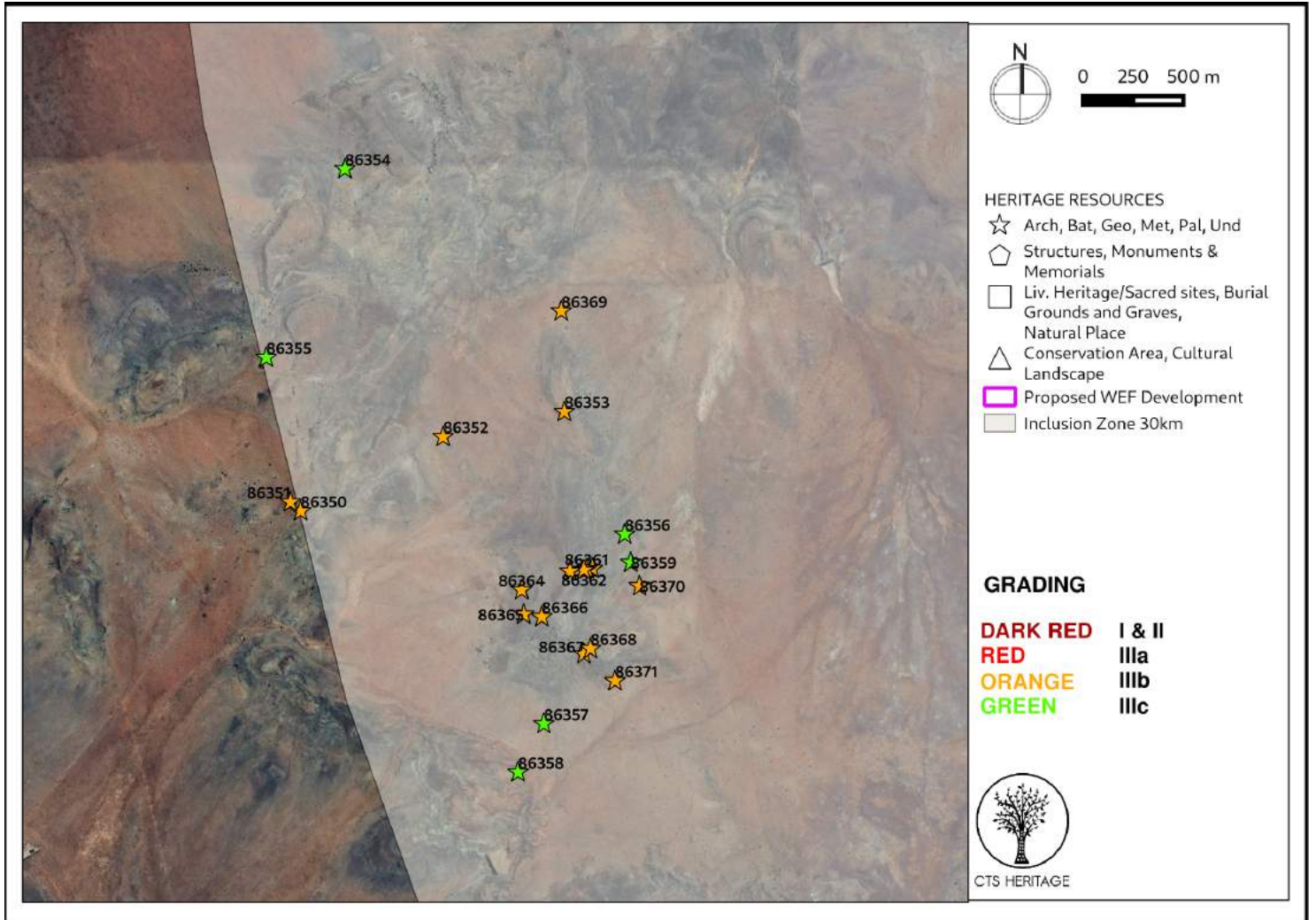


Figure 3a. Inset



CTS HERITAGE

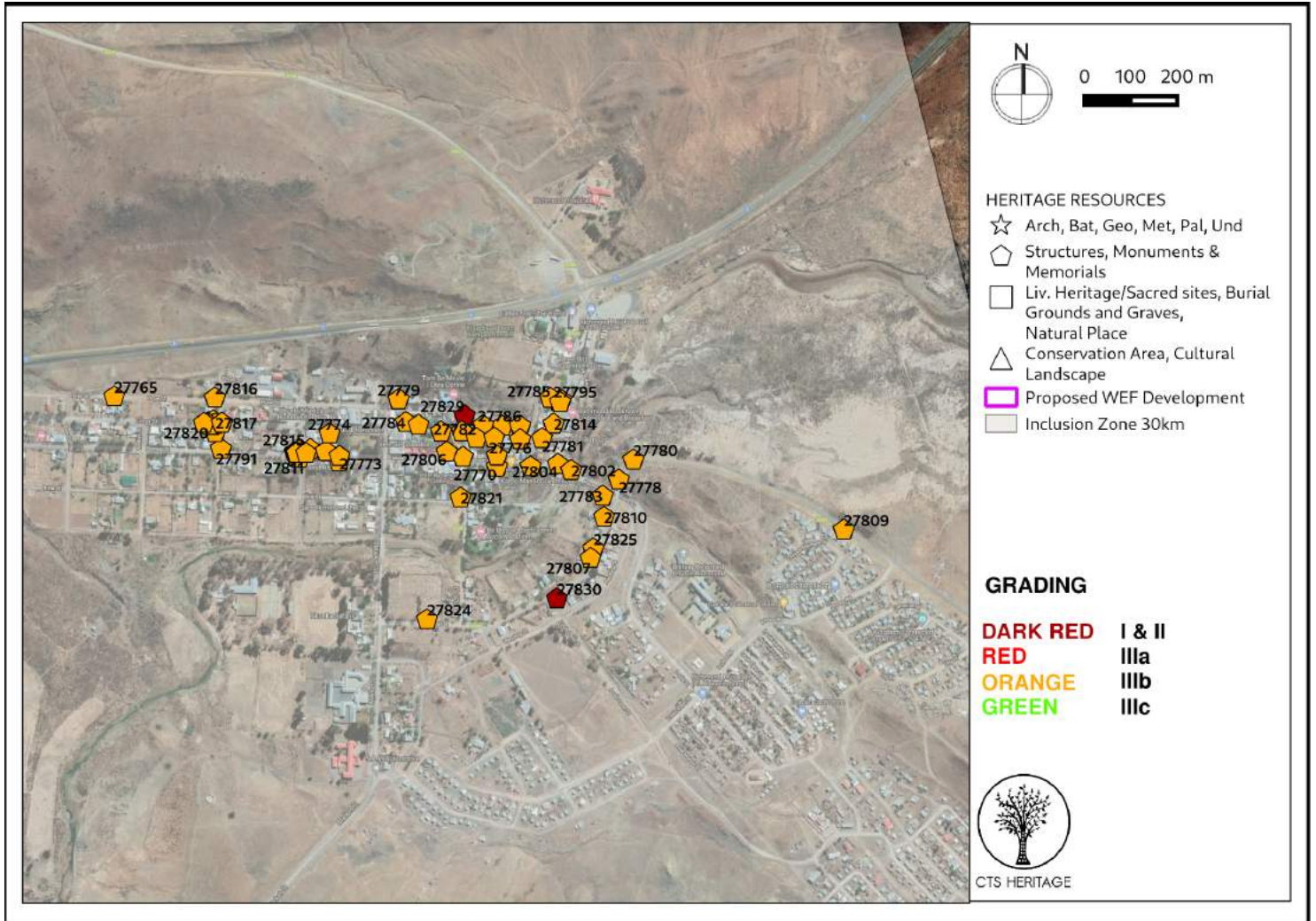
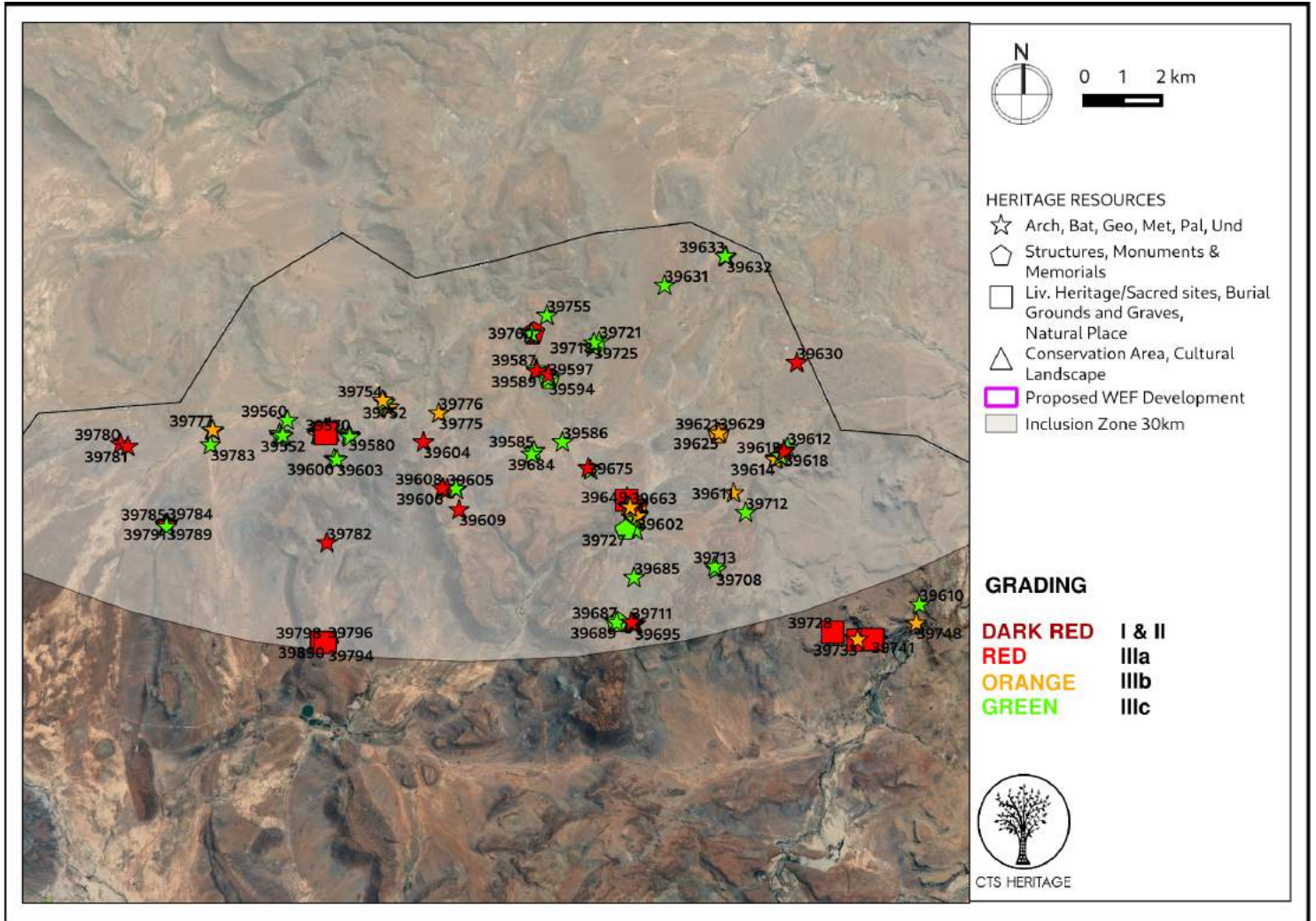


Figure 3b. Inset



CTS HERITAGE



4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

No fewer than 132 locations were plotted containing historical and Stone Age heritage resources. The vast majority of these sites hold MSA material but LSA observations were well represented in the study area. The various windmills and small farm dams were recorded but are of no further concern in terms of heritage impacts anticipated by the WEFs and solar PV facilities as the current farming activities will continue beyond the establishment of the energy infrastructure. The two primary farms at Rondavel and Vogelstruisfontein will also be unaffected and a large graveyard at Vogelstruisfontein held a number of marked graves within a central stone walled compound of the Conroy, Visser and Botha families spanning the late 18th to 20th centuries. A series of unmarked graves were also found nearby and the boundary of the graveyard consists of upright dolerite slabs and broken wire fencing that has all but disappeared. The central compound and the unmarked graves are deteriorating and signs of dilapidated walls and slabs were evident.



The Stone Age material was mainly produced on locally sourced hornfels cores. Flakes and cores in greywacke and siltstones were also found but these were far less prominent. A lower grindstone showing a clear grinding groove was found in a level sandy bay surrounded by dolerite ridges.

The relative absence of surface artefacts on the level plains, particularly where the solar PV facilities are proposed, was initially picked up as notable in the first days of the survey but subsequent inspections of the dongas in the study area revealed a lower, buried level of gravels that contained MSA artefacts. It was therefore clear that wind-blown and flooding events in the area have resulted in the burial of artefacts in many level areas. Given that the overall assessment reached over 130 observations, the Stone Age material is ubiquitous, generally dispersed across a wide area and highlights the extensive use of this landscape by people throughout the Middle and Later Stone Age.

Despite the large number of dolerite outcrops, no engravings were found. We are not currently aware of a large number of Stone Age engravings in this area and the lack of sites found might possibly be due to the routes chosen for the access roads and turbine positions. It was noted in the field assessment that the archaeology located around the dolerite ridges is very dense and exposed and as such, we would recommend caution should changes be made to turbine positions or access roads.



Figure 4.1: Existing grid infrastructure at the southern extent of the proposed grid connections



Figure 4.2: Existing grid infrastructure at the southern extent of the proposed grid connections



CTS HERITAGE



Figure 4.3: Site at which Grid Option 3 links with Grid Option 2



Figure 4.4: Easternmost extent of Grid Option 5



Figure 4.5: Contextual Images - flat nature of the topography with the occasional butte



CTS HERITAGE



Figure 4.6: Flat topography of the area proposed for the PV development



Figure 4.7: Contextual Images of landscape



Figure 4.8: Contextual Images of Landscape



CTS HERITAGE



Figure 4.9: Contextual Images of Landscape



Figure 4.10: Contextual Images of Landscape, with the N1 running through the development area



Figure 4.11: Contextual Images of the Angora WEF area



CTS HERITAGE



Figure 4.12: Contextual Images of the Angora WEF area



Figure 4.13: Contextual Images of the Angora WEF area



Figure 4.14: Contextual Images of the Angora WEF area



CTS HERITAGE



Figure 4.15: Contextual Images of the Angora WEF area



Figure 4.16: Contextual Images of the Merino WEF area



Figure 4.17: Contextual Images of the Merino WEF area



CTS HERITAGE



Figure 4.18: Contextual Images of the Angora WEF area

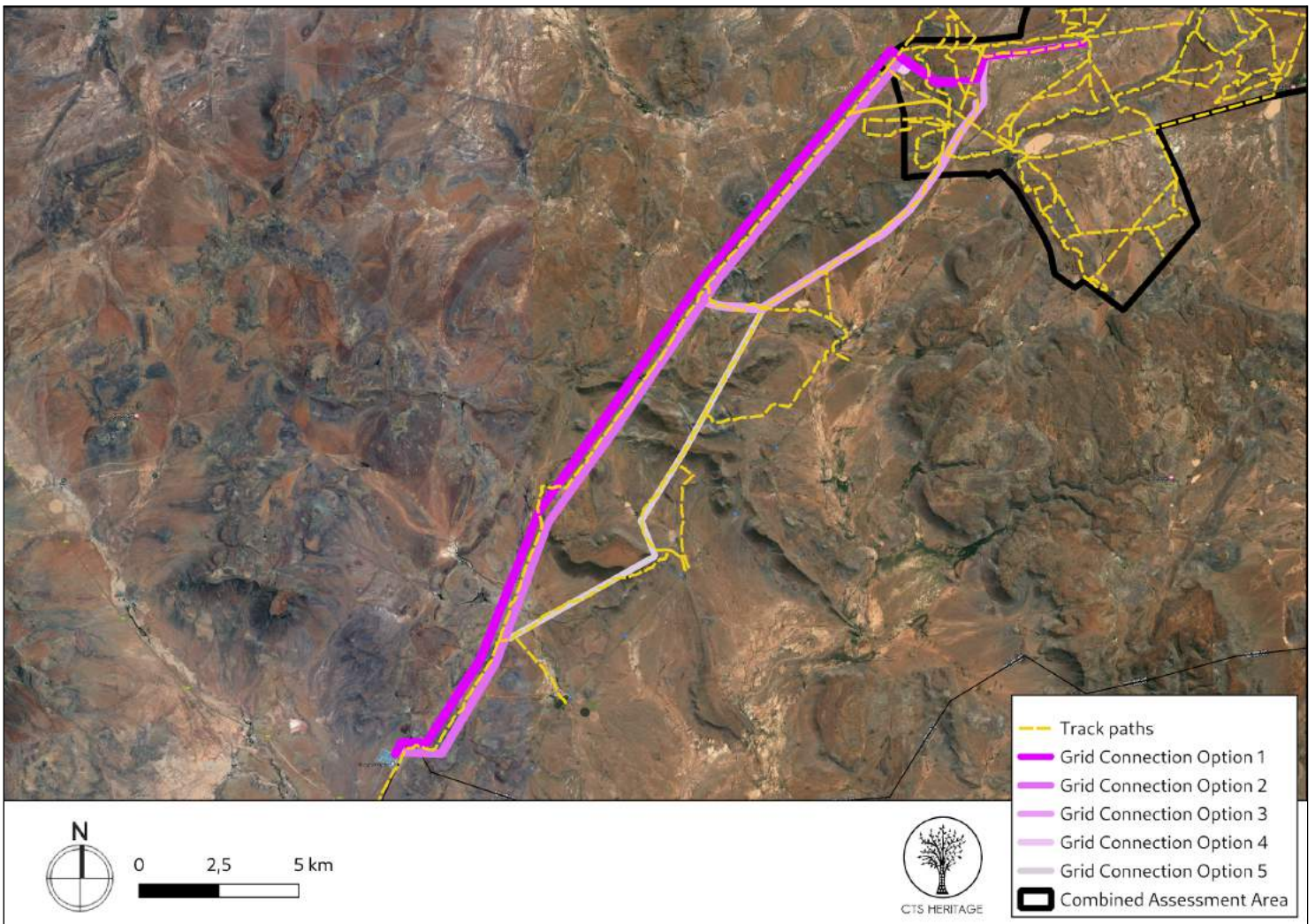


Figure 5.1: Overall track paths of foot survey for the grid connection options



CTS HERITAGE

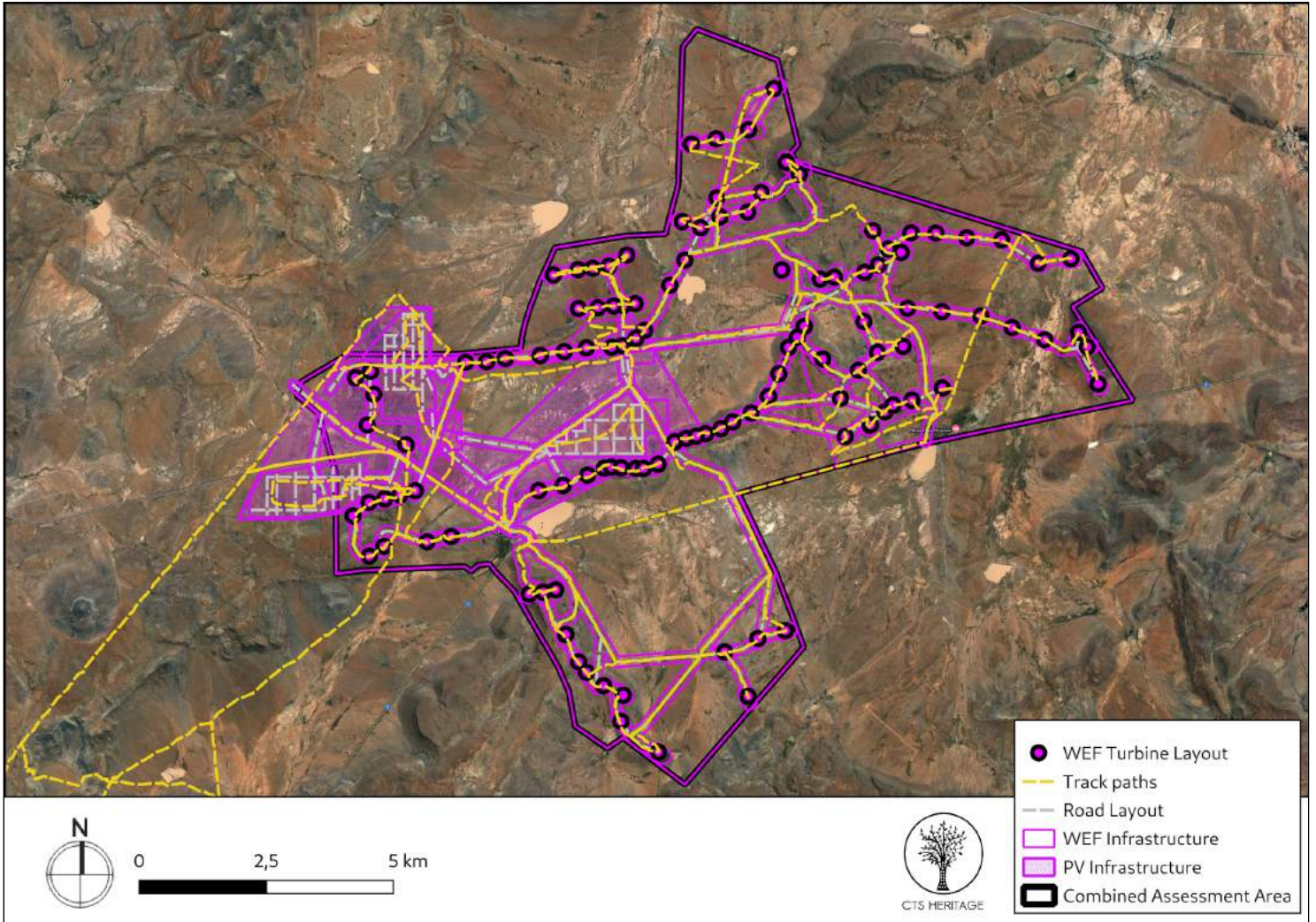


Figure 5.2: Overall track paths of foot survey for the PV and WEF



4.2 Archaeological Resources identified

Table 1: Observations noted during the field assessment

POINT ID	Site Name	Description	Period	Co-ordinates		Grading	Mitigation
GK001	Great Karoo 001	Hornfels broken up source rock, one flake	MSA	-31.67536	23.41625	NCW	NA
GK002	Great Karoo 002	Siltstone flakes and cores near dolerite boulder shelter	MSA	-31.67466	23.41763	NCW	NA
GK003	Great Karoo 003	Quarrying of hornfels and greywacke, no formal tools seen	MSA	-31.67114	23.42757	NCW	NA
GK004	Great Karoo 004	Patinated hornfels assemblage, mainly blades near dry stream bed. Not early MSA	MSA	-31.66289	23.43376	NCW	NA
GK005	Great Karoo 005	Early MSA flake, edge slightly worked	MSA	-31.65061	23.44315	NCW	NA
GK006	Great Karoo 006	Hornfels cores and flakes, one white very patinated flake with old retouched edges	MSA	-31.64028	23.44753	NCW	NA
GK007	Great Karoo 007	Hornfels flakes, cores, greywacke cores and flakes. Partially buried in Kalahari sands	MSA	-31.61139	23.45934	NCW	NA
GK008	Great Karoo 008	Fine grained hornfels flakes, microliths, LSA. Patinated and older MSA cores and flakes in natural clearing surrounded by dolerite boulders	LSA, MSA	-31.59409	23.47433	NCW	NA
GK009	Great Karoo 009	Hornfels flake, cortex remaining on dorsal	MSA	-31.56952	23.49539	NCW	NA
GK010	Great Karoo 010	Rusted large metal spanner, pole, rings associated with powerlines	Modern	-31.54909	23.51106	NCW	NA
GK011	Great Karoo 011	Windmill, concrete tank	Modern	-31.55271	23.5267	NCW	NA
GK012	Great Karoo 012	Hornfels blade flake	MSA	-31.55056	23.52993	NCW	NA
GK013	Great Karoo 013	Patinated hornfels flakes and siltstone	MSA	-31.54143	23.55346	NCW	NA
GK014	Great Karoo 014	Brick plastered tank	Modern	-31.49752	23.56122	NCW	NA
GK015	Great Karoo 015	Hornfels flakes	MSA	-31.49997	23.59458	NCW	NA
GK016	Great Karoo 016	Density of hornfels flakes and cores higher lower down but some on top of small ridge	MSA	-31.50041	23.59568	NCW	NA
GK017	Great Karoo 017	Erosion channel showing artefact gravels 2m below aeolian overburden	MSA	-31.50095	23.5931	NCW	NA
GK018	Great Karoo 018	Thin hornfels flake point, edge retouched	MSA	-31.50189	23.58947	NCW	NA
GK019	Great Karoo 019	Hornfels bladelet	LSA	-31.50992	23.58297	NCW	NA
GK020	Great Karoo 020	Hornfels flakes patinated	MSA	-31.51111	23.5838	NCW	NA
GK021	Great Karoo 021	Hornfels flake buried in donga exposure	MSA	-31.50839	23.59374	NCW	NA
GK022	Great Karoo 022	Thin hornfels flake	MSA	-31.50938	23.59756	NCW	NA
GK023	Great Karoo 023	Thin hornfels flake	MSA	-31.50958	23.59826	NCW	NA
GK024	Great Karoo 024	Microlithic hornfels flake	LSA	-31.50907	23.60067	NCW	NA
GK025	Great Karoo 025	Hornfels core	LSA	-31.50888	23.60096	NCW	NA
GK026	Great Karoo 026	Hornfels cores and flakes	MSA	-31.5083	23.60168	NCW	NA
GK027	Great Karoo 027	Hornfels flakes	MSA	-31.49865	23.59082	NCW	NA
GK028	Great Karoo 028	Hornfels core, weathered	LSA	-31.49853	23.57938	NCW	NA
GK029	Great Karoo 029	Hornfels flakes, patinated	MSA	-31.49854	23.57903	NCW	NA



CTS HERITAGE

GK030	Great Karoo 030	Hornfels blade flake, very weathered	MSA	-31.49878	23.57507	NCW	NA
GK031	Great Karoo 031	Windmill	Modern	-31.50086	23.57677	NCW	NA
GK032	Great Karoo 032	Very thin, weathered hornfels flake	MSA	-31.49897	23.56639	NCW	NA
GK033	Great Karoo 033	greywacke flake	MSA	-31.50312	23.57239	NCW	NA
GK034	Great Karoo 034	Green hornfels flake	MSA	-31.50309	23.57357	NCW	NA
GK035	Great Karoo 035	Hornfels core	MSA	-31.50148	23.5799	NCW	NA
GK036	Great Karoo 036	greywacke core	MSA	-31.50101	23.58142	NCW	NA
GK037	Great Karoo 037	Stone walled ruins x 2	Historic	-31.506165	23.611848	IIIB	No-go development buffer of 500m
GK038	Great Karoo 038	Rondawel farmhouse complex	Historic	-31.507875	23.614365	IIIA	No-go development buffer of 1km
GK039	Great Karoo 039	Windmill	Modern	-31.492339	23.622409	NCW	NA
GK040	Great Karoo 040	Windmill	Modern	-31.497367	23.62571	NCW	NA
GK041	Great Karoo 041	Hornfels flakes, cores, schist core and flakes	MSA	-31.50286	23.61655	NCW	NA
GK042	Great Karoo 042	Quarry	Modern	-31.5031	23.61808	NCW	NA
GK043	Great Karoo 043	Hornfels flakes, cores, schist core and flakes	MSA, LSA	-31.50152	23.61861	NCW	NA
GK044	Great Karoo 044	Schist early MSA flake	MSA	-31.49988	23.62598	NCW	NA
GK045	Great Karoo 045	Hornfels flakes	MSA	-31.49923	23.62776	NCW	NA
GK046	Great Karoo 046	Hornfels and greywacke flakes	MSA	-31.49696	23.64159	NCW	NA
GK047	Great Karoo 047	Siltstone and hornfels flakes, termite mound	MSA	-31.49654	23.64288	NCW	NA
GK048	Great Karoo 048	Lower, ground, grindstone, greywacke flakes, cores	LSA, MSA	-31.49589	23.64534	IIIB	No-go development buffer of 50m
GK049	Great Karoo 049	Ostrich eggshell piece only	LSA	-31.49539	23.64665	NCW	NA
GK050	Great Karoo 050	Thin shale flake	MSA	-31.4888	23.64082	NCW	NA
GK051	Great Karoo 051	Hornfels flakes	MSA	-31.48781	23.64071	NCW	NA
GK052	Great Karoo 052	Windmill	Modern	-31.480756	23.640181	NCW	NA
GK053	Great Karoo 053	Hornfels blade flake	MSA	-31.48751	23.6386	NCW	NA
GK054	Great Karoo 054	Patinated hornfels flake	MSA	-31.49064	23.63448	NCW	NA
GK055	Great Karoo 055	Quartzite flake large bulb of percussion, hornfels cores and flakes	MSA	-31.49191	23.62685	NCW	NA
GK056	Great Karoo 056	Thin hornfels flake	MSA	-31.49487	23.61937	NCW	NA
GK057	Great Karoo 057	Hornfels flakes	MSA	-31.49837	23.61361	NCW	NA
GK058	Great Karoo 058	Siltstone flake	MSA	-31.49961	23.61246	NCW	NA
GK059	Great Karoo 059	Windmill	Modern	-31.47116	23.63189	NCW	NA
GK060	Great Karoo 060	Patinated hornfels flake	MSA	-31.46943	23.63271	NCW	NA
GK061	Great Karoo 061	Patinated hornfels flake	MSA	-31.46118	23.63059	NCW	NA
GK062	Great Karoo 062	Hornfels core and flake	LSA	-31.46084	23.63163	NCW	NA
GK063	Great Karoo 063	Hornfels flake, greywacke flake in broken rocky area	MSA	-31.46351	23.6364	NCW	NA
GK064	Great Karoo 064	Hornfels flake	MSA	-31.46685	23.64032	NCW	NA
GK065	Great Karoo 065	Hornfels flakes	LSA	-31.47172	23.64317	NCW	NA
GK066	Great Karoo 066	Patinated hornfels flake	MSA	-31.47339	23.6404	NCW	NA
GK067	Great Karoo 067	Windmill	Modern	-31.49657	23.65129	NCW	NA



CTS HERITAGE

GK068	Great Karoo 068	Windmill	Modern	-31.498092	23.660175	NCW	NA
GK069	Great Karoo 069	Patinated hornfels flake	MSA	-31.51857	23.62263	NCW	NA
GK070	Great Karoo 070	Hornfels core and flake	LSA, MSA	-31.51917	23.62275	NCW	NA
GK071	Great Karoo 071	greywacke flake blade	MSA	-31.52735	23.62783	NCW	NA
GK072	Great Karoo 072	Hornfels flake	MSA	-31.5288	23.62814	NCW	NA
GK073	Great Karoo 073	Patinated hornfels flake	MSA	-31.53259	23.63142	NCW	NA
GK074	Great Karoo 074	Stone walled ruin	Historic	-31.54013	23.64369	IIIB	No-go development buffer of 500m
GK075	Great Karoo 075	Windmill	Modern	-31.54335	23.63757	NCW	NA
GK076	Great Karoo 076	Ruined dam	Modern	-31.54332	23.63995	NCW	NA
GK077	Great Karoo 077	Hornfels core	MSA	-31.53989	23.64523	NCW	NA
GK078	Great Karoo 078	Hornfels flake	MSA	-31.53512	23.64977	NCW	NA
GK079	Great Karoo 079	Patinated hornfels flakes	MSA	-31.52945	23.65541	NCW	NA
GK080	Great Karoo 080	Hornfels core and flakes	MSA	-31.49512	23.59417	NCW	NA
GK081	Great Karoo 081	Hornfels core	MSA	-31.4933	23.59447	NCW	NA
GK082	Great Karoo 082	Hornfels flakes	LSA	-31.49158	23.59317	NCW	NA
GK083	Great Karoo 083	Windmill	Modern	-31.49136	23.59298	NCW	NA
GK084	Great Karoo 084	Patinated hornfels flakes	MSA	-31.48999	23.58868	NCW	NA
GK085	Great Karoo 085	Hornfels core and flakes	LSA	-31.48695	23.58745	NCW	NA
GK086	Great Karoo 086	Hornfels core	MSA	-31.47988	23.58493	NCW	NA
GK087	Great Karoo 087	Patinated hornfels flake	MSA	-31.47814	23.58762	NCW	NA
GK088	Great Karoo 088	Hornfels flake	MSA	-31.47416	23.59419	NCW	NA
GK089	Great Karoo 089	Hornfels core	MSA	-31.4735	23.5942	NCW	NA
GK090	Great Karoo 090	Patinated hornfels flake	MSA	-31.46989	23.59372	NCW	NA
GK091	Great Karoo 091	Windmill	Modern	-31.46921	23.5958	NCW	NA
GK092	Great Karoo 092	Hornfels flake	MSA	-31.47445	23.59679	NCW	NA
GK093	Great Karoo 093	Patinated hornfels flakes	MSA	-31.47954	23.59481	NCW	NA
GK094	Great Karoo 094	Patinated hornfels flakes	MSA	-31.48168	23.59467	NCW	NA
GK095	Great Karoo 095	Patinated hornfels flake	MSA	-31.48242	23.5961	NCW	NA
GK096	Great Karoo 096	Hornfels flake blade	MSA	-31.48828	23.5975	NCW	NA
GK097	Great Karoo 097	Patinated hornfels flake	MSA	-31.49064	23.599	NCW	NA
GK098	Great Karoo 098	Windmill	Modern	-31.49582	23.59807	NCW	NA
GK099	Great Karoo 099	Windmill	Modern	-31.493731	23.68202	NCW	NA
GK100	Great Karoo 100	Vogelstruisfontein farmhouse complex	Historic	-31.490632	23.702744	IIIA	No-go development buffer of 1km
GK101	Great Karoo 101	Vogelstruisfontein graveyard surrounded by stone wall, individual dolerite boundary markers set out bigger area of unmarked graves	Historic	-31.486078	23.701456	IIIA	No-go development buffer of 500m
GK102	Great Karoo 102	Windmill	Modern	-31.482254	23.707171	NCW	NA
GK103	Great Karoo 103	Hornfels flake, edge retouched	MSA	-31.4723	23.72314	NCW	NA
GK104	Great Karoo 104	Hornfels flake, possibly LSA	LSA	-31.45692	23.719209	NCW	NA
GK105	Great Karoo 105	Schalkhanna red roofed farmhouse complex, stone walled kraal	Historic	-31.460227	23.725995	IIIB	No-go development buffer of 500m



CTS HERITAGE

GK106	Great Karoo 106	Windmill	Modern	-31.455061	23.701265	NCW	NA
GK107	Great Karoo 107	Hornfels flake	LSA, MSA	-31.468664	23.704401	NCW	NA
GK108	Great Karoo 108	greywacke core	MSA	-31.47322	23.67603	NCW	NA
GK109	Great Karoo 109	Siltstone and hornfels flakes	MSA	-31.48407	23.6799	NCW	NA
GK110	Great Karoo 110	greywacke quarrying, hornfels cores and flakes, especially in the way up	MSA	-31.49017	23.68499	NCW	NA
GK111	Great Karoo 111	Hornfels core	MSA	-31.48881	23.68984	NCW	NA
GK112	Great Karoo 112	Hornfels flake	MSA	-31.47871	23.68792	NCW	NA
GK113	Great Karoo 113	Hornfels flake, core LSA	LSA, MSA	-31.4714	23.6895	NCW	NA
GK114	Great Karoo 114	Windmill	Modern	-31.46782	23.68721	NCW	NA
GK115	Great Karoo 115	greywacke and hornfels flakes, patinated near jeep junction	MSA	-31.455371	23.668206	NCW	NA
GK116	Great Karoo 116	Windmill	Modern	-31.453894	23.676511	NCW	NA
GK117	Great Karoo 117	Siltstone flakes	MSA	-31.45151	23.67798	NCW	NA
GK118	Great Karoo 118	Hornfels blade flake	MSA	-31.44625	23.67587	NCW	NA
GK119	Great Karoo 119	Very patinated hornfels flake	MSA	-31.453605	23.655916	NCW	NA
GK120	Great Karoo 120	Hornfels flake	LSA	-31.447639	23.665162	NCW	NA
GK121	Great Karoo 121	Windmill	Modern	-31.442398	23.667416	NCW	NA
GK122	Great Karoo 122	greywacke and hornfels circular thin flake, formal	MSA	-31.438828	23.65496	NCW	NA
GK123	Great Karoo 123	Hornfels debitage not worked	MSA	-31.431445	23.668741	NCW	NA
GK124	Great Karoo 124	Windmill	Modern	-31.466957	23.679028	NCW	NA
GK125	Great Karoo 125	greywacke and hornfels cores and flakes	MSA	-31.643632	23.451292	NCW	NA
GK126	Great Karoo 126	Hornfels flakes, dorsal reduction	MSA	-31.6384659	23.45974918	NCW	NA
GK127	Great Karoo 127	Quartzite flake	MSA	-31.63040907	23.47842969	NCW	NA
GK128	Great Karoo 128	Hornfels bladelet	LSA	-31.5979548	23.50175682	NCW	NA
GK129	Great Karoo 129	greywacke core	MSA	-31.60338828	23.49861806	NCW	NA
GK130	Great Karoo 130	Hornfels blade flake	MSA	-31.61165517	23.49280684	NCW	NA
GK131	Great Karoo 131	Hornfels bladelet	LSA	-31.61571999	23.49376	NCW	NA
GK132	Great Karoo 132	Hornfels flake	MSA	-31.62469267	23.49593221	NCW	NA



CTS HERITAGE

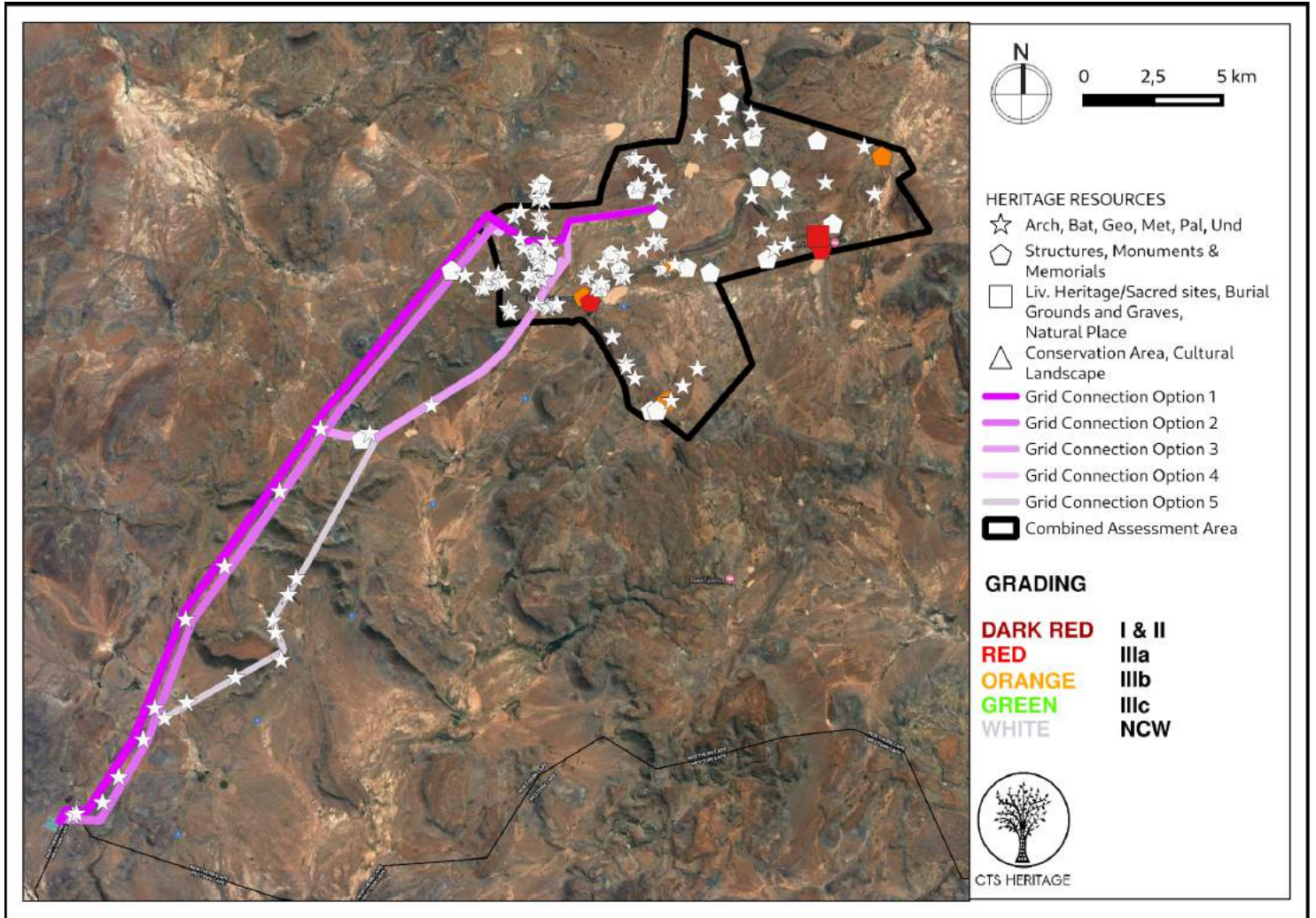


Figure 5.3: Map of all sites and observations noted within the development area



4.3 Selected photographic record

(a full photographic record is available upon request)



Figure 6.1: Observation GK001



Figure 6.2: Observation GK011 and GK012



Figure 6.3: Observation GK019 and GK020



Figure 6.4: Observation GK029



Figure 6.5 Observation GK037



Figure 6.6 Observation GK038



CTS HERITAGE



Figure 6.7 Observation GK048



Figure 6.8 Observation GK048



CTS HERITAGE



Figure 6.9: Observation GK057 and GK058



Figure 6.10: Observation GK074



Figure 6.11: Observation GK083 and GK093



Figure 6.12: Observation GK100



Figures 6.13: Observation GK101



Figure 6.14: Observation GK101



CTS HERITAGE



Figure 6.15: Observation GK105



Figure 6.16: Observation GK105



Figure 6.17: Observation GK115 and GK116



Figure 6.18: Observation GK125



Figure 6.19: Observation GK132



CTS HERITAGE

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

The proposed development will not have a substantial negative impact on the heritage resources identified within the proposed development area for the renewable energy facilities and the grid connection. The majority of the lithic material identified is of low significance (not conservation-worthy), and even though the resources may be destroyed during construction, the impact is inconsequential. No mitigation is required for archaeological material recorded in the footprint areas of the proposed development.

Despite the high number of observations of artefacts, these resources are common and representative of similar scatters across widespread areas of the Karoo. Despite the very high numbers of observations made, the archaeological material is ubiquitous across the entire area and in general, the results of this assessment indicate that the archaeological sensitivity of the development area is low.

Grid

A total of 24 archaeological observations were identified in the five proposed grid alignment options. None of the identified archaeological resources were determined to be conservation-worthy. Six modern windmill and water storage structures were identified within the grid alignment options but none of these were determined to be conservation-worthy. Based on the outcomes of this assessment, none of the proposed grid alternatives will have a negative impact on any significant heritage resources and as such, there is no preferred alternative in terms of impacts to heritage resources.



CTS HERITAGE

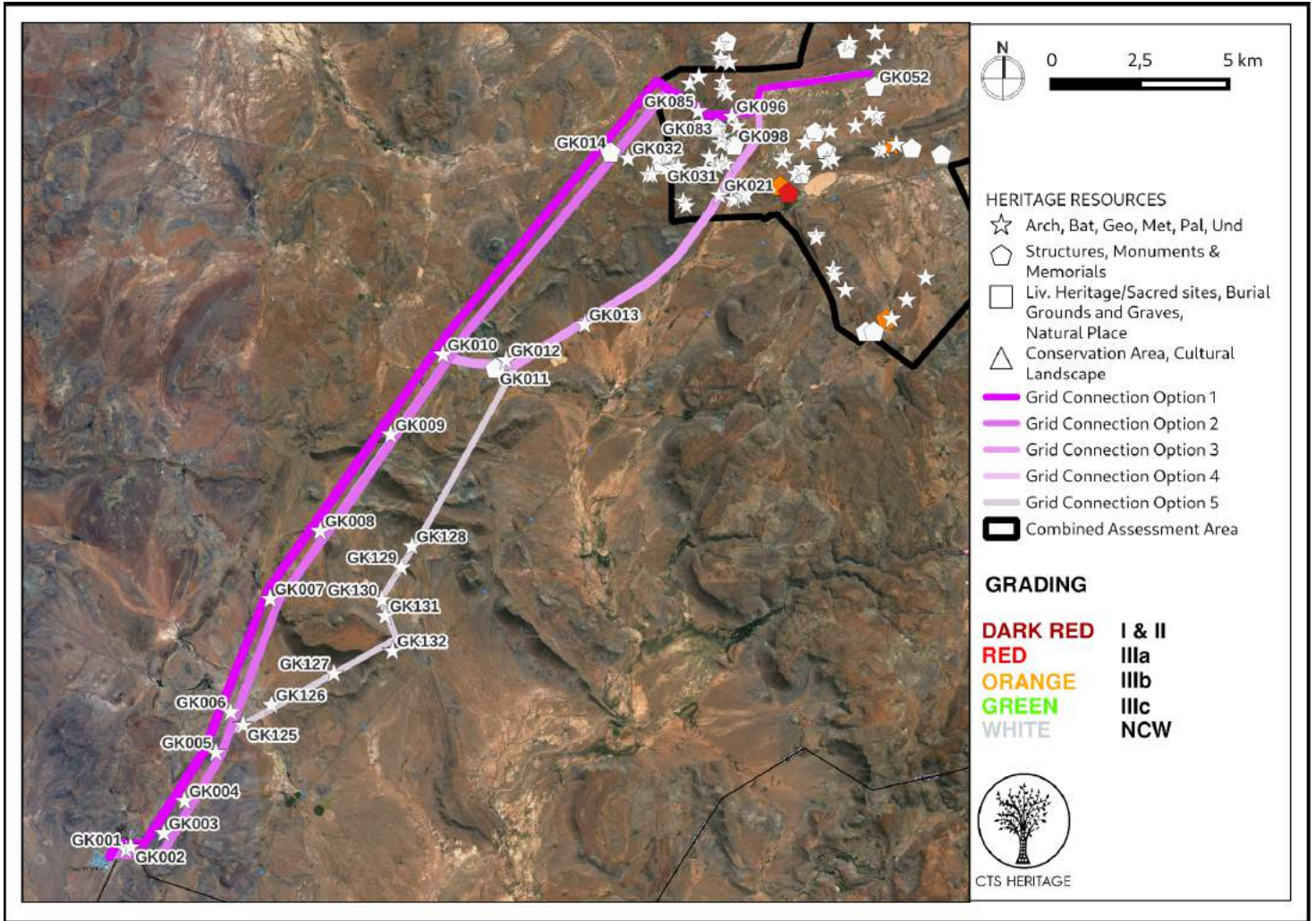


Figure 7: Map of heritage resources identified during the field assessment relative to the proposed development footprint for the grid connection options



CTS HERITAGE

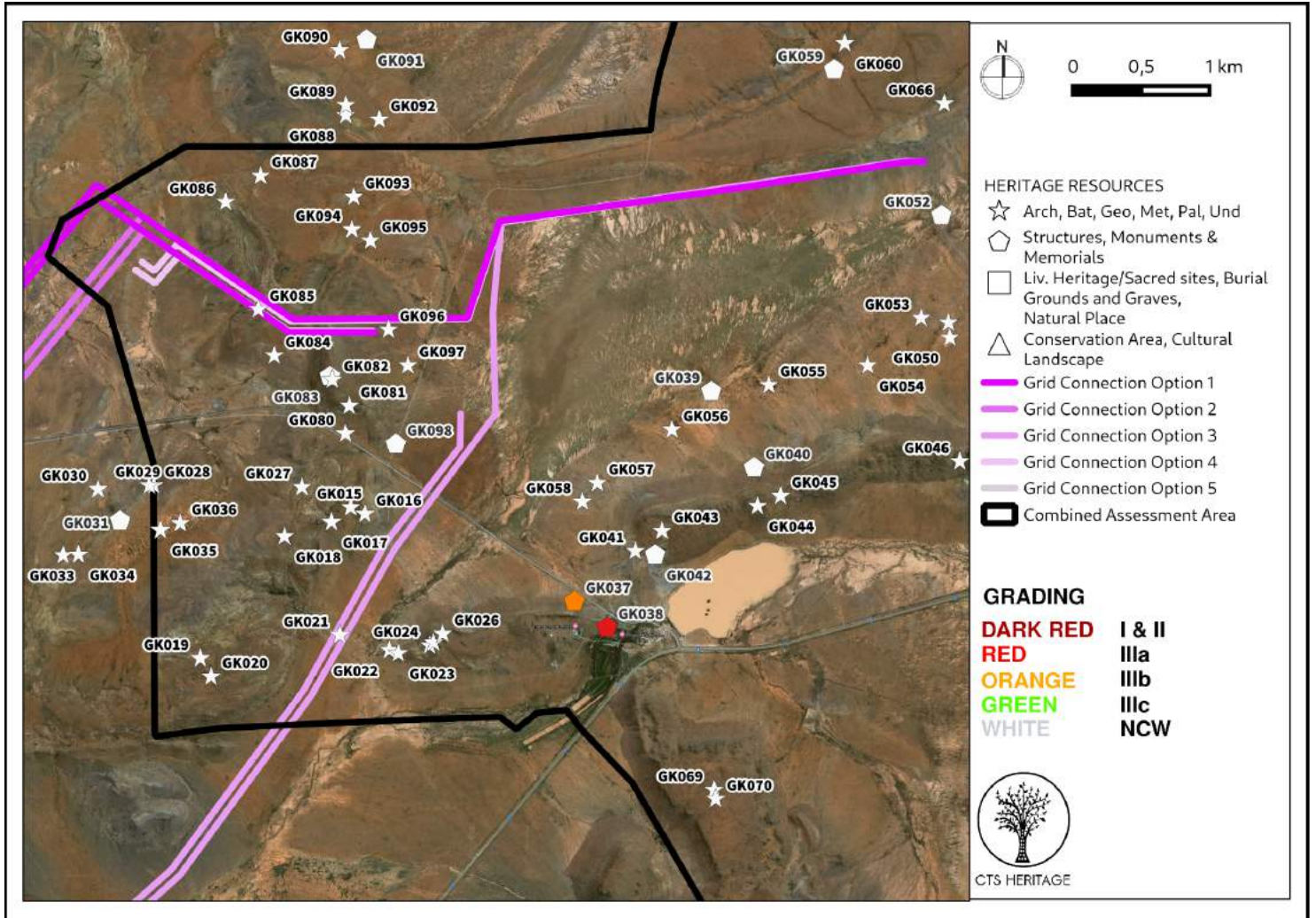


Figure 7.1: Map of heritage resources identified during the field assessment relative to the proposed grid connection options



CTS HERITAGE

Merino WEF

A total of 54 archaeological observations and 13 structures were identified within the Merino WEF development area. Only one of the identified archaeological resources was determined to be conservation-worthy, Observation GK048 which is described as both MSA and LSA material including lower, ground, grindstone, greywacke flakes and cores and is graded IIIB. This site is located in close proximity to proposed wind turbines, however no impact is anticipated at this stage. To ensure that no impact occurs, it is recommended that a no-go development buffer of 50m is imposed around this site.

Thirteen structures were identified within the Merino WEF development area, the majority of which are modern windmills and dams, and one quarry. None of these were determined to be conservation-worthy. Three conservation-worthy structures were identified within this development area. Site GK038 records a rondavel farmhouse complex that has historic significance and has been graded IIIA. There is over 1km distance between this site and the nearest proposed WEF infrastructure and as such, no direct impact is anticipated. It is recommended that this 1km no-go development buffer be maintained. GK037 and GK074 record stone wall ruins and have been graded IIIB. There is more than 500m distance between these sites and the nearest proposed WEF infrastructure and as such, no direct impact is anticipated. It is recommended that this 1km no-go development buffer be maintained.



CTS HERITAGE

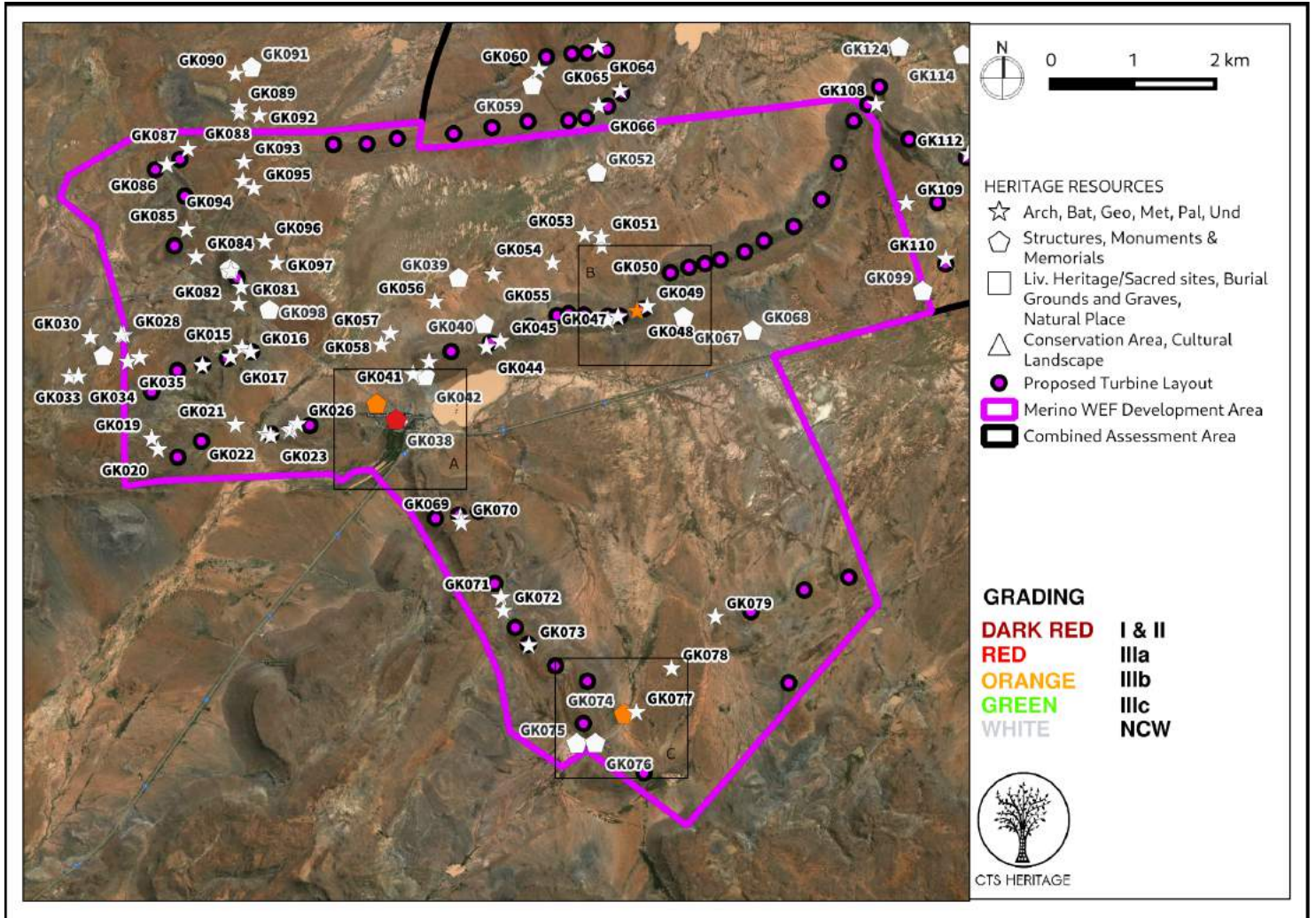


Figure 8: Map of heritage resources identified during the field assessment relative to the proposed development footprint for the Merino WEF



CTS HERITAGE

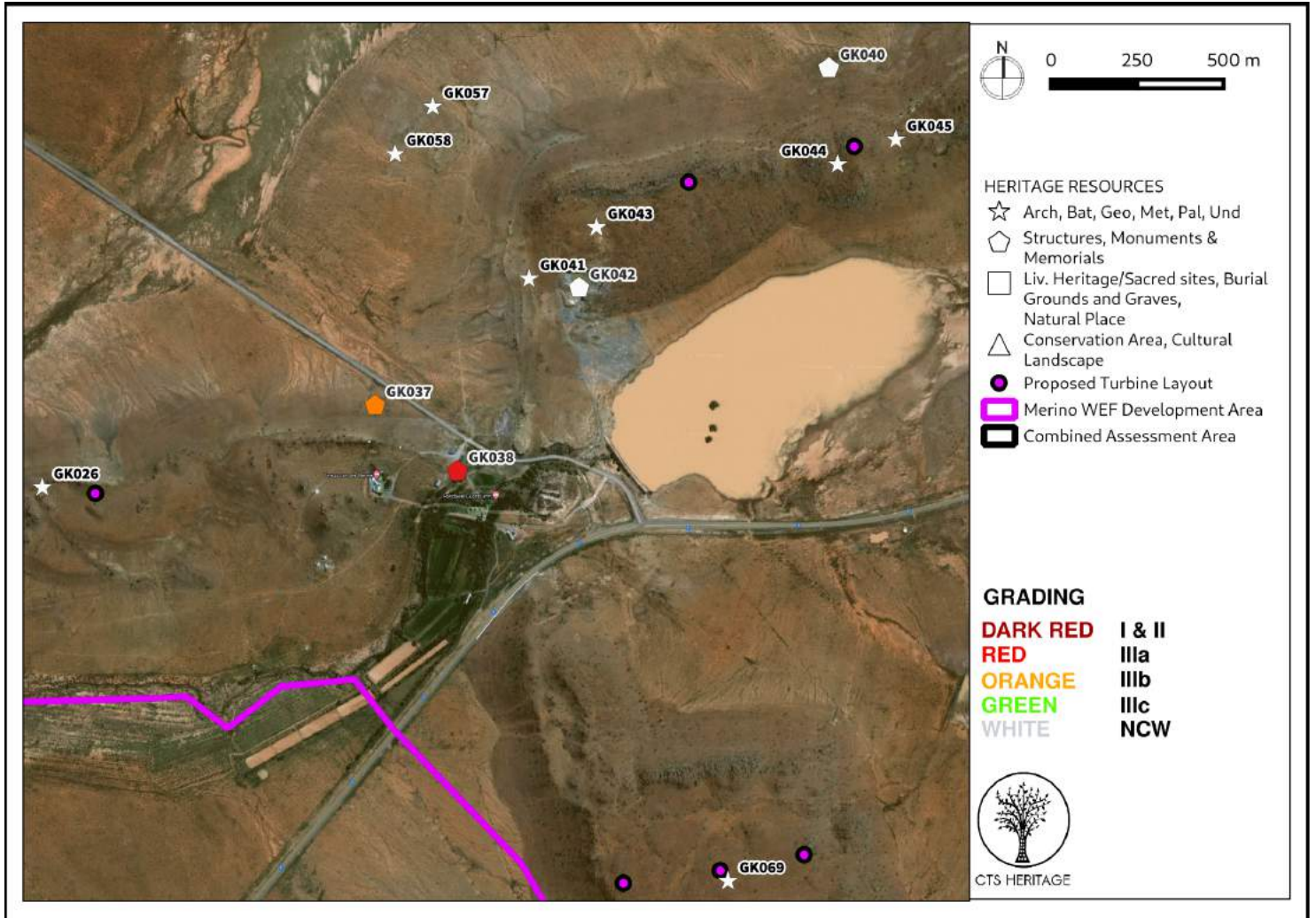


Figure 8.1: Inset A



CTS HERITAGE

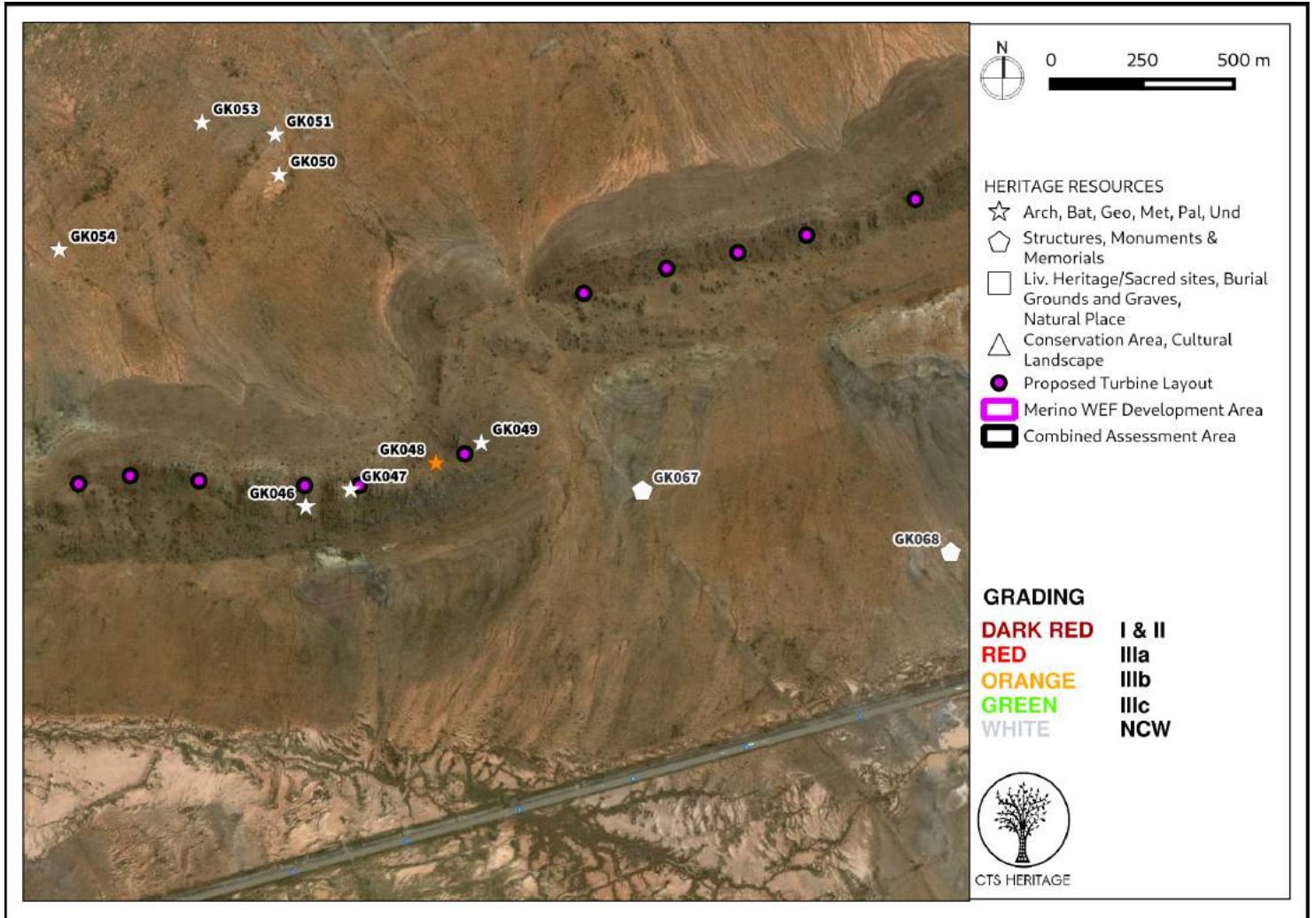


Figure 8.2: Inset B



CTS HERITAGE

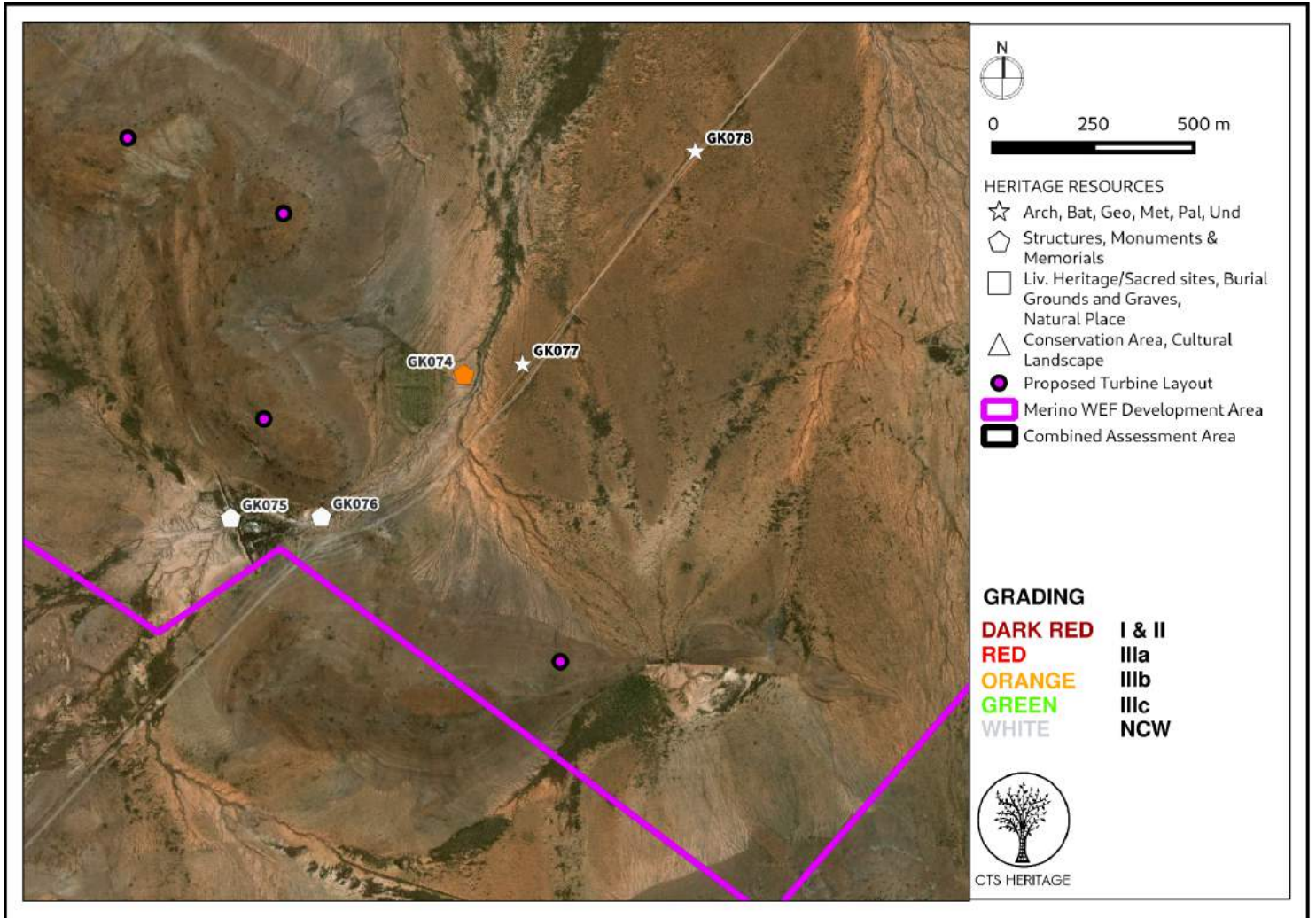


Figure 8.3: Inset C



CTS HERITAGE

Angora WEF

A total of 23 archaeological observations and 10 structures were identified within the Angora WEF development area. None of the identified archaeological resources was determined to be conservation-worthy and as such, no further recommendations are made regarding the archaeological material identified.

Ten structures were identified within the Angora WEF development area, the majority of which are modern windmills which were determined to be not conservation-worthy. Two conservation-worthy structures were identified within this development area. Site GK100 records the Vogelstruisfontein farmhouse complex that has historic significance and has been graded IIIA. Site GK101 records the Vogelstruisfontein graveyard associated with this farmhouse complex and is located approximately 500m from GK100. This site is surrounded by stone wall with individual dolerite boundary markers set out to demarcate a bigger area of unmarked graves. This burial ground site is also graded IIIA. There is approximately 790m distance between site GK100 and the nearest proposed WEF infrastructure and as such, no direct impact is anticipated. It is recommended that, as with the other grade IIIA sites, this no-go development buffer be expanded to 1km. This will also ensure a 500m no-go development buffer around the burial ground site GK101.

Site GK105 records the Schalkhanna red roofed farmhouse complex which includes stone walled kraal. This site has been graded IIIB for its historic significance. A wind turbine has been proposed to be located less than 150m from this site which is likely to negatively impact on the sense of place associated with this site. It is recommended that in order to ensure that no impact takes place, a 500m no-go development buffer be implemented around this site. This will require that this turbine be moved.



CTS HERITAGE

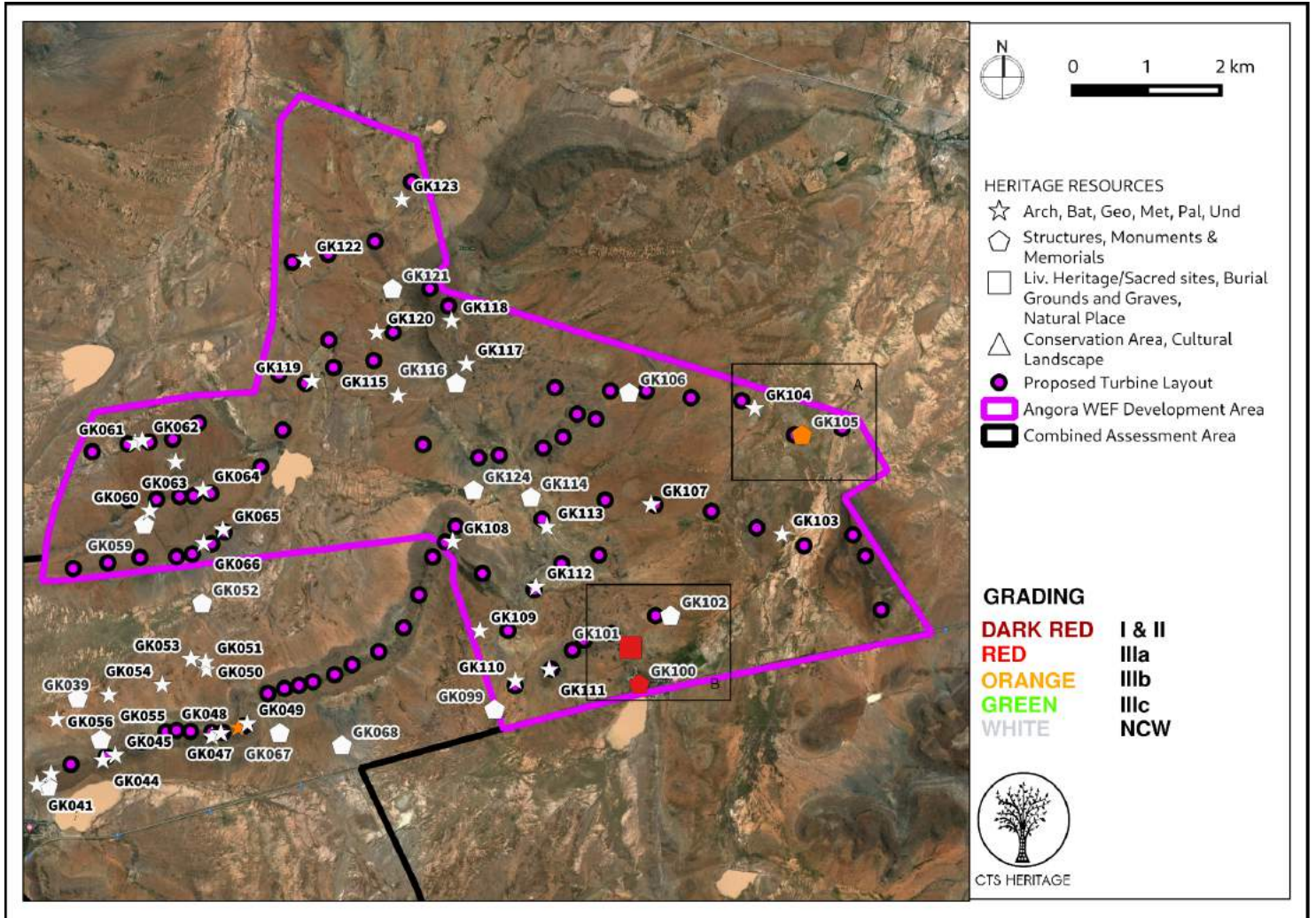


Figure 9: Map of heritage resources identified during the field assessment relative to the proposed development footprint for the Angora WEF



CTS HERITAGE

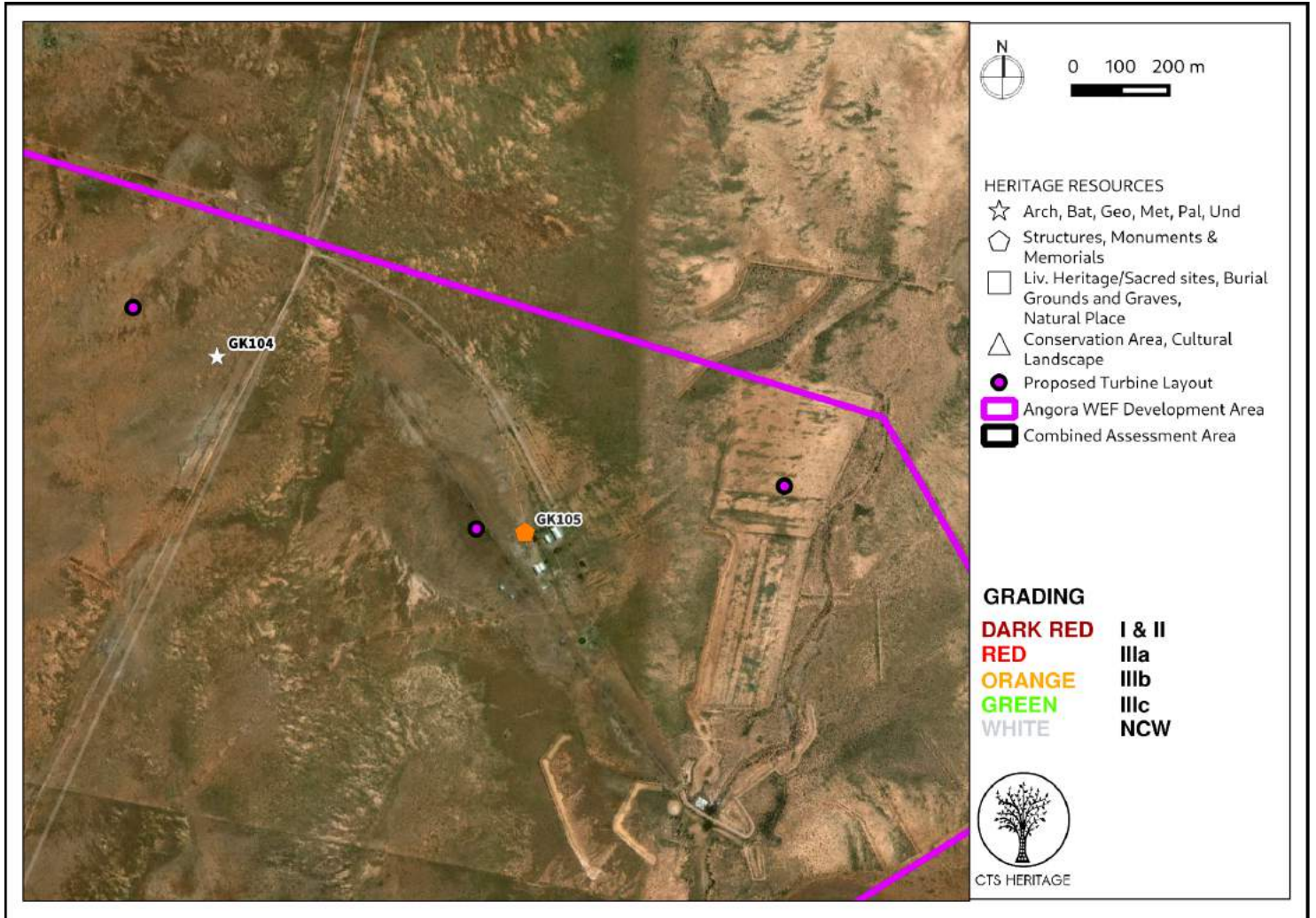


Figure 9.1: Inset A



CTS HERITAGE

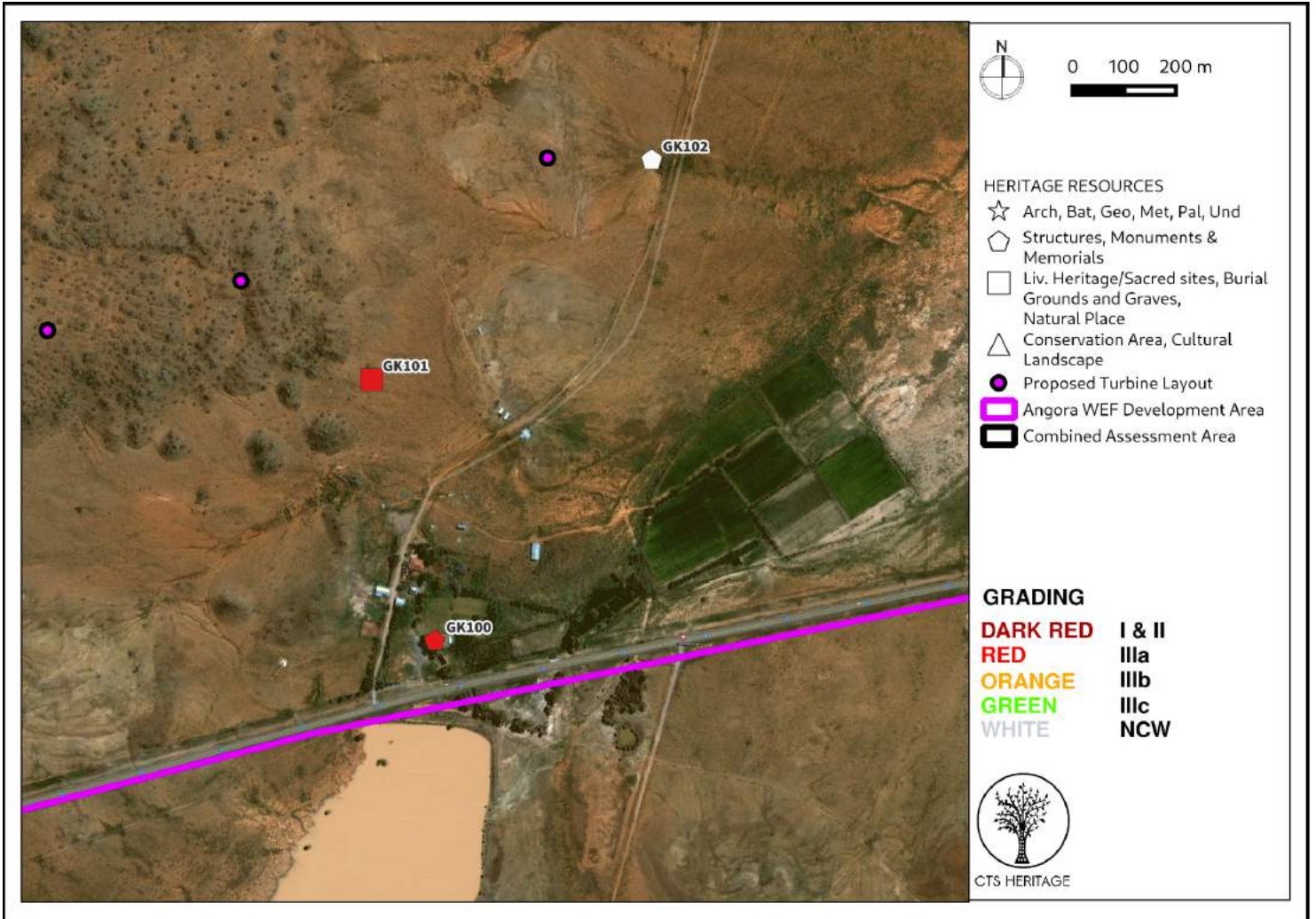


Figure 9.2: Inset B



CTS HERITAGE

PV Facilities

A total of 38 archaeological observations were identified within the PV Facilities development area. None of the identified archaeological resources were determined to be conservation-worthy and no impact to any significant archaeological heritage is anticipated at this stage.

Observation GK048 which is described as both MSA and LSA material including lower, ground, grindstone, greywacke flakes and cores and is graded IIIB. This site is located approximately 180m outside of the PV Facilities development area, and as such no impact is anticipated at this stage. To ensure that no impact occurs, it is recommended that a no-go development buffer of 50m is imposed around this site.

Eight structures were identified within the PV Facilities development area, all of which are modern windmills and dams, and one quarry. None of these were determined to be conservation-worthy.

Site GK038 records a rondavel farmhouse complex that has historic significance and has been graded IIIA. Site GK037 records stone wall ruins and has been graded IIIB. Both of these sites are located outside of the PV Facilities development area and as such, no direct impact is anticipated at this stage. It is recommended that a 1km no-go development buffer be maintained around Site GK038 and a 500m no-go development buffer be maintained around Site GK037 to ensure that no impact occurs..



CTS HERITAGE

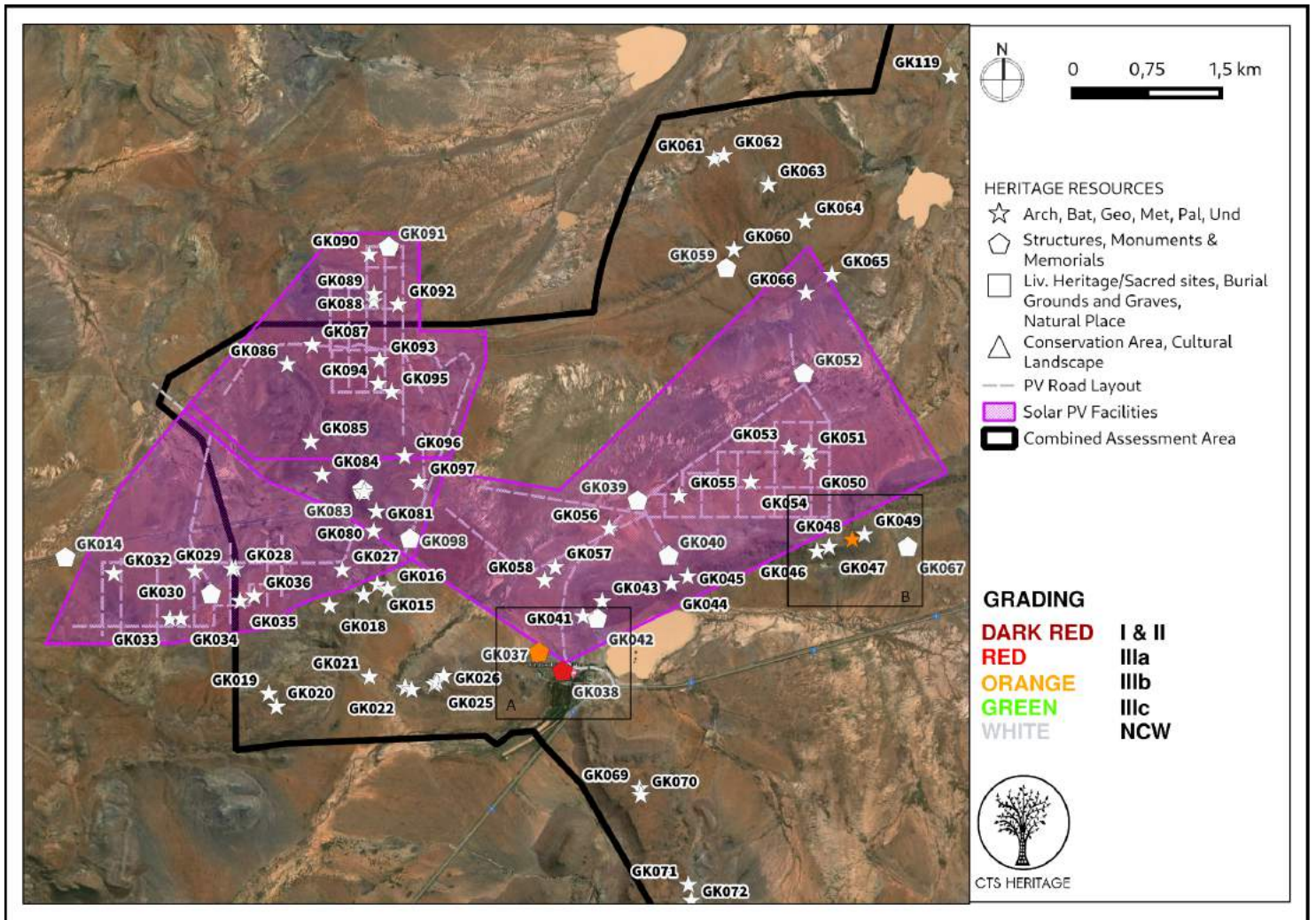


Figure 10: Map of heritage resources identified during the field assessment relative to the proposed development footprint for the PV Facilities



CTS HERITAGE

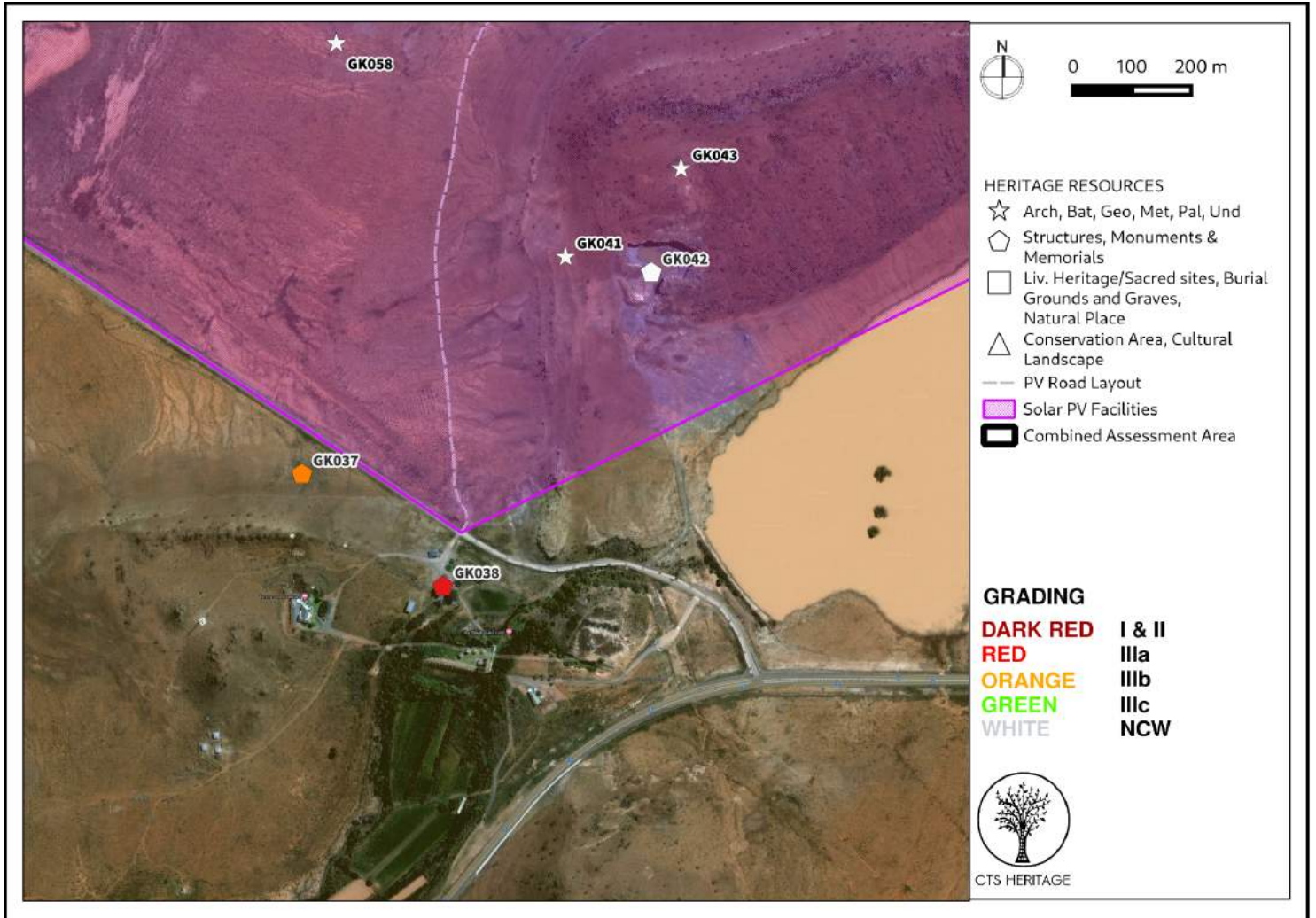


Figure 10.1: Inset A



CTS HERITAGE

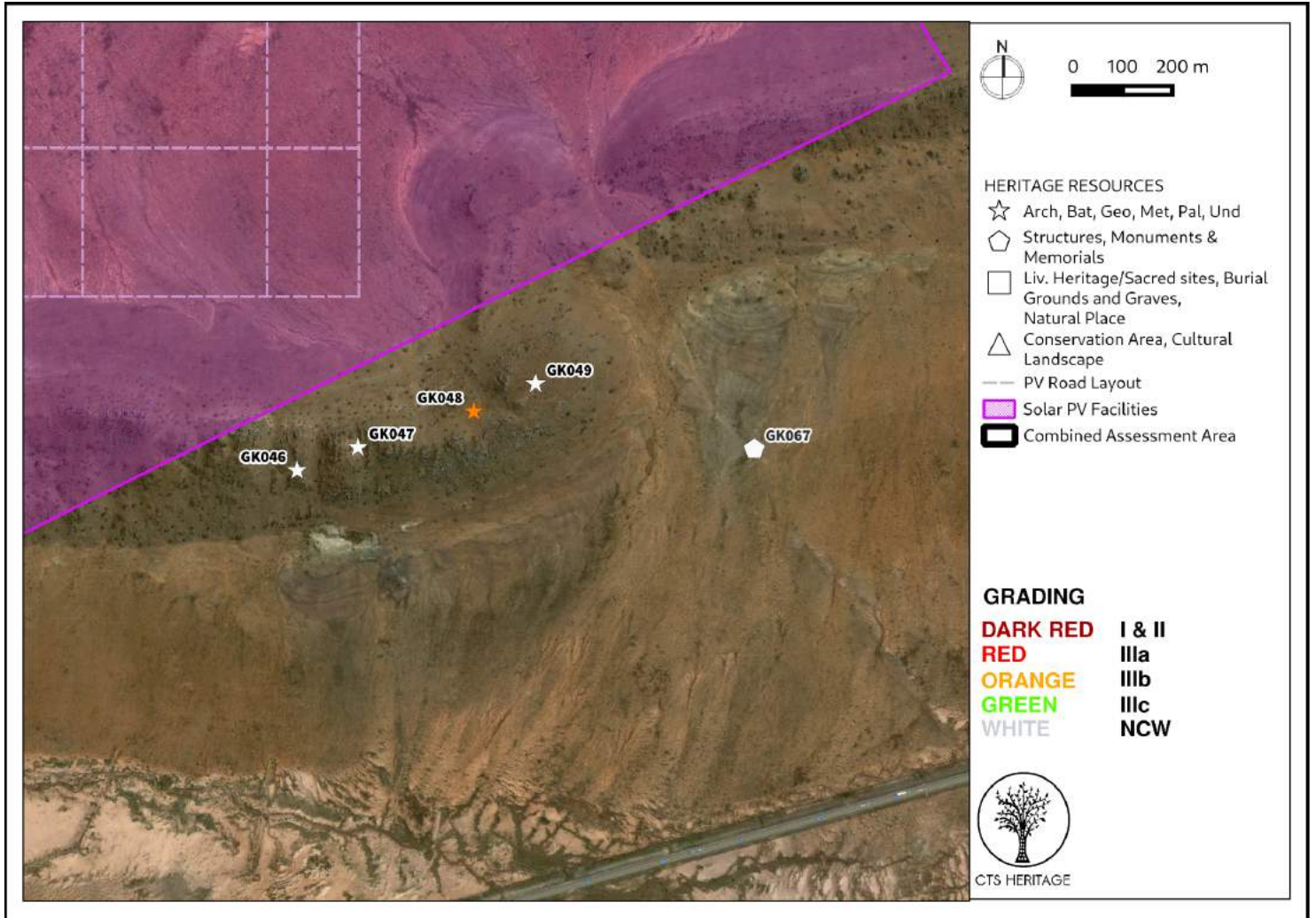


Figure 10.2: Inset B



6. CONCLUSION AND RECOMMENDATIONS

The findings of this assessment largely correlate with the findings of other assessments completed in the vicinity such as the findings of the ACO (2013, SAHRIS NID 503074) who note that “Because of the scarcity of caves and shelters, more than 90% of Karoo archaeological sites are open sites of stone artefacts, ostrich eggshell fragments and occasionally, pottery. Bone remains are rarely preserved. Artefacts of both the Early and Middle Stone Age are widespread and may generally be described as an ancient litter that occurs at a low frequency across the landscape.” This same archaeological signature has been identified within the development footprint.

It is noted that high numbers of quarried stone artefacts predominantly from the Middle Stone Age period were found on this property which is consistent with observations on neighbouring farms through impact assessments and research surveys. These artefacts are particularly visible in deflated open sites where the top soil has washed away onto a harder gravel surface. Despite the large number of dolerite outcrops, no engravings were found. We are not currently aware of a large number of Stone Age engravings in this area and the lack of sites found might possibly be due to the routes chosen for the access roads and turbine positions. It was noted in the field assessment that the archaeology located around the dolerite ridges is very dense and exposed and as such, we would recommend caution should changes be made to turbine positions or access roads.

One archaeological site of significance was identified, Site GK048 (Grade IIIB). It is recommended that a no-go development buffer of 50m is implemented around this site to ensure that it is not impacted. The other significant resources identified include stone wall ruins (GK037, GK074 and GK105) graded IIIB and two significant farm werfs (GK038 and GK100) and a burial ground (GK101) graded IIIA. No-go development buffers are recommended around these sites to ensure that no impact takes place. These are illustrated in Figure 11 below.

Recommendations

Based on the outcomes of this report, it is not anticipated that the proposed development of the renewable energy facilities and its associated grid connection infrastructure will negatively impact on significant archaeological heritage on condition that::

- A 50m no-go development buffer is implemented around site GK048 (Figure 11.5)
- A 500m no-go development buffer is implemented around site GK037 (Figure 11.1), GK074 (Figure 11.2), GK105 (Figure 11.4) and GK101 (Figure 11.3)
- A 1km no-go development buffer is implemented around site GK038 (Figure 11.1) and GK100 (Figure 11.4)
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.



CTS HERITAGE

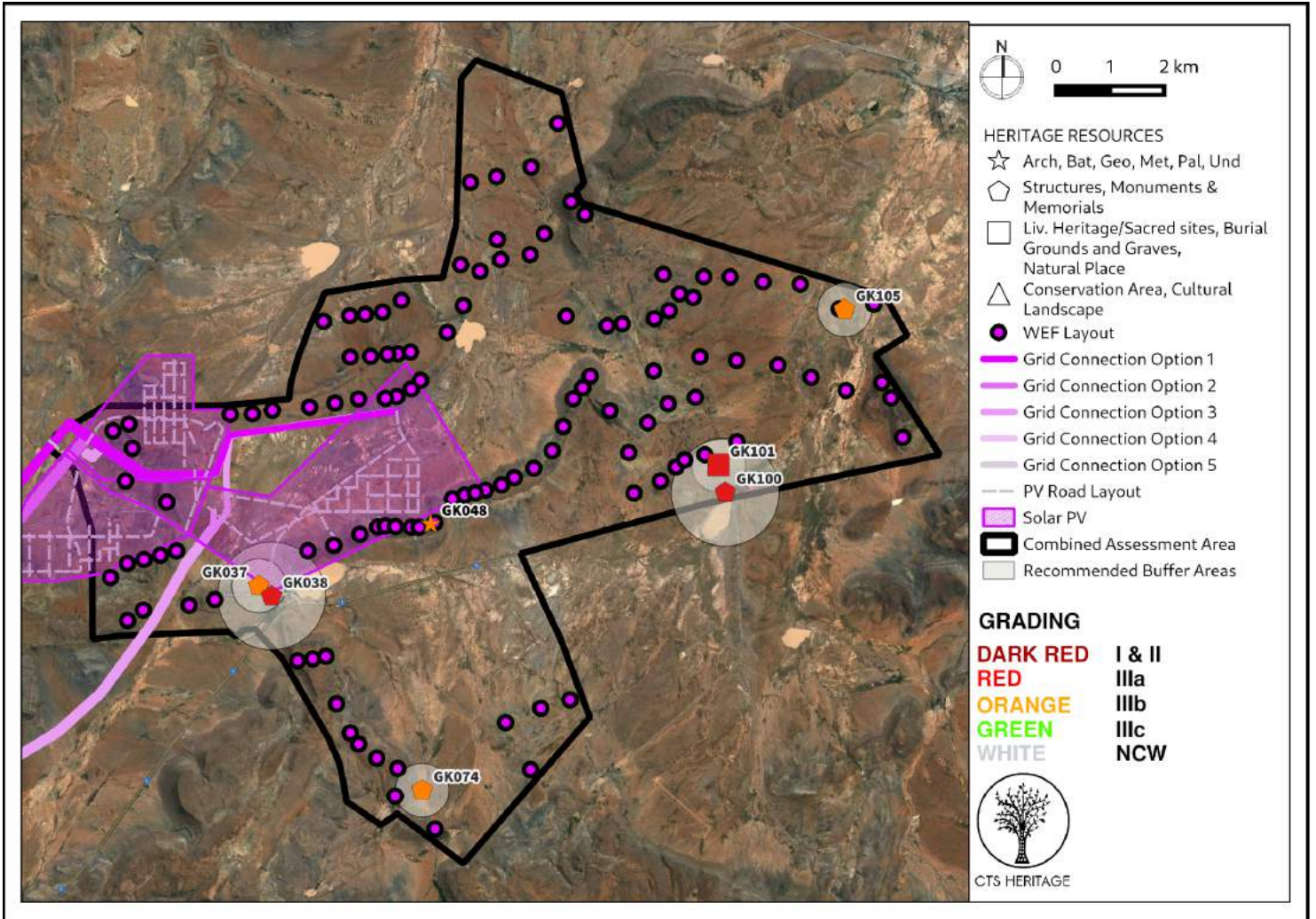


Figure 11: Map of recommended buffer areas relative to the proposed development footprint for all proposed development



CTS HERITAGE

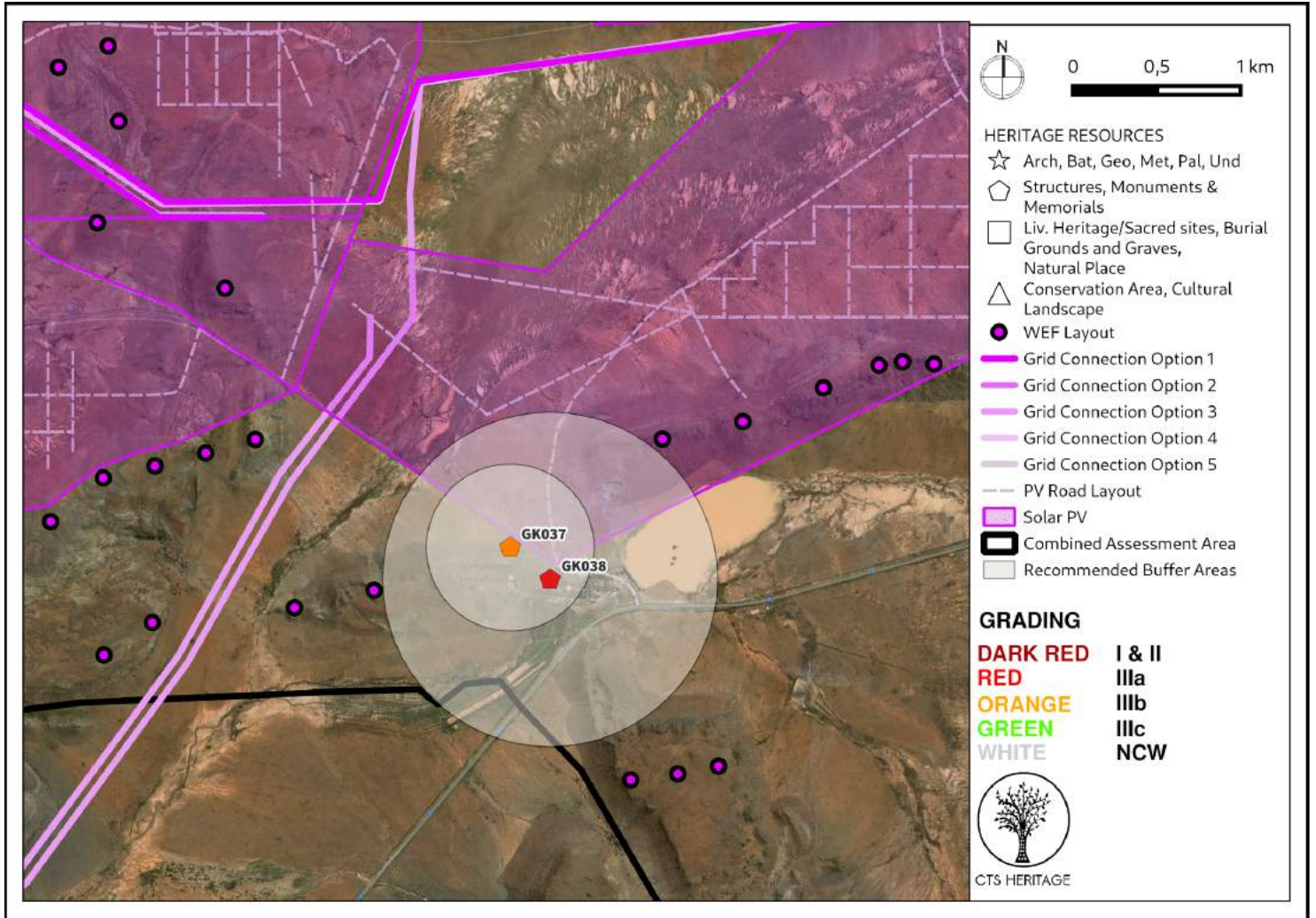


Figure 11.1: Recommended buffer around sites GK037 and GK038 relative to all proposed development



CTS HERITAGE

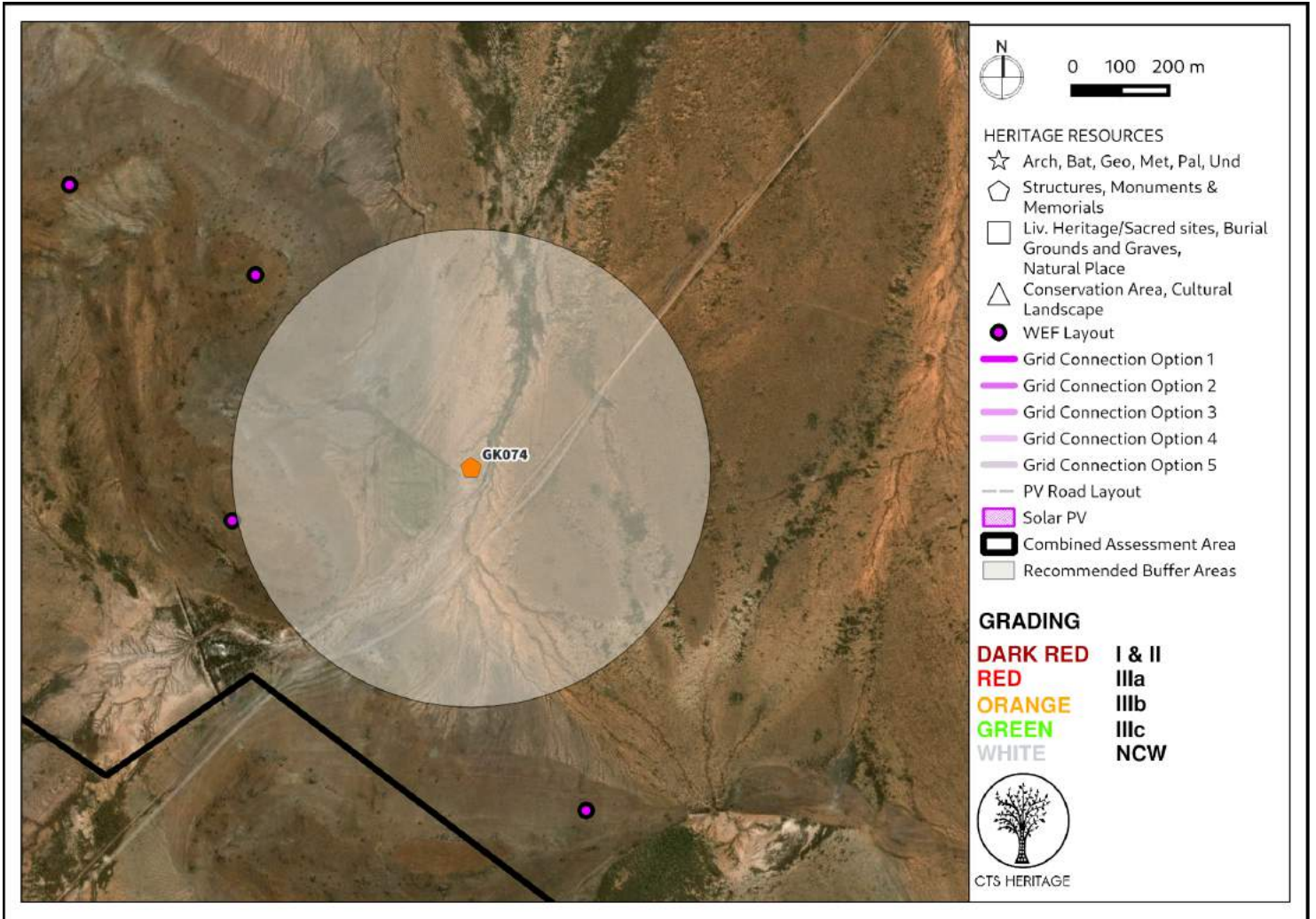


Figure 11.2: Recommended buffer around sites GK074 relative to all proposed development



CTS HERITAGE

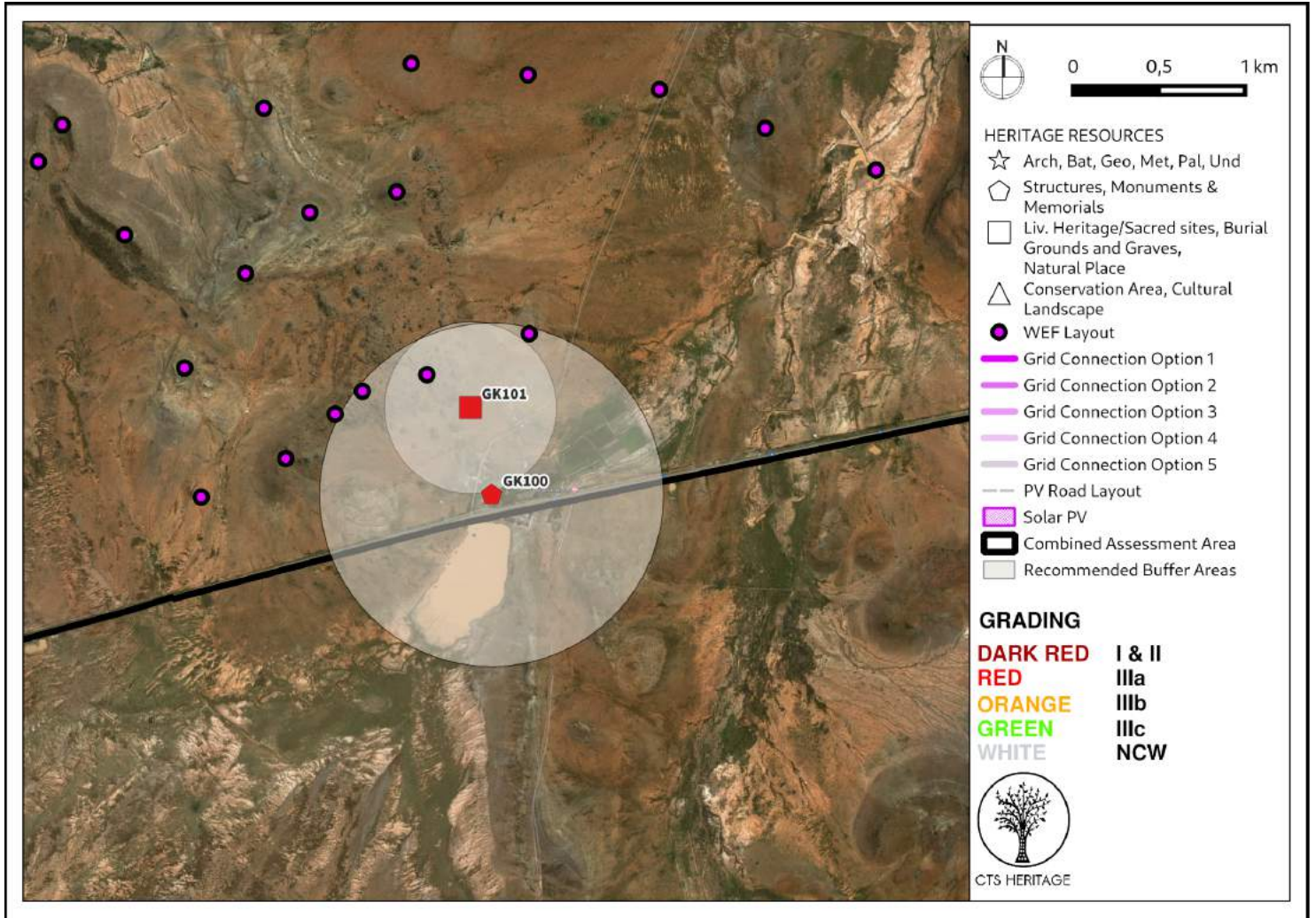


Figure 11.3: Recommended buffer around sites GK100 and GK101 relative to all proposed development



CTS HERITAGE

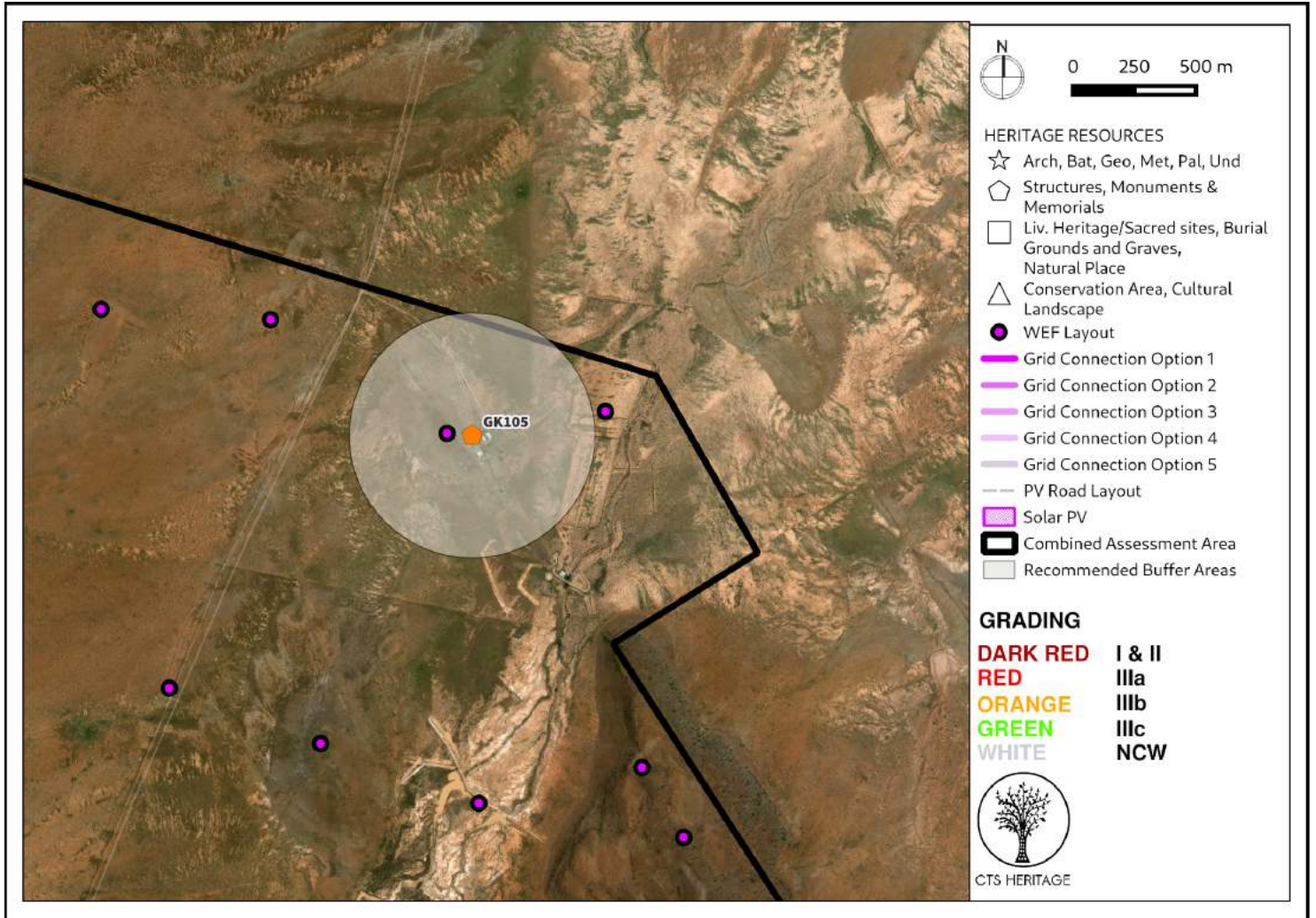


Figure 11.4: Recommended buffer around sites GK105 relative to all proposed development



CTS HERITAGE

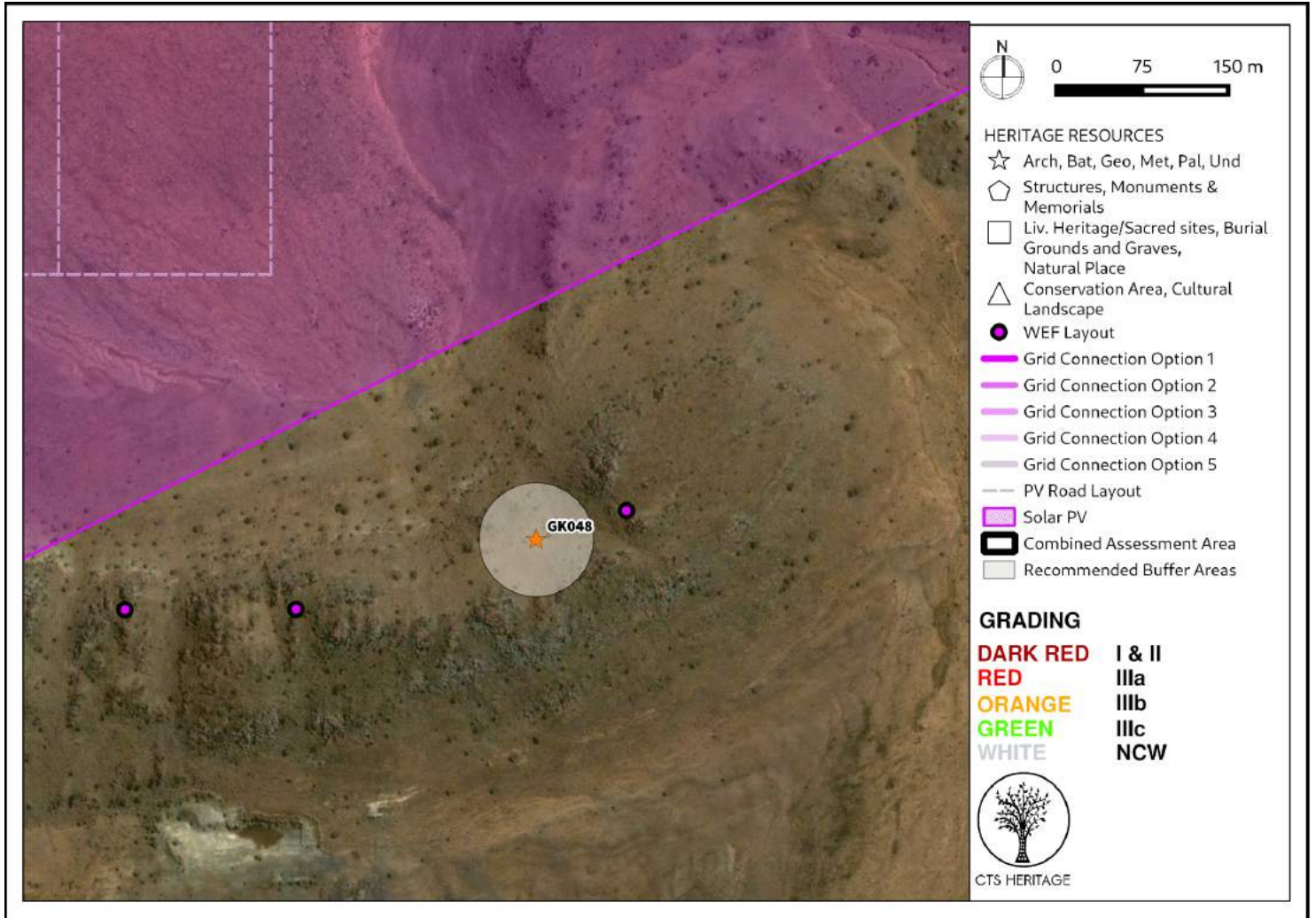


Figure 11.5: Recommended buffer around sites GK048 relative to all proposed development



7. REFERENCES

Heritage Impact Assessments				
Nid	Report Type	Author/s	Date	Title
120317	HIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120325	HIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120325	HIA Phase 1	Celeste Booth, Sholeen Shanker	01/12/2012	An archaeological ground-truthing walk-through for the proposed substation and associated overhead power line for the Nobelsfontein Wind Energy Facility situated on a site south of Victoria West on the Farm Nobelsfontein 227, Northern Cape Province
120820	HIA Phase 1	Celeste Booth	01/12/2012	An Archaeological Ground-Truthing Walk-Through For The Nobelsfontein Wind Energy Facility Situated On A Site South Of Victoria West On The Farms Nobelsfontein 227, Annex Nobelsfontein 234, Ezelsfontein 235, And Rietkloofplaaten 239, Northern Cape Province
251290	PIA Desktop	Lloyd Rossouw	01/01/2014	Combined Environmental Environmental Impact Assessment for the proposed Ishwati Emoyeni Wind Energy Facility and Supporting Eskom Transmission and Eskom Distribution Grid Connection Infrastructure near Murraysburg, Western Cape. Chapter 13: Palaeontology Impact Assessment.
251296	AIA Phase 1	Dave Halkett	01/01/2014	Combined Environmental Impact Assessment for the proposed Ishwati Emoyeni Wind Energy Facility and Supporting Eskom Transmission and Eskom Distribution Grid Connection Infrastructure near Murraysburg, Western Cape. Chapter 13: Archaeology Impact Assessment.
356942	AIA Phase 1	Johan Binneman, Celeste Booth, Natasha Higgitt	01/05/2010	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED SKIETKUIL QUARRIES 1 AND 2 ON THE FARM SKIETKUIL No. 3, VICTORIA WEST, CENTRAL KAROO DISTRICT, WESTERN CAPE PROVINCE
356942	AIA Phase 1	Johan Binneman, Celeste Booth, Natasha Higgitt	01/05/2010	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED SKIETKUIL QUARRIES 1 AND 2 ON THE FARM SKIETKUIL No. 3, VICTORIA WEST, CENTRAL KAROO DISTRICT, WESTERN CAPE PROVINCE
357137	Heritage Impact Assessment Specialist Reports	Timothy Hart	13/10/2015	Heritage Impact Assessment for the proposed Umsinde Emoyeni Wind Energy Facility



CTS HERITAGE

360840	Non Impact Assessment Related Reports	Wouter Fourie	05/03/2016	Environmental Impact Assessment of the proposed amendments to the Environmental Authorisation for the Mainstream Renewable Power South Africa Wind Energy Project near Victoria West in the Northern Cape – Specialist Heritage Opinion
360850	HIA Phase 1	Wouter Fourie	04/03/2016	Basic assessment process for Proposed development of supporting infrastructure to the Victoria West Wind Energy Facility, Victoria West
6805	AIA Phase 1	Len van Schalkwyk, Elizabeth Wahl	01/09/2007	Heritage Impact Assessment of Gamma Grassridge Power Line Corridors and Substation, Eastern, Western and Northern Cape Provinces, South Africa
7035	AIA Phase 1	Johan Binneman, Celeste Booth, Natasha Higgitt	05/03/2011	A Phase 1 Archaeological Impact Assessment (AIA) for the proposed Karoo Renewable Energy Facility on a site south of Victoria West, Northern and Western Cape Province on the farms Phaisantkraal 1, Modderfontein 228, Nobelsfontein 227, Annex Nobelsfontein
7036	AIA Desktop	Celeste Booth, Natasha Higgitt	19/11/2010	An Archaeological Desktop Study for the proposed Karoo Renewable Energy Facility on a site south of Victoria West, Northern and Western Cape
8943	PIA Phase 1	Lloyd Rossouw	24/03/2011	Palaeontological desktop assessment of a commercial renewable energy facility site located approximately 34km south of Victoria West in the Western Cape Province (and Northern Cape)