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CTS Reference Number:	CTS21_114
SAHRIS Reference:	
Client:	Savannah Environmental (Pty) Ltd
Date:	November 2021
Title:	Proposed Kwana Solar PV Facility to be developed as part of the Great Karoo Renewable Energy Development near Richmond in the Northern Cape

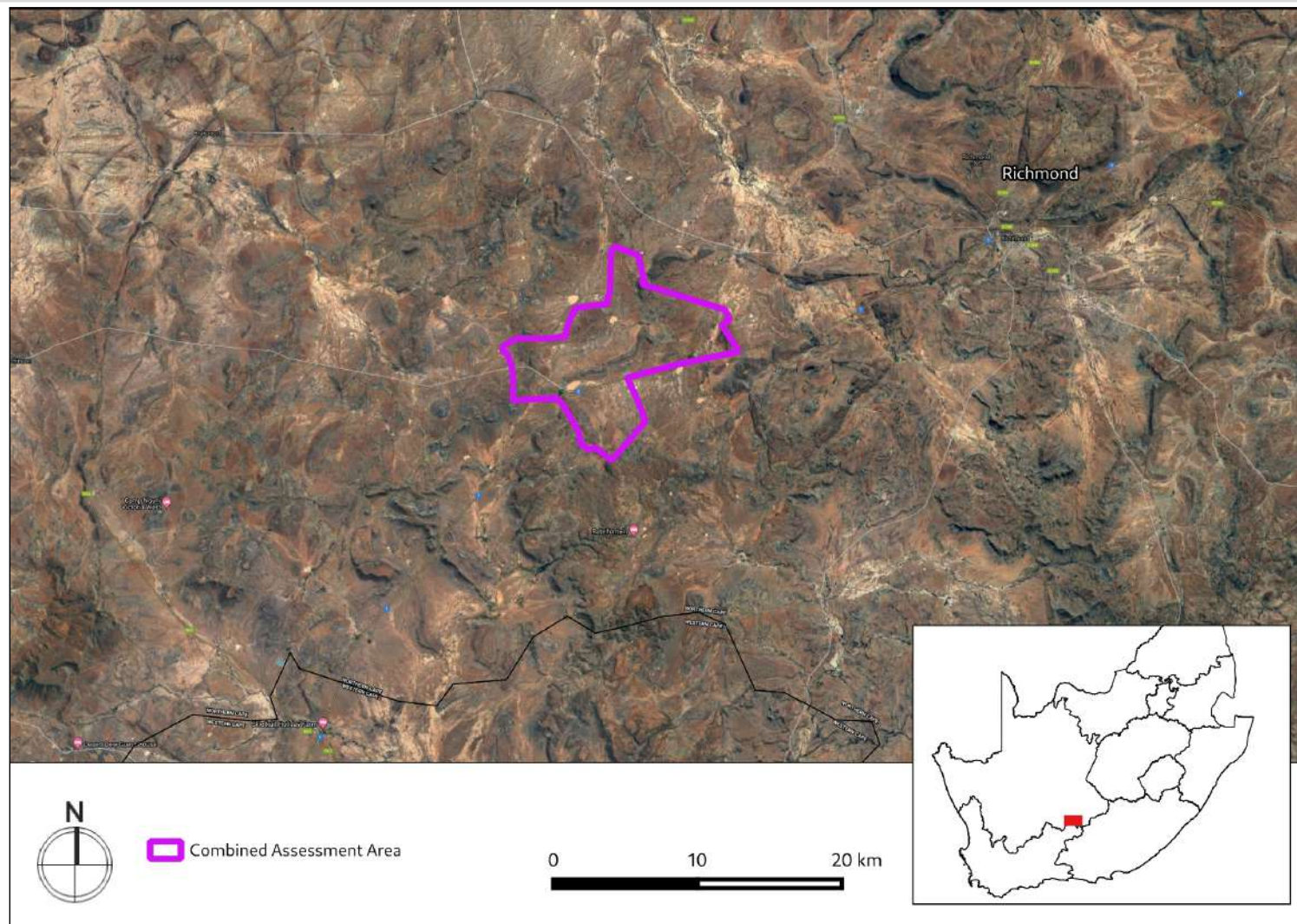


Figure 1a. Satellite map indicating the location of the proposed development in the Northern Cape

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1. Proposed Development Summary

Great Karoo Renewable Energy (Pty) Ltd is proposing the construction and operation of a photovoltaic (PV) solar energy facility and associated infrastructure on Portion 0 of Farm Rondavel 85, located approximately 35km south-west of Richmond and 80km south-east of Victoria West, within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province.

A preferred project site with an extent of ~29 909ha and a development area of ~991ha within the project site has been identified by Great Karoo Renewable Energy (Pty) Ltd as a technically suitable area for the development of the Kwana Solar PV Facility with a contracted capacity of up to 100MW.

The Kwana Solar PV Facility project site is proposed to accommodate the following infrastructure, which will enable the facility to supply a contracted capacity of up to 100MW:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- 33/132kV onsite facility substation.
- Cabling from the onsite substation to the collector substation (either underground or overhead).
- Electrical and auxiliary equipment required at the collector substation that serves that solar energy facility, including switchyard/bay, control building, fences, etc.
- Battery Energy Storage System (BESS).
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Laydown areas.
- Access roads and internal distribution roads.

The solar PV facility is proposed in response to the identified objectives of the national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes. It is the developer's intention to bid the Kwana Solar PV Facility under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, with the aim of evacuating the generated power into the national grid. This will aid in the diversification and stabilisation of the country's electricity supply, in line with the objectives of the Integrated Resource Plan (IRP) with the Kwana Solar PV Facility set to inject up to 100MW into the national grid.

The project is planned as part of a larger cluster of renewable energy projects, which include two (2) 140MW Wind Energy Facilities (known as Merino Wind Farm and Angora Wind Farm) two (2) additional 100MW PV facilities (known as Nku Solar PV and Moriri Solar PV), as well as the grid connection infrastructure connecting the renewable energy facilities to the existing Eskom Gamma Substation.

2. Application References

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

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3. Property Information

Latitude / Longitude	31°29'27.46"S 23°37'44.94"E
Erf number / Farm number	Portion 1 of Farm Rondavel 85
Local Municipality	Ubuntu
District Municipality	Pixley ka Seme
Province	Northern Cape
Current Use	Agricultural
Current Zoning	Agricultural

4. Nature of the Proposed Development

Total Area	~571ha
Depth of excavation (m)	TBA
Height of development (m)	TBA

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



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	4. Rezoning of a site exceeding 10 000m ²
	5. Other (state):

6. Additional Infrastructure Required for this Development

See Project Description

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

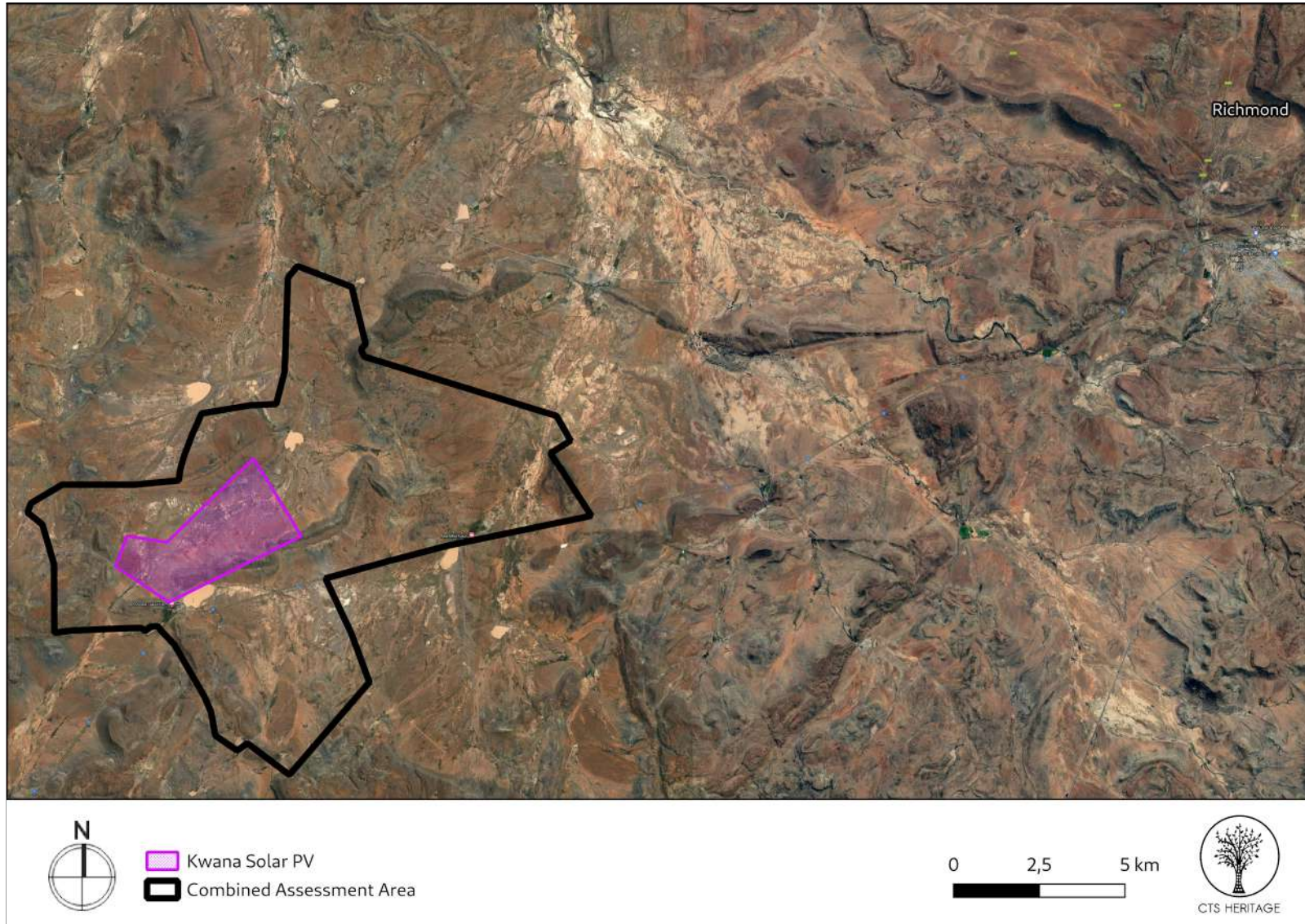


Figure 1b. Overview Map. Satellite image (2020) indicating the proposed development area relative to Richmond

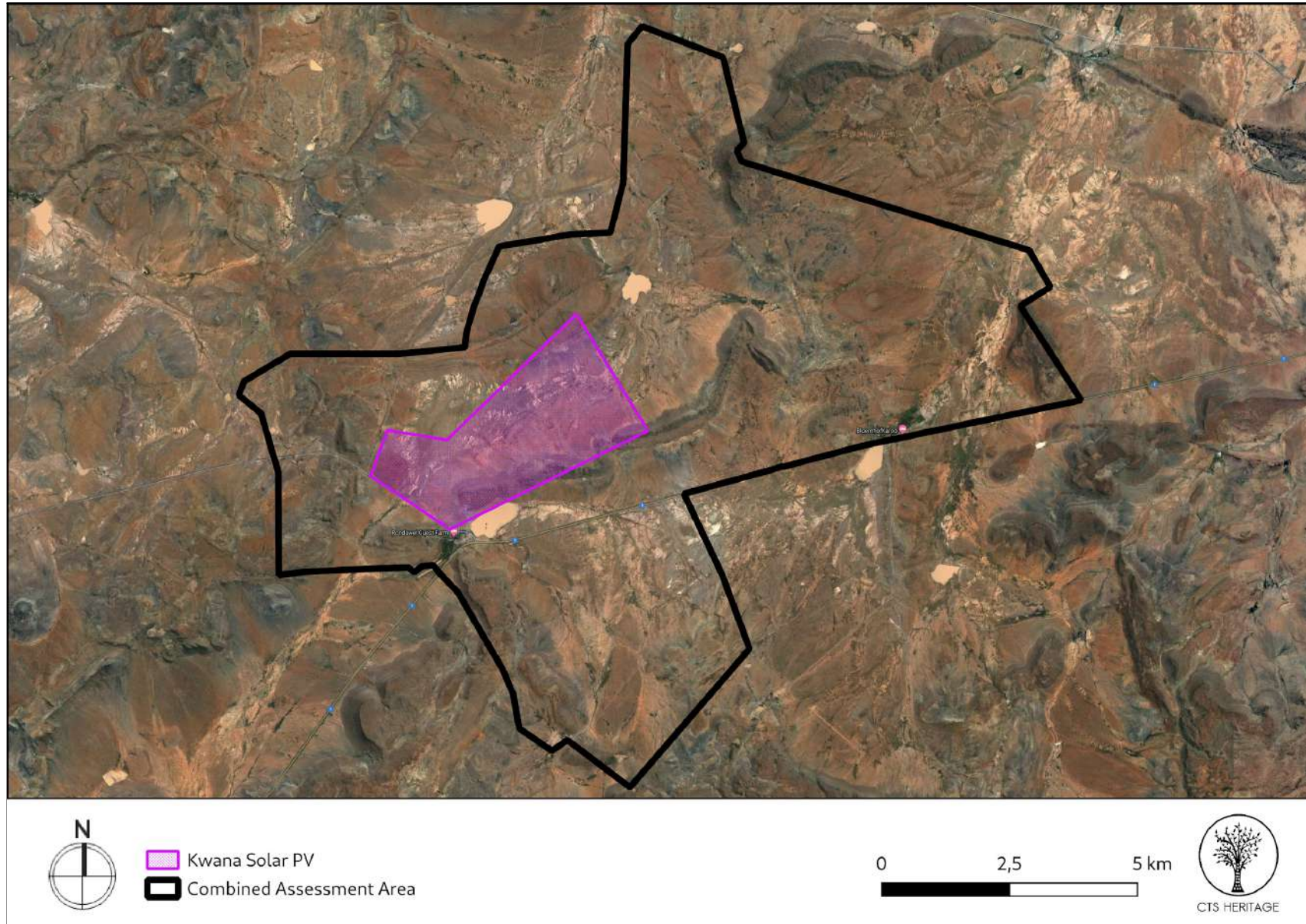


Figure 1c. Overview Map. Satellite image (2020) indicating the proposed development area

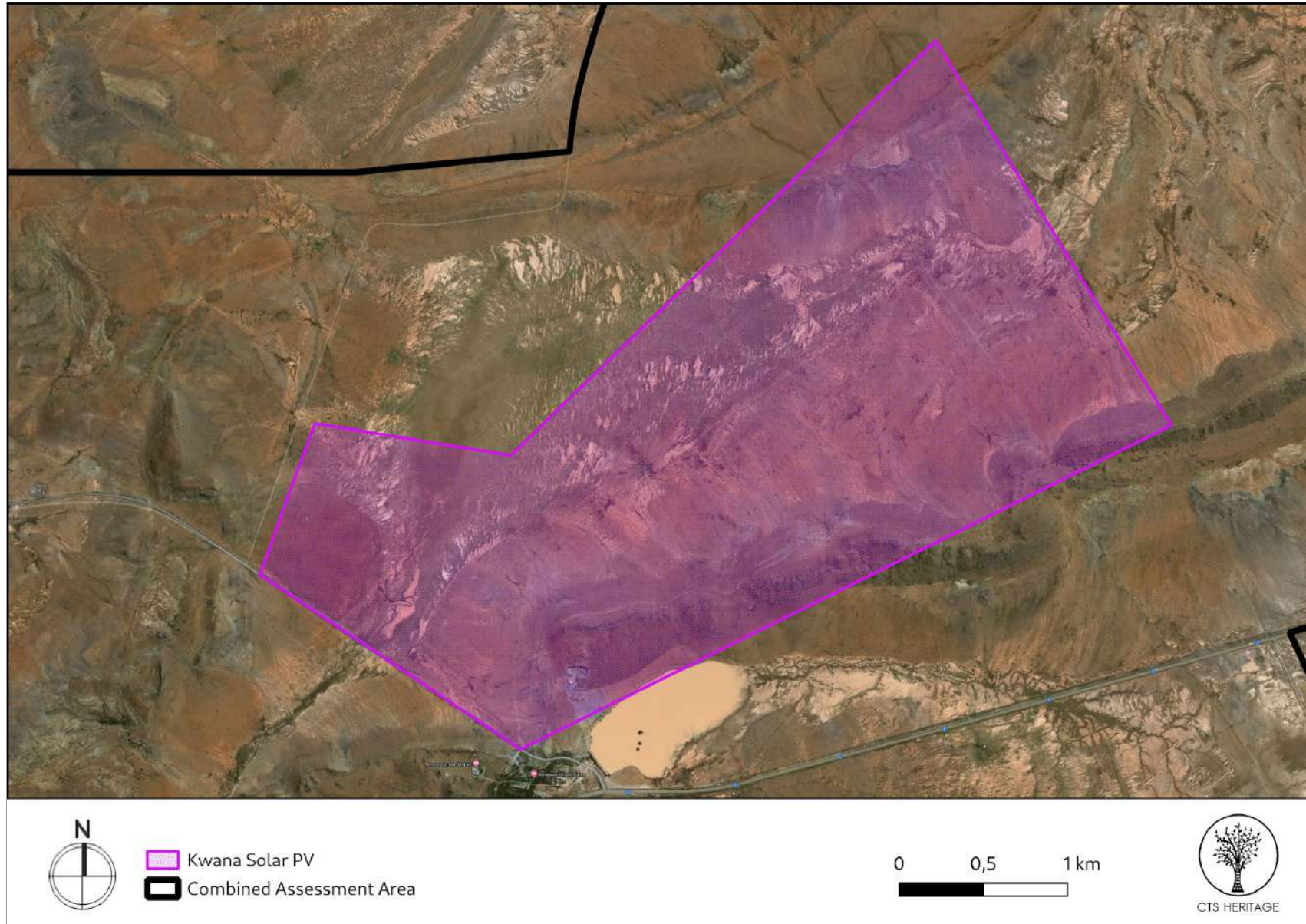


Figure 1d. Overview Map. Satellite image (2020) indicating the proposed development area



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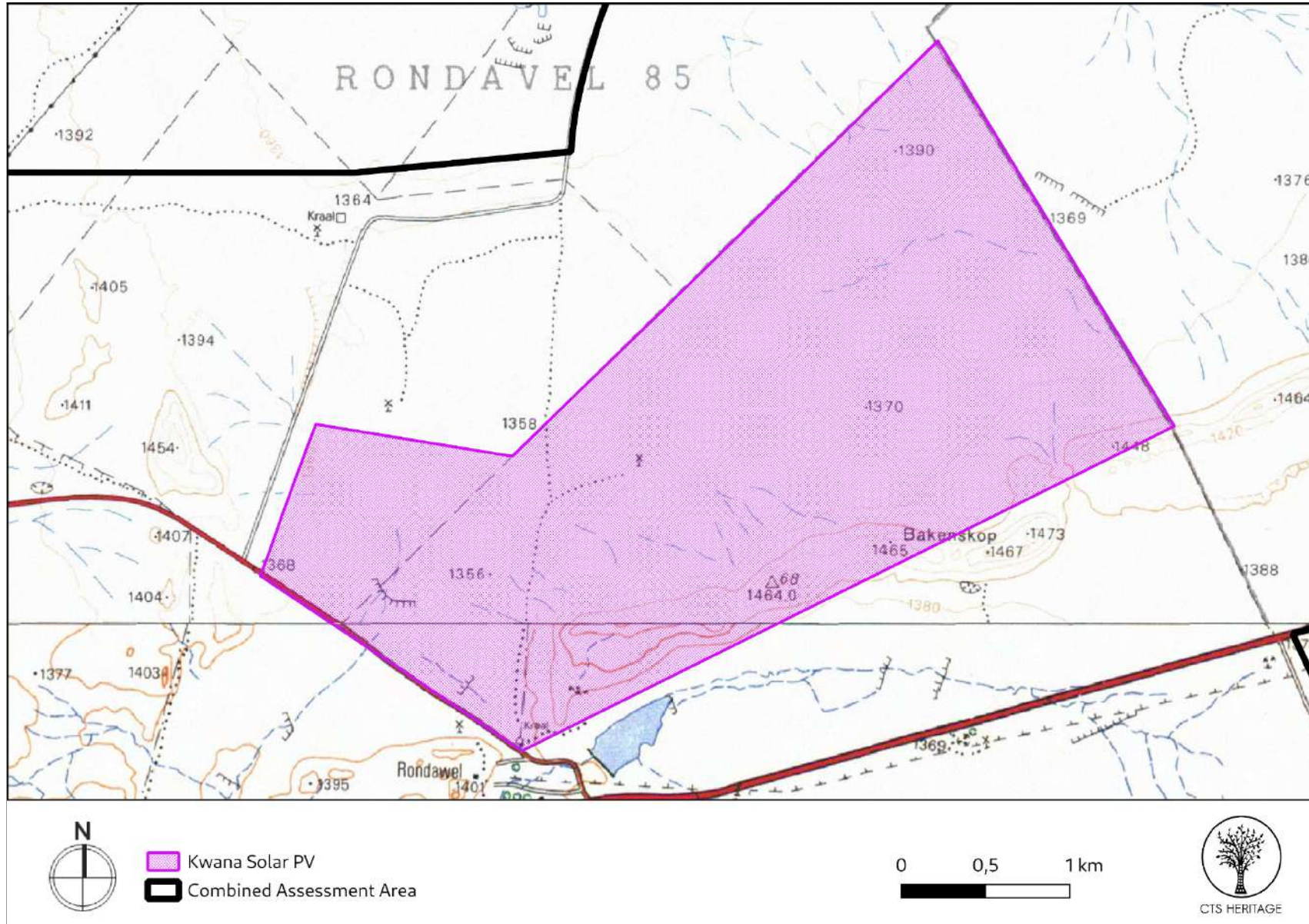


Figure 1e. Overview Map. 1:50 000 Topo Map indicating the proposed development area

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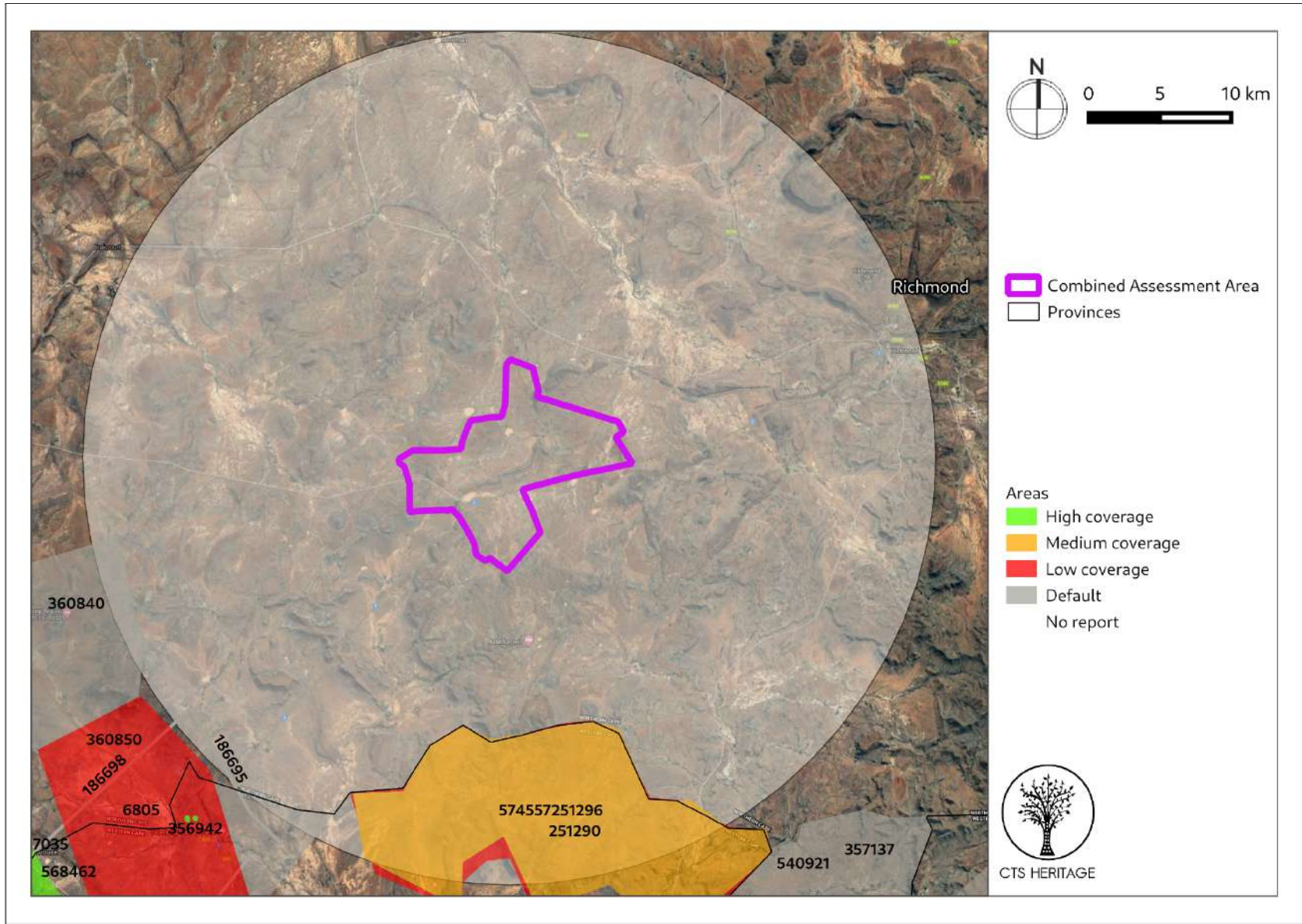


Figure 2a. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.



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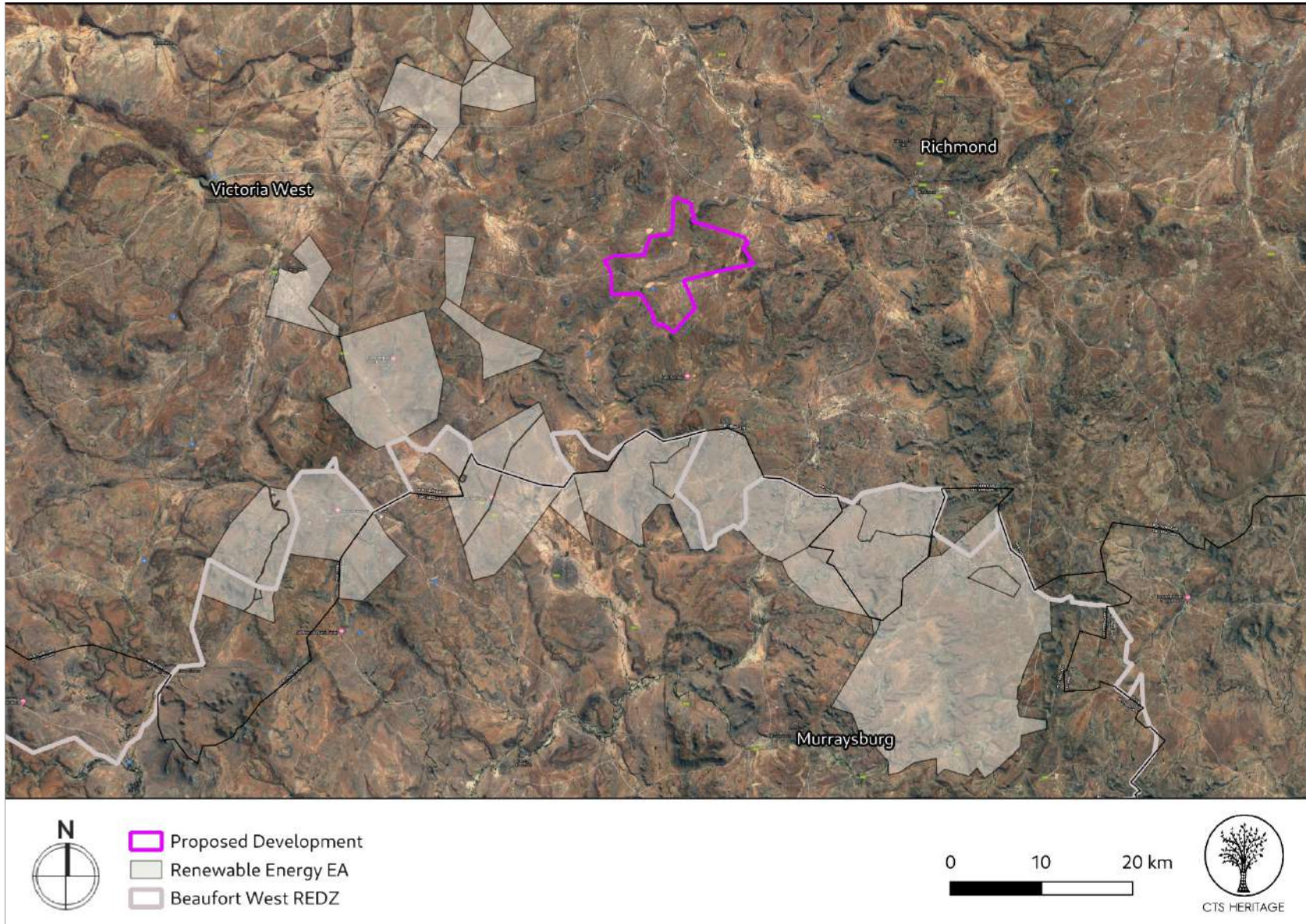


Figure 2b. Previous Reports Map. Map indicating the boundaries of the Beaufort West REDZ and the renewable energy developments that have received Environmental Authorisation

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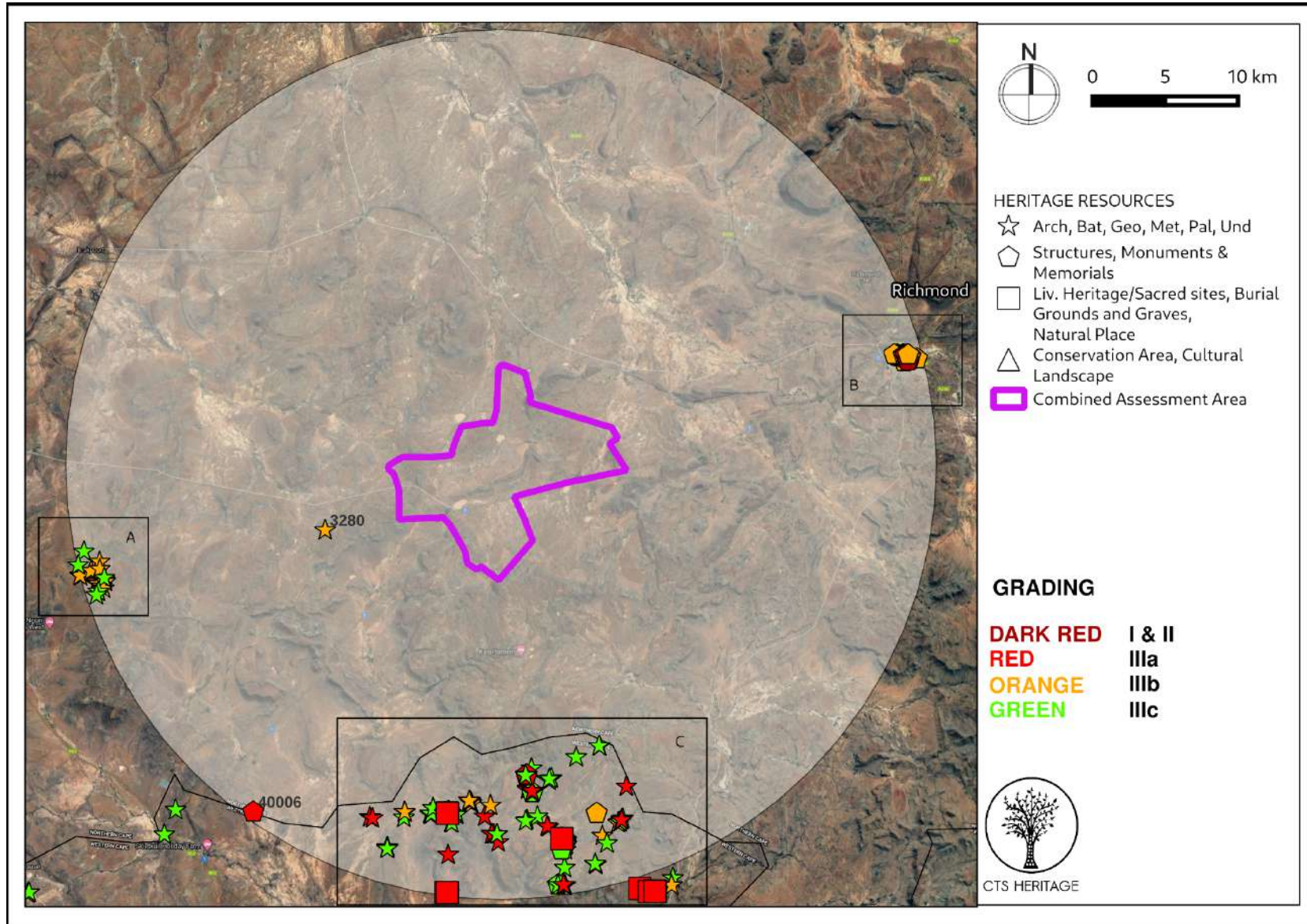


Figure 3. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for full description of heritage resource types.

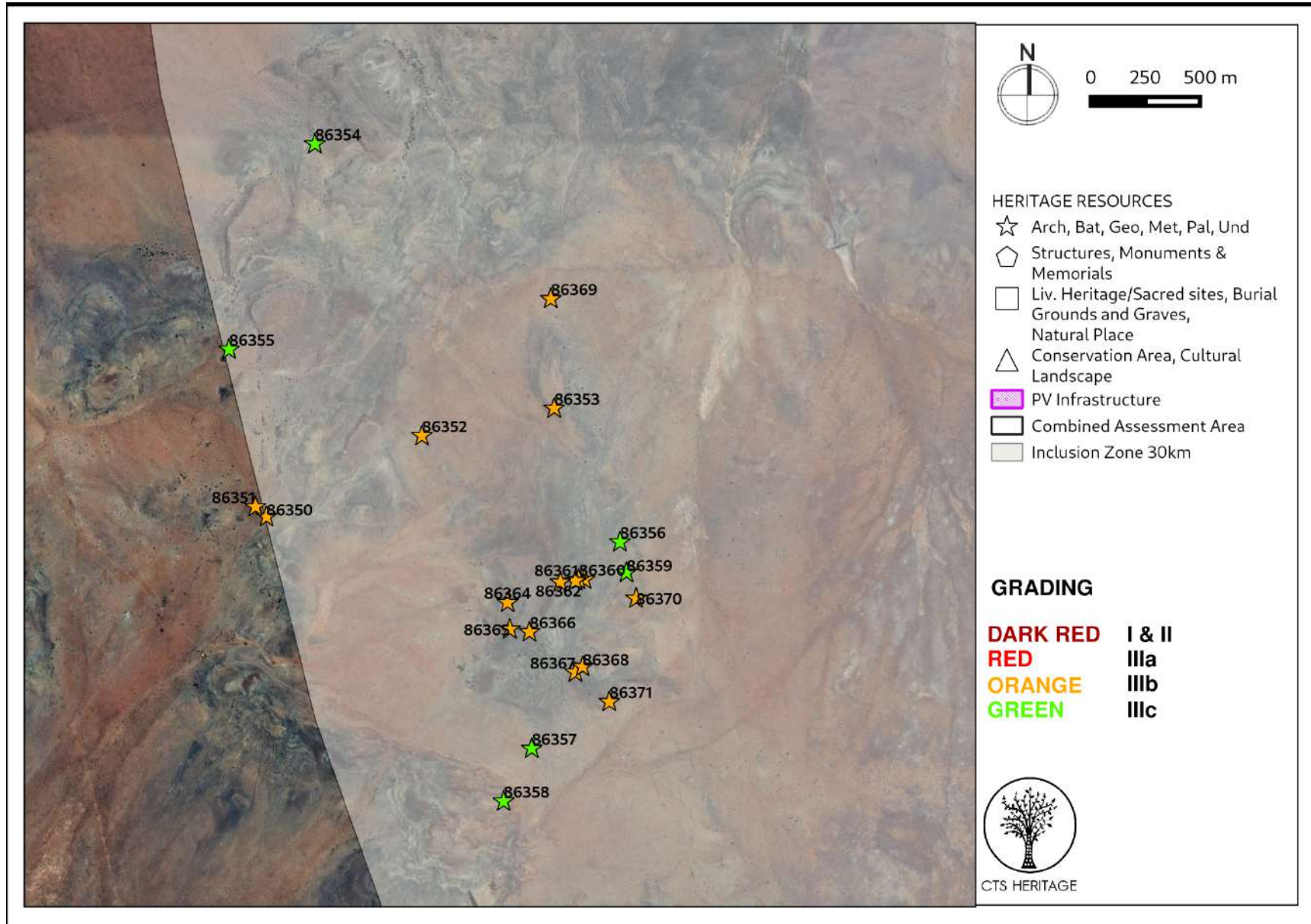


Figure 3a. Heritage Resources Map Inset A

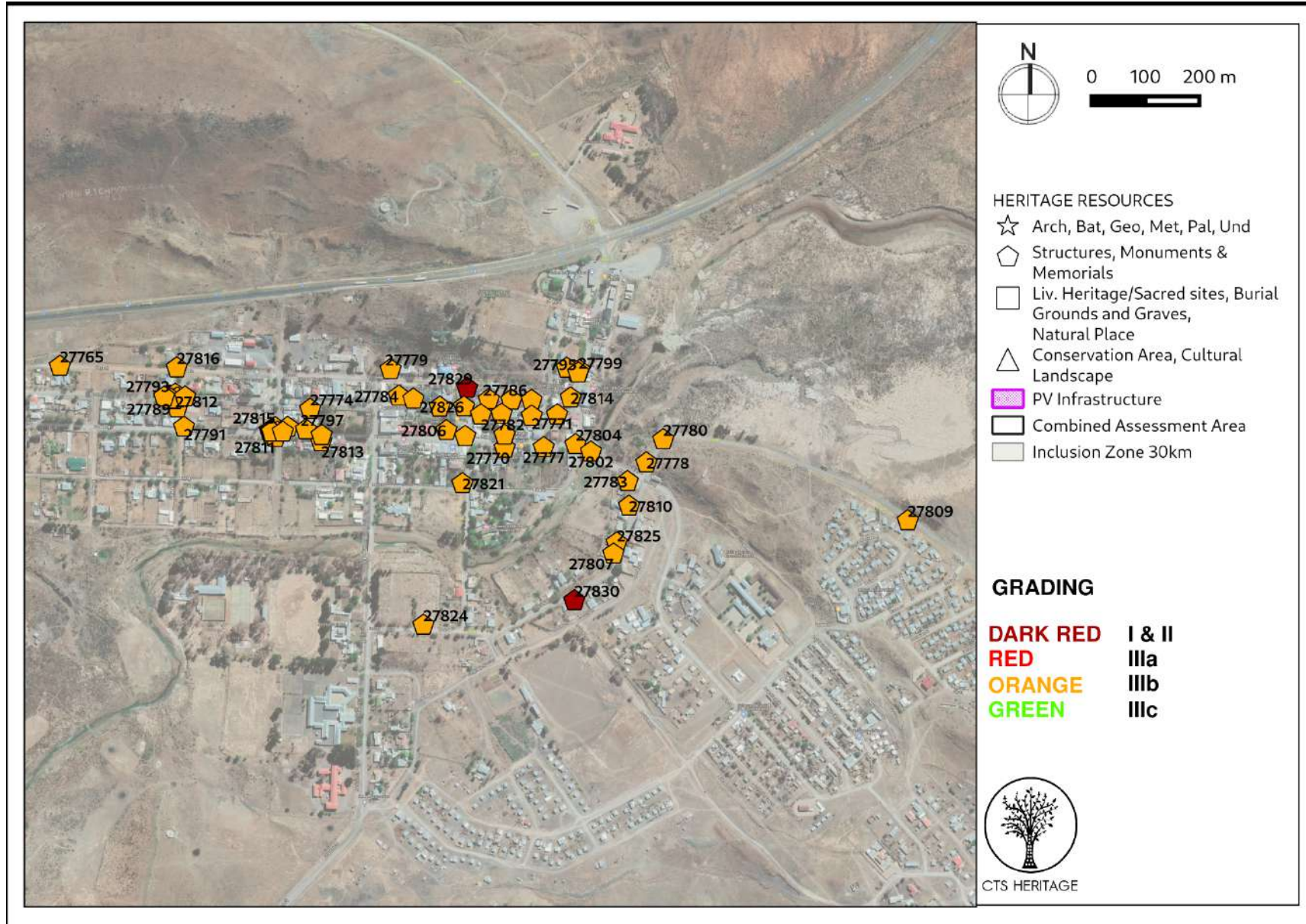


Figure 3b. Heritage Resources Map Inset B



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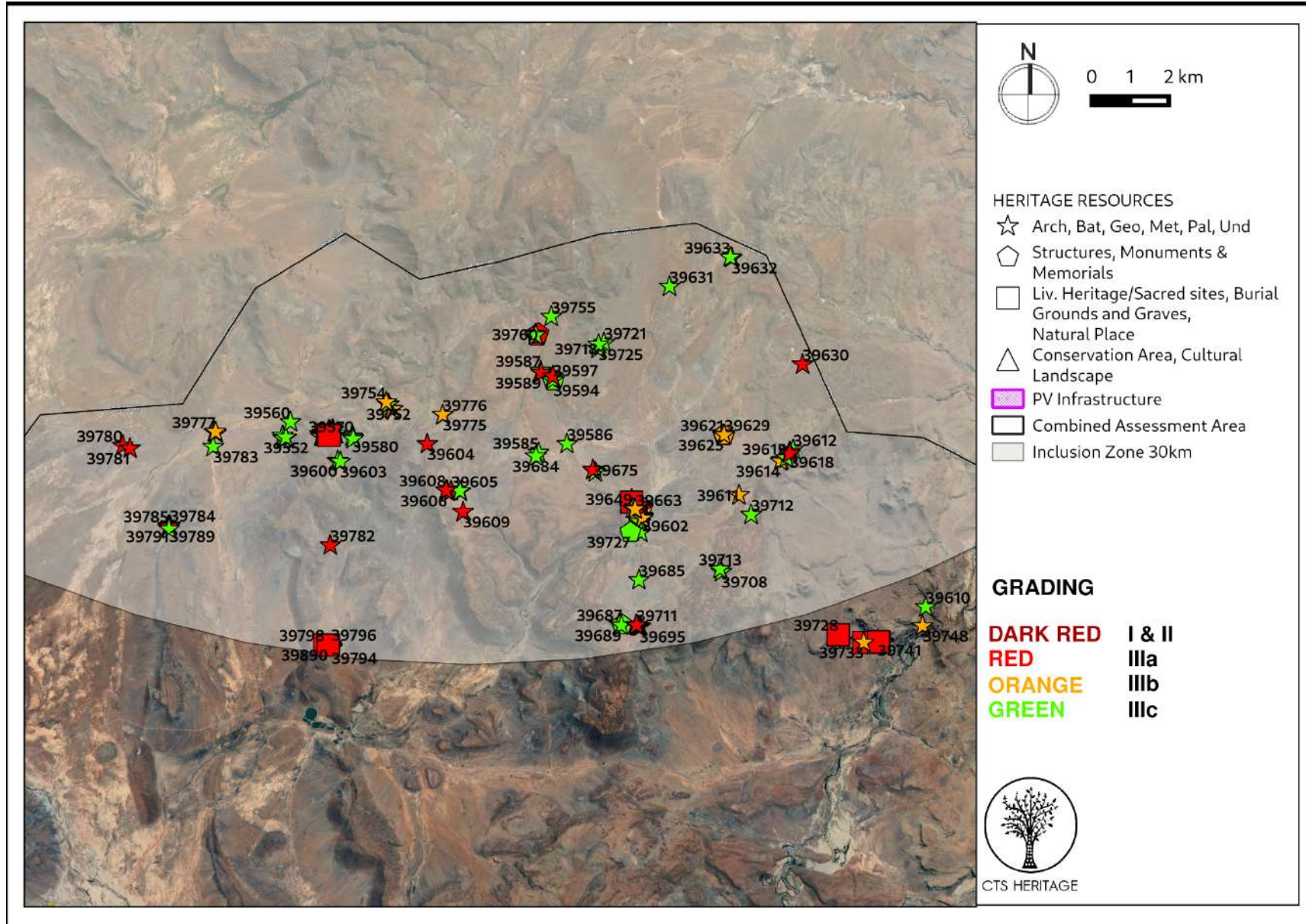


Figure 3c. Heritage Resources Map Inset C

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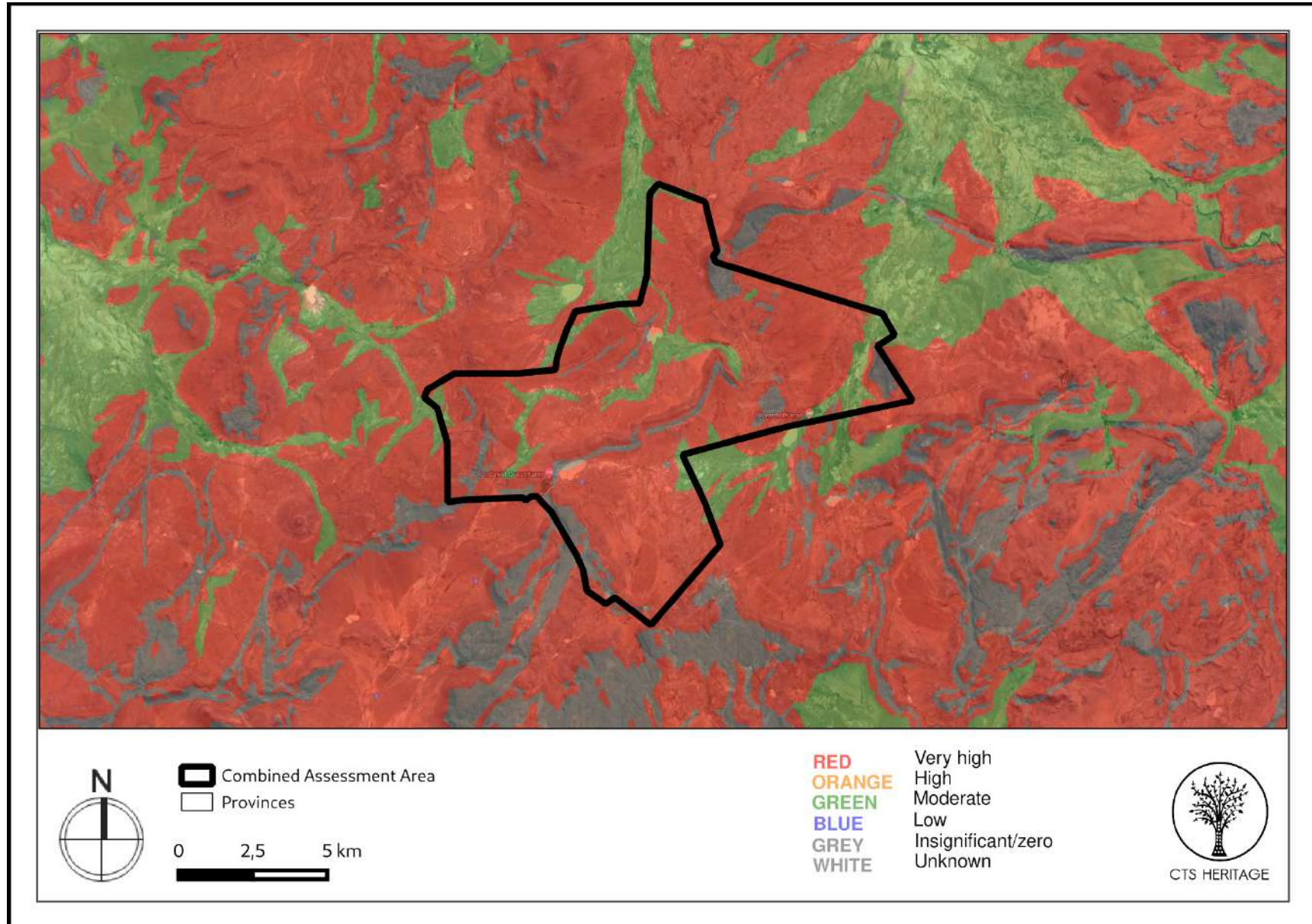


Figure 4a. Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

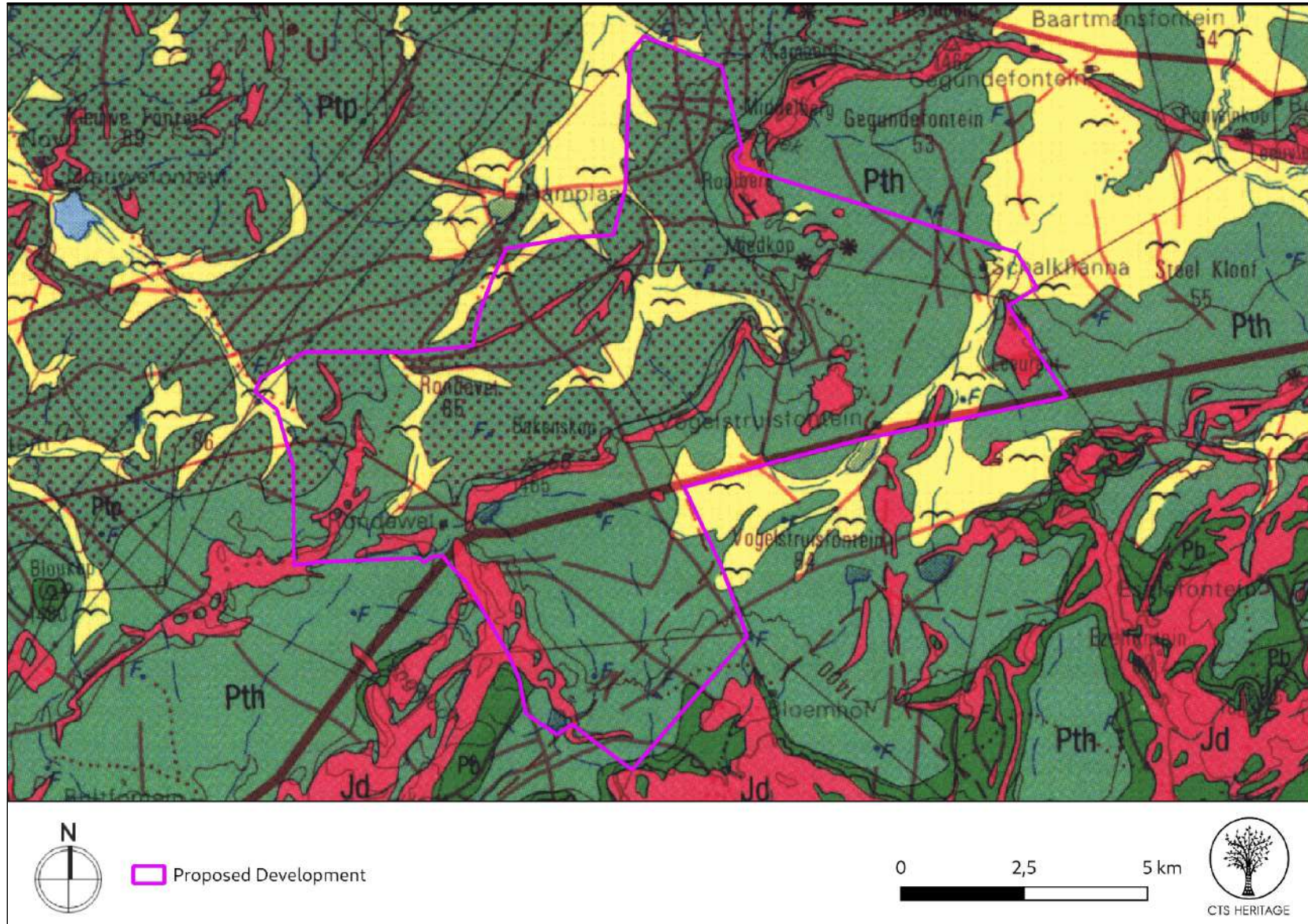


Figure 4b. Geology Map. Extract from the CGS 3122 Victoria West Map indicating that the development area for the PV development is underlain by sediments of Ptp: Poortjie Member and Pth: Hoedemaker Member of the Teekloof Formation of the Adelaide Subgroup and Jd: Jurassic Dolerite as well as Quaternary Sands



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Figure 5a. Google Street View. Indicating views of the development area facing north from the N1

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8. Heritage Assessment

The area proposed for the Great Karoo Renewable Energy Facility Projects including this proposed Kwana Solar PV 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.

Cultural Landscape

The name 'Karoo' has its roots in the Khoisan word meaning 'place of great dryness'. It once supported large grassy flatlands and the San and Khoekhoen migrated across the region for hunting and grazing purposes. Less than two hundred years ago large herds of antelope still roamed the grass plains. With the occupation of the area by stock farmers the sheep gradually replaced the game and the grass receded along with changing grazing and weather patterns (Winter et al 2009; Winter & Oberholzer 2013). By the late 17th century, the Khoenhoen had moved from the region into the more water rich southern Karoo and the coastal plains. During the early colonial period, the harshness of the Karoo region formed an almost impenetrable barrier from the Cape to the interior for colonial explorers, hunters and travellers. The 18th century was characterized by a marked increase in the rate of expansion of the boundaries of the settlement at the Cape. This was associated with the emergence of the migrant stock farmer (trekboer) (Guelke 1982 In Winter et al 2009). Early routes into the interior largely followed the tracks initially used by migrating herds of game or the cattle herds and sheep flocks of the Khoekhoen on their seasonal route between coastal and inland grazing grounds. These routes were later reinforced by generations of trek farmers moving between the markets at the Cape and their farms (Winter et al 2009).

Permanent settlement of the region only really occurred in the 19th century with towns being established near permanent water sources. It was during this period that Beaufort West was established as a drostdy in 1818 on the farm Hooyvlakte. In the same year, a mission station was established at Kookfontein, just outside Beaufort West (Winter et al 2009). Beaufort West became the first municipality in South Africa on 3 February 1837 and had the country's first town hall. When the railroad reached the town in 1880 it became a marshalling yard and locomotive depot and today it is the largest town in the Karoo. A number of the significant heritage resources located in close proximity to the proposed development are located within Beaufort West and are associated with the early colonial history of the town (Figure 3a and Appendix 1).

The proposed development is located along the N1 which is used as a main transport route from the Western Cape to Gaiteng through the Northern Cape. In addition, the area proposed for development has limited topography that could screen the proposed development (Figure 5a and 5b). It is therefore very likely that the proposed development will have a negative impact on the cultural and scenic value of the landscape.

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.



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Palaeontology

According to the SAHRIS Palaeosensitivity Map (Figure 4a), the area proposed for development is underlain by sediments of very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3122 for Victoria West, the development area is underlain by the Abrahamskraal and Teekloof Formations, both of the Adelaide Subgroup of the Beaufort Group of sediments. According to the SAHRIS Fossil Heritage Browser and the Palaeotechnic Report for the Western Cape (Almond and Pether, 2008), the Beaufort Group sediments are known to preserve diverse terrestrial and freshwater tetrapods of *Tapinocephalus* to *Lystrosaurus* Biozones (amphibians, true reptiles, synapsids – especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways) and sparse vascular plants (*Glossopteris* Flora, including petrified wood). Based on the known paleontological sensitivity of this area, it is very likely that activities associated with the development of the proposed PV and grid connections will negatively impact on significant fossil heritage.

Plan of Study

Ground-truthing field assessments will be conducted by an archaeologist, a palaeontologist as well as a cultural landscape specialist. Each specialist will draft a report outlining the heritage resources identified in their respective analyses. A Heritage Impact Assessment (HIA) that satisfies section 38(3) of the NHRA will then be drafted that integrates the findings of the specialist assessments and determines the likely impact to the identified heritage resources from the proposed development. These impacts are then assessed in the HIA and mitigation measures will be proposed. The HIA will determine whether or not there are any heritage-based objections to the proposed development and will propose recommendations should the development proceed.

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9. Scoping Assessment

Impact Destruction of significant heritage resources			
Issue	Nature of Impact	Extent of Impact	No-go Areas
Destruction of archaeological heritage	Direct impact to archaeological heritage of scientific significance	Within project boundary	None identified at this stage
Destruction of palaeontological heritage	Direct impact to palaeontological heritage of scientific significance	Within project boundary	None identified at this stage
Negative impact to significant cultural landscapes	Indirect impact to significant cultural landscapes and cultural landscape elements	Regional	None identified at this stage
Description of expected significance of impact Field assessment will determine the significance of the resources likely to be impacted. Impacts can be minimised through the implementation of appropriate mitigation measures.			
Gaps in knowledge & recommendations for further study The project area and the area more broadly have not been subjected to many heritage impact assessments and therefore substantial gaps in knowledge exist. Field assessment will fill these gaps.			
Recommendations with regards to general field surveys Archaeological field surveys must provide sufficient ground-coverage of the areas to be developed to be able to determine the nature of the resources likely to be impacted. Palaeontological and cultural landscape field surveys will target sensitive geological and cultural landscape features.			

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APPENDIX 1

List of heritage resources within close proximity to the development area

Site ID	Site no	Full Site Name	Site Type	Grading
27793	9/2/078/0012-036	29 Loop Street, Richmond	Building	Grade IIIb
27791	9/2/078/0012-037	115 Pienaar Street, Richmond	Building	Grade IIIb
27825	9/2/078/0005	214 Paul Street, Richmond	Building	Grade IIIb
27826	9/2/078/0012-001	247 Church Street, Richmond	Building	Grade IIIb
27823	9/2/078/0012-002	170 Pienaar Street, Richmond	Building	Grade IIIb
27824	9/2/078/0012-006	208 Paul Street, Richmond	Building	Grade IIIb
27821	9/2/078/0012-007	258 Church Street, Richmond	Building	Grade IIIb
27822	9/2/078/0012-008	60 Loop Street, Richmond	Building	Grade IIIb
27818	9/2/078/0012-009	152 Pienaar Street, Richmond	Building	Grade IIIb
27819	9/2/078/0012-010	148 Pienaar Street, Richmond	Building	Grade IIIb
27820	9/2/078/0012-011	15 Loop Street, Richmond	Building	Grade IIIb
27816	9/2/078/0012-012	260 Hope Street, Richmond	Building	Grade IIIb
27817	9/2/078/0012-013	19 Loop Street, Richmond	Building	Grade IIIb
27813	9/2/078/0012-014	156 Pienaar Street, Richmond	Building	Grade IIIb
27814	9/2/078/0012-015	14 Spring Street, Richmond	Building	Grade IIIb
27815	9/2/078/0012-016	158 Pienaar Street, Richmond	Building	Grade IIIb

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27811	9/2/078/0012-017	120 Pienaar Street, Richmond	Building	Grade IIIb
27812	9/2/078/0012-018	56 Loop Street, Richmond	Building	Grade IIIb
27808	9/2/078/0012-019	26 Loop Street, Richmond	Building	Grade IIIb
27809	9/2/078/0012-020	Paul Street, Richmond	Building	Grade IIIb
27810	9/2/078/0012-021	216 Paul Street, Richmond	Building	Grade IIIb
27806	9/2/078/0012-022	160 Pienaar Street, Richmond	Building	Grade IIIb
27807	9/2/078/0012-023	241 Paul Street, Richmond	Building	Grade IIIb
27803	9/2/078/0012-024	144 Pienaar Street, Richmond	Building	Grade IIIb
27804	9/2/078/0012-025	129 Pienaar Street, Richmond	Building	Grade IIIb
27805	9/2/078/0012-026	140 Pienaar Street, Richmond	Building	Grade IIIb
27801	9/2/078/0012-027	132 Pienaar Street, Richmond	Building	Grade IIIb
27802	9/2/078/0012-028	Eastern end of Pienaar Street, Richmond	Building	Grade IIIb
27800	9/2/078/0012-030	141 Pienaar Street, Richmond	Building	Grade IIIb
27797	9/2/078/0012-031	127 Pienaar Street, Richmond	Building	Grade IIIb
27798	9/2/078/0012-032	113 Pienaar Street, Richmond	Building	Grade IIIb
27794	9/2/078/0012-033	11 Spring Street, Richmond	Building	Grade IIIb
27795	9/2/078/0012-034	12 Spring Street, Richmond	Building	Grade IIIb
27796	9/2/078/0012-035	33 Loop Street, Richmond	Building	Grade IIIb
27792	9/2/078/0012-038	118 Pienaar Street, Richmond	Building	Grade IIIb

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27789	9/2/078/0012-039	23 Loop Street, Richmond	Building	Grade IIIb
27790	9/2/078/0012-040	116 Pienaar Street, Richmond	Building	Grade IIIb
27787	9/2/078/0012-041	Erf 220, 37 Loop Street, Richmond	Building	Grade IIIb
27788	9/2/078/0012-042	Richmond Museum, 17 Loop Street, Richmond	Building	Grade IIIb
27785	9/2/078/0012-043	13 Spring Street, Richmond	Building	Grade IIIb
27786	9/2/078/0012-044	24 Loop Street, Richmond	Building	Grade IIIb
27782	9/2/078/0012-045	42 Loop Street, Richmond	Building	Grade IIIb
27783	9/2/078/0012-046	168 Pienaar Street, Richmond	Building	Grade IIIb
27784	9/2/078/0012-047	54 Loop Street, Richmond	Building	Grade IIIb
27780	9/2/078/0012-048	219 Paul Street, Richmond	Building	Grade IIIb
27781	9/2/078/0012-049	28 Loop Street, Richmond	Building	Grade IIIb
27777	9/2/078/0012-050	145 Pienaar Street, Richmond	Building	Grade IIIb
27778	9/2/078/0012-051	217 Paul Street, Richmond	Building	Grade IIIb
27779	9/2/078/0012-052	270 Hope Street, Richmond	Building	Grade IIIb
27775	9/2/078/0012-053	67 Loop Street, Richmond	Building	Grade IIIb
27776	9/2/078/0012-054	38 Loop Street, Richmond	Building	Grade IIIb
27772	9/2/078/0012-055	40 Loop Street, Richmond	Building	Grade IIIb
27773	9/2/078/0012-056	Pienaar Street, Richmond	Building	Grade IIIb

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27774	9/2/078/0012-057	21 Loop Street, Richmond	Building	Grade IIIb
27770	9/2/078/0012-058	146 Pienaar Street, Richmond	Building	Grade IIIb
27771	9/2/078/0012-059	Erf 622, 46 Loop Street, Richmond	Building	Grade IIIb
27768	9/2/078/0012-060	35 Loop Street, Richmond	Building	Grade IIIb
27769	9/2/078/0012-061	142 Pienaar Street, Richmond	Building	Grade IIIb
27765	9/2/078/0012-062	268 Hope Street, Richmond	Building	Grade IIIb
27766	9/2/078/0012-063	66 Loop Street, Richmond	Building	Grade IIIb
86360	VIWB011	Victoria West Bultfontein 011	Artefacts	Grade IIIb
86361	VIWB012	Victoria West Bultfontein 012	Artefacts	Grade IIIb
86362	VIWB013	Victoria West Bultfontein 013	Artefacts	Grade IIIb
86363	VIWB014	Victoria West Bultfontein 014	Artefacts	Grade IIIb
86364	VIWB015	Victoria West Bultfontein 015	Artefacts	Grade IIIb
86365	VIWB016	Victoria West Bultfontein 016	Artefacts	Grade IIIb
86366	VIWB017	Victoria West Bultfontein 017	Artefacts	Grade IIIb
86367	VIWB018	Victoria West Bultfontein 018	Artefacts	Grade IIIb
86354	VIWB005	Victoria West Bultfontein 005	Artefacts	Grade IIIc
86359	VIWB010	Victoria West Bultfontein 010	Artefacts	Grade IIIc
86368	VIWB019	Victoria West Bultfontein 019	Artefacts	Grade IIIb
86369	VIWB020	Victoria West Bultfontein 020	Artefacts	Grade IIIb

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86370	VIWB021	Victoria West Bultfontein 005	Artefacts	Grade IIIb
86371	VIWB022	Victoria West Bultfontein 022	Artefacts	Grade IIIb
27829	9/2/078/0003	Dutch Reformed Church, Loop Street, Richmond	Building	Grade II
27830	9/2/078/0004	De Oude Dak, 237 Paul Street, Richmond	Building	Grade II
39608	MUR050	Murraysburg 050	Rock Art	Grade IIIa
39624	MUR066	Murraysburg 066	Artefacts	Grade IIIb
39659	MUR093	Murraysburg 093	Stone walling	Grade IIIb
27799	9/2/078/0012-029	22 Spring Street, Richmond	Building	Grade IIIb
3280	Roggefontein Farm		Palaeontological	Grade IIIb
39547	MUR001	Murraysburg 001	Artefacts	Grade IIIc
39548	MUR002	Murraysburg 002	Artefacts	Grade IIIc
39549	MUR003	Murraysburg 003	Artefacts	Grade IIIc
39550	MUR004	Murraysburg 004	Stone walling	Grade IIIc
39551	MUR005	Murraysburg 005	Artefacts	Grade IIIc
39552	MUR006	Murraysburg 006	Artefacts	Grade IIIa
39553	MUR007	Murraysburg 007	Artefacts	Grade IIIc
39554	MUR008	Murraysburg 008	Artefacts	Grade IIIc
39555	MUR009	Murraysburg 009	Artefacts	Grade IIIc

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39556	MUR010	Murraysburg 010	Artefacts	Grade IIIc
39559	MUR013	Murraysburg 013	Artefacts	Grade IIIc
39560	MUR014	Murraysburg 014	Artefacts	Grade IIIc
39565	MUR019	Murraysburg 019	Artefacts	Grade IIIb
39566	MUR020	Murraysburg 020	Artefacts	Grade IIIc
39567	MUR021	Murraysburg 021	Stone walling	Grade IIIb
40006	GRA001	Grassridge 001	Building	Grade IIIa
39568	MUR022	Murraysburg 022	Artefacts	Grade IIIc
39569	MUR023	Murraysburg 023	Artefacts	Grade IIIc
39570	MUR024	Murraysburg 024	Rock Art	Grade IIIb
39571	MUR025	Murraysburg 025	Artefacts	Grade IIIc
39572	MUR026	Murraysburg 026	Rock Art	Grade IIIa
39573	MUR027	Murraysburg 027	Rock Art	Grade IIIa
39574	MUR028	Murraysburg 028	Rock Art	Grade IIIa
39575	MUR029	Murraysburg 029	Rock Art	Grade IIIa
39576	MUR030	Murraysburg 030	Rock Art	Grade IIIa
39577	MUR031	Murraysburg 031	Rock Art	Grade IIIa
39578	MUR032	Murraysburg 032	Rock Art	Grade IIIa
39579	MUR033	Murraysburg 033	Rock Art	Grade IIIa

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39580	MUR034	Murraysburg 034	Artefacts	Grade IIIc
39581	MUR035	Murraysburg 035	Artefacts	Grade IIIc
39582	MUR036	Murraysburg 036	Artefacts	Grade IIIc
39583	MUR037	Murraysburg 037	Stone walling	Grade IIIa
39584	MUR038	Murraysburg 038	Stone walling	Grade IIIb
39585	MUR107	Murraysburg 107	Archaeological	Grade IIIc
39586	MUR108	Murraysburg 108	Artefacts	Grade IIIc
39587	MUR109	Murraysburg 109	Stone walling	Grade IIIc
39588	MUR039	Murraysburg 039	Artefacts	Grade IIIc
39589	MUR110	Murraysburg 110	Stone walling	Grade IIIa
39590	MUR040	Murraysburg 040	Artefacts	Grade IIIc
39591	MUR111	Murraysburg 111	Structures	Grade IIIc
39592	MUR041	Murraysburg 041	Artefacts	Grade IIIb
39594	MUR113	Murraysburg 113	Archaeological	Grade IIIa
39595	MUR042	Murraysburg 042	Artefacts	Grade IIIb
39596	MUR112	Murraysburg 112	Structures	Grade IIIc
39597	MUR114	Murraysburg 114	Artefacts	Grade IIIc
39598	MUR043	Murraysburg 043	Artefacts	Grade IIIc
39599	MUR115	Murraysburg 115	Artefacts	Grade IIIa

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39600	MUR044	Murraysburg 044	Artefacts	Grade IIIc
39602	MUR116	Murraysburg 116	Artefacts	Grade IIIa
39603	MUR045	Murraysburg 045	Artefacts	Grade IIIc
39604	MUR046	Murraysburg 046	Artefacts	Grade IIIa
39605	MUR047	Murraysburg 047	Rock Art	Grade IIIa
39606	MUR048	Murraysburg 048	Rock Art	Grade IIIa
39607	MUR049	Murraysburg 049	Rock Art	Grade IIIa
39609	MUR051	Murraysburg 051	Rock Art	Grade IIIa
39611	MUR053	Murraysburg 053	Rock Art	Grade IIIb
39612	MUR054	Murraysburg 054	Artefacts	Grade IIIc
39613	MUR055	Murraysburg 055	Rock Art	Grade IIIb
39614	MUR056	Murraysburg 056	Artefacts	Grade IIIb
39615	MUR057	Murraysburg 057	Artefacts	Grade IIIb
39616	MUR058	Murraysburg 058	Artefacts	Grade IIIc
39617	MUR059	Murraysburg 059	Artefacts	Grade IIIc
39618	MUR060	Murraysburg 060	Artefacts	Grade IIIa
39619	MUR061	Murraysburg 061	Artefacts	Grade IIIa
39620	MUR062	Murraysburg 062	Stone walling	Grade IIIa
39621	MUR063	Murraysburg 063	Artefacts, Stone walling	Grade IIIc

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39622	MUR064	Murraysburg 064	Artefacts, Stone walling	Grade IIIa
39625	MUR067	Murraysburg 067	Building, Artefacts	Grade IIIa
39626	MUR068	Murraysburg 068	Artefacts	Grade IIIa
39627	MUR069	Murraysburg 069	Artefacts	Grade IIIa
39628	MUR070	Murraysburg 070	Artefacts	Grade IIIa
39629	MUR071	Murraysburg 071	Artefacts	Grade IIIa
39630	MUR072	Murraysburg 072	Artefacts	Grade IIIa
39631	MUR073	Murraysburg 073	Artefacts	Grade IIIc
39632	MUR074	Murraysburg 074	Artefacts	Grade IIIc
39633	MUR075	Murraysburg 075	Artefacts	Grade IIIc
39634	MUR076	Murraysburg 076	Artefacts	Grade IIIc
39635	MUR077	Murraysburg 077	Artefacts	Grade IIIa
39636	MUR078	Murraysburg 078	Artefacts, Building	Grade IIIb
39637	MUR079	Murraysburg 079	Artefacts	Grade IIIb
39638	MUR080	Murraysburg 080	Artefacts	Grade IIIa
39639	MUR081	Murraysburg 081	Artefacts	Grade IIIc
39640	MUR082	Murraysburg 082	Archaeological	Grade IIIb
39641	MUR083	Murraysburg 083	Artefacts	Grade IIIa
39642	MUR084	Murraysburg 084	Stone walling	Grade IIIc

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39643	MUR085	Murraysburg 085	Stone walling	Grade IIIa
39644	MUR086	Murraysburg 086	Stone walling	Grade IIIa
39645	MUR117	Murraysburg 117	Artefacts	Grade IIIa
39646	MUR087	Murraysburg 087	Stone walling	Grade IIIa
39647	MUR118	Murraysburg 118	Artefacts	Grade IIIa
39651	MUR090	Murraysburg 090	Artefacts	Grade IIIb
39652	MUR119	Murraysburg 119	Stone walling	Grade IIIa
39653	MUR120	Murraysburg 120	Stone walling	Grade IIIa
39654	MUR091	Murraysburg 091	Building	Grade IIIa
39655	MUR121	Murraysburg 121	Structures	Grade IIIb
39656	MUR092	Murraysburg 092	Stone walling	Grade IIIb
39657	MUR122	Murraysburg 122	Structures	Grade IIIb
39658	MUR123	Murraysburg 123	Stone walling	Grade IIIa
39660	MUR124	Murraysburg 124	Stone walling	Grade IIIa
39661	MUR125	Murraysburg 125	Artefacts	Grade IIIa
39663	MUR094	Murraysburg 094	Building	Grade IIIb
39664	MUR095	Murraysburg 095	Stone walling	Grade IIIc
39665	MUR096	Murraysburg 096	Artefacts	Grade IIIa
39666	MUR097	Murraysburg 097	Stone walling	Grade IIIc

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39667	MUR098	Murraysburg 098	Artefacts	Grade IIIa
39668	MUR099	Murraysburg 099	Artefacts	Grade IIIa
39669	MUR100	Murraysburg 100	Artefacts	Grade IIIc
39670	MUR101	Murraysburg 101	Artefacts	Grade IIIc
39672	MUR103	Murraysburg 103	Artefacts	Grade IIIb
39673	MUR104	Murraysburg 104	Stone walling	Grade IIIc
39675	MUR106	Murraysburg 106	Artefacts, Stone walling	Grade IIIa
39676	MUR126	Murraysburg 126	Artefacts	Grade IIIa
39677	MUR127	Murraysburg 127	Artefacts	Grade IIIa
39678	MUR128	Murraysburg 128	Artefacts	Grade IIIa
39679	MUR129	Murraysburg 129	Artefacts	Grade IIIa
39680	MUR130	Murraysburg 130	Rock Art	Grade IIIb
39682	MUR132	Murraysburg 132	Stone walling	Grade IIIc
39684	MUR131	Murraysburg 131	Archaeological	Grade IIIc
39685	MUR133	Murraysburg 133	Archaeological	Grade IIIc
39686	MUR134	Murraysburg 134	Stone walling	Grade IIIc
39687	MUR135	Murraysburg 135	Structures	Grade IIIc
39689	MUR136	Murraysburg 136	Artefacts	Grade IIIc
39690	MUR137	Murraysburg 137	Artefacts	Grade IIIa

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39691	MUR138	Murraysburg 138	Rock Art	Grade IIIa
39693	MUR139	Murraysburg 139	Rock Art	Grade IIIa
39695	MUR140	Murraysburg 140	Rock Art	Grade IIIb
39698	MUR143	Murraysburg 143	Artefacts	Grade IIIb
39700	MUR141	Murraysburg 141	Archaeological	Grade IIIa
39701	MUR142	Murraysburg 142	Rock Art	Grade IIIa
39702	MUR144	Murraysburg 144	Artefacts	Grade IIIb
39703	MUR145	Murraysburg 145	Rock Art	Grade IIIa
39704	MUR146	Murraysburg 146	Rock Art	Grade IIIa
39705	MUR147	Murraysburg 147	Rock Art	Grade IIIa
39708	MUR150	Murraysburg 150	Artefacts	Grade IIIc
39711	MUR148	Murraysburg 148	Rock Art	Grade IIIa
39712	MUR149	Murraysburg 149	Artefacts	Grade IIIc
39713	MUR151	Murraysburg 151	Artefacts	Grade IIIc
39715	MUR153	Murraysburg 153	Stone walling	Grade IIIc
39718	MUR155	Murraysburg 155	Artefacts	Grade IIIc
39721	MUR154	Murraysburg 154	Artefacts	Grade IIIc
39725	MUR156	Murraysburg 156	Artefacts	Grade IIIc
39727	MUR152	Murraysburg 152	Structures	Grade IIIc

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39749	MUR174	Murraysburg 174	Artefacts	Grade IIIb
39750	MUR175	Murraysburg 175	Artefacts	Grade IIIb
39751	MUR176	Murraysburg 176	Artefacts	Grade IIIc
39752	MUR177	Murraysburg 177	Artefacts	Grade IIIc
39753	MUR178	Murraysburg 178	Artefacts	Grade IIIc
39754	MUR179	Murraysburg 179	Artefacts	Grade IIIb
39755	MUR180	Murraysburg 180	Artefacts	Grade IIIc
39756	MUR181	Murraysburg 181	Artefacts	Grade IIIc
39757	MUR182	Murraysburg 182	Archaeological	Grade IIIc
39758	MUR183	Murraysburg 183	Archaeological	Grade IIIc
39759	MUR184	Murraysburg 184	Structures	Grade IIIa
39760	MUR185	Murraysburg 185	Structures	Grade IIIa
39761	MUR186	Murraysburg 186	Structures	Grade IIIa
39773	MUR187	Murraysburg 187	Artefacts	Grade IIIc
39774	MUR188	Murraysburg 188	Artefacts	Grade IIIc
39775	MUR189	Murraysburg 189	Artefacts	Grade IIIb
39776	MUR190	Murraysburg 190	Artefacts	Grade IIIb
39778	MUR192	Murraysburg 192	Stone walling	Grade IIIc
39779	MUR193	Murraysburg 193	Archaeological	Grade IIIb

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39780	MUR194	Murraysburg 194	Battlefield	Grade IIIa
39781	MUR195	Murraysburg 195	Artefacts	Grade IIIa
39782	MUR196	Murraysburg 196	Stone walling	Grade IIIa
39783	MUR197	Murraysburg 197	Rock Art	Grade IIIc
39784	MUR198	Murraysburg 198	Rock Art	Grade IIIa
39785	MUR199	Murraysburg 199	Rock Art	Grade IIIa
39786	MUR200	Murraysburg 200	Rock Art	Grade IIIa
39787	MUR201	Murraysburg 201	Rock Art	Grade IIIa
39788	MUR202	Murraysburg 202	Rock Art	Grade IIIa
39789	MUR203	Murraysburg 203	Rock Art	Grade IIIa
39790	MUR204	Murraysburg 204	Rock Art	Grade IIIa
39791	MUR205	Murraysburg 205	Rock Art	Grade IIIa
39792	MUR206	Murraysburg 206	Rock Art	Grade IIIc
39793	MUR207	Murraysburg 207	Stone walling	Grade IIIc
39794	MUR208	Murraysburg 208	Stone walling	Grade IIIc
39795	MUR209	Murraysburg 209	Stone walling	Grade IIIc
39796	MUR210	Murraysburg 210	Stone walling	Grade IIIc
39797	MUR211	Murraysburg 211	Stone walling	Grade IIIb
39623	MUR065	Murraysburg 065	Building	Grade IIIb

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39649	MUR088	Murraysburg 088	Stone walling	Grade IIIb
39650	MUR089	Murraysburg 089	Stone walling	Grade IIIb
39777	MUR191	Murraysburg 191	Artefacts	Grade IIIb
39561	MUR015	Murraysburg 015	Burial Grounds & Graves	Grade IIIa
39562	MUR016	Murraysburg 016	Burial Grounds & Graves	Grade IIIa
39563	MUR017	Murraysburg 017	Burial Grounds & Graves	Grade IIIa
39564	MUR018	Murraysburg 018	Burial Grounds & Graves	Grade IIIa
39671	MUR102	Murraysburg 102	Burial Grounds & Graves	Grade IIIa
39798	MUR212	Murraysburg 212	Burial Grounds & Graves	Grade IIIa
39890	MUR213	Murraysburg 213	Burial Grounds & Graves	Grade IIIa
86350	VIWB001	Victoria West Bultfontein 001	Artefacts	Grade IIIb
86351	VIWB002	Victoria West Bultfontein 002	Artefacts	Grade IIIb
86352	VIWB003	Victoria West Bultfontein 003	Artefacts	Grade IIIb
86353	VIWB004	Victoria West Bultfontein 004	Artefacts	Grade IIIb
86355	VIWB006	Victoria West Bultfontein 006	Artefacts	Grade IIIc
86356	VIWB007	Victoria West Bultfontein 007	Artefacts	Grade IIIc
86357	VIWB008	Victoria West Bultfontein 008	Artefacts	Grade IIIc
86358	VIWB009	Victoria West Bultfontein 009	Artefacts	Grade IIIc

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APPENDIX 2

Reference List with relevant AIAs and PIAs

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	01/05/2010	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED

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		Booth, Natasha Higgitt		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
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 â€“ 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)

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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.

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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 PALAEOLOGICAL 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.

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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



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- 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.

APPENDIX 5 -Summary of Specialist Expertise

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 since 2016, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is 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). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

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

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