HERITAGE IMPACT ASSESSMENT

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

PROPOSED DEVELOPMENT OF A 66KV OHL FOR THE AUTHORISED MSENGE EMOYENI WIND ENERGY FACILITY, EASTERN CAPE

Prepared by CTS Heritage

CTS HERITAGE

For

Nala Environmental Consulting Firm

MAY 2022

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EXECUTIVE SUMMARY

1. Site Name:

Msenge Emoyeni Grid Connection

2. Location:

Remainder of Farm Leeuw Fontein No.221

Portion 1 of Farm Normandale No. 206

Portion 3 of Farm Plat House No. 203

Remaining Extent of Farm Kop Leegte No. 205

Remainder of Farm 260 No. 260

Remainder of Farm 242 No. 242

Remainder of Farm 148 No. 148

Portion 3 of Farm 148 No. 148

Portion 5 of the Farm Van Wyks Kraal No.73

3. Locality Plan:

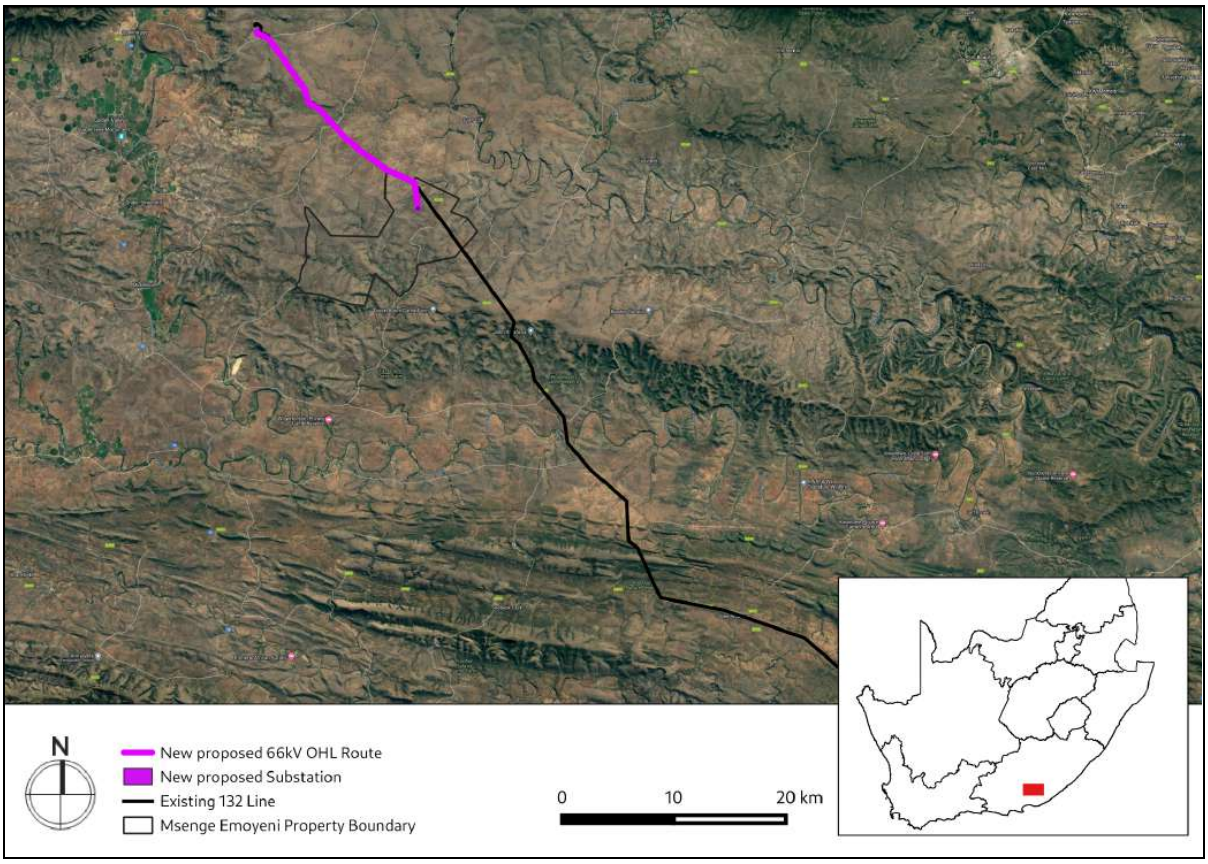

Figure A: Location of the proposed development area

4. Description of Proposed Development:

Msenge Emoyeni Wind Farm (Pty) Ltd is proposing the deviation of the authorised overhead powerline for the authorised Msenge Emoyeni Wind Energy Facility ("Msenge Emoyeni WEF") from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon Main Transmission Substation (MTS), (DFFE Ref: 12/12/20/1754/2). The authorised Msenge Emoyeni WEF is located approximately 20km south of the town of Bedford in the Eastern Cape Province. The grid connection infrastructure related to the authorised WEF is located within the Cookhouse Renewable Energy Development Zone ("REDZ") and Eastern Power Corridor.

5. Heritage Resources Identified:

In terms of the heritage resources identified in the archaeological and palaeontological field assessments, no significant archaeological or palaeontological heritage resources were identified within the area proposed for the grid connection.

6. Anticipated Impacts on Heritage Resources:

No archaeological resources of significance were identified within the area proposed for development during this field assessment although one site of heritage value was previously identified within the 300m corridor. No impacts to significant archaeological heritage resources are anticipated from the proposed development on condition that the recommended mitigation measures are implemented.

No observations of palaeontological significance were noted within the area proposed for development. However, the geology underlying the development area remains sensitive for impacts to significant palaeontological heritage.

There are limited impacts anticipated to archaeological and palaeontological heritage from this proposed development and as such, the principle of grid connection infrastructure in this location is supported from a heritage perspective as the infrastructure is located in an area able to tolerate this impact.

7. Recommendations:

Based on the outcomes of this report, it is not anticipated that the proposed development of the grid connection infrastructure facility and its associated grid connection infrastructure will negatively impact on significant heritage resources. The following recommendations are made:

- The recommendations of the VIA must be implemented.
- A no-go 30m buffer must be implemented around Site 87039 to ensure that no impact takes place. The OHL can pass over the kraal if necessary.
- The pylon footings of the proposed OHL are not located within any kloofs or river valleys to mitigate the likelihood of impact to significant archaeological heritage

- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.

8. Author/s and Date:

Jenna Lavin

May 2022

Details of Specialist who prepared the HIA

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

Jenna is on the Executive Committee of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). 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 250 Screening and Heritage Impact Assessments throughout South Africa.

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2 Palaeontological Impact Assessment 2022
3 Chance Fossil Finds Procedure
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1. INTRODUCTION

1.1 Background Information on Project

Msenge Emoyeni Wind Farm (Pty) Ltd is proposing the deviation of the authorised overhead powerline for the authorised Msenge Emoyeni Wind Energy Facility ("Msenge Emoyeni WEF") from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon Main Transmission Substation (MTS), (DFFE Ref: 12/12/20/1754/2). The authorised Msenge Emoyeni WEF is located approximately 20km south of the town of Bedford in the Eastern Cape Province. The grid connection infrastructure related to the authorised WEF is located within the Cookhouse Renewable Energy Development Zone ("REDZ") and Eastern Power Corridor.

The project has been selected as a preferred bidder via private offtake. Following liaison with Eskom it was determined that in order to provide suitable setbacks to the existing Amakhala and Nojoli WEFs' turbines and to follow the existing Albany-Poseidon 132kV powerline as closely as possible, while reducing/optimising crossing points, and as a result the authorised 132kV powerline routing has deviated from the authorised routing which falls outside of the previously assessed and authorised 20-30m wide servitude.

A 66kV powerline route with a corridor of approximately 300m (150m on either side of the centre line) is proposed to evacuate power from the proposed 33/132kV Onsite Substation associated with the Msenge Emoyeni WEF, informed by the most feasible grid connection point into the national grid by providing suitable setbacks to the operational Amakhala and Nojoli wind farms' turbines and to follow the existing Albany-Poseidon 132kV powerline as closely as possible, while reducing/optimising crossing points. The assessment of the 300m grid connection corridor also provides an opportunity for the consolidation of linear electrical infrastructure within the area, inclusive of the impacts that are bundled together at this location; this can be seen as an advantage to the development of the grid connection infrastructure from a social and environmental impact perspective.

A Basic Assessment ("BA") process is to be undertaken to assess and permit the powerline deviation, on-site substation and associated access tracks and water course crossings after considering all the above-mentioned factors. The infrastructure and key components considered as part of this Basic Assessment process includes:

- 66kV overhead single circuit powerline approximately 22,7km long in a 300m wide assessment corridor (150m on either side), from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon MTS.
- Access tracks of up to 7m in width following the powerline route from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon MTS to enable construction and maintenance activities.
- Water course crossings along the powerline route from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon MTS.
- 33kV/132kV on-site substation with a footprint occupying an area of 250m x 200m, within a 300m radius to allow movement where possible.

1.2 Description of Property and Affected Environment

As per Binneman (2014) "The proposed Msenge Emoyeni WEF and associated infrastructure are located within the 1:50 000 topographic reference maps 3225DD Golden Valley and 3226CC Herbert's Hope (Map 1). The developments fall within the Blue Crane Route Local Municipality in the Eastern Cape Province. It is situated approximately 16 kilometres south of Bedford (nearest point) and west of the R350 main road connecting Grahamstown with Bedford. The Poseidon Substation is situated approximately 18 kilometres north-west of the development."

Binneman (2014) goes on to note that "The general landscape comprises a gentle undulating hill landscape, lowlands and non- perennial open valley drainage systems/lines (Figure 1). No perennial rivers traverse the study area. The major rivers occurs many kilometres to the north, east (Great Fish River) and west (Sunday's River). The dominant natural vegetation is grassland, small, low shrubs in places and patches of *Acacia karroo* in the drainage valleys. The main activity in the study area is commercial stock farming and the land is used for grazing of livestock. Apart from the usual small scale disturbances due to farming activities such as fences, tracks, dams, soil erosion and power lines which crosses through the area, the hill tops shows little disturbances. Most development and disturbance, such as homesteads, and associated infrastructure occur mainly along and adjacent to the network of gravel roads which traverse the study area, or in valleys areas close to drainage lines."

In 2022, the ground survey found the area much in the same state as described by Binneman in 2014 with the notable exception that the Amakhala Emoyeni wind farm has been built with 56 2.4MW turbines. There is also an existing 132kV overhead powerline connecting this completed WEF to the Poseidon substation which runs along the route vast majority of the proposed route studied for this project. Around 7-9km of the north west end and the south east section run over ground which has been transformed by plouging and levelling of ground for grazing sheep and cattle while the middle segment of approximately 5km is less transformed over a hilly section which gently slopes down into one of the non-perennial floodplains noted by Binneman. Most of the archaeological observations were made in this area.

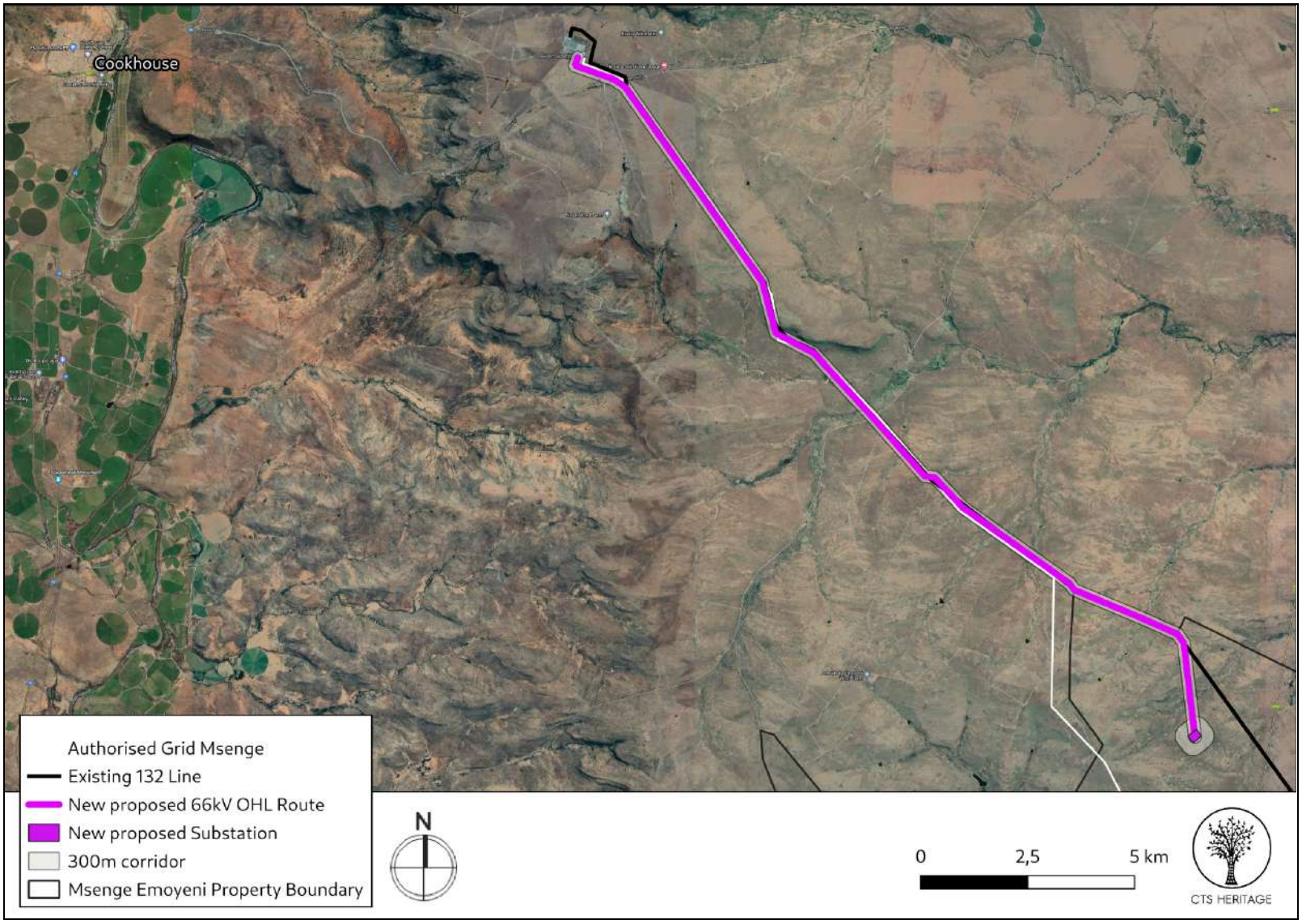

Figure 1.1: Proposed development relative to Cookhouse

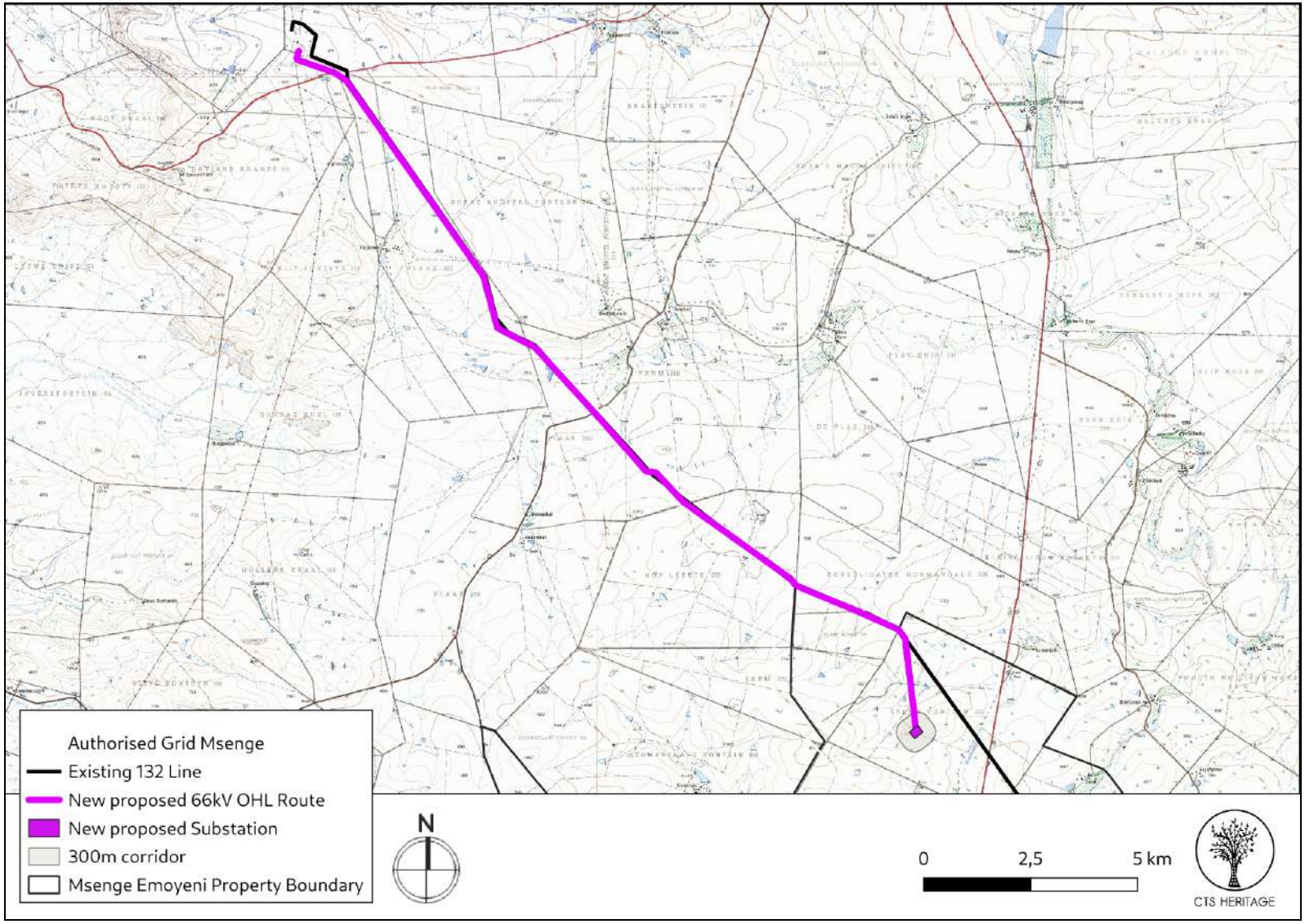

Figure 1.3: The proposed development layout of the proposed PV Facilities on an extract of the 1:50 000 Topo Map

2. METHODOLOGY

2.1 Purpose of HIA

The purpose of this Heritage Impact Assessment (HIA) is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999).

2.2 Summary of steps followed

- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used)
- An archaeologist conducted an assessment of archaeological resources likely to be disturbed by the proposed development. The archaeologist conducted his site visit from 10 to 14 April 2022.
- A palaeontologist conducted an assessment of palaeontological resources likely to be disturbed by the proposed development. The palaeontologist conducted her site visit from 27 to 28 April 2022
- The identified resources were assessed to evaluate their heritage significance and impacts to these resources were assessed.
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

2.3 Assumptions and uncertainties

- The *significance* of the sites and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

- It should be noted that archaeological and palaeontological deposits often occur below ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted, and it would be required that the heritage consultants are notified for an investigation and evaluation of the find(s) to take place.

However, despite this, sufficient time and expertise was allocated to provide an accurate assessment of the heritage sensitivity of the area.

2.4 Constraints & Limitations

As mentioned earlier, the OHL runs over ground which can be characterised by three segments. The north western and south eastern ends are almost entirely transformed by intensive stock farming on gentle, grassy slopes and level ground. These areas were very easily traversed and very little archaeological material was

found, possibly due to extensive ploughing and rock removal. The middle segment of around 5km has a small rocky hill and a non-perennial floodplain where more archaeological material was found. Grass cover receded in this area to acacia thorn trees and Albany thicket vegetation which aided in the identification of surface stone artefacts.

It should be noted that access to some of the farms was prohibited for the palaeontologist because they are hunting farms and too dangerous to visit during the hunting season. From the public roads the higher ridges were viewed, as well as the exposed rock in the road cuttings. The latter were ideal for determining the richness (or not) of the fossils because the area is covered in soils and thin to thick vegetation.

The experience of the archaeology, palaeontology and heritage practitioners, and observations made during the field study, allow us to predict with some accuracy the heritage sensitivity of the receiving environment.

2.5 Nala Impact Assessment Methodology

Direct, indirect and cumulative impacts associated with the projects must be assessed in terms of the following criteria:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high).
- The duration, wherein it will be indicated whether:
    - The lifetime of the impact will be of a very short duration (0 – 1 years) – assigned a score of 1.
    - The lifetime of the impact will be of a short duration (2 – 5 years) – assigned a score of 2.
    - Medium-term (5 – 15 years) – assigned a score of 3.
    - Long term (> 15 years) – assigned a score of 4.
    - Permanent – assigned a score of 5.
- The consequences (magnitude), quantified on a scale from 0 – 10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1 – 5, where 1 is very improbable (probably will not happen), 2 is

improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

- The significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high.
- The status, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

S = (E + D + M) x P

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area).
- 30 – 60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated).
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

The authorised Msenge Emoyeni Wind Energy Facility (WEF) is located approximately 20km south of the town of Bedford in the Eastern Cape Province. The assessment aims to determine the likely impact to significant heritage resources from the proposed development of a 23km long 66kv powerline. The area proposed for development is located west of the R350 Main Road between Grahamstown and Bedford. According to Binneman (2014), the landscape comprises gentle undulating hills, lowlands and non-perennial, open valley drainage systems. The area is dominated by commercial stock farming.

Archaeology

The area under assessment in this application has been previously assessed by the ACO (Halkett et al.) as part of an extensive heritage assessment for a larger area proposed for the Amakhala Emoyeni WEF (2010, SAHRIS NID 8376). In addition, the area under assessment has also been surveyed by Binneman for the first phase of the Amakhala Emoyeni WEF (2012) and for the Msenge Emoyeni WEF (2014, SAHRIS NID 271038). These reports are used to provide insight into the heritage sensitivities of the area. In general, it is known that the area was likely occupied by Early, Middle and Later Stone Age people. According to Halkett et al. (2010), "Before colonisation of the Eastern Cape by the British in the early 19th century, Khoe herders formed powerful transhumant communities herding cattle and sheep throughout the coastal plain… They enjoyed dominance as far as the Great Fish River, where they shared a loose border with Xhosa farming communities to the east." Halkett et al. (2010) go on to note that "The arrival of the "Trekboer" farmers in the mid-18th century started what has become known as the "Bushman War" which continued for almost 60 years. Eventually, the kommandos that were dispatched from regional centres prevailed and the "wild bushmen" of the Karoo were subjugated by the early 19th century."

In their field survey, Halkett et al. (2010) identified diffuse and isolated scatters of Early and Middle Stone Age artefacts. They note that these artefacts are often located along the margins of small depressions in the bedrock where rain water has collected. Some were also located along rocky ridges and in areas where the ground has been scarred by erosion. They further note that while these findings have limited heritage significance, they do seem to have some level of spatial integrity. Halkett et al. also identified a number of Later Stone Age sites, some with pottery. These sites tend to be located closer to "rivers", particularly in sandy areas. Additional heritage resources identified in the broader area include various historic farmhouses dated to the early and mid-19th century as well as a number of abandoned/ruinous structures and colonial period artefacts. The field survey also identified a number of "stone features consisting of loose aggregations of boulders which could represent the remains of early settlements or possibly graves", as well as formal cemeteries and informal groupings of graves. The findings of the survey conducted by Binneman (2014) corroborate the results of the assessment by Halkett et al (2010).

All heritage resources identified in these assessments have been mapped relative to the proposed development in Figures 3, 3a to 3e. The known heritage resources that fall within or in close proximity to the 300m assessment corridor have been detailed in the table below.

Table 1: SAHRIS Sites within close proximity to the development area

SAHRIS ID	Site Name	Site Description	Grading	Mitigation/Notes	Co-ordinates	
36153	Amakhala 048	Single core on a quartzite slab.	IIIA	Insufficient description to warrant recommended grading. No impact anticipated.	32° 47′ 53.412″ S	25° 58′ 28.916″ E
36154	Amakhala 049	Set of gum trees near a dam. GPS point must be moved about 200m to the west.	IIIC	Gum trees not evident on satellite image. No impact anticipated but gums should be retained if present.	32° 45′ 52.9668″ S	25° 56′ 57.854″ E
36196	Amakhala 066	ESA scatter with variable weathering from heavily rolled to well wind-abraded. Good concentration here with nothing else around. Site located at low point (saddle) between hills.	IIIA	Located outside of 300m corridor area. No impact anticipated.	32° 49′ 53.4648″ S	26° 0′ 45.3168″ E
36197	Amakhala 067	Concentration of ESA in deflation in saddle area.	IIIB	Located outside of 300m corridor area. No impact anticipated.	32° 49′ 53.7672″ S	26° 0′ 46.134″ E
36072	Amakhala 096	Farm “werf”, 2 room house with external oven, ?1930s. 3 other structures: (1) pole high and daga with 2 stone buttresses, (2) round daga, (3) round stone. Also 1 ?grave. Artefacts all 20th C and not recorded.	IIIA	Located outside of 300m corridor area. No impact anticipated.	32° 51′ 9.3888″ S	26° 2′ 11.3964″ E
87039	**Iziduli 001**	**This site is situated next to the service track under the power line. The age of the stone kraal is not known, but it is not as high and well constructed like the other stone walls in the area and may be not of similar age.**	**IIIB**	**A no-go 30m buffer must be implemented around this kraal to ensure that no impact takes place. The OHL can pass over the kraal if necessary.**	**32° 51′ 46.08″ S**	**26° 3′ 58.0788″ E**

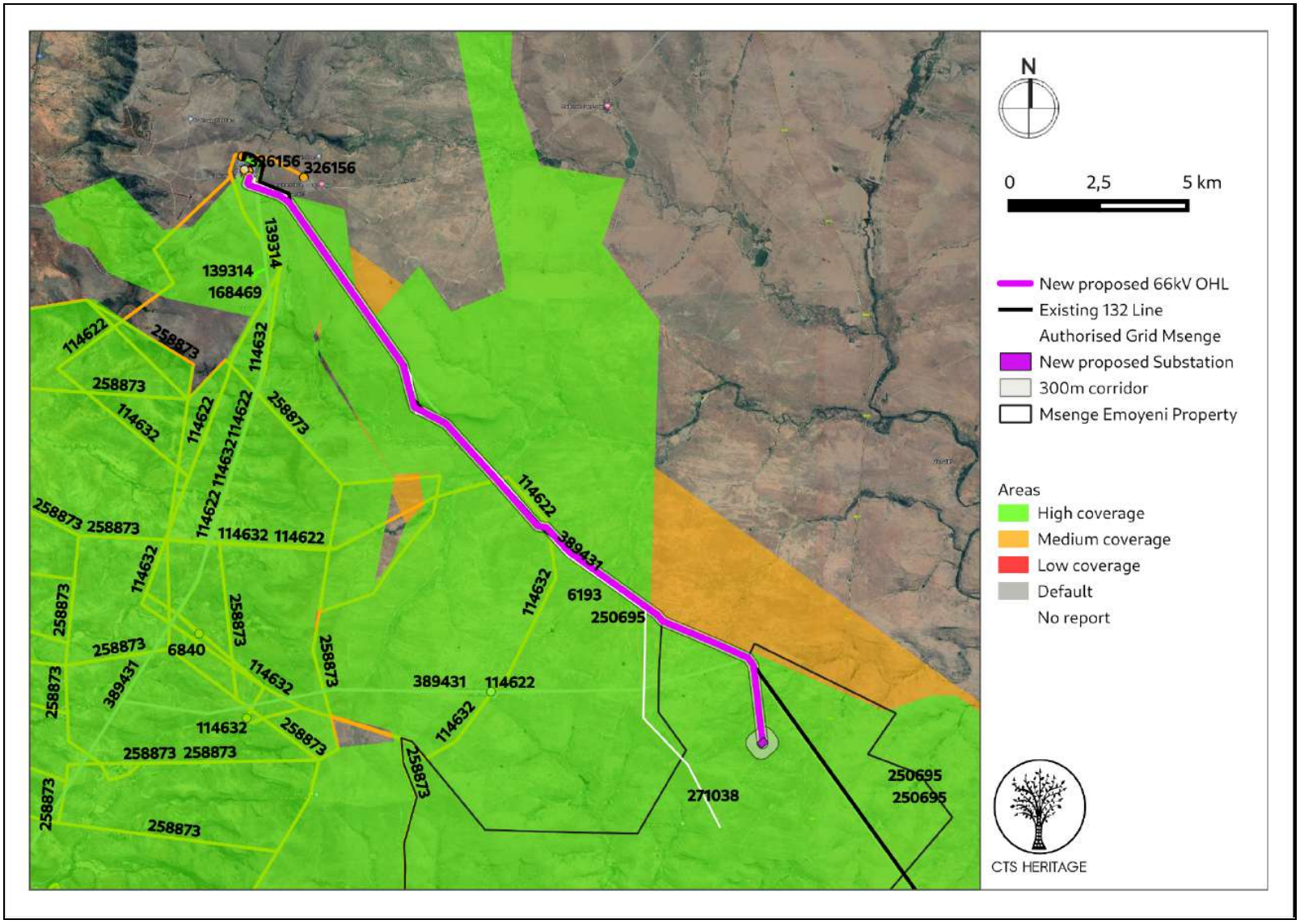

Figure 2. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.

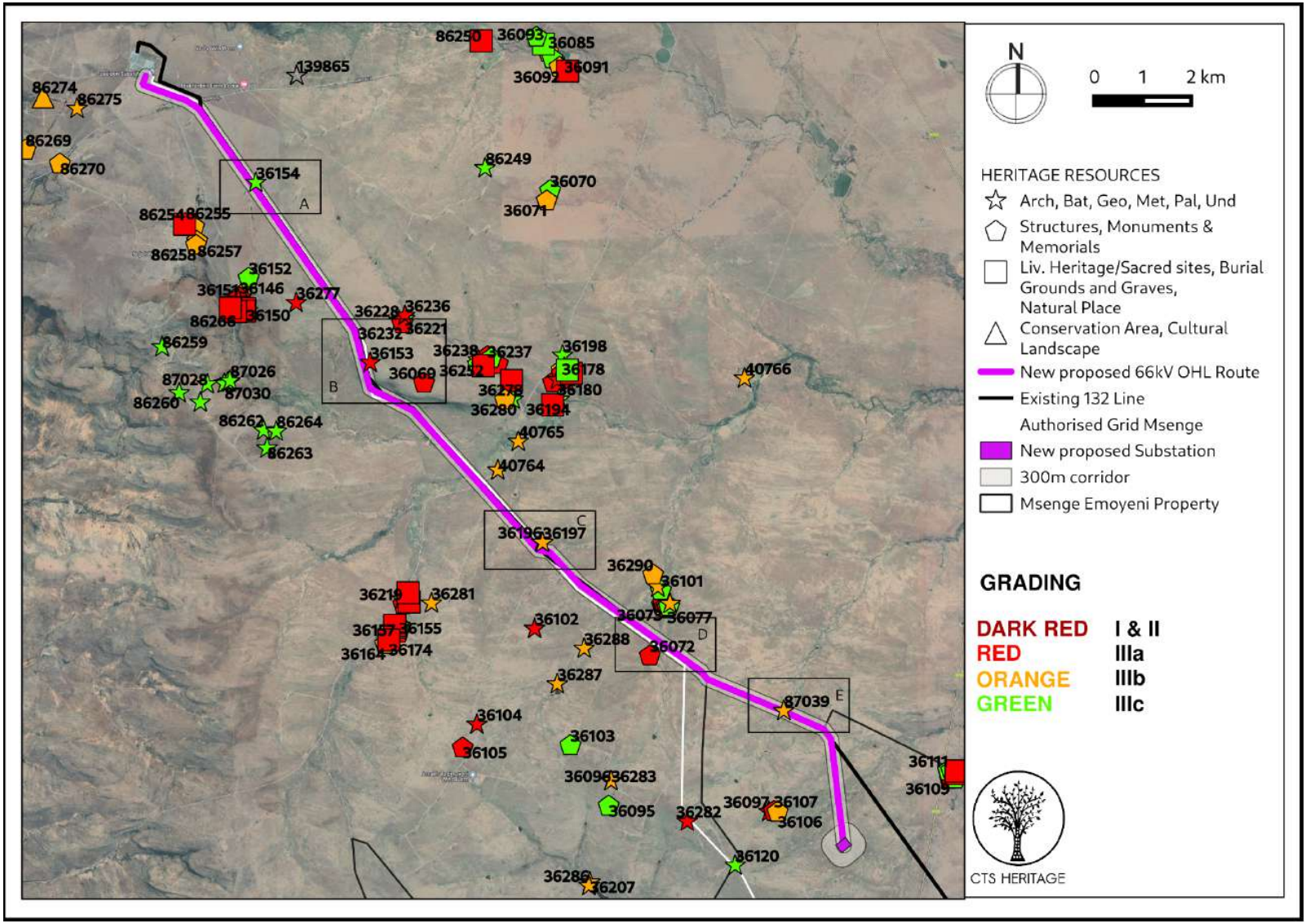

Figure 3. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for full description of heritage resource types.

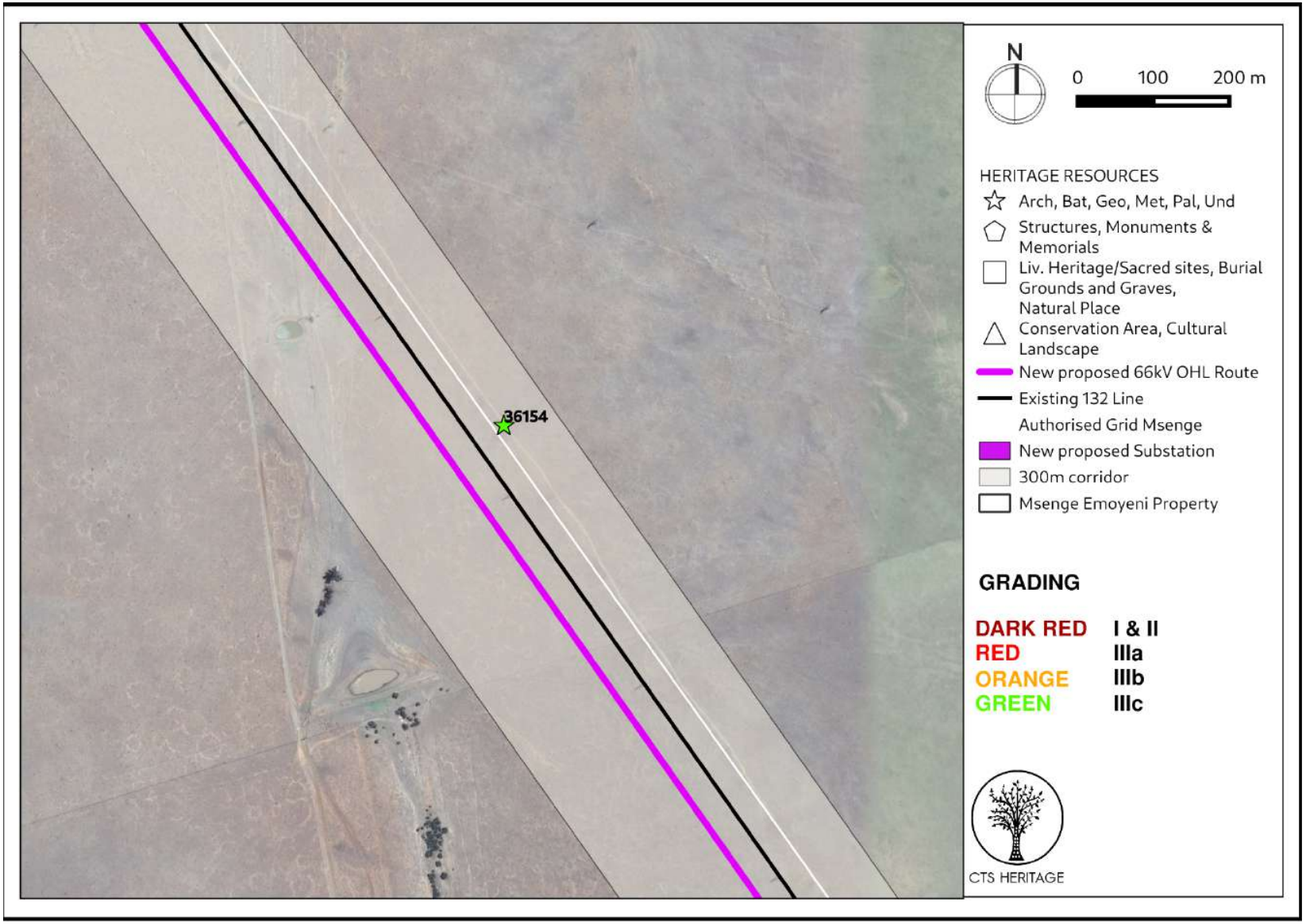

Figure 3.1. Heritage Resources Map Inset A

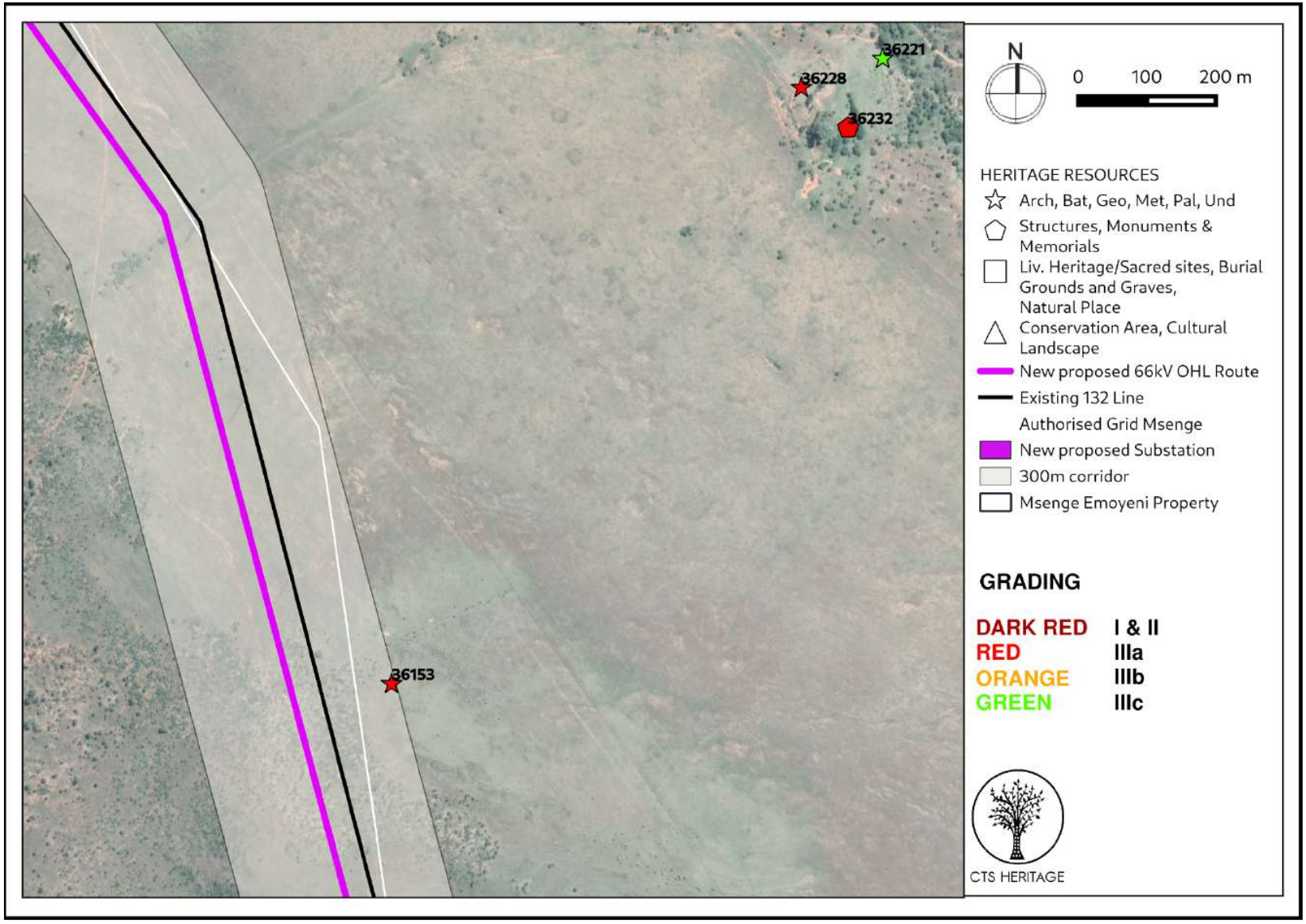

Figure 3.2. Heritage Resources Map Inset B

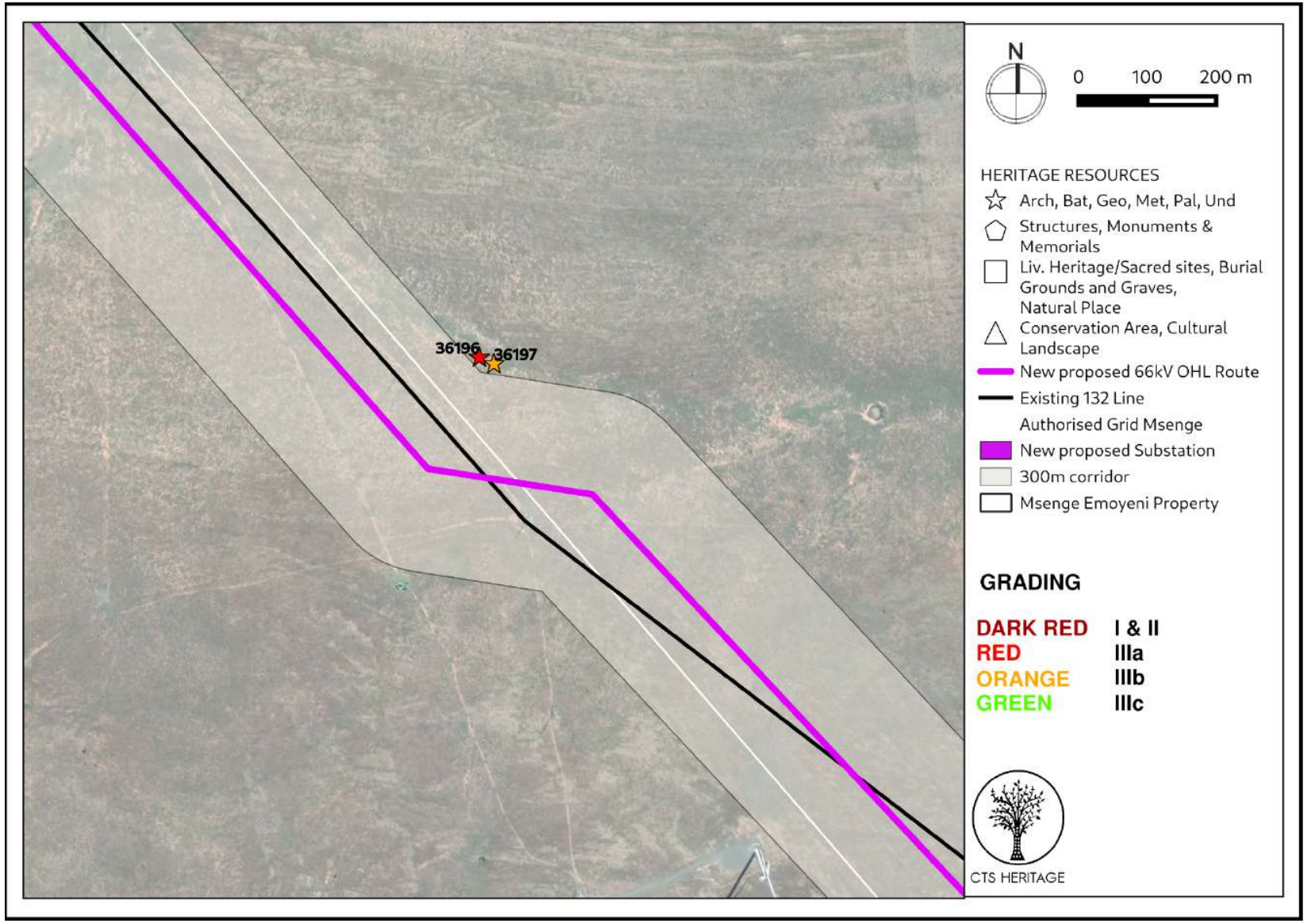

Figure 3.3. Heritage Resources Map Inset C

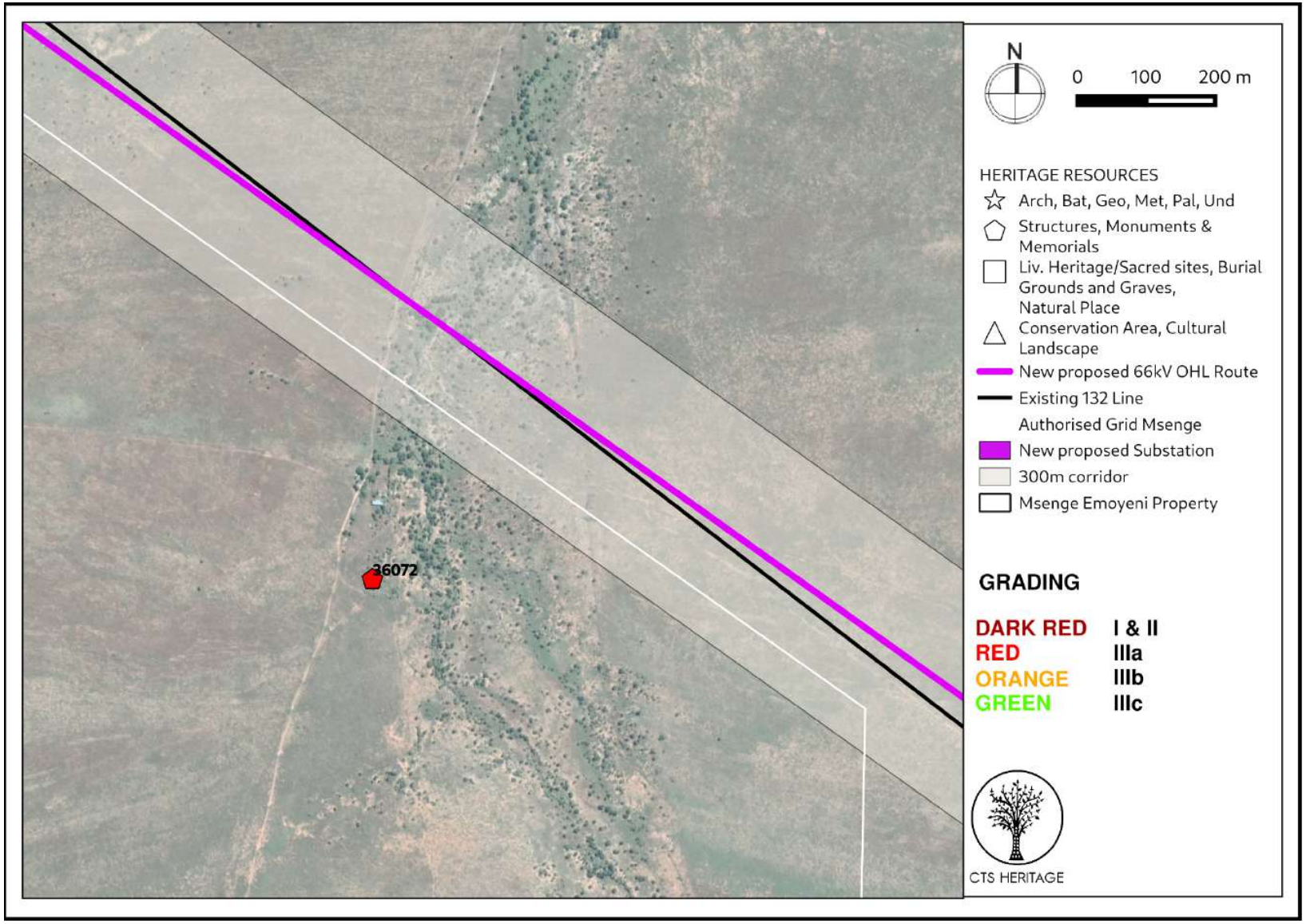

Figure 3.4. Heritage Resources Map Inset D

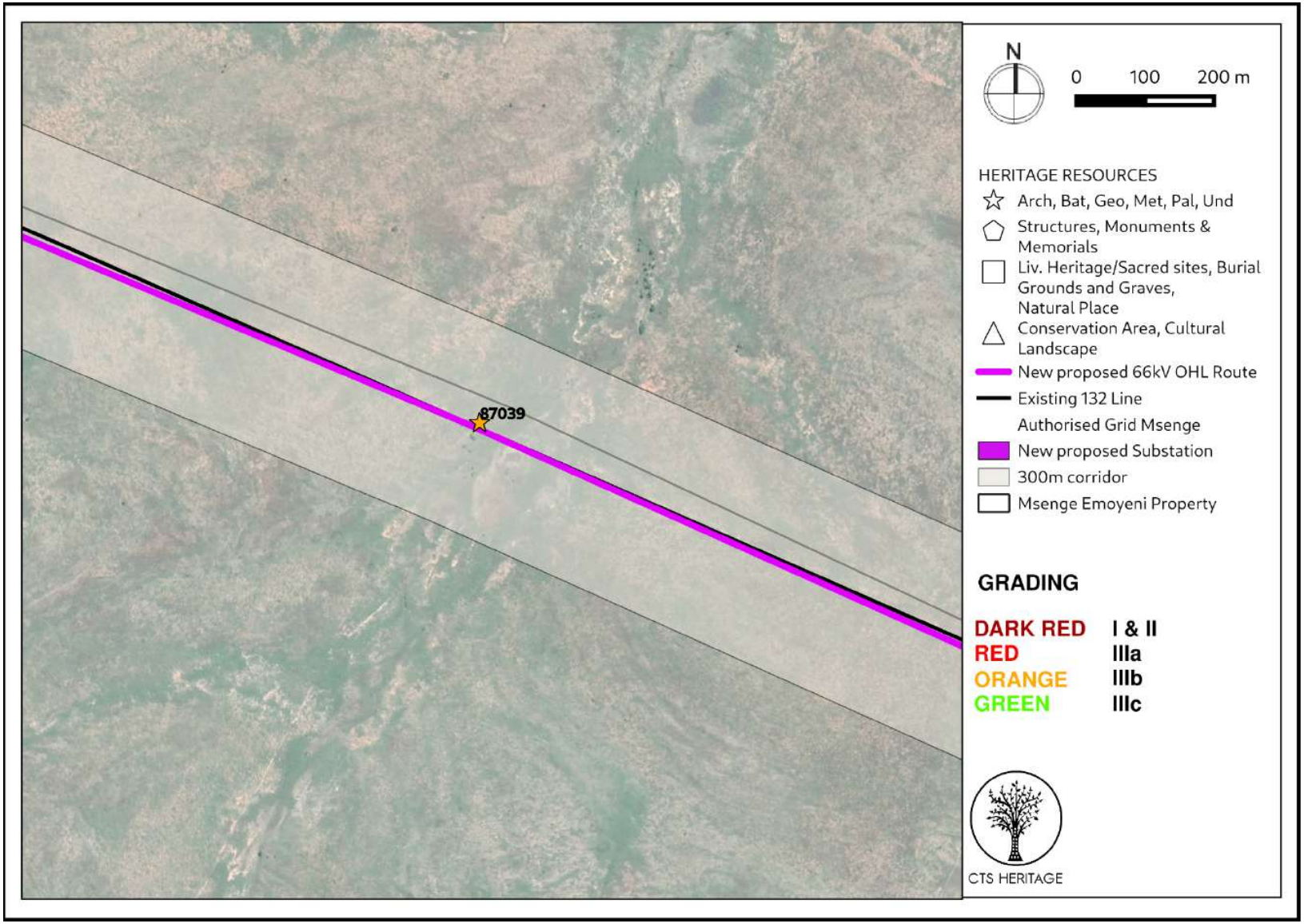

Figure 3.5. Heritage Resources Map Inset E

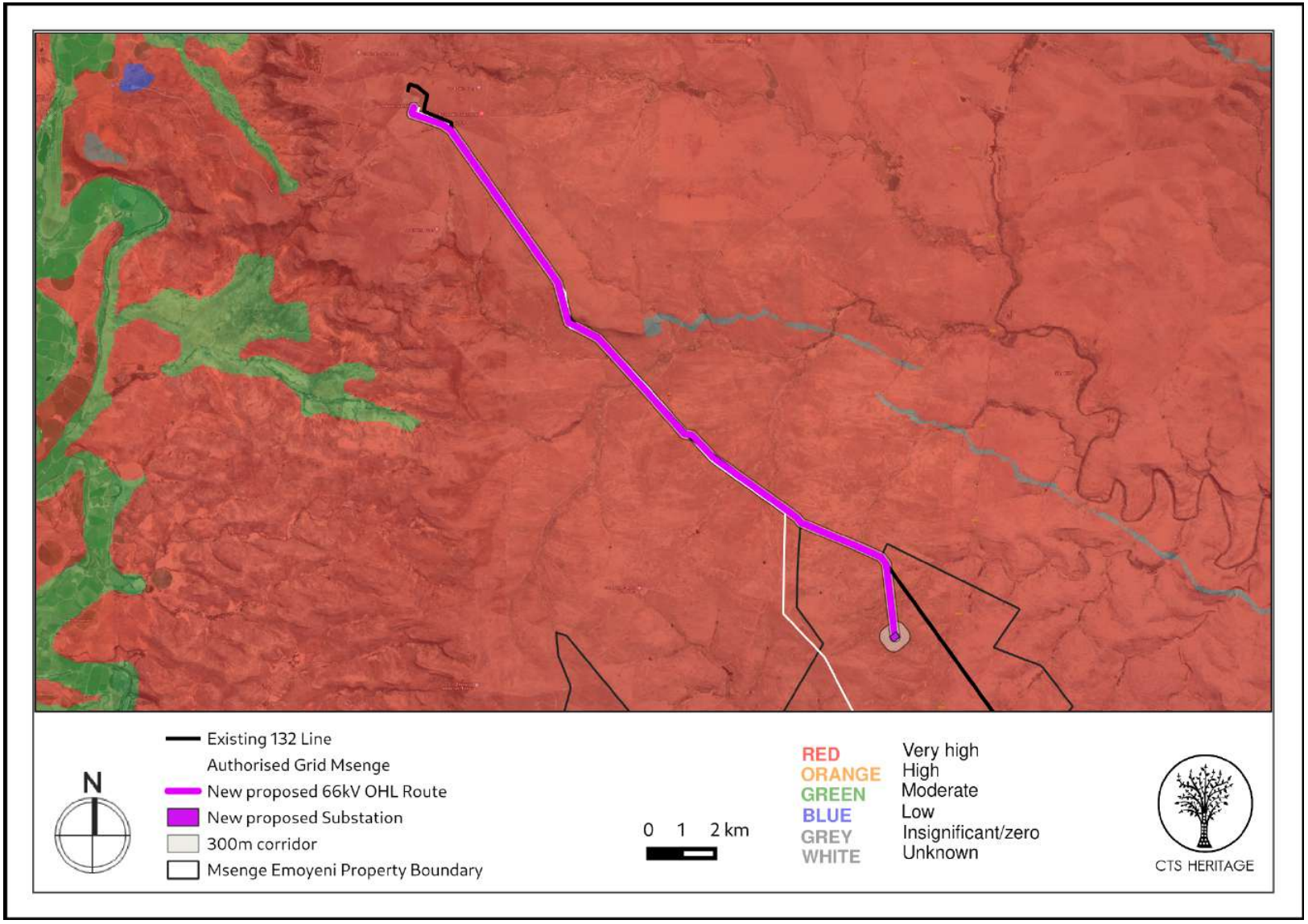

Figure 4.1: Palaeontological sensitivity of the proposed development area

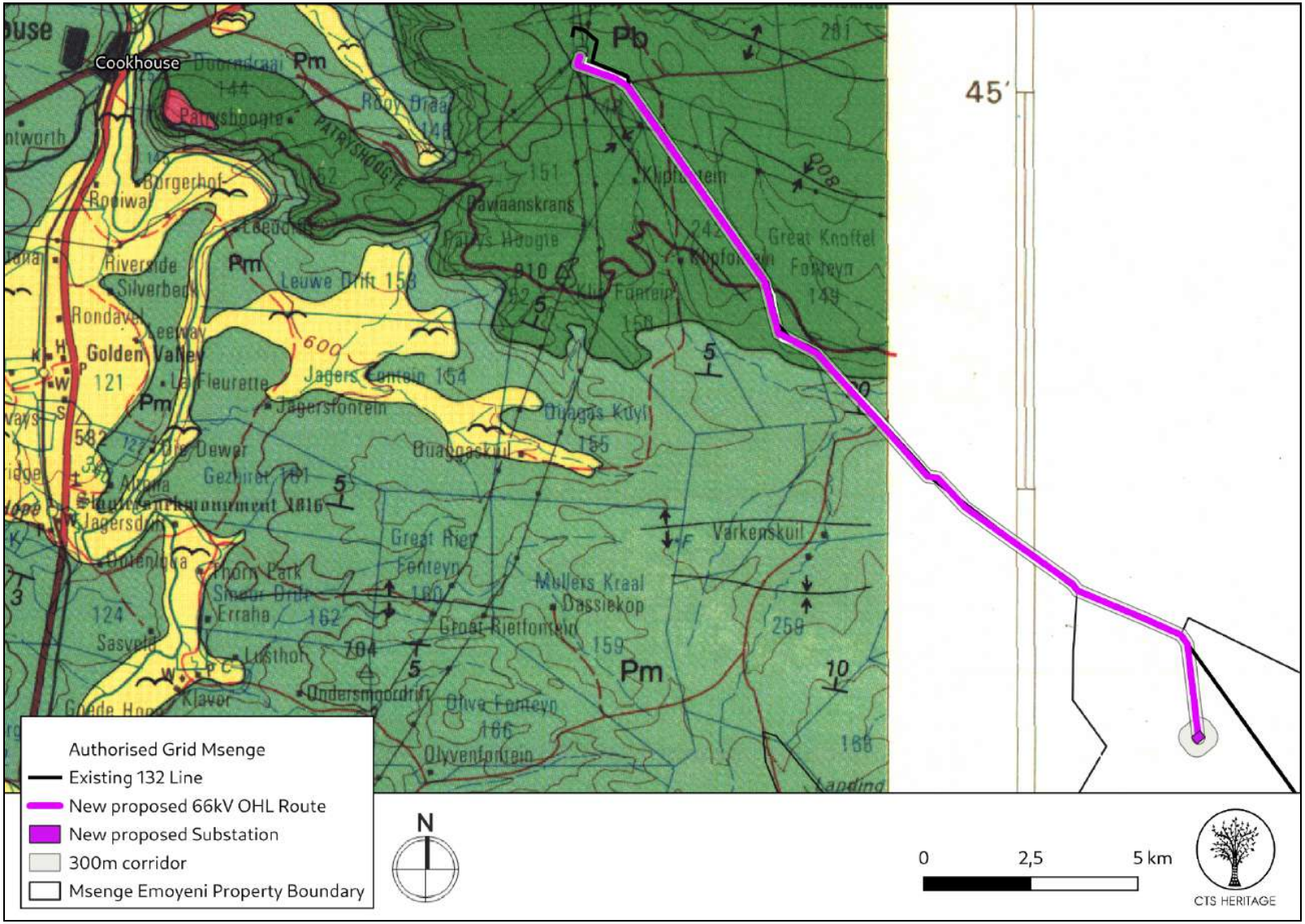

Figure 4.2: Extract from the CGS 3224 Graaf Reniet Map indicating that the development area is underlain by sediments of the Beaufort group, within the Middleton Formation of the Adelaide Subgroup (Pum) and Jurassic Dolerite (Jd)

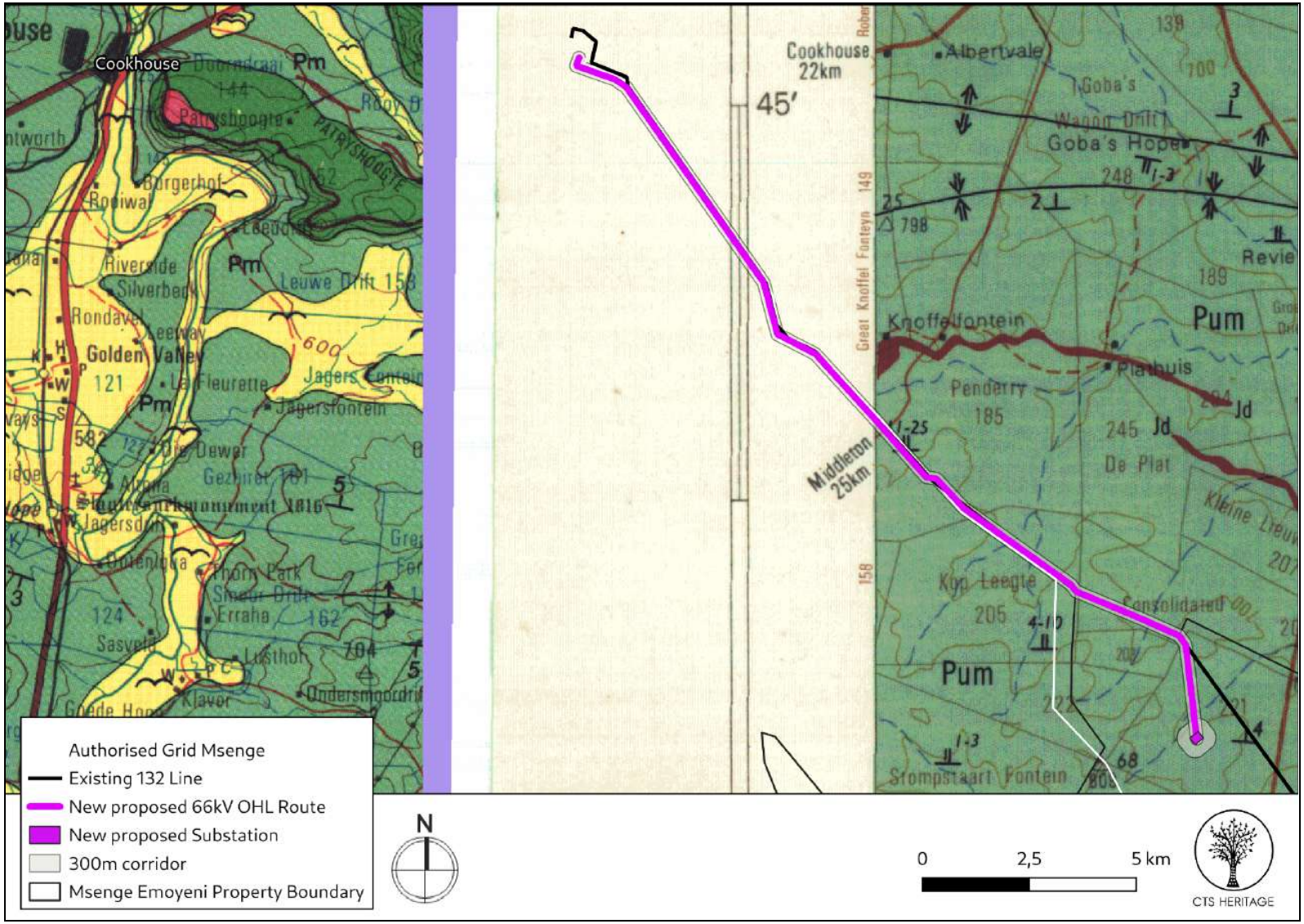

Figure 4.3: Extract from the CGS 3226 King Williams Town Map indicating that the development area is underlain by sediments of the Beaufort group, within the Middleton Formation of the Adelaide Subgroup (Pum).

Palaeontology

The area proposed for development is underlain by sediments that have very high palaeontological sensitivity according to the SAHRIS Fossil Sensitivity Map (Figure 4a). The geology map of the area (Council of GeoScience Map 3226, King Williams Town, Figure 4b and Map 3224 Graaf Reinet Figure 4c) indicates that the area is underlain by sediments of the Karoo Supergroup assigned to the Beaufort group, within the Middleton Formation of the Adelaide Subgroup. According to the SAHRIS Fossil Heritage Browser which is based on Palaeotechnical Assessments completed for SAHRA, the Beaufort Group is known for "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)". De Klerk (2010) conducted a detailed palaeontological assessment for the proposed development and concluded that "Because fossils are rare in this part of the Lower Beaufort Group sediments, it is difficult to find them, even in ideal outcrop conditions. Because of the low relief topography in a great part of the footprint area, and the consequent deeper soil profile reducing the availability of bedrock outcrop, there is a very low likelihood of finding well-preserved fossils. There is, however, a reasonably good chance that fossils may be exposed in areas that are excavated for foundations, roads or trenches." As such, the proposed OHL development and substation are unlikely to negatively impact significant palaeontological heritage resources, however it is recommended that a Chance Fossil Finds procedure be implemented (attached as Appendix 3).

Table 2: Explanation of symbols for the geological map and approximate ages (Johnson et al., 2006; Rubidge et al., 1995; Smith et al., 2020). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Neogene, ca 2.5 Ma to present
Jd	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, approx. 180 Ma
Pm	Middleton Fm, Adelaide Subgroup, Beaufort Group, Karoo SG	Grey and red mudstones, sandstone,	Late Permian,

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialists

Archaeology (Appendix 1)

The survey was conducted on foot with the aid of a mountain bike where feasible. The survey began on the north west end at the Poseidon substation and followed the existing 132kV powerline route all the way to the existing Amakhala Emoyeni wind farm entrance. The middle segment of the OHL route proved to hold more in situ archaeological material than either of the adjacent north west and south east segments which are heavily affected by stock farming and ploughing. Notably, the relative absence of archaeological material on the high ground observed when surveying the neighbouring turbine locations continued in this proposed alignment with stone artefacts concentrated along the floodplains of the non-perennial systems. There was also material lining the lower slopes of the rock hill ridge in the middle segment. There are no rock shelters or large boulders holding potential engravings in this area and the main river system (Great Fish River) runs further to the west and north west.

Around 20 observations were made primarily of weathered Middle Stone Age flakes and radial cores. The raw materials were locally sourced quartzites and siltstones which displayed very little evidence of large transport distances as access to the bedrock and river cobbles is readily available. Later Stone Age evidence was also present and higher grade hornfels cores and flakes were found that were most likely brought into the area from a number of possible karoo sources. The OHL route avoids all the main homesteads and historical werfs and overall had a very low archaeological sensitivity.

Palaeontology (Appendix 2)

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and some do contain fossil plant, insect, invertebrate and vertebrate material. The site visit and walk through on 25 and 26 April 2022 by Bamford and Matias confirmed that there are NO FOSSILS visible on the surface and there are no visible rocky outcrops that potentially could have vertebrate fossils. A representative section of the ridges was surveyed but not the entire area because of no access, but as far as we could see, and according to the geological map and satellite imagery, there so not appear to be any anomalous areas. It is not known what lies below the soils.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils. The site visit and walk through confirmed that there were NO FOSSILS in the project footprint.

Since there is a small chance that fossils from the *Cistecephalus* Assemblage Zone (AZ) might occur below the surface and soils and may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

4.2 Heritage Resources identified

In terms of the heritage resources identified in the archaeological and palaeontological field assessments, no significant archaeological or palaeontological heritage resources were identified within the area proposed for the grid connection. The following table indicates the archaeological observations made during the field assessment. All were found to be Not Conservation-Worthy.

Table 2: Artefacts identified during the field assessment development area

POINT ID	Project Area	Period	Description	Co-ordinates		Grading	Mitigation
019	Grid	MSA	Siltstone core radial both ends	-32.89334	26.10634	NCW	NA
020	Grid	MSA	Siltstone flake, early MSA	-32.89205	26.10784	NCW	NA
021	Grid	MSA	Siltstone blade flake	-32.88098	26.10519	NCW	NA
022	Grid	MSA	Siltstone flake, early MSA	-32.87855	26.10268	NCW	`NA
025	Grid	MSA	Quartzite flakes and core, early MSA	-32.89438	26.05735	NCW	NA
026	Grid	MSA	Quartzite core	-32.88438	26.05409	NCW	NA
027	Grid	MSA	Quartzite biface early MSA	-32.87564	26.0677	NCW	NA
028	Grid	MSA	Fine grained quartzite blade	-32.87233	26.07015	NCW	NA
029	Grid	Modern	Brick water tank	-32.87218	26.04892	NCW	NA
030	Grid	MSA	Early Msa quartzite flake in eroded jeep track	-32.79101	25.97021	NCW	`NA
031	Grid	MSA	Quartzite flake, early MSA	-32.79308	25.97158	NCW	NA
032	Grid	MSA, LSA	Silcrete radial core, flake, quartzite flakes, siltstone flake, hornfels core	-32.80312	25.97532	NCW	NA
033	Grid	MSA	Quartzite flake	-32.80566	25.98105	NCW	NA
034	Grid	MSA	Siltstone bifacially worked flake	-32.80756	25.98438	NCW	NA
035	Grid	LSA	Hornfels core	-32.81356	25.99092	NCW	NA
036	Grid	MSA	Silcrete point on top of sand Bank of dam wall	-32.81892	25.99685	NCW	NA
037	Grid	MSA	Quartzite flake early MSA	-32.82573	26.00442	NCW	`NA
038	Grid	MSA	Quartzite blade flake	-32.83107	26.01001	NCW	NA
039	Grid	MSA, LSA	Hornfels and quartzite flakes in eroded warthog den	-32.84437	26.02901	NCW	NA
040	Grid	MSA	Siltstone flake	-32.84965	26.03786	NCW	NA

4.3 Mapping and spatialisation of heritage resources

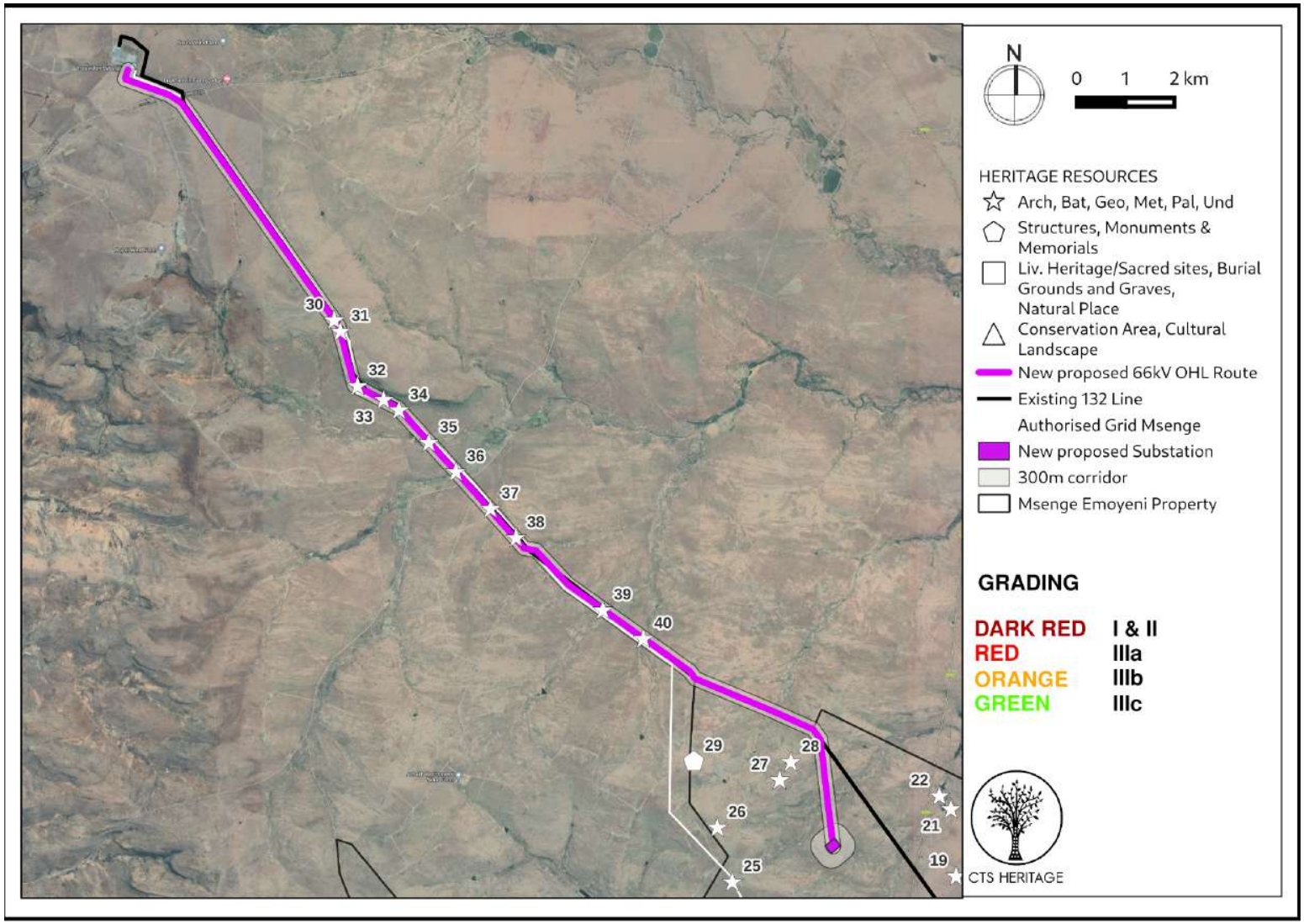

Figure 6.1: Map of archaeological and built environment heritage resources within the proposed development area

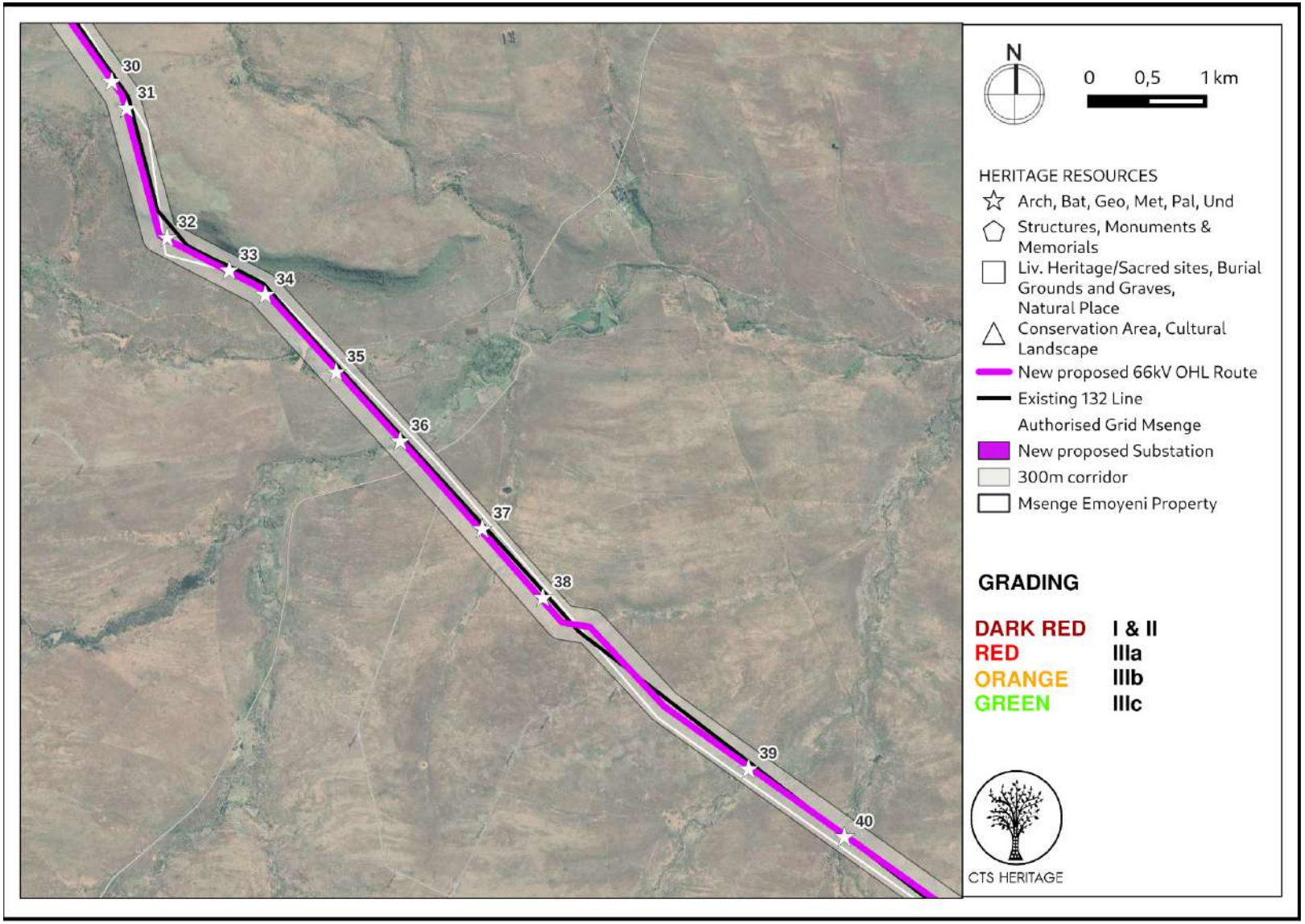

Figure 6.2: Map of archaeological and built environment heritage resources within the proposed development area

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

5.1.1 Archaeology

Based on the field assessment completed, the overall archaeological sensitivity of the development area is low. As per the findings of Binneman (2014) and Halkett (2010), this field assessment identified that stone artefacts seem to be concentrated along the floodplains of the non-perennial river systems. As such, potential impacts to archaeological heritage can be avoided through the careful placement of pylons on higher ground and not in valleys or close to river systems and in sandy plains.

None of the archaeological observations noted in this field assessment were determined to have sufficient scientific significance to be conservation-worthy and their recording in this report is considered sufficient. One of the archaeological findings from a previous assessment completed here, SAHRIS ID 87039, a stone kraal graded IIIB (of moderate local significance, is located within the 300m grid corridor. The location of this stone kraal is described as "next to the service track under the power line. The age of the stone kraal is not known, but it is not as high and well constructed as the other stone walls in the area and may not be of similar age." It is recommended that no-go 30m buffer must be implemented around this kraal to ensure that no impact takes place. The OHL can pass over the kraal if necessary.

Based on this field assessment and on the findings of previous assessments in the area, it is not anticipated that the proposed OHL development will negatively impact on significant archaeological heritage on condition that the recommendations articulated below are implemented.

Table 5: Impact table for Archaeological Heritage Resources

NATURE: The area proposed for development is known to conserve heritage resources of archaeological significance that may be impacted by the proposed development				
		Before Mitigation		**After Mitigation**
MAGNITUDE	**M (5)**	No significant archaeological resources were identified within the development area 300m corridor other than one stone kraal	**L (2)**	No significant archaeological resources were identified within the development area 300m corridor other than one stone kraal
DURATION	**H (5)**	Where manifest, the impact will be permanent.	**H (5)**	Where manifest, the impact will be permanent.
EXTENT	**L (1)**	Localised within the site boundary	**L (1)**	Localised within the site boundary
PROBABILITY	**M (3)**	It is extremely unlikely that any significant archaeological resources will be impacted	**L (1)**	It is extremely unlikely that any significant archaeological resources will be impacted
SIGNIFICANCE	**M**	(5+5+1)x3=33	**L**	(2+5+1)x1=8
STATUS		Neutral		Neutral
REVERSIBILITY	**L**	Any impacts to heritage resources that do occur are irreversible	**L**	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE	**M**	Possible	**L**	Unlikely

LOSS OF RESOURCES?				
CAN IMPACTS BE MITIGATED		Yes		
MITIGATION: A no-go 30m buffer must be implemented around this kraal to ensure that no impact takes place. The OHL can pass over the kraal if necessary The pylon footings of the proposed OHL are not located within any kloofs or river valleys to mitigate the likelihood of impact to significant archaeological heritage Should any significant archaeological resources be uncovered during the course of the construction phase, work must cease in the area of the find and SAHRA must be contacted regarding an appropriate way forward.				
RESIDUAL RISK: Should any significant archaeological resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources				

5.1.3 Palaeontology

Based on the fossil record but confirmed by the site visit and walk through there are no visible rocky outcrops and NO FOSSILS on the land surface of the *Cistecephalus* Assemblage Zone (upper Middleton Formation, Adelaide Subgroup, Karoo Supergroup) even though fossils have been recorded from rocks of a similar age and type in South Africa.

It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the mudstones of the Middleton Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the contractor, environmental officer, or other responsible person once excavations and drilling have commenced, then they should be rescued and a palaeontologist called to assess and collect a representative sample. There is no preferred route or no-go area for the OHPL.

Table 6: Impact table for Palaeontological Heritage Resources

NATURE: The area proposed for development is known to conserve heritage resources of palaeontological significance that may be impacted by the proposed development				
		Before Mitigation		**After Mitigation**
MAGNITUDE	**H (8)**	No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is very sensitive for impacts to significant fossils	**H (8)**	No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is very sensitive for impacts to significant fossils
DURATION	**H (5)**	Where manifest, the impact will be permanent.	**H (5)**	Where manifest, the impact will be permanent.
EXTENT	**L (1)**	Localised within the site boundary	**L (1)**	Localised within the site boundary
PROBABILITY	**H (5)**	It is extremely likely that significant palaeontological resources will be negatively impacted	**L (1)**	It is extremely unlikely that any significant paleontological resources will be negatively impacted

SIGNIFICANCE	**H**	(1+5+8)x5=70	**L**	(1+5+8)x1=14
STATUS		Neutral		Neutral
REVERSIBILITY	**L**	Any impacts to heritage resources that do occur are irreversible	**L**	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE LOSS OF RESOURCES?	**H**	Likely	**L**	Unlikely
CAN IMPACTS BE MITIGATED		Yes		
MITIGATION: The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities				
RESIDUAL RISK: Should any significant palaeontological resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources				

5.2 Sustainable Social and Economic Benefit

The Eastern Cape Province will not benefit from the private offtaker undertaking the initiative to generate electricity rather than draw from the already strained National Grid. There will also be a potential loss for development of renewable energy which is detailed in the local, regional and national policies to be of great importance for economic development.

Socio-economic development will be in the form of disposable salaries and the purchases of services and supplies from the local communities in and around the region. They are required as part of their bidding requirements (via private offtaker) to contribute towards local economic development (LED) and social upliftment initiatives within the area in which they are proposed. The proposed development, therefore, has the potential to contribute positively towards socio-economic development and improvements within the local area.

As the anticipated impacts to heritage resources resulting from the proposed development are limited, the socio-economic benefits outweigh these impacts on condition that the delineated no-go areas are avoided and the recommended mitigations are applied.

5.3 Proposed development alternatives

For this assessment, no alternatives have been considered; however, this report does assess a 300m grid corridor within which the powerline will be located. There is an existing grid line within this corridor and all of the 300m corridor falls within an area that has previously been assessed. As such, we are confident that the findings of this report are applicable to the 300m grid corridor in its entirety. Furthermore, the proposed 300m substation footprint has been assessed thoroughly and it is located within an area that has been previously assessed.

Development of the grid connection infrastructure and substation within the assessed corridors is acceptable from a heritage perspective, provided all delineated no-go areas are avoided and the recommended mitigations are applied.

5.4 Cumulative Impacts

The proposed OHL and substation will form part of the infrastructure required for the Msenge Emoyeni WEF and is located immediately adjacent to the approved substation associated with the Msenge Emoyeni WEF. Furthermore, the majority of the proposed OHL is located within an already approved WEF 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 OHL development and substation are therefore unlikely to result in unacceptable risk or loss, nor will the proposed development result in a complete change to the sense of place of the area or result in an unacceptable increase in impact. As the majority of the proposed OHL is located within an already approved WEF, no additional cumulative impacts are anticipated to archaeological, palaeontological or cultural landscape heritage resources.

6. RESULTS OF PUBLIC CONSULTATION

As this application is made in terms of NEMA, the public consultation on the HIA will take place with the broader public consultation process required for the Environmental Impact Assessment process and will be managed by the lead environmental consultants on the project.

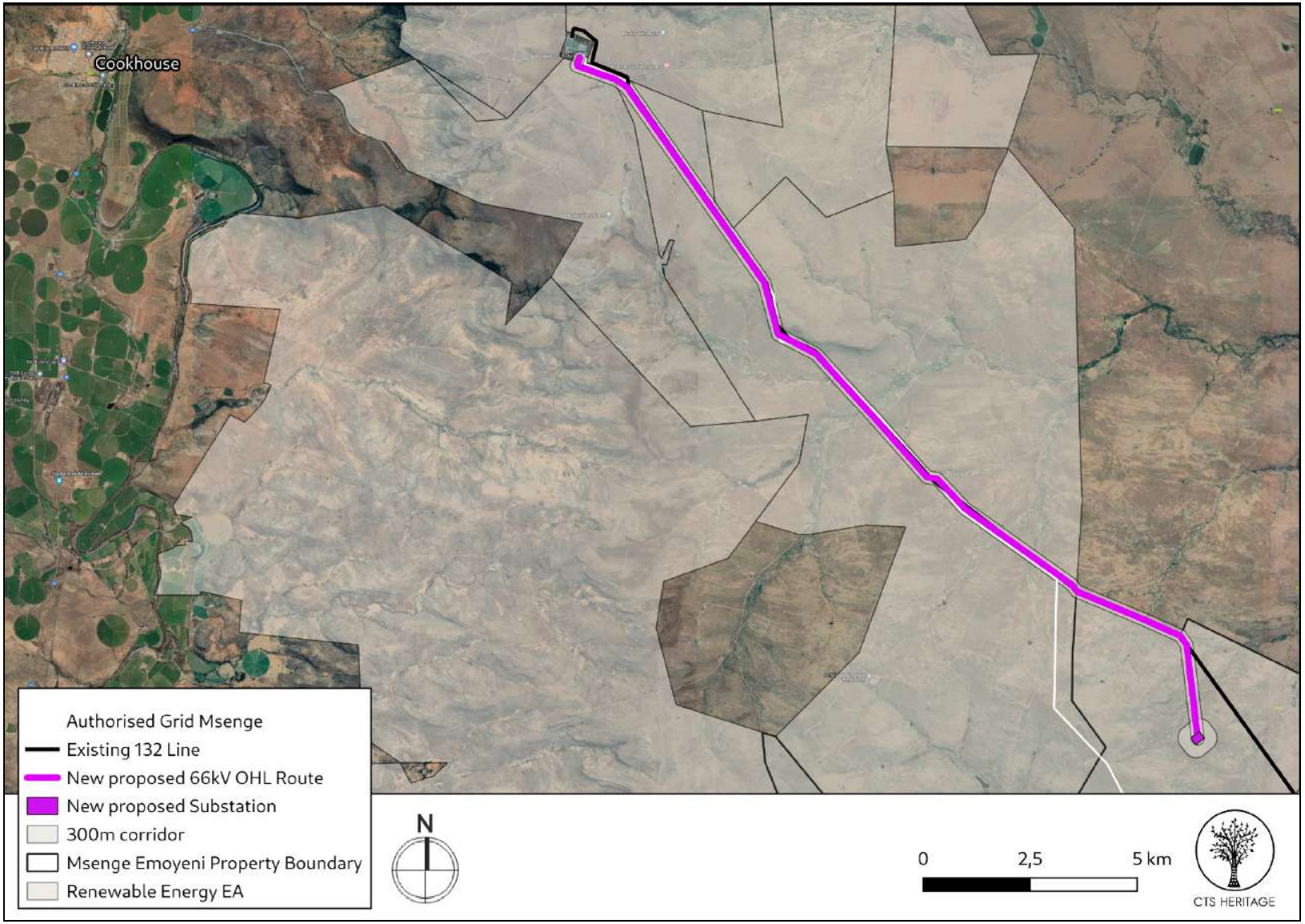

Figure 8.1: Approved REF projects within 20km of the proposed development area

7. CONCLUSION

No archaeological resources of significance were identified within the area proposed for development during this field assessment although one site of heritage value was previously identified within the 300m grid corridor or the proposed substation footprint and assessment area. No impacts to significant archaeological heritage resources are anticipated from the proposed development on condition that the recommended mitigation measures are implemented.

No observations of palaeontological significance were noted within the area proposed for development. However, the geology underlying the development area remains sensitive for impacts to significant palaeontological heritage.

There are limited impacts anticipated to archaeological and palaeontological heritage from this proposed development and as such, the principle of grid connection infrastructure in this location is supported from a heritage perspective as the infrastructure is located in an area able to tolerate this impact.

8. RECOMMENDATIONS

Based on the outcomes of this report, it is not anticipated that the proposed development of the grid connection infrastructure facility and its associated grid connection infrastructure will negatively impact on significant heritage resources. The following recommendations are made:

- The recommendations of the VIA must be implemented.
- A no-go 30m buffer must be implemented around Site 87039 to ensure that no impact takes place. The OHL can pass over the kraal if necessary.
- The pylon footings of the proposed OHL are not located within any kloofs or river valleys to mitigate the likelihood of impact to significant archaeological heritage
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.

9. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
6193	AIA Phase 1	Dave Halkett, Lita Webley	28/03/2010	Heritage Scoping Assessment of a Proposed Wind Energy Facility to be situated on farms in the Cookhouse District, Eastern Cape.
7945	AIA Desktop	Frans Prins	05/02/2011	DRAFT Technical Report in support of the EMP for the South Western Karoo Basin Gas Exploration Application Project: CULTURAL HERITAGE: EASTERN PRECINCT
8376	**HIA Phase 1**	**Dave Halkett, Lita Webley, Jayson Orton, Hugo Pinto**	**17/10/2010**	**Heritage Impact Assessment of the proposed Amakhala-Emoyeni Wind Energy Facility, Cookhouse District, Eastern Cape**
109187	PIA Phase 1	Billy De Klerk	01/09/2010	Palaeontological Impact Assessment of a proposed wind energy facility to be situated on a site south-east of Cookhouse and asouth of Bedford in the Eastern Cape province. The Amakhala-Emoyeni Wind Energy Facility
109190	AIA Phase 1B	Johan Binneman	01/08/2013	An archaeological walkthrough survey of the turbine footprint for the proposed Phase 1 Amakhala Emoyeni Wind Energy Facility, Cookhouse District, Blue Crane Route Municipality, Eastern Cape Province
250695	**AIA Phase 1**	**Johan Binneman**	**31/07/2014**	**A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENTS OF THE PROPOSED SUBSTATION, SWITCHING STATION AND POWER LINE GRID CONNECTION FOR THE IZIDULI EMOYENI WIND FARM, BLUE CRANE ROUTE LOCAL MUNICIPALITY, SARAH BAARTMAN DISTRICT, EASTERN CAPE**
271038	**Archaeological Specialist Reports**	**Johan Binneman**	**24/03/2014**	**An Archaeological Walk through Survey if the proposed turbine footprint and infrastructure for the Msenge Emoyeni Wind Energy Facility, Bedford District, Blue Crane Route Municipality, Eastern Cape Province**

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APPENDICES

APPENDIX 1: Archaeological Assessment (2022)

ARCHAEOLOGICAL SPECIALIST STUDY

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

PROPOSED DEVELOPMENT OF A 66KV OHL FOR THE AUTHORISED MSENGE EMOYENI WIND ENERGY FACILITY, EASTERN CAPE

Prepared by

CTS HERITAGE

In Association with

Nala Environmental Consulting Firm

May 2022

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EXECUTIVE SUMMARY

Msenge Emoyeni Wind Farm (Pty) Ltd is proposing the deviation of the authorised overhead powerline for the authorised Msenge Emoyeni Wind Energy Facility ("Msenge Emoyeni WEF") from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon Main Transmission Substation (MTS), (DFFE Ref: 12/12/20/1754/2). The authorised Msenge Emoyeni WEF is located approximately 20km south of the town of Bedford in the Eastern Cape Province. The grid connection infrastructure related to the authorised WEF is located within the Cookhouse Renewable Energy Development Zone ("REDZ") and Eastern Power Corridor.

Based on the field assessment completed, the overall archaeological sensitivity of the development area is low. As per the findings of Binneman (2014) and Halkett (2010), this field assessment identified that stone artefacts seem to be concentrated along the floodplains of the non-perennial river systems. As such, potential impacts to archaeological heritage can be avoided through the careful placement of pylons on higher ground and not in valleys or close to river systems and in sandy plains.

None of the archaeological observations noted in this field assessment were determined to have sufficient scientific significance to be conservation-worthy and their recording in this report is considered sufficient. One of the archaeological findings from a previous assessment completed here, SAHRIS ID 87039, a stone kraal graded IIIB (of moderate local significance, is located within the 300m grid corridor. The location of this stone kraal is described as "next to the service track under the power line. The age of the stone kraal is not known, but it is not as high and well constructed as the other stone walls in the area and may not be of similar age." It is recommended that no-go 30m buffer must be implemented around this kraal to ensure that no impact takes place. The OHL can pass over the kraal if necessary.

Based on this field assessment and on the findings of previous assessments in the area, it is not anticipated that the proposed OHL development will negatively impact on significant archaeological heritage on condition that the recommendations articulated below are implemented.

Recommendations

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

- A no-go 30m buffer must be implemented around Site 87039 to ensure that no impact takes place. The OHL can pass over the kraal if necessary.
- The pylon footings of the proposed OHL are not located within any kloofs or river valleys to mitigate the likelihood of impact to significant archaeological heritage
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other

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categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.

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1. INTRODUCTION

1.1 Background Information on Project

Msenge Emoyeni Wind Farm (Pty) Ltd is proposing the deviation of the authorised overhead powerline for the authorised Msenge Emoyeni Wind Energy Facility ("Msenge Emoyeni WEF") from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon Main Transmission Substation (MTS), (DFFE Ref: 12/12/20/1754/2). The authorised Msenge Emoyeni WEF is located approximately 20km south of the town of Bedford in the Eastern Cape Province. The grid connection infrastructure related to the authorised WEF is located within the Cookhouse Renewable Energy Development Zone ("REDZ") and Eastern Power Corridor.

The project has been selected as a preferred bidder via private offtake. Following liaison with Eskom it was determined that in order to provide suitable setbacks to the existing Amakhala and Nojoli WEFs' turbines and to follow the existing Albany-Poseidon 132kV powerline as closely as possible, while reducing/optimizing crossing points, and as a result the authorised 132kV powerline routing has deviated from the authorised routing which falls outside of the previously assessed and authorised 20-30m wide servitude.

A 66kV powerline route with a corridor of approximately 300m (150m on either side of the centre line) is proposed to evacuate power from the proposed 33/132kV on-site substation associated with the Msenge Emoyeni WEF, informed by the most feasible grid connection point into the national grid by providing suitable setbacks to the operational Amakhala and Nojoli wind farms' turbines and to follow the existing Albany-Poseidon 132kV powerline as closely as possible, while reducing/optimizing crossing points. The assessment of the 300m grid connection corridor also provides an opportunity for the consolidation of linear electrical infrastructure within the area, inclusive of the impacts that are bundled together at this location, this can be seen as an advantage to the development of the grid connection infrastructure from a social and environmental impact perspective.

A Basic Assessment ("BA") process is to be undertaken to assess and permit the powerline deviation, on-site substation and associated access tracks and water course crossings after considering all the above-mentioned factors. The infrastructure and key components considered as part of this Basic Assessment process includes:

- 66kV overhead single circuit powerline approximately 22,7km long in a 300m wide assessment corridor (150m on either side), from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon MTS.
- Access tracks of up to 7m in width following the powerline route from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon MTS to enable construction and maintenance activities.
- Water course crossings along the powerline route from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon MTS.
- 33kV/132kV on-site substation with a footprint occupying an area of 250m x 200m, within a 300m radius to allow movement where possible.

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1.2 Description of Property and Affected Environment

As per Binneman (2014) "The proposed Msenge Emoyeni WEF and associated infrastructure are located within the 1:50 000 topographic reference maps 3225DD Golden Valley and 3226CC Herbert's Hope (Map 1). The developments fall within the Blue Crane Route Local Municipality in the Eastern Cape Province. It is situated approximately 16 kilometres south of Bedford (nearest point) and west of the R350 main road connecting Grahamstown with Bedford. The Poseidon Substation is situated approximately 18 kilometres north-west of the development."

Binneman (2014) goes on to note that "The general landscape comprises a gentle undulating hill landscape, lowlands and non- perennial open valley drainage systems/lines (Figure 1). No perennial rivers traverse the study area. The major rivers occurs many kilometres to the north, east (Great Fish River) and west (Sunday's River). The dominant natural vegetation is grassland, small, low shrubs in places and patches of *Acacia karoo* in the drainage valleys. The main activity in the study area is commercial stock farming and the land is used for grazing of livestock. Apart from the usual small scale disturbances due to farming activities such as fences, tracks, dams, soil erosion and power lines which crosses through the area, the hill tops shows little disturbances. Most development and disturbance, such as homesteads, and associated infrastructure occur mainly along and adjacent to the network of gravel roads which traverse the study area, or in valleys areas close to drainage lines."

In 2022, the ground survey found the area much in the same state as described by Binneman in 2014 with the notable exception that the Amakhala Emoyeni wind farm has been built with 56 2.4MW turbines. There is also an existing 132kV overhead powerline connecting this completed WEF to the Poseidon substation which runs along the route vast majority of the proposed route studied for this project. Around 7-9km of the north west end and the south east section run over ground which has been transformed by plouging and levelling of ground for grazing sheep and cattle while the middle segment of approximately 5km is less transformed over a hilly section which gently slopes down into one of the non-perennial floodplains noted by Binneman. Most of the archaeological observations were made in this area.

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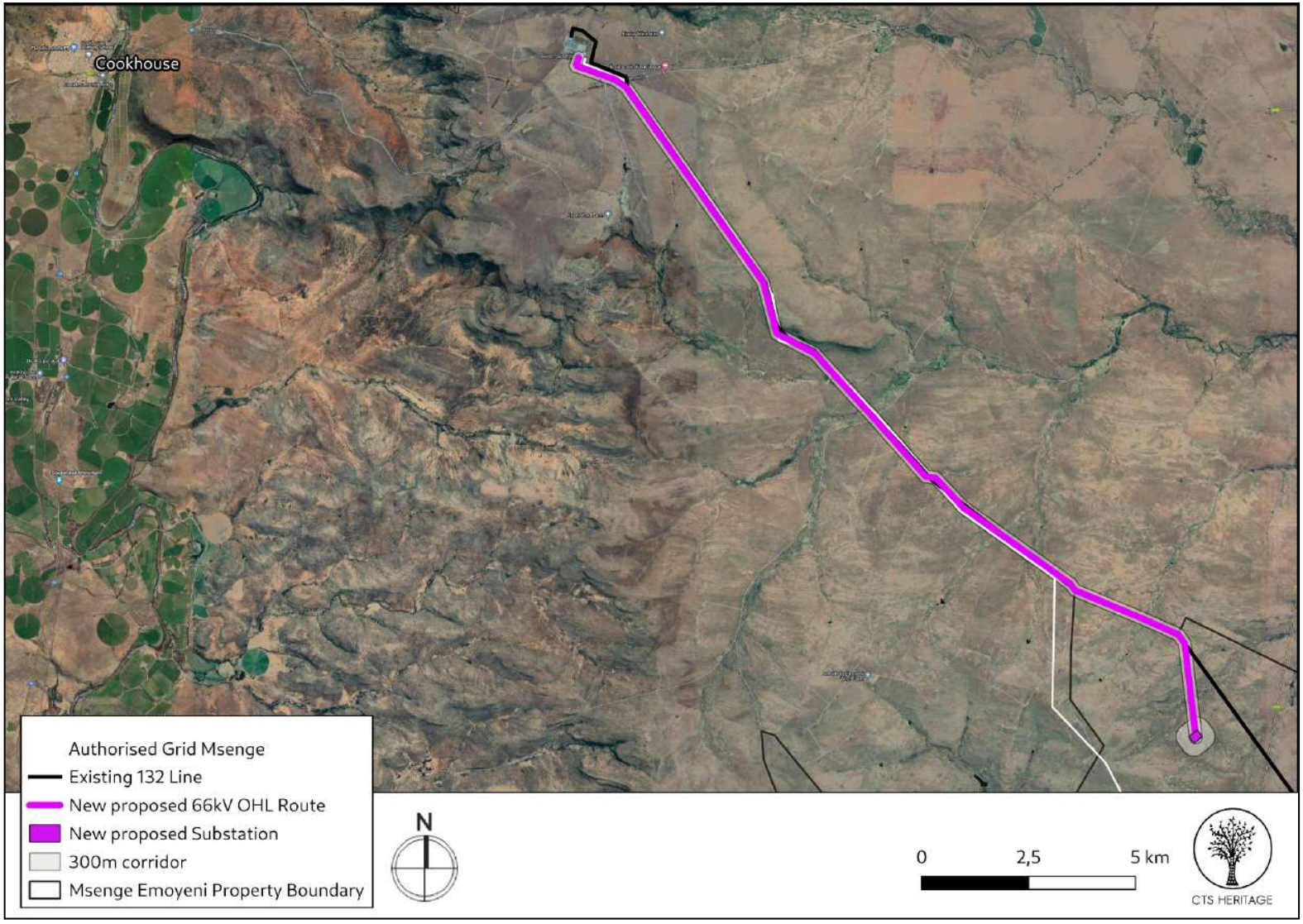

Figure 1.1: Satellite image indicating proposed location of development

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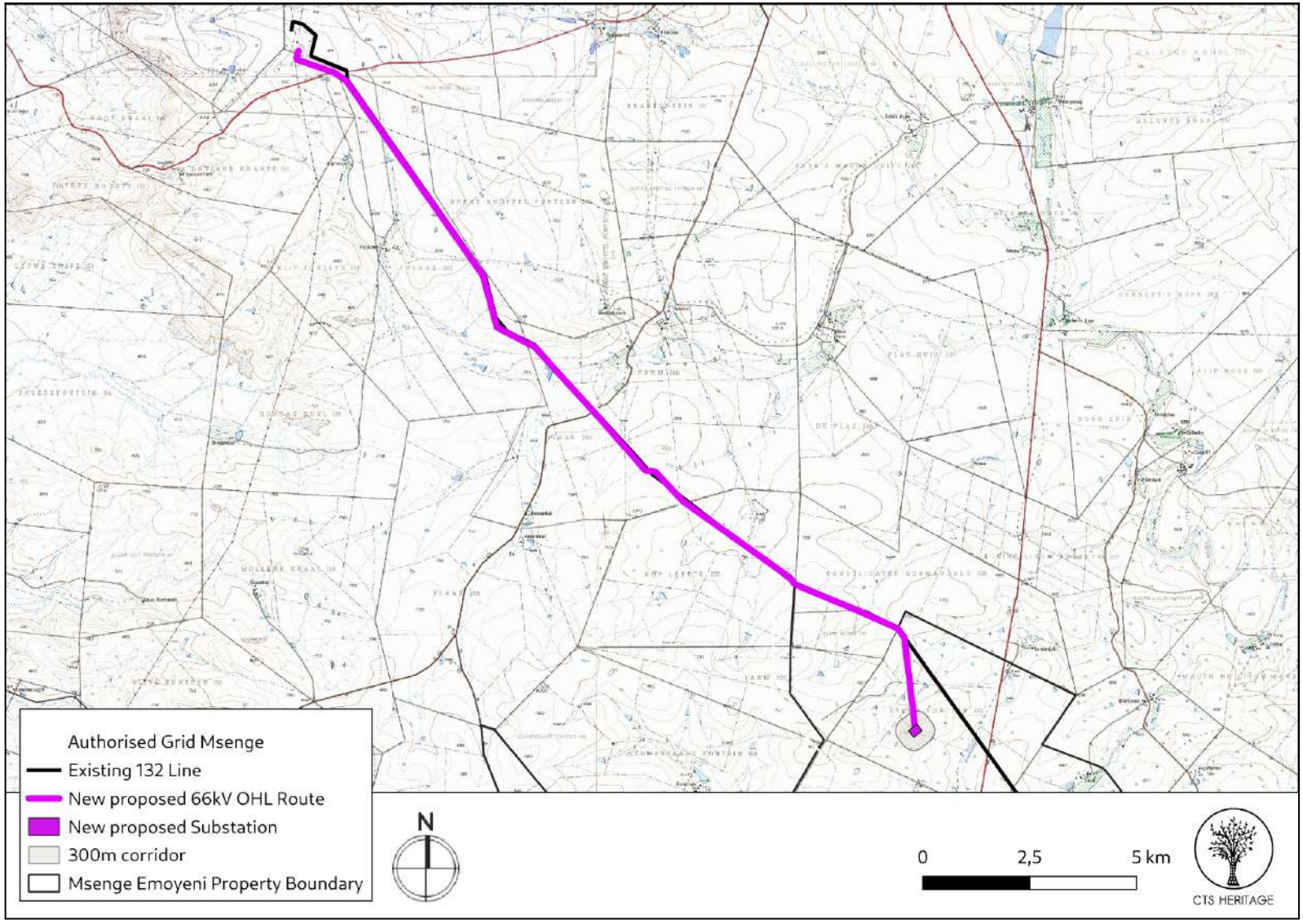

Figure 1.2: Proposed project boundary - Topo Map

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2. METHODOLOGY

2.1 Purpose of Archaeological Study

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

2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs from 10 to 14 April 2022 to determine what archaeological resources are likely to be impacted by the proposed development.
- The area proposed for development was assessed on foot, photographs of the context and finds were taken, and tracks were recorded using a GPS.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

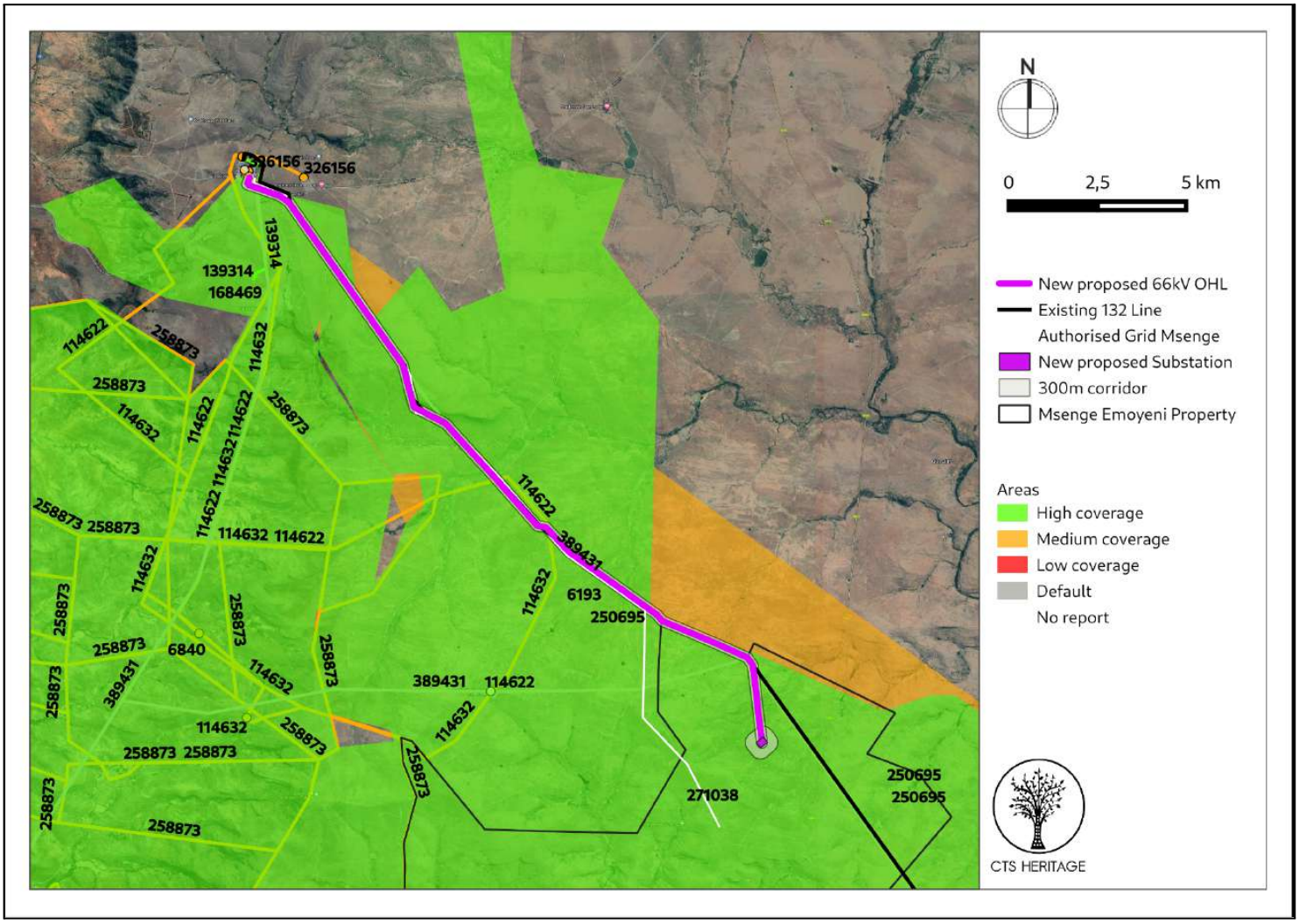

Figure 2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted

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2.3 Constraints & Limitations

As mentioned earlier, the OHL runs over ground which can be characterised by three segments. The north western and south eastern ends are almost entirely transformed by intensive stock farming on gentle, grassy slopes and level ground. These areas were very easily traversed and very little archaeological material was found, possibly due to extensive ploughing and rock removal. The middle segment of around 5km has a small rocky hill and a non-perennial floodplain where more archaeological material was found. Grass cover receded in this area to acacia thorn trees and Albany thicket vegetation which aided in the identification of surface stone artefacts. The experience of the heritage practitioner, and observations made during the study, allow us to predict with some accuracy the archaeological sensitivity of the receiving environment.

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

Background:

The authorised Msenge Emoyeni Wind Energy Facility (WEF) is located approximately 20km south of the town of Bedford in the Eastern Cape Province. The assessment aims to determine the likely impact to significant heritage resources from the proposed development of a 23km long 66kv powerline. The area proposed for development is located west of the R350 Main Road between Grahamstown and Bedford. According to Binneman (2014), the landscape comprises gentle undulating hills, lowlands and non-perennial, open valley drainage systems. The area is dominated by commercial stock farming.

Archaeology

The area under assessment in this application has been previously assessed by the ACO (Halkett et al.) as part of an extensive heritage assessment for a larger area proposed for the Amakhala Emoyeni WEF (2010, SAHRIS NID 8376). In addition, the area under assessment has also been surveyed by Binneman for the first phase of the Amakhala Emoyeni WEF (2012) and for the Msenge Emoyeni WEF (2014, SAHRIS NID 271038). These reports are used to provide insight into the heritage sensitivities of the area. In general, it is known that the area was likely occupied by Early, Middle and Later Stone Age people. According to Halkett et al. (2010), “Before colonisation of the Eastern Cape by the British in the early 19th century, Khoe herders formed powerful transhumant communities herding cattle and sheep throughout the coastal plain… They enjoyed dominance as far as the Great Fish River, where they shared a loose border with Xhosa farming communities to the east.” Halkett et al. (2010) go on to note that “The arrival of the “Trekboer” farmers in the mid-18th century started what has become known as the “Bushman War” which continued for almost 60 years. Eventually, the kommandos that were dispatched from regional centres prevailed and the “wild bushmen” of the Karoo were subjugated by the early 19th century.”

In their field survey, Halkett et al. (2010) identified diffuse and isolated scatters of Early and Middle Stone Age artefacts. They note that these artefacts are often located along the margins of small depressions in the bedrock where rain water has collected. Some were also located along rocky ridges and in areas where the ground has been scarred by erosion. They further note that while these findings have limited heritage significance, they do seem to have some level of spatial integrity. Halkett et al. also identified a number of Later Stone Age sites, some with pottery. These sites tend

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to be located closer to “rivers”, particularly in sandy areas. Additional heritage resources identified in the broader area include various historic farmhouses dated to the early and mid-19th century as well as a number of abandoned/ruinous structures and colonial period artefacts. The field survey also identified a number of “stone features consisting of loose aggregations of boulders which could represent the remains of early settlements or possibly graves”, as well as formal cemeteries and informal groupings of graves. The findings of the survey conducted by Binneman (2014) corroborate the results of the assessment by Halkett et al (2010).

All heritage resources identified in these assessments have been mapped relative to the proposed development in Figures 3, 3a to 3e. The known heritage resources that fall within or in close proximity to the 300m assessment corridor have been detailed in the table below.

Table 1: SAHRIS Sites within close proximity to the development area

SAHRIS ID	Site Name	Site Description	Grading	Mitigation/Notes	Co-ordinates	
36153	Amakhala 048	Single core on a quartzite slab.	IIIA	Insufficient description to warrant recommended grading. No impact anticipated.	32° 47′ 53.412″ S	25° 58′ 28.916″ E
36154	Amakhala 049	Set of gum trees near a dam. GPS point must be moved about 200m to the west.	IIIC	Gum trees not evident on satellite image. No impact anticipated but gums should be retained if present.	32° 45′ 52.9668″ S	25° 56′ 57.854″ E
36196	Amakhala 066	ESA scatter with variable weathering from heavily rolled to well wind-abraded. Good concentration here with nothing else around. Site located at low point (saddle) between hills.	IIIA	Located outside of 300m corridor area. No impact anticipated.	32° 49′ 53.4648″ S	26° 0′ 45.3168″ E
36197	Amakhala 067	Concentration of ESA in deflation in saddle area.	IIIB	Located outside of 300m corridor area. No impact anticipated.	32° 49′ 53.7672″ S	26° 0′ 46.134″ E
36072	Amakhala 096	Farm “werf”, 2 room house with external oven, ?1930s. 3 other structures: (1) pole high and daga with 2 stone buttresses, (2) round daga, (3) round stone. Also 1 ?grave. Artefacts all 20th C and not recorded.	IIIA	Located outside of 300m corridor area. No impact anticipated.	32° 51′ 9.3888″ S	26° 2′ 11.3964″ E
87039	**Iziduli 001**	**This site is situated next to the service track under the power line. The age of the stone kraal is not known, but it is not as high and well constructed like the other stone walls in the area and may be not of similar age.**	**IIIB**	**A no-go 30m buffer must be implemented around this kraal to ensure that no impact takes place. The OHL can pass over the kraal if necessary.**	**32° 51′ 46.08″ S**	**26° 3′ 58.0788″ E**

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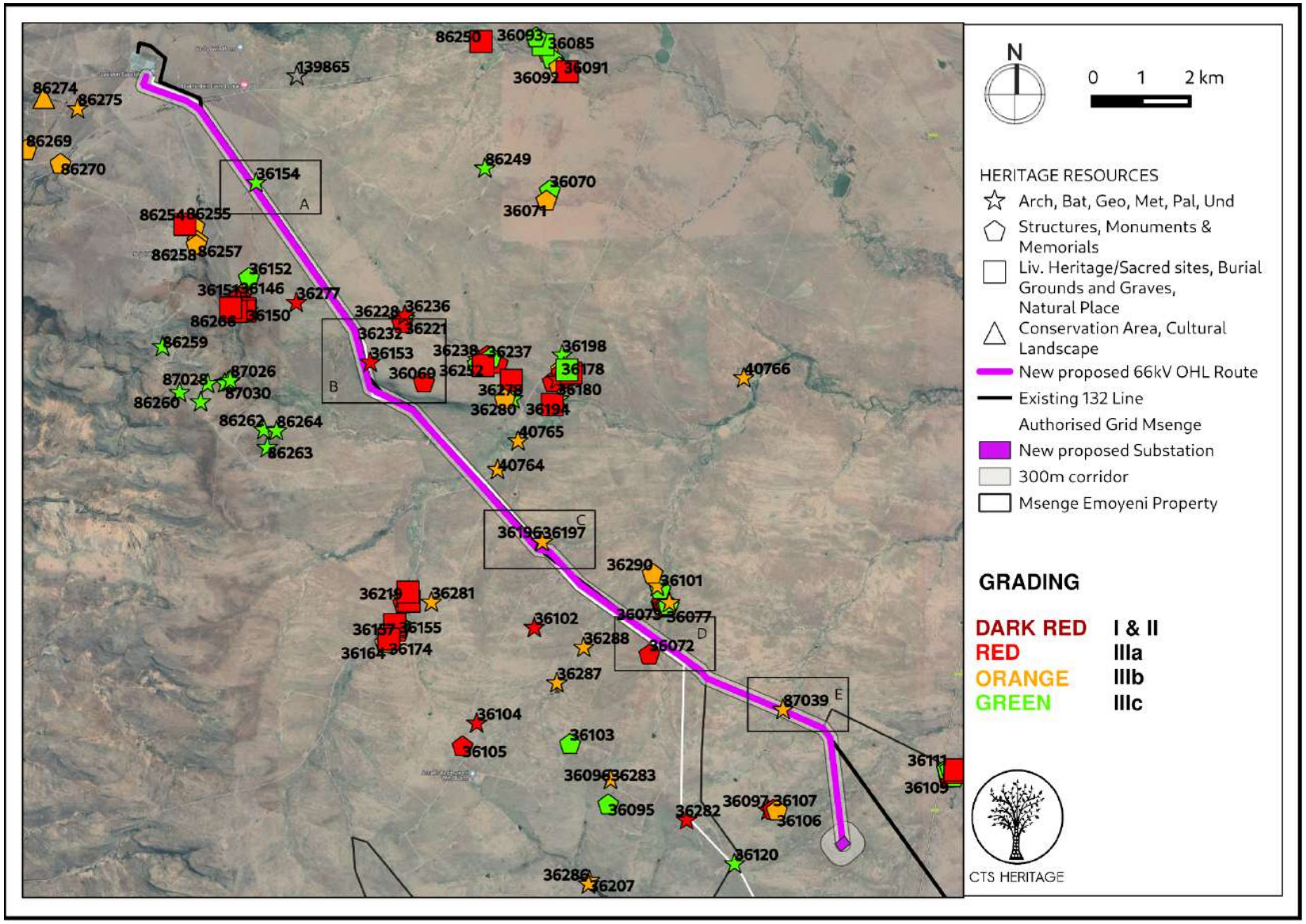

Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated

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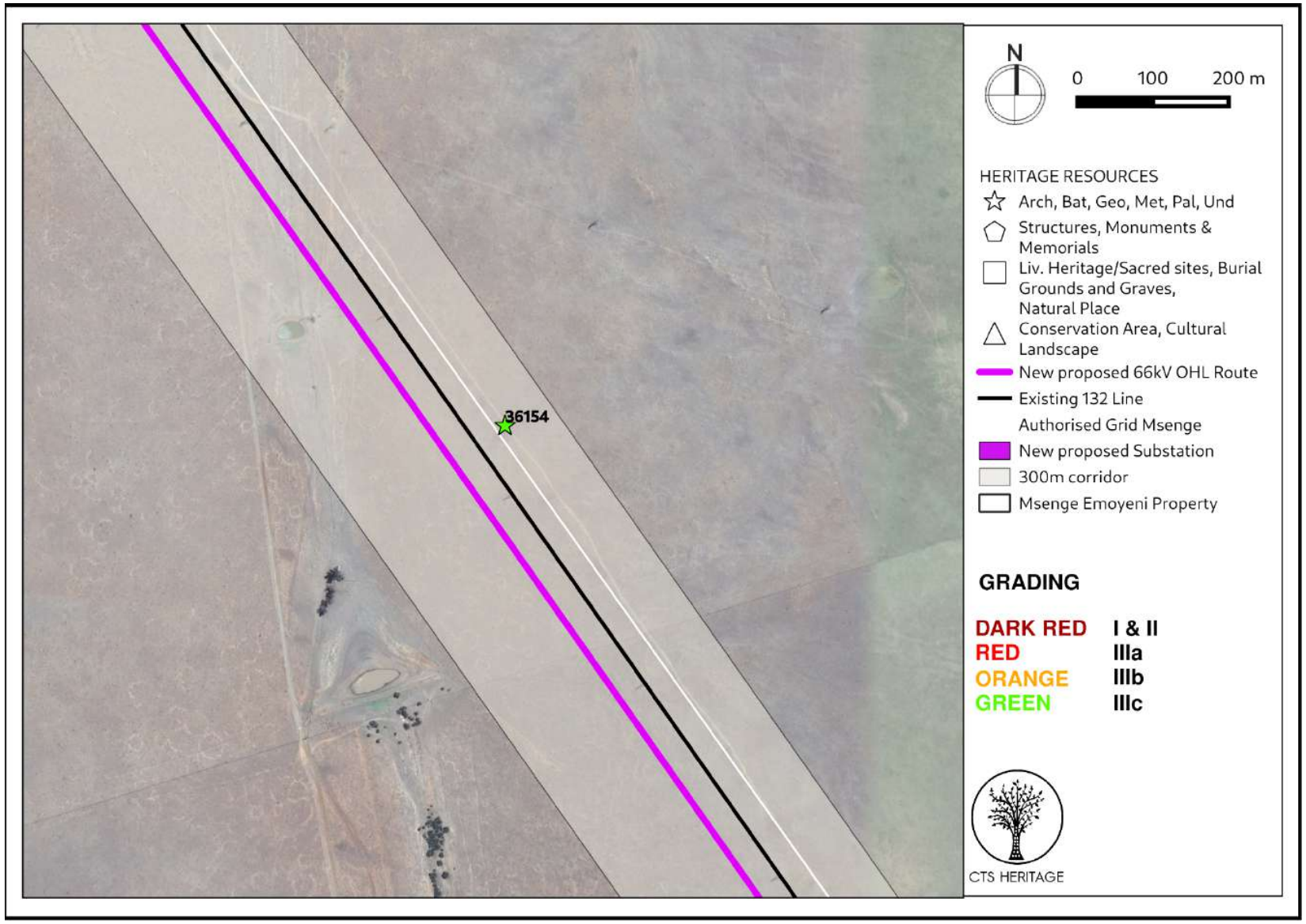

Figure 3.1. Heritage Resources Map Inset A

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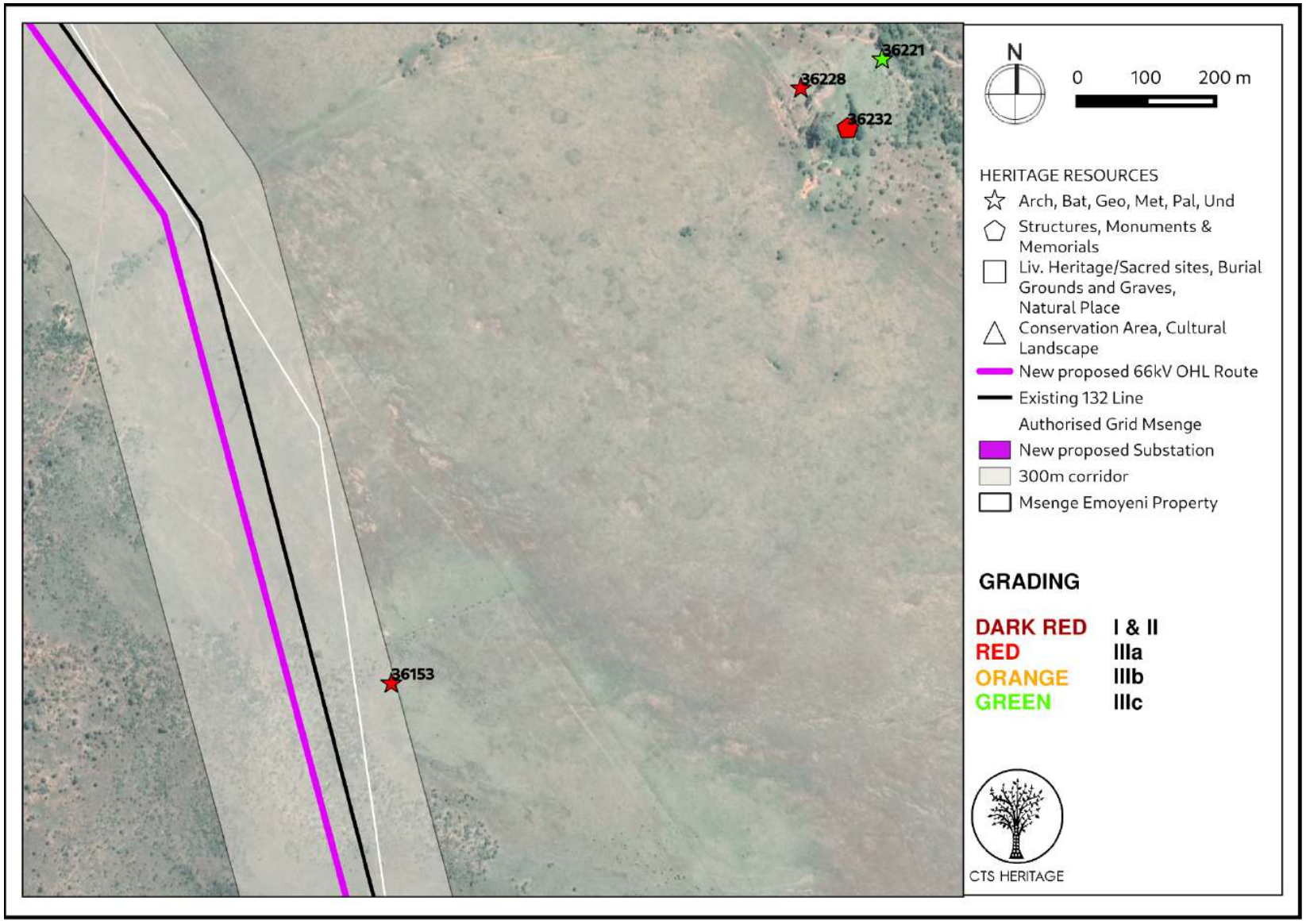

Figure 3.2. Heritage Resources Map Inset B

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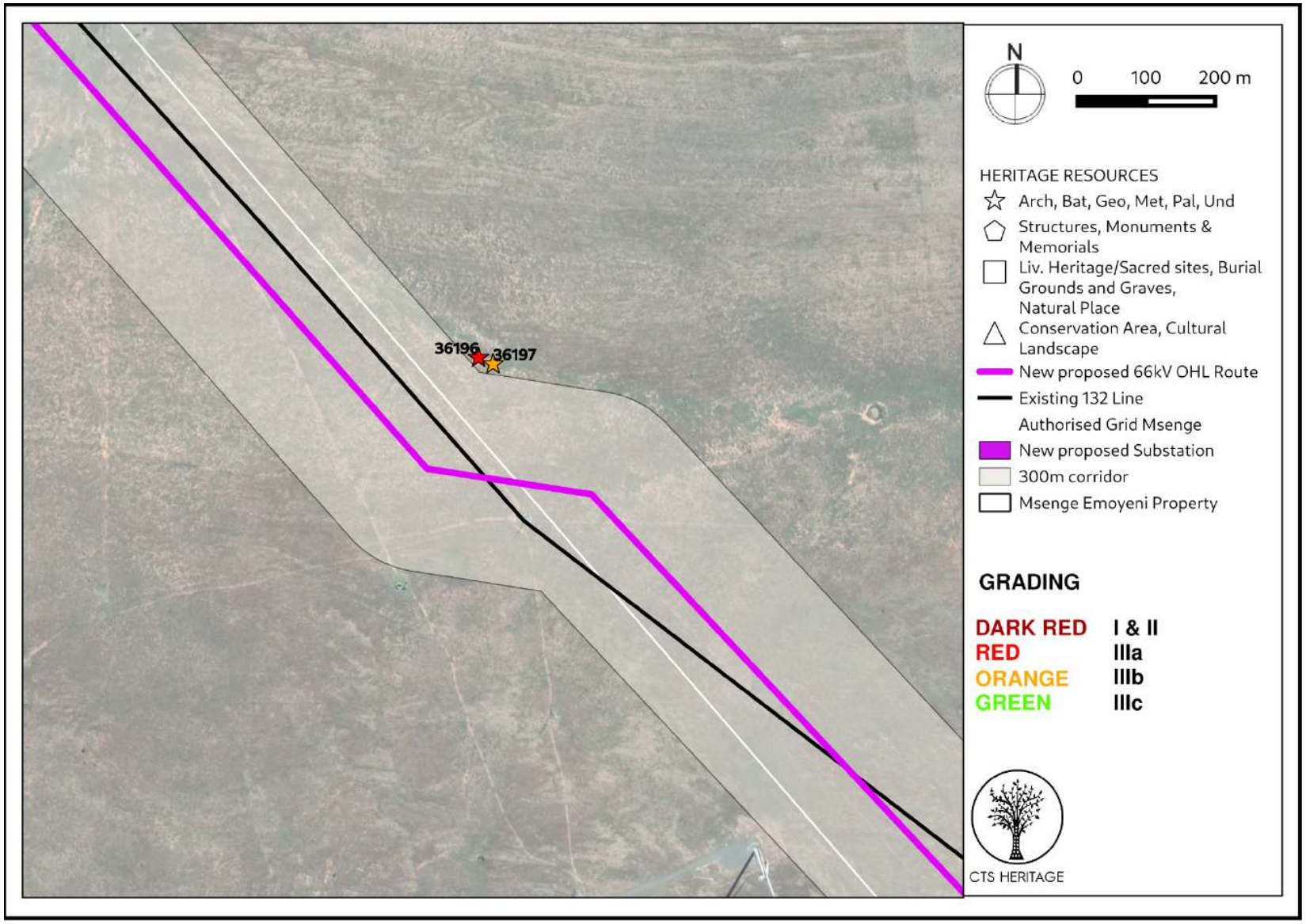

Figure 3.3. Heritage Resources Map Inset C

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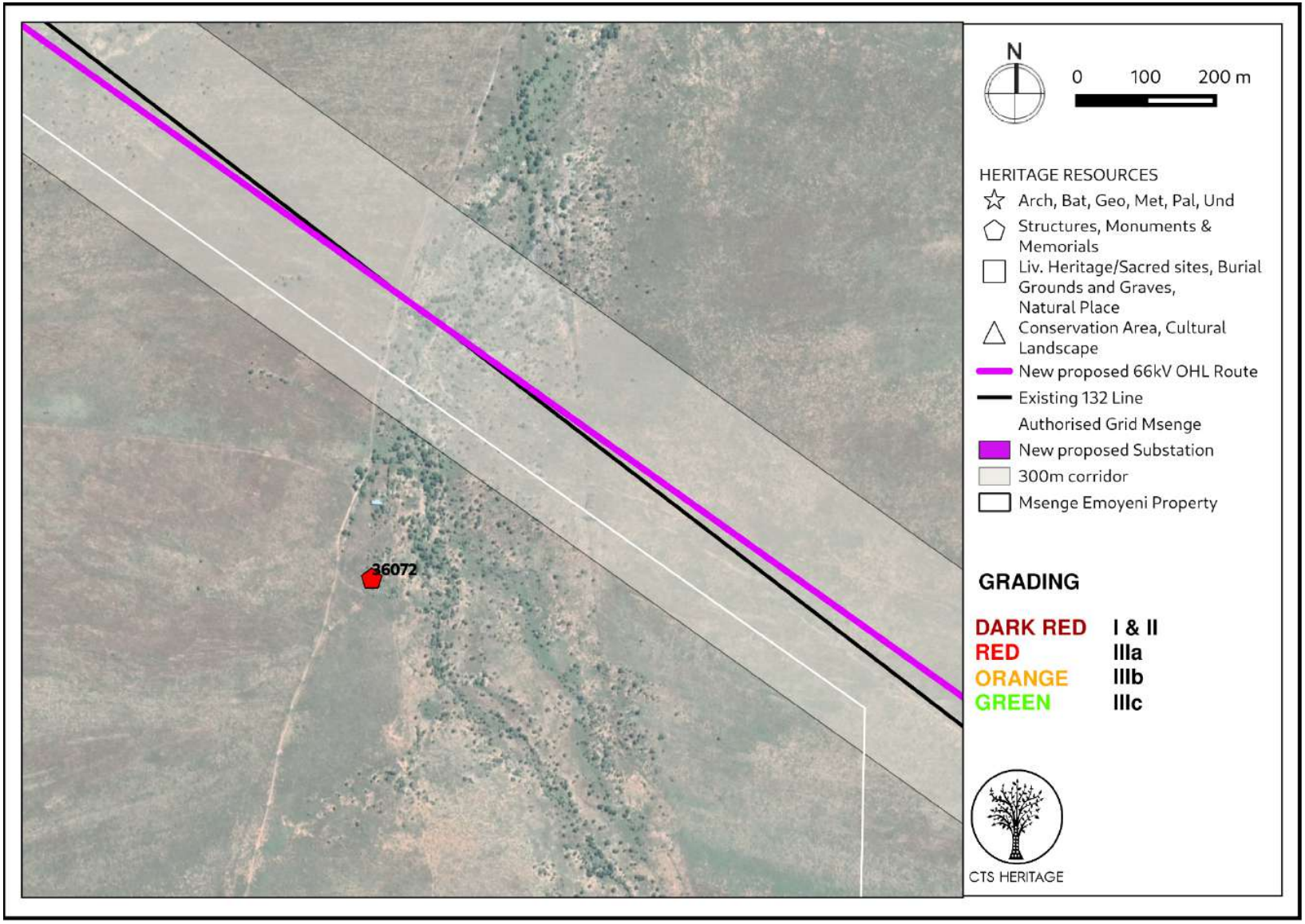

Figure 3.4. Heritage Resources Map Inset D

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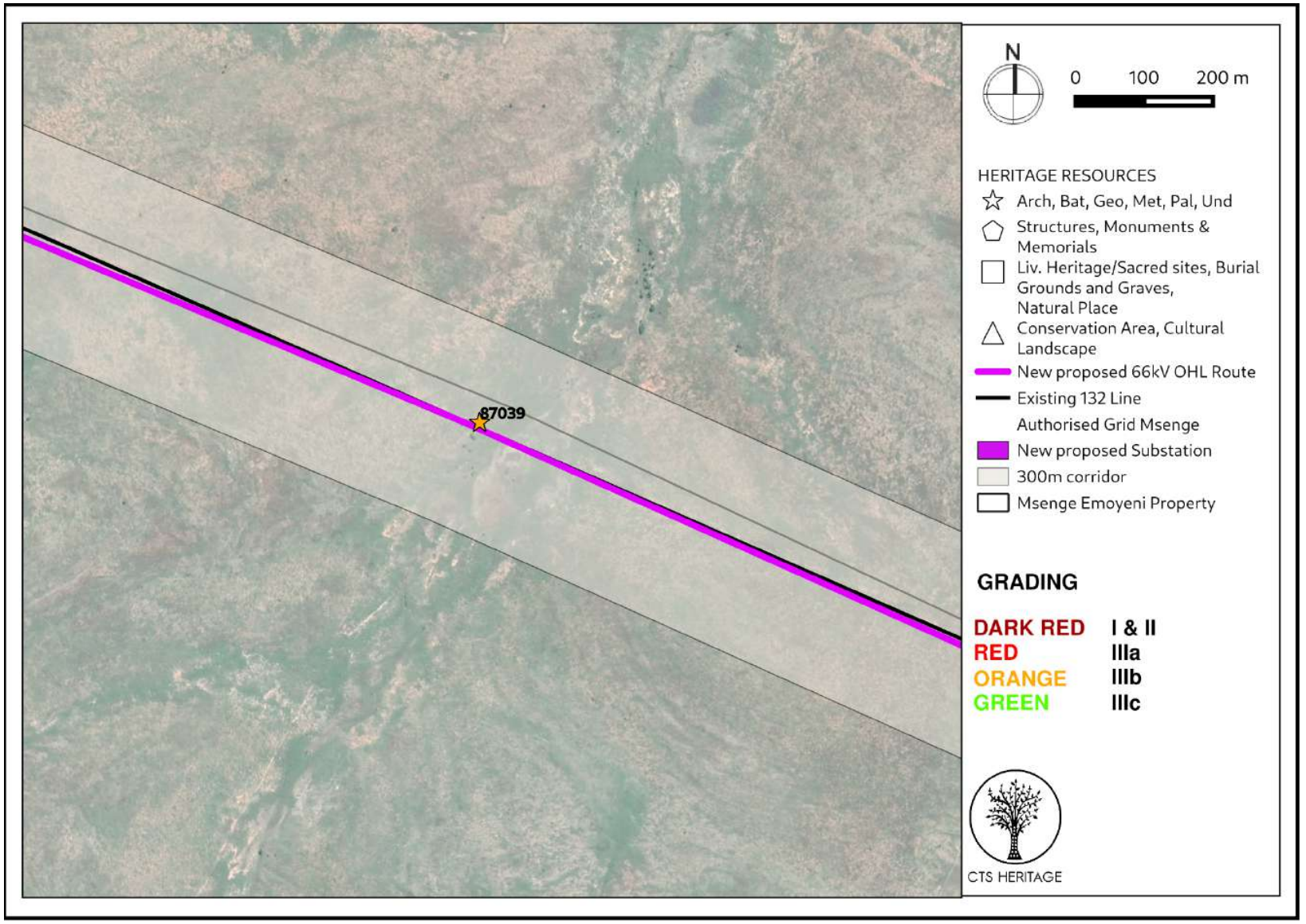

Figure 3.5. Heritage Resources Map Inset E

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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

The survey was conducted on foot with the aid of a mountain bike where feasible. The survey began on the north west end at the Poseidon substation and followed the existing 132kV powerline route all the way to the existing Amakhala Emoyeni wind farm entrance. The middle segment of the OHL route proved to hold more *in situ* archaeological material than either of the adjacent north west and south east segments which are heavily affected by stock farming and ploughing. Notably, the relative absence of archaeological material on the high ground observed when surveying the neighbouring turbine locations continued in this proposed alignment with stone artefacts concentrated along the floodplains of the non-perennial systems. There was also material lining the lower slopes of the rock hill ridge in the middle segment. There are no rock shelters or large boulders holding potential engravings in this area and the main river system (Great Fish River) runs further to the west and north west.

Around 20 observations were made primarily of weathered Middle Stone Age flakes and radial cores. The raw materials were locally sourced quartzites and siltstones which displayed very little evidence of large transport distances as access to the bedrock and river cobbles is readily available. Later Stone Age evidence was also present and higher grade hornfels cores and flakes were found that were most likely brought into the area from a number of possible karoo sources. The OHL route avoids all the main homesteads and historical werfs and overall had a very low archaeological sensitivity.

Figure 4.1: Existing grid infrastructure within the 300m grid corridor

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Figure 4.2: Existing turbines in close proximity to the grid corridor and grid infrastructure within the 300m grid corridor

Figure 4.3: Existing grid infrastructure within the 300m grid corridor

Figure 4.4: Existing grid infrastructure within the 300m grid corridor

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Figure 4.5: Contextual Images of 300m grid corridor

Figure 4.6: Existing grid infrastructure within the 300m grid corridor

Figure 4.7: Existing grid infrastructure and turbines within the 300m grid corridor

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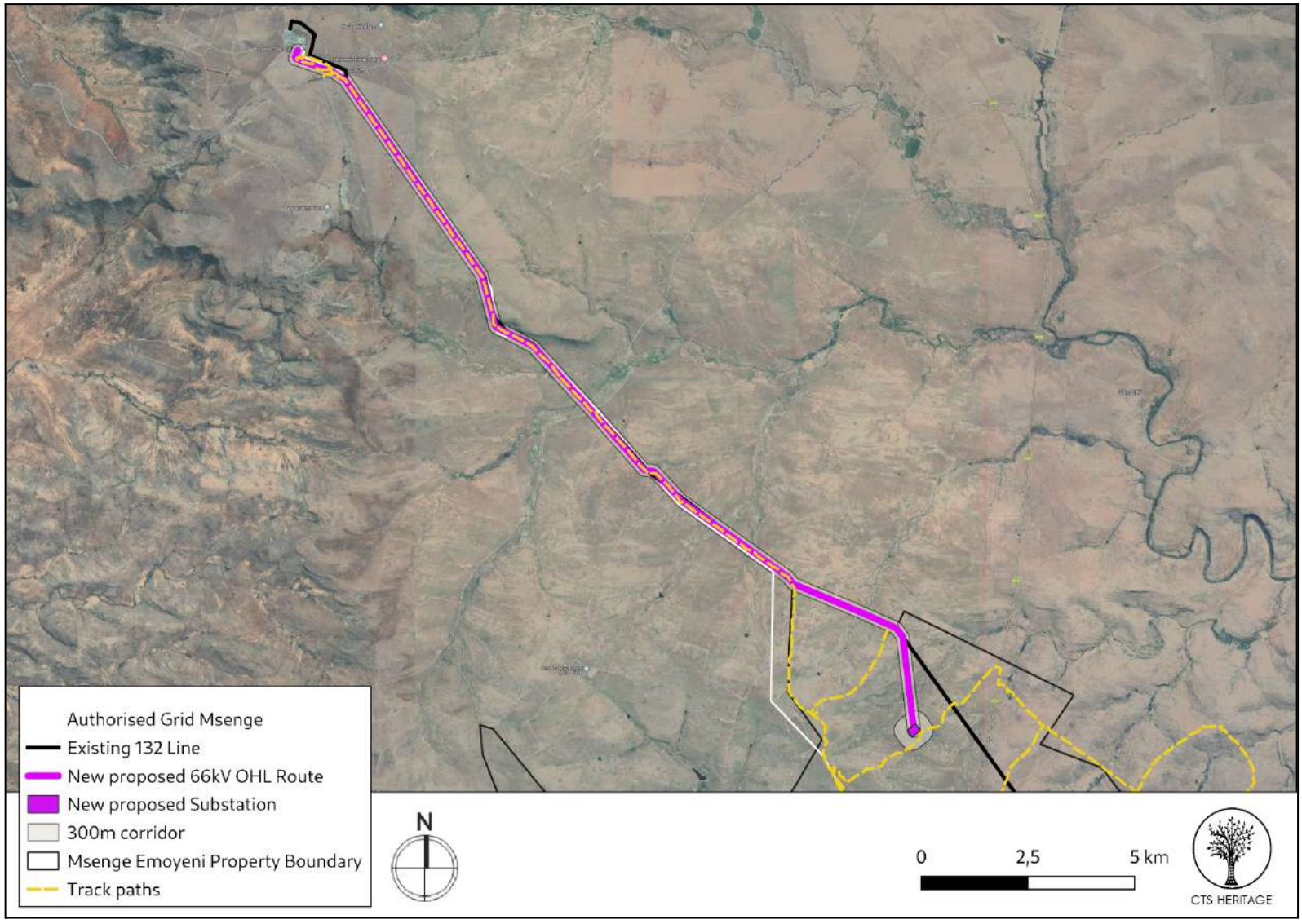

Figure 5.: Trackpaths indicating the path walked by the specialist

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4.2 Archaeological Resources identified

Table 1: Observations noted during the field assessment

POINT ID	Project Area	Period	Description	Co-ordinates		Grading	Mitigation
019	Grid	MSA	Siltstone core radial both ends	-32.89334	26.10634	NCW	NA
020	Grid	MSA	Siltstone flake, early MSA	-32.89205	26.10784	NCW	NA
021	Grid	MSA	Siltstone blade flake	-32.88098	26.10519	NCW	NA
022	Grid	MSA	Siltstone flake, early MSA	-32.87855	26.10268	NCW	`NA
025	Grid	MSA	Quartzite flakes and core, early MSA	-32.89438	26.05735	NCW	NA
026	Grid	MSA	Quartzite core	-32.88438	26.05409	NCW	NA
027	Grid	MSA	Quartzite biface early MSA	-32.87564	26.0677	NCW	NA
028	Grid	MSA	Fine grained quartzite blade	-32.87233	26.07015	NCW	NA
029	Grid	Modern	Brick water tank	-32.87218	26.04892	NCW	NA
030	Grid	MSA	Early Msa quartzite flake in eroded jeep track	-32.79101	25.97021	NCW	`NA
031	Grid	MSA	Quartzite flake, early MSA	-32.79308	25.97158	NCW	NA
032	Grid	MSA, LSA	Silcrete radial core, flake, quartzite flakes, siltstone flake, hornfels core	-32.80312	25.97532	NCW	NA
033	Grid	MSA	Quartzite flake	-32.80566	25.98105	NCW	NA
034	Grid	MSA	Siltstone bifacially worked flake	-32.80756	25.98438	NCW	NA
035	Grid	LSA	Hornfels core	-32.81356	25.99092	NCW	NA
036	Grid	MSA	Silcrete point on top of sand Bank of dam wall	-32.81892	25.99685	NCW	NA
037	Grid	MSA	Quartzite flake early MSA	-32.82573	26.00442	NCW	`NA
038	Grid	MSA	Quartzite blade flake	-32.83107	26.01001	NCW	NA
039	Grid	MSA, LSA	Hornfels and quartzite flakes in eroded warthog den	-32.84437	26.02901	NCW	NA
040	Grid	MSA	Siltstone flake	-32.84965	26.03786	NCW	NA

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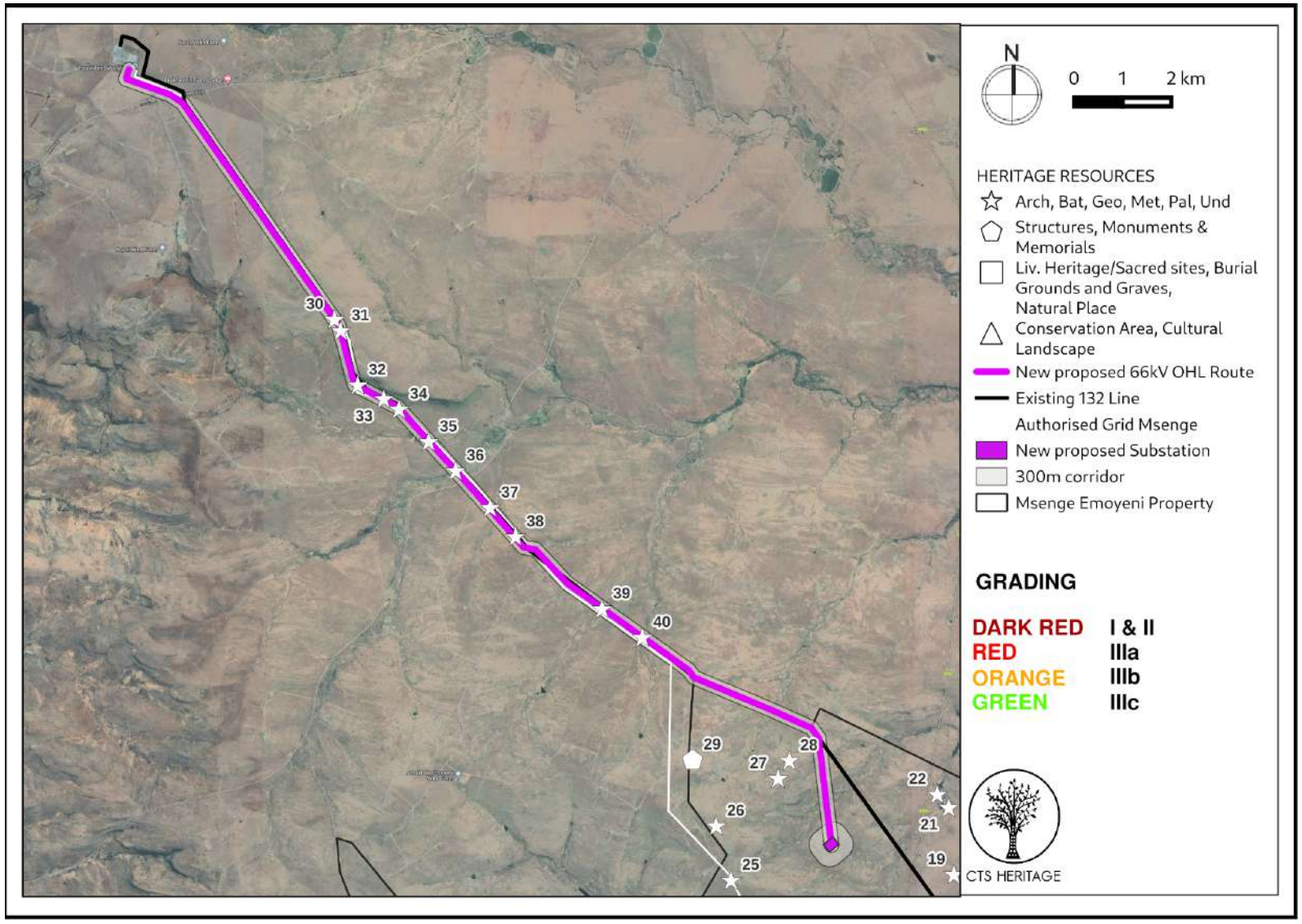

Figure 6: Map of heritage resources identified during the field assessment relative to the proposed development footprint

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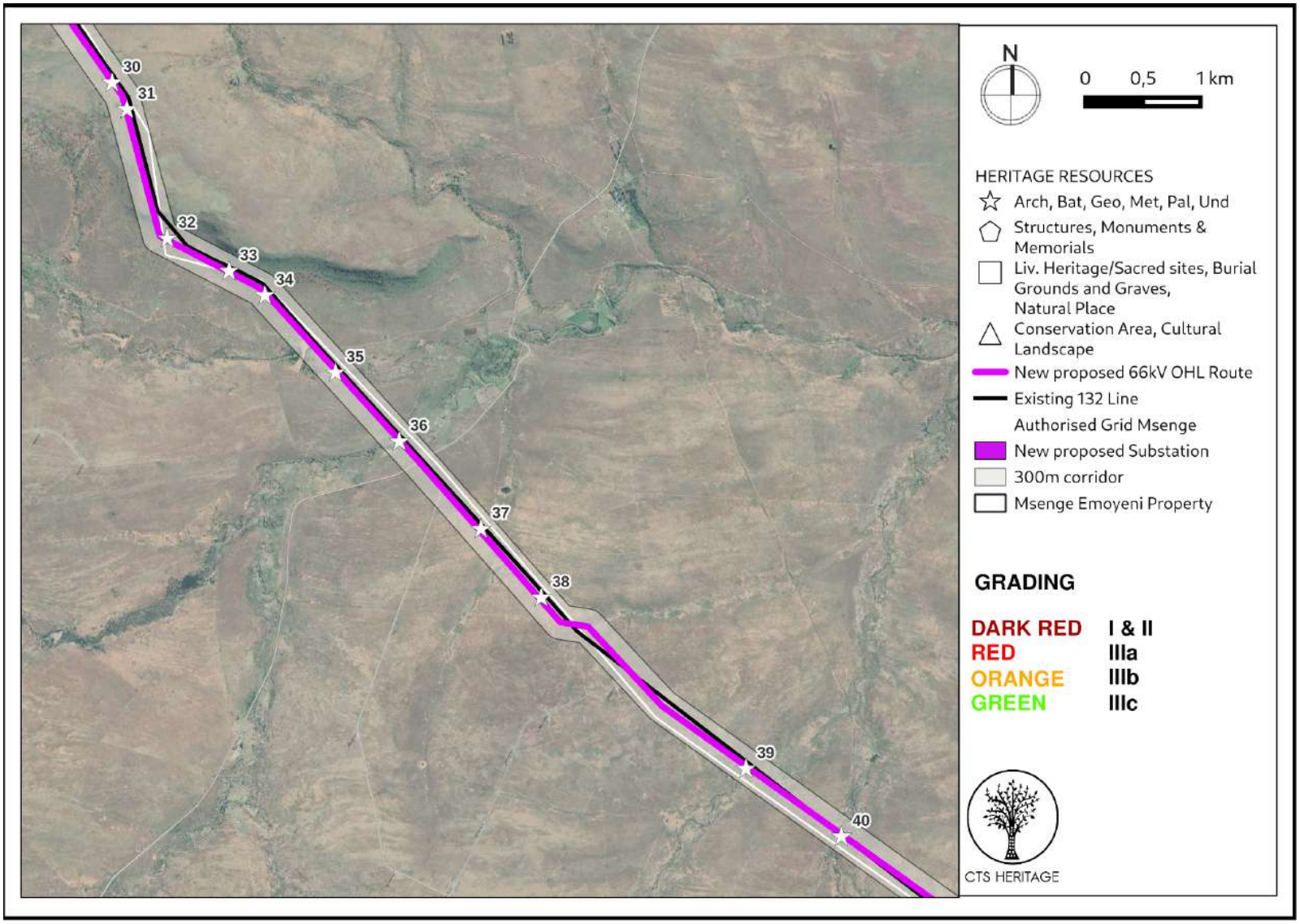

Figure 6.1: Map of heritage resources identified during the field assessment relative to the proposed development footprint

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4.3 Selected photographic record

(a full photographic record is available upon request)

Figure 7.1: Observation 030

Figure 7.2: Observation 031

Figure 7.3: Observation 032

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Figure 7.4: Observation 033

Figure 7.5 Observation 034

Figure 7.6 Observation 035

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Figure 7.7 Observation 036

Figure 7.8 Observation 037 and 038

Figure 7.9: Observation 039 and 040

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

Based on the field assessment completed, the overall archaeological sensitivity of the development area is low. As per the findings of Binneman (2014) and Halkett (2010), this field assessment identified that stone artefacts seem to be concentrated along the floodplains of the non-perennial river systems. As such, potential impacts to archaeological heritage can be avoided through the careful placement of pylons on higher ground and not in valleys or close to river systems and in sandy plains.

None of the archaeological observations noted in this field assessment were determined to have sufficient scientific significance to be conservation-worthy and their recording in this report is considered sufficient. One of the archaeological findings from a previous assessment completed here, SAHRIS ID 87039, a stone kraal graded IIIB (of moderate local significance, is located within the 300m grid corridor. The location of this stone kraal is described as "next to the service track under the power line. The age of the stone kraal is not known, but it is not as high and well constructed as the other stone walls in the area and may not be of similar age." It is recommended that no-go 30m buffer must be implemented around this kraal to ensure that no impact takes place. The OHL can pass over the kraal if necessary.

6. CONCLUSION AND RECOMMENDATIONS

Based on this field assessment and on the findings of previous assessments in the area, it is not anticipated that the proposed OHL development will negatively impact on significant archaeological heritage on condition that the recommendations articulated below are implemented.

Recommendations

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

- A no-go 30m buffer must be implemented around Site 87039 to ensure that no impact takes place (Figure 7). The OHL can pass over the kraal if necessary.
- The pylon footings of the proposed OHL are not located within any kloofs or river valleys to mitigate the likelihood of impact to significant archaeological heritage
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward.

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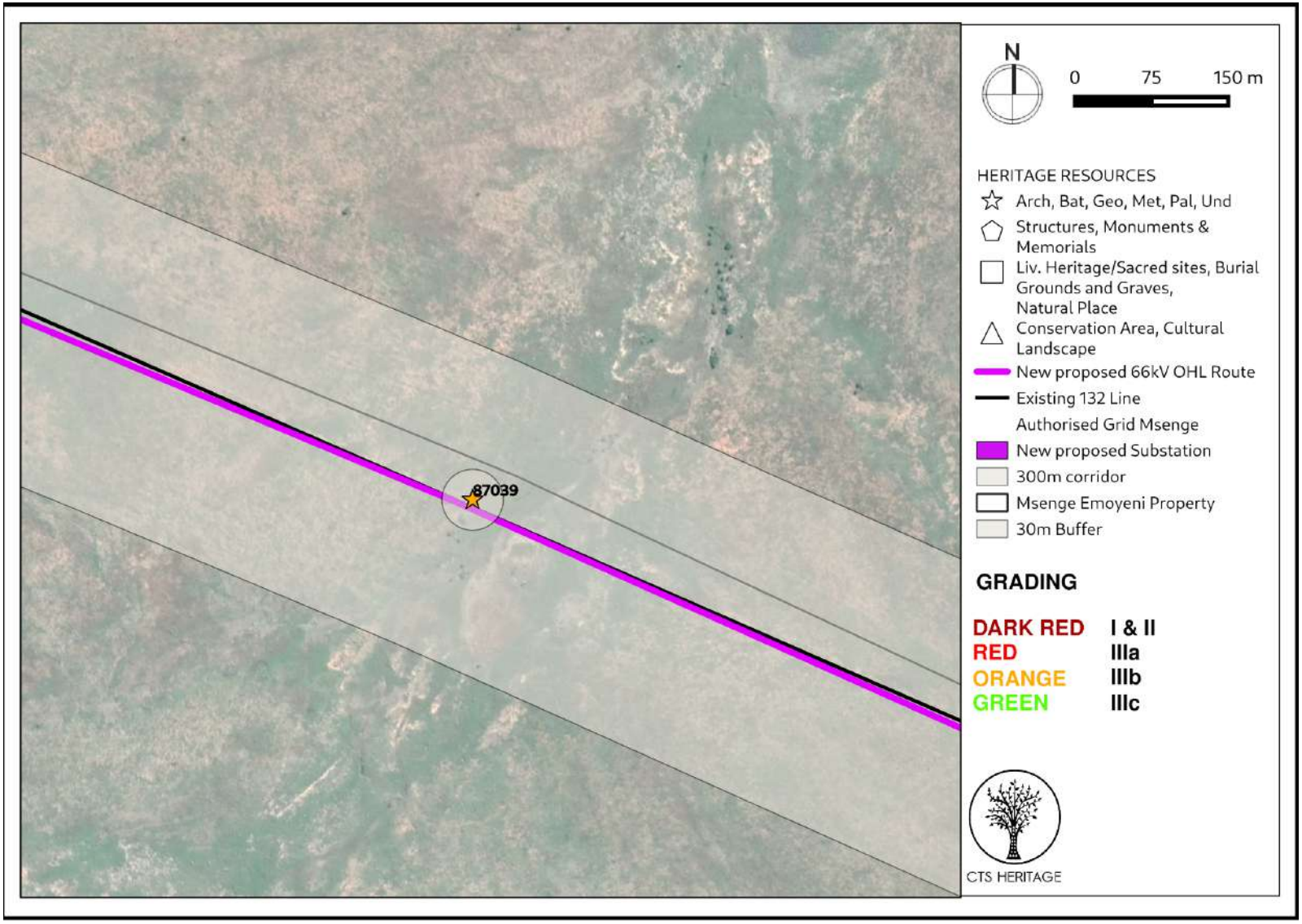

Figure 7: Map of recommended mitigation measures as per the recommendations

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7. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
6193	AIA Phase 1	Dave Halkett, Lita Webley	28/03/2010	Heritage Scoping Assessment of a Proposed Wind Energy Facility to be situated on farms in the Cookhouse District, Eastern Cape.
7945	AIA Desktop	Frans Prins	05/02/2011	DRAFT Technical Report in support of the EMP for the South Western Karoo Basin Gas Exploration Application Project: CULTURAL HERITAGE: EASTERN PRECINCT
8376	HIA Phase 1	Dave Halkett, Lita Webley, Jayson Orton, Hugo Pinto	17/10/2010	Heritage Impact Assessment of the proposed Amakhala-Emoyeni Wind Energy Facility, Cookhouse District, Eastern Cape
109187	PIA Phase 1	Billy De Klerk	01/09/2010	Palaeontological Impact Assessment of a proposed wind energy facility to be situated on a site south-east of Cookhouse and asouth of Bedford in the Eastern Cape province. The Amakhala-Emoyeni Wind Energy Facility
109190	AIA Phase 1B	Johan Binneman	01/08/2013	An archaeological walkthrough survey of the turbine footprint for the proposed Phase 1 Amakhala Emoyeni Wind Energy Facility, Cookhouse District, Blue Crane Route Municipality, Eastern Cape Province
250695	AIA Phase 1	Johan Binneman	31/07/2014	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENTS OF THE PROPOSED SUBSTATION, SWITCHING STATION AND POWER LINE GRID CONNECTION FOR THE IZIDULI EMOYENI WIND FARM, BLUE CRANE ROUTE LOCAL MUNICIPALITY, SARAH BAARTMAN DISTRICT, EASTERN CAPE
271038	Archaeological Specialist Reports	Johan Binneman	24/03/2014	An Archaeological Walk through Survey if the proposed turbine footprint and infrastructure for the Msenge Emoyeni Wind Energy Facility, Bedford District, Blue Crane Route Municipality, Eastern Cape Province

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APPENDIX 2: Palaeontological Assessment (2022)

Palaeontological Impact Assessment for the proposed Msenge WEF, Grid Connection and substation, south of Bedford and east of Cookhouse, Eastern Cape Province

Site Visit Report (Phase 2)

For

CTS Heritage

02 May 2022

Prof Marion Bamford
Palaeobotanist
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Johannesburg, South Africa
Marion.bamford@wits.ac.za

Expertise of Specialist

The Palaeontologist Consultant: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, ASSAf
Experience: 33 years research; 25 years PIA studies

Declaration of Independence

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by CTS Heritage, Cape Town, South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the Project.

Specialist: Prof Marion Bamford

Signature: 

Executive Summary

A Palaeontological Impact Assessment was requested for the proposed Msenge WEF, south of Bedford and east of Cookhouse, Eastern Cape Province. The proposed alignment of the of the OHL route from Posiedon to the Msenge WEF is included.

To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a site visit (Phase 2) Palaeontological Impact Assessment (PIA) was completed for the proposed development.

The proposed site lies on the potentially very highly fossiliferous rocks of the Middleton Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup. These mudstones and sandstones could preserve vertebrate fossils of the *Cistecephalus* Assemblage Zone. The site visit on 26-27 April confirmed that there were NO FOSSILS visible on the land surface. The stream and road cuttings through the rocks also were barren of vertebrate and plant fossils. It is not known what lies beneath the soil cover, although fossils are not numerous in this part of the Karoo Basin. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, developer, environmental officer or other designated responsible person once excavations or drilling activities for turbine foundations, pipes, powerlines and infrastructure have commenced. Since the impact will be low, as far as the palaeontology is concerned, the project should be authorised.

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i. Background

The proposed Msenge Wind Energy Facility (WEF) with about 16 turbines, access roads and power lines and facility on-site substation is planned for construction on five land parcels that lie to the west of the R350 road between Bedford and Grahamstown, but closer to Cookhouse and Bedford, Eastern Cape Province.

The land parcels in this project are from north to south, portion 1/206 of Farm Consolidated, Portion 3/203, Portion 2/222, Farm 221, Portion 1/220 of Farm Geluk, Farm 225, and Portions RE/223 and 2/223 of Farm Paarde Kloof (Figures 1, 2). Remaining Extent of Farm Leeuw Fontein No. 220 will also have aproposed substation. There are numerous turbines to the northwest of this cluster along the prominent ridges and they feed into the Poseidon Substation that in the direction of Cookhouse (Figure 1), as will this cluster. The route for the grid connection is more or less aligned with the existing powerline (Figure 3).

The whole area for the turbines and grid connection/powerline is on potentially very highly fossiliferous rocks of the Middleton Formation so a site visit palaeontological assessment is required.

A Palaeontological Impact Assessment was requested for the Msenge WEF project. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a site visit and walkthrough (Phase 2) Palaeontological Impact Assessment (PIA) was completed on 27-28 April by palaeontologist Marion Bamford and assistant student Roxane Matias for the proposed development and is reported herein.

Table 1: Specialist report requirements in terms of Appendix 6 of the EIA Regulations (amended 2017)

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
ai	Details of the specialist who prepared the report	Appendix B
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Appendix B
b	A declaration that the person is independent in a form as may be specified by the competent authority	Page 1

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
c	An indication of the scope of, and the purpose for which, the report was prepared	Section i.
ci	An indication of the quality and age of the base data used for the specialist report: SAHRIS palaeosensitivity map accessed – date of this report	Yes
cii	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 5
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	N/A
e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section ii.
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 4
g	An identification of any areas to be avoided, including buffers	N/A
h	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section viii.
j	A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section vii.
k	Any mitigation measures for inclusion in the EMPr	Section 8, Appendix A
l	Any conditions for inclusion in the environmental authorisation	N/A
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 8, Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Section 6
nii	If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Sections 6, 8
o	A description of any consultation process that was undertaken during the course of carrying out the study	N/A
p	A summary and copies if any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A

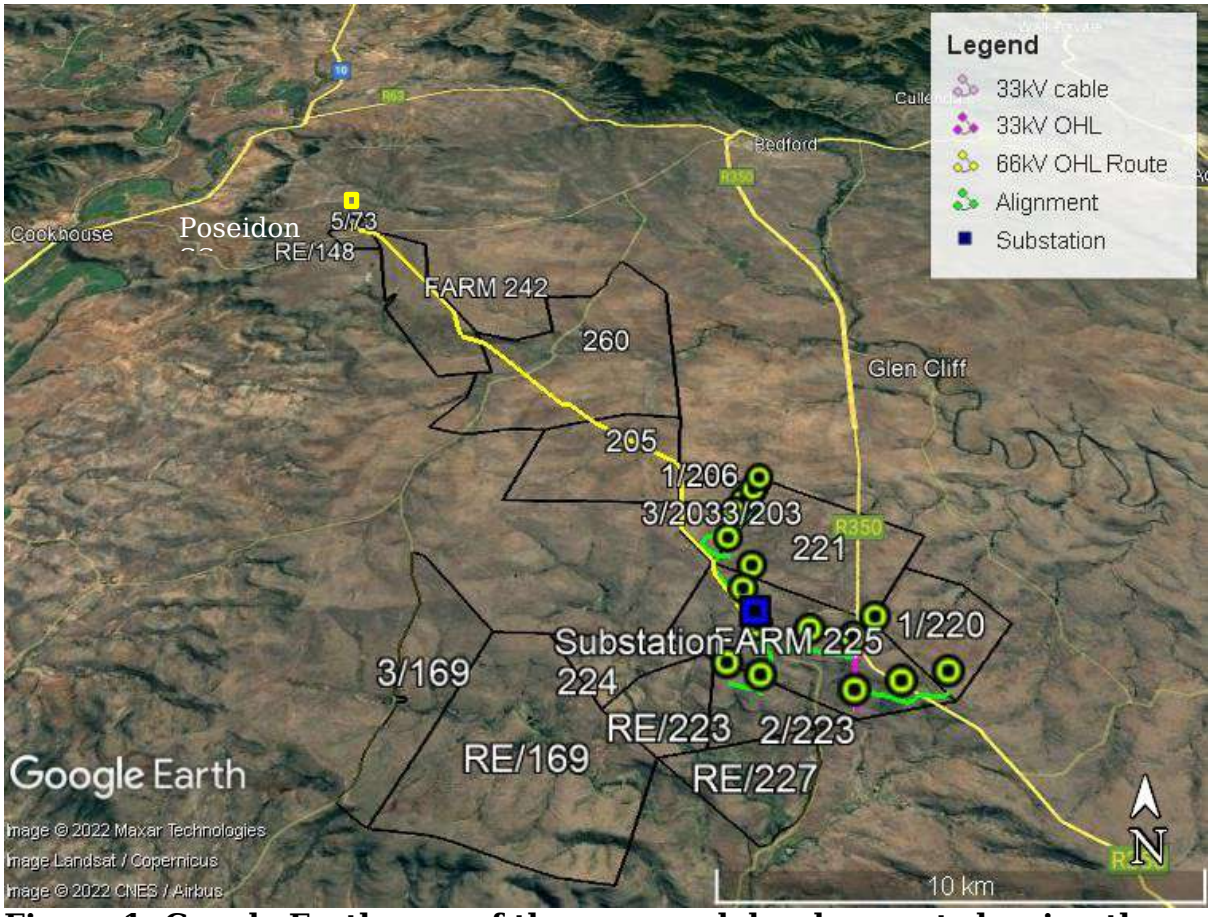


Figure 1: Google Earth map of the proposed development showing the relevant land marks.

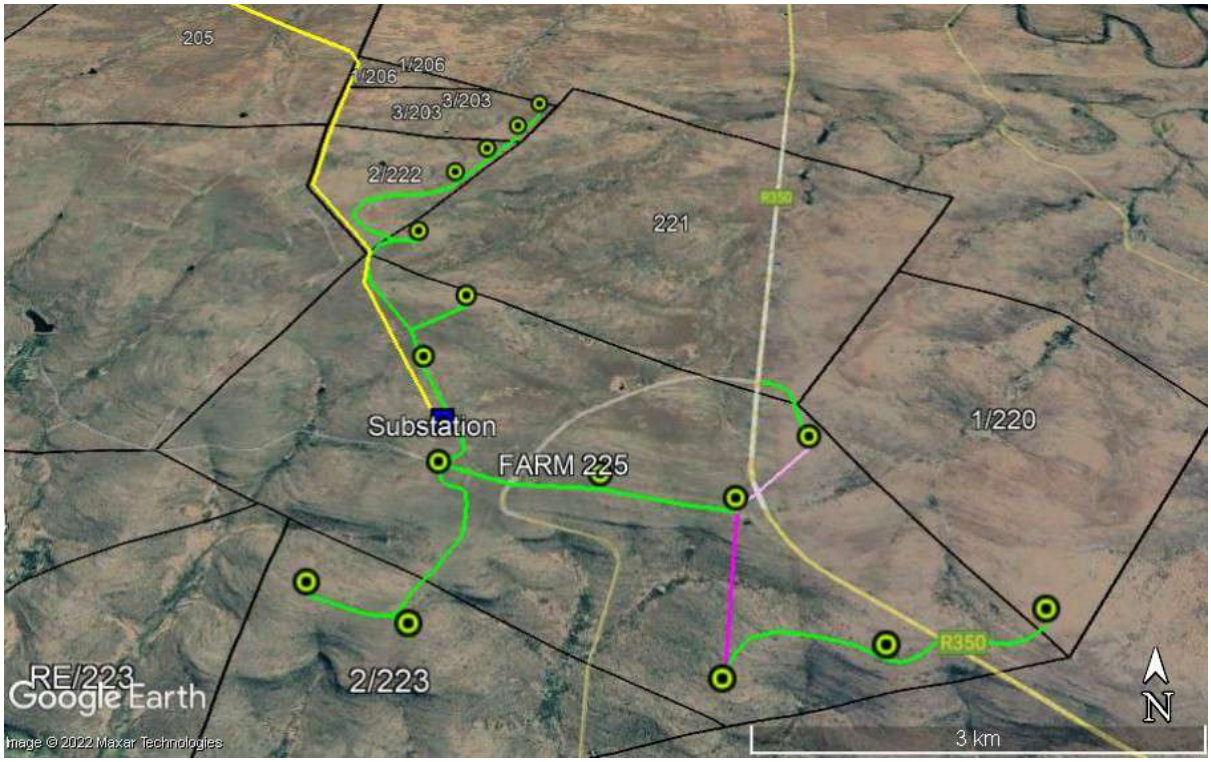


Figure 2: Google Earth map of the Msenge WEF turbines and connections.

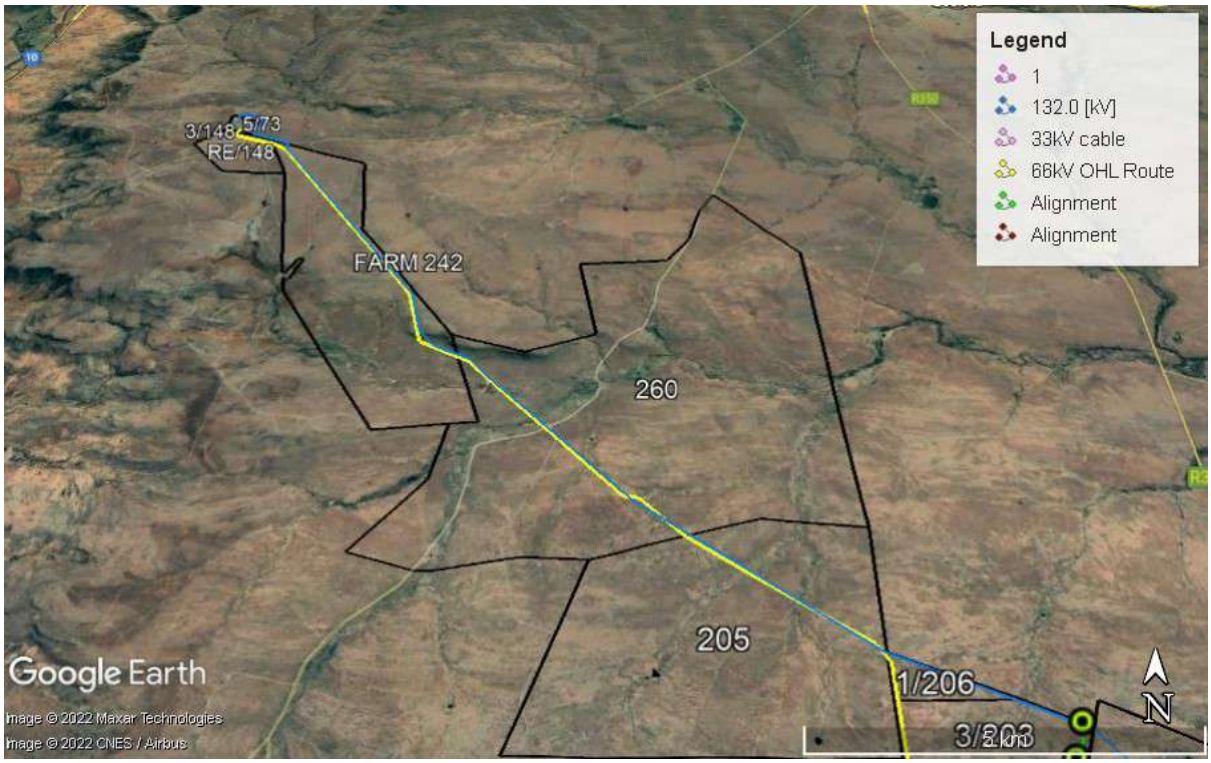


Figure 3: Google Earth map to show the northern part of the 132 kV OHL route for the WEFs – blue line. Yellow line is the existing powerline

ii. Methods and Terms of Reference

The Terms of Reference (ToR) for this study were to undertake a PIA and provide feasible management measures to comply with the requirements of SAHRA.

The methods employed to address the ToR included:

1. Consultation of geological maps, literature, palaeontological databases, published and unpublished records to determine the likelihood of fossils occurring in the affected areas. Sources included records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases;
2. Where necessary, site visits by a qualified palaeontologist to locate any fossils and assess their importance, as is the case here;
3. Where appropriate, collection of unique or rare fossils with the necessary permits for storage and curation at an appropriate facility (*not applicable to this assessment*); and
4. Determination of fossils' representivity or scientific importance to decide if the fossils can be destroyed or a representative sample collected (*not applicable to this assessment*).

iii. Geology and Palaeontology

iv. Project location and geological context

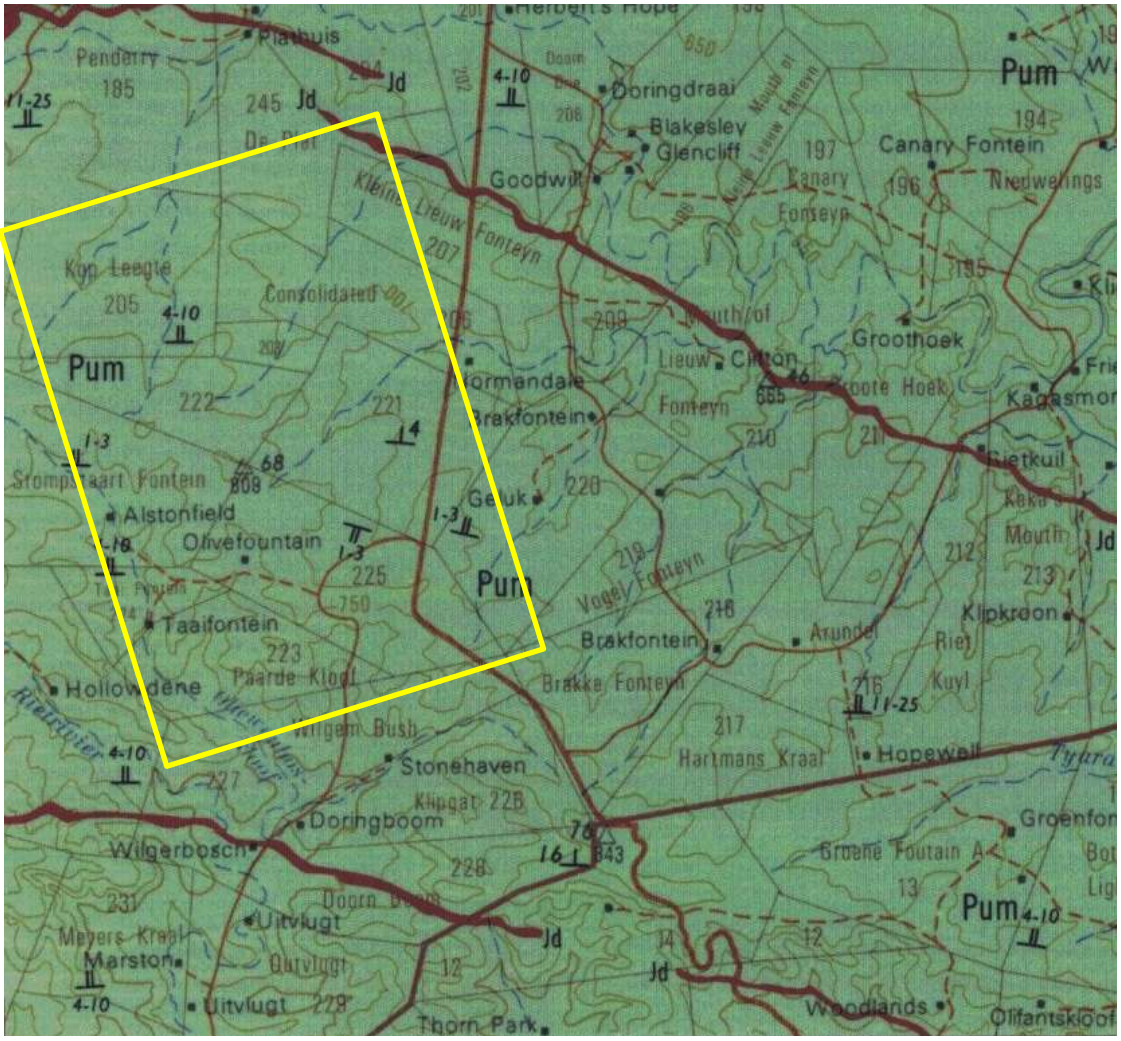


Figure 4: Geological map of the area around the Msenge WEF east of Cookhouse and south of Bedford indicated within the yellow rectangle. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 3226 King Williamstown.

Table 2: Explanation of symbols for the geological map and approximate ages (Johnson et al., 2006; Rubidge et al., 1995; Smith et al., 2020). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Neogene, ca 2.5 Ma to present
Jd	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, approx. 180 Ma
Pm	Middleton Fm, Adelaide Subgroup, Beaufort Group, Karoo SG	Grey and red mudstones, sandstone,	Late Permian,

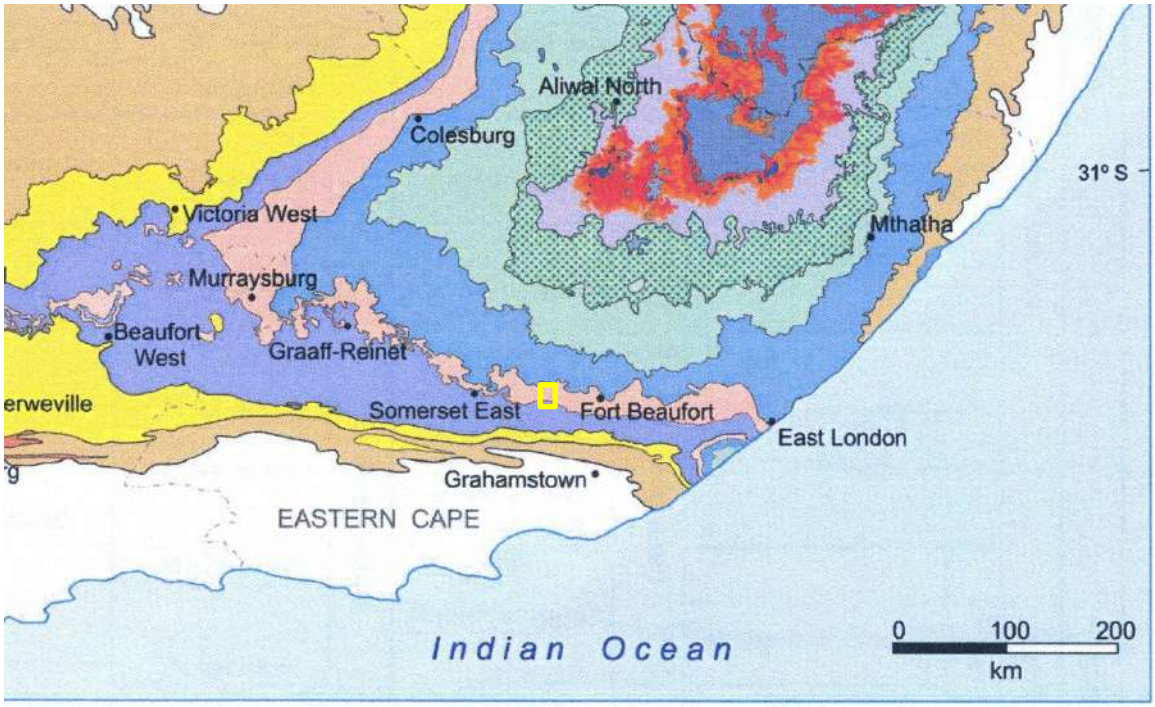


Figure 5: Karoo biostratigraphy map to show the vertebrate assemblage zones. Msenge (yellow rectangle between Somerset East and fort Beaufort) is in the pink band – Cistecephalus Assemblage Zone (map from Smith et al., 2020, fig.1).

The site lies in the southern margin of the Main Karoo Basin where the rocks of the Middleton Formation are exposed (Figure 4) and the *Cistecephalus* Assemblage Zone (Figure 5).

The Karoo Supergroup rocks cover a very large proportion of South Africa and extend from the northeast (east of Pretoria) to the southwest and across to almost the KwaZulu Natal south coast. It is bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks. Representing some 120 million years (300 – 183Ma), the Karoo Supergroup rocks have preserved a diversity of fossil plants, insects, vertebrates and invertebrates.

During the Carboniferous Period South Africa was part of the huge continental landmass known as Gondwanaland and it was positioned over the South Pole. As a result, there were several ice sheets that formed and melted, and covered most of South Africa (Visser, 1986, 1989; Isbell et al., 2012). Gradual melting of the ice as the continental mass moved northwards and the earth warmed, formed fine-grained sediments in the large inland sea. These are the oldest rocks in the system and are exposed around the outer part of the ancient Karoo Basin, and are known as the Dwyka Group (Johnson et al., 2006).

Overlying the Dwyka Group rocks are rocks of the Ecca Group that are Early Permian in age. There are eleven formations recognised in this group but they do not all extend throughout the Karoo Basin.

Overlying the Ecca Group are the rocks of the Beaufort Group that has been divided into the lower Adelaide Subgroup for the Upper Permian strata, and the Tarkastad Subgroup for the Early to Middle Triassic strata. As with the older Karoo sediments, the formations vary across the Karoo Basin. In this part of the basin, east of 24°E, three formations are recognised in the Adelaide Subgroup, the basal Koonap Formation, **Middleton Formation** and thick upper Balfour Formation. The latter has been divided into five members, the lower four from the base up are the Oudeberg, Daggaboersnek, Ripplemead and Elandsberg Members. The topmost member, the Palingkloof Member, is in the earliest Triassic (Smith et al., 2020).

Overlying the Beaufort Group are the three formations of the Stormberg Group. They are absent from the western part of the basin but are more uniform across the eastern part of the basin. Capping the Stormberg Group are the Drakensberg Group basalts and dykes that signalled the end of deposition in the Karoo basin. The Stormberg Group formations are the lower Molteno Formation shales, the Elliot Formation that recently has been divided into the lower and upper Elliot Formation, and the upper Clarens Formation.

Large exposures of Jurassic dolerite dykes occur throughout the area but more so in the north. These intruded through the Karoo sediments around 183 million years ago at about the same time as the Drakensberg basaltic eruption.

v. Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 6. The site for development is in the very highly sensitive Middleton Formation (red).

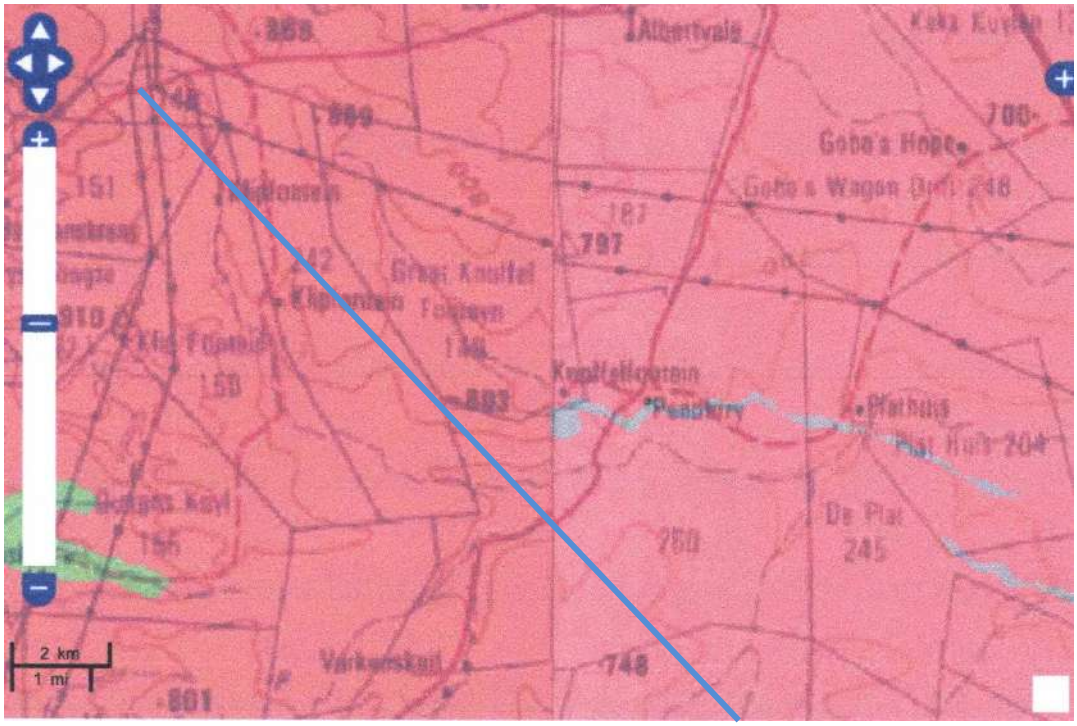


Figure 6: SAHRIS palaeosensitivity map for the site for the proposed Poseidon to Albany 132 kV OHL route with the section for Msenge WEF shown by the blue line. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

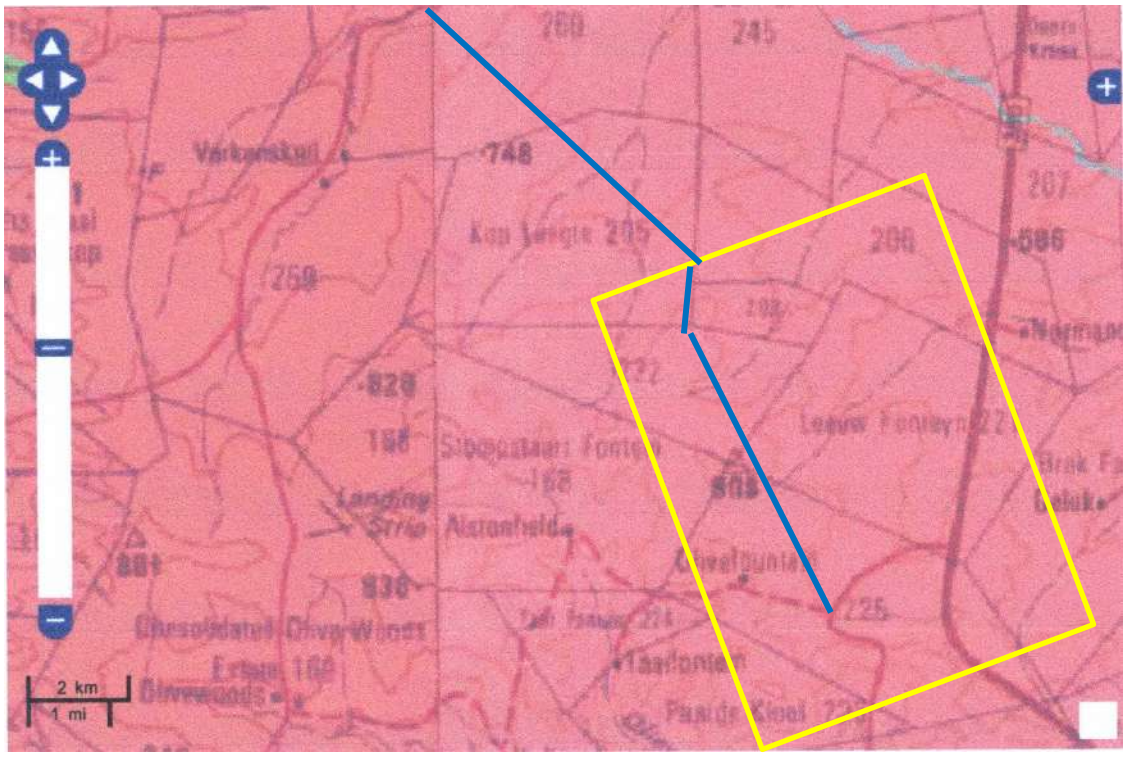


Figure 7: SAHRIS palaeosensitivity map for the Msenge WEF shown in the yellow rectangle. Blue line is the proposed 132 kV OHL. Colours as above.

The Late Permian Middleton Formation preserves only a small selection of fossil plants of the *Glossopteris* flora but a variety of vertebrate fossils have been found in the Karoo exposures. These include Pisces, Amphibia, Pararеptilia, Pararеptilia, Eureptila, Biarmosuchia, Anomodontia, Gorgonopsia and Therocephalia (see list of genera in Appendix A). Based on these fossils at other exposures in the Karoo, the upper Middleton Formation preserves the *Cistecephalus* Assemblage Zone (Rubidge et al., 1995; Smith et al., 2020). A site visit or Phase 2 Palaeontological Impact Assessment is therefore required.

vi. Site visit observations

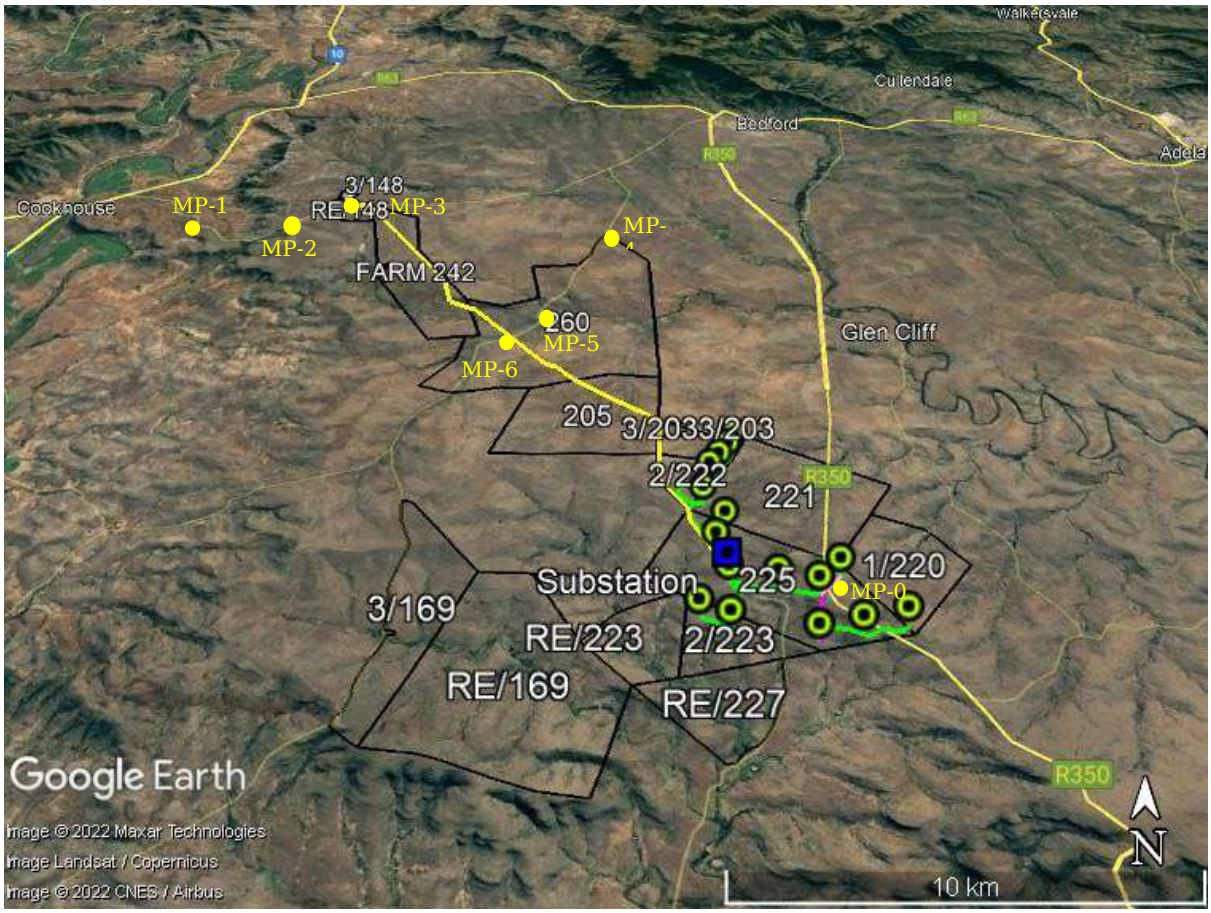


Figure 8: Annotated Google Earth map for the site stops and observations (refer to Table 3).

The area was visited by palaeontologist Marion Bamford and student assistant Roxane Matias on 27-28 April 2022. The main site stops/GPS points, photographs and observations are provided in Figure 7 and Table

3. It should be note that access to the farms was prohibited because they are hunting farms and too dangerous to visit during the hunting season – current. From the public roads the higher ridges were viewed, as well as the exposed rock in the road cuttings. The latter were ideal for determining the richness (or not) of the fossils because the area is covered in soils and thin to thick vegetation.

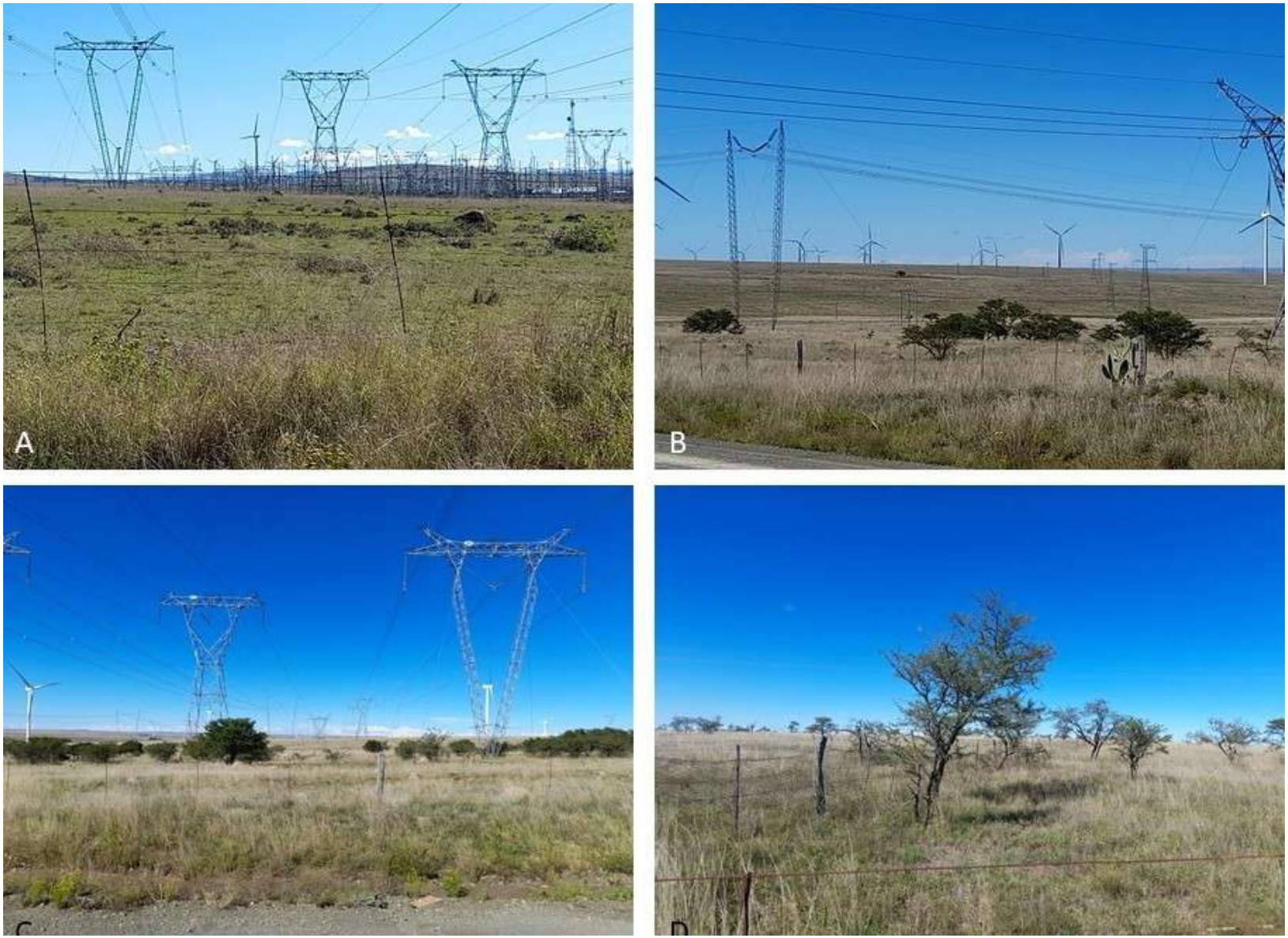
Table 3: Site observations, GPS points and relevant figures

GPS	Observations	Figures
MP-1 32° 58’ 58.95”S 25° 52’ 37.98”E	Patryshoek Road from Cookhouse to Bedford (MR00356). View from road of the existing turbines along the ridge. Medium height grassland and scattered shrubs on sandy soils. No rocky outcrops	9A-B
MP-2 32° 45’ 38.46”S 25° 54’ 24.25”E	Top of the hill with turbines in area that has been cleared of tall vegetation so clear view of the soils and lack of rocks.	9 C-D
MP-3 32° 56’ 28.70”S 26° 07’ 37.03”E	Beneath the powerlines from Poseidon Substation. There will be minor deviations from the existing powerline for the new powerline. Deep soils, no rocky outcrops and no fossils visible on the surface.	10A-C
MP-4 32° 46’ 36.26”S 26° 01’ 36.75”E	Road to Middleton from the Patryshoek Road (MR00635), border of Farm 260 with a view of the ridges to the south, en route to OHPL crossing. Open veld, short vegetation. No rocky outcrops and no fossils visible on the surface.	10D, 11A
MP-5 32° 48’ 40.65”S 26° 00’ 30.09”E	Middleton River cutting that exposes the sandstones and thin bands of mudstones of the Middleton Formation. No fossils and no signs of biotic activity in the rocks.	11B-D,
MP-6 32° 49’ 12.82”S 25° 59’ 55.90”E	Powerline crosses over the road here towards Poseidon Substation. Private property of Amakulu WEF on the east side. Borrow pit on the west side shows the coarse sandstone and calcrete capping of the exposed strata (probably recent). No laminated strata visible and no fossils.	12 A-D
MP-0 32° 55” 25.22”S 26° 05’	R350 from Bedford to Grahamstown, just north of the wide bend in the road, on Farm 225. Ridge has short vegetation, no rocky outcrops or surface fossils visible.	13 A-D

35.52”E	This section overlaps with the Iziduli WEF.	


A


B


A
B
C
D


A
B
C
D


A
B


A
B
C
D

vii. Impact assessment

An assessment of the potential impacts to possible palaeontological resources considers the criteria encapsulated in Table :

Table 4a: Criteria for assessing impacts

PART A: DEFINITION AND CRITERIA		
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M +	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H +	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	**L**	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	**L**	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national
PROBABILITY (of exposure to impacts)	**H**	Definite/ Continuous
	M	Possible/ frequent
	L	Unlikely/ seldom

Table 4b: Impact Assessment

PART B: Assessment		
SEVERITY/ NATURE	**H**	-
	M	-

PART B: Assessment		
	L	Soils and sands do not preserve plant fossils; so far there are no records from the Middleton Fm of plant or animal fossils in this region so it is unlikely that fossils occur on the site. The impact would be very unlikely.
	L+	-
	M+	-
	H+	-
DURATION	**L**	-
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	**L**	Since the only possible fossils within the area would be vertebrate fossils of the Cistecephalus AZ (Middleton Fm) in the mudstones, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	**H**	**-**
	M	It is unlikely that any fossils would be found in the loose sand and soils that cover the area but they might be below ground in unweathered mudstones. Therefore, a Fossil Chance Find Protocol should be added to the eventual EMPr.
	L	

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils. The site visit and walk through confirmed that there were NO FOSSILS in the project footprint. Since there is a small chance that fossils from the *Cistecephalus* Assemblage Zone (AZ) might occur below the surface and soils and may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

viii. Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and some do

contain fossil plant, insect, invertebrate and vertebrate material. The site visit and walk through on 25 and 26 April 2022 by Bamford and Matias confirmed that there are NO FOSSILS visible on the surface and there are no visible rocky outcrops that potentially could have vertebrate fossils. A representative section of the ridges was surveyed but not the entire area because of no access, but as far as we could see, and according to the geological map and satellite imagery, there so not appear to be any anomalous areas. It is not known what lies below the soils.

ix. Recommendation

Based on the fossil record but confirmed by the site visit and walk through there are no visible rocky outcrops and NO FOSSILS on the land surface of the *Cistecephalus* Assemblage Zone (upper Middleton Formation, Adelaide Subgroup, Karoo Supergroup) even though fossils have been recorded from rocks of a similar age and type in South Africa. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the mudstones of the Middleton Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the contractor, environmental officer, or other responsible person once excavations and drilling have commenced, then they should be rescued and a palaeontologist called to assess and collect a representative sample. There is no preferred route or no-go area for the OHPL.

x. References

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xi. Chance Find Protocol

Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figures 14, 15). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.

6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site an ECPHHA or SAHRA permit must be obtained. Annual reports must be submitted to ECPHRA and SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

xii. Appendix A – Examples of fossils from the Middleton Formation (Beaufort Group).

Figure 14: Photograph of partially exposed bones in the rock, mudstone of the Beaufort Group.

Figure 15: Photographs of fossil plants of the Beaufort Group.

Table 5: Lists of plants and vertebrates from the *Cistecephalus* AZ (compiled from Anderson and Anderson, 1985; Rubidge et al., 1995; Smith et al., 2020).

Group/sG/Fm	Plant Group	*Genera*	Animal Group	Common Genera
Beaufort, middle Teekloof, lower Balfour Fms Cistecephalus AZ	Sphenophytes	*Schizoneura Phyllotheca*	Pisces	*Namaichthys, Atherstonia,*
	Lycopods	*Paracalamites*	Amphibia	*Rhinesuchus, Laccosaurus*
	Ferns	*Asterotheca*	Parareptilia	*Pareiasaurus, Owenettia, Milleretta, Sauroichtus*
	Glossopterids	*Glossopteris, Plumsteadia, Lidgettonia Estcourtia*	Parareptilia	*Pareiasaurus, Owenettia, Milleretta, Sauroichtus*
			Eureptila	*Youngina,*
			Biarmosuchia	*Rubidgina, Lycaenodon, Lemurosaurus,*
			Anomodontia	*Emydops, Pristerodon,*

				Diictodon, Dicynodontoides, Oudeondon, Aulacephalodon, Dianomodon, Dicynodon, Daptocephalus, Cistecephalus
			Gorgonopsia	Gorgonops, Lycaenops Cynosaurus, Rubidgea Smilesaurus, Lontosaurus, Scylacosaurus, Aelurognathus
			Therocephalia	Hofmeyeria, Ictidosuchoides, Euchambersia

xiii. Appendix B – Details of specialists

Marion Bamford (PhD)

Short CV for PIAs – Jan 2022

I) **Personal details**

Present employment : Professor; Director of the Evolutionary Studies Institute.

Member Management Committee of the NRF/DST Centre of Excellence Palaeosciences, University of the Witwatersrand, Johannesburg, South Africa

Telephone : +27 11 717 6690
Fax : +27 11 717 6694
Cell : 082 555 6937
E-mail : marion.bamford@wits.ac.za ; marionbamford12@gmail.com

ii) **Academic qualifications**

Tertiary Education: All at the University of the Witwatersrand:
1980-1982: BSc, majors in Botany and Microbiology. Graduated April 1983.
1983: BSc Honours, Botany and Palaeobotany. Graduated April 1984.
1984-1986: MSc in Palaeobotany. Graduated with Distinction, November 1986.
1986-1989: PhD in Palaeobotany. Graduated in June 1990.

iii) **Professional qualifications**
Wood Anatomy Training (overseas as nothing was available in South Africa):
1994 - Service d'Anatomie des Bois, Musée Royal de l'Afrique Centrale, Tervuren, Belgium, by Roger Dechamps
1997 - Université Pierre et Marie Curie, Paris, France, by Dr Jean-Claude Koeniguer
1997 - Université Claude Bernard, Lyon, France by Prof Georges Barale, Dr Jean-Pierre Gros, and Dr Marc Philippe

iv) **Membership of professional bodies/associations**
Palaeontological Society of Southern Africa
Royal Society of Southern Africa - Fellow: 2006 onwards
Academy of Sciences of South Africa - Member: Oct 2014 onwards
International Association of Wood Anatomists - First enrolled: January 1991
International Organization of Palaeobotany – 1993+
Botanical Society of South Africa
South African Committee on Stratigraphy – Biostratigraphy - 1997 - 2016
SASQUA (South African Society for Quaternary Research) – 1997+
PAGES - 2008 –onwards: South African representative
ROCEEH / WAVE – 2008+
INQUA – PALCOMM – 2011+onwards

vii) **Supervision of Higher Degrees**
All at Wits University

Degree	Graduated/ completed	Current
Honours	11	0
Masters	14	1
PhD	11	6
Postdoctoral fellows	12	2

viii) **Undergraduate teaching**
Geology II – Palaeobotany GEOL2008 – average 65 students per year
Biology III – Palaeobotany APES3029 – average 25 students per year
Honours – Evolution of Terrestrial Ecosystems; African Plio-Pleistocene Palaeoecology; Micropalaeontology – average 12 - 20 students per year.

ix) **Editing and reviewing**
Editor: Palaeontologia africana: 2003 to 2013; 2014 – Assistant editor
Guest Editor: Quaternary International: 2005 volume
Member of Board of Review: Review of Palaeobotany and Palynology: 2010 –
Associate Editor: Cretaceous Research: 2018-2020
Associate Editor: Royal Society Open: 2021 -
Review of manuscripts for ISI-listed journals: 25 local and international journals

x) **Palaeontological Impact Assessments**

Selected from recent project only – list not complete:

- Mala Mala 2017 for Henwood
- Modimolle 2017 for Green Vision
- Klipoortjie and Finaalspan 2017 for Delta BEC
- Ledjadja borrow pits 2018 for Digby Wells
- Lungile poultry farm 2018 for CTS
- Olienhout Dam 2018 for JP Celliers
- Isondlo and Kwasobabili 2018 for GCS
- Kanakies Gypsum 2018 for Cabanga
- Nababeep Copper mine 2018
- Glencore-Mbali pipeline 2018 for Digby Wells
- Remhoogte PR 2019 for A&HAS
- Bospoort Agriculture 2019 for Kudzala
- Overlooked Quarry 2019 for Cabanga
- Richards Bay Powerline 2019 for NGT
- Eilandia dam 2019 for ACO
- Eastlands Residential 2019 for HCAC
- Fairview MR 2019 for Cabanga
- Graspan project 2019 for HCAC
- Lieliefontein N&D 2019 for Enviropro
- Skeerpoort Farm Mast 2020 for HCAC
- Vulindlela Eco village 2020 for 1World
- KwaZamakhule Township 2020 for Kudzala
- Sunset Copper 2020 for Digby Wells
- McCarthy-Salene 2020 for Prescali
- VLNR Lodge 2020 for HCAC
- Madadeni mixed use 2020 for Enviropro
- Frankfort-Windfield Eskom Powerline 2020 for 1World
- Beaufort West PV Facility 2021 for ACO Associates
- Copper Sunset MR 2021 for Digby Wells
- Sannaspos PV facility 2021 for CTS Heritage
- Smithfield-Rouxville-Zastron PL 2021 for TheroServe
- Glosam Mine 2021 for AHSA

Xi) **Research Output**

Publications by M K Bamford up to January 2022 peer-reviewed journals or scholarly books: over 160 articles published; 5 submitted/in press; 10 book chapters.

Scopus h-index = 30; Google Scholar h-index = 36; -i10-index = 95

Conferences: numerous presentations at local and international conferences.

APPENDIX 3: Chance Fossil Finds Procedure

CTS HERITAGE

CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL

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

Introduction

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

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

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

Training

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

Actions to be taken

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

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

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

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

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

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

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

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APPENDIX 4: Heritage Screening Assessment

CTS HERITAGE

HERITAGE SCREENER

CTS Reference Number:	**CTS22_050**
SAHRIS Reference:	
Client:	**Nala Environmental Consulting Firm**
Date:	**May 2022**
Title:	**HERITAGE SCREENING ASSESSMENT FOR THE PROPOSED 66KV OHL FOR THE AUTHORISED MSENGE EMOYENI WIND ENERGY FACILITY, EASTERN CAPE**

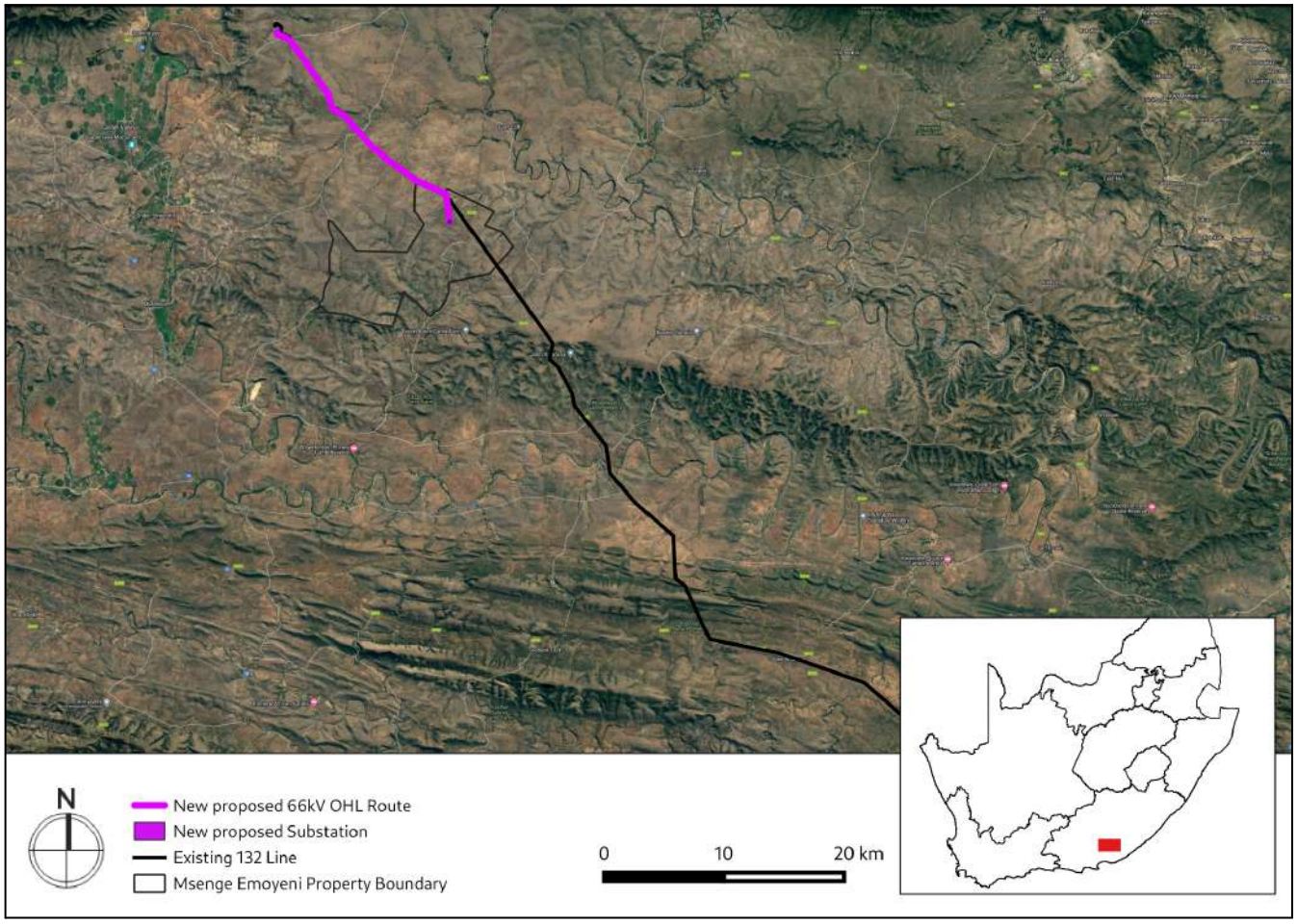

Figure 1a. Satellite map indicating the location of the proposed development in the Eastern Cape

RECOMMENDATION

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.**

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Tel: +27 (0)87 073 5739 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

CTS HERITAGE

1. Proposed Development Summary

Msenge Emoyeni Wind Farm (Pty) Ltd is proposing the deviation of the authorised overhead powerline for the authorised Msenge Emoyeni Wind Energy Facility ("Msenge Emoyeni WEF") from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon Main Transmission Substation (MTS), (DFFE Ref: 12/12/20/1754/2). The authorised Msenge Emoyeni WEF is located approximately 20km south of the town of Bedford in the Eastern Cape Province. The grid connection infrastructure related to the authorised WEF is located within the Cookhouse Renewable Energy Development Zone ("REDZ") and Eastern Power Corridor.

The project has been selected as a preferred bidder via private offtake. Following liaison with Eskom it was determined that in order to provide suitable setbacks to the existing Amakhala and Nojoli WEFs' turbines and to follow the existing Albany-Poseidon 132kV powerline as closely as possible, while reducing/optimizing crossing points, and as a result the authorised 132kV powerline routing has deviated from the authorised routing which falls outside of the previously assessed and authorised 20-30m wide servitude.

A 66kV powerline route with a corridor of approximately 300m (150m on either side of the centre line) is proposed to evacuate power from the authorised Msenge Emoyeni WEF, informed by the most feasible grid connection point into the national grid by providing suitable setbacks to the operational Amakhala and Nojoli wind farms' turbines and to follow the existing Albany-Poseidon 132kV powerline as closely as possible, while reducing/optimizing crossing points. The assessment of the 300m grid connection corridor also provides an opportunity for the consolidation of linear electrical infrastructure within the area, inclusive of the impacts that are bundled together at this location, this can be seen as an advantage to the development of the grid connection infrastructure from a social and environmental impact perspective.

A Basic Assessment ("BA") process is to be undertaken to assess and permit the powerline deviation, on-site substation and associated access tracks and water crossings after considering all the above-mentioned factors. The infrastructure and key components considered as part of this Basic Assessment process includes:

- 66kV overhead single circuit powerline approximately 22,7km long in a 300m wide assessment corridor (150m on either side), from the authorised Msenge Emoyeni WEF onsite substation to the Poseidon MTS.
- Access tracks of up to 7m in width following the powerline route from the authorised Msenge Emoyeni WEF onsite substation to the Poseidon MTS to enable construction and maintenance activities.
- Water course crossings along the powerline route from the authorised Msenge Emoyeni WEF onsite substation to the Poseidon MTS.
- 33kV/132kV on-site substation with a footprint occupying an area of 250m x 200m, within a 300m radius to allow movement where possible.

2. Application References

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

CTS HERITAGE

3. Property Information

Latitude / Longitude	32°53'12.20"S 26° 4'44.69"E
Erf number / Farm number	Remainder of Farm 221 No.221 Portion 1 of Farm Normandale No. 206 Portion 3 of Farm Plat House No. 203 Remaining Extent of Farm Kop Leegte No. 205 Remainder of Farm 260 No. 260 Remainder of Farm 242 No. 242 Remainder of Farm 148 No. 148 Portion 3 of Farm 148 No. 148 Portion 5 of the Farm Van Wyks Kraal No.73
Local Municipality	Blue Crane Route
District Municipality	Cacadu
Province	Eastern Cape
Current Use	Agriculture
Current Zoning	Agriculture

4. Nature of the Proposed Development

Total Area	23km x 300m assessment corridor for the PL
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

x	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-
	a) exceeding 5 000m^2 in extent
	b) involving three or more existing erven or subdivisions thereof
	c) involving three or more erven or divisions thereof which have been consolidated within the past five years
	4. Rezoning of a site exceeding 10 000m^2
	5. Other (state):

6. Additional Infrastructure Required for this Development

- Access tracks of up to 7m in width following the powerline route from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon MTS to enable construction and maintenance activities.
- Water course crossings along the powerline route from the proposed Msenge Emoyeni WEF onsite substation to the Poseidon MTS.
- 33kV/132kV on-site substation with a footprint occupying an area of 250m x 200m, within a 300m radius to allow movement where possible.

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

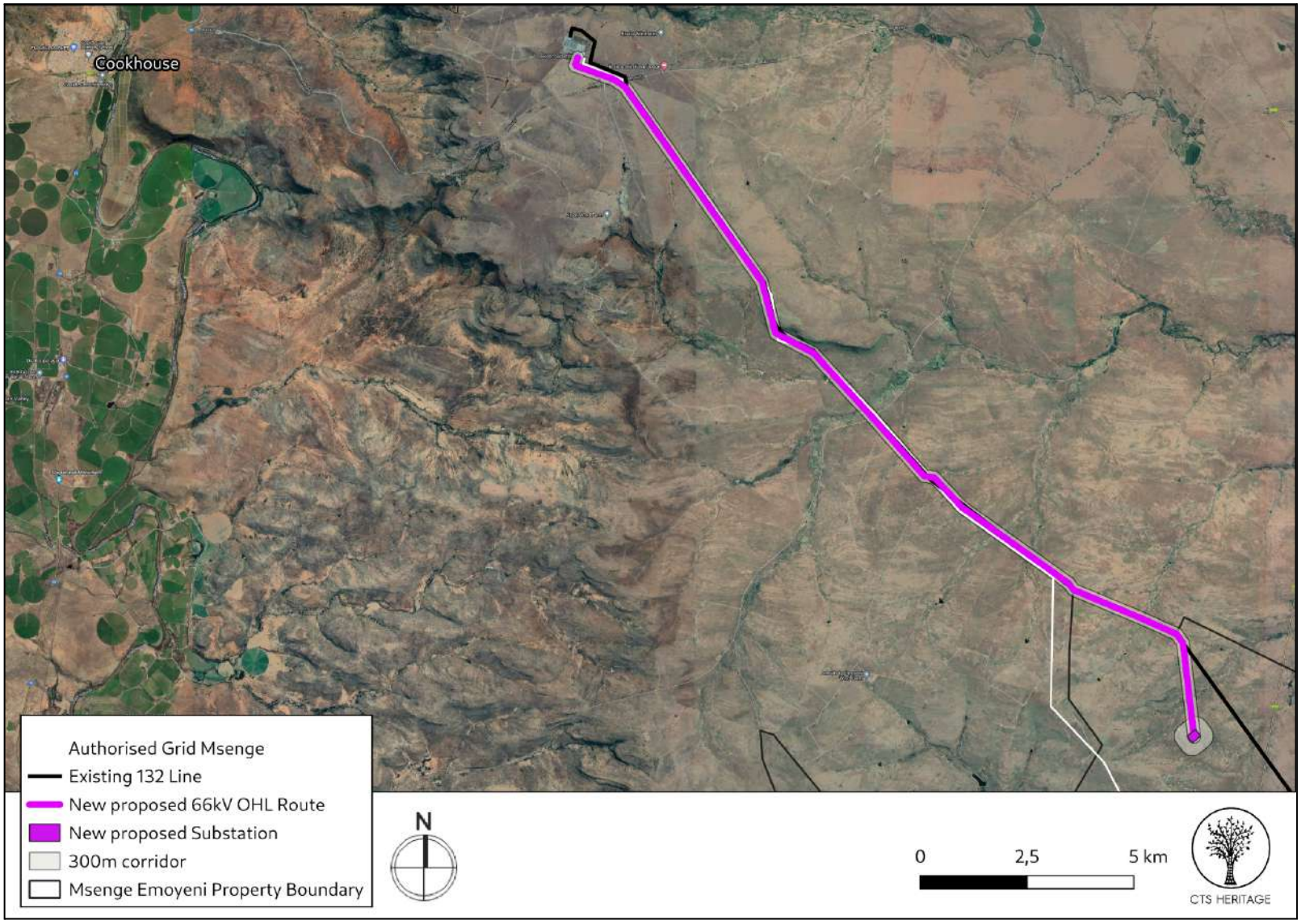

Figure 1b. Overview Map. Satellite image (2020) indicating the proposed development area relative to Cookhouse

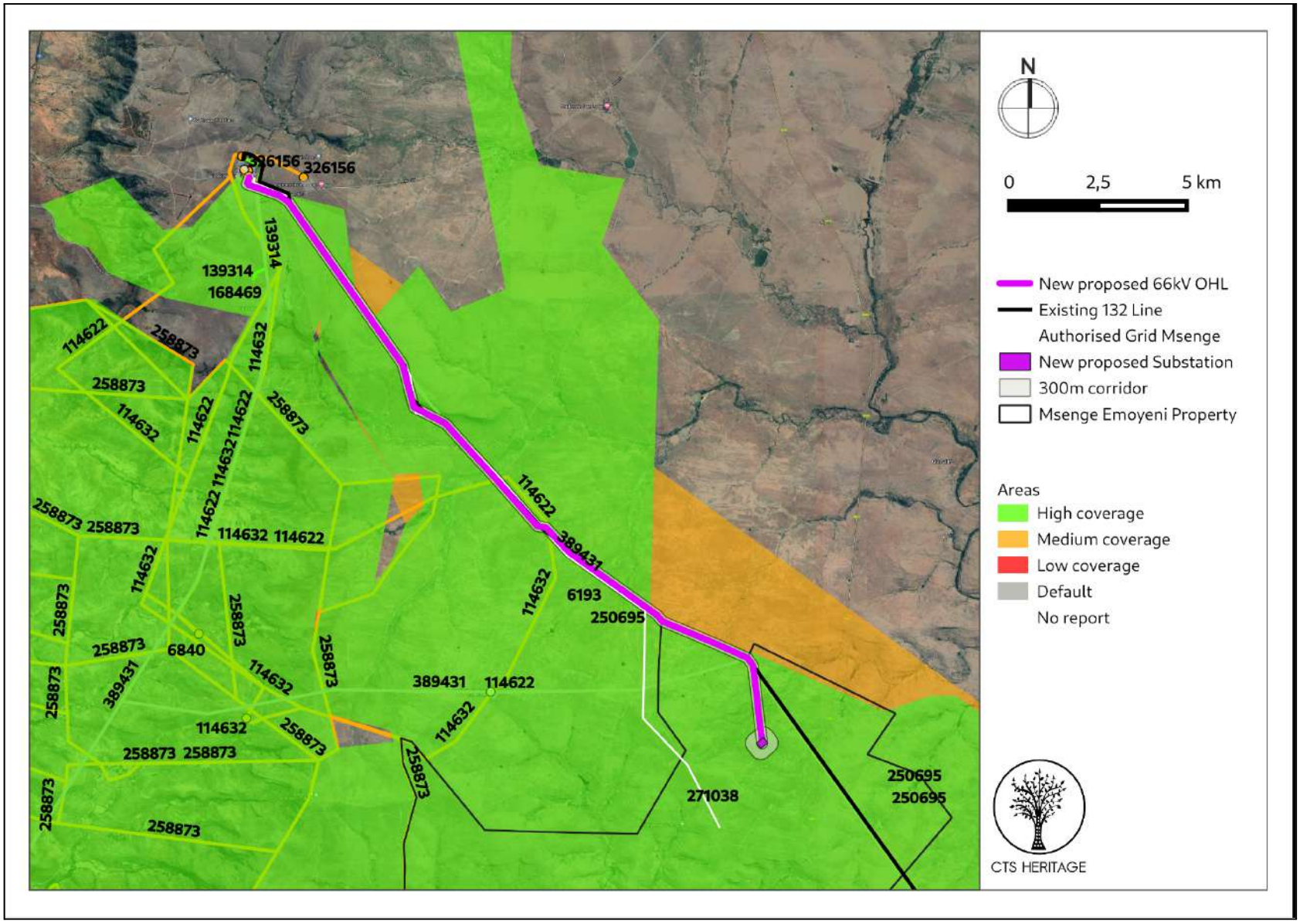

Figure 2. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.

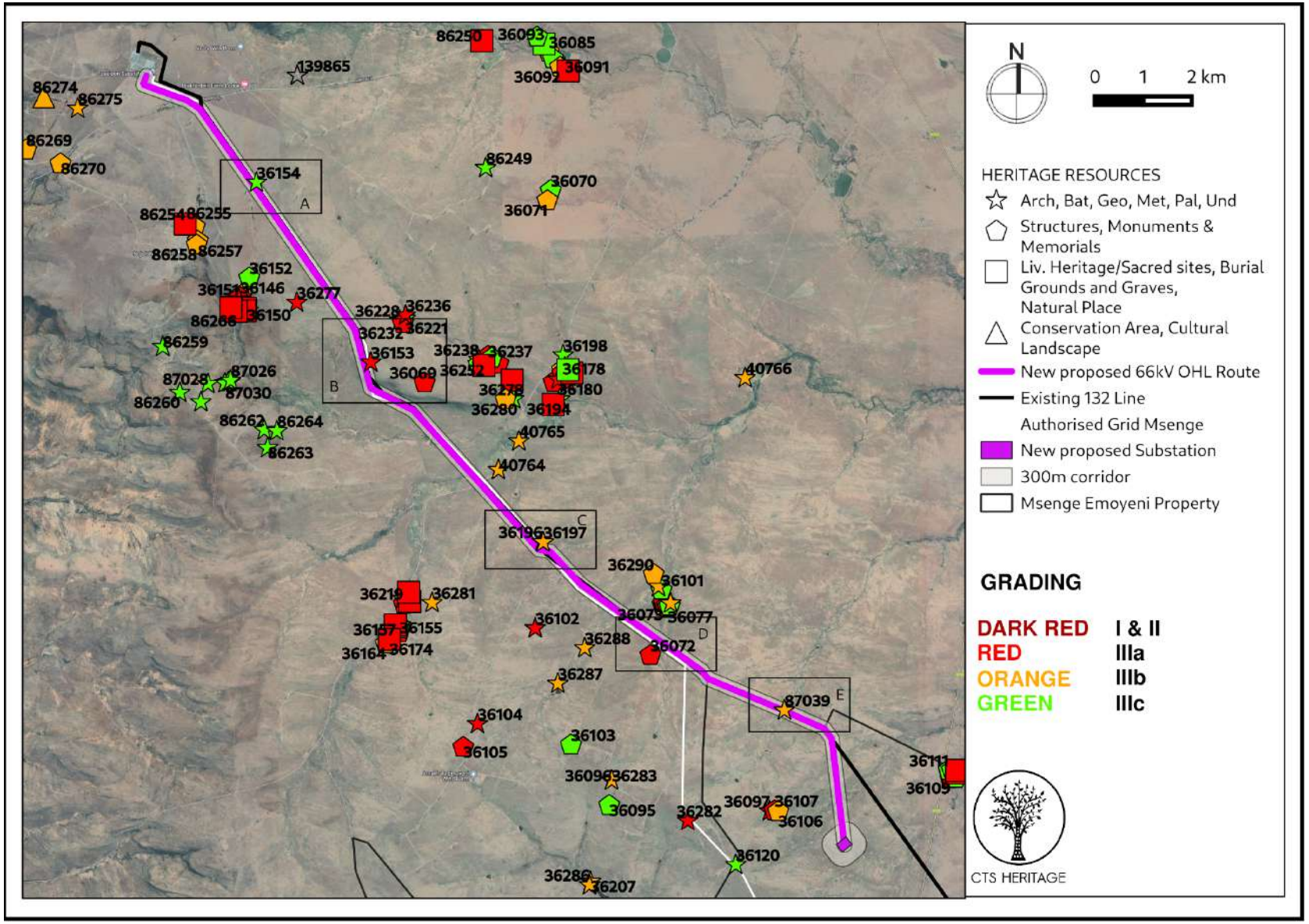

Figure 3. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for full description of heritage resource types.

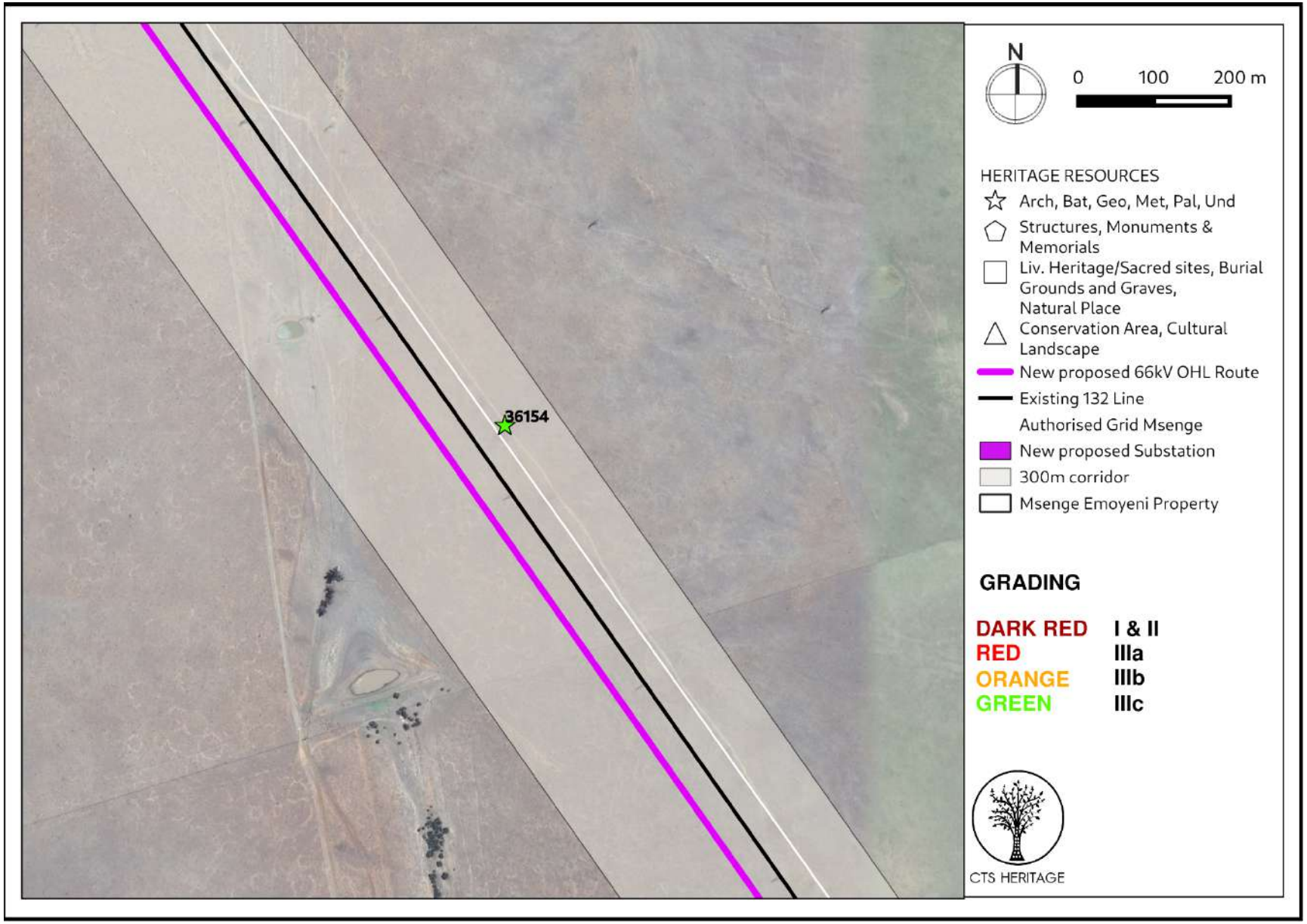

Figure 3a. Heritage Resources Map Inset A

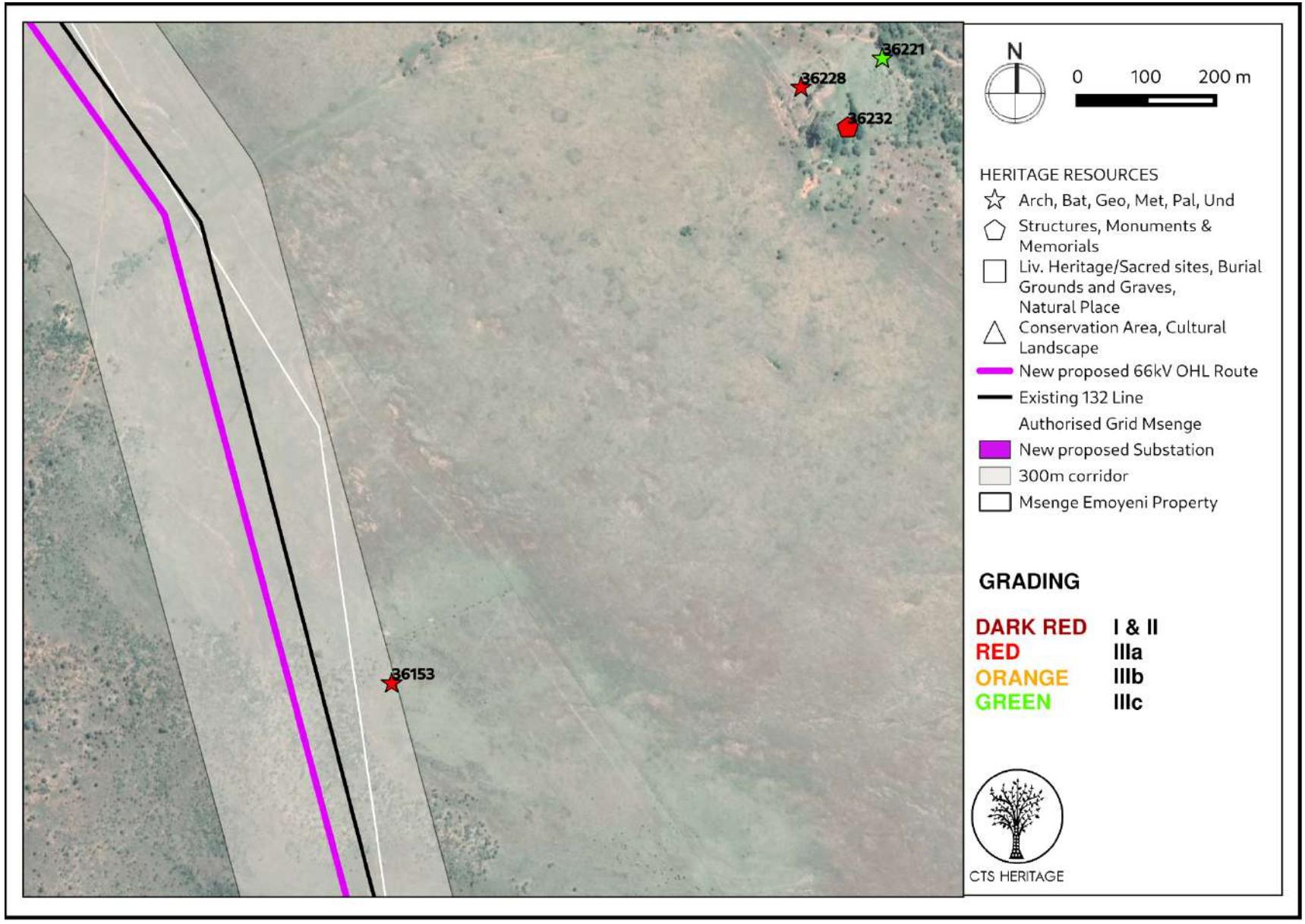

Figure 3b. Heritage Resources Map Inset B

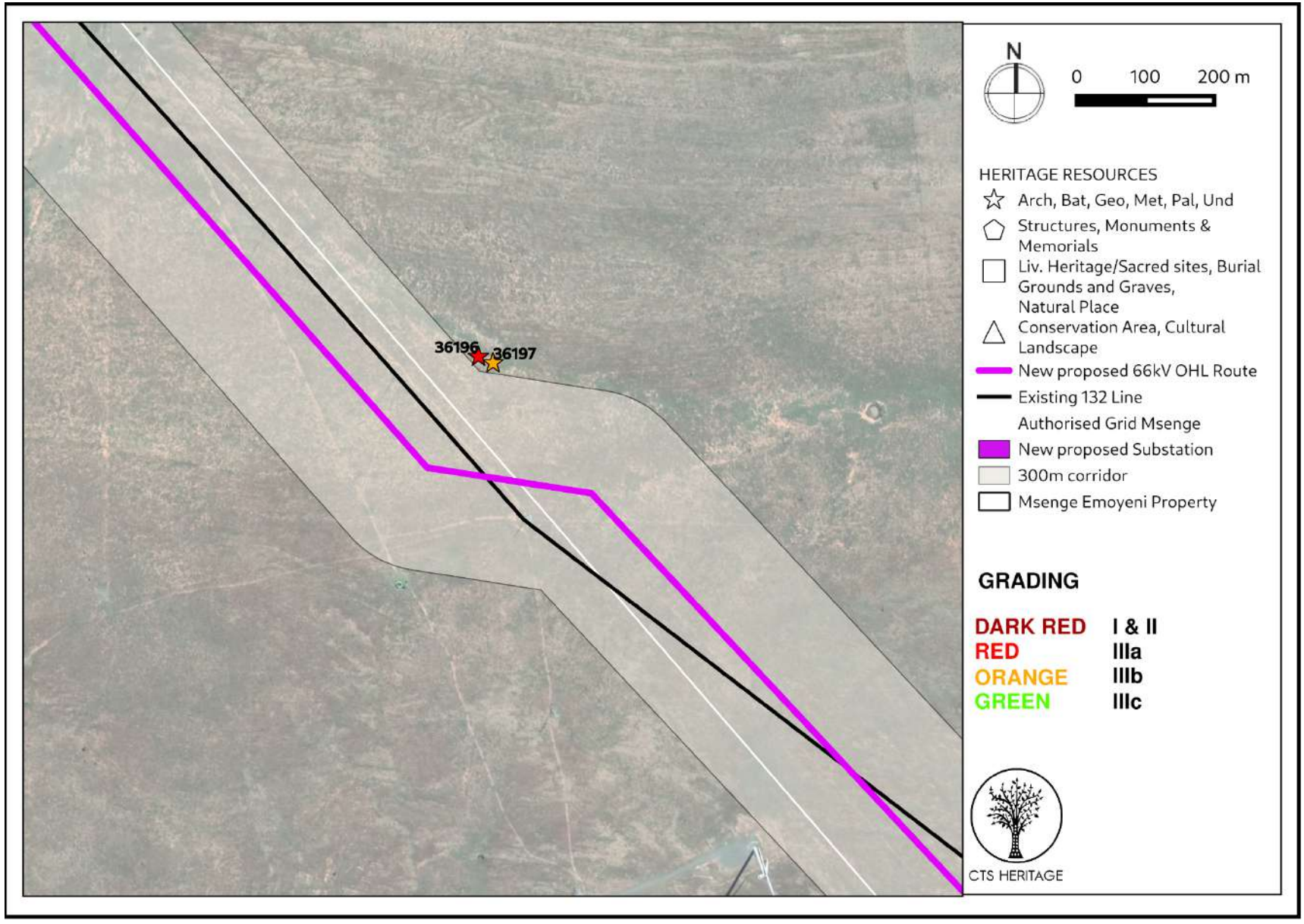

Figure 3c. Heritage Resources Map Inset C

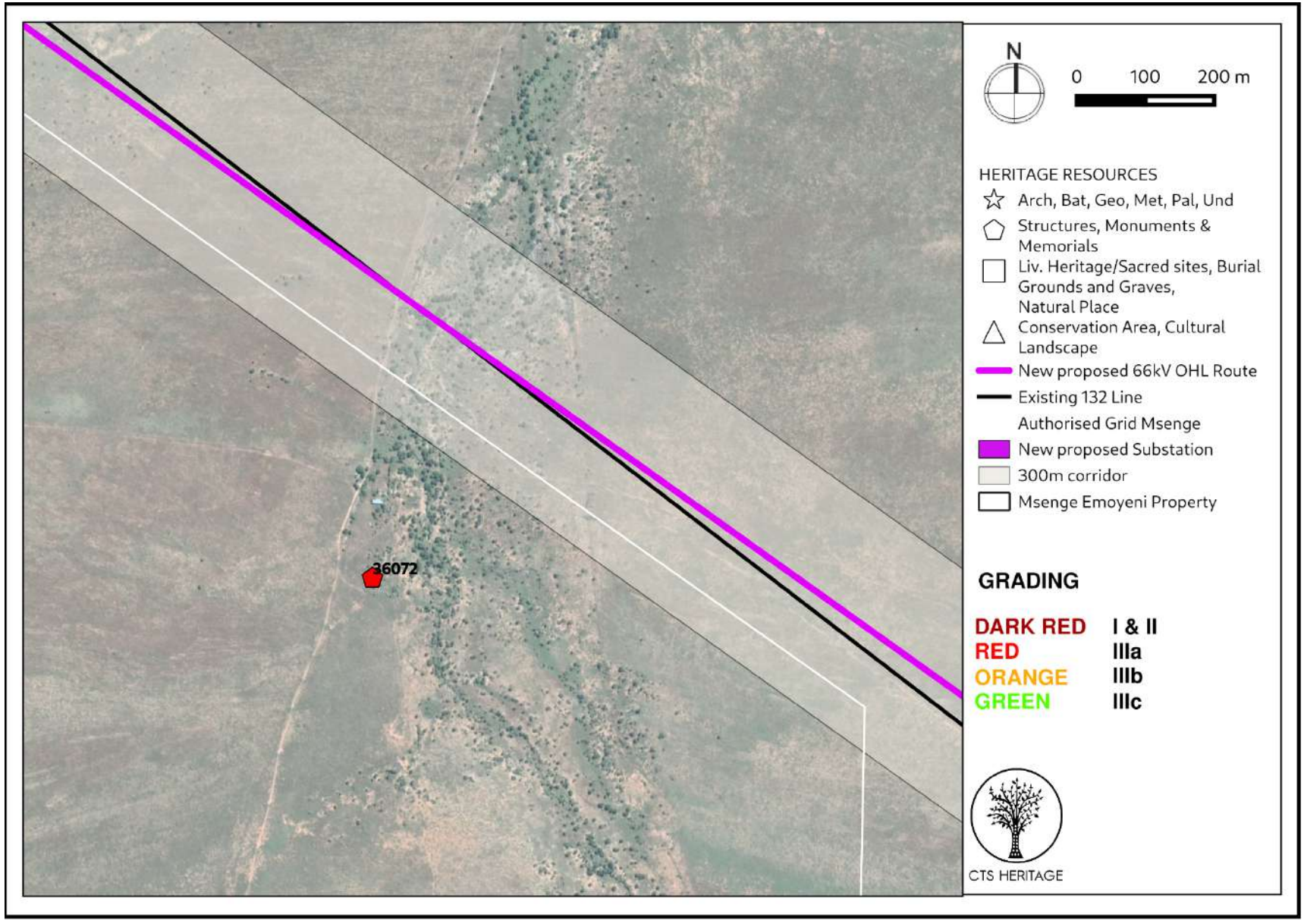

Figure 3d. Heritage Resources Map Inset D

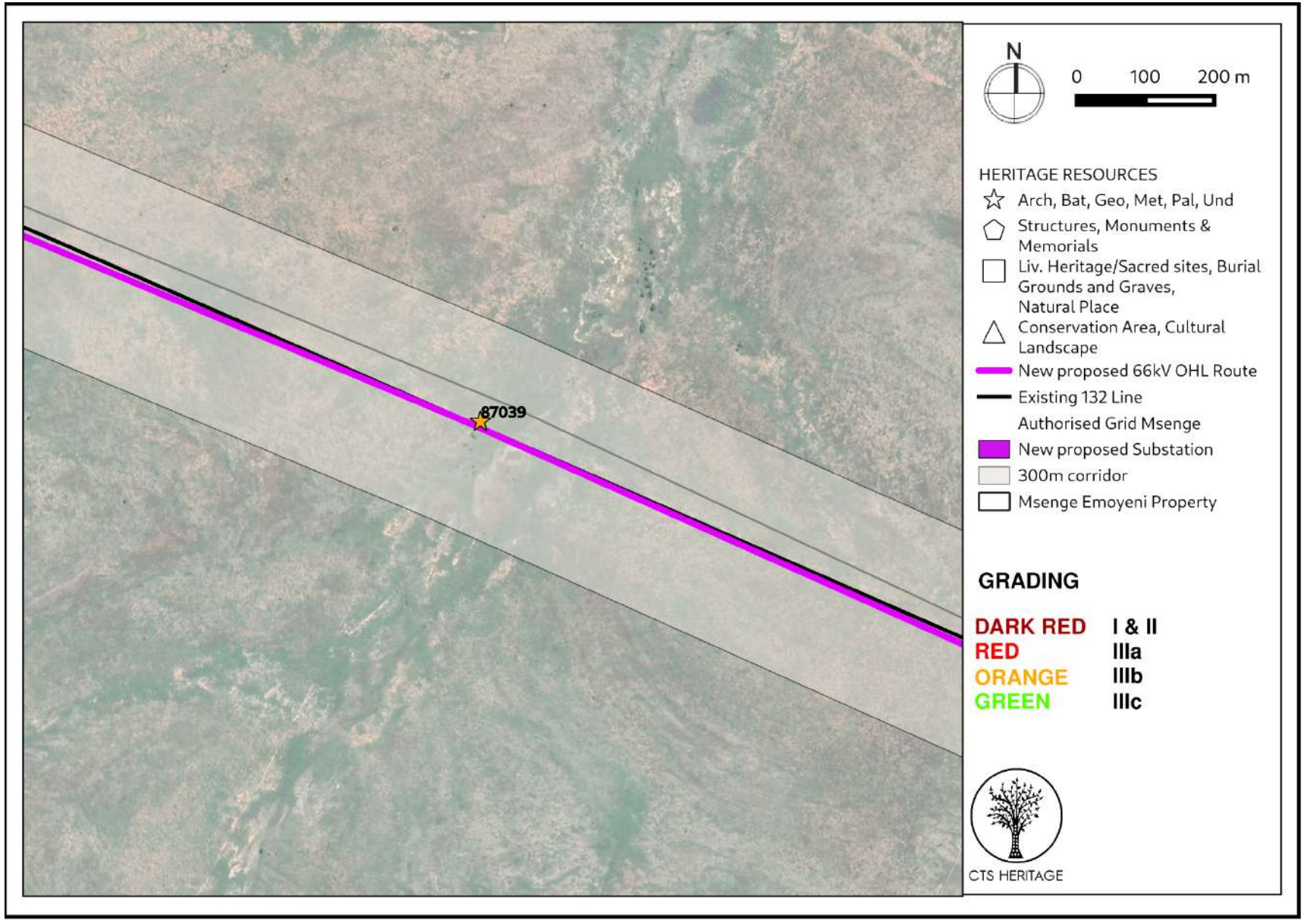

Figure 3e. Heritage Resources Map Inset E

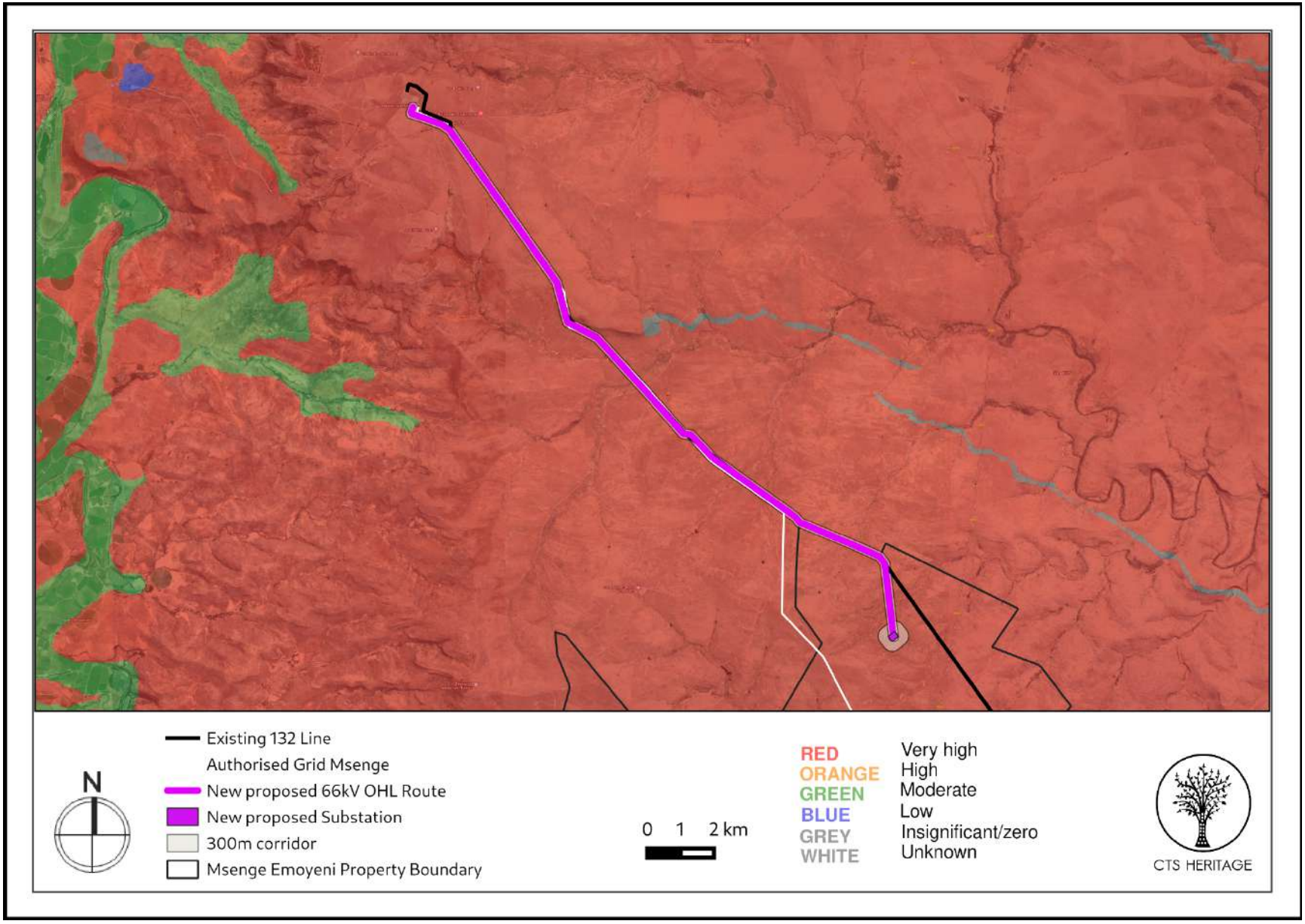

Figure 4a. Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

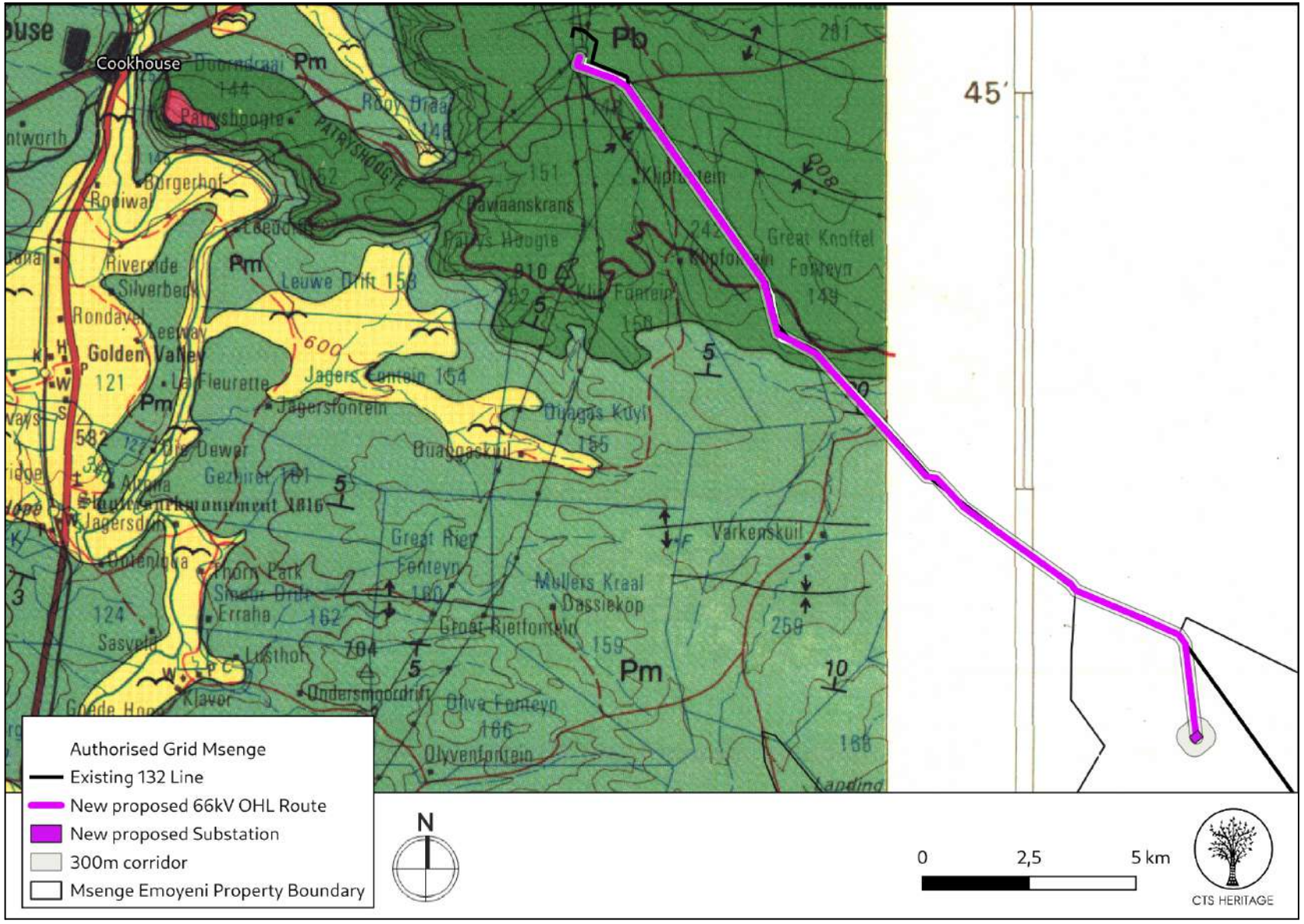

Figure 4b. Geology Map. Extract from the CGS 3224 Graaf Reniet Map indicating that the development area is underlain by sediments of the Beaufort group, within the Middleton Formation of the Adelaide Subgroup (Pum) and Jurassic Dolerite (Jd)

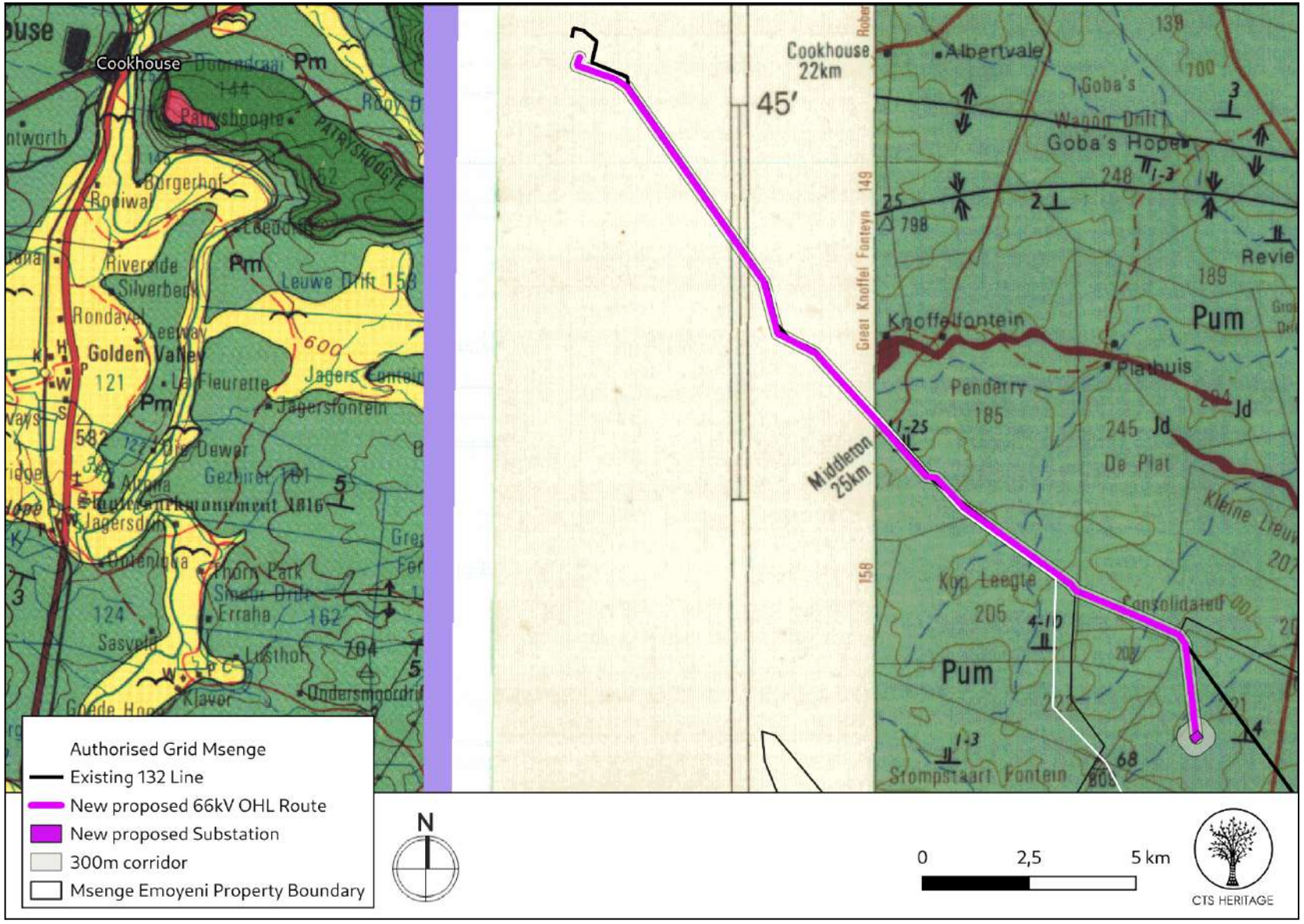

Figure 4c. Geology Map. Extract from the CGS 3226 King Williams Town Map indicating that the development area is underlain by sediments of the Beaufort group, within the Middleton Formation of the Adelaide Subgroup (Pum).

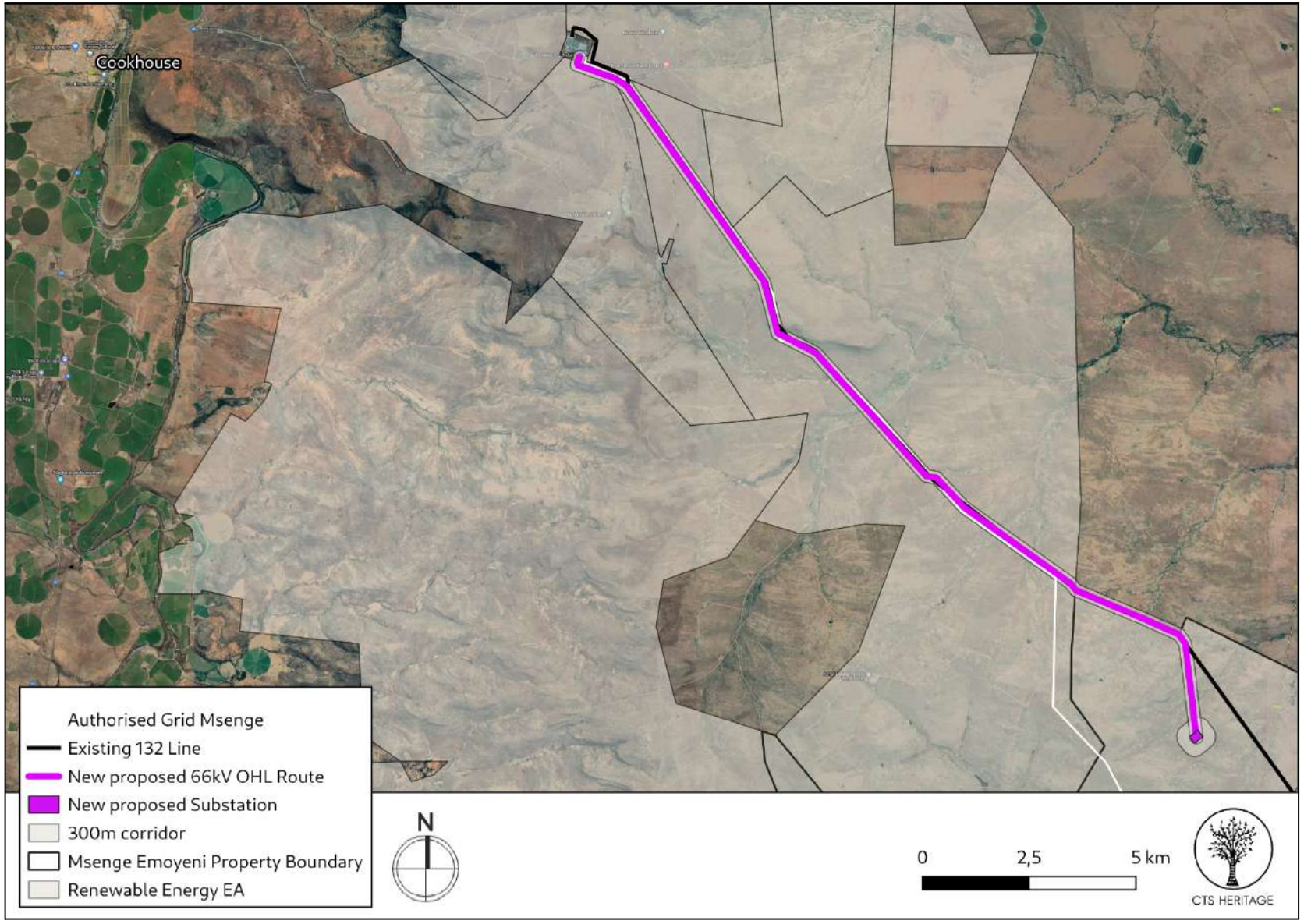

Figure 5. Cumulative Impact Map. Indicating other Renewable Energy Facilities that have been granted Environmental Authorisation (EA).

8. Heritage Assessment

Background

The authorised Msenge Emoyeni Wind Energy Facility (WEF) is located approximately 20km south of the town of Bedford in the Eastern Cape Province. The assessment aims to determine the likely impact to significant heritage resources from the proposed development of a 23km long 66kv powerline. The area proposed for development is located west of the R350 Main Road between Grahamstown and Bedford. According to Binneman (2014), the landscape comprises gentle undulating hills, lowlands and non-perennial, open valley drainage systems. The area is dominated by commercial stock farming.

Archaeology and Built Environment Heritage

The area under assessment in this application has been previously assessed by the ACO (Halkett et al.) as part of an extensive heritage assessment for a larger area proposed for the Amakhala Emoyeni WEF (2010, SAHRIS NID 8376). In addition, the area under assessment has also been surveyed by Binneman for the first phase of the Amakhala Emoyeni WEF (2012) and for the Msenge Emoyeni WEF (2014, SAHRIS NID 271038). These reports are used to provide insight into the heritage sensitivities of the area. In general, it is known that the area was likely occupied by Early, Middle and Later Stone Age people. According to Halkett et al. (2010), “Before colonisation of the Eastern Cape by the British in the early 19th century, Khoe herders formed powerful transhumant communities herding cattle and sheep throughout the coastal plain… They enjoyed dominance as far as the Great Fish River, where they shared a loose border with Xhosa farming communities to the east.” Halkett et al. (2010) go on to note that “The arrival of the “Trekboer” farmers in the mid-18th century started what has become known as the “Bushman War” which continued for almost 60 years. Eventually, the kommandos that were dispatched from regional centres prevailed and the “wild bushmen” of the Karoo were subjugated by the early 19th century.”

In their field survey, Halkett et al. (2010) identified diffuse and isolated scatters of Early and Middle Stone Age artefacts. They note that these artefacts are often located along the margins of small depressions in the bedrock where rain water has collected. Some were also located along rocky ridges and in areas where the ground has been scarred by erosion. They further note that while these findings have limited heritage significance, they do seem to have some level of spatial integrity. Halkett et al. also identified a number of Later Stone Age sites, some with pottery. These sites tend to be located closer to “rivers”, particularly in sandy areas. Additional heritage resources identified in the broader area include various historic farmhouses dated to the early and mid-19th century as well as a number of abandoned/ruinous structures and colonial period artefacts. The field survey also identified a number of “stone features consisting of loose aggregations of boulders which could represent the remains of early settlements or possibly graves”, as well as formal cemeteries and informal groupings of graves. The findings of the survey conducted by Binneman (2014) corroborate the results of the assessment by Halkett et al (2010).

All heritage resources identified in these assessments have been mapped relative to the proposed development in Figures 3, 3a to 3e. The known heritage resources that fall within or in close proximity to the 300m assessment corridor have been detailed in the table below.

SAHRIS ID	Site Name	Site Description	Grading	Mitigation/Notes	Co-Ordinates	
36153	Amakhala 048	Single core on a quartzite slab.	IIIA	Insufficient description to warrant	32° 47′ 53.412″ S	25° 58′ 28.916″ E

				recommended grading. No impact anticipated.		
36154	Amakhala 049	Set of gum trees near a dam. GPS point must be moved about 200m to the west.	IIIC	Gum trees not evident on satellite image. No impact anticipated but gums should be retained if present.	32° 45′ 52.9668″ S	25° 56′ 57.854″ E
36196	Amakhala 066	ESA scatter with variable weathering from heavily rolled to well wind-abraded. Good concentration here with nothing else around. Site located at low point (saddle) between hills.	IIIA	Located outside of 300m corridor area. No impact anticipated.	32° 49′ 53.4648″ S	26° 0′ 45.3168″ E
36197	Amakhala 067	Concentration of ESA in deflation in saddle area.	IIIB	Located outside of 300m corridor area. No impact anticipated.	32° 49′ 53.7672″ S	26° 0′ 46.134″ E
36072	Amakhala 096	Farm “werf”, 2 room house with external oven, ?1930s. 3 other structures: (1) pole high and daga with 2 stone buttresses, (2) round daga, (3) round stone. Also 1 ?grave. Artefacts all 20th C and not recorded.	IIIA	Located outside of 300m corridor area. No impact anticipated.	32° 51′ 9.3888″ S	26° 2′ 11.3964″ E
87039	Iziduli 001	This site is situated next to the service track under the power line. The age of the stone kraal is not known, but it is not as high and well constructed like the other stone walls in the area and may be not of similar age.	IIIB	A no-go 30m buffer must be implemented around this kraal to ensure that no impact takes place. The OHL can pass over the kraal if necessary.	32° 51′ 46.08″ S	26° 3′ 58.0788″ E

Palaeontology

The area proposed for development is underlain by sediments that have very high palaeontological sensitivity according to the SAHRIS Fossil Sensitivity Map (Figure 4a). The geology map of the area (Council of GeoScience Map 3226, King Williams Town, Figure 4b and Map 3224 Graaf Reinet Figure 4c) indicates that the area is underlain by sediments of the Karoo Supergroup assigned to the Beaufort group, within the Middleton Formation of the Adelaide Subgroup. According to the SAHRIS Fossil Heritage Browser which is based on Palaeotechnical Assessments completed for SAHRA, the Beaufort Group is known for “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)”. De Klerk (2010) conducted a detailed palaeontological assessment for the proposed development and concluded that “Because fossils are rare in this part of the Lower Beaufort Group sediments, it is difficult to find them, even in ideal outcrop conditions. Because of the low relief topography in a great part of the footprint area, and the consequent deeper soil profile reducing the availability of bedrock outcrop, there is a very low likelihood of finding well-preserved fossils. There is, however, a reasonably good chance that fossils may be exposed in areas that are excavated for foundations, roads or trenches.” As such, the proposed OHL development and substation are unlikely to negatively impact significant palaeontological heritage resources, however it is recommended that a Chance Fossil Finds procedure be implemented (attached).

Cumulative Impacts

The proposed OHL and substation will form part of the infrastructure required for the Msenge Emoyeni WEF and is located immediately adjacent to the approved substation associated with the Msenge Emoyeni WEF. Furthermore, the majority of the proposed OHL is located within an already approved WEF 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 OHL development and substation are therefore unlikely to result in unacceptable risk or loss, nor will the proposed development result in a complete change to the sense of place of the area or result in an unacceptable increase in impact. As the majority of the proposed OHL is located within an already approved WEF, no additional cumulative impacts are anticipated to archaeological, palaeontological or cultural landscape heritage resources.

Conclusion

The proposed development of the OHL and substation within the approved Msenge Emoyeni WEF is unlikely to negatively impact on significant heritage resources as long as the recommendations contained in Binneman (2014) and De Klerk (2010), and repeated below, are implemented. There is no heritage objection to the proposed OHL development and substation on condition that:

- A no-go 30m buffer must be implemented around Site 87039 to ensure that no impact takes place. The OHL can pass over the kraal if necessary.
- The footings of the proposed OHL are not located within any kloofs or river valleys to mitigate the likelihood of impact to significant archaeological heritage
- The attached Chance Fossils Finds Procedure is implemented for all excavation activities

RECOMMENDATION

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.

Table 2: Impact Assessment Table

NATURE: Significant archaeological, built environment and palaeontological heritage resources may be impacted by the construction phase of the proposed development								
		Archaeology without Mitigation		**Archaeology with Mitigation**		**Palaeontology without Mitigation**		**Palaeontology with Mitigation**
MAGNITUDE	**M (5)**	No significant archaeological resources were identified within the development area 300m corridor other than one stone kraal	**L (2)**	No significant archaeological resources were identified within the development area 300m corridor other than one stone kraal	**L (1)**	De Klerk (2010) conducted a detailed palaeontological assessment for the proposed Msenge Emoyeni WEF development and concluded that "Because fossils are rare in this part of the Lower Beaufort Group sediments, it is difficult to find them, even in ideal outcrop conditions. Because of the low relief topography in a great part of the footprint area, and the consequent deeper soil profile reducing the availability of bedrock outcrop, there is a very low likelihood of finding well-preserved fossils. There is, however, a reasonably good chance that fossils may be exposed in areas that are excavated for foundations, roads or trenches" This assessment similarly applies to the proposed OHL development	**L (1)**	De Klerk (2010) conducted a detailed palaeontological assessment for the proposed Msenge Emoyeni WEF development and concluded that "Because fossils are rare in this part of the Lower Beaufort Group sediments, it is difficult to find them, even in ideal outcrop conditions. Because of the low relief topography in a great part of the footprint area, and the consequent deeper soil profile reducing the availability of bedrock outcrop, there is a very low likelihood of finding well-preserved fossils. There is, however, a reasonably good chance that fossils may be exposed in areas that are excavated for foundations, roads or trenches" This assessment similarly applies to the proposed OHL development
DURATION	**H (5)**	Where manifest, the impact will be permanent.	**H (5)**	Where manifest, the impact will be permanent.	**H (5)**	Where manifest, the impact will be permanent.	**H (5)**	Where manifest, the impact will be permanent.
EXTENT	**L (1)**	Localised within the site boundary	**L (1)**	Localised within the site boundary	**L (1)**	Localised within the site boundary.	**L (1)**	Localised within the site boundary.
PROBABILITY	**M (3)**	It is extremely unlikely that any significant archaeological resources will be impacted	**L (1)**	It is extremely unlikely that any significant archaeological resources will be impacted	**L (1)**	It is possible that fossils Middleton formation would be impacted	**L (1)**	It is possible that fossils Middleton formation would be impacted
SIGNIFICANCE	**M**	(5+5+1)x3=33	**L**	(2+5+1)x1=8	**L**	(1+5+1)x1=7	**L**	(1+5+1)x1=7
STATUS		Neutral		Neutral		Neutral		Neutral
REVERSIBILITY	**L**	Any impacts to heritage resources that do occur are irreversible	**L**	Any impacts to heritage resources that do occur are irreversible	**L**	Any impacts to heritage resources that do occur are irreversible	**L**	Any impacts to heritage resources that do occur are irreversible
IRREPLACEABLE LOSS OF	**M**	Possible	**L**	Unlikely	**L**	Possible	**L**	Possible

RESOURCES?								
CAN IMPACTS BE MITIGATED		Yes				Yes		

MITIGATION:

- A no-go 30m buffer must be implemented around Site 87039 to ensure that no impact takes place. The OHL can pass over the kraal if necessary.
- The footings of the proposed OHL are not located within any kloofs or river valleys to mitigate the likelihood of impact to significant archaeological heritage
- All construction activities must be monitored by an archaeologist/heritage practitioner or alternatively a person must be specially trained, for example, the ECO to conduct the monitoring
- The attached Chance Fossils Finds Procedure is implemented for all excavation activities

RESIDUAL RISK:

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

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APPENDIX 1

List of heritage resources within proximity of the proposed development (Figure 3)

Site ID	Site no	Full Site Name	Site Type	Grading
36285	AMA203	Amakhala 203	Settlement	Grade IIIb
36106	AMA109	Amakhala 109	Structures	Grade IIIb
36117	**AMA036**	**Amakhala 036**	**Structures**	**Grade IIIb**
87039	IZI001	Iziduli 001	Stone walling	Grade IIIb
36216	AMA172	Amakhala 172	Artefacts	Grade IIIc
36220	AMA173	Amakhala 173	Structures	Grade IIIc
36226	AMA174	Amakhala 174	Artefacts	Grade IIIc
36227	AMA175	Amakhala 175	Artefacts	Grade IIIc
36229	AMA176	Amakhala 176	Structures	Grade IIIa
36230	AMA177	Amakhala 177	Structures	Grade IIIa
36234	AMA178	Amakhala 178	Structures	Grade IIIb
36241	AMA179	Amakhala 179	Structures	Grade IIIa
36242	AMA180	Amakhala 180	Artefacts	Grade IIIc
36243	AMA181	Amakhala 181	Artefacts	Grade IIIc
36244	AMA182	Amakhala 182	Artefacts	Grade IIIc
36245	AMA183	Amakhala 183	Artefacts	Grade IIIc

36246	AMA184	Amakhala 184	Artefacts	Grade IIIc
36247	AMA185	Amakhala 185	Structures	Grade IIIb
36248	AMA186	Amakhala 186	Structures	Grade IIIc
36260	AMA187	Amakhala 187	Structures	Grade IIIb
36261	AMA188	Amakhala 188	Structures	Grade IIIa
36262	AMA189	Amakhala 189	Structures	Grade IIIc
36284	**AMA202**	**Amakhala 202**	**Stone walling**	**Grade IIIa**
36097	AMA028	Amakhala 028	Stone walling	Grade IIIa
36098	AMA029	Amakhala 029	Building	Grade IIIb
36099	AMA030	Amakhala 030	Structures	Grade IIIb
36107	AMA110	Amakhala 110	Structures	Grade IIIa
36108	AMA111	Amakhala 111	Structures	Grade IIIa
36109	AMA112	Amakhala 112	Structures	Grade IIIa
36110	AMA113	Amakhala 113	Structures	Grade IIIa
36111	AMA114	Amakhala 114	Structures	Grade IIIc
36112	AMA031	Amakhala 031	Artefacts	Grade IIIc
36114	AMA033	Amakhala 033	Artefacts	Grade IIIc
36115	AMA034	Amakhala 034	Artefacts	Grade IIIc
36116	AMA035	Amakhala 035	Structures	Grade IIIb

36118	AMA037	Amakhala 037	Artefacts	Grade IIIc
36119	AMA038	Amakhala 038	Artefacts	Grade IIIc
36120	AMA039	Amakhala 039	Stone walling	Grade IIIc
36124	AMA117	Amakhala 117	Structures	Grade IIIc
36125	AMA118	Amakhala 118	Structures	Grade IIIc
36126	AMA119	Amakhala 119	Structures	Grade IIIa
36127	AMA120	Amakhala 120	Structures	Grade IIIb
36128	AMA121	Amakhala 121	Structures	Grade IIIc
36129	AMA122	Amakhala 122	Structures	Grade IIIa
36130	AMA123	Amakhala 123	Artefacts	Grade IIIc
36131	AMA124	Amakhala 124	Artefacts	Grade IIIc
36132	AMA125	Amakhala 125	Artefacts	Grade IIIc
36133	AMA126	Amakhala 126	Artefacts	Grade IIIc
36135	AMA128	Amakhala 128	Artefacts	Grade IIIc
36136	AMA129	Amakhala 129	Artefacts	Grade IIIc
36138	AMA131	Amakhala 131	Artefacts	Grade IIIc
36139	AMA132	Amakhala 132	Artefacts	Grade IIIc
36140	AMA133	Amakhala 133	Artefacts	Grade IIIc
36141	AMA134	Amakhala 134	Artefacts	Grade IIIc

36142	AMA135	Amakhala 135	Structures	Grade IIIc
40761	COOK-BED001	Cookhouse-Bedford 001	Palaeontological	Grade IIIb
36143	AMA136	Amakhala 136	Artefacts	Grade IIIc
36144	AMA137	Amakhala 137	Artefacts	Grade IIIb
36145	AMA138	Amakhala 138	Artefacts	Grade IIIb
36158	AMA139	Amakhala 139	Artefacts	Grade IIIb
36163	AMA140	Amakhala 140	Artefacts	Grade IIIc
36165	AMA142	Amakhala 142	Structures	Grade IIIc
36166	AMA143	Amakhala 143	Structures	Grade IIIa
36167	**AMA144**	**Amakhala 144**	**Artefacts**	**Grade IIIc**
36168	AMA145	Amakhala 145	Artefacts	Grade IIIc
36169	AMA146	Amakhala 146	Artefacts	Grade IIIc
36170	AMA147	Amakhala 147	Artefacts	Grade IIIc
36171	AMA148	Amakhala 148	Artefacts	Grade IIIc
36172	AMA149	Amakhala 149	Artefacts	Grade IIIc
36173	AMA150	Amakhala 150	Artefacts	Grade IIIc
36181	AMA151	Amakhala 151	Artefacts	Grade IIIc
36182	AMA152	Amakhala 152	Artefacts	Grade IIIc
36183	AMA153	Amakhala 153	Artefacts	Grade IIIc

36184	AMA154	Amakhala 154	Artefacts	Grade IIIc
36185	AMA155	Amakhala 155	Artefacts	Grade IIIc
36186	AMA156	Amakhala 156	Artefacts	Grade IIIc
36208	AMA170	Amakhala 170	Burial Grounds & Graves	Grade IIIa
36217	AMA171	Amakhala 171	Burial Grounds & Graves	Grade IIIa
36113	AMA032	Amakhala 032	Burial Grounds & Graves	Grade IIIa
36122	AMA115	Amakhala 115	Burial Grounds & Graves	Grade IIIa
36123	AMA116	Amakhala 116	Burial Grounds & Graves	Grade IIIa
36134	AMA127	Amakhala 127	Burial Grounds & Graves	Grade IIIa
36137	AMA130	Amakhala 130	Burial Grounds & Graves	Grade IIIa
36162	AMA141	Amakhala 141	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**
6193	AIA Phase 1	Dave Halkett, Lita Webley	28/03/2010	Heritage Scoping Assessment of a Proposed Wind Energy Facility to be situated on farms in the Cookhouse District, Eastern Cape.
7945	AIA Desktop	Frans Prins	05/02/2011	DRAFT Technical Report in support of the EMP for the South Western Karoo Basin Gas Exploration Application Project: CULTURAL HERITAGE: EASTERN PRECINCT
8376	**HIA Phase 1**	**Dave Halkett, Lita Webley, Jayson Orton, Hugo Pinto**	**17/10/2010**	**Heritage Impact Assessment of the proposed Amakhala-Emoyeni Wind Energy Facility, Cookhouse District, Eastern Cape**
109187	PIA Phase 1	Billy De Klerk	01/09/2010	Palaeontological Impact Assessment of a proposed wind energy facility to be situated on a site south-east of Cookhouse and south of Bedford in the Eastern Cape province. The Amakhala-Emoyeni Wind Energy Facility
109190	AIA Phase 1B	Johan Binneman	01/08/2013	An archaeological walkthrough survey of the turbine footprint for the proposed Phase 1 Amakhala Emoyeni Wind Energy Facility, Cookhouse District, Blue Crane Route Municipality, Eastern Cape Province
250695	**AIA Phase 1**	**Johan Binneman**	**31/07/2014**	**A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENTS OF THE PROPOSED SUBSTATION, SWITCHING STATION AND POWER LINE GRID CONNECTION FOR THE IZIDULI EMOYENI WIND FARM, BLUE CRANE ROUTE LOCAL MUNICIPALITY, SARAH BAARTMAN DISTRICT, EASTERN CAPE**
271038	**Archaeological Specialist Reports**	**Johan Binneman**	**24/03/2014**	**An Archaeological Walk through Survey of the proposed turbine footprint and infrastructure for the Msenge Emoyeni Wind Energy Facility, Bedford District, Blue Crane Route Municipality, Eastern Cape Province**

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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 PALAEONTOLOGICAL SENSITIVITY

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

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

DETERMINATION OF THE COVERAGE RATING ASCRIBED TO A REPORT POLYGON

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

was undertaken.

Low coverage will be used for:

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

Medium coverage will be used for

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

High coverage will be used for

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

RECOMMENDATION GUIDE

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

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

This recommendation is made when:

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

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

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

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

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

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

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.