HERITAGE IMPACT ASSESSMENT

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

Proposed Development of the Steenbok Solar 2 Project, Free State Province

Prepared by CTS Heritage

CTS HERITAGE

Jenna Lavin

For

EnviroNamics

November 2022

CTS HERITAGE

EXECUTIVE SUMMARY

1. Site Name:

Steenbok Solar 2 Facility

2. Location:

Farm Floradale No. 15

3. Locality Plan:

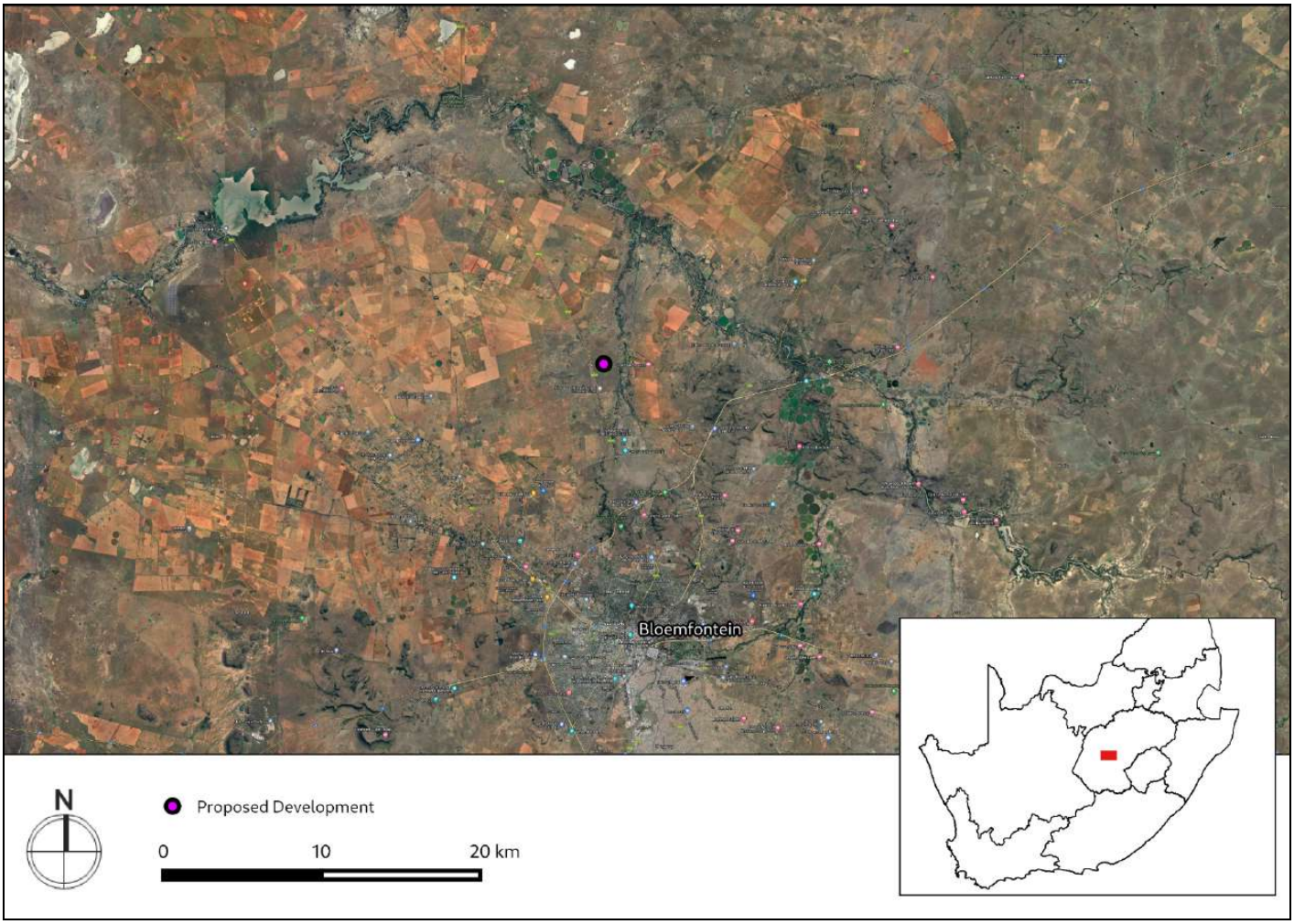

Figure A: Location of the proposed development area

4. Description of Proposed Development:

Steenbok Solar (Pty) Ltd is interested in developing a 35 MW solar PV facility and associated infrastructure on Farm 15 Floradale, approximately 17 km north of the centre of Bloemfontein in the Free State Province. The project will include a solar PV facility with standard infrastructure of a PV facility including PV arrays; cabling; inverters;

on-site substation and grid connection; battery storage; auxiliary buildings; access and internal roads; temporary laydown areas; and fencing.

To evacuate the power generated by the proposed Steenbok Solar 1 and Steenbok Solar 2, a grid connection is required in the form of an approximately 310 M length 132 kV overhead power line that will connect to an existing powerline which traverses the property.

5. Heritage Resources Identified:

No heritage resources were identified during the field assessment and the underlying geology has zero palaeontological sensitivity for impacts to significant fossils.

6. Anticipated Impacts on Heritage Resources:

The survey proceeded with two minor constraints and limitations, yet the project area was comprehensively surveyed for heritage resources, and no archaeological material remains were documented.

Should significant archaeological materials – such as well-preserved subsurface artefacts or fossils – be exposed during construction, the on-duty Environmental Control Officer should protect these (preferably in primary exposed context), and should immediately consult a professional archaeologist. In this circumstance, the South African Heritage Resources Authority should be immediately alerted so that appropriate mitigation measures by a professional archaeologist can be implemented, at the expense of the developer. In such a scenario, mitigation measures would normally involve the application for an excavation permit and the digital documentation of the occurrences with modern archaeological recording standards, as well as the collection of a reflective sample of material to be deposited in a local approved curation facility.

There are no objections on palaeontological heritage grounds and impacts to significant fossil heritage resources are unlikely.

7. Recommendations:

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

- The Final Optimised Layout as indicated in Figure 9 below is supported from a heritage perspective.
- 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

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

Since 2016, Jenna has drafted over 250 Screening and Heritage Impact Assessments throughout South Africa.

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APPENDICES

1. INTRODUCTION

1.1 Background Information on Project

Steenbok Solar (Pty) Ltd is interested in developing a 35 MW solar PV facility and associated infrastructure on Farm 15 Floradale, approximately 17 km north of the centre of Bloemfontein in the Free State Province. The project will include a solar PV facility with standard infrastructure of a PV facility including PV arrays; cabling; inverters; on-site substation and grid connection; battery storage; auxiliary buildings; access and internal roads; temporary laydown areas; and fencing.

To evacuate the power generated by the proposed Steenbok Solar 1 and Steenbok Solar 2, a grid connection is required in the form of an approximately 310 M length 132 kV overhead power line that will connect to an existing powerline which traverses the property.

1.2 Description of Property and Affected Environment

The footprint of the proposed Steenbok Solar 2 Project, and associated infrastructure, is located across 5 private agricultural camps approximately 17 km northwest of the town of Bloemfontein, in the grassland biome of the summer rainfall region of the Free State Province, South Africa. The footprint for potential development is flat, and characterised - over substantial portions - by veld that has been used primarily for grazing of various stock (mostly cattle). In several locations, the original quaternary deposits that cover much of the region west of Bloemfontein have been reworked or removed to depths in excess of ~0.5m for track and powerline construction, and for the construction of agricultural infrastructure such as boreholes and other watering facilities. Where agricultural activities have been more intense, the original quaternary deposits have also been more heavily trampled and disturbed through bioturbation where animals are watered.

Local bedrock outcrops ephemerally at several points in the far western portion of the affected area, and is comprised largely of shales and indurated siltstones that are characteristic of outcrops on the terraces of the Modder River and its tributaries. The upper sediments covering these host rocks, and the footprint itself, are primarily silts that derive from the *in situ* weathering of local parent formations and look to have been fluvially deposited across much of the area. Such fluvial activity likely relates to historical flooding of several drainages of the Modder River that are located only 200 metres to the east of the footprint. The upper sediments also appear to thicken in transect from west to east - suggestive of deposition related to local drainages - and have lithic inclusions with sub-angular edges and rounding.

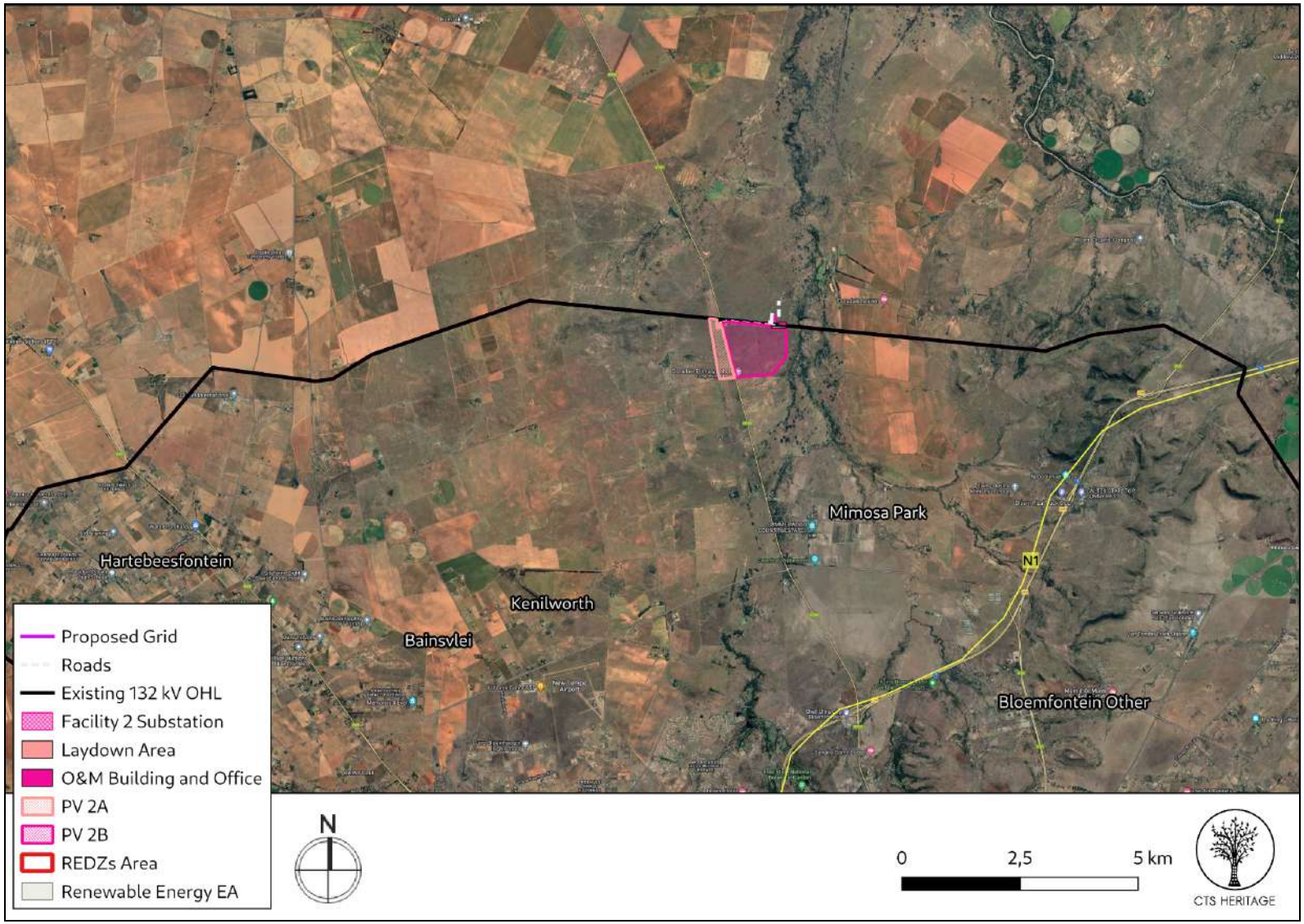

Figure 1.1: Proposed development relative to Bloemfontein

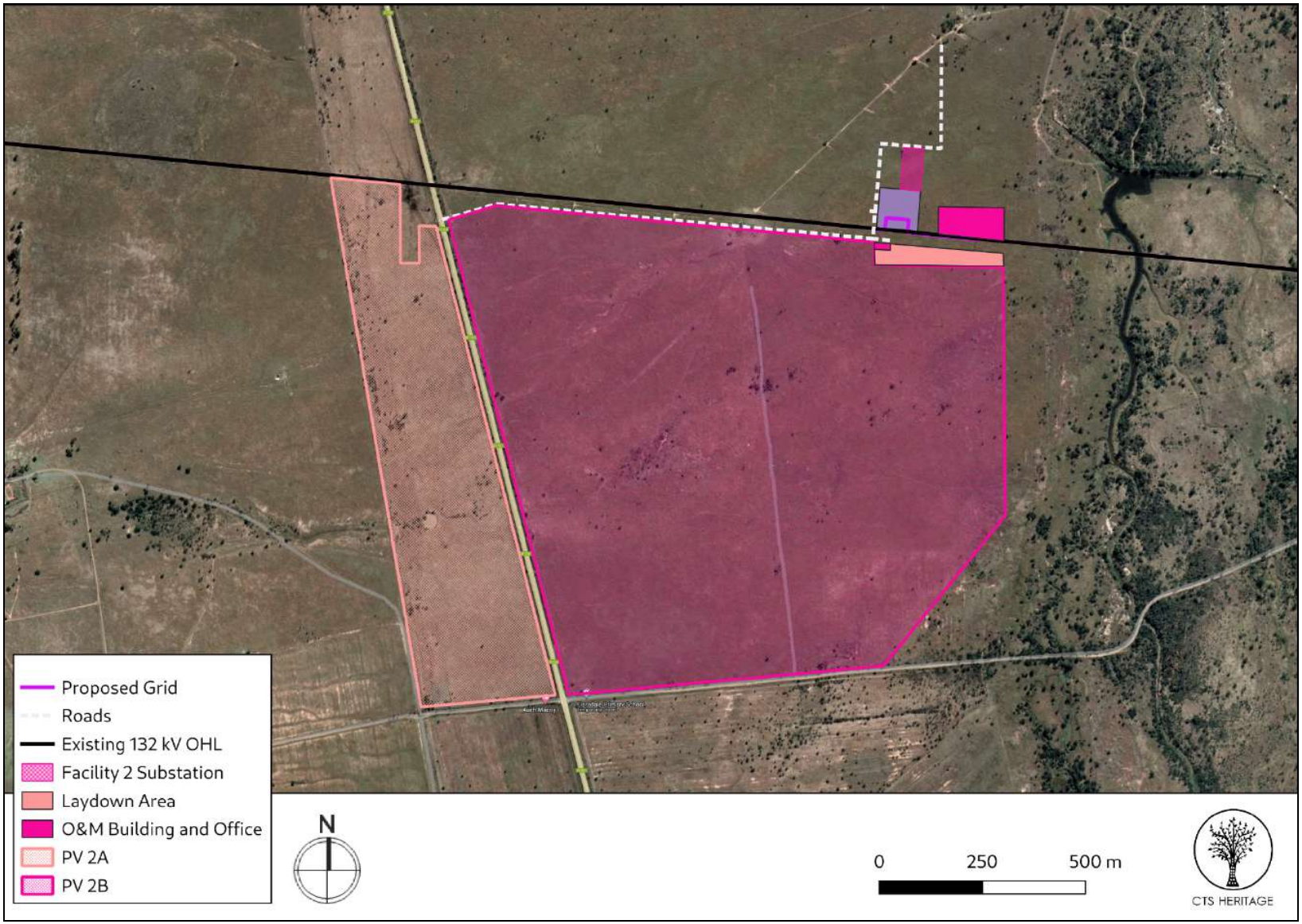

Figure 1.2: The proposed development layout

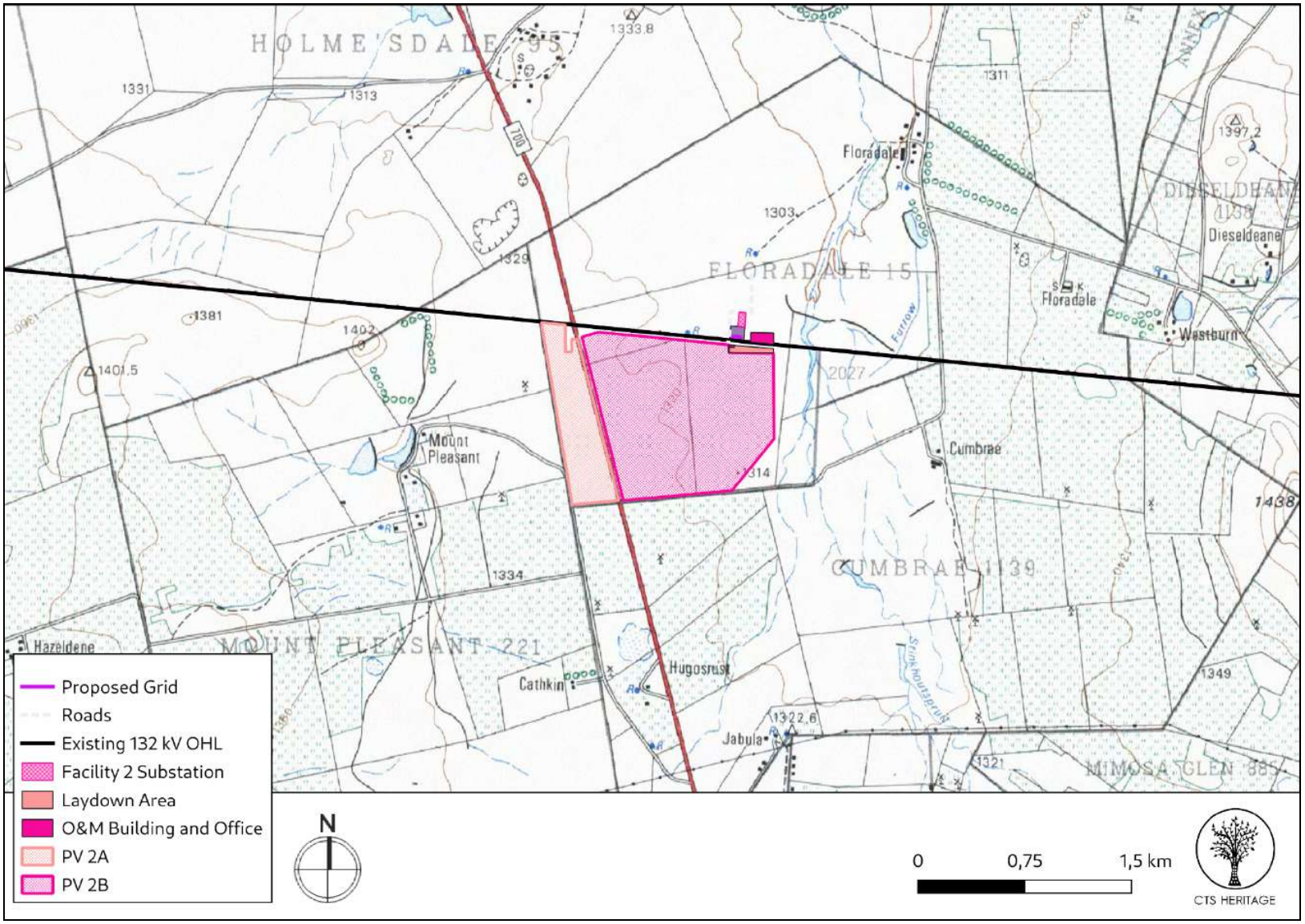

Figure 1.3: The proposed development layout on an extract of the 1:50 000 Topo Map

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 a survey of the site and its environs on 20 and 21 August 2022 to determine what archaeological resources are likely to be impacted by the proposed development.
- 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

(1) Dense grasses and occasional shrubs cover portions of the project area. This coverage inhibited the visibility of surface archaeology. However, even in the places that had optimal visibility, evidence of archaeology was extremely sparse to non-existent. It is clear that the Stone Age sensitivity and scientific potential of the project area has been comprehensively assessed.

(2) Previous vegetation clearing activities by farmers may have affected evidence of surface archaeology where tracks and power lines have been constructed (i.e. the removal of surface stone structures).

(3) Upper sediments are disturbed in the portions of the potentially affected area that have historically been used as enclosures for animals and where modern farming infrastructure has been constructed.

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

2.5 Environamics Impact Assessment Methodology

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in the Table below.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating

system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact the following criteria is used:

Table 1: The rating system

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).

4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		

1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects

SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.
The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

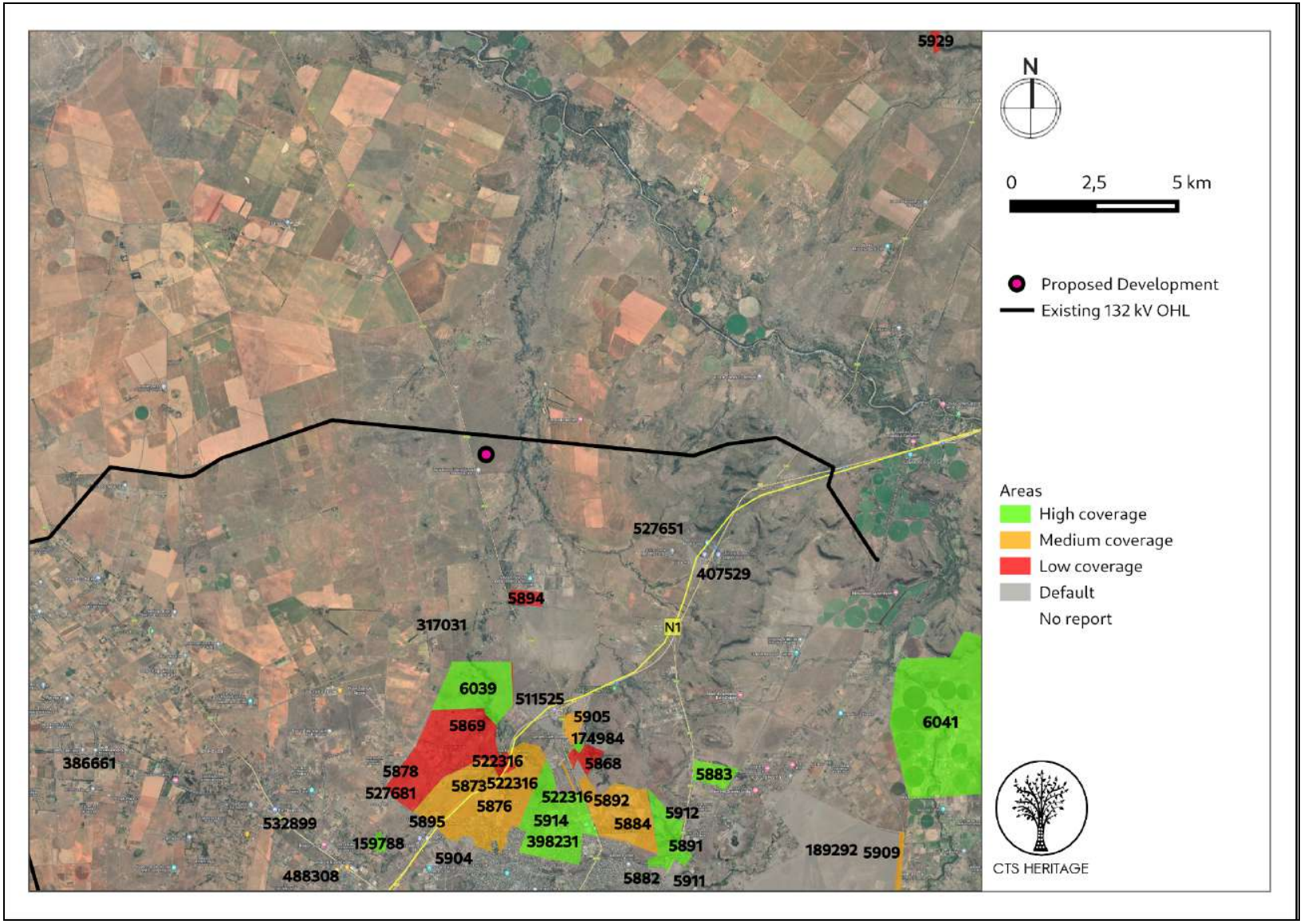

Figure 2.1: Spatialisation of heritage assessments conducted in proximity to the proposed development

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

Background:

The area proposed for development is located approximately 17km north of the centre of Bloemfontein. Prior to its establishment in 1846, the area is said to have been the location of an !Orana settlement and subsequently a Boer settlement. With colonial policy shifts, the region changed into the Orange River Sovereignty (1848–54) and eventually the Orange Free State Republic (1854–1902). From 1902 to 1910 it served as the capital of the Orange River Colony and since that time as the provincial capital of the Free State. In 1910 it became the Judicial capital of the Union of South Africa. The area proposed for development is located on Floradale Farm and the proposed infrastructure is located approximately 1km from a number of farm buildings - possibly the farm werf. Other farm werfs located nearby which may be indirectly impacted by the proposed development include Cumbrae, Mount Pleasant and Holmesdale.

According to Roodt (2012, SAHRIS NID 48744), "Historically, the area north of Bloemfontein is known for military activities that took place here during the South African War (1900 - 1902). Evidence of fortification can be found on the hills around Bloemfontein..." It is possible such evidence may be present within the area proposed for development.

Archaeology

Bloemfontein is located on the edges of the Great Karoo. Scattered throughout the Karoo is evidence of historic and prehistoric occupation in the form of Early, Middle and Later Stone Age lithics and other material remains. The descendants of the historic and prehistoric occupants of the region are found in the indigeous Khoe and San, as well as modern inhabitants of the area.

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

No significant archaeological heritage resources have been identified within close proximity to the area proposed

for development (Figure 2.2), however it is clear that no heritage impact assessments have been conducted in close proximity to the development area (Figure 2.1). It is therefore possible, although unlikely, that significant archaeological heritage resources are located within the area proposed for development.

Palaeontology

According to the SAHRIS Palaeosensitvity Map (Figure 3), the study area is underlain by sediments of zero palaeontological sensitivity. The sediments underlying the study area include Karoo Dolerite which has no palaeontological sensitivity, Quaternary Sands may overlie the dolerite bedrock. The palaeontological sensitivity of the Quaternary Sands sediments derives from the likelihood of finding archaeological deposits preserved in these sediments and as such, is dealt with in the paragraphs above. It is very unlikely that significant palaeontological heritage will be impacted by the proposed development and no further studies are recommended in this regard.

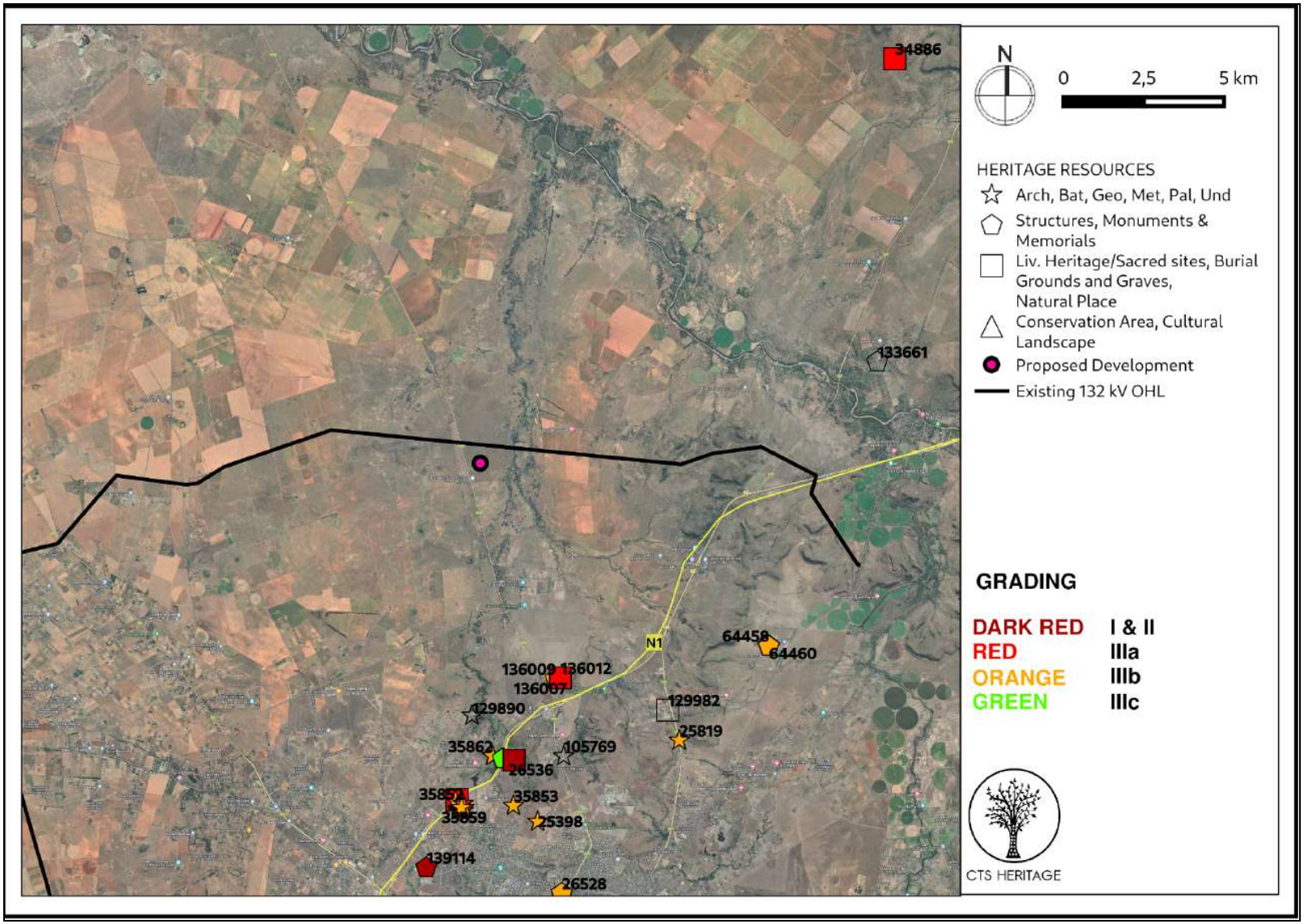

Figure 2.2. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated. Please See Appendix 4 for full description of heritage resource types.

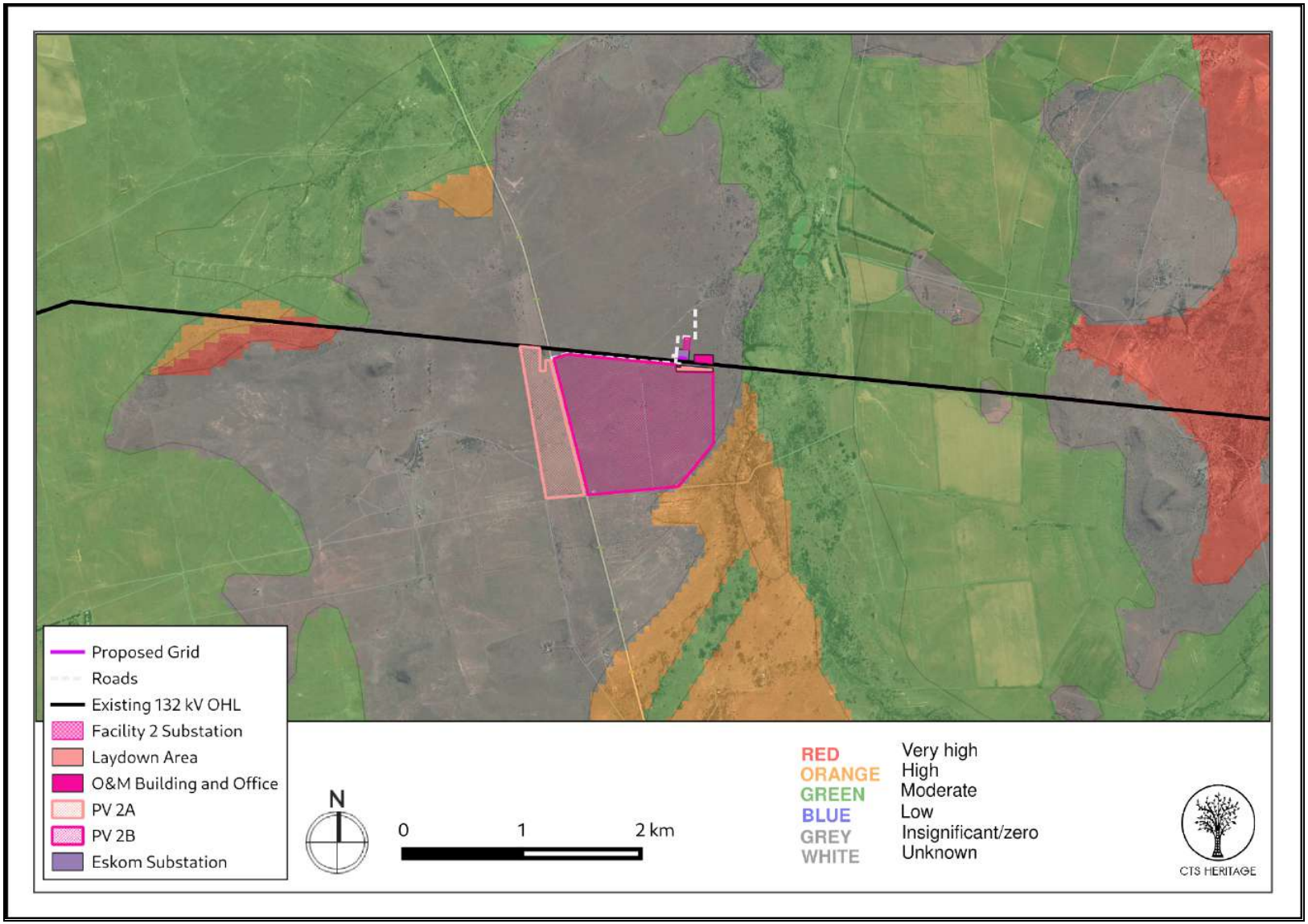

Figure 3: Palaeontological sensitivity of the proposed development area

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

Archaeology (Appendix 1)

The survey was conducted on foot and by vehicle, and sought to assess the presence and significance of archaeological occurrences within the project area. No significant archaeology was documented within the footprint of the proposed Steenbok Solar 2 Project.

Evidence for archaeology was extremely minimal on the potentially affected property. No graves were identified within the survey, and visibility was reasonably good for stone structures, so the latter finding could be considered comprehensive. However, the substantial grass cover and soil formation across most of the footprint was a relevant constraint to documenting stone artefacts and other smaller potential surface remains such as pottery etc.

4.2 Heritage Resources identified

No archaeological resources were identified within the development area

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

Due to the nature of heritage resources, impacts to archaeological and palaeontological heritage resources are unlikely to occur during the PLANNING, OPERATIONAL and DECOMMISSIONING phases of the project. Potential impacts to the cultural landscape throughout the OPERATIONAL phase are discussed in the section below that deals with Cumulative Impacts. The impacts discussed here pertain to the CONSTRUCTION phase of the project.

Archaeology

No significant archaeological heritage resources were identified within the area proposed for development and as such, no impact to archaeological heritage is anticipated.

There are no objections to the authorization of the proposed development of the Steenbok Solar 2 Project in the area surveyed for the current study.

Table 2: Assessment of impacts to archaeological heritage resources

NATURE		
Destruction of significant archaeological heritage during the construction phase of development.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
REVERSIBILITY		

This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
4	Complete loss of resources	The impact results in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
3	Medium cumulative impact	The impact would result in minor cumulative effects.
SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.

Palaeontology

According to the SAHRIS Palaeosensitvity Map (Figure 3), the study area is underlain by sediments of zero palaeontological sensitivity. The sediments underlying the study area include Karoo Dolerite which has no palaeontological sensitivity, Quaternary Sands may overlie the dolerite bedrock. The palaeontological sensitivity of the Quaternary Sands sediments derives from the likelihood of finding archaeological deposits preserved in these sediments and as such, is dealt with in the paragraphs concerning archaeology above. It is very unlikely that significant palaeontological heritage will be impacted by the proposed development

Table 3: Assessment of impacts to palaeontological heritage resources

NATURE		
Destruction of significant palaeontological heritage during the construction phase of development.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
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Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.

5.2 Sustainable Social and Economic Benefit

According to the information provided, the development will introduce employment opportunities during the construction phase (temporary employment) and a limited number of permanent employment opportunities during the operation phase. The proposed project could assist the local economy in creating entrepreneurial growth and opportunities, especially if local business is involved in the provision of general material, goods and services during the construction and operational phases. This positive impact is likely to be compounded by the cumulative impact associated with the development of several other solar facilities within the surrounding area, and because of the project's location within an area which is characterised by high levels of solar irradiation and which is therefore well suited to the development of commercial solar energy facilities.

The proposed development also represents an investment in infrastructure for the generation of non-polluting, Renewable Energy, which, when compared to energy generated because of burning polluting fossil fuels, represents a positive social benefit for society. It should be noted that the perceived benefits associated with the project, which include RE generation and local economic and social development, outweigh the perceived impacts associated with the project.

Based on the available information, the anticipated socio-economic benefits to be derived from the development outweigh the impacts to heritage resources identified in this report.

5.3 Proposed development alternatives

The Department of Environmental Affairs and Tourism (DEAT) 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives namely, the no-go, location, activity, and design alternatives. It is however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer and EAP, which in some instances culminates in a single preferred project proposal. An initial site assessment was conducted by the developer and the farm portion was found favourable due to its proximity to grid connections, solar radiation, site access and relative flat terrain. These factors were then taken into consideration and avoided as far as possible, where required. The following alternatives were considered in relation to the proposed activity:

No-go alternative

This alternative considers the option of 'do nothing' and maintaining the status quo. The site is currently zoned for agricultural land uses. Should the proposed activity not proceed, the site will remain unchanged and will continue to be used for these purposes. The potential opportunity costs in terms of adding solar energy generation to the current land use, would be lost if the status quo persist, and therefore all positive socio-economic opportunities and associated growth will also be lost.

Location alternatives

The location identified for the development is based on various aspects considered by the Applicant from a technical, economic, and environmental perspective. This includes the solar radiation values of the area, proximity to the national grid, available grid connection capacity in the national grid, readily available access to the development, landowner support, terrain characteristics and the absence of potentially sensitive environmental features and areas. The property proposed for development is considered suitable for the development by the Applicant and therefore the area has been demarcated and indicated as being preferred. No other properties have been identified for the development in the Bloemfontein area.

Design and layout alternatives

A detailed Screening and Iterative Design Process has served to identify all sensitive 'No-Go' areas specific to each environmental aspect for the various infrastructure components (PV arrays, substation, Temporary construction laydown areas, Buildings, roads and cables and overhead lines). These areas have subsequently been avoided in application of the mitigation hierarchy. This process was based on extensive field work and is considered to be adequately robust to ensure that all significant environmental impacts are avoided from the outset of the design process. The final optimised layout is smaller than the total area assessed in this report and is reflected in Figure 9.

Technology and Technical alternatives were also considered however these will have no impact on heritage resources.

5.4 Cumulative Impacts

The area proposed for development is presently dominated by agricultural activities and as such, the pattern of settlement within this landscape reflects this. At this stage, there is the potential for the cumulative impact of proposed renewable energy facilities to negatively impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial. This project is not located within a REDZ area, and it is noted that it is preferable to have renewable energy facility development clustered in an area such as a REDZ. However, as this development is located well away from any known significant heritage resources, no cumulative impact in terms of heritage is anticipated and the expected cumulative impact significance is low.

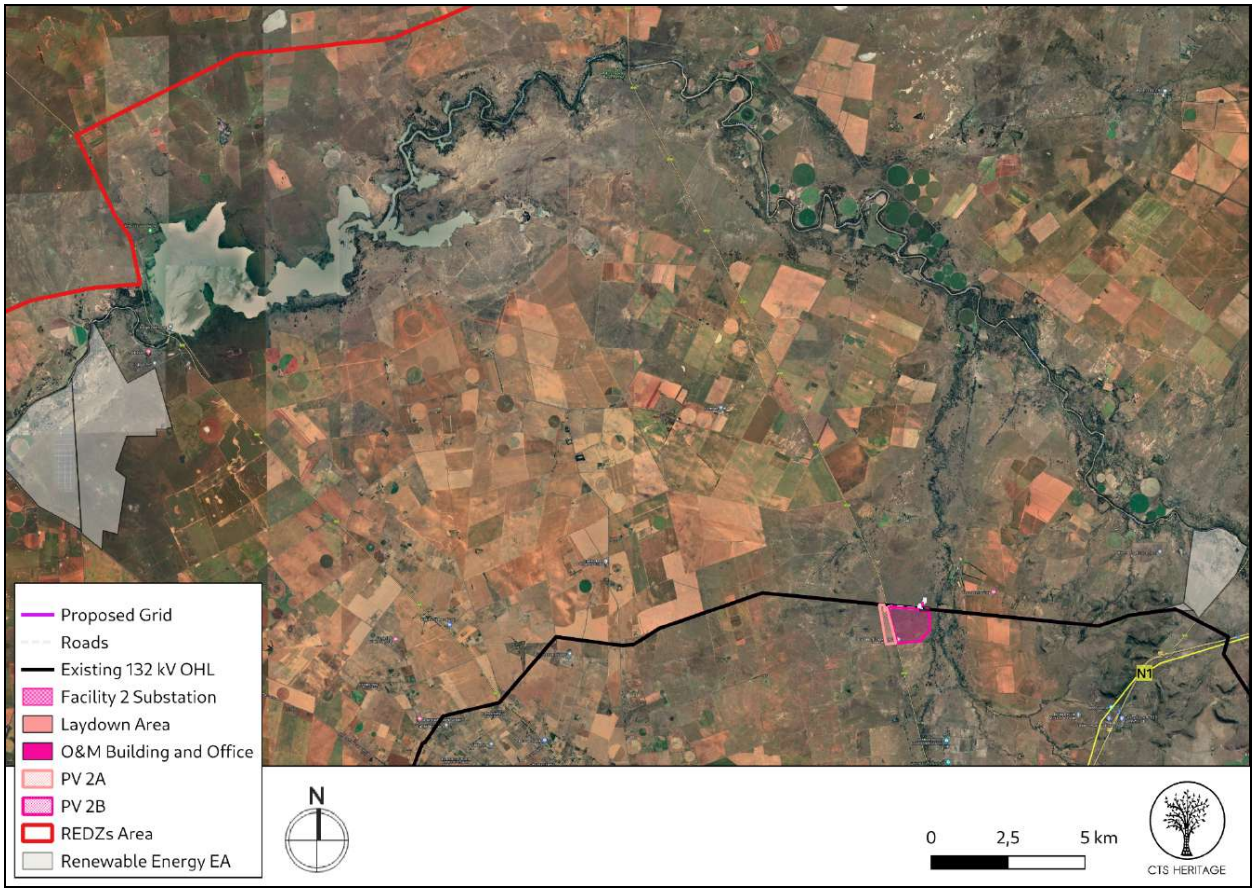

Figure 8: Approved REF projects within 50km of the proposed development area, and the boundary of the closest REDZ

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.

7. CONCLUSION

The survey proceeded with two minor constraints and limitations, yet the project area was comprehensively surveyed for heritage resources, and no archaeological material remains were documented.

Should significant archaeological materials – such as well-preserved subsurface artefacts or fossils – be exposed during construction, the on-duty Environmental Control Officer should protect these (preferably in primary exposed context), and should immediately consult a professional archaeologist. In this circumstance, the South African Heritage Resources Authority should be immediately alerted so that appropriate mitigation measures by a professional archaeologist can be implemented, at the expense of the developer. In such a scenario, mitigation measures would normally involve the application for an excavation permit and the digital documentation of the occurrences with modern archaeological recording standards, as well as the collection of a reflective sample of material to be deposited in a local approved curation facility.

There are no objections on palaeontological heritage grounds and impacts to significant fossil heritage resources are unlikely.

8. RECOMMENDATIONS

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

- The final optimised layout is smaller than the total area assessed in this report and is reflected in Figure 9.
- 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.

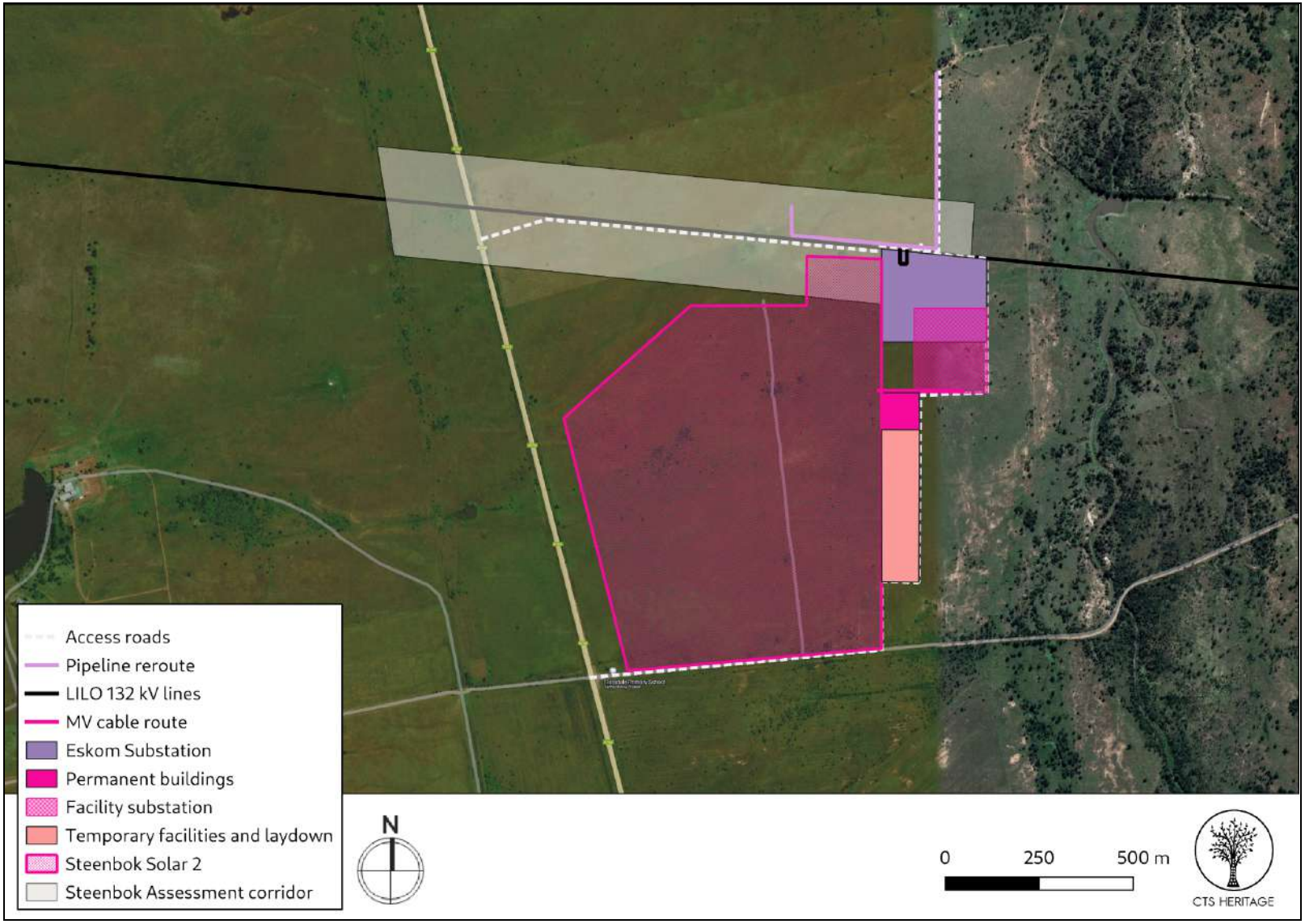

Figure 9: Final Optimised Layout for Steenbok Solar 2 Project

9. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
159390	HIA Letter of Exemption	Lloyd Rossouw	03/09/2013	Exemption of Phase 1 Archaeological and Palaeontological Impact Assessment for a 3 km long 132 kV Power line on Farm Kwaggafontein 2300, Bloemfontein, Free State Province
159788	HIA Phase 1	Lloyd Rossouw	29/11/2013	Phase 1 Paleontological and Archaeological Impact Assessment of a portion of the farm The Retreat 804, Bloemfontein, FS
170940	AIA Phase 1	Cobus Dreyer	12/04/2012	First Phase Archaeological and Historical Investigation of the proposed commercial developments on Portion 10, Bergendal 1706 & Erf 26360, Bloemfontein.
174984	HIA Letter of Exemption	Lloyd Rossouw	12/05/2014	Exemption from a Phase 1 Archaeological and Palaeontological Impact Assessment for proposed new township establishment on the Remainder of Portion 1 of the Farm Tredenham 2153, Bloemfontein, Free State
189292	HIA Letter of Exemption	Lloyd Rossouw	05/12/2014	Exemption from a Phase 1 Heritage Impact Assessment for a proposed new water pipeline from the outfall water treatment works to the Renosterspruit, Bloemfontein, Free State Province
317031	HIA Phase 1	Lloyd Rossouw	20/05/2015	Phase 1 Heritage Impact Assessment of a proposed new chicken abattoir facility on Portion 5 of farm Groot Genoeg 2662, Bloemfontein, Free State Province
5868	AIA Phase 1	Cobus Dreyer	20/02/2004	First Phase Heritage/Archaeological Assessment of the Proposed Residential Development at Tredenham, Bloemfontein
5869	AIA Phase 1	Cobus Dreyer	20/02/2004	First Phase Heritage/Archaeological Assessment of the Proposed Residential Development at Hillandale, Bloemfontein
5870	AIA Phase 1	Cobus Dreyer	15/03/2004	Archaeological and Historical Investigation of the Proposed Shellyvale Residential Developments, at Lilyvale 2913, Bloemfontein
5871	AIA Phase 1	Cobus Dreyer	18/05/2004	First Phase Heritage/Archaeological Assessment of the Proposed Residential Development at Padlangs 2145, Bloemfontein
5873	AIA Phase 1	Cobus Dreyer	28/07/2004	Archaeological and Historical Investigation of the Proposed Developments at the Remainder of Rayton 28, Portion 1 of Rayton 28 & Portion 2 of Rayton 431, Bloemfontein
5874	AIA Phase 1	Cobus Dreyer	28/07/2004	Archaeological and Historical Investigation of the Proposed Development at Subdivision 20 & 24 of the Farm Lilyvale 2313, Bloemfontein
5875	AIA Phase 1	Cobus Dreyer	16/08/2004	Archaeological and Historical Investigation of the Proposed Rayton Estate

				Township, on Subdivision 29 of the Farm Lilyvale 2913, Bloemfontein
5876	HIA Phase 1	Garth Benneyworth	29/09/2004	Report on the Burial Site and Associated Terrain Lilyvale, Bloemfontein
5878	AIA Phase 1	Cobus Dreyer	14/12/2004	First Phase Archaeological/Cultural Heritage Assessment of the Proposed Residential Development at Subdivision 3 and Subdivision 2 and Subdivision 7 of the Remainder of the Farm Musket 2718, Bloemfontein
5882	AIA Phase 1	Cobus Dreyer	27/07/2005	First Phase Archaeological and Historical Investigation of the Proposed Residential Developments at Roderick's Park 2834, Bloemfontein
5883	AIA Phase 1	Cobus Dreyer	17/08/2005	First Phase Archaeological and Heritage Assessment of the Proposed Residential Developments on Plots 18, 20 & 21 on the Farm Deales Gift 2804, Bloemfontein
5884	AIA Phase 1	Cobus Dreyer	29/10/2005	Archaeological and Historical Investigation of the Proposed Residential Developments on a Portion of the Farm Hillside 2830, Bloemfontein. Free State
5890	AIA Phase 1	Cobus Dreyer	15/05/2006	First Phase Archaeological and Cultural Investigation of the Proposed Residential Developments at Western Spitskop 1399, Rayton, Bloemfontein
5891	AIA Phase 1	Cobus Dreyer	15/05/2006	First Phase Archaeological and Cultural Investigation of the Proposed Residential Developments at Roderick's Park 2032 & Hillside 2827, Bloemfontein
5892	AIA Phase 1	Cobus Dreyer	20/06/2006	First Phase Archaeological and Cultural Heritage Investigation of the Proposed Power Transmission Line at Northridge Mall, Bloemfontein
5894	AIA Phase 1	Cobus Dreyer	30/08/2006	First Phase Archaeological and Cultural Heritage Investigation of the Proposed Water World Installation at Gwentham 963, Bloemfontein
5895	AIA Phase 1	Cobus Dreyer	28/10/2006	Archaeological and Historical Investigation of the Proposed Developments at the Remainder of Plot 28 Rayton, Portion 1 of Plot 28 Rayton & Portion 2 of Rayton 431, Bloemfontein
5896	AIA Phase 1	Cobus Dreyer	22/11/2006	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Borrow Pit Sites Along the N1 Main Road Between Bloemfontein & the Verkeerdevlei Toll Gate, Free State
5900	AIA Phase 1	Cobus Dreyer	10/04/2007	Archaeological and Historical Investigation of the Proposed Township Developments on the Remainder of the Farm Hillside 2830, Bloemfontein
5904	AIA Phase 1	Cobus Dreyer	20/09/2007	First Phase Archaeological and Cultural Heritage Investigation of the Proposed Residential Developments at Blackheath 1397, (Hill View 1377), Bloemfontein
5905	AIA Phase 1	Cobus Dreyer	15/10/2007	First Phase Archaeological and Cultural Heritage Investigation of the

				Proposed Residential Developments on the Annex of Wildealskloof 2607, Bloemfontein
5906	AIA Phase 1	Cobus Dreyer	25/11/2007	Archaeological and Historical Investigation of the Proposed Residential Developments on Portion 2 of Plot 28, Rayton 431, Bloemfontein
5909	AIA Phase 1	Cobus Dreyer	10/03/2008	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Eastern Ring Road Developments at Bloemfontein
5911	AIA Phase 1	Cobus Dreyer	10/07/2008	First Phase Archaeological and Historical Investigation of the Proposed Township Establishment at the Remainder of Roderick's Park 2834, Bloemfontein
5912	AIA Phase 1	Cobus Dreyer	10/07/2008	First Phase Archaeological and Historical Investigation of the Proposed Residential Developments at Douglas Valley 260, Bloemfontein
5914	AIA Phase 1	Cobus Dreyer	01/06/2001	Environmental Impact Assessment of the Griffiths' Property, Pentagon Park, Bloemfontein
5915	AIA Phase 1	Cobus Dreyer	25/11/2004	Archaeological and Historical Investigation of the Proposed Developments at the Remainder of the Farm Boven Tempe 203, Bloemfontein
5916	AIA Phase 1	Cobus Dreyer	29/10/2005	Archaeological and Historical Investigation of the Proposed Residential Developments on a Portion of the Farm Bayswater 2865, Bloemfontein
5929	AIA Phase 1	Cobus Dreyer	05/07/2006	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Residential Development at Daskop 615, Brandfort, Free State
6039	AIA Phase 1	Cobus Dreyer	28/08/2006	First Phase Archaeological and Cultural Heritage Assessment of the Phase II Residential Developments of Woodland Hills Wildlife Estate, Hillandale 2960 (249) Bloemfontein
6041	AIA Phase 1	Cobus Dreyer	29/05/2007	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Residential Developments at the Farm Donkerhoek 392, Bloemfontein, Free State
6393	AIA Phase 1	Cobus Dreyer	14/04/2007	Archaeological and Historical Investigation of the Proposed Township Establishment on Portions of the Farms Cecilia 2352, Kwaggafontein 2300 and Bloemfontein 654, Bloemfontein, Free State
7211	AIA Phase 1	Zoe Henderson	01/01/2004	Report on Archaeological Survey of Subdivision 7, Remainder and Portion of Subdivision 25, of the Farm Lilyvale 2313, Bloemfontein

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APPENDICES

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APPENDIX 1: Archaeological Assessment (2022)

ARCHAEOLOGICAL SPECIALIST STUDY

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

Proposed Development of the Bloemfontein PV 1 and PV 2 Solar Projects

Prepared by

CTS HERITAGE

In Association with

Environamics

September 2022

CTS HERITAGE

EXECUTIVE SUMMARY

Steenbok Solar (Pty) Ltd are interested in developing 2x 100 MW solar PV facilities and associated infrastructure on Farm 15 Floradale, approximately 17 km north of the centre of Bloemfontein in the Free State Province. Each project will include a solar PV facility with standard infrastructure of a PV facility including PV arrays; cabling; inverters; on-site substation and grid connection; battery storage; auxiliary buildings; access and internal roads; temporary laydown areas; and fencing. To evacuate the power generated by the proposed Sprinkaan Solar 1 and Sprinkaan Solar 2, a grid connection is required in the form of an approximately 310 M length 132 kV overhead power line that will connect to an existing powerline which traverses the property. 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.

No significant archaeological heritage resources were identified within the area proposed for development and as such, no impact to archaeological heritage is anticipated.

There are no objections to the authorization of the proposed development of the Bloemfontein PV 1 and PV 2 Solar Projects in the area surveyed for the current study.

Recommendations

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

- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

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CONTENTS

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1. INTRODUCTION

1.1 Background Information on Project

Steenbok Solar (Pty) Ltd are interested in developing 2x 100 MW solar PV facilities and associated infrastructure on Farm 15 Floradale, approximately 17 km north of the centre of Bloemfontein in the Free State Province. Each project will include a solar PV facility with standard infrastructure of a PV facility including PV arrays; cabling; inverters; on-site substation and grid connection; battery storage; auxiliary buildings; access and internal roads; temporary laydown areas; and fencing.

To evacuate the power generated by the proposed Sprinkaan Solar 1 and Sprinkaan Solar 2, a grid connection is required in the form of an approximately 310 M length 132 kV overhead power line that will connect to an existing powerline which traverses the property.

1.2 Description of Property and Affected Environment

The footprint of the proposed Bloemfontein PV 1 and PV 2 Solar Projects, and associated infrastructure, is located across 5 private agricultural camps approximately 20 km northwest of the town of Bloemfontein, in the grassland biome of the summer rainfall region of the Free State Province, South Africa. The footprint for potential development is flat, and characterised - over substantial portions - by veld that has been used primarily for grazing of various stock (mostly cattle). In several locations, the original quaternary deposits that cover much of the region west of Bloemfontein have been reworked or removed to depths in excess of ~0.5m for track and powerline construction, and for the construction of agricultural infrastructure such as boreholes and other watering facilities. Where agricultural activities have been more intense, the original quaternary deposits have also been more heavily trampled and disturbed through bioturbation where animals are watered.

Local bedrock outcrops ephemerally at several points in the far western portion of the affected area, and is comprised largely of shales and indurated siltstones that are characteristic of outcrops on the terraces of the Modder River and its tributaries. The upper sediments covering these host rocks, and the footprint itself, are primarily silts that derive from the *in situ* weathering of local parent formations and look to have been fluvially deposited across much of the area. Such fluvial activity likely relates to historical flooding of several drainages of the Modder River that are located only 200 metres to the east of the footprint. The upper sediments also appear to thicken in transect from west to east - suggestive of deposition related to local drainages - and have lithic inclusions with sub-angular edges and rounding.

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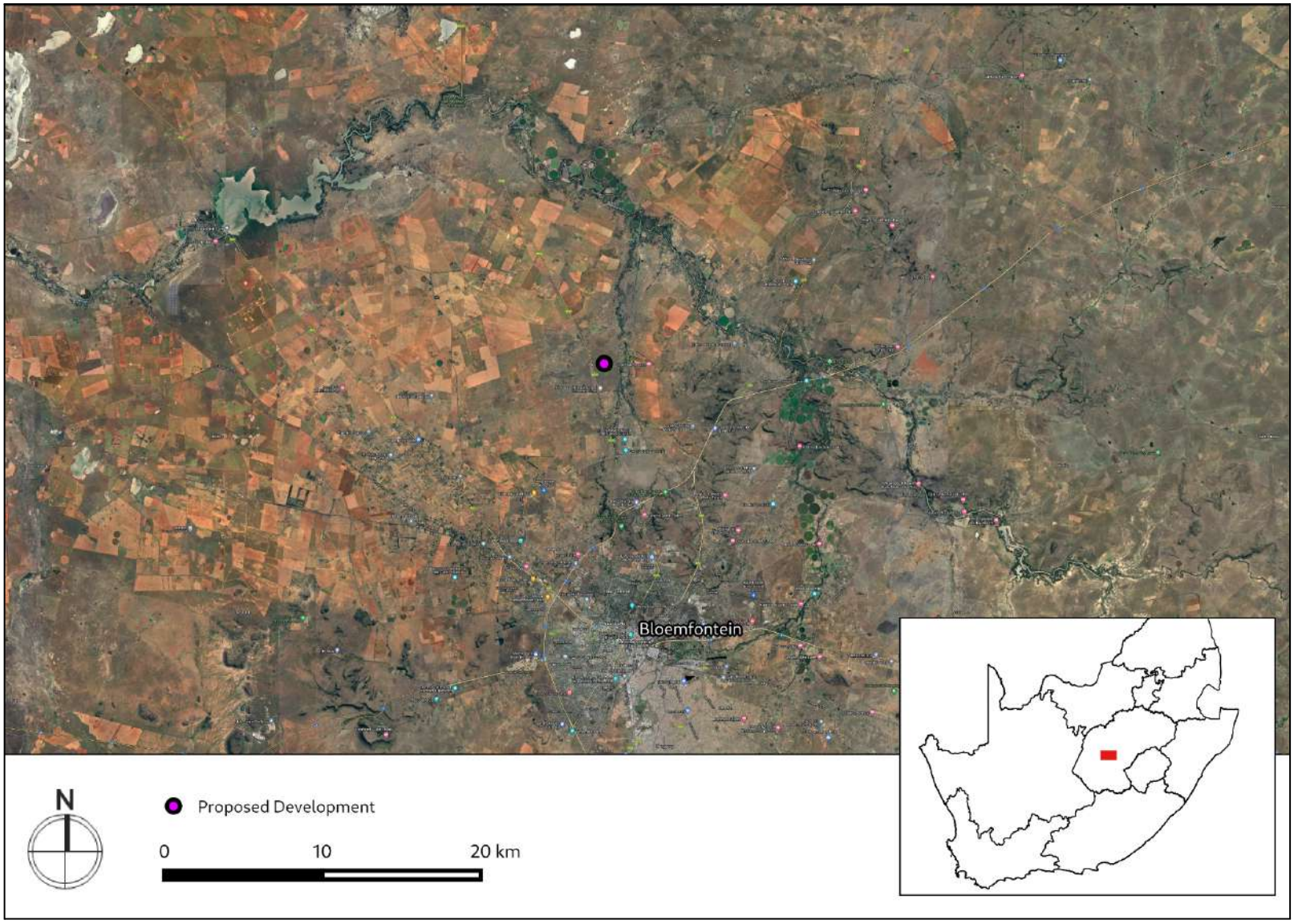

Figure 1.1: Close up satellite image indicating proposed location of study area

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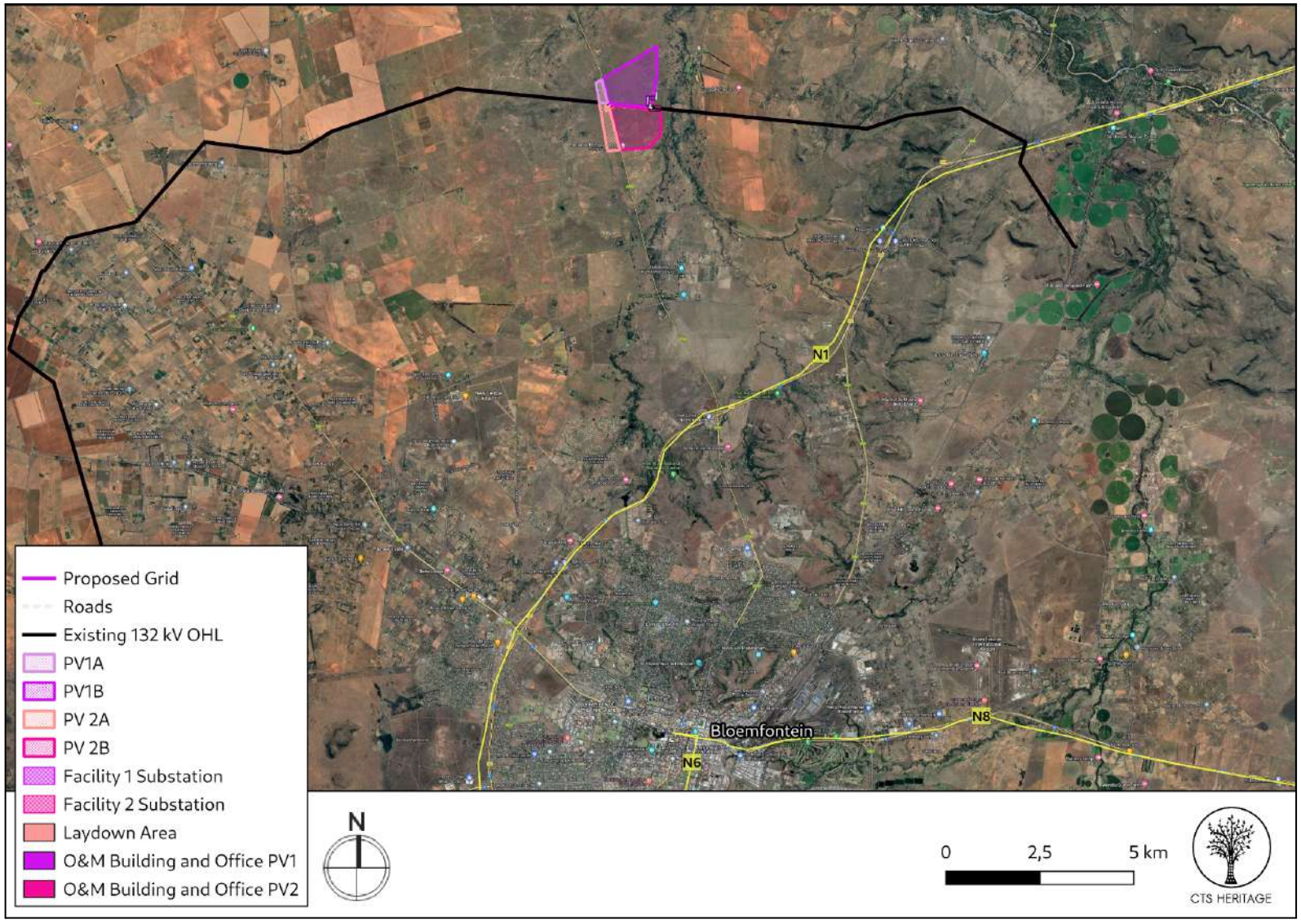

Figure 1.2: Study Area

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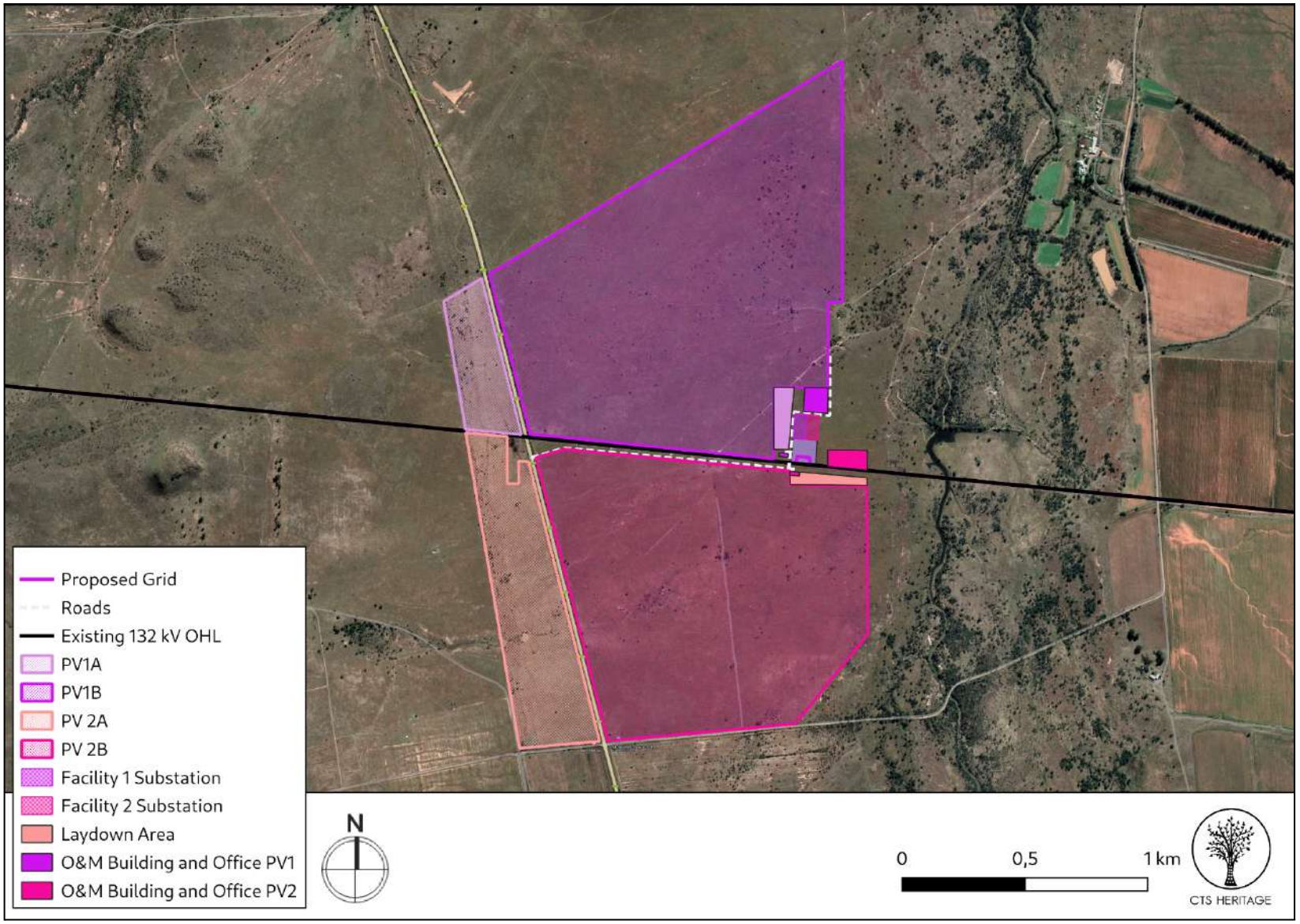

Figure 1.3: Study Area - proposed layout

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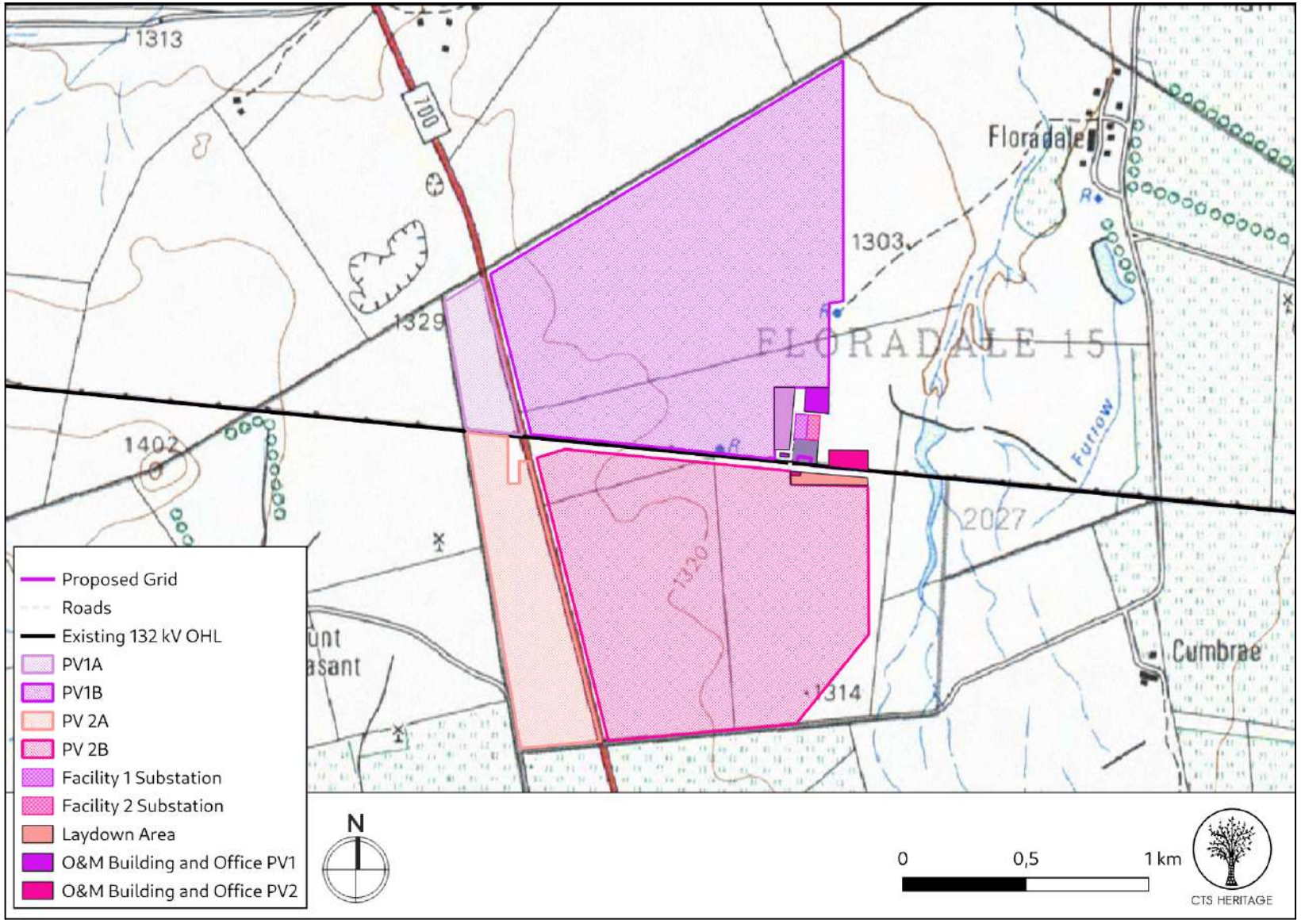

Figure 1.4: Study Area reflected on the 1:50 000 Topo Map

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2. METHODOLOGY

2.1 Purpose of Archaeological Study

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

2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs on 20 and 21 August 2022 to determine what archaeological resources are likely to be impacted by the proposed development.
- The study area was assessed on foot in transects, photographs of the context and finds were taken, and tracks were recorded using a GPS.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

2.3 Constraints & Limitations

(1) Dense grasses and occasional shrubs cover portions of the project area. This coverage inhibited the visibility of surface archaeology. However, even in the places that had optimal visibility, evidence of archaeology was extremely sparse to non-existent. It is clear that the Stone Age sensitivity and scientific potential of the project area has been comprehensively assessed.

(2) Previous vegetation clearing activities by farmers may have affected evidence of surface archaeology where tracks and power lines have been constructed (i.e. the removal of surface stone structures).

(3) Upper sediments are disturbed in the portions of the potentially affected area that have historically been used as enclosures for animals and where modern farming infrastructure has been constructed.

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

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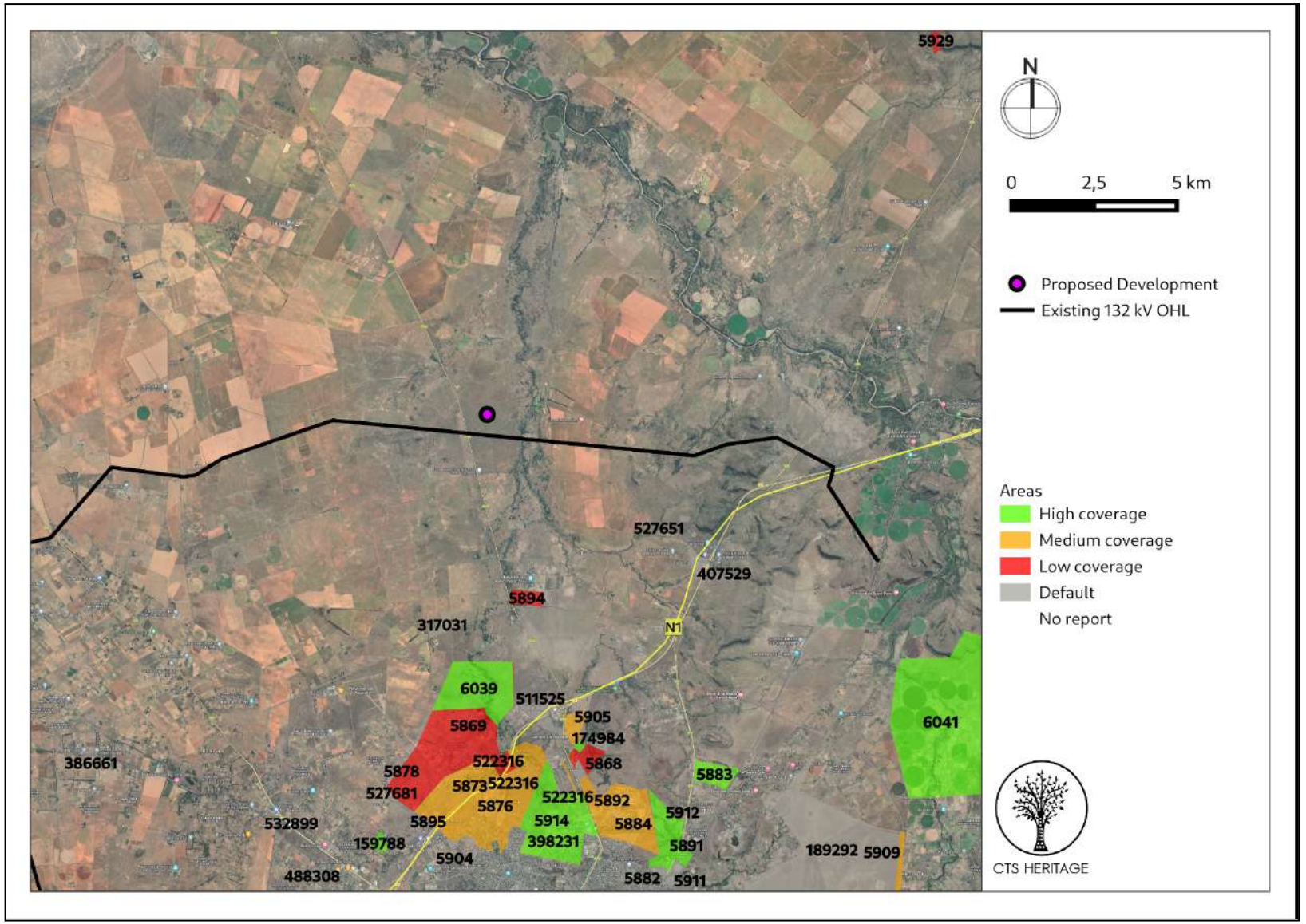

Figure 2: Close up satellite image indicating proposed location of the study area in relation to heritage studies previously conducted

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3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

The area proposed for development is located approximately 20km north of the centre of Bloemfontein. Prior to its establishment in 1846, the area is said to have been the location of an !Orana settlement and subsequently a Boer settlement. With colonial policy shifts, the region changed into the Orange River Sovereignty (1848–54) and eventually the Orange Free State Republic (1854–1902). From 1902 to 1910 it served as the capital of the Orange River Colony and since that time as the provincial capital of the Free State. In 1910 it became the Judicial capital of the Union of South Africa. The area proposed for development is located on Floradale Farm and the proposed infrastructure is located approximately 1km from a number of farm buildings - possibly the farm werf. The age and heritage significance of these farm structures will need to be established through a site visit. Other farm werfs located nearby which may be indirectly impacted by the proposed development include Cumbrae, Mount Pleasant and Holmesdale.

According to Roodt (2012, SAHRIS NID 48744), "Historically, the area north of Bloemfontein is known for military activities that took place here during the South African War (1900 - 1902). Evidence of fortification can be found on the hills around Bloemfontein..." It is possible such evidence may be present within the area proposed for development.

Archaeology

Bloemfontein is located on the edges of the Great Karoo. Scattered throughout the Karoo is evidence of historic and prehistoric occupation in the form of Early, Middle and Later Stone Age lithics and other material remains. The descendents of the historic and prehistoric occupants of the region are found in the indigeous Khoe and San, as well as modern inhabitants of the area.

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

No significant archaeological heritage resources have been identified within close proximity to the area proposed for development (Figure 3), however it is clear that no heritage impact assessments have been conducted in close proximity to the development area (Figure 2). It is therefore possible, although unlikely, that significant archaeological heritage resources are located within the area proposed for development.

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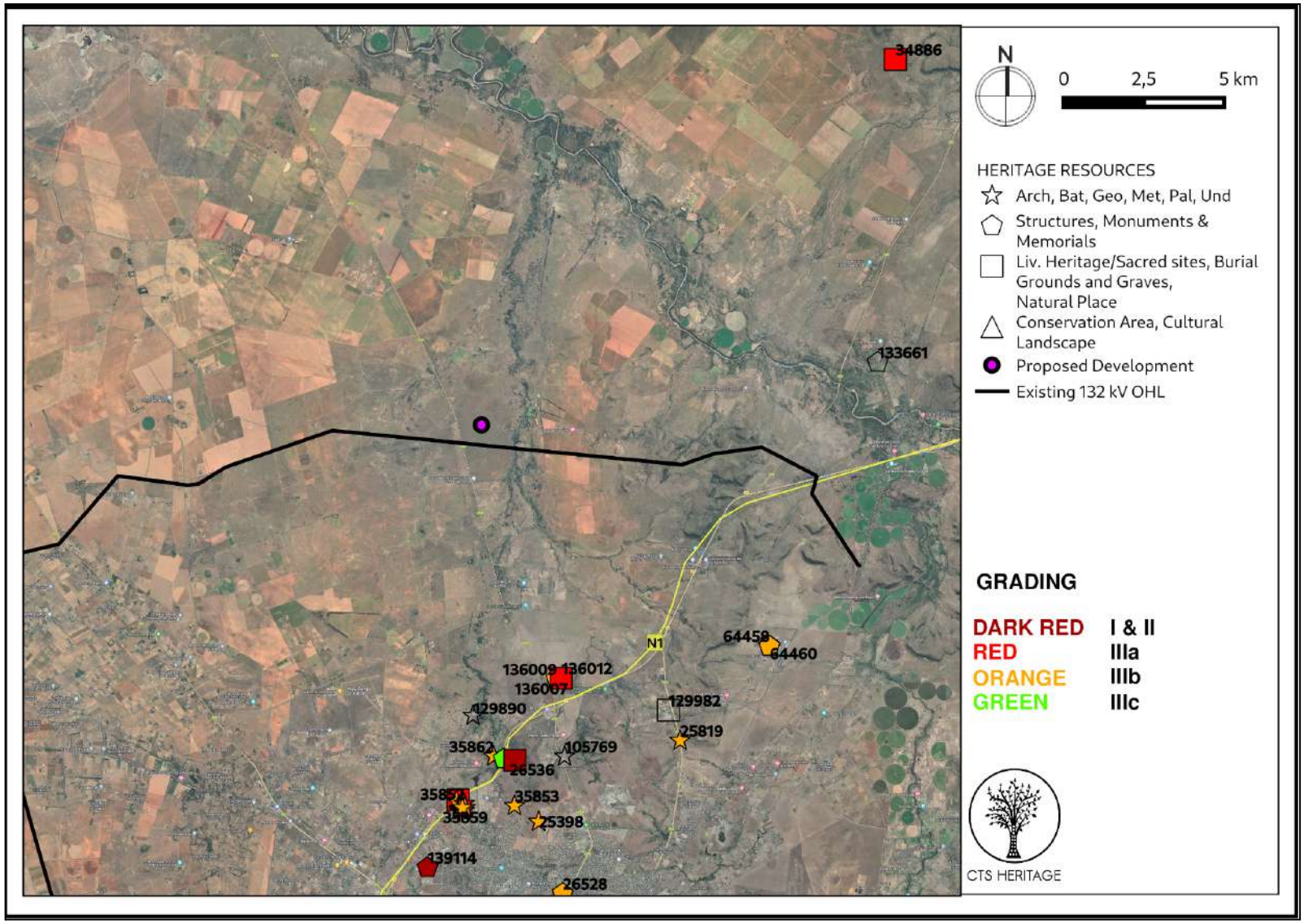

Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated

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Figure 4.1: Context and characteristic grassland cover at CBF1.

Figure 4.2: Context and characteristic grassland cover at CBF4.

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Figure 4.3: Context and characteristic grassland cover at CBF6.

Figure 4.4: Context and characteristic grassland cover at CBF9.

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Figure 4.5: Context and characteristic grassland cover at CBF12.

Figure 4.6: Context and characteristic vegetation at CBF14.

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Figure 4.7: Context and characteristic grassland cover at CBF17.

Figure 4.8: Context and characteristic grassland cover at CBF19.

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Figure 4.9: Context and characteristic grassland cover at CBF20.

Figure 4.10: Context and characteristic grassland cover at CBF22.

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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

The survey was conducted on foot and by vehicle, and sought to assess the presence and significance of archaeological occurrences within the project area. No significant archaeology was documented within the footprint of the proposed Bloemfontein PV 1 and PV 2 Solar Projects.

Abundant paleo-river terraces, springs and seasonal lake pan sites are dispersed across the broader Free State region, with water being the common attractor for hominins and fauna in the past. These types of sites are increasingly frequent to the west of Bloemfontein, and, when eroded through natural or anthropogenic processes often yield material remains pertaining to human-environment interactions through the Pleistocene, with frequently abundant stone artefacts and fossils. Fortunately, none of these features were identified in the environment of the potentially affected area based on above surface field observations. The potentially affected area is only ~10 km south of the Modder River – which has abundant fossiliferous and artefact rich paleo-terraces at certain points - and ~17km south-east of the world-renowned later Pleistocene fossil and artefact bearing locality of Florisbad.

Where natural landscape is primarily retained (i.e. less affected by modern activity), grassland and semi-arid shrubland is evident with shale and some evidence for sub-volcanic rock in the form of small secondary nodules (mostly <5cm in maximum diameter) in several locations. No primary or secondary sources of artefact quality stone were documented on the affected property which may be one factor influencing the paucity of archaeological materials.

The eastern portion of the affected property (east of the R700) is interspersed with tracks where grass has been trampled and/or removed to facilitate vehicle manoeuvrability between agricultural infrastructure and camps. Indigenous fowl including francolin and guineafowl were observed on the affected property, in addition to abundant traces of burrowing rodents (predominantly hares), which may well affect any potential sub-surface archaeology (though no sub-surface remains were documented).

Evidence for archaeology was extremely minimal on the potentially affected property. No graves were identified within the survey, and visibility was reasonably good for stone structures, so the latter finding could be considered comprehensive. However, the substantial grass cover and soil formation across most of the footprint was a relevant constraint to documenting stone artefacts and other smaller potential surface remains such as pottery etc.

4.2 Archaeological Resources identified

No significant archaeological resources were identified during the field assessment.

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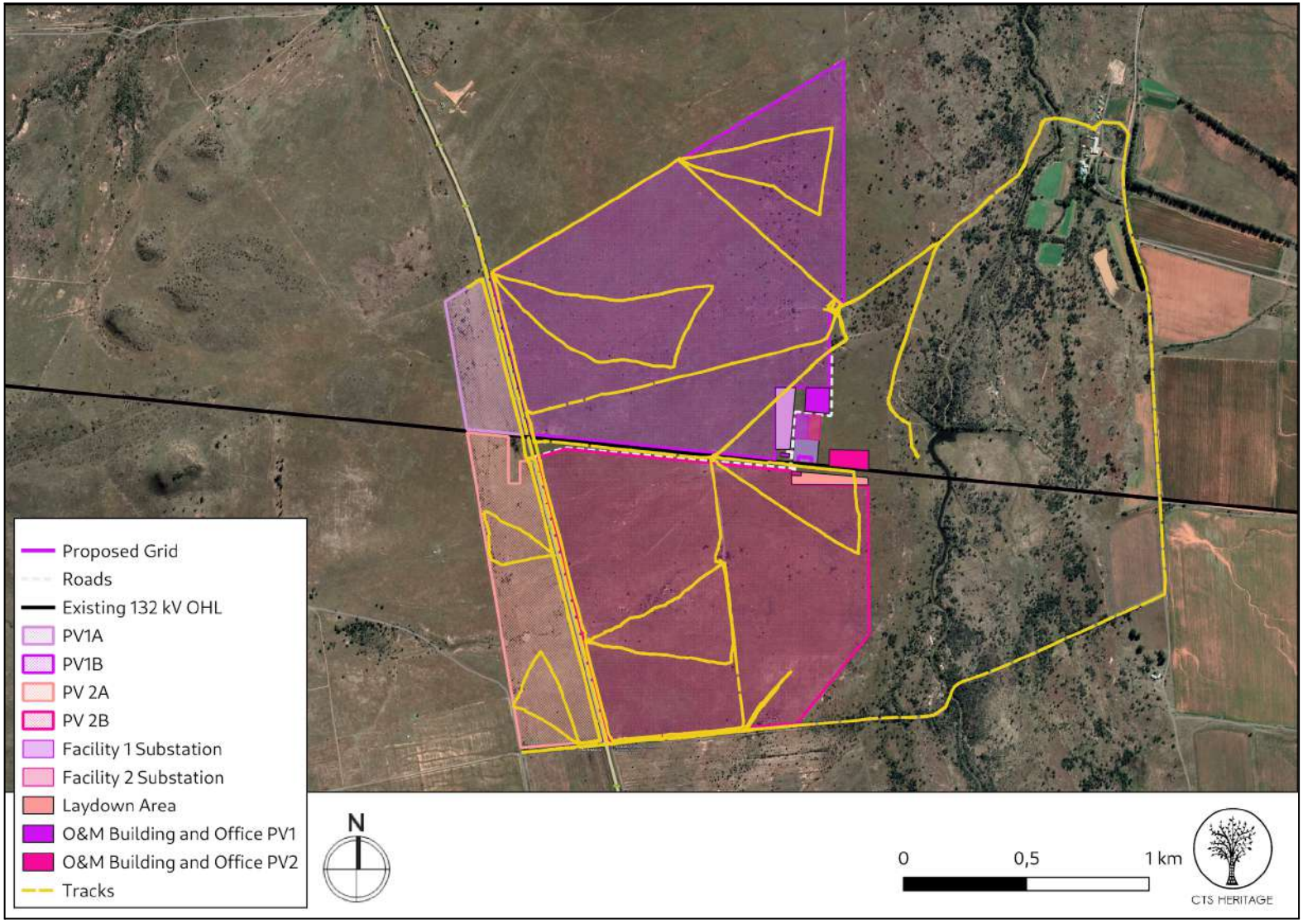

Figure 5.: Overall track paths of foot surveys conducted

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

No significant archaeological heritage resources were identified within the area proposed for development and as such, no impact to archaeological heritage is anticipated.

There are no objections to the authorization of the proposed development of the Bloemfontein PV 1 and PV 2 Solar Projects in the area surveyed for the current study.

6. CONCLUSION AND RECOMMENDATIONS

No significant archaeological heritage resources were identified within the area proposed for development and as such, no impact to archaeological heritage is anticipated.

There are no objections to the authorization of the proposed development of the Bloemfontein PV 1 and PV 2 Solar Projects in the area surveyed for the current study.

Recommendations

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

- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

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Email: info@ctsheritage.com **Web:** www.ctsheritage.com

7. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
159390	HIA Letter of Exemption	Lloyd Rossouw	03/09/2013	Exemption of Phase 1 Archaeological and Palaeontological Impact Assessment for a 3 km long 132 kV Power line on Farm Kwaggafontein 2300, Bloemfontein, Free State Province
159788	HIA Phase 1	Lloyd Rossouw	29/11/2013	Phase 1 Palaentological and Archaeological Impact Assessment of a portion of the farm The Retreat 804, Bloemfontein, FS
170940	AIA Phase 1	Cobus Dreyer	12/04/2012	First Phase Archaeological and Historical Investigation of the proposed commercial developments on Portion 10, Bergendal 1706 & Erf 26360, Bloemfontein.
174984	HIA Letter of Exemption	Lloyd Rossouw	12/05/2014	Exemption from a Phase 1 Archaeological and Palaeontological Impact Assessment for proposed new township establishment on the Remainder of Portion 1 of the Farm Tredenham 2153, Bloemfontein, Free State
189292	HIA Letter of Exemption	Lloyd Rossouw	05/12/2014	Exemption from a Phase 1 Heritage Impact Assessment for a proposed new water pipeline from the outfall water treatment works to the Renosterspruit, Bloemfontein, Free State Province
317031	HIA Phase 1	Lloyd Rossouw	20/05/2015	Phase 1 Heritage Impact Assessment of a proposed new chicken abattoir facility on Portion 5 of farm Groot Genoeg 2662, Bloemfontein, Free State Province
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5869	AIA Phase 1	Cobus Dreyer	20/02/2004	First Phase Heritage/Archaeological Assessment of the Proposed Residential Development at Hillandale, Bloemfontein
5870	AIA Phase 1	Cobus Dreyer	15/03/2004	Archaeological and Historical Investigation of the Proposed Shellyvale Residential Developments, at Lilyvale 2913, Bloemfontein
5871	AIA Phase 1	Cobus Dreyer	18/05/2004	First Phase Heritage/Archaeological Assessment of the Proposed Residential Development at Padlangs 2145, Bloemfontein
5873	AIA Phase 1	Cobus Dreyer	28/07/2004	Archaeological and Historical Investigation of the Proposed Developments at the Remainder of Rayton 28, Portion 1 of Rayton 28 & Portion 2 of Rayton 431, Bloemfontein
5874	AIA Phase 1	Cobus Dreyer	28/07/2004	Archaeological and Historical Investigation of the Proposed Development at Subdivision 20 & 24 of the Farm Lilyvale 2313, Bloemfontein
5875	AIA Phase 1	Cobus Dreyer	16/08/2004	Archaeological and Historical Investigation of the Proposed Rayton Estate Township, on Subdivision 29 of the Farm Lilyvale 2913, Bloemfontein
5876	HIA Phase 1	Garth Benneyworth	29/09/2004	Report on the Burial Site and Associated Terrain Lilyvale, Bloemfontein
5878	AIA Phase 1	Cobus Dreyer	14/12/2004	First Phase Archaeological/Cultural Heritage Assessment of the Proposed Residential Development at Subdivision 3 and Subdivision 2 and Subdivision

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				7 of the Remainder of the Farm Musket 2718, Bloemfontein
5882	AIA Phase 1	Cobus Dreyer	27/07/2005	First Phase Archaeological and Historical Investigation of the Proposed Residential Developments at Roderick's Park 2834, Bloemfontein
5883	AIA Phase 1	Cobus Dreyer	17/08/2005	First Phase Archaeological and Heritage Assessment of the Proposed Residential Developments on Plots 18, 20 & 21 on the Farm Deales Gift 2804, Bloemfontein
5884	AIA Phase 1	Cobus Dreyer	29/10/2005	Archaeological and Historical Investigation of the Proposed Residential Developments on a Portion of the Farm Hillside 2830, Bloemfontein. Free State
5890	AIA Phase 1	Cobus Dreyer	15/05/2006	First Phase Archaeological and Cultural Investigation of the Proposed Residential Developments at Western Spitskop 1399, Rayton, Bloemfontein
5891	AIA Phase 1	Cobus Dreyer	15/05/2006	First Phase Archaeological and Cultural Investigation of the Proposed Residential Developments at Roderick's Park 2032 & Hillside 2827, Bloemfontein
5892	AIA Phase 1	Cobus Dreyer	20/06/2006	First Phase Archaeological and Cultural Heritage Investigation of the Proposed Power Transmission Line at Northridge Mall, Bloemfontein
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5895	AIA Phase 1	Cobus Dreyer	28/10/2006	Archaeological and Historical Investigation of the Proposed Developments at the Remainder of Plot 28 Rayton, Portion 1 of Plot 28 Rayton & Portion 2 of Rayton 431, Bloemfontein
5896	AIA Phase 1	Cobus Dreyer	22/11/2006	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Borrow Pit Sites Along the N1 Main Road Between Bloemfontein & the Verkeerdevlei Toll Gate, Free State
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5906	AIA Phase 1	Cobus Dreyer	25/11/2007	Archaeological and Historical Investigation of the Proposed Residential Developments on Portion 2 of Plot 28, Rayton 431, Bloemfontein
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5912	AIA Phase 1	Cobus Dreyer	10/07/2008	First Phase Archaeological and Historical Investigation of the Proposed Residential Developments at Douglas Valley 260, Bloemfontein
5914	AIA Phase 1	Cobus Dreyer	01/06/2001	Environmental Impact Assessment of the Griffiths' Property, Pentagon Park, Bloemfontein
5915	AIA Phase 1	Cobus Dreyer	25/11/2004	Archaeological and Historical Investigation of the Proposed Developments at the Remainder of the Farm Boven Tempe 203, Bloemfontein
5916	AIA Phase 1	Cobus Dreyer	29/10/2005	Archaeological and Historical Investigation of the Proposed Residential Developments on a Portion of the Farm Bayswater 2865, Bloemfontein
5929	AIA Phase 1	Cobus Dreyer	05/07/2006	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Residential Development at Daskop 615, Brandfort, Free State
6039	AIA Phase 1	Cobus Dreyer	28/08/2006	First Phase Archaeological and Cultural Heritage Assessment of the Phase II Residential Developments of Woodland Hills Wildlife Estate, Hillandale 2960 (249) Bloemfontein
6041	AIA Phase 1	Cobus Dreyer	29/05/2007	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Residential Developments at the Farm Donkerhoek 392, Bloemfontein, Free State
6393	AIA Phase 1	Cobus Dreyer	14/04/2007	Archaeological and Historical Investigation of the Proposed Township Establishment on Portions of the Farms Cecilia 2352, Kwaggafontein 2300 and Bloemfontein 654, Bloemfontein, Free State
7211	AIA Phase 1	Zoe Henderson	01/01/2004	Report on Archaeological Survey of Subdivision 7, Remainder and Portion of Subdivision 25, of the Farm Lilyvale 2313, Bloemfontein

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APPENDIX 2: Heritage Screening Assessments

CTS HERITAGE

HERITAGE SCREENER

CTS Reference Number:	**CTS21_250**
SAHRIS Ref:	
Client:	**Environamics**
Date:	**August 2022**
Title:	**DESKTOP HERITAGE SCREENING AND SENSITIVITY ASSESSMENT FOR THE BLOEMFONTEIN PV 2 SOLAR PROJECT**

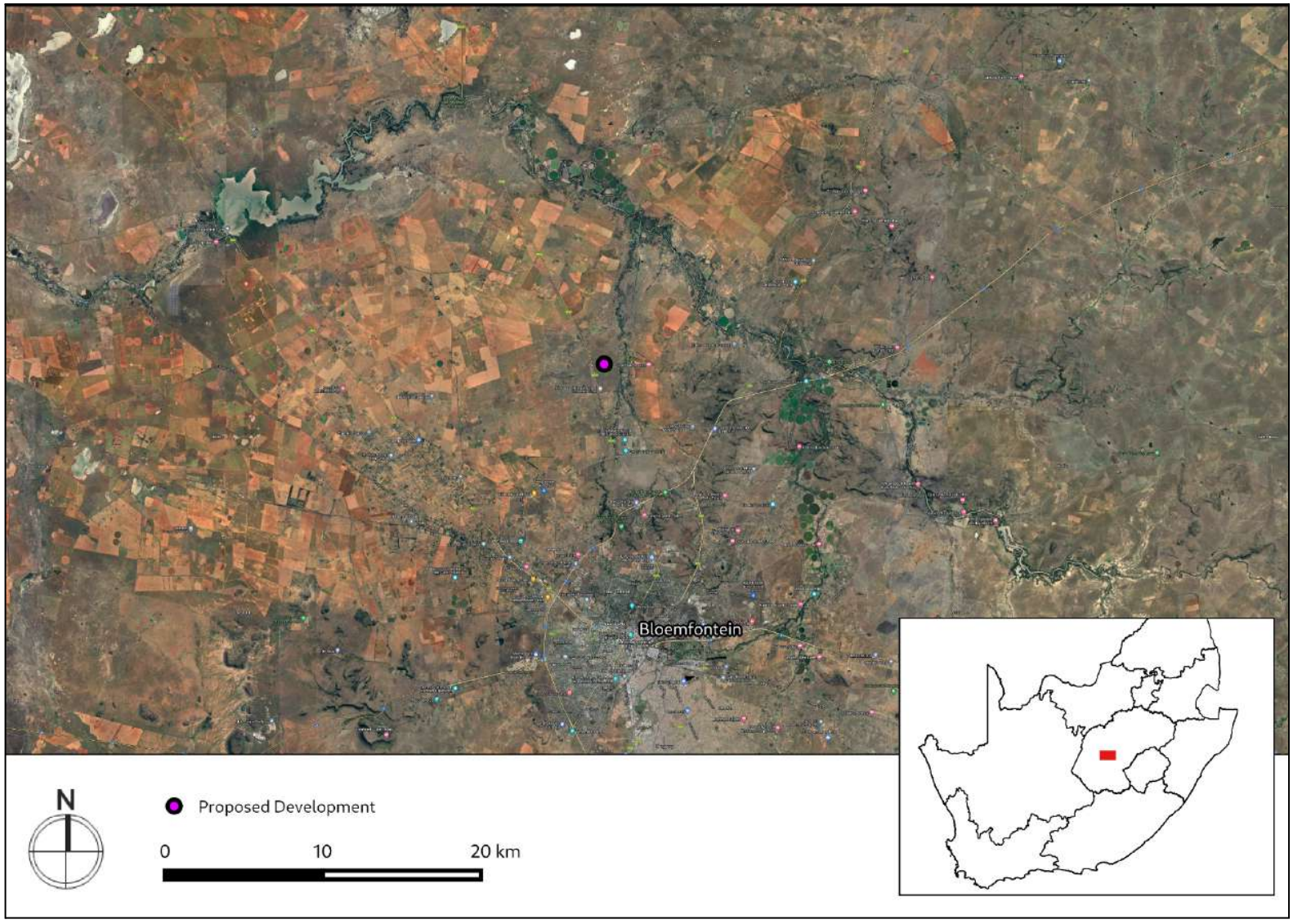

Figure 1a. Satellite map indicating the location of the proposed development in the Free State Province

CTS HERITAGE

1. Proposed Development Summary

TBA

2. Application References

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

3. Property Information

Latitude / Longitude	28°58'11.37"S 26°12'6.05"E
Erf number / Farm number	Farm Floradale 15
Local Municipality	Mangaung
Province	Free State
Current Use	Agriculture
Current Zoning	Agriculture

4. Nature of the Proposed Development

Total Surface Area of development	TBA
Depth of excavation (m)	TBA
Height of development (m)	TBA

5. Category of Development

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

6. Additional Infrastructure Required for this Development

TBA

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

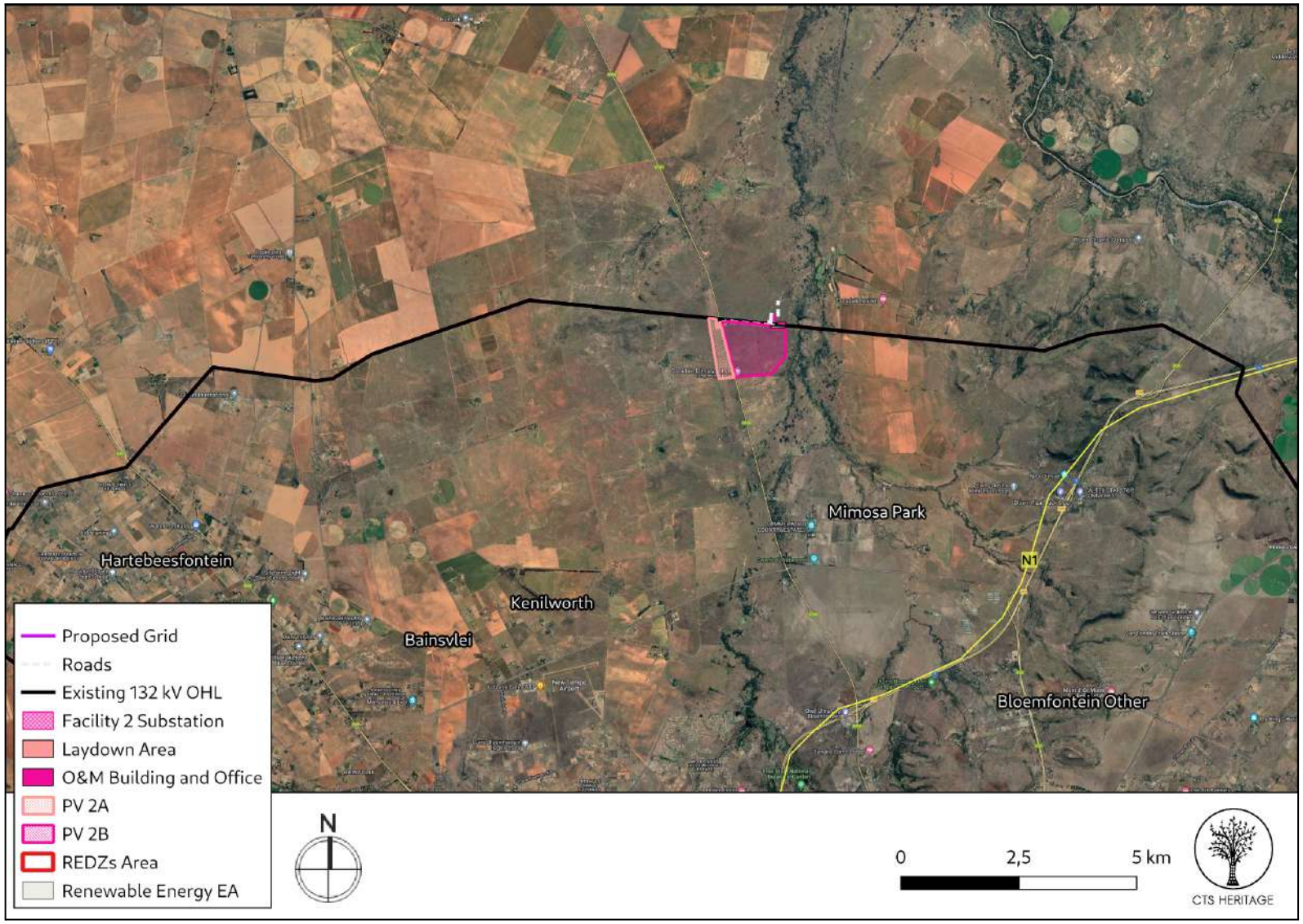

Figure 1b Overview Map. Satellite image (2022) indicating the proposed development area at closer range.

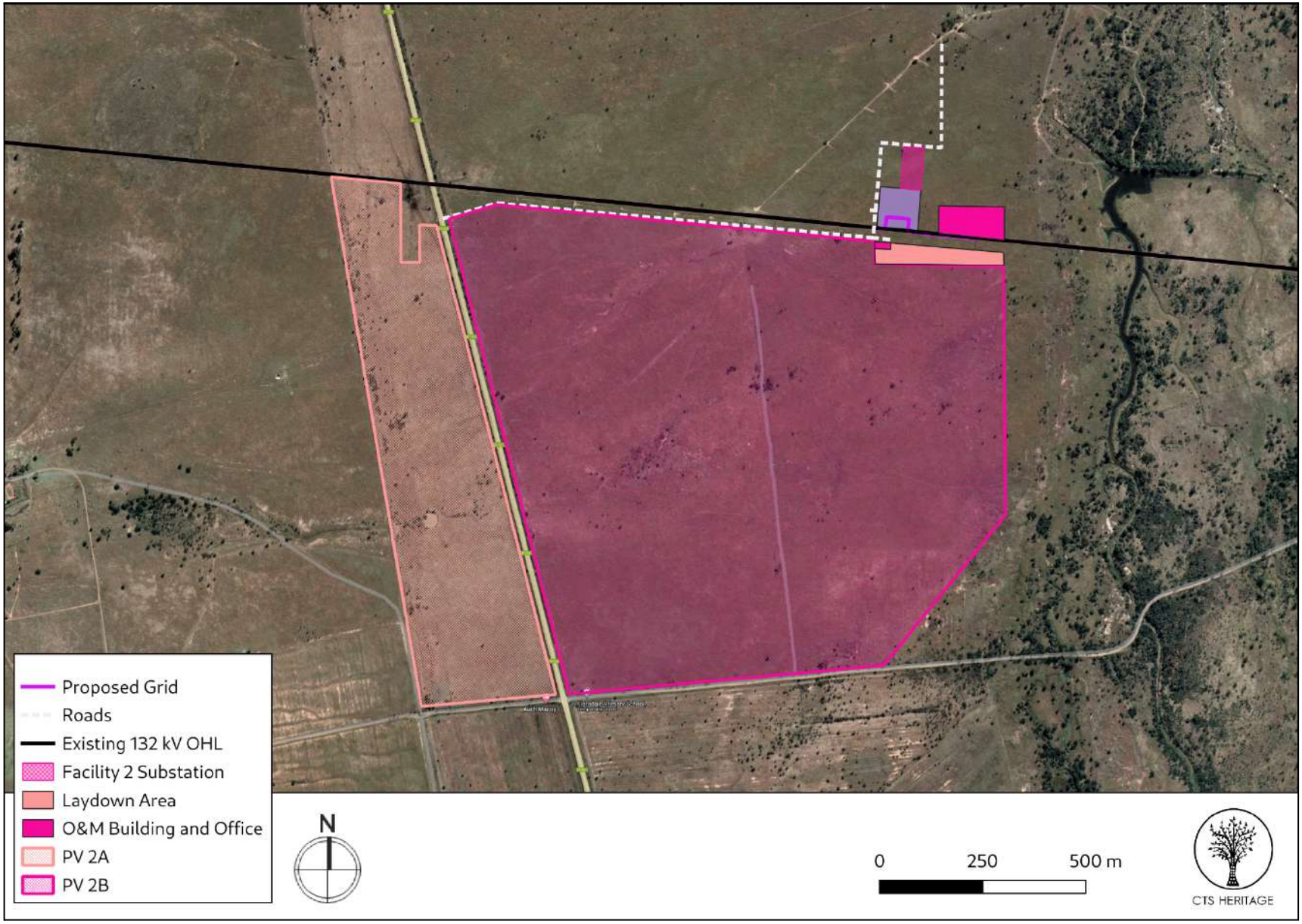

Figure 1c. Overview Map. Satellite image (2022) indicating the proposed development area at closer range.

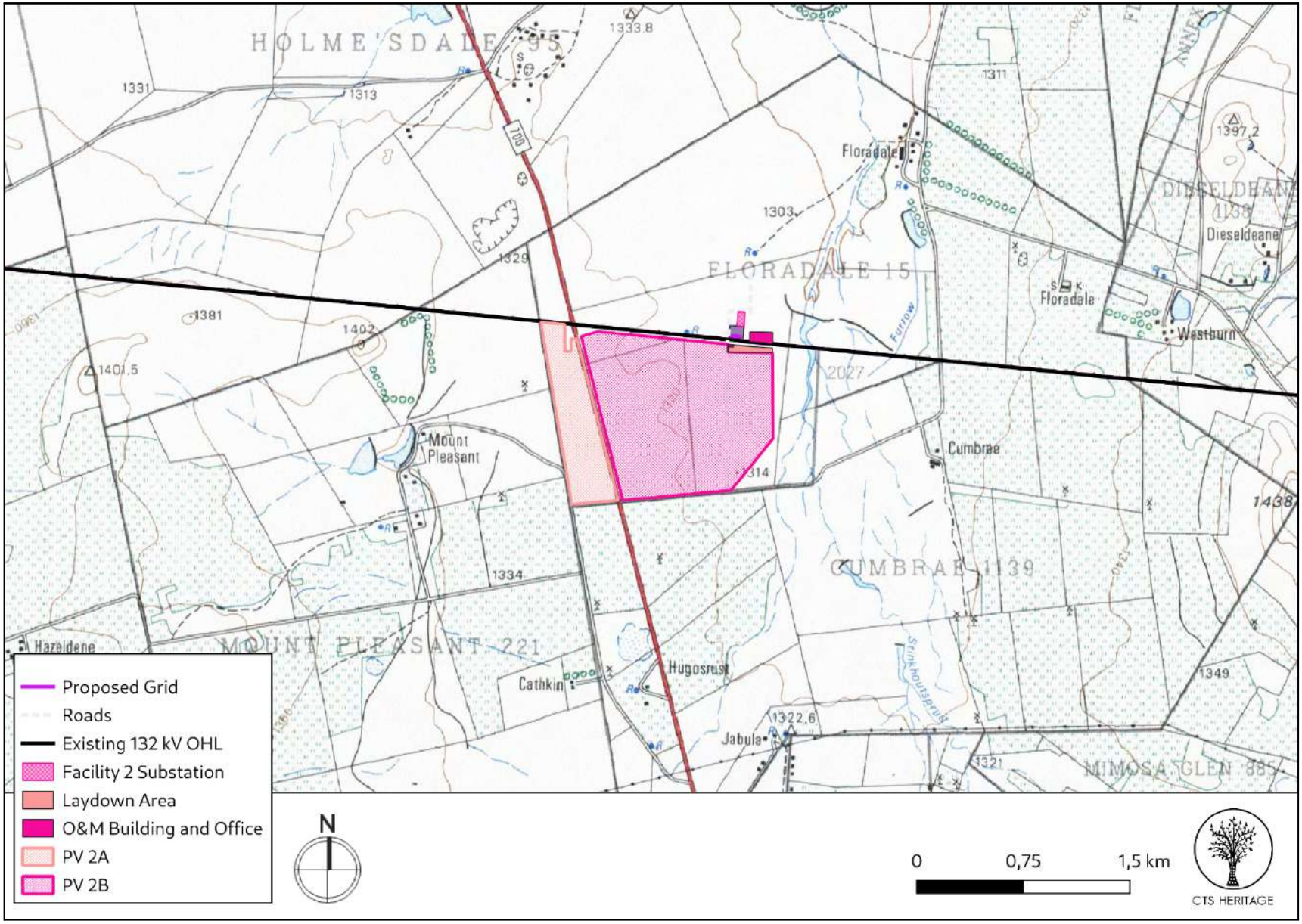

Figure 1d. Overview Map. 1:50 000 Topo Map for the development area

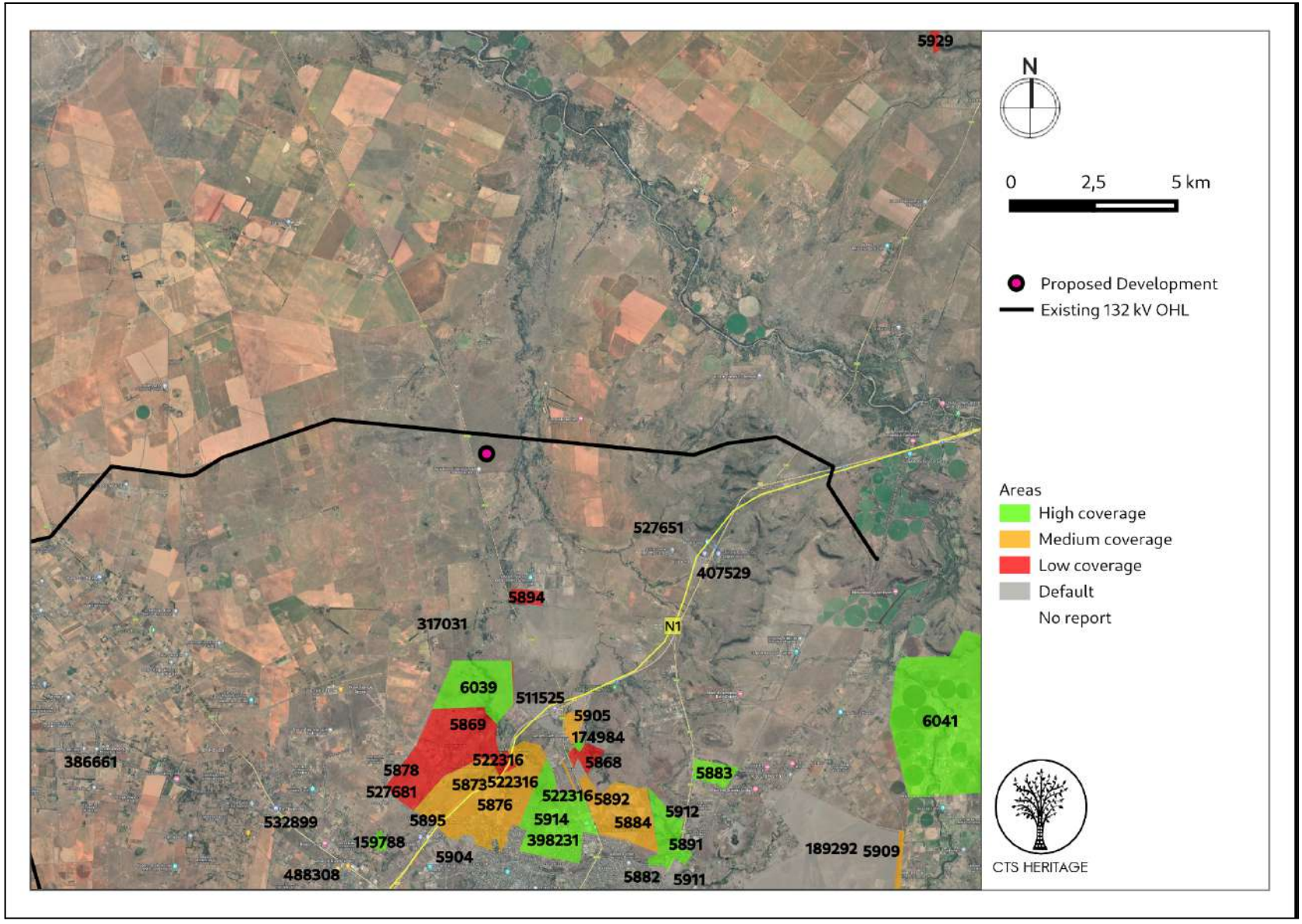

Figure 2. Previous HIAs Map. Previous Heritage Impact Assessments surrounding the proposed development area, with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.

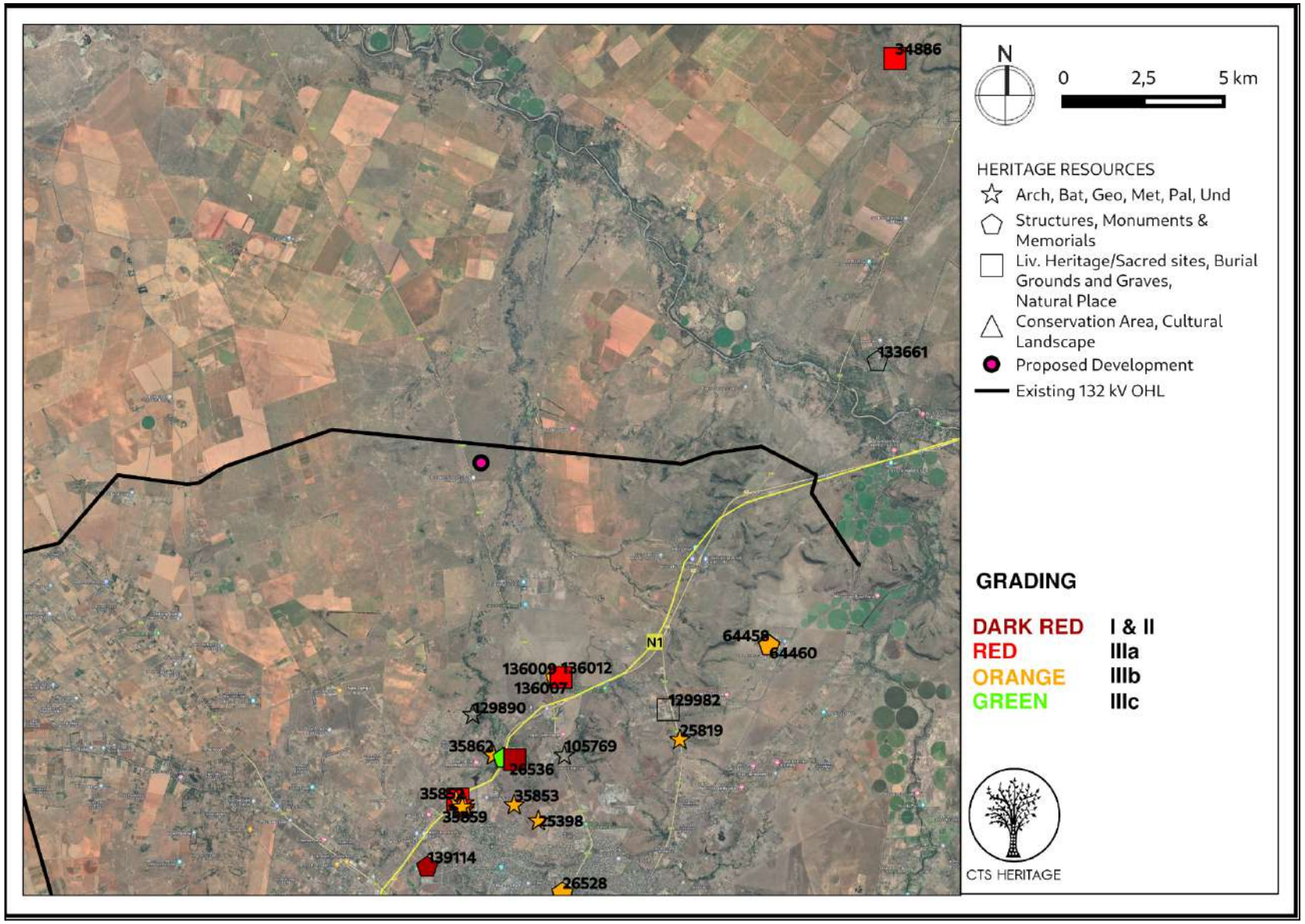

Figure 3a. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated. Please See Appendix 4 for full description of heritage resource types.

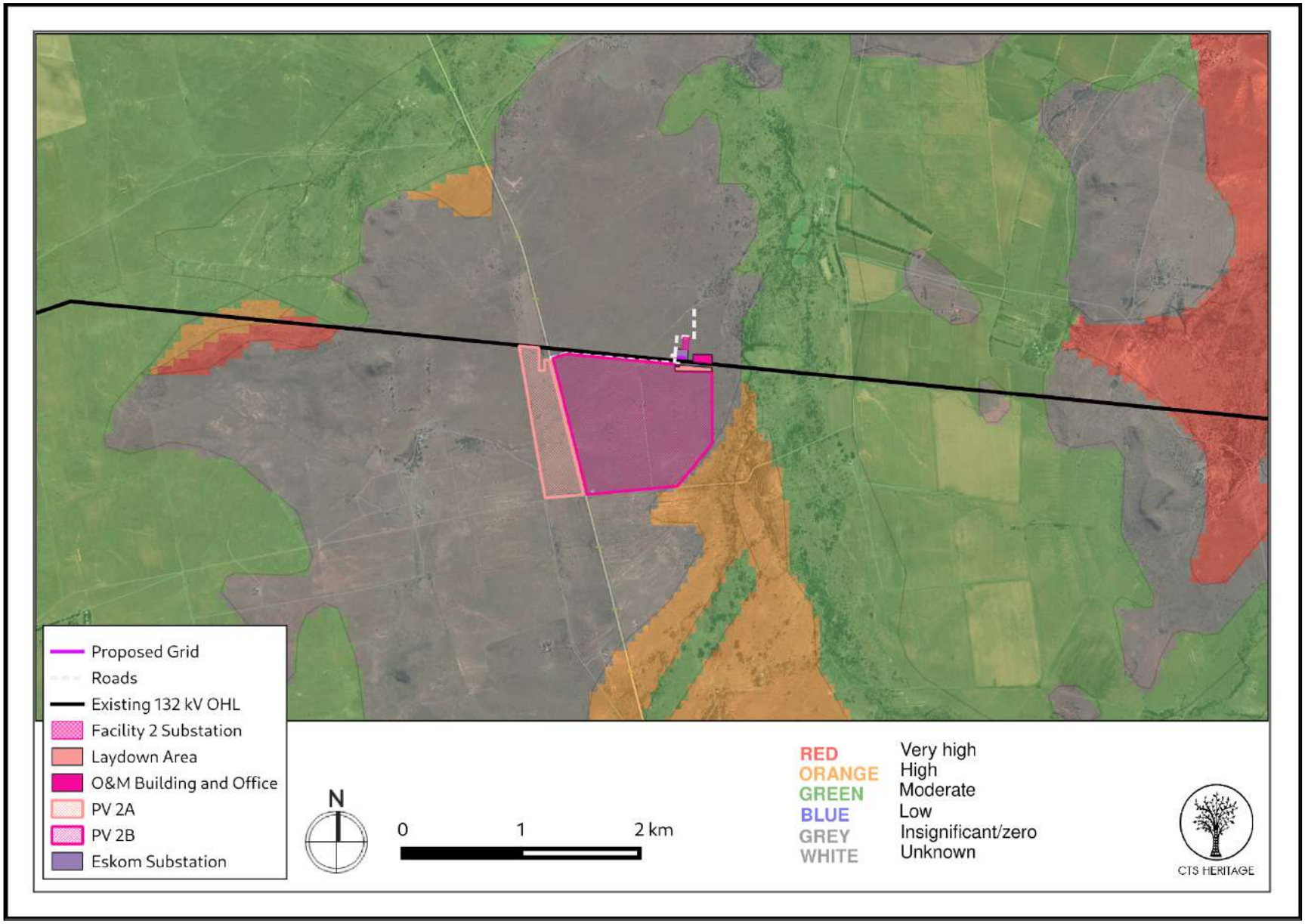

Figure 4. Palaeosensitivity Map. Indicating Zero, Moderate and High fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

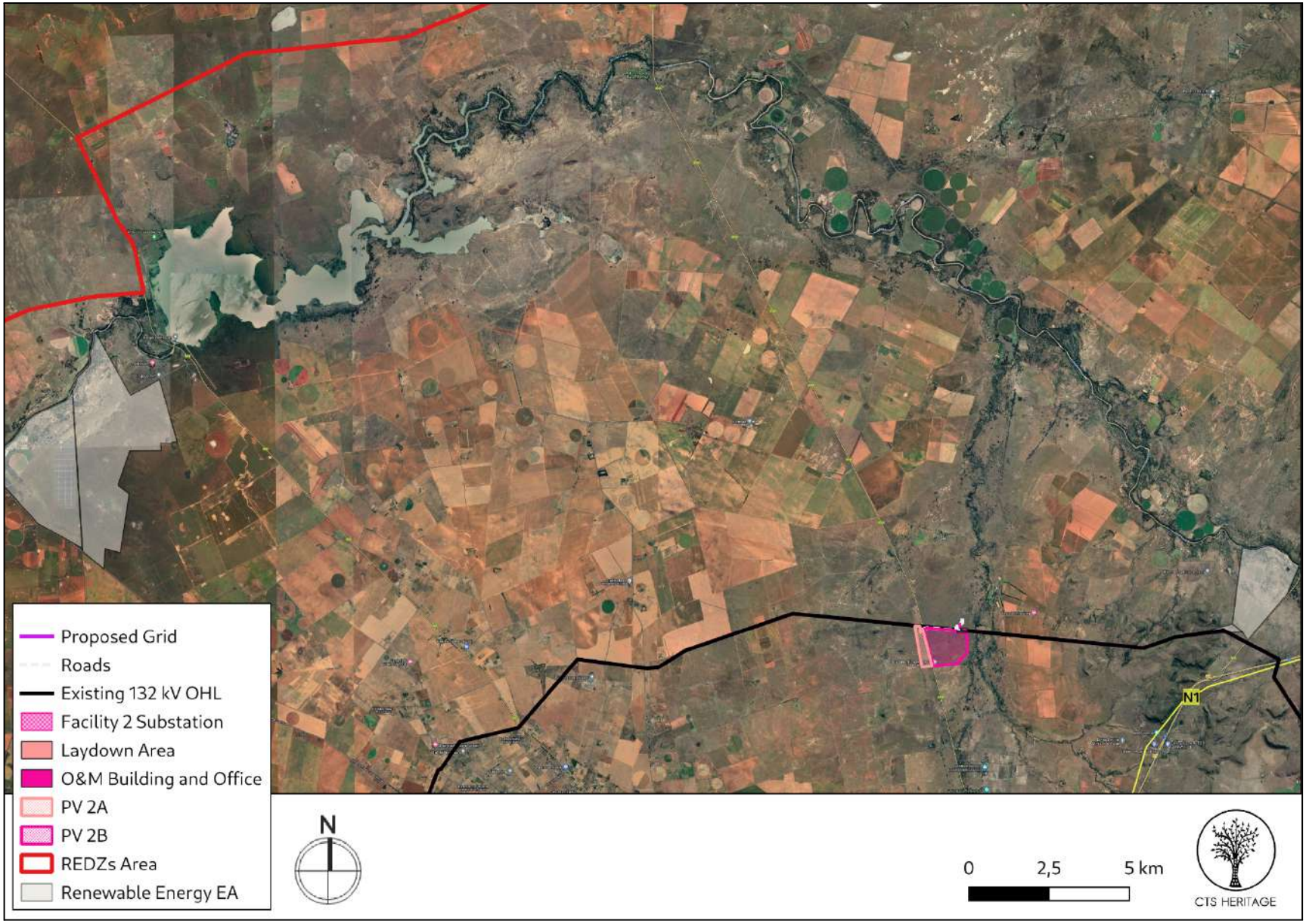

Figure 5. Renewable Energy EA Map. Indicating the location of the development outside of the REDZ area

8. Heritage statement and character of the area

Background

The area proposed for development is located approximately 20km north of the centre of Bloemfontein. Prior to its establishment in 1846, the area is said to have been the location of an !Orana settlement and subsequently a Boer settlement. With colonial policy shifts, the region changed into the Orange River Sovereignty (1848–54) and eventually the Orange Free State Republic (1854–1902). From 1902 to 1910 it served as the capital of the Orange River Colony and since that time as the provincial capital of the Free State. In 1910 it became the Judicial capital of the Union of South Africa. The are proposed for development is located on Floradale Farm and the proposed infrastructure is located approximately 1km from a number of farm buildings - possibly the farm werf. The age and heritage significance of these farm structures will need to be established through a site visit. Other farm werfs located nearby which may be indirectly impacted by the proposed development include Cumbrae, Mount Pleasant and Holmesdale.

According to Roodt (2012, SAHRIS NID 48744), “Historically, the area north of Bloemfontein is known for military activities that took place here during the South African War (1900 - 1902). Evidence of fortification can be found on the hills around Bloemfontein…” It is possible the such evidence may be present within the area proposed for development.

Archaeological sensitivity

Bloemfontein is located on the edges of the Great Karoo. Scattered throughout the Karoo is evidence of historic and prehistoric occupation in the form of Early, Middle and Later Stone Age lithics and other material remains. The descendents of the historic and prehistoric occupants of the region are found in the indigeous Khoe and San, as well as modern inhabitants of the area.

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

No significant archaeological heritage resources have been identified within close proximity to the area proposed for development (Figure 3), however it is clear that no heritage impact assessments have been conducted in close proximity to the development area (Figure 2). It is therefore possible, although unlikely, that significant archaeological heritage resources are located within the area proposed for development.

Palaeontology

According to the SAHRIS Palaeosensitvity Map (Figure 4), the study area is underlain by sediments of zero palaeontological sensitivity. The sediments underlying the study area include Karoo Dolerite which has no palaeontological sensitivity, Quaternary Sands may overlie the dolerite bedrock. The palaeontological sensitivity of the Quaternary Sands sediments derives from the likelihood of findings archaeological deposits preserved in these sediments and as such, is dealt with in the paragraphs above. It is very unlikely that significant palaeontological heritage will be impacted by the proposed development and no further studies are recommended in this regard.

RECOMMENDATIONS AND CONCLUSIONS

As it is possible that any proposed development within the study area may negatively impact on significant heritage resources, it is recommended that a Heritage Impact Assessment that satisfies section 38(3) of the NHRA is completed.

CTS HERITAGE

APPENDIX 1

List of heritage resources within close proximity to the development area from SAHRIS

Site ID	Site no	Full Site Name	Site Type	Grading
25819	Andries Pretorius Cutting Fossil Site	Andries Pretorius Cutting Fossil Site, Bloemfontein	Palaeontological	Grade IIIb
64458	TAFE001	Tafelkop 2876/ 001	Stone walling, Structures	Grade IIIb
64460	TAFE002	Tafelkop 2876/ 002	Stone walling, Structures	Grade IIIb
25398	LLV -01	Lilyvale 2313	Artefacts	Grade IIIb
35850	LIL001	Lilyvale 001	Stone walling	Grade IIIb
35851	LIL002	Lilyvale 002	Stone walling	Grade IIIb
35852	LIL003	Lilyvale 003	Deposit	Grade IIIa
35853	LIL004	Lilyvale 004	Stone walling	Grade IIIb
35854	LIL005	Lilyvale 005	Battlefield	Grade IIIb
35855	LIL006	Lilyvale 006	Stone walling	Grade IIIb
35856	LIL007	Lilyvale 007	Stone walling	Grade IIIb
35857	LIL008	Lilyvale 008	Artefacts	Grade IIIb
35858	LIL009	Lilyvale 009	Stone walling	Grade IIIa
35859	LIL010	Lilyvale 010	Stone walling	Grade IIIb
35860	LIL011	Lilyvale 011	Stone walling	Grade IIIb
35862	LIL013	Lilyvale 013	Stone walling	Grade IIIb

35861	LIL012	Lilyvale 012	Burial Grounds & Graves	Grade IIIa
34886	DAS001	Daskop 001	Burial Grounds & Graves	Grade IIIa
26528	9/2/302/0063	Somerlust, 32 Whites Road, Waverley, Bloemfontein	Building	Grade IIIb
94172	Bloem Cross 2	Bloem Cross 2	Structures	Grade IIIc
105769	TDH001	Tredenham Stone Walling Site 001	Stone walling	Ungraded
138337	Erf 22011-Bloemfontein	Heritage Lifestyle Centre (Erf 22011), Bloemfontein	Archaeological	
26536	9/2/302/0039	Orange Free State Botanical Gardens, Bloemfontein	Natural	Grade II
129890	erf 30113	51 Kameeldoring, Woodland Hills Wildlife Estate	Stone walling	
136007	WKF001	Wildealskloof	Artefacts	Grade IIIc
136009	WKF002	Wildealskloof	Structures	Grade IIIb
139114	9/2/302/0061	Corrugated-Iron Building, School of Armour, Tempe, Bloemfontein	Building	Grade II
136012	WKF003	Wildealskloof	Burial Grounds & Graves	Grade IIIa
129982	Plot 14 Ribblesdale, Bloemfontein	Plot 14 Ribblesdale, Bloemfontein	Natural	
133661	MAN/NAMM/0010	Glen Agricultural Monument, Glen Agricultural College, Bloemfontein	Monuments & Memorials	

CTS HERITAGE

APPENDIX 2

Reference List from SAHRIS

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159390	HIA Letter of Exemption	Lloyd Rossouw	03/09/2013	Exemption of Phase 1 Archaeological and Palaeontological Impact Assessment for a 3 km long 132 kV Power line on Farm Kwaggafontein 2300, Bloemfontein, Free State Province
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5915	AIA Phase 1	Cobus Dreyer	25/11/2004	Archaeological and Historical Investigation of the Proposed Developments at the Remainder of the Farm Boven Tempe 203, Bloemfontein
5916	AIA Phase 1	Cobus Dreyer	29/10/2005	Archaeological and Historical Investigation of the Proposed Residential Developments on a Portion of the Farm Bayswater 2865, Bloemfontein

5929	AIA Phase 1	Cobus Dreyer	05/07/2006	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Residential Development at Daskop 615, Brandfort, Free State
6039	AIA Phase 1	Cobus Dreyer	28/08/2006	First Phase Archaeological and Cultural Heritage Assessment of the Phase II Residential Developments of Woodland Hills Wildlife Estate, Hillandale 2960 (249) Bloemfontein
6041	AIA Phase 1	Cobus Dreyer	29/05/2007	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Residential Developments at the Farm Donkerhoek 392, Bloemfontein, Free State
6393	AIA Phase 1	Cobus Dreyer	14/04/2007	Archaeological and Historical Investigation of the Proposed Township Establishment on Portions of the Farms Cecilia 2352, Kwaggafontein 2300 and Bloemfontein 654, Bloemfontein, Free State
7211	AIA Phase 1	Zoe Henderson	01/01/2004	Report on Archaeological Survey of Subdivision 7, Remainder and Portion of Subdivision 25, of the Farm Lilyvale 2313, Bloemfontein

CTS HERITAGE

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.

CTS HERITAGE

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.