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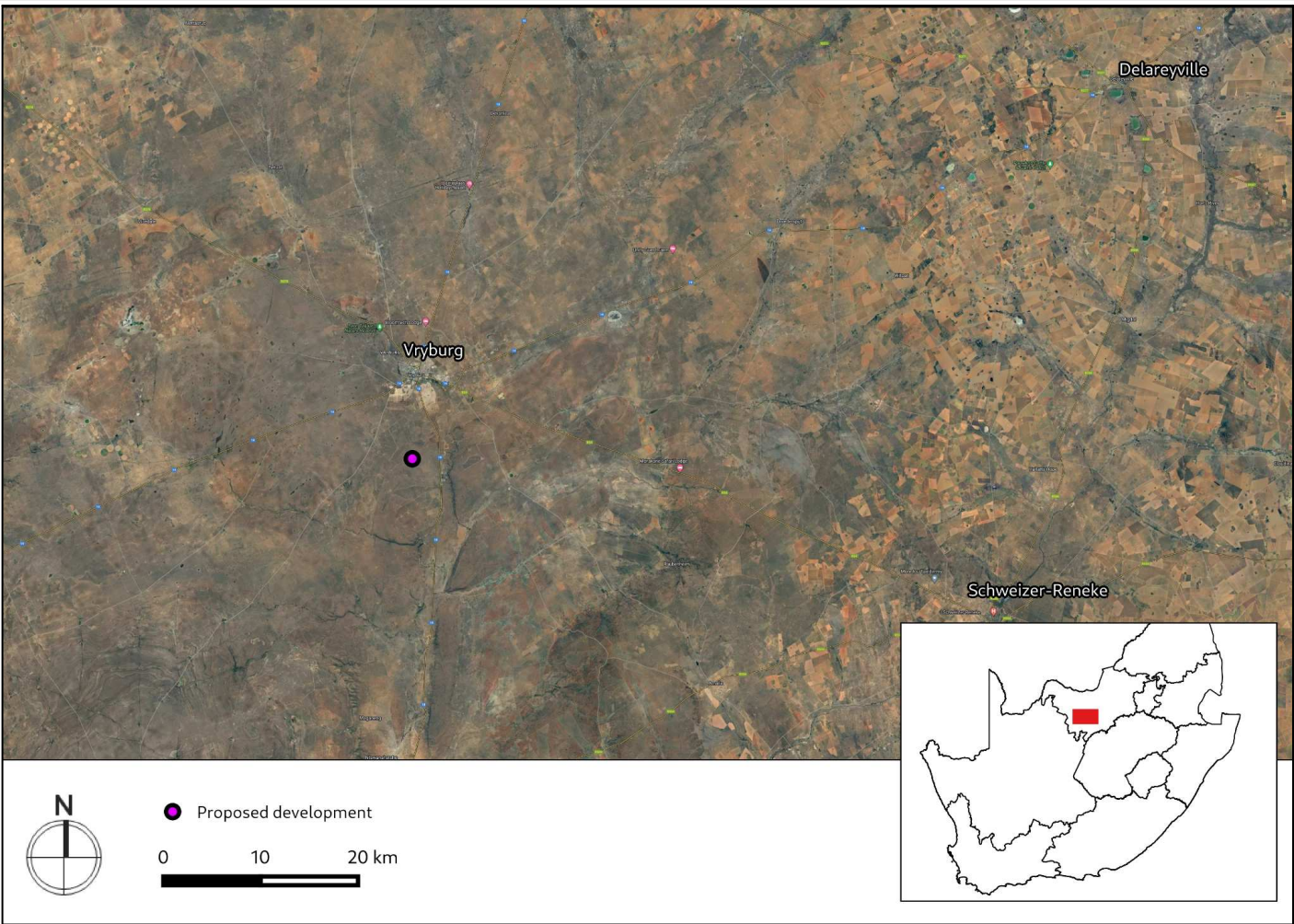
CTS Reference Number:	CTS22_078	
SAHRA Case No.	9721	
Client:	WSP	
Date:	March 2023	
Title:	Proposed development of the Sendawo PV BESS and OHL near Vryburg in the North West Province	
CTS Heritage Recommendation	RECOMMENDATION Based on the information available, it is likely that the proposed grid connection corridor will impact on significant archaeological heritage and as such, it is recommended that a Heritage Impact Assessment is conducted that complies with section 38(3) of the NHRA for the proposed development with special focus on impacts to significant archaeological heritage.	

Figure 1a. Satellite map indicating the location of the proposed development in the North West Province

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1. Proposed Development Summary

The proposed Sendawo BESS facility is located within the Vryburg Renewable Energy Development Zone (REDZ) 6, and the proposed 400 kV OHPL is located within the Northern Strategic Transmission Corridor. The proposed BESS facility will be located off the N18, on Portion 1 of the Farm Edinburgh No 735, approximately 5 km south of the of Vryburg in the North West Province. The Sendawo Battery Energy Storage System (BESS) project entails the construction and operation of a 150 MW/600 MWh BESS facility and associated infrastructure, at the authorised Sendawo Solar Energy Facility (SEF) Substation near Vryburg in the North West Province.

The proposed BESS comprises a number of DC Battery Enclosures, Converter Stations, associated auxiliary transformers and an HV substation. Each DC Battery Enclosure is approximately 10 x 2 x 4 m (l x b x h), and houses a number of liquid cooled Lithium-ion batteries. The enclosure is equipped with a fire detection system, and gas detection and prevention mechanism.

A typical 150MW/600MWh BESS system comprises a number of DC Battery Enclosures at a capacity of 2.81 MW. The proposed system has a 4 hour discharge time, with a usable energy of 0.7 MW, hence for a 150MW/600MWh BESS system, approximately 215 battery enclosures are required.

Each Converter Station comprises of 2 converters (~4200 kW,~1500VDC, - 690Vac) feeding into a single MV transformer (690V/(22kV-33kV)), with the dimensions of each converter measuring 3.0 x 2.0 x 2.2m. A single converter is fed from approximately 7 Battery Enclosures.

The BESS is supplied by a number of outdoor auxiliary transformers ((22kV-33kV)/(220-380V)) to provide auxiliary power to the plant. The MV transformers feed the HV substation which steps the voltage from 22kV to 66kV through one or more HV transformers, in the HV substation connecting to the Eskom grid.

The onsite HV substation will be constructed with a maximum footprint of approximately 56 800 m² and encloses the 22kV/66kV HV power transformer. A lightning mast with a maximum height of 24m, tower sections, earthing switches, circuit breakers, surge arrestors, busbars and other miscellaneous substation equipment, including a substation building containing MV switchgear, control and protection equipment will also form part of the onsite substation.

The proposed OHPL is a 400 kV single or double steel structure with a kingbird conductor. The powerline will be supported by powerline towers which may be steel lattice (518 H and 518 C) or monopole structures, both options will have a maximum height of 28 m.

2. Application References

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

3. Property Information

Latitude / Longitude	BESS 1: 27° 2'9.44"S, 24°43'32.37"E
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	BESS 2: 27° 2'40.10"S, 24°42'43.39"E
Erf number / Farm number	Portion 1 of the Farm Edinburgh No 735
Local Municipality	Naledi Local Municipality
District Municipality	Dr Ruth Segomotsi Mompati District Municipality
Current Zoning	Grazing land (Still to be rezoned)

4. Nature of the Proposed Development

Total Area	5ha for the BESS and a 4.6km grid servitude
Depth of excavation (m)	<3m
Height of development (m)	Main equipment: Up to 4 m Light poles: maximum height 4.8 m Lightning mast at the Sendawo substation: 20m Powerline towers: Up to 28 m high.

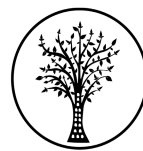
5. Category of Development

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

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6. Additional Infrastructure Required for this Development

For the BESS:

- Approx. 6 m wide access road to BESS (6m wide road surface with 1m drainage on each side of the road), internal roads also up to 6 m wide;
- MV cabling (underground/overhead);
- Fencing around the BESS;
- Temporary laydown area within the BESS footprint;
- Possible firebreak located within the footprint;
- Water supply;

For the grid, existing road infrastructure will be used as far as possible to provide access for construction vehicles during the construction of the line. Thereafter, the roads are used for inspection and maintenance purposes. Where appropriate roads may be upgraded to access transmission lines and substations.

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

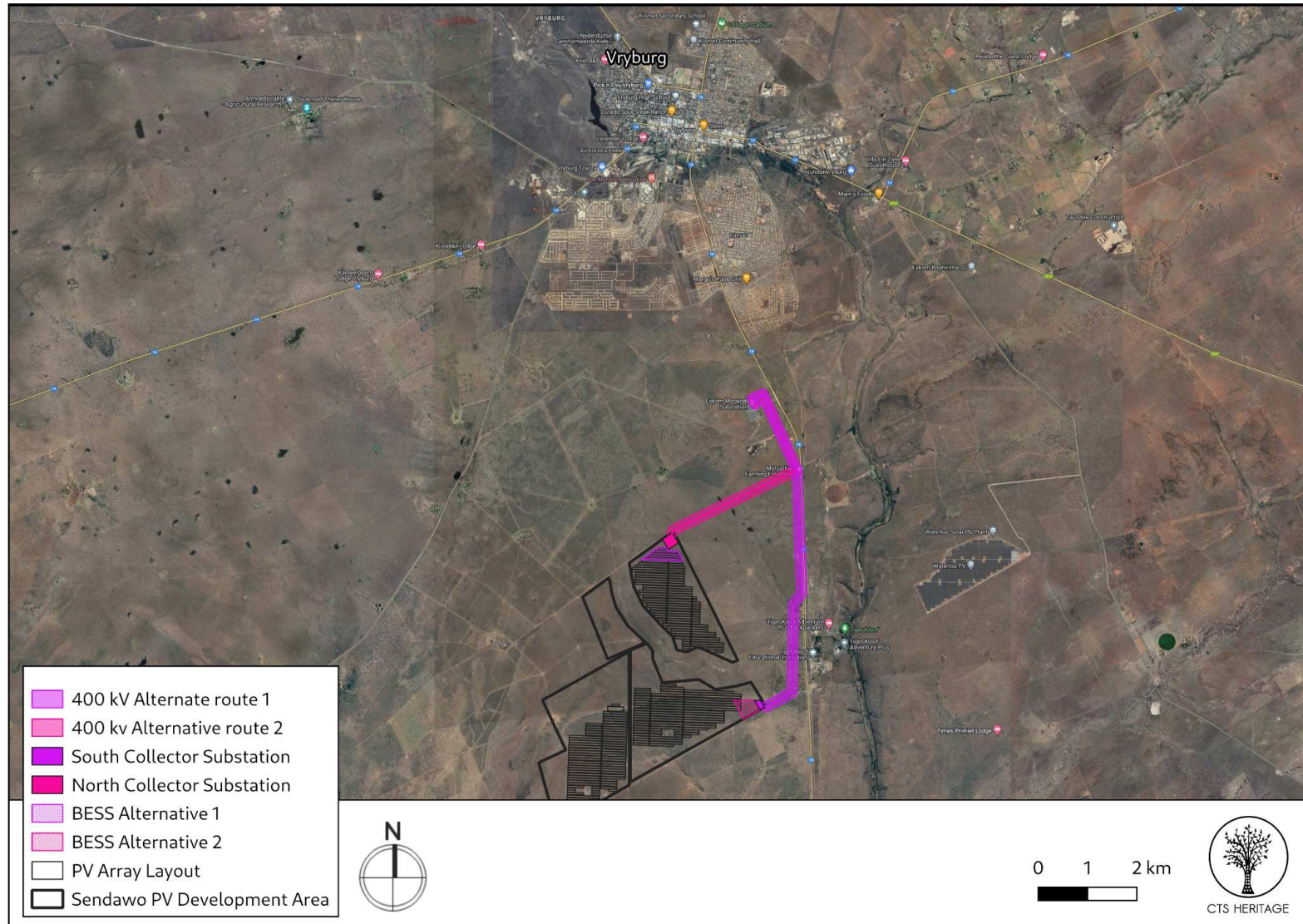


Figure 1b. Overview Map. Satellite image (2022) indicating the proposed development area relative to Vryburg

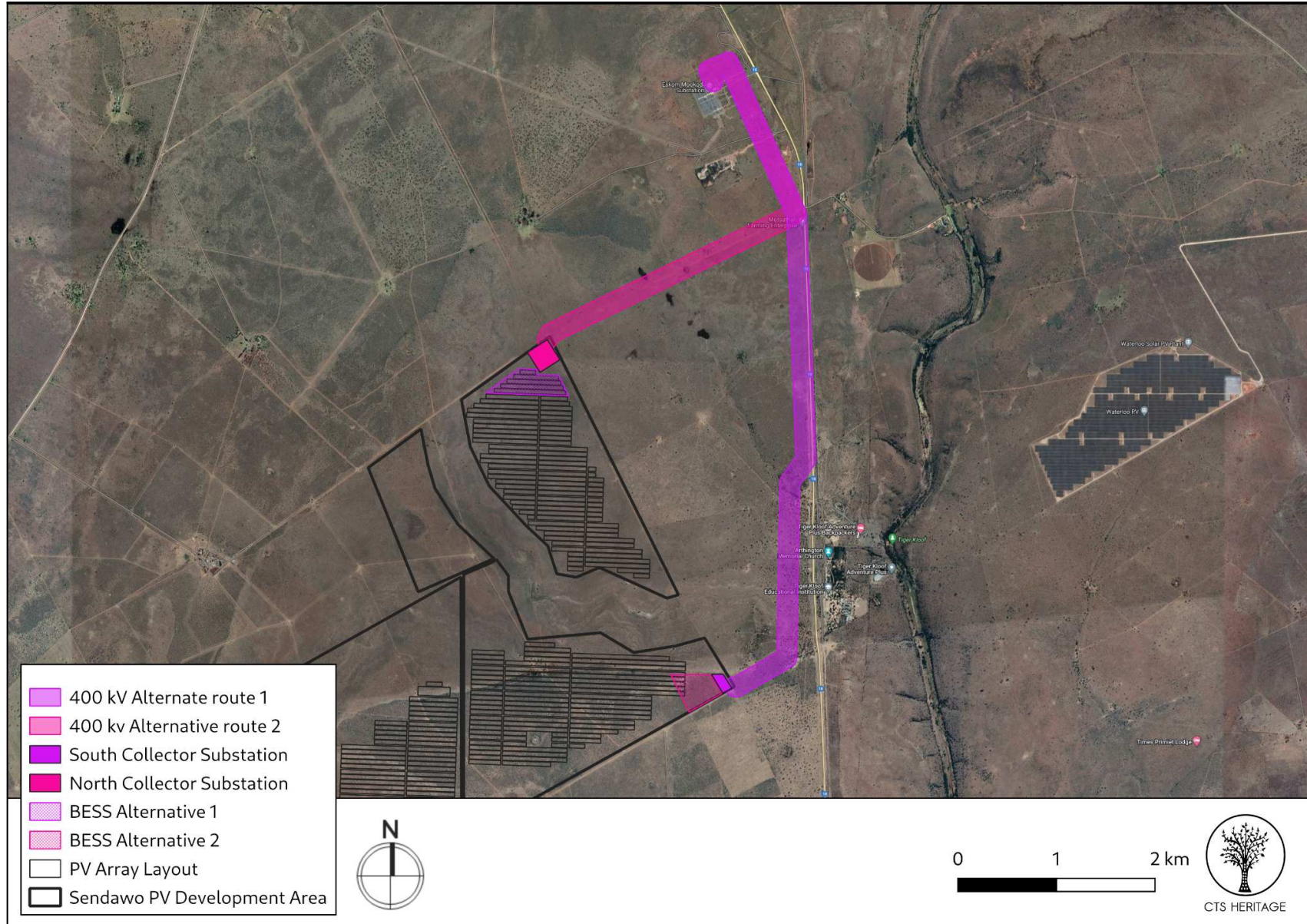
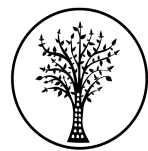


Figure 1c. Overview Map. Satellite image (2022) indicating the proposed development area in the North West Province



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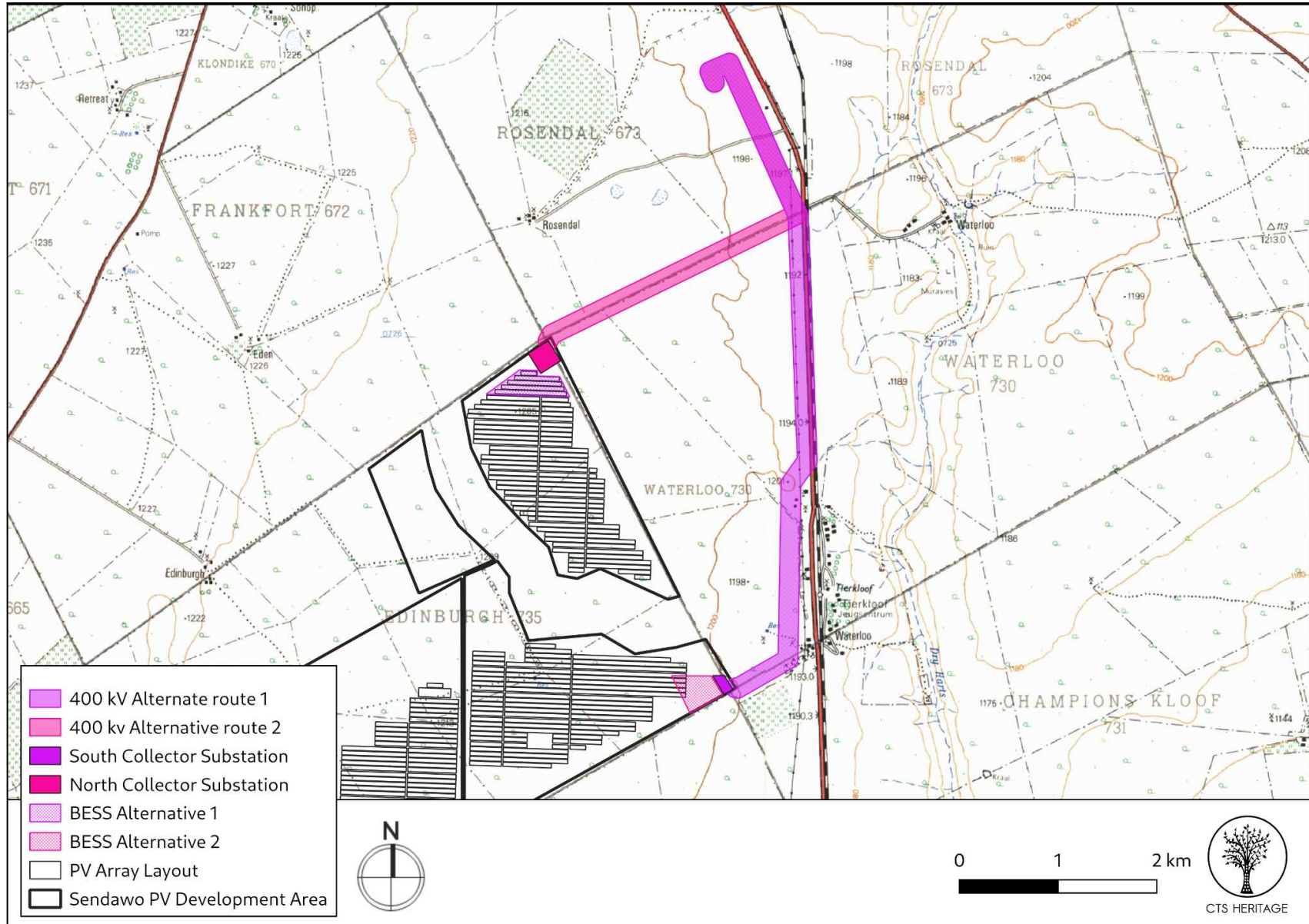


Figure 1d. Overview Map. Extract from the 1:50 000 Topo map indicating the proposed development area

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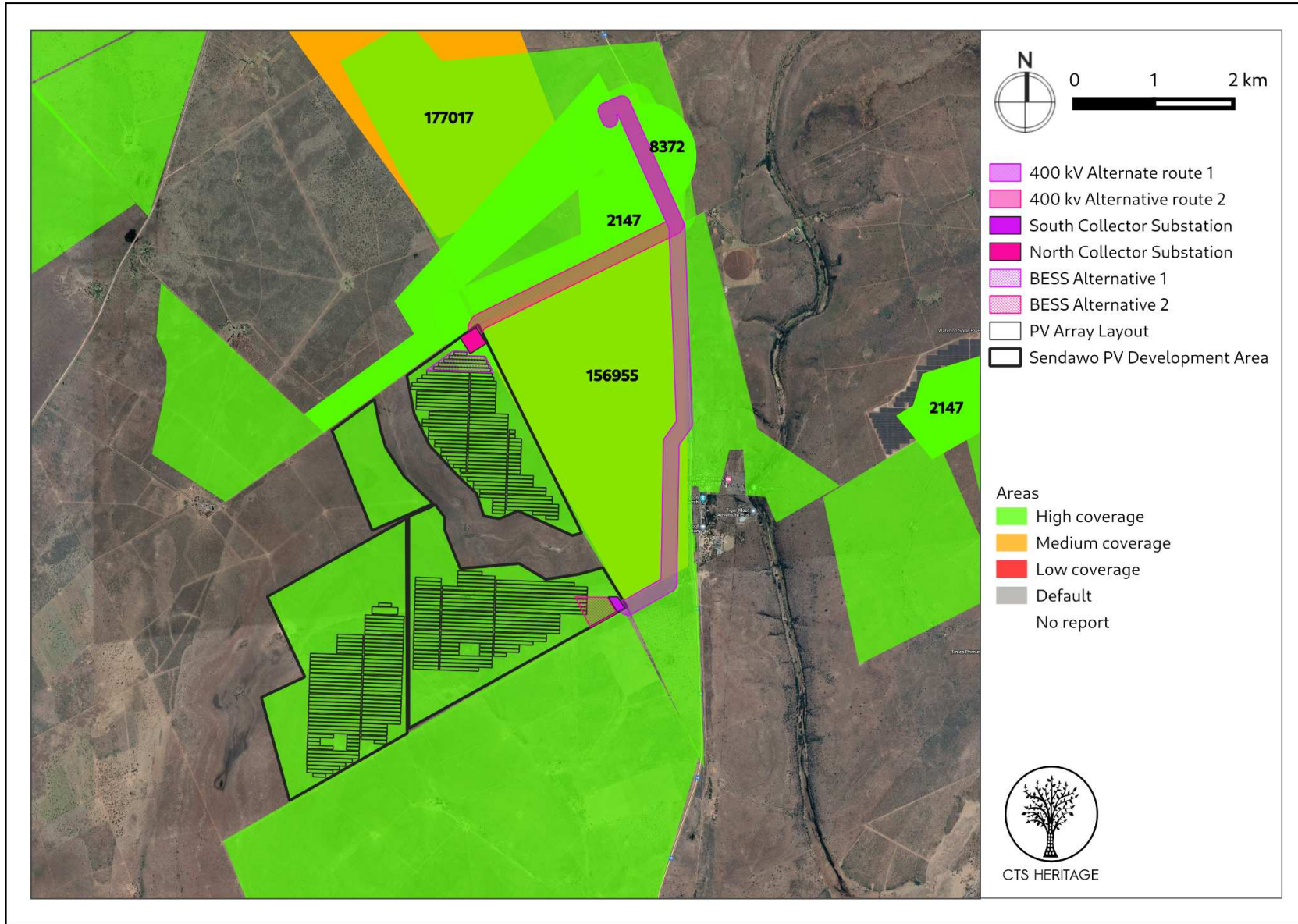
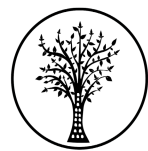


Figure 2a. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.



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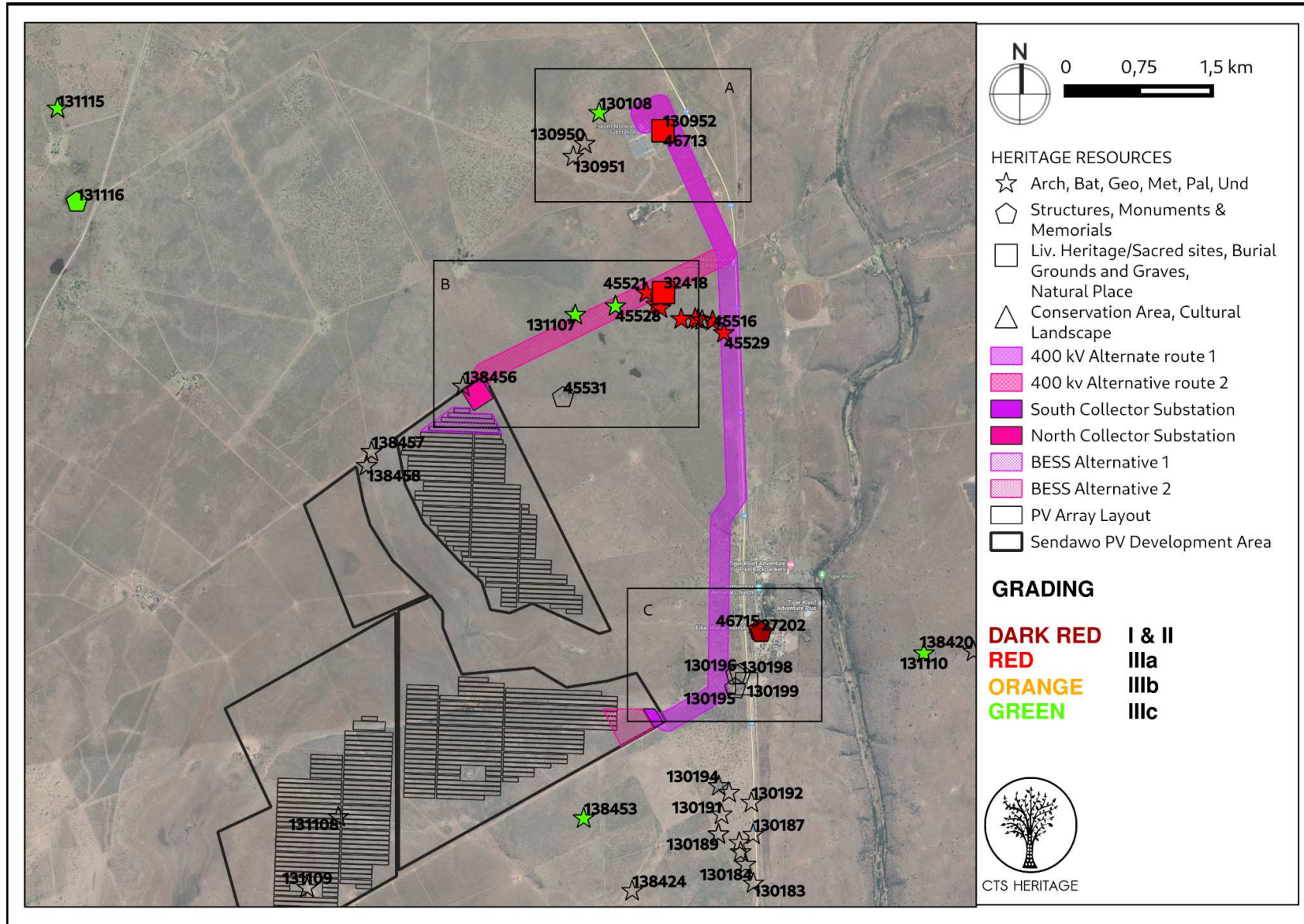


Figure 3. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for a full description of heritage resource types.

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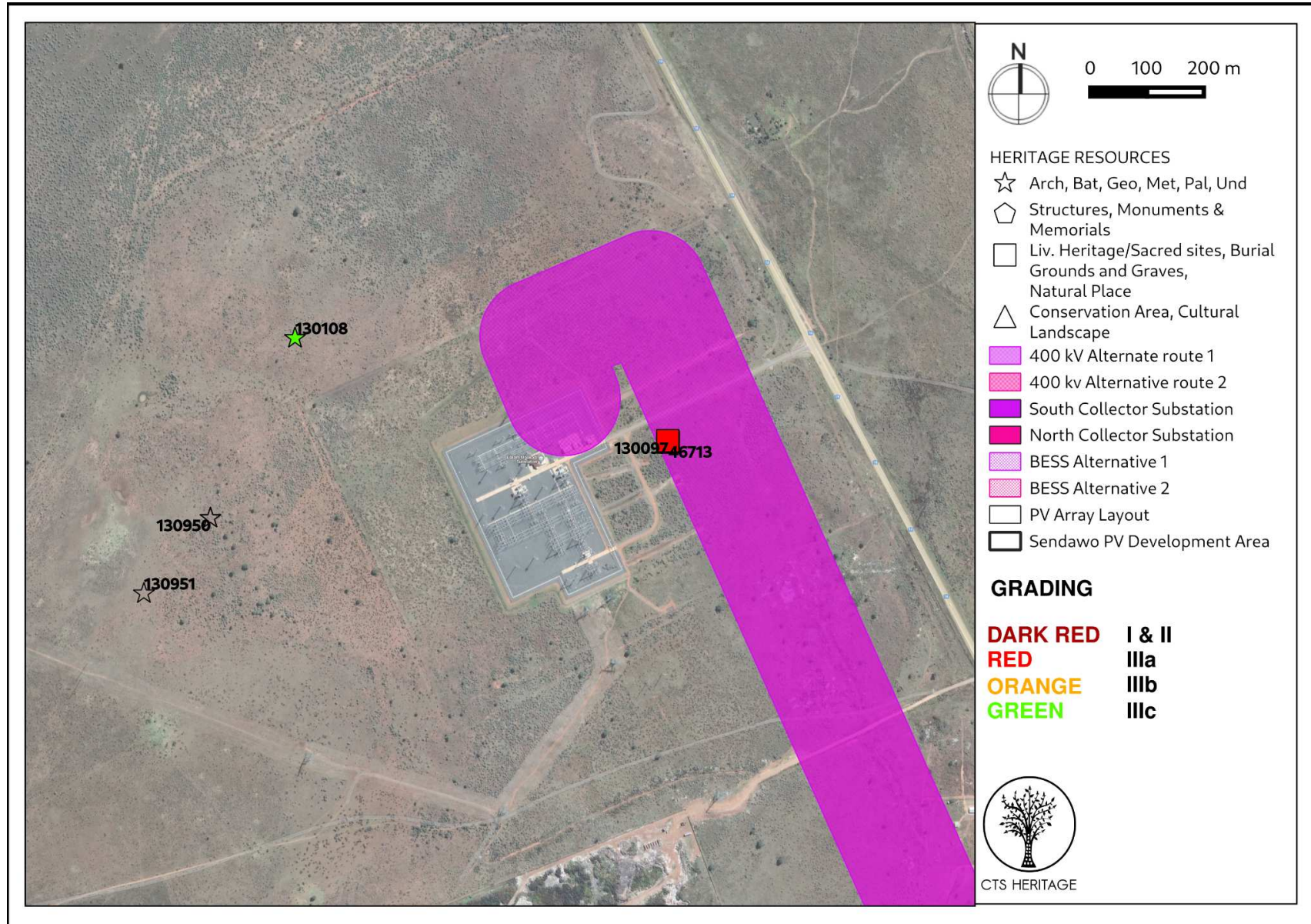
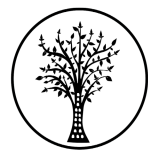


Figure 3a. Heritage Resources Map. Heritage Resources inset A

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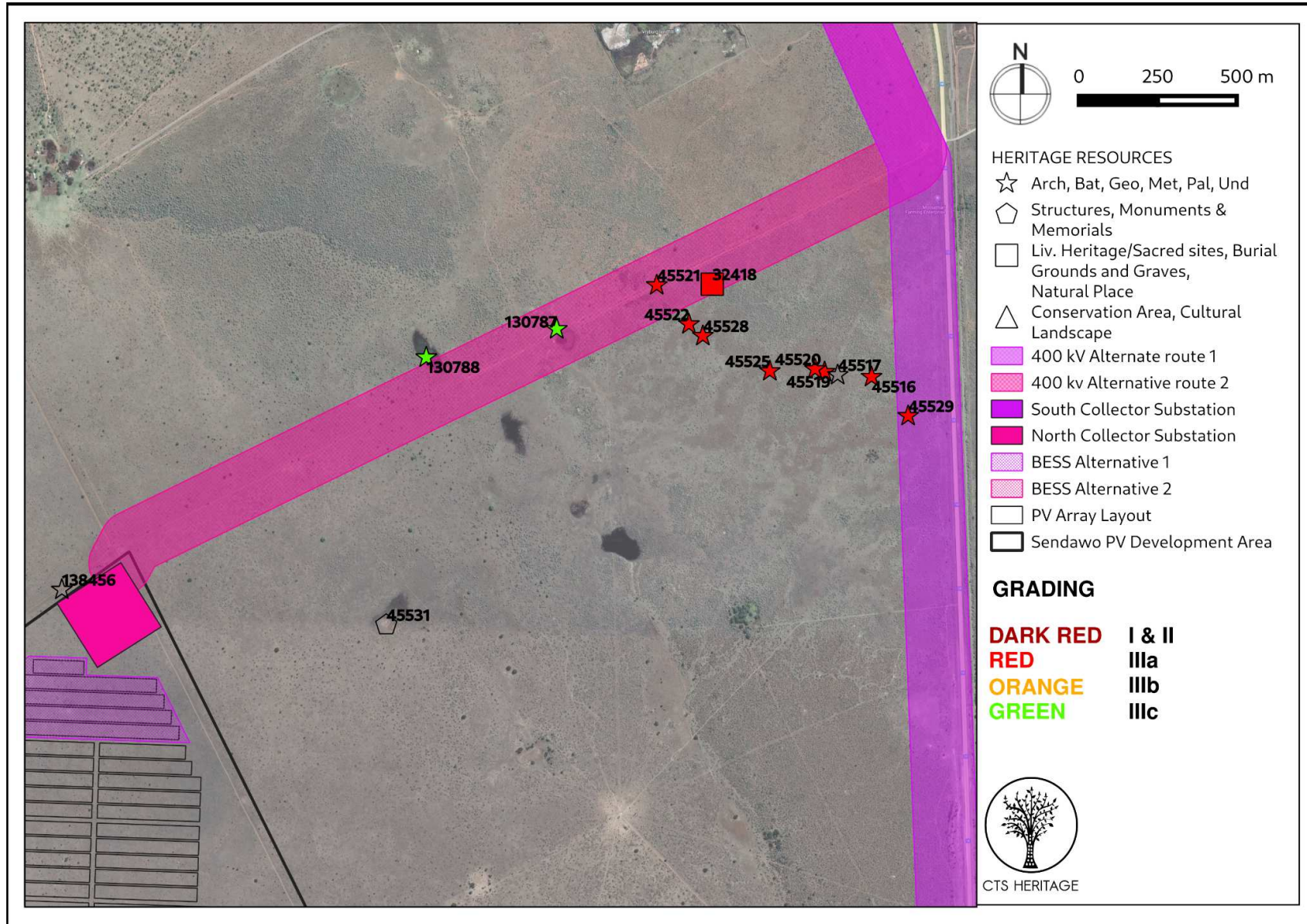
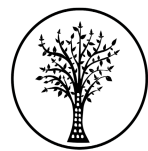


Figure 3b. Heritage Resources Map. Heritage Resource inset B

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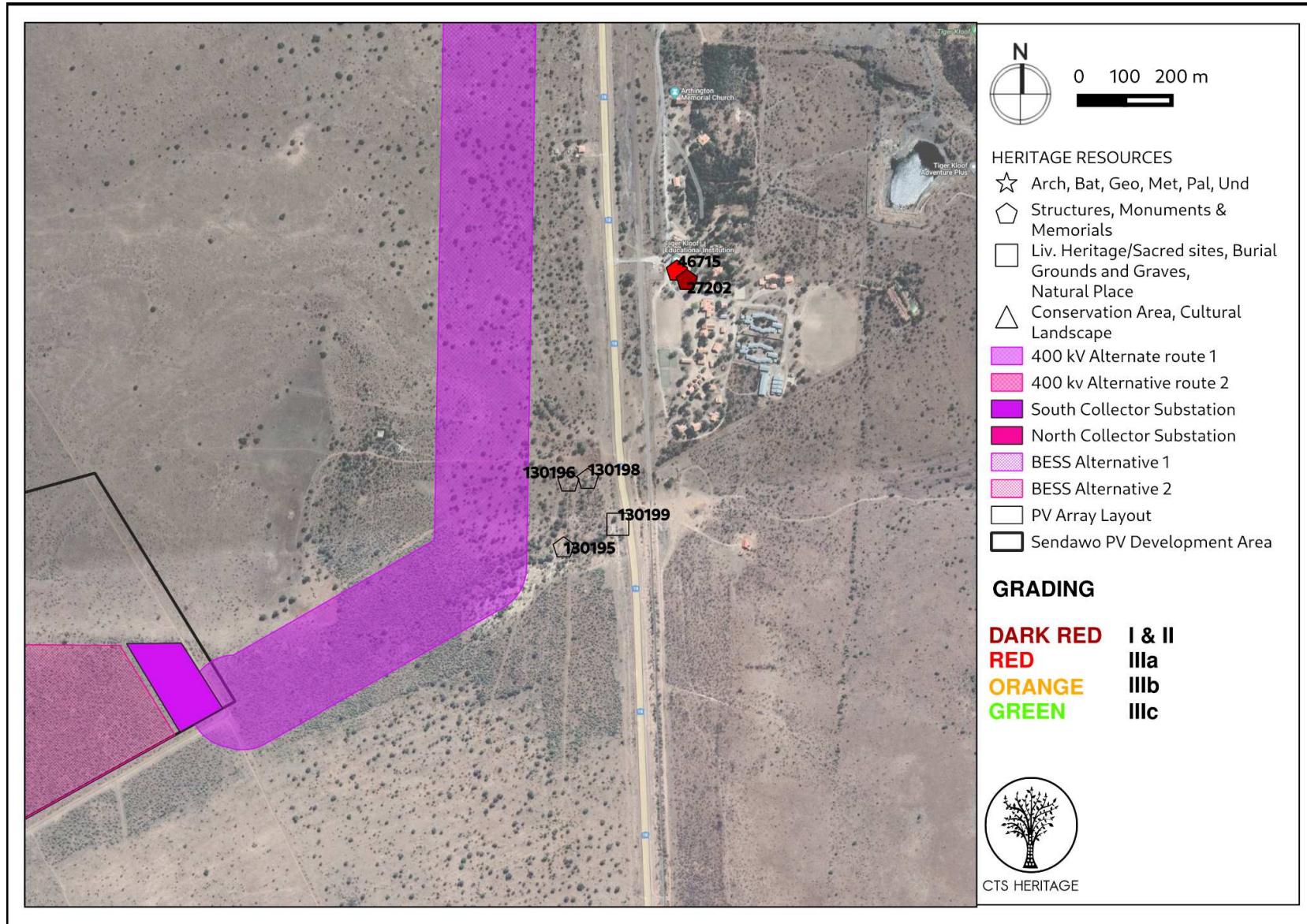


Figure 3c. Heritage Resources Map. Heritage Resource inset C

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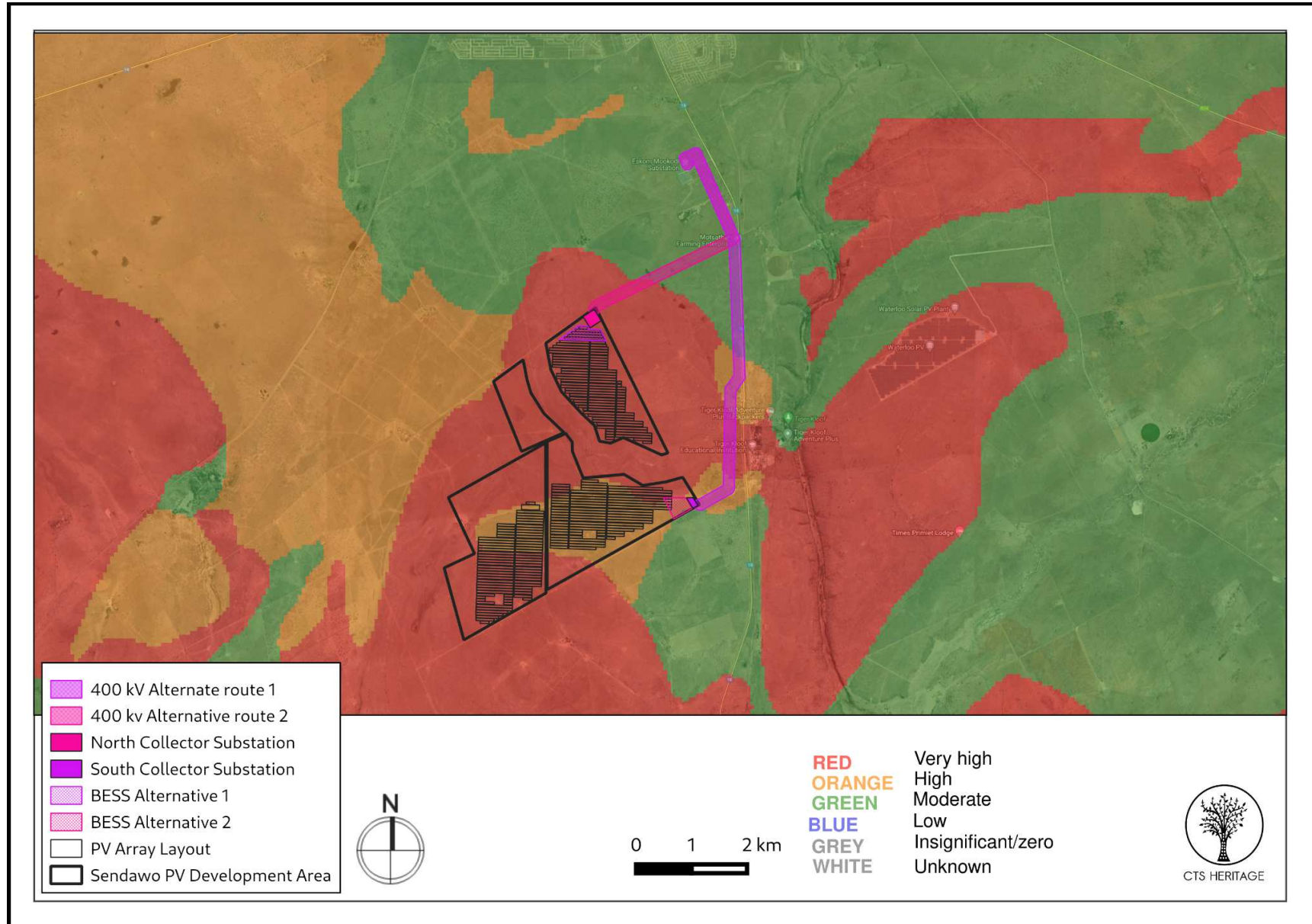


Figure 4a. Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

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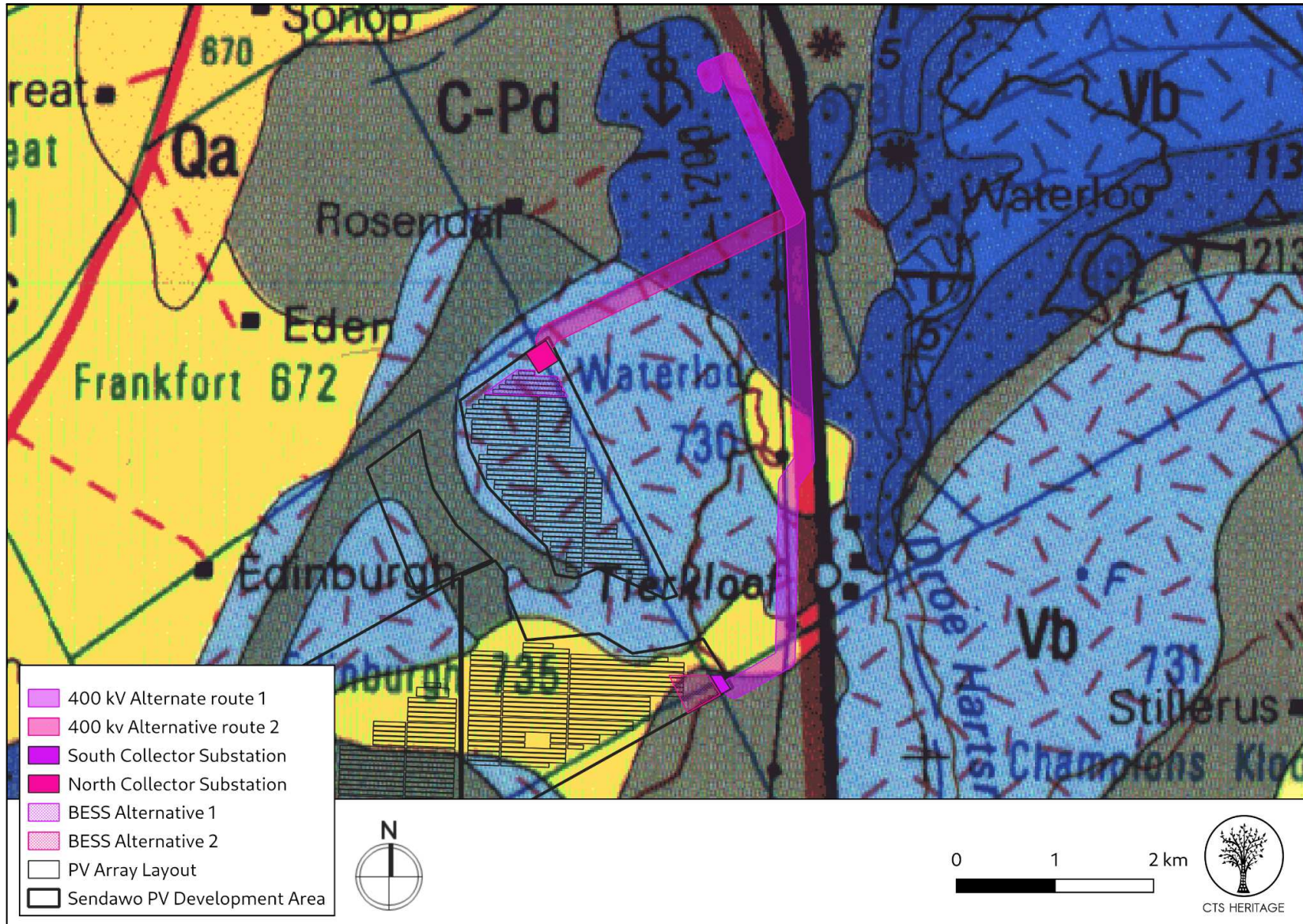


Figure 4b. Geology Map. Extract from the CGS 2724 Christiana Map indicating that the development area for the BESS and OHL alternatives is underlain by Tertiary calcrete and Quaternary alluvium, sand and soils (T-Qc), Clearwater Formation (Vc), Boomplaas Formation (Vb) and Vryburg Formation (Vv) of the Ghaap Group

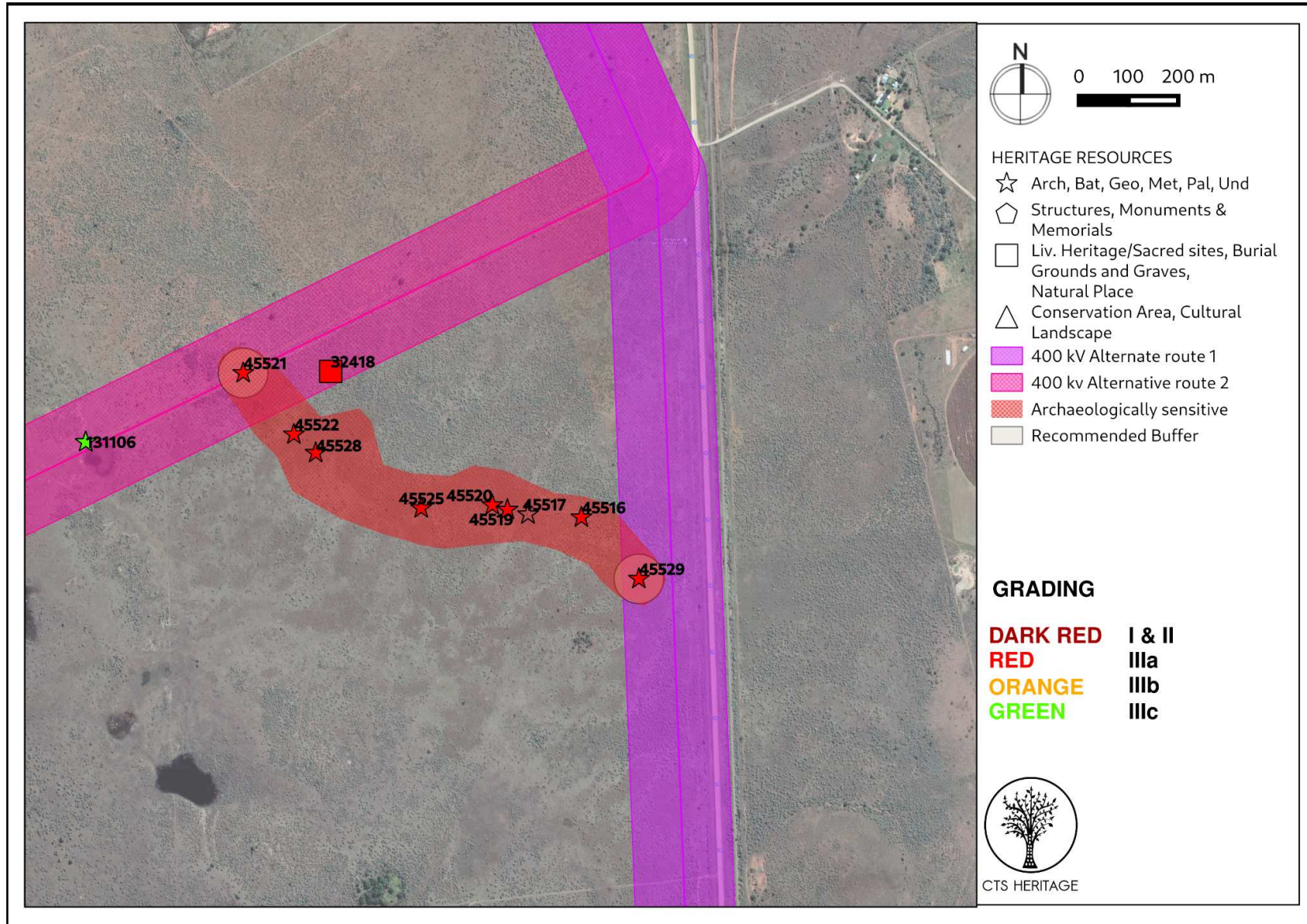
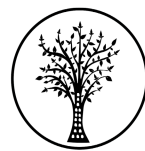


Figure 5. Heritage Resources Map. Heritage Resources with recommended mitigation measures



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8. Desktop Heritage Assessment

Background

This report is drafted for the proposed construction and operation of a Battery Energy Storage (BESS) and a grid connection for the authorised Sendawo Solar Energy Facility. The BESS which will have an extent of no more than 5ha will be developed within the authorised development footprint of the Sendawo PV facility. Two options are proposed for the area proposed for the BESS development, both are located within the area previously assessed for the Sendawo PV facility. This area was thoroughly assessed for impacts to heritage resources in the Heritage Impact Assessment conducted by Fourie (2016, SAHRIS NID 9721). The HIA by Fourie (2016) and an HIA completed by Van Schalkwyk (2018) for an adjacent property is referred to below.

Archaeology and Built Environment Heritage

Vryburg town was established in 1882 as the capital town of the independent Boer Republic of Stellaland. During its short history, the small state became a focal point for conflict between the British Empire and the South African Republic, the two major players vying for control of the territory. After a series of claims and annexations, British fears of Boer expansionism led to its demise and, among other factors, set the stage for the Second Boer War. Before the proclamation of the republic, the area was under the control of competing Korana and Tswana groups, while the United Kingdom laid claim to it as a part of the emerging protectorate of British Bechuanaland. Two of the indigenous groups were under the leadership of chiefs Mankoroane and Montšioa, whom the British regarded as "friendly," and two others under the leadership of chiefs Moshette (a Motswana) and Massouw (a Korana). When a feud erupted between Mankoroane and another chief, each side resorted to recruiting volunteers, promising them land in return for their assistance. After a settlement was negotiated with mediation from the Transvaal Republic, large portions of Mankoroane's land were given to Boer mercenaries who had fought on his adversary's side, and the new inhabitants decided to declare independence and establish the Republic of Stellaland. During the Second Boer War, a concentration camp was established at Vryburg, however this concentration camp is located north of Vryburg town and is therefore located sufficiently far from the area proposed for development that no impact is anticipated.

According to van Schalkwyk et al (2018, SAHRIS NID 510838) "Very little habitation of the central highveld area took place during Stone Age times. Tools dating to the Early Stone Age period are mostly found in the vicinity of larger watercourses, e.g. the Vaal River or the Harts River and especially in sheltered areas such as at the Taung fossil site. During Middle Stone Age (MSA) times (c. 150 000 – 30 000 BP), people became more mobile, occupying areas formerly avoided. In many cases, tools dating to this period are found on the banks of the many pans that occur all over." Van Schalkwyk (2018, SAHRIS NID 510838) notes that Later Stone Age artefacts and rock art are also known from the area. Iron Age people started to settle in the area in the 1500s. According to Van Schalkwyk (2018, SAHRIS NID 510838), "By the 16th century things changed, with the climate becoming warmer and wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the treeless plains of the Free State and North West Province." including the proposed development area. "The earliest Iron Age settlers who moved into the North West Province region were Tswana-speakers such as the Tlhaping, Hurutshe, Fokeng, Kgatla and Rolong. In the region of the study area, it was mostly the booRapulana and booRatlou sections of the Rolong (Breutz 1959)."

Despite the overall archaeological sensitivity of the broader landscape, the archaeological survey conducted by Fourie (2016) identified limited heritage resources of value within the areas proposed for the BESS facilities. Fourie (2016) notes that "The find spots in the larger study area varied from Later Stone Age (LSA) scatters consisting of flakes, chips and some cores manufactured from fine-grained quartzite, chalcedony, and cryptocrystalline (ccs) material; Middle Stones Age (MSA) lithics consisting of cores, chips and flakes with a low occurrence of formal tools. The majority of the material utilised were either lideanite that occur in the form of medium sized boulders or round washed pebbles in the area or coarse-grained quartzite that occur as sporadic outcrops. Earlier Stone Age (ESA) lithics found at some of these finds spots consisted of a hand axe, cleavers and large flakes. Most of the lithics were either rolled or heavily weathered with patination evident on many of the lithics. No heritage resources related to archaeology or the more recent history was identified in the footprint area of Solar 3" (The proposed BESS locations are within Sendawo Solar Area 3).

The field assessment for the Sendawo Grid connection assessed a corridor that includes the alternatives considered in this report. Two archaeological sites of significance were identified by Fourie (2016) in his assessment. These sites, as well as others that occur within the grid corridor are detailed in the table below:

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Site ID	Site Name	Corridor	Description	Grading	Mitigation
45521	WATER05	Alt 2	The site consists of a low ridge in the eastern portion of the study area that crosses the study area roughly from the north to the south and south east. The entire ridge is covered in MSA and LSA artefacts where the locally available CCS is exploited. The MSA component is characterised by a high frequency of blades. From casual observation it seems as if a higher frequency of concentration of artefacts are found on the eastern side of the ridge where there is a clear view to the Dry Harts River roughly more than 2km to the east. Where higher artefact concentrations or where a clear edge to a concentration could be determined within the ridge these were recorded as Site 1 A to Site 1 I. These concentrations are how ever seen as part of one knapping site (Site 1) where there is a high ratio of artefacts to cores. This site consists of high concentration 22-m ² of MSA and LSA tools from CCS and Quartzite.	IIIA	Buffer of 50m recommended - See Figure 5
45529	WATER09	Alt 1	The site consists of a low ridge in the eastern portion of the study area that crosses the study area roughly from the north to the south and south east. The entire ridge is covered in MSA and LSA artefacts where the locally available CCS is exploited. The MSA component is characterised by a high frequency of blades. From casual observation it seems as if a higher frequency of concentration of artefacts are found on the eastern side of the ridge where there is a clear view to the Dry Harts River roughly more than 2km to the east. Where higher artefact concentrations or where a clear edge to a concentration could be determined within the ridge these were recorded as Site 1 A to Site 1 I. These concentrations are how ever seen as part of one knapping site (Site 1) where there is a high ratio of artefacts to cores. This site consists of Artefact count 13-m ² . LSA dominates with some MSA. Raw material on CCS and quartzite.	IIIA	Buffer of 50m recommended - See Figure 5
32418	Exhumati on of graves at Eskom Mookodi Substatio n1	Alt 2 (although likely to have been mapped incorrectly)	Permit granted in 2014 to remove the graves at this site to a new location: PGS Heritage was appointed by Eskom Holdings SOC Limited, to effect the relocation of 6 graves located within the Eskom Mookodi substation area. The graves are located next to the substation High Voltage yard and have been fenced off. The graves need to be relocated as the expansion of the substation necessitates their relocation after alternatives for their preservation that were investigated were not viable. Based on this description, this site is likely the same as Sites 46713, 130097 and 130952 but mapped incorrectly	IIIA	NA
138456	SDNP004	Alt 2	Shallow sandy soils on shale and quartzites with minor dolomite. No heritage significance	NCW	NA
131106	SDG001	Alt 2	Low density scatter of MSA lithics over an area of approximately 50 m2. The site is	IIIC	Implement walk down of final alignment on power

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			<p>characterised by a large pebble concentration within a dry pan. Same location as Site 130787</p> <p>Low density scatter of MSA lithics over an area of approximately 50 m2. The site is characterised by a large pebble concentration within a dry pan. The sites varied from Middle Stone Age (MSA) scatters consisting of flakes and some cores manufactured from coarse-grained quartzite material; Early Stones Age (ESA) lithics consisting of cores and a hand axe with a low occurrence of formal tools. The majority of the material utilised were either lideanite that occur in the form of medium sized boulders or round washed pebbles in the area or coarse-grained quartzite that occur as sporadic outcrops. Most of the lithics were either rolled or heavily weathered with patination evident on many of the lithics. Find spots V07 and V08 have a low significance, however the possibility of subsurface deposits cannot be discounted and was kept in mind with the development of the mitigation recommendations.</p>		line alignment
131107	SDG002	Alt 2	<p>Low density scatter of MSA and ESA material The site is characterised by the typical Savanna Biome and more specifically in the Ghaap Plateau Vaalbosveld Group the size of the site is about 130 m2. Same location as Site 130788:</p> <p>Low density scatter of MSA and ESA material The site is characterised by the typical Savanna Biome and more specifically in the Ghaap Plateau Vaalbosveld Group the size of the site is about 130 m2. The sites varied from Middle Stone Age (MSA) scatters consisting of flakes and some cores manufactured from coarse-grained quartzite material; Early Stones Age (ESA) lithics consisting of cores and a hand axe with a low occurrence of formal tools. The majority of the material utilised were either lideanite that occur in the form of medium sized boulders or round washed pebbles in the area or coarse-grained quartzite that occur as sporadic outcrops. Most of the lithics were either rolled or heavily weathered with patination evident on many of the lithics. Find spots V07 and V08 have a low significance, however the possibility of subsurface deposits cannot be discounted and was kept in mind with the development of the mitigation recommendations.</p>	IIIC	Implement walk down of final alignment on power line alignment
130952	VBS003	Both	<p>Originally some graves occurred in this area. They were very old and only marked with low stone cairns. As they were located next to the laydown area for the construction of the substation, they were fenced off. They could not be located during the site visit (possibly due to incorrect coordinates). It is also possible that they were relocated during the construction activities. Same location as Site 46713 and 130097</p>	IIIA	<p>All cemeteries should have a buffer of at least 20 metres from the outermost graves. Fortunately, many cemeteries are fenced off, which can then be used as a buffer.</p> <p>Likely already exhumed</p>

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for the BESS development is underlain by sediments of high palaeontological sensitivity (Figure 4a). According to the extract from the CGS 2724 Christiana Ma, the development area for the Sendawo PV Facility as well as the development area for the BESS is underlain by Tertiary calcrete and Quaternary alluvium, sand and soils (T-Qc) (Figure 4b). The palaeontological impacts associated with the development of the Sendawo solar facilities was assessed by Groenewald

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(2016). According to Groenewald (2016), the area proposed for the BESS development is underlain by Stromatolitic carbonate rocks (limestones, dolomites) of Early Precambrian (Archaean) age in outcrops of the Ventersdorp Group (Kameeldorns, Rietgat and Bothaville Formations) as well as the lower part of the Transvaal Supergroup (Ghaap Group, Vryburg Formation & Schmidtsdrift Subgroup, including the Boomplaas Formation). In the Vryburg area and further south towards Taung these include some of the oldest (> 2.5 billion years) and best-preserved stromatolites (fossil microbial mounds) known from this period; Stromatolites are recorded from the dolomite layers. Highly fossiliferous Caenozoic cave breccias are also known to occur within the dolomite layers, but are not mapped individually. These fossiliferous deposits often contain more recent mammal and hominid fossils, e.g. in the Cradle of Humankind.

In his palaeontological assessment, Groenewald (2016) notes that “A small part of the study area is characterised by the presence of significant Stromatolites and that stromatolites are present in almost all the dolomite boulders on site. Some areas have possible remains of cave breccia but no in situ outcrops were recorded.” The significant palaeontological observations noted by Groenewald (2016) are all located towards the south of the Sendawo PV 3 area and are located well away from the proposed BESS locations. As such, although no palaeontological resources were identified within the area proposed for the BESS development during the field assessment, it remains likely that significant palaeontological heritage in the form of Tertiary-aged fossils or stromatolites may be impacted. As such, the attached Palaeontological Chance Finds Procedure must be implemented for the duration of excavations activities.

Cumulative Impacts

The proposed BESS development will form part of the infrastructure required for the Sendawo solar development and is located in close proximity to the substation and operations and maintenance facilities associated with the Sendawo solar development. Furthermore, the proposed BESS is located within an already approved solar facility development footprint which is also located within a belt of approved renewable energy facilities (Figure 5). In terms of impacts to heritage resources, it is preferred that this kind of infrastructure development is concentrated in one location and is not sprawled across an otherwise culturally significant landscape. The construction of the proposed BESS is therefore unlikely to result in unacceptable risk or loss, nor will the proposed BESS development result in a complete change to the sense of place of the area or result in an unacceptable increase in impact. No additional cumulative impacts have been identified in addition to those already covered in the EIA.

Conclusion

There is no objection to the proposed development of Sendawo PV BESS and grid connection on heritage grounds and no monitoring protocols are recommended. There are no disadvantages or advantages associated with the proposed amendment from a heritage perspective on condition that the mitigation measures included in the Table above are implemented. It should be noted that, although there were no other archaeological or heritage resources identified during the survey conducted for the already approved solar facility; some archaeological material, including artefacts and graves can be buried underground and as such, may not have been identified during the initial survey and site visits. In the case where the proposed development activities bring these materials to the surface, work must cease and SAHRA must be contacted immediately to determine a way forward. The following findings have been made:

- No archaeological resources were identified in the project area identified for the development of the BESS.
- Archaeological resources of significance are known from the grid corridors. These significant resources must be avoided as per the table above.
- No graves or burial grounds were identified in the project area identified for the development of the BESS. However, graves are subterranean in nature and might not have been identified during the initial site visit and survey.
- There are no preferred alternatives for the BESS location from a heritage perspective
- Alternative 1 is preferred for the grid connection from an archaeological perspective due to the possible impacts archaeological heritage
- Based on the known palaeontological sensitivity of the area, it remains likely that significant palaeontological heritage in the form of Tertiary-aged fossils or stromatolites will be impacted by the development. As such, the attached Palaeontological Chance Finds Procedure must be implemented for the duration of excavations activities.

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- If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.

RECOMMENDATION

Based on the information available, it is not likely that the proposed BESS and grid connection development will impact on significant heritage resources and as such, it is recommended that no further heritage assessments are required on condition that Alternative 1 is preferred for the grid connection and the recommendations included in the table above are implemented.

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APPENDIX 1

List of heritage resources within the development area

Site ID	Site no	Full Site Name	Site Type	Grading
27202	9/2/103/0003	Tiger Kloof, Waterloo 730, District Vryburg	Structures	Grade II
45516	WATER01	Waterloo 730 -01	Artefacts	Grade IIIa
45519	WATER03	Waterloo 730 -03	Artefacts	Grade IIIa
45520	WATER04	Waterloo 730 -04	Artefacts	Grade IIIa
45521	WATER05	Waterloo 730 -05	Artefacts	Grade IIIa
45522	WATER06	Waterloo 730 -06	Artefacts	Grade IIIa
45525	WATER08	Waterloo 730 -08	Artefacts	Grade IIIa
45528	WATER07	Waterloo 730 -07	Artefacts	Grade IIIa
45529	WATER09	Waterloo 730 -09	Artefacts	Grade IIIa
32418	Exhumation of graves at Eskom Mookodi Substation1	Exhumation of graves at Eskom Mookodi Substation	Burial Grounds & Graves	Grade IIIa
46715	MOOK010	Mookodi 010	Building	Grade IIIa
46713	MOOK008	Mookodi 008	Burial Grounds & Graves	Grade IIIa
45531	WATER10	Waterloo 730 -10	Structures	
45517	WATER02	Waterloo 730 -02	Artefacts	
138424	PT-001	PROTEA	Artefacts	Grade IV
138453	HTM-001	HARTSBOOM 734	Artefacts	Grade IIIc

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138455	SDNP003	Sendawo PV	Geological	
138456	SDNP004	Sendawo PV	Artefacts	
138457	SDNP005	Sendawo PV	Artefacts	
138458	SDNP006	Sendawo PV	Geological	
130096	2724BA/ Solar/ Farm Rosendal 673/ Site 1	Stone Age factory site	Archaeological	Grade IV
130097	2724BA/ Solar/ Farm Rosendal 673/ Site 2	Burial site	Burial Grounds & Graves	Grade IV
130724	2724DB/ Solar/ Farm Frankfort No 672/ Site V02	Low density scatter	Archaeological	Grade IV
130726	2724DB/ Solar/ Farm Frankfort No 672/ Site V03	Low density scatter	Archaeological	Grade IV
130108	2724BA/ Solar/ Farm Rosendal 673/ Site 2	Archaeological site	Archaeological	Grade IIIc
130183	2724BA/ Solar/ Farm Waterloo 730/ Site 001	Archaeological site	Archaeological	Grade IV
130184	2724BA/ Solar/ Farm Waterloo 730/ Site 002	Archaeological site	Archaeological	Grade IV
130185	2724BA/ Solar/ Farm Waterloo 730/ Site 003	Archaeological site	Archaeological	Grade IV
130186	2724BA/ Solar/ Farm Waterloo 730/ Site 004	Archaeological site	Archaeological	Grade IV
130187	2724BA/ Solar/ Farm Waterloo 730/ Site 005	Archaeological site	Archaeological	Grade IV
130188	2724BA/ Solar/ Farm Waterloo	Arhaeological site	Archaeological	

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	730/ Site 006			
130189	2724BA/ Solar/ Farm Waterloo 730/ Site 006	Arhaeological site	Archaeological	Grade IV
130191	2724BA/ Solar/ Farm Waterloo 730/ Site 007	Archaeological site	Archaeological	Grade IV
130787	2724DB/ Solar/ Farm Frankfort No 672/ Site V07	Low density scatter	Archaeological	Grade IIIc
130192	2724BA/ Solar/ Farm Waterloo 730/ Site 009	Archaeological site	Archaeological	Grade IV
130788	2724DB/ Solar/ Farm Frankfort No 672/ Site V08	Low density scatter	Archaeological	Grade IIIc
130193	2724BA/ Solar/ Farm Waterloo 730/ Site 011	Archaeological site	Archaeological	Grade IV
130194	2724BA/ Solar/ Farm Waterloo 730/ Site 014	Archaeological site	Archaeological	Grade IV
130195	2724BA/ Solar/ Farm Waterloo 730/ Site 018	Building	Structures	Grade IV
130196	2724BA/ Solar/ Farm Waterloo 730/ Site 019	Building	Structures	Grade IV
130198	2724BA/ Solar/ Farm Waterloo 730/ Site 020	Homestead	Structures	Grade IV
130199	2724BA/ Solar/ Farm Waterloo 730/ Site 021	Grave yard	Burial Grounds & Graves	Grade IV
131106	SDG001	Sendawo Grid	Artefacts	Grade IIIc
131107	SDG002	Sendawo Grid	Artefacts	Grade IIIc

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131108	SDNP001	Sendawo PV 2	Artefacts	Grade IV
131109	SDNP002	Sendawo PV 2	Artefacts	Grade IV
130950	VBS001	VRYBURG SOLAR	Artefacts	Grade IV
130951	VBS002	VRYBURG SOLAR	Artefacts	Grade IV
130952	VBS003	VRYBURG SOLAR	Burial Grounds & Graves	Grade IIIa

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APPENDIX 2

Reference List with relevant AIAs and PIAs

Heritage Impact Assessments				
Nid	Report Type	Author/s	Date	Title
359	PIA Phase 1	John E Almond	01/01/2013	PALAEONTOLOGICAL HERITAGE ASSESSMENT: COMBINED DESKTOP & FIELD-BASED STUDY Proposed PV Solar Facility on a portion of the farm Waterloo 992 near Vryburg, Naledi Local Municipality, North-West Province
382	PIA Desktop	John E Almond	01/01/2013	PALAEONTOLOGICAL HERITAGE ASSESSMENT: DESKTOP STUDY Proposed PV Solar Facility on a portion of the farm Rosendal 673 near Vryburg, Naledi Local Municipality, North-West Province
4265	HIA Phase 1	David Morris	01/04/2014	Appendix D3 Vryburg WWTW Heritage Specialist Report
4826	Palaeontological Specialist Reports	John E Almond	30/11/2013	Proposed Tiger Skloof Photovoltaic Solar Energy Facility near Vryburg, Naledi Local Municipality, North-West Province
6471	HIA Phase 1	Johnny Van Schalkwyk	31/08/2014	BASIC HERITAGE ASSESSMENT FOR THE PROPOSED MOOKODI 132KV PHASE 2 POWER LINES DEVELOPMENT, NORTH WEST PROVINCE
9049	Palaeontological Specialist Reports	John Edward Almond		Palaentological Heritage Assessment: Combined Desktop & Field- Based Study Proposed Sonbesie Solar Plant on the Remaining Extent of the Farm Retreat 671, near Vryburg, Naledi local municipality, North-West Province
9051	HIA Phase 1	Johnny Van Schalkwyk		Cultural heritage Impact assessment for the Development of the Proposed Khubu Solar Power Plant in the Portion 5 of the Farm CHampions Kloof 731, Vryburg Region, North West Province
9055	HIA Phase 1		31/01/2016	Cultural heritage impact assessment for THE DEVELOPMENT OF THE PROPOSED PROTEA SOLAR POWER PLANT ON A PORTION OF THE FARM HARTSBOOM 734, VRYBURG REGION, NORTH WEST PROVINCE
9708	HIA Phase 1	Wouter Fourie	26/05/2016	75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY SENDAWO SOLAR 1

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				Heritage Impact Assessment
9720	HIA Phase 1	Wouter Fourie	26/05/2016	75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY SENDAWO SOLAR 2 Heritage Impact Assessment
9721	HIA Phase 1	Wouter Fourie	26/05/2016	75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY SENDAWO SOLAR 3 Heritage Impact Assessment
9722	HIA Phase 1	Wouter Fourie	19/05/2016	SENDAWO POWERLINE ALTERNATIVES SENDAWO PROJECTS Heritage Impact Assessment
9730	PIA Phase 1	John Almond	07/01/2013	Palaeontological Heritage Assessment: Combined Desktop & Field-based Study Proposed PV Solar Facility on a portion of the farm Waterloo 992 near Vryburg, Naldi Local Municipality, North West Province
9755	AIA Phase 1	Lloyd Rossouw	04/11/2016	Phase 1 Archaeological Impact Assessment of two borrow pit areas on Farm 506IN near Vryburg, Northwest Province.
10095	HIA Phase 1	Stefan de Kock	15/09/2016	PROPOSED DEVELOPMENT OF THE AMDA DELTA PV (SOLAR ENERGY FACILITY) ON REMAINING EXTENT OF THE FARM KLONDIKE NO 670, AND OVERHEAD POWER LINE GRID CONNECTION TO THE MOOKODI MTS SUB-STATION ACROSS THE REMAINDER OF ERF 506 AND REMAINDER OF THE FARM ROSENDAL 6
10096	HIA Phase 1	Stefan de Kock	15/09/2016	PROPOSED DEVELOPMENT OF THE AMDA ECHO PV (SOLAR ENERGY FACILITY) ON REMAINING EXTENT OF THE FARM KLONDIKE NO 670, AND OVERHEAD POWER LINE GRID CONNECTION TO THE MOOKODI MTS SUB-STATION ACROSS THE REMAINDER OF ERF 506 AND REMAINDER OF THE FARM ROSENDAL 67
10098	HIA Phase 1	Stefan de Kock	15/09/2016	PROPOSED DEVELOPMENT OF THE AMDA FOXTROT PV (SOLAR ENERGY FACILITY) ON REMAINING EXTENT OF THE FARM KLONDIKE NO 670, AND OVERHEAD POWER LINE GRID CONNECTION TO THE MOOKODI MTS SUB-STATION ACROSS THE REMAINDER OF ERF 506 AND REMAINDER OF THE FARM ROSENDAL
1714	HIA Phase 1	Johnny Van Schalkwyk	06/03/2013	Mookodi Integration Project Phase 2 - Heritage Report - Basic Assessment

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9053	Palaeontological Specialist Reports	John E Almond		Palaeontological Heritage Assessment: Combined Desktop & Field-Based Study Proposed Alpha Solar Power Plant on Portion 3 of Farm Middel Pan 605 near Vryburg, Naledi Local Municipality, North West Province
9054	HIA Phase 1	Johnny Van Schalkwyk		Cultural heritage Impact assessment for The Development of the proposed Meerkat Solar Power Plant on a portion of the farm Vyflings Pan 598IN, Vryburg Region, North West Province
1714	HIA Phase 1	Johnny Van Schalkwyk	06/03/2013	Mookodi Integration Project Phase 2 - Heritage Report - Basic Assessment
9755	AIA Phase 1	Lloyd Rossouw	04/11/2016	Phase 1 Archaeological Impact Assessment of two borrow pit areas on Farm 506IN near Vryburg, Northwest Province.
7952	AIA Phase 1B	Neels Kruger	23/09/2015	ADDITIONAL ARCHAEOLOGICAL IMPACT STUDY FOR THE PROPOSED CAROCRAFT SOLAR PARK, NALEDI LOCAL MUNICIPALITY, BOPHIRIMA DISTRICT MUNICIPALITY, NORTH WEST PROVINCE
9050		Johnny Van Schalkwyk	29/01/2016	Cultural heritage impact assessment for THE DEVELOPMENT OF THE PROPOSED GAMMA SOLAR POWER PLANT ON PORTION 4 OF THE FARM CHAMPIONS KLOOF 731, VRYBURG REGION, NORTH WEST PROVINCE
1714	HIA Phase 1	Johnny Van Schalkwyk	06/03/2013	Mookodi Integration Project Phase 2 - Heritage Report - Basic Assessment

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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)
DEFF	Department of Environmental, Forestry and Fisheries (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

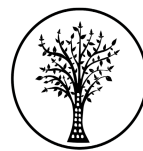
Full guide to Palaeosensitivity Map legend

	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.

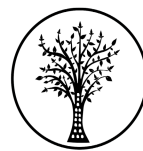
This recommendation is made in instances in which there are already some studies undertaken in the area and/or in the adjacent area for the proposed development. Further studies in a limited HIA may include:

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

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

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

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