UPDATED HERITAGE IMPACT ASSESSMENT

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

Proposed development of the Tournée 1 Solar PV Park near Standerton, Mpumalanga

Prepared by CTS Heritage

CTS HERITAGE

For

WSP

September 2023

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EXECUTIVE SUMMARY

1. Site Name:

Tournee 1 Solar (Pty) Ltd

2. Location:

- Portion 7 (Portion of Portion 3) of Farm Dwars-in-die-Weg 350 IS
- Portion 6 of Farm Dwars-in-die-Weg 350 IS

3. Locality Plan:

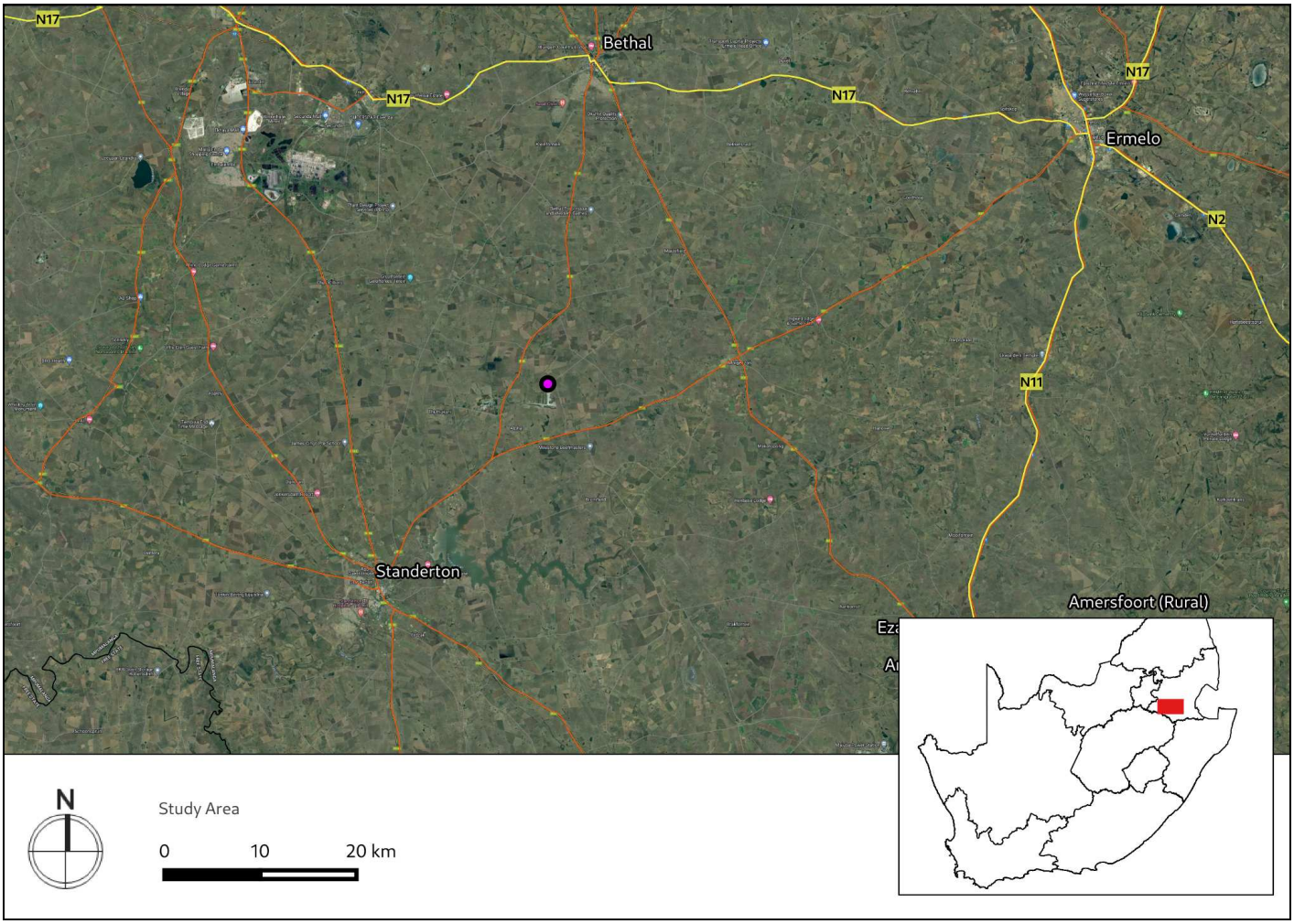

Figure A: Location of the proposed development area

4. Description of Proposed Development:

Red Rocket propose to construct the Tournée 1 & 2 Solar PV Parks near Thuthukani in the Mpumalanga Province. The Tournée Solar PV Cluster will include two 150MW Solar Energy Facilities (SEFs). This report assesses the likely impacts to heritage resources anticipated from Tournee 1 PV Park.

5. Anticipated Impacts on Heritage Resources:

The survey proceeded with some constraints and limitations, yet the project area was comprehensively surveyed for heritage resources. The significant heritage resources identified relate to the historic farm occupation of this property. These resources include the remnants of an old farm werf as well as burial sites that were identified.

In order to ensure that no impact to the identified resources occurs during the construction or operational phases of the development, a number of recommendations are made below.

Based on the fossil record but confirmed by the site visit and walk through there are NO FOSSILS of any significance such as those of recognisable *Glossopteris* floral elements, 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 shales of the Vryheid Formation so a Fossil Chance Find Protocol must be implemented for the duration of excavation activities.

6. Recommendations:

There is no objection to the proposed development from an archaeological perspective on condition that:

- The recommendations in the VIA are implemented
- A no development buffer of 50m is implemented around the burial sites identified within the development area
- Ongoing community access to these burials, as well as their conservation into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the burials to be implemented for the duration of the project.
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- 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.

Details of Specialist who prepared the HIA

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, 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 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.

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

Red Rocket propose to construct the Tournée 1 & 2 Solar PV Parks near Thuthukani in the Mpumalanga Province. The Tournée Solar PV Cluster will include two 150MW Solar Energy Facilities (SEFs).

It is understood that Red Rocket has a corporate Environmental and Social Management System (ESMS) which aligns with the Equator Principles, the International Funding Corporation (IFC) Performance Standards (PS) and applicable World Bank/IFC Environmental, Health and Safety (EHS) and Sector specific Guidelines and applicable Good International Industry Practice (GIIP). All Red Rocket's renewable energy projects, from inception, development, construction, operation, and any decommissioning are required to fully comply with the requirements and expectations of the ESMS.

Table 1: The following technical details are applicable to each facility*:*

Project Related Info	TOURNEE 1 SOLAR PV PARK
Municipality	▪ Lekwa Local Municipality ▪ Gert Sibande District Municipality
Farm portions	▪ Portion 7 (Portion of Portion 3) of Farm Dwars-in-die-Weg 350 IS ▪ and Portion 6 of Farm Dwars-in -die-Weg 350 IS
Extent	▪ 306.65 ha
Buildable area	Approximately 229 Ha, subject to finalization based on technical and environmental requirements
Contracted Capacity of PVSEF	150MW
What other infrastructure does the client want to include in this Process (PVSEF, BESS, Substation, switching station, access roads etc.)	PV Solar Energy Facility including bifacial solar PV modules installed on single axis tracker mounting structures at a height of up to 6m above ground level, and inverters and transformers.
	Access road - Up to 8m width
	▪ O&M building (including substructures) = 1,500 m²
	▪ Typical construction camp area 100m x 50m = 5,000m²
	Typical laydown area 100m x 200m = 20,000m2.
	▪ Sewage: Septic tanks and portable toilets
	2,500 m² Paved areas

	Temporary concrete batching plant - Gravel and sand will be stored in separate heaps whilst the cement will be contained in a silo. = 30,000 m²
	Internal roads - Up to 4m in width
	Internal road length - Up to 16km
	Cables - Communication, AC and DC cables installed underground and overhead. AC cabling up to 33kV between project components
	Independent Power Producer (IPP) site substation and battery energy storage system (BESS): Total footprint will be up to 5.5 ha in extent (4 ha for the BESS and 1.5 ha for the IPP portion of the substation).
	The back to back substation (including facility substation, and Eskom collector/switching station) will consist of a high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control buildings, telecommunications infrastructure, access roads, etc. = 15,000 m²
	An up to 132kV Overhead Powerline ("OHPL"). The final interconnection solution will be dependent on the requirements of Eskom, which are still to be defined.
	The Battery Energy Storage System's main components include the batteries installed in rows of containers, the power conversion system (inverters) and transformers. The capacity will be up to 150MW/600MWh. Area required = 40,000 m²
	Fencing around development area

1.2 Description of Property and Affected Environment

The study terrains consist of gentle to medium undulating landscapes covered by Soweto Highveld Grassland. No prominent rocky outcrops were observed. Instead, due to the cultivated areas, we observed peat (turf), clay-like soils, and waterlogged areas (due to heavy rains). The area is densely vegetated with various grasses and plant species. In addition, a few planted tree lanes were observed on the field perimeters.

Some of the plant and grass species observed appear to belong to the species of *Elionurus muticus, Setaria nigrirostris,Themeda triandra, Cosmos bipinnatus, Eragrostis micrantha,* among various others. Two prominent water sources are located on Dwars-in-de-weg 3/350 and 7/350. Dirt roads and farmlands bound the site to the north, south, east and west. An Eskom ash dumping site is located south of portion 3/350.

Several farming-related features, such as water reservoirs, wind pumps and livestock troughs, can be found throughout the properties. The majority of the properties have cultivated lands, still currently in use. Other farming activities, like livestock grazing, further disturbed the soil.

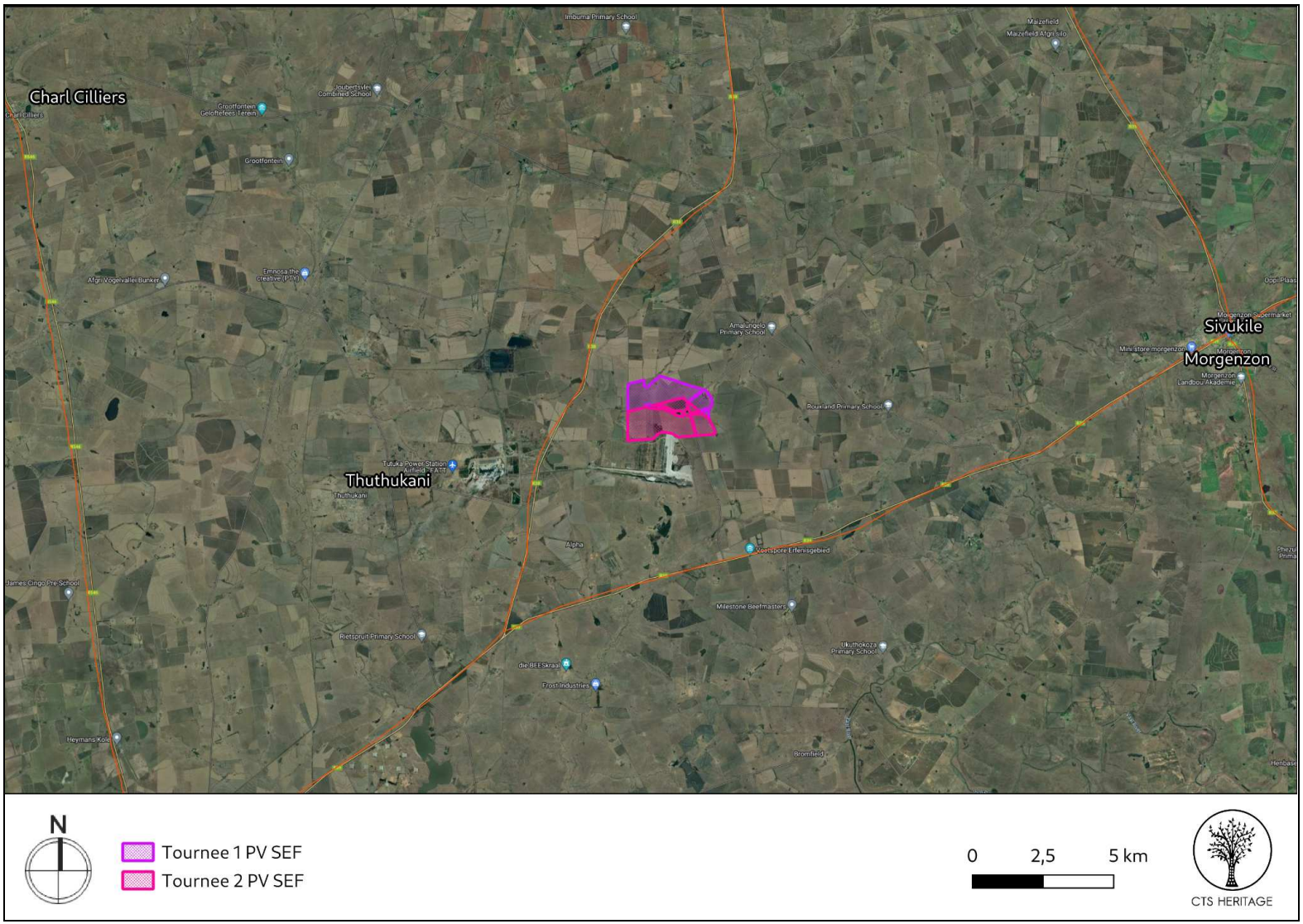

Figure 1.2: Proposed project boundary

Figure 1.3: Proposed project boundary

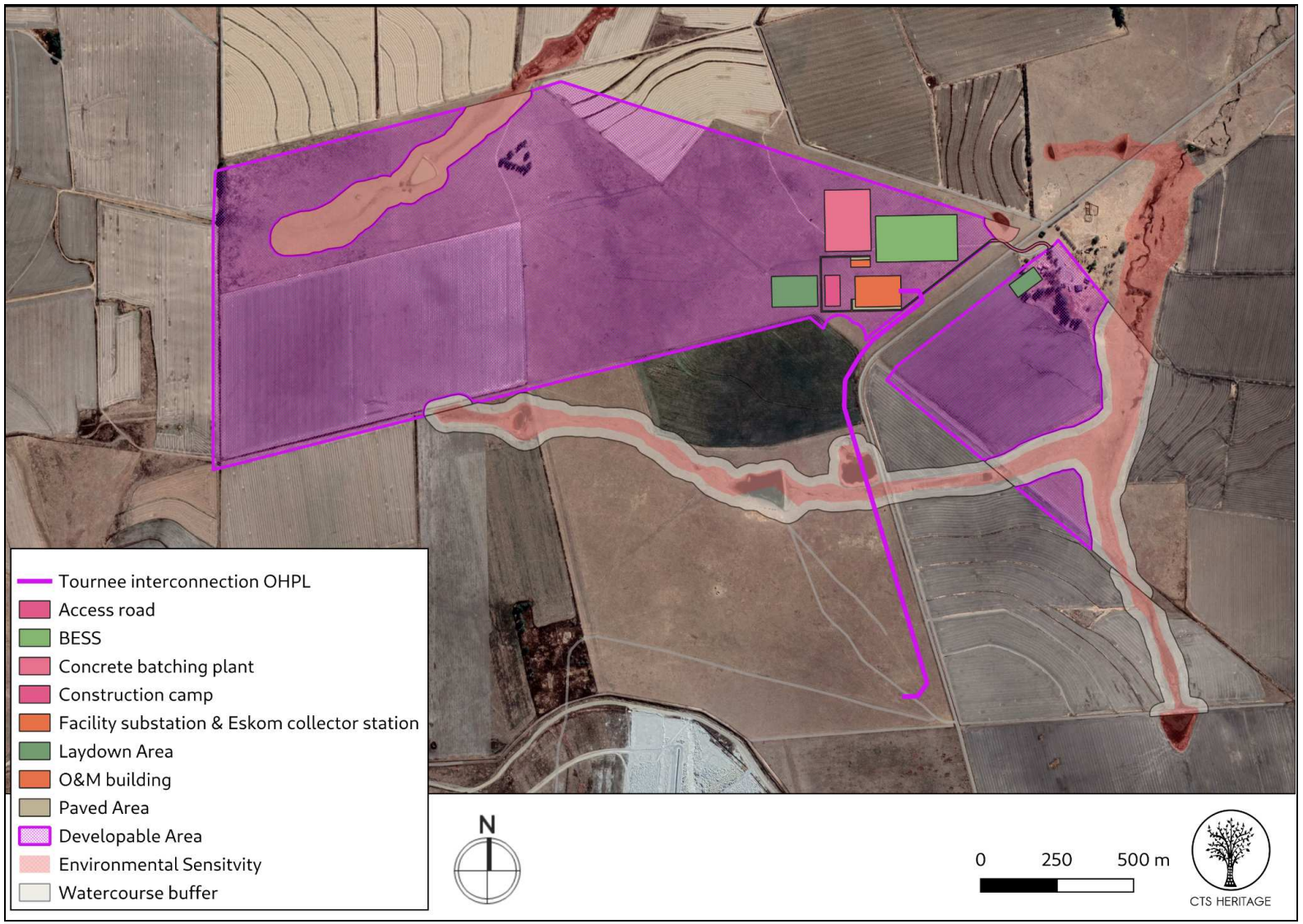

Figure 1.4: Final Project Layout

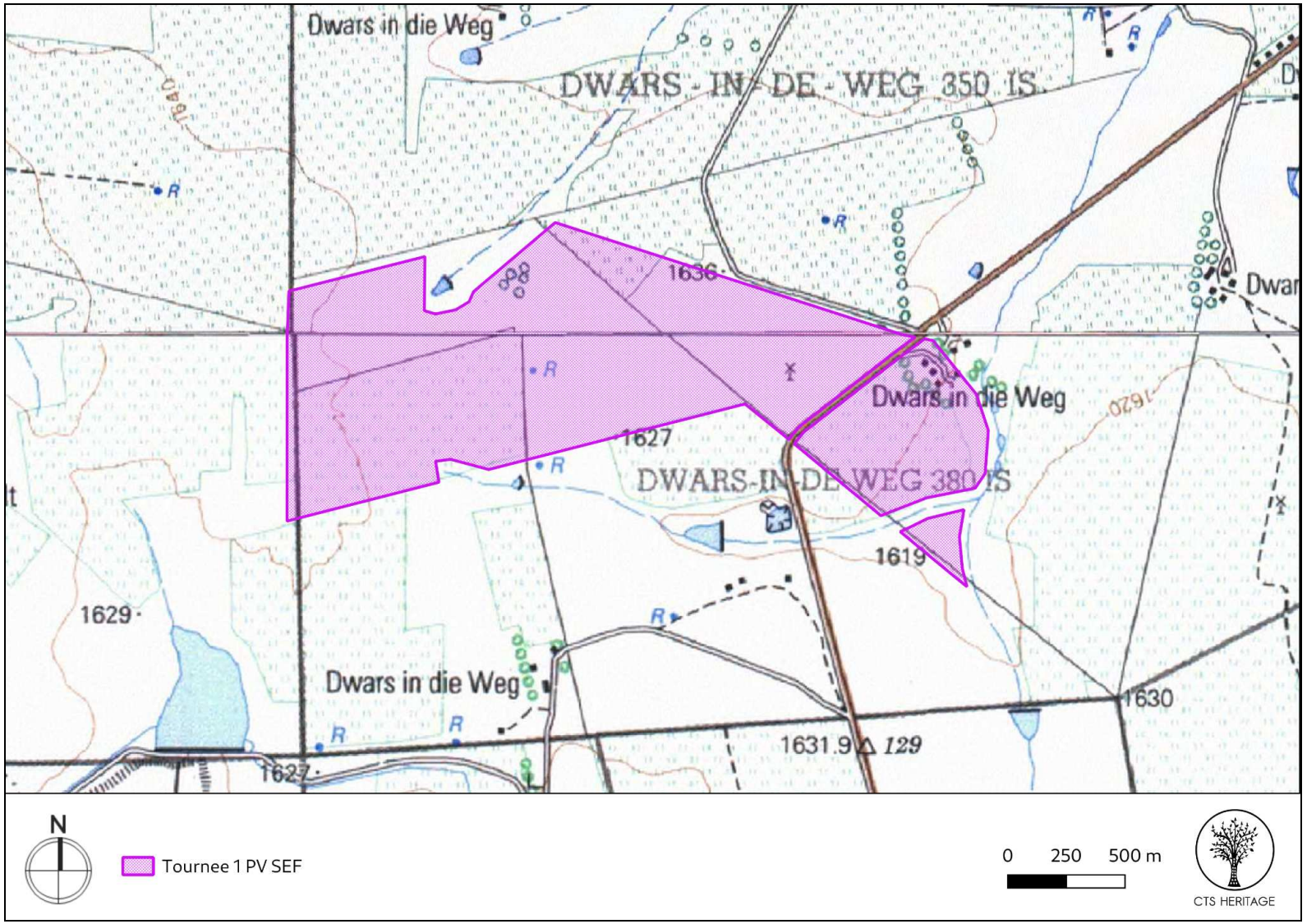

Figure 1.4: Proposed project boundary indicated on the 1:50 000 Topo Map

1.3. Legislative Framework

1.3.1 Relevant Acts, Ordinances and By-laws (National, Provincial and Municipal)

National Heritage Resources Act 25 of 1999

- to introduce an integrated and interactive system for the management of the national heritage resources;
- to promote good government at all levels, and empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations;
- to lay down general principles for governing heritage resources management throughout the Republic;
- to introduce an integrated system for the identification, assessment and management of the heritage resources of South Africa;
- to establish the South African Heritage Resources Agency together with its Council to co-ordinate and promote the management of heritage resources at national level;
- to set norms and maintain essential national standards for the management of heritage resources in the Republic and to protect heritage resources of national significance;
- to control the export of nationally significant heritage objects and the import into the Republic of cultural property illegally exported from foreign countries;
- to enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources;
- to provide for the protection and management of conservation-worthy places and areas by local authorities;
- Section 7 provides a system for evaluating cultural significance - the grading system

Integrated Coastal Management Act 24 of 2008

- Integrated coastal and estuarine management, including heritage sites within 1km of the coastline

National Environmental Management Act 107 of 1998

- Management of all environmental resources including heritage through the linking clause of S. 38(8) of the NHRA
- There is no specialist specific protocol - so the general protocol is used for impacts to heritage resources

Table 2: National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6).

	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,	Page 3
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Page 3
b	A declaration that the person is independent in a form as may be specified by the competent authority	Attached by EAP
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 2.1
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	Section 2.1 and Section 9
cii	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 5.1
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 2.2
e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 2
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 5
g	An identification of any areas to be avoided, including buffers	Section 5
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;	Section 5
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2.3
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 5
k	Any mitigation measures for inclusion in the EMPr	Section 8
l	Any conditions for inclusion in the environmental authorisation	Section 8
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 8
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Section 7
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	Section 8
o	A description of any consultation process that was undertaken during the course of carrying out the study	Section 6
p	A summary and copies of any comments that were received during any consultation process	N/A

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	Relevant section in report
q	Any other information requested by the competent authority.	N/A
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

NEMA: Protected Areas Act 57 of 2003

- Management of declared World Heritage Sites and buffer areas within South Africa
- The purpose of the National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEMPAA) is to, inter alia, provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. To this end, it provides for the declaration and management of various types of protected areas.
- Section 39 of NEM:PAA requires the preparation and submission of a management plan for a protected area declared in terms of the Act. The objective of a management plan, as stated in Section 41 of NEM:PAA, is to ensure the protection, conservation and management of the protected area concerned in a manner that is consistent with the objectives of NEMPAA and for the purpose it was declared.
- Section 50(5) of NEM:PAA states that "*no development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority.*"
- The management authority for a WHS is established through a NEM:PAA process. The MA is located within and funded by the DFFE.
- The MA is tasked with ensuring that activities within the WHS and its buffer area comply with the approved Conservation Management Plan developed for the WHS.

World Heritage Convention Act 49 of 1999

- Provides for the incorporation of the World Heritage Convention into South African law;
- Provides for the enforcement and implementation of the World Heritage Convention in South Africa;
- Provides for the recognition and establishment of World Heritage Sites;
- Provides for the establishment of Authorities and the granting of additional powers to existing organs of state;
- Provides for the powers and duties of such Authorities, especially those safeguarding the integrity of World Heritage Sites;

- Provides for where appropriate, the establishment of Boards and Executive Staff Components of the Authorities;
- Provides for integrated management plans over World Heritage Sites;
- Provides for land matters in relation to World Heritage Sites;
- Provides for financial, auditing and reporting controls over the Authorities;
- Provides for the establishment of the World Heritage Convention Committee of South Africa which is responsible for liaison with the World Heritage Convention Committee of UNESCO
- Declared WHS within this assessment area - Richtersveld Cultural Landscape WHS

1.3.2 Relevant International Treaties and Conventions

Unesco Convention on the Protection of World Cultural and Natural Heritage, 1972

- Provides a system for the protection of natural and cultural heritage sites which demonstrate importance for all the peoples of the world
- Provides a system for the identification of Outstanding Universal Value (OUV)

Burra Charter or the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (1979)

- Defines the basic principles and procedures to be followed in the conservation of Australian heritage places but is widely used across the world and very much in South Africa today.
- Accepts the philosophy and concepts of the ICOMOS Venice Charter, but wrote them in a form which would be practical and useful in Australia. The Charter is periodically revised and updated (most recent, 2013)
- Recognised as having pioneered the understanding of cultural heritage as going beyond the mere preservation of the built environment.

NARA Document on Authenticity (1994)

- Addresses the need for a broader understanding of cultural diversity and cultural heritage in relation to conservation in order to evaluate the value and authenticity of cultural property more objectively.
- "authenticity is an essential element in defining, assessing, and monitoring cultural heritage."
- "authenticity" varies from culture to culture - when authenticity is being assessed for a particular cultural heritage, its underlying cultural context should be considered

Convention for the Safeguarding of Intangible Cultural Heritage (2003)

- Intangible Cultural Heritage means the practices, representations, expressions, knowledge, and skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage.
- This intangible cultural heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity.
- For the purposes of this Convention, consideration will be given solely to such intangible cultural heritage as is compatible with existing international human rights instruments, as well as with the requirements of mutual respect among communities, groups and individuals, and of sustainable development

1.3.3 Relevant Guidelines (promulgated and proposed)

HWC Grading: Purpose and Management Implications (2016)

- Although emanating from the Western Cape, this document provides clarity on the grading system outlined in Sections 7 and 8 of the NHRA
- Provides the basis for grading recommendations for heritage resources and the outcomes thereof

SAHRA Minimum Standards: Archaeological And Palaeontological Components Of Impact Assessment Reports, 2007

- Outlines the minimum requirements for impact assessments submitted to SAHRA in terms of section 38 of the NHRA

SAHRA Minimum Standards: Palaeontological Component of Heritage Impact Assessment Reports, 2012

- Outlines the minimum requirements for palaeontological impact assessments submitted to SAHRA in terms of section 38 of the NHRA

Richtersveld Community Conservancy Management Plan (2006)

- This Management Plan was drawn up by the Reference Group of the Richtersveld Community Conservancy over a period of two years. During this time a special task team was elected with the purpose of drawing up an Operational Plan, which shows the road that needs to be taken to establish the Richtersveld Community Conservancy.
- The task team held workshops and drew up an Operational Plan, which was approved and accepted by the Reference Group. This Operational Plan was converted into a concept Management Plan.

- This document provides guidance in terms of the protection and management of the unique biodiversity and natural landscape to the advantage of the local people and all of humankind
- The goal of this management plan is to:
    - To plan proper versatile land use so that it can be implemented in sustainable ways.
    - To use resources in integrated, effective and sustainable ways so that they are not exhausted.
    - To investigate and promote participation and benefits to local people.
    - To bring about an effective management system and put in place an integrated conservation and development principle.
    - To determine and continuously monitor economic, social and environmental impacts.

1.3.4 Any discipline specific permitting requirements

The NHRA describes a number of general protections that apply to heritage resources including:

- Section 34 permit for impacts to structures older than 60 years
- Section 35 permit for impacts to archaeological heritage, palaeontological heritage and meteorites
- Section 36 permit for impacts to burial grounds and graves that fall outside of a municipal cemetery
- Section 38 HIA process for impacts resulting from developments

The NHRA also describes a number of formal protections that apply to heritage resources that have been protected through the placement of a notice in a National or Provincial gazette

- Section 27 permit for impacts to National and Provincial Heritage Sites
- Section 28 permit for impacts to a site that is provisionally protected
- Section 29 permit for impacts to a buffer area around a National or Provincial Heritage Site
- Section 30 and 31 permits for impacts to sites placed on the heritage register or heritage areas

1.3.5 Any relevant IFC, Equator Principles or World Bank requirements

IFC Performance Standard 7: Indigenous Peoples

Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalised and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded.

Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat. As a consequence, Indigenous Peoples may be more vulnerable to the adverse impacts associated with project development than non-indigenous communities. This vulnerability may include loss of identity, culture, and natural resource-based livelihoods, as well as exposure to impoverishment and diseases. Private sector projects can create opportunities for Indigenous Peoples to participate in, and benefit from project-related activities that may help them fulfil their aspiration for economic and social development. Furthermore, Indigenous Peoples may play a role in sustainable development by promoting and managing activities and enterprises as partners in development. Government often plays a central role in the management of Indigenous Peoples' issues, and clients should collaborate with the responsible authorities in managing the risks and impacts of their activities.

The primary objectives of Performance Standard 7 are:

- To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples;
- To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts;
- To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner;
- To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life cycle.
- To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present;
- To respect and preserve the culture, knowledge, and practices of Indigenous Peoples; and
- There is no universally accepted definition of "Indigenous Peoples." Indigenous Peoples may be referred to in different countries by such terms as "Indigenous ethnic minorities," "aboriginals," "hill tribes," "minority nationalities," "scheduled tribes," "first nations," or "tribal groups."

The term "Indigenous Peoples" is used in a generic sense to refer to a distinct social and cultural group possessing the following characteristics in varying degrees:

- Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;
- Customary cultural, economic, social, or political institutions that are separate from those of the mainstream society or culture; or

- A distinct language or dialect, often different from the official language or languages of the country or region in which they reside.

Projects shall seek input from competent professionals to ascertain whether a particular group is considered as Indigenous Peoples.

IFC Performance Standard 8 - Cultural Heritage (2012)

This principle recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.

The primary objectives of Performance Standard 8 are:

- To protect cultural heritage from the adverse impacts of project activities and support its preservation; and
- To promote the equitable sharing of benefits from the use of cultural heritage. Cultural heritage refers to:
    - Tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values;
    - Unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls; and
    - Certain instances of intangible forms of culture that are proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.

1.3.6 Discussion

NATIONAL HERITAGE RESOURCES ACT (1999)

Heritage resources significant enough to be considered part of the national "estate" in Section 3(2) of the NHRA, and may include *inter alia:*

- Places, buildings, structures and equipment of cultural significance;
- Places to which oral traditions are attached or which are associated with living heritage;
- Historical settlements and townscapes;
- Landscapes and natural features of cultural significance;

- Geological sites of scientific or cultural importance;
- Archaeological sites and objects;
- Graves and burial grounds;
- Sites of significance relating to the history of slavery in South Africa;
- Moveable objects including military objects, fine art, books records, documents, archaeological and paleontological objects, and materials.

Cultural heritage significance means aesthetic, historical, scientific, architectural, spiritual, technological or/and social significance. The process of deciding why a place is of heritage significance is called heritage assessment. Understanding heritage significance is essential to making sound decisions about the future of the heritage resource, to assess development proposals and to ensure the appropriate level of heritage management.

A culturally significant resource or site is considered part of the national estate if it has cultural significance or any other special values due to:

- Its importance in the community, or pattern of South Africa's history;
- Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural history;
- Its potential to yield information that will contribute to an understanding of South Africa natural or cultural heritage;
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- Its strong association with a particular community or cultural group for social, cultural or spiritual reasons;
- Its strong and special association with the life or work of a person, group or organisation of importance in the history of south Africa;
- Sites of significance in relations to the history of slavery (Section 3[3] NHRA).

The National Heritage Resources Act (Act 25 of 1999) provides a mechanism for the management of heritage resources of cultural significance. The NHRA envisages a three tier system of management of heritage resources, namely National, Provincial and Local.

Specific management tools are available to Local Authorities for heritage resource management. In terms of section 8(4) of the National Heritage Resources Act, "A local authority is responsible for the identification and management of Grade III heritage resources and heritage resources which are deemed to fall within their competence in terms of this Act".

Registered Conservation Bodies play an extremely important role in assisting with the identification of heritage resources which are important to the community, and can provide local knowledge in determining their significance. The benefits to Local Authorities in implementing heritage management in terms of the NHRA include the protection of local resources, giving certainty to local property owners as to what is and is not protected, and enabling them to have their applications dealt with at a local level. The specific management tools provided for in the NHRA include:

- Grading (Sections 7 and 8 of the NHRA)
- Surveys (Section 30 of the NHRA)
- Heritage Registers (Section 30 of the NHRA)
- Heritage Areas (Section 31 of the NHRA)

Grading

The NHRA requires that all heritage resources be graded in order to assign the appropriate level of management responsibility (i.e. Local, Provincial or National spheres of governance) to a heritage resource and to indicate its significance. Significance is key to assessing grading and is the primary tool in defining heritage management.

The identification of significant heritage resources is a requirement of the National Heritage Resources Act, No 25 of 1999 (NHRA). NHRA Section 7 (1) makes provision for the establishment of a system of grading places and objects which form part of the national estate, and which distinguishes between at least the following categories:

- Grade 1: Heritage resources with qualities so exceptional that they are of special national significance and thus should be declared national heritage sites;
- Grade II: Heritage resources which although forming part of the national estate can be considered to have special qualities which make them significant within the context of a province or a region and thus should be declared provincial heritage sites; and
- Grade III: Other conservation-worthy heritage resources, which should be entered on the provincial heritage register and protected in terms of the local planning system.

This system needs to prescribe certain assessment criteria, consistent with the criteria set out in section 3(3) of the NHRA. These must be used to assess the intrinsic, comparative and contextual significance of a heritage resource and the relative benefits and cost of its protection so that the appropriate level of grading of the resource and the consequent responsibility for its management may be allocated.

Grading is an important step in the process towards (but not necessarily leading to) the formal protection of a heritage resource, such as declaration as a National Heritage Site, Provincial Heritage Site, or, in the case of Grade

III heritage resources, the placing of a heritage resource on the Heritage Register. It is not an end in itself, but a means of establishing an appropriate level of management to proceed with future formal protection.

In terms of grading, we will be following the recommended grading system included in the HWC Grading Policy document and included in this report at Table 1.

Legislative Mandate

The National Heritage Resources Act (NHRA, Act 25 of 1999) primarily employs two mechanisms to ensure the effective conservation and management of significant heritage resources. These mechanisms are the Formal Protections detailed in Part I of Chapter II of the NHRA and the General Protections detailed in Part II of Chapter II of the NHRA. Formal Protections include the declaration of National and Provincial Heritage Sites, Heritage Areas as well as the establishment of the Heritage Register. The General Protections include permitting requirements for alterations to structures that are older than 60 years (Section 34) and permit requirements for impacts to archaeological and palaeontological heritage resources (Section 35), amongst others.

Applications for renewable energy developments, in general, fall under section 38 of the NHRA, a section that falls within Part II of Chapter II - the General Protections. This section of the heritage legislation is triggered by developments of a certain scale, size or nature such as the change of character to a site exceeding 5000m^2. Section 38(8) of the NHRA specifically deals with such developments that also trigger other legislation that requires an assessment of impacts, for example, in terms of NEMA.

Section 38(8) of the NHRA requires that any assessment of impacts from such developments also include an assessment of impacts to heritage resources that satisfies certain criteria detailed in section 38(3) of the NHRA. Section 38(8) also requires heritage authorities to comment on such heritage impact assessments, and that the relevant decision-making authorities (such as the DFFE) take this comment into consideration prior to issuing the authorisation (such as the Environmental Authorisation or equivalent). This is to ensure that any significant heritage resources that may be impacted by the proposed development are identified and appropriately managed or mitigated against impacts prior to authorisation.

In terms of section 38(3) of the NHRA, it is required that impacts to all heritage resources be assessed in an HIA. “All heritage resources” includes archaeological heritage, palaeontological heritage, the built environment as well as the cultural landscape more broadly. This HIA is drafted to satisfy this requirement.

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 archaeologists conducted their site visit from 1 to 2 February 2023
- A palaeontologist conducted a field assessment of palaeontological resources likely to be disturbed by the proposed development on 10 February 2023.
- 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

The local farmers confirmed a rainfall of 70 mm between the 31st of January and the morning of the 1st of February. The rain affected the surface of the development footprint properties and access roads. In addition, the

soil was saturated, with waterlogged areas, specifically near the water sources and cultivated areas. The water and mud affected the surface's visibility and made certain areas inaccessible by vehicle and foot.

Several areas were densely vegetated, with various grasses and vegetation affecting the visibility of the surface. Vegetation growth, wet weather, waterlogged areas, and erosion limited the transects that could be undertaken during the survey. Nevertheless, the survey tracks followed the landscape, farm roads, fences and boundaries from which we conducted pedestrian surveys at various points. In addition, the ground surface and areas with noticeable vegetation changes were inspected to the best of our abilities.

The team is confident that the work done accurately reflects the archaeological sensitivity of the development area.

2.5 WSP Impact Assessment Methodology

Assessments of Impacts and Mitigation

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[1], indirect[2], secondary[3] as well as cumulative impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria presented in Table 1 below.

Impact Mitigation

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management

and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

Table 3: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite

Significance (S) is determined by combining the above criteria:	S=(E+D+R+M)xP Significance=(Extent+Duration+Reversibility+Magnitude) x Probability

IMPACT SIGNIFICANCE RATING					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

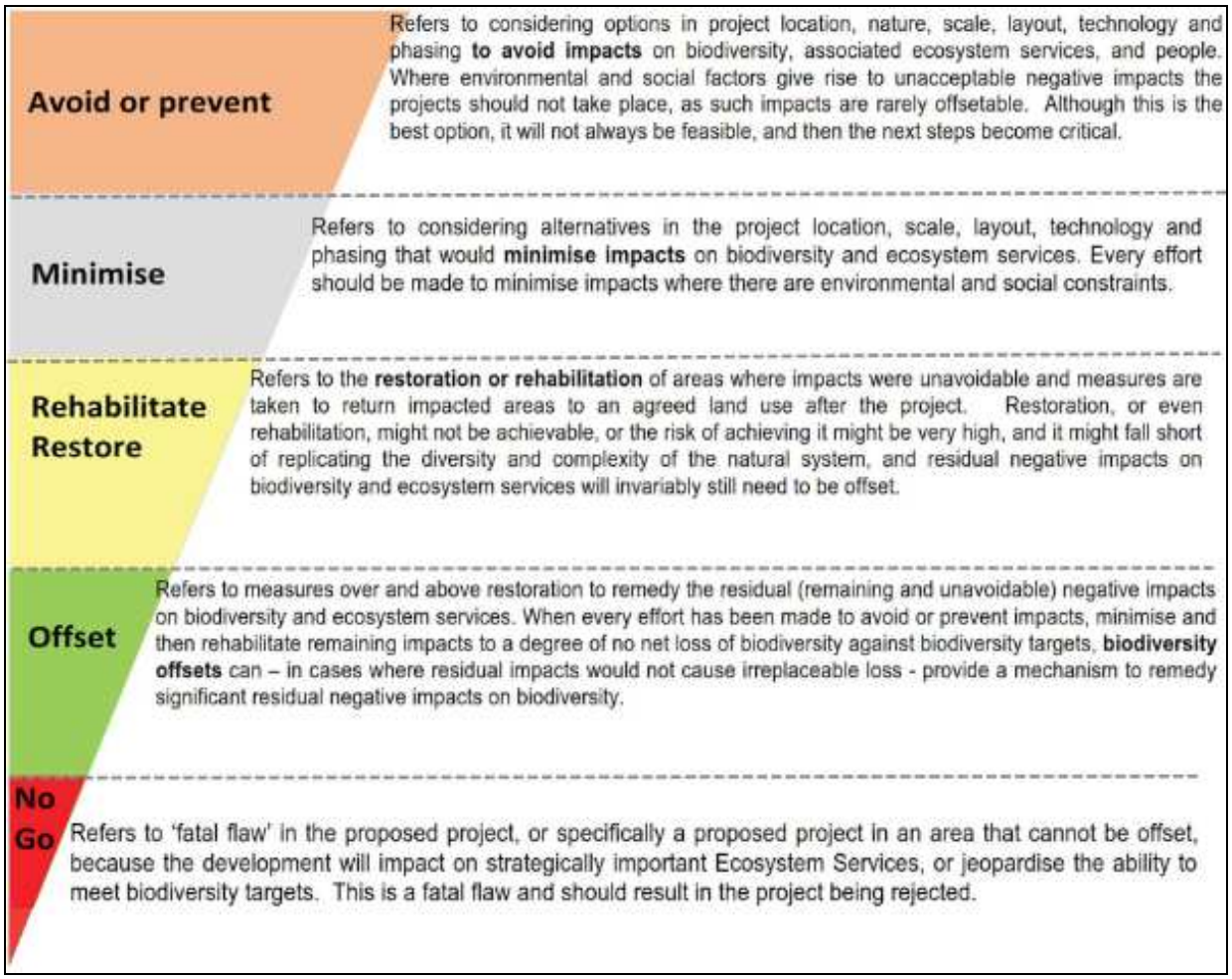

Figure 2: Mitigation Sequence Hierarchy

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

The area proposed for this Solar Energy Development is located immediately east of the R38 between Standerton and Bethal. This area is known for its rolling hills and extensive coal mine infrastructure. The proposed PV development is located in close proximity to the Tutuka Coal Power Station. The broader area in which the proposed development is located is dominated by power generation infrastructure and associated grid connections and as such, the proposed SEF is consistent with the general area uses.

3.1.1 Cultural Landscape

Van Vollenhoven (2015) described the broader assessment area in his assessment completed for a de-stoning plant located near to this proposed development area. Van Vollenhoven (2015) describes the environment as "disturbed by recent human activities, mainly agriculture. This consists of maize fields. Other disturbance visible is mining infrastructure..., a railway track... and power lines... Signs of old fields were also present which could be seen in the pioneer plant species consisting of weeds and grass. Almost half of the surveyed area consists of natural grassland. The vegetation cover varies between short and long grass... The topography of the area forms part of the rolling hills of the surrounding landscape."

Van Vollenhoven (2015) notes that "At the beginning of the 19th century the Phuthing, a South Sotho group, stayed in the vicinity of modern day Bethal. During the Difaquane they fled to the south (Bergh 1999: 10-11; 109). In 1829 the traveller Robert Scoon passed through an area to the north of Bethal (Bergh 1999: 13). The first white farmers only settled here during the late 1850's. By the 1890's this area was inhabited by many white farmers (Bergh 1999: 18-20). The town of Standerton was established in 1879 although it already was a district in 1878. Bethal was established in 1880 and it became an independent district in 1898 (Bergh 1999: 20-21). During the Anglo-Transvaal War (1880-1881) the British garrison in Standerton was beleaguered by the Boer forces (Bergh 1999: 46). The Highveld areas also saw much action consisting of various skirmishes between Boer and Brit during the Anglo-Boer War (1899-1902). It includes skirmishes on the farms Oshoek (4 December 1901), Trigaardsfontein (10 December 1901), Witbank (11 January 1902) and Nelspan (26 January 1902) (Bergh 1999: 51, 54)... At Standerton there was both a concentration camp for white and for black people (Bergh 1999: 54)."

Matenga (2022) notes that the neighbouring "Tutuka Power Station was commissioned in 1985. The Power Station and other associated built elements are therefore less than 60 years old, hence below the threshold of recognition in terms of the Heritage Act as industrial heritage of significance. The six cooling towers and two chimneys are iconic structures dominating the landscape and skyline. They represent coal power generating technology of the period from the late 19th century through to the late 20th century." The proposed SEF is relatively small in both its vertical and horizontal dimensions when compared to the Tutuka Power Station. It is dwarfed by the power plant,

and as such its impact on the existing landscape is not likely to be significant. However, cognisance must be taken of this unique cultural landscape, consisting of farm werfs etc in the proposed layout.

3.1.2 Archaeology

None of the area proposed for development has been previously assessed in any heritage impact assessment process, however Van Schalkwyk surveyed Farm Spioenkop 376IS in 2002 (SAHRIS NID 5700). Van Schalkwyk (2002) notes that "Although sporadic finds of Stone Age tools have been reported in the larger geographical area, all of these are surface finds, with no known stratified site close by. Some Iron Age sites are also known to exit in the larger area, but none are found close to the study area. Similarly, although some Anglo-Boer War II battlefields occur in the area, and some old farmsteads can be identified on some of the farms, none of these occur in the study area." Van Schalkwyk (2002) identified no heritage resources of significance in his assessment.

Heritage Impact Assessments have been completed nearby for projects in Secunda and these can be used to infer the archaeological sensitivity in the development area. Van Vollenhoven (2015) notes that the geographical area around the towns of Standerton and Bethal is not known to conserve Stone Age archaeology. He notes that "No such sites are indicated on maps contained in a historical atlas of this area (Bergh 1999: 4-5). However this may only be since no research has actually been done in this area. The closest known Stone Age occurrences are a Late Stone Age site at the town of Ermelo and rock art sites far to the west of Standerton (Bergh 1999: 4-5)." Van Vollenhoven (2015) noted no natural shelters during the survey; however, the good vegetation in the surrounding area and the rivers indicate that ample grazing and water may have been available, making it a prime spot for hunting in the past. Therefore one may assume that Stone Age people probably would have moved through the area. Late Iron Age sites are found in a large area around the towns of Bethal and Standerton and number at least 585 such sites.

In the heritage assessment of a powerline upgrade at the nearby Syferfontein Mine, Nel & Karodia (2013), noted that "*a heritage assessment was conducted in 2000 by the National Cultural History Museum and included in the Syferfontein Mine EMP in 2010. During the survey, a few Stone Age artefacts were identified. These artefacts were not considered to have any primary context and therefore were interpreted to have low significance value. No Early Iron Age sites were identified. The Late Iron Age sites found here conform to those identified in the literature for the Southern Highveld area (former southern Transvaal, northern Orange Free State) as Type V sites. As the soil is mostly turf, Iron Age settlement usually took place on the various dolerite outcrops. The added benefit of choosing these locations was that it was located at the source of building material used in constructing the settlements. One such site shows interesting features as the living units were actually excavated to obtain enough building material for the surrounding walls. A few of the farmsteads dating to early part of this century were identified as possibly having historical-architectural significance. A number of abandoned homesteads are*

located in the areas that were investigated. These seem to belong to farm labourers and were all abandoned within the last few years. They are therefore not viewed to be of cultural or historical significance. However, some graves are located in the vicinity of the homesteads and it is possible that more graves will be located nearby".

CTS Heritage recently completed a field assessment for a proposed REF located approximately 20km away for this development area. This field assessment determined that the area proposed for development has medium to high local historical significance. The broader cultural landscape consists of old farmhouses, kraals, circular stone structures, and the remnants of old water pumps, feeding and watering troughs. Even though the area is rich in history, no significant archaeological heritage resources were identified during the field assessment. No Stone Age or Iron Age heritage resources were identified during the survey. The few heritage resources that were identified consist of the ruins of older farm structures and kraals. However, the field assessment identified six burial grounds or graves. None of the sites identified in the assessment referenced are located within or near the development area, however the text provides a good assessment of resources that may be present in this study area. It is therefore possible that the proposed development will impact negatively on archaeological resources associated with the Late Iron Age, burial grounds and graves as well as stone age archaeological resources.

3.1.3 Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of zero and very high palaeontological sensitivity (Figure 4a). According to the extract from the Council of Science Map for East Rand 2628 (Figure 4b), the palaeontologically sensitive geology of the area is ascribed to the Vryheid Formation of the Ecca Group of sediments. Groenewald (2014, SAHRIS NID 167013) completed a field-based palaeontological assessment for the Waaihoek WEF in which he interrogates the palaeontological sensitivity of this formation. In this assessment, Groenewald (2014) notes that "The Vryheid Formation consists of interbedded very coarse-grained sandstone and mudstone that yields plant and trace fossils as well as some prominent coal seams." In this assessment, Groenewald (2014) made the following recommendations for the WEF development within the Vryheid Formation "The PEA and CEO be made aware of the possibility of finding fossils in the Vryheid and Volksrust Formation sediments during excavation of the foundations for the turbines and other infrastructure. A professional palaeontologist is appointed to monitor possible palaeontological finds during excavation of turbine foundations and infrastructure where turbine positions and infrastructure fall on Vryheid and Volksrust Formation sediments." The sediments underlying the development area have very high levels of palaeontological sensitivity, the nature of the excavations associated with Renewable Energy facilities tends to be deep and as such, the likelihood of impacting intact Vryheid Formation sediments is high. Further investigation of the palaeontological sensitivity of the development area is recommended.

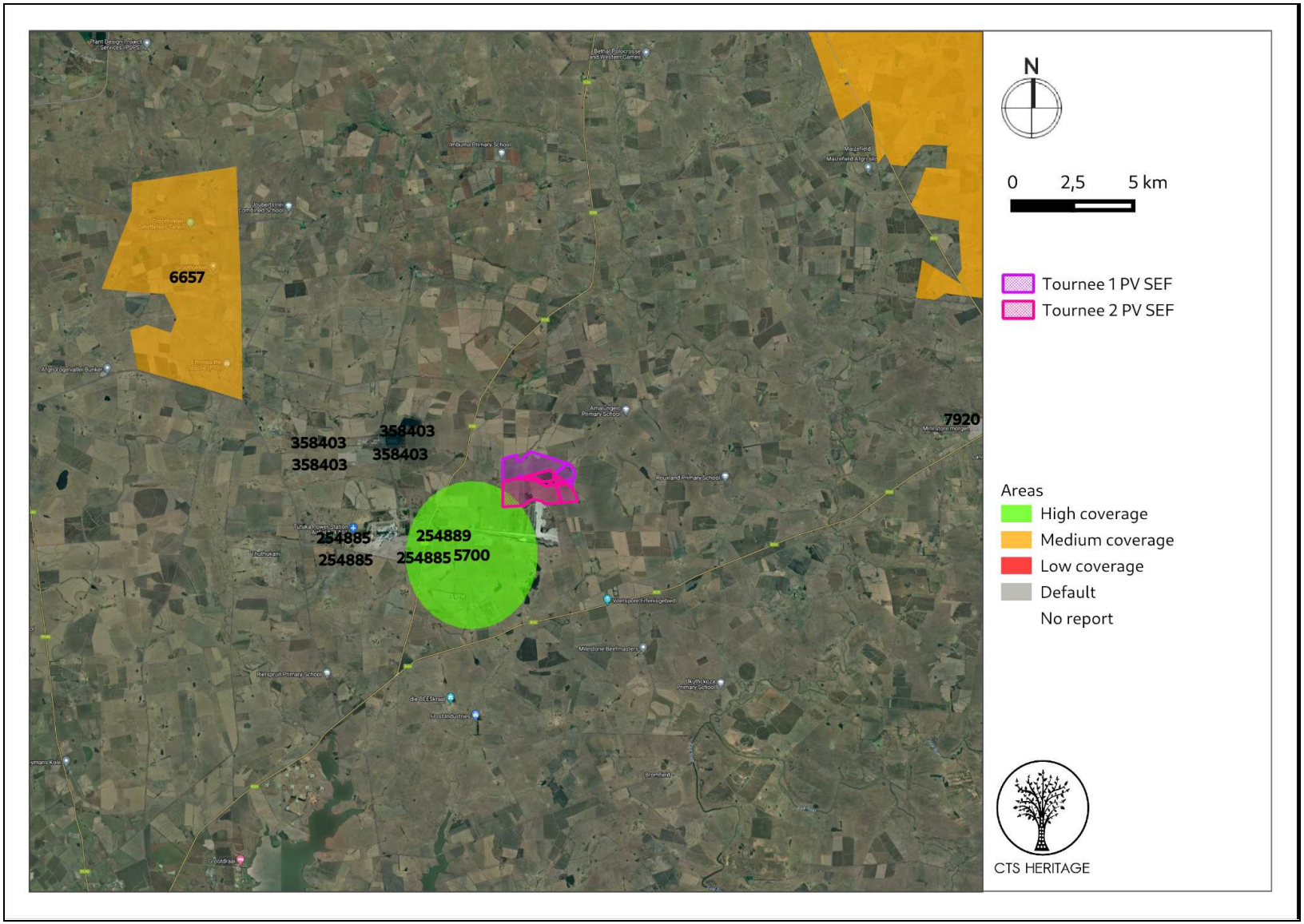

Figure 2: Spatialisation of heritage assessments conducted in proximity to the proposed development

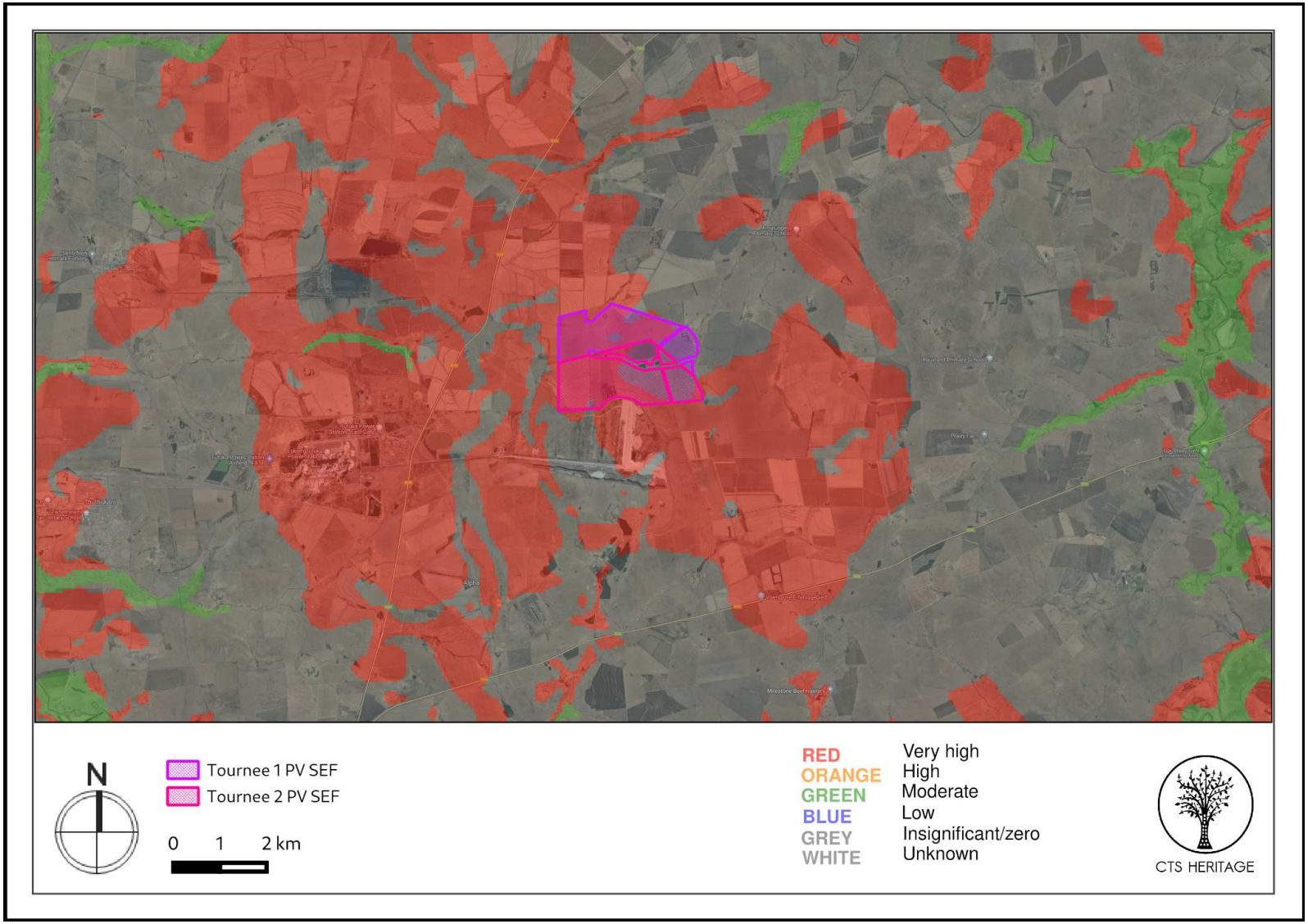

Figure 3.1: Palaeontological sensitivity of the proposed development area

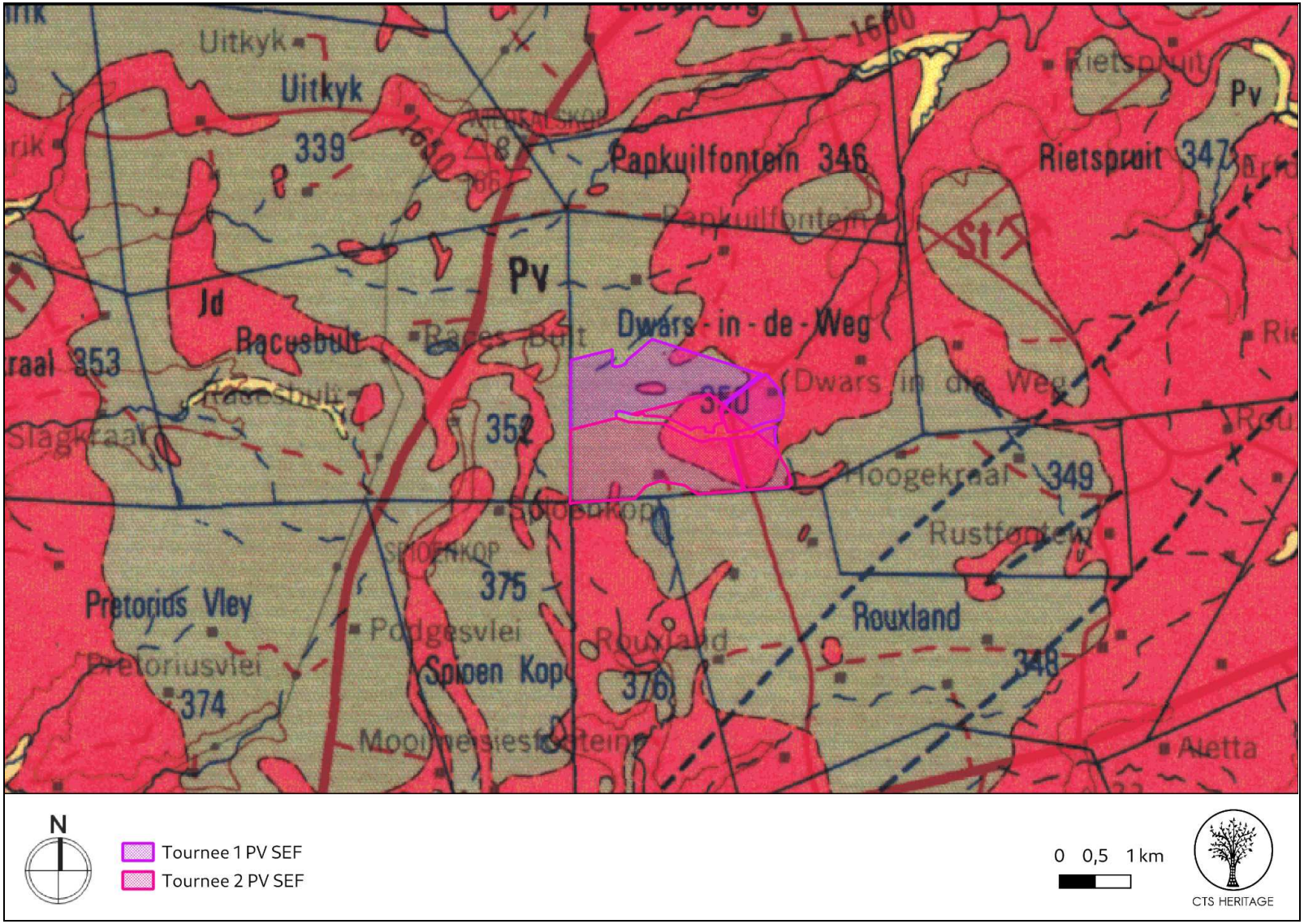

Figure 3.2: Extract from the CGS 2628 East Rand Map indicating that the development area for the REF development is underlain by sediments of Pv: Vryheid Formation of the Ecca Group and Jd: Jurassic Dolerite as well as Quaternary Sands

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

Archaeology (Appendix 1)

The field assessment was very thorough over the area proposed for the PV facility where conditions allowed. Three observations were made, two of which reflect significant heritage resources. All are described further below. Most areas within the proposed development footprint have been disturbed through cultivation. The dense vegetation and waterlogged areas affected the surface visibility throughout the site. A farmhouse (still in use) is located on portion 6/350. This structure does not appear to have any historical or cultural significance.

The recorded demolished farmhouse likely dates from the late-1960s/1970s (WP 001). According to the farmer, it was demolished by Eskom, probably to discourage illegal occupation. However, no significant cultural material was found by or near the structure. It is, therefore, considered not to have historical or cultural significance. This observation is therefore considered to be Not Conservation-Worthy.

A total of 8 visible stone cairn graves were observed (WP 002). Further, several loose stones were noted approximately 40 m southeast of the confirmed graves (WP 003). Therefore, there is a slight probability that additional (unmarked) graves could be located in this area. However, these stones may also belong to the prominent grave cairns – they could have been displaced due to heavy rainfalls or farming-related activities.

All graves are of high significance, and a minimum of a 50m buffer should be maintained around the extent of the graves. Graves are readily found within the South African rural landscape, and it should be expected that more graves may be in the area of the earmarked development layout. A modern beer bottle was found adjacent to one of the graves.

Overall, the field assessment has revealed that the area proposed for development has a low level of archaeological sensitivity and it is unlikely that significant archaeological heritage will be located within the areas that were unable to be surveyed.

Palaeontology (Appendix 2)

According to the PIA completed for this project, the site lies in the northeastern part of the Karoo basin where the lower Karoo Supergroup strata are exposed. Along the rivers and streams much younger reworked sands and alluvium overly the older strata.

The Vryheid Formation lies on the uneven topography of pre-Karoo or Dwyka Group rocks in the northern and northwestern margins, but lies directly on the Pietermaritzburg Formation in the central and eastern part. The lithofacies show a number of upward-coarsening cycles, some very thick, and they are essentially deltaic in origin. There are also delta-front deposits, evidence of delta switching, and fluvial deposits with associated meandering rivers, braided streams, back swamps or interfluves and abandoned channels (Cadle et al., 1993; Cairncross, 1990; 2001; Johnson et al., 2006). Coal seams originated where peat swamps developed on broad abandoned alluvial plains, and less commonly in the backswamps or interfluves. Most of the economically important coal seams occur in the fluvial successions (ibid). In the east (Mpumalanga and northern KwaZulu Natal), the Vryheid formation can be subdivided into a lower fluvial-dominated deltaic interval, a middle fluvial interval, and an upper fluvial-dominated deltaic interval again (Taverner-Smith et al., 1988).

The Vryheid Formation preserves the distinctive Gondwanan flora, the *Glossopteris* flora. As the climate warmed up and the huge continent drifted polewards the land was rapidly colonised by luxuriant vegetation, in some parts. Peats formed in waterlogged environments and over time were buried, preserved and altered by heat and pressure to eventually form the coal seams typical of this formation and abundant in Mpumalanga and KwaZulu Natal coalfields. Coals themselves do not preserve the original plant structures, but plant impressions or compressions can be preserved in the lenses between the coals or in fine grained sediments. The flora is composed of the dominant *Glossopteris* plants (leaves, seeds, reproductive structures, roots and wood). Other plants are lycopods, sphenophytes, ferns, cordaitaleans and other early gymnosperms. Vertebrates are not found with the fossil plants because they require a different set of conditions for preservations. Plants require rapid burial in a reducing and anoxic environment, while bones can be preserved in oxidizing environments (Cowan, 1995).

The Jurassic dolerite does not preserve fossils because it is an intrusive volcanic rock. The very young Quaternary sands along the stream are also very unlikely to preserve fossils as they have been moved by the river floods and fossils would have been destroyed, if present in the first place.

The proposed project area is situated south of Bethal, north of Standerton and west of Morgenson, adjacent to the R38. The land has been cultivated and/or grazed for decades and so is highly disturbed from clearing of the land of rocks for cultivation and ploughing. There are no rocky outcrops within the cultivated land. With a gently

rolling topography covered with either secondary grassland or exposed soils after ploughing, the visibility was generally good. Streams were not surveyed for fossils because they are seldom permitted to be developed, but more importantly, water and water-logged areas are not good for the preservation of fossils.

The palaeontologists tracked their route in the vehicle but walked into the veld to observe and take photographs. For Tournee Solar Park 1, the same topography, open grasslands and lack of rocky outcrops were observed. NO FOSSILS of any kind were seen on the ground surface and are unlikely to be found in the overlying soils.

4.2 Heritage Resources identified

In terms of the heritage resources identified in the archaeological field assessment, see Table 2 below and Appendix 1 for full descriptions and images.

Table 4: Artefacts identified during the field assessment development area

POINT ID	Description	Density	Co-ordinates		Grading	Mitigation
002	Fieldstone cairns located next to the border fence (opposite cultivated lands). Eight visible graves. Some headstones visible but no inscriptions	NA	26°45'13.05"S	29°25'21.84"E	IIIA	Buffer recommended
003	Additional unmarked graves may exist at WP 003. However, the loose stones may be related to the graves at WP 002. Heavy rainfalls and/or farming activities may have displaced the identified cairns.	NA	26°45'13.80"S	29°25'23.15"E	IIIA	Buffer recommended

4.3 Mapping and spatialisation of heritage resources

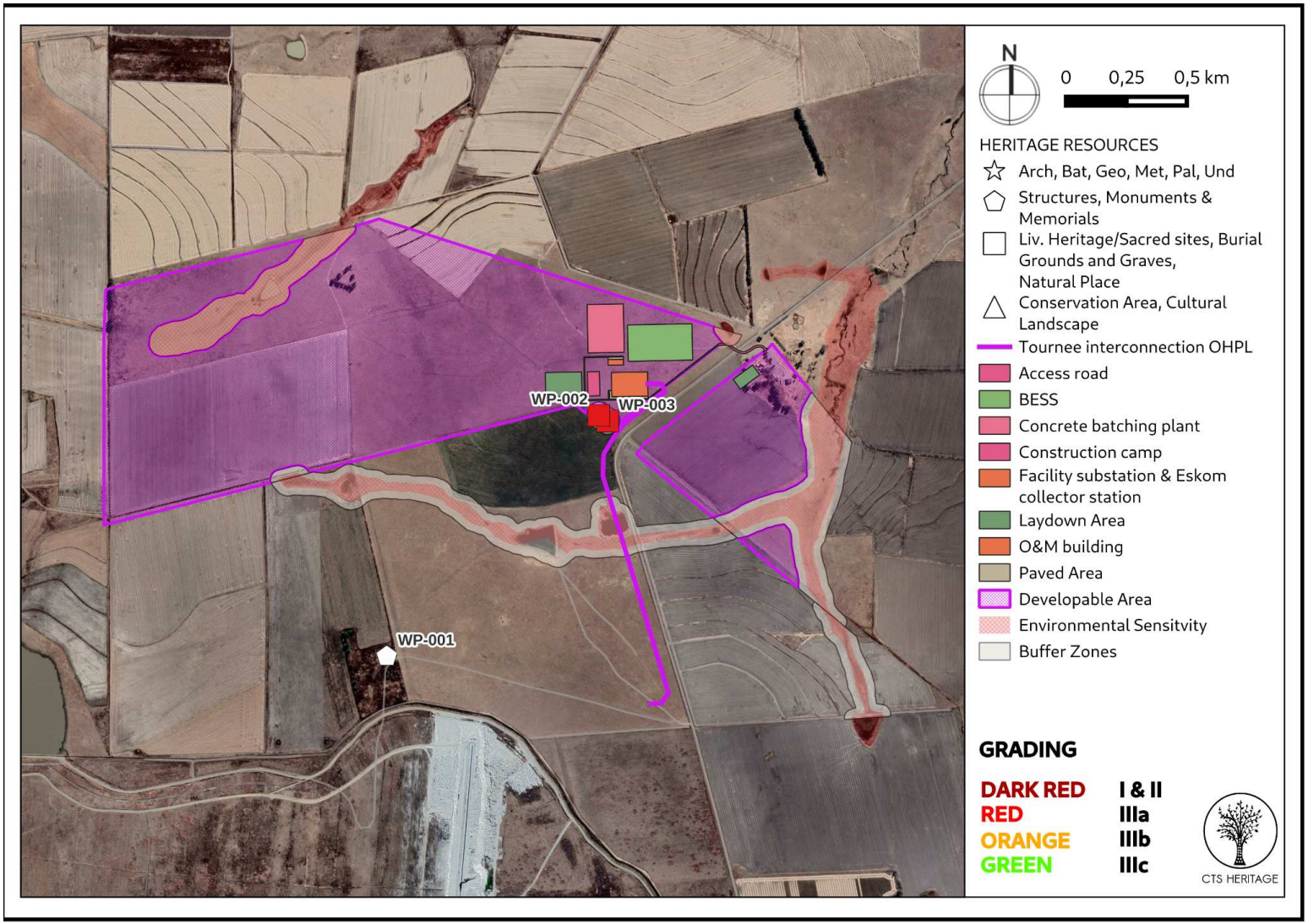

Figure 5.1: All heritage resources within proximity to the development area

Figure 5.2: Map of heritage resources identified within the PV development area

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

5.1.1 Visual Impact Assessment Summary

According to the VIA completed for this project, "The proposed Tourneé 1 Solar PV Park is situated in a rural area with a relatively low number of sensitive receptor; comprising mostly farmsteads. Based on the field assessment, the undulating topography and dense vegetation associated with the farmsteads partially obscures the view towards the Tourneé 1 Solar PV Park, therefore the visual impact for the Tourneé 1 Solar PV Park is considered moderately low as the visual intrusion on the receiving environment will be low to moderate depending on the location of the vantage point.

With the Tourneé 1 Solar PV Park and surroundings being dominated by grasses interspersed with freshwater ecosystems and cultivated fields, the vegetative component will not be able to substantially assist in screening the Tourneé 1 Solar PV Park. The farmsteads do however have existing dense tree lines which may partially or completely obscure the view towards Tourneé 1 Solar PV Park. The local topography of the Tourneé 1 Solar PV Park is relatively flat to gently sloping with the surrounding landscape displaying undulating terrain. With the local topography of the Tourneé 1 Solar Park being relatively flat, it is unlikely to assist in absorbing and/ or screening the Tourneé 1 Solar PV Park. The field assessment did however indicate the undulating terrain of the surrounding area affecting the degree of visibility from various vantage points. The Tutuka ash dump will assist in screening and/ or absorbing the Tourneé 1 Solar PV Park, especially to receptors located to the south and north.

The sense of place associated with the Tourneé 1 Solar PV Park can be described as calm, tranquil and peaceful, with limited development and movement, with the exception of the shepherds moving with the livestock and the cultivated fields being tilled or harvested. The sense of place is however not unique to the Tourneé 1 Solar PV Park as it extends to the larger region. During the construction phase of the Tourneé 1 Solar PV Park, the sense of place will however be affected, shifting the mood to busy and disturbed with construction vehicles and potential need for some earth moving equipment, however, once the panels are operational there will be limited additional vehicular movement in and out of the area, thus returning the area to a calm and tranquil landscape.

Even though the gravel road intersecting the Tourneé 1 Solar PV Park may not be considered an important passage, motorists are easily distracted by objects on the side of the road, especially if such structures may possibly cause glint and glare, it was recommended that a stretch of land directly adjacent to the road not be considered for development of the solar PV panels. A 50 m buffer for the gravel road was recommended, to reduce the level of visual intrusion on the gravel road, and reduce the possibility of glint and glare. Should the recommended buffer zone be adhered to, the overall proposed visual intrusion on the landscape may be reduced. Additionally, if Tourneé 2 Solar PV Park is also approved, it will be indistinguishable from each other. The

proposed Tourneé 1 Solar PV Park is therefore likely to have an overall moderate visual impact on the receiving environment."

Visual impacts are thoroughly assessed in the VIA and as such, will not be dealt with further in this report.

5.1.2 Archaeology

The heritage resources observed fall within the area proposed for the PV facilities based on the layout provided. WP 002 and 003 fall within the area proposed for the Tournee 1 PV Facility. As such, based on the current layouts provided, it is likely that all observed resources will be impacted by the proposed development.

Both WP 002 and WP 003 fall within the areas proposed for the Tournee 1 PV Facility. All the graves are highly significant, and a 50m buffer zone with a fence is recommended to ensure their conservation. Furthermore, it is recommended that a Conservation Management Plan be drafted for the ongoing management and conservation of the identified burials and other heritage resources. The recommended buffer areas are indicated in Figure 5.2.

Table 5.1 Impacts of the proposed development to archaeological resources

CRITERIA	Without Mitigation	With Mitigation
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	5	1
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	1	1
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	5	5
Impact Duration (D) The length of permanence of the impact on the environmental receptor	5	5
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	5	1
Significance (S) is determined by combining the above criteria: S=(E+D+R+M)xP	**80**	**12**
Mitigation Recommendations	A no development buffer of 50m is implemented around the burial sites identified within the development area. Ongoing community access to these burials, as well as their conservation into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the burials to be implemented for the duration of the project. Should 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 or other categories of heritage resources be found during	

	the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist must be contracted as soon as possible to inspect the findings. A Phase 2 rescue excavation operation may be required subject to permits issued by SAHRA.

5.1.3 Palaeontology

According to the PIA completed for the project, 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 of any significance in the project footprint. Furthermore, the surface material to be excavated is soil and this does not preserve fossils. Since there is a small chance that fossils from the Vryheid Formation might occur below ground and might be disturbed when excavations commence for foundations and infrastructure, 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 low to moderate.

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 only some do contain fossil plant, insect, invertebrate and vertebrate material. The site visit and walk through on 06 February 2023 (summer) by palaeontologists confirmed that there are no fossils on the surface. There were no outcrops of shales that could potentially preserve fossils. There were no fossils on the surface. It is not known what lies below the surface but the soils appear to be a metre or more deep. The overlying soils and sands of the Quaternary period would not preserve fossils.

Based on the fossil record but confirmed by the site visit and walk through there are NO FOSSILS of any significance such as those of recognisable *Glossopteris* floral elements, 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 shales of the Vryheid Formation so a Fossil Chance Find Protocol must be implemented for the duration of excavation activities.

Table 5.2: Impacts of the proposed development of the PV facilities to palaeontological resources

CRITERIA	Without Mitigation	With Mitigation
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	2	1
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	1	1
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	5	5
Impact Duration (D) The length of permanence of the	5	5

impact on the environmental receptor		
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	2	1
Significance (S) is determined by combining the above criteria: S=(E+D+R+M)xP	**26**	**12**
Mitigation Recommendations	The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities	

5.2 Sustainable Social and Economic Benefit

According to the SIA completed for this project by Barbour (2023), "The construction phase will extend over a period of approximately 18-24 months and create in the region of 250 employment opportunities. Members from the local communities in Standerton, Thuthukani, Morgenson, Bethal and Secunda may qualify for a percentage of low skilled and semi-skilled employment opportunities and a number of skilled opportunities. The Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The total wage bill will be in the region of R 30 million (2023 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the LM. The capital expenditure associated with the construction phase will be approximately R 2 billion (2023 Rand value). This will create opportunities for local companies and the regional and local economy. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site." Barbour (2023) notes additional positive impacts during the operational phase including:

- Generate renewable energy and improve energy security.
- Creation of employment opportunities.
- Benefits associated with establishment of community trust.
- Benefits for local landowners.

The proposed project will supplement South Africa's energy and assist to improve energy security. In addition, it will also reduce the country's reliance on coal as an energy source. This represents a positive social benefit.

As such, on condition that the recommendations outlined below are adhered to, the anticipated socio-economic benefits outweigh negative impacts to heritage resources.

5.3 Proposed development alternatives

The EIA Regulations of 2014 (as amended) require that the S&EIA process must identify and describe alternatives to the proposed activity that were considered, or motivation for not considering alternatives. Different types or categories of alternatives could be considered including different locations, technology types, and project layouts. At the scoping level the evaluation of alternatives is provided at a high level in the absence of detailed environmental comparators for each alternative; due to the two-staged nature of the S& EIA process it is more suitable to identify and describe the potential alternatives on a high-level basis within scoping, and to perform a more detailed analysis of alternatives (with environmental comparators) in the EIA phase of the project. As such, the S&EIA will holistically assess the impacts and risks of each alternative comparatively, as suggested by Appendix 2 of the EIA Regulations of 2014 (as amended).

All alternatives outlined below are considered both feasible and reasonable with no apparent advantages or disadvantages at this stage of the project. All alternatives will be described and assessed in more detail during the EIA Phase.

Extensive consideration of alternatives and avoidance of impacts took place in the screening/design phase. This is discussed in detail in the section below.

TECHNOLOGY ALTERNATIVES

- SOLAR PV TECHNOLOGY

The Tournée 1 Solar PV Facility will utilise solar PV technology to generate power. Therefore, no other technology alternatives are being considered for this project.

- BESS TECHNOLOGY

The BESS will be made up of Lithium-Ion batteries or similar solid-state technology due to them being a mature and safe technology with regard to potential impacts on the environment in a solar facility farm, modular and easy to install and due to their technical characteristics, will work well as energy storage systems for solar facilities, as well as supporting grid stability. No other BESS technology is being considered for this project..

LOCATION ALTERNATIVES

The location of the proposed project is based on the site awarded to the applicant in response to an Eskom Request for Proposal (RFP). The following aspects were required by the RFP to be taken into consideration when selecting the location of the site:

- The selected location must be in close proximity to the existing Eskom infrastructure and interconnection points including substations;
- The site must be suitable open land for Solar PV development; and
- The screening process for the selected location must not identify exceedances of environmental sensitivities; and
- The selected site must contribute to the JET Programme.

The site is considered suitable and the investigation of an alternative site is not currently proposed.

LAYOUT ALTERNATIVES

The process undertaken for this project is an iterative design process through various assessment phases and iteratively updating the site sensitivities to avoid environmental features. Therefore, no layout alternatives are being considered for this project.

NO-GO ALTERNATIVE

In the “no project” alternative, the proposed project will not be developed. In this scenario, there could be a missed opportunity to address the need for a just transition within the Province and Nationally. This project will also support the need to increase renewable energy generation in an effort to mitigate against concerns of climate change and exploitation of non-renewable resources. The no-go alternative would not assist in responding to the growing electricity demand in South Africa and would not contribute to the reliability of electricity supply at a national scale.

5.4 Site Verification Statement

According to the DFFE Screening Tool analysis, the development area has Very High levels of sensitivity for impacts to palaeontological heritage and Low levels of sensitivity for impacts to archaeological and cultural heritage resources. The results of this assessment in terms of site sensitivity are summarised below:

- The cultural value of the broader area has some significance in terms of its mining and agricultural history (Moderate)
- Some significant archaeological resources were identified within the broader area (Moderate)
- 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 (Moderate)

As per the findings of this assessment, and its supporting documentation, the outcome of the sensitivity verification disputes the results of the DFFE Screening Tool for Palaeontology - this should be considered to be Moderate - and disputes the results of the screening tool for archaeology and cultural heritage - this should be considered to be Moderate. This evidence is provided in the body of this report and in the appendices (Appendix 1 and 2).

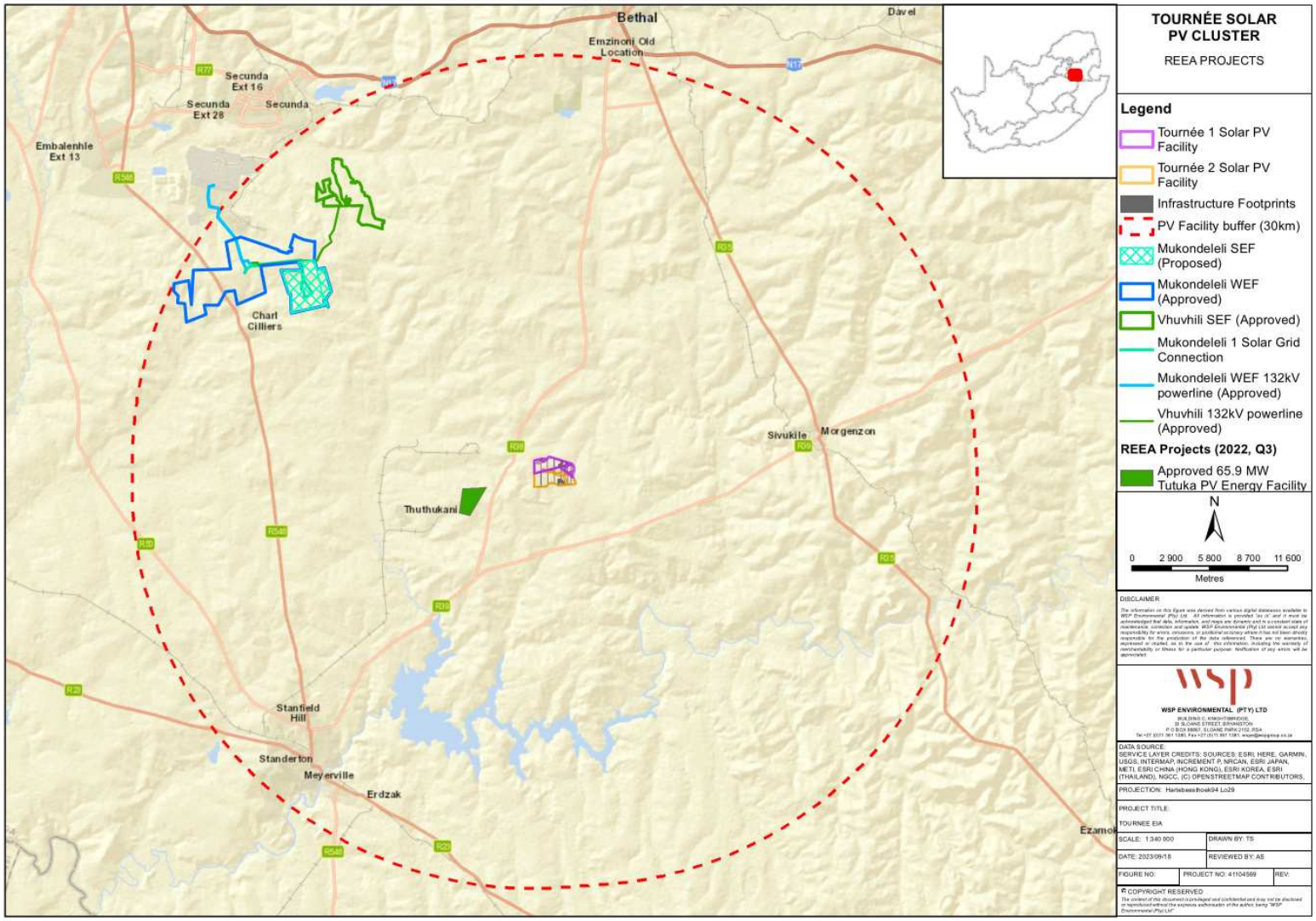

Figure 6: Cumulative Impact Map

5.5 Cumulative Impacts

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. It is important to note that the cumulative impact assessment for a particular project, like what is being done here, is not the same as an assessment of the impact of all surrounding projects. The cumulative assessment for this project is an assessment only of the impacts associated with this project, but seen in the context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within the context of the overall impact. But it is not simply the overall impact itself.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

In terms of cumulative impacts to heritage resources, impacts to archaeological and palaeontological resources are sufficiently dealt with on a case by case basis. The primary concern from a cumulative impact perspective would be to the cultural landscape. The cultural landscape is defined as the interaction between people and the places that they have occupied and impacted. In some places in South Africa, the cultural landscape can be more than 1 million years old where we find evidence of Early Stone Age archaeology (up to 2 million years old), Middle Stone Age archaeology (up to 200 000 years old), Later Stone Age archaeology (up to 20 000 years old), evidence of indigenous herder populations (up to 2000 years old) as well as evidence of colonial frontier settlement (up to 300 years old) and more recent agricultural layers.

Modern interventions into such landscapes, such as renewable energy development, constitute an additional layer onto the cultural landscape which must be acceptable in REDZ areas. However outside of REDZ areas, these impacts must be more carefully considered. The primary risk in terms of negative impact to the cultural landscape resulting from renewable energy development lies in the eradication of older layers that make up the cultural landscape. There are various ways that such impact can be mitigated.

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 agricultural landscape. Based on available information, it seems that there is only 1 other solar facility located in close proximity to this development (Figure 6).

Table 6: Projects referred to in Figure 6

Project	Status	Reference Number
65.9 MW Tutuka PV Energy Facility and Its associated Infrastructure	Approved	DFFE Ref: 14/12/16/3/3/2/754
Mukondeleli WEF	Approved	MDARDLEA Ref: 1/3/1/16/1G-265
Mukondeleli 1 SEF	Proposed	DFFE Ref: 14/12/16/3/3/2/2392
Vhuvhili SEF	Approved	MDARDLEA Ref: 1/3/1/16/1G-253
Mukondeleli WEF 132kV Powerline	Approved	MDARDLEA Ref: 1/3/1/16/1G-276
Mukondeleli 1 Solar Grid Connection	Proposed	N/A
Vhuvhili 132kV Powerline	Approved	MDARDLEA Ref: 1/3/1/16/1G-272

The proposed development is therefore likely to result in a change to the sense of place of the area however these impacts are assessed in the VIA and appropriate mitigation measures proposed.

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 some constraints and limitations, yet the project area was comprehensively surveyed for heritage resources. The significant heritage resources identified relate to the historic farm occupation of this property. These resources include the remnants of an old farm werf as well as burial sites that were identified.

In order to ensure that no impact to the identified resources occurs during the construction or operational phases of the development, a number of recommendations are made below.

Based on the fossil record but confirmed by the site visit and walk through there are NO FOSSILS of any significance such as those of recognisable *Glossopteris* floral elements, 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 shales of the Vryheid Formation so a Fossil Chance Find Protocol must be implemented for the duration of excavation activities.

8. RECOMMENDATIONS

There is no objection to the proposed development from an archaeological perspective on condition that:

- The recommendations in the VIA are implemented

- A no development buffer of 50m is implemented around the burial sites identified within the development area
- Ongoing community access to these burials, as well as their conservation into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the burials to be implemented for the duration of the project.
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- 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.

9. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
138237	Anton Pelser		HIA Phase 1	Sun Valley Heritage Report
146257	Anton Pelser	14/11/2013	HIA Phase 1	Report on a Phase 1 HIA for the Proposed Wilkoppies Ext. 108 Township Development on Holdings 19, 20, 21, 22, 23 and 48, Wilkoppies Agricultural Holdings (Elandsheuvel 402IP) in Klerksdorp, North West Province
168281	Polke Birkholtz	25/06/2014	Heritage Impact Assessment Specialist Reports	Heritage Impact Assessment: Matlosana 132 kV Loop-in-Loop-Out Line and Substation: Proposed Eskom Line on Sections of Portions 36 and 60 of the farm Palmietfontein 403 IP, City of Matlosana Local Municipality, North West Province.
321166	Jaco van der Walt	17/06/2015	Archaeological Specialist Reports	Archaeological Scoping Report for the Proposed Buffels Solar 1 SEF, Klerksdorp, North West Province
321168	Barry Millsteed	21/06/2015	PIA Desktop	Palaeontological Heritage Impact Assessment Report on the Site of a Proposed Solar Power Production Facility known as the Buffels Solar 1 PV Energy Facility to be located approximately 20 km north East of Orkney, NW Province
321169	Barry Millsteed	21/06/2015	PIA Desktop	Palaeontological Heritage Impact Assessment Report on the Site of a Proposed Solar Power Production Facility known as the Buffels Solar 2 PV Energy Facility to be located approximately 20 km north East of Orkney, NW Province
321170		17/06/2015	Archaeological Specialist Reports	Archaeological Scoping Report for the Proposed Buffels Solar 2 SEF, Klerksdorp, North West Province
336090	Johnny Van Schalkwyk	01/05/2015	Heritage Impact Assessment Specialist Reports	Cultural heritage assessment for the PROPOSED IKAGENG EXTENSION 13 ON PORTION 2 OF THE REMAINDER OF TOWN AND TOWNLANDS OF POTCHEFSTROOM 435IQ, NORTH WEST PROVINCE
5099	Udo Kusel	04/12/2006	AIA Phase 1	Cultural Heritage Resources Impact Assessment of Goudkoppie Klerksdorp North West Province
5100	Udo Kusel	25/06/2007	HIA Phase 1	Cultural Heritage Resources Impact Assessment on Portion 376 (A Portion of Portion 360) of the Farm Elandsheuwel 402 IP Klerksdorp
5195	Udo Kusel	15/02/2008	HIA Phase 1	Cultural Heritage Resources Impact Assessment of Portion 46 of the Farm Elandsheuwel 436 IQ (Portions Adjacent and to the West of Loopspruit), Tlkowe Local Municipality, North West Province

8402	Udo Kusel	11/12/2007	HIA Phase 1	Cultural Heritage Resources Impact Assessment of Holding 109 Wilkoppies Portion 430 (A Portion of Portion 59) of the Farm Elandsheuvel 402 IP Klerksdorp, North West Province
8491	Udo Kusel	01/12/2007	HIA Phase 1	Cultural Heritage Resources Impact Assessment of Portion 2 of the Farm Elandsheuwel 436 IQ Tlokwe Local Municipality, North West Province

APPENDICES

APPENDIX 1: Archaeological Assessment (2022)

ARCHAEOLOGICAL SPECIALIST STUDY

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

Proposed development of the Tournée 1 and 2 Solar PV Parks near Standerton, Mpumalanga

Prepared by

CTS HERITAGE

Jenna Lavin and

Heidi Fivaz and Sky-Lee Fairhurst of Ubique Heritage Consultants

In Association with

WSP

March 2023

CTS HERITAGE

EXECUTIVE SUMMARY

Red Rocket propose to construct the Tournée 1 & 2 Solar PV Parks near Thuthukani in the Mpumalanga Province. The Tournée Solar PV Cluster will include two 150MW Solar Energy Facilities (SEFs).

It is understood that Red Rocket has a corporate Environmental and Social Management System (ESMS) which aligns with the Equator Principles, the International Funding Corporation (IFC) Performance Standards (PS) and applicable World Bank/IFC Environmental, Health and Safety (EHS) and Sector specific Guidelines and applicable Good International Industry Practice (GIIP). All Red Rocket's renewable energy projects, from inception, development, construction, operation, and any decommissioning are required to fully comply with the requirements and expectations of the ESMS.

The heritage resources observed fall within the area proposed for the PV facilities based on the layout provided. WP 002 and 003 fall within the area proposed for the Tournee 1 PV Facility and WP 001 falls within the area proposed for the Tournee 2 PV Facility. As such, based on the current layouts provided, it is likely that all observed resources will be impacted by the proposed development.

Both WP 002 and WP 003 fall within the areas proposed for the Tournee 1 PV Facility. All the graves are highly significant, and a 50m buffer zone with a fence is recommended to ensure their conservation. Furthermore, it is recommended that a Conservation Management Plan be drafted for the ongoing management and conservation of the identified burials and other heritage resources. The recommended buffer areas are indicated in Figure 6.2.

The structure identified at WP 001 falls within the area proposed for Tournee 2 PV Facility. This structure does not appear to have any archaeological or cultural significance and it has also been disturbed. It is therefore considered to be Not Conservation-worthy and no mitigation is required.

Recommendations

There is no objection to the proposed development from an archaeological perspective on condition that:

- A no development buffer of 50m is implemented around the burial sites identified within the development area for Tournee 1 PV Facility. This buffer area extends into the area proposed for the Tournee 2 PV Facility (Figure 6.2)
- Ongoing community access to these burials, as well as their conservation into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the burials to be implemented for the duration of the project.
- 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

Red Rocket propose to construct the Tournée 1 & 2 Solar PV Parks near Thuthukani in the Mpumalanga Province. The Tournée Solar PV Cluster will include two 150MW Solar Energy Facilities (SEFs).

It is understood that Red Rocket has a corporate Environmental and Social Management System (ESMS) which aligns with the Equator Principles, the International Funding Corporation (IFC) Performance Standards (PS) and applicable World Bank/IFC Environmental, Health and Safety (EHS) and Sector specific Guidelines and applicable Good International Industry Practice (GIIP). All Red Rocket's renewable energy projects, from inception, development, construction, operation, and any decommissioning are required to fully comply with the requirements and expectations of the ESMS.

The following technical details are applicable to each facility:

Facility Name	**Tournee 1 PV**	**Tournee 2 PV**
Applicant Name:	▪ **Tournée 1 Solar (Pty) Ltd**	▪ **Tournée 2 Solar (Pty) Ltd**
Municipalities	▪ Lekwa Local Municipality ▪ Gert Sibande District Municipality	
Affected Farms	▪ Portion 7 (Portion of Portion 3) of Farm Dwars-in-die-Weg 350 IS ▪ Portion 6 of Farm Dwars-in-die-Weg 350 IS	▪ Remaining Portion of Portion 3 of Farm Dwars-in-die-Weg 350 IS ▪ Portion 6 of Farm Dwars-in-die-Weg 350 IS
Extent	306.65 ha	505.15 ha
Buildable area	Approximately 229 ha, subject to finalisation based on technical and environmental requirements	Approximately 297 ha, subject to finalisation based on technical and environmental requirements
Capacity	Up to 150MW	Up to 150MW
Power system technology	Solar PV	Solar PV
Operations and Maintenance (O&M) building footprint:	▪ Operations building (including stores and workshop) – 1 500m^2	▪ Operations building (including stores and workshop) – 1 500m^2
Construction camp and laydown area	▪ Typical construction camp area 100m x 50m = 5,000m^2. ▪ Typical laydown area 100m x 200m = 20,000m^2. ▪ Sewage: Septic tanks and portable toilets	▪ Typical construction camp area 100m x 50m = 5,000m^2. ▪ Typical laydown area 100m x 200m = 20,000m^2. ▪ Sewage: Septic tanks and portable toilets
Cement batching plant (temporary):	Gravel and sand will be stored in separate heaps whilst the cement will be contained in a silo. *The Alternative of utilising ready mix trucks should also be considered.*	Gravel and sand will be stored in separate heaps whilst the cement will be contained in a silo. *The Alternative of utilising ready mix trucks should also be considered.*
Internal Roads:	▪ Width of internal road – Between 4m and 5m. ▪ Length of internal roads – Approximately 8km.	▪ Width of internal road – Between 4m and 5m. ▪ Length of internal roads – Approximately 8km.
Cables:	Communication, AC and DC cables.	Communication, AC and DC cables.

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Independent Power Producer (IPP) site substation and battery energy storage system (BESS):	Total footprint will be up to 5.5ha in extent (3ha for the BESS and 2.5ha for the IPP portion of the substation). The substation will consist of a high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc. The associated BESS storage capacity will be up to 150MW/600MWh with up to four hours of storage. It is proposed that Lithium Battery Technologies, such as Lithium Iron Phosphate, or Lithium Nickel Manganese Cobalt oxides will be considered as the preferred battery technology. The main components of the BESS include the batteries, power conversion system and transformer which will all be stored in various rows of containers.	Total footprint will be up to 5.5ha in extent (3ha for the BESS and 2.5ha for the IPP portion of the substation). The substation will consist of a high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc. The associated BESS storage capacity will be up to 150MW/600MWh with up to four hours of storage. It is proposed that Lithium Battery Technologies, such as Lithium Iron Phosphate, or Lithium Nickel Manganese Cobalt oxides will be considered as the preferred battery technology. The main components of the BESS include the batteries, power conversion system and transformer which will all be stored in various rows of containers.

1.2 Description of Property and Affected Environment

The study terrains consist of gentle to medium undulating landscapes covered by Soweto Highveld Grassland. No prominent rocky outcrops were observed. Instead, due to the cultivated areas, we observed peat (turf), clay-like soils, and waterlogged areas (due to heavy rains). The area is densely vegetated with various grasses and plant species. In addition, a few planted tree lanes were observed on the field perimeters.

Some of the plant and grass species observed appear to belong to the species of *Elionurus muticus, Setaria nigrirostris,Themeda triandra, Cosmos bipinnatus, Eragrostis micrantha,* among various others. Two prominent water sources are located on Dwars-in-de-weg 3/350 and 7/350. Dirt roads and farmlands bound the site to the north, south, east and west. An Eskom ash dumping site is located south of portion 3/350.

Several farming-related features, such as water reservoirs, wind pumps and livestock troughs, can be found throughout the properties. The majority of the properties have cultivated lands, still currently in use. Other farming activities, like livestock grazing, further disturbed the soil.

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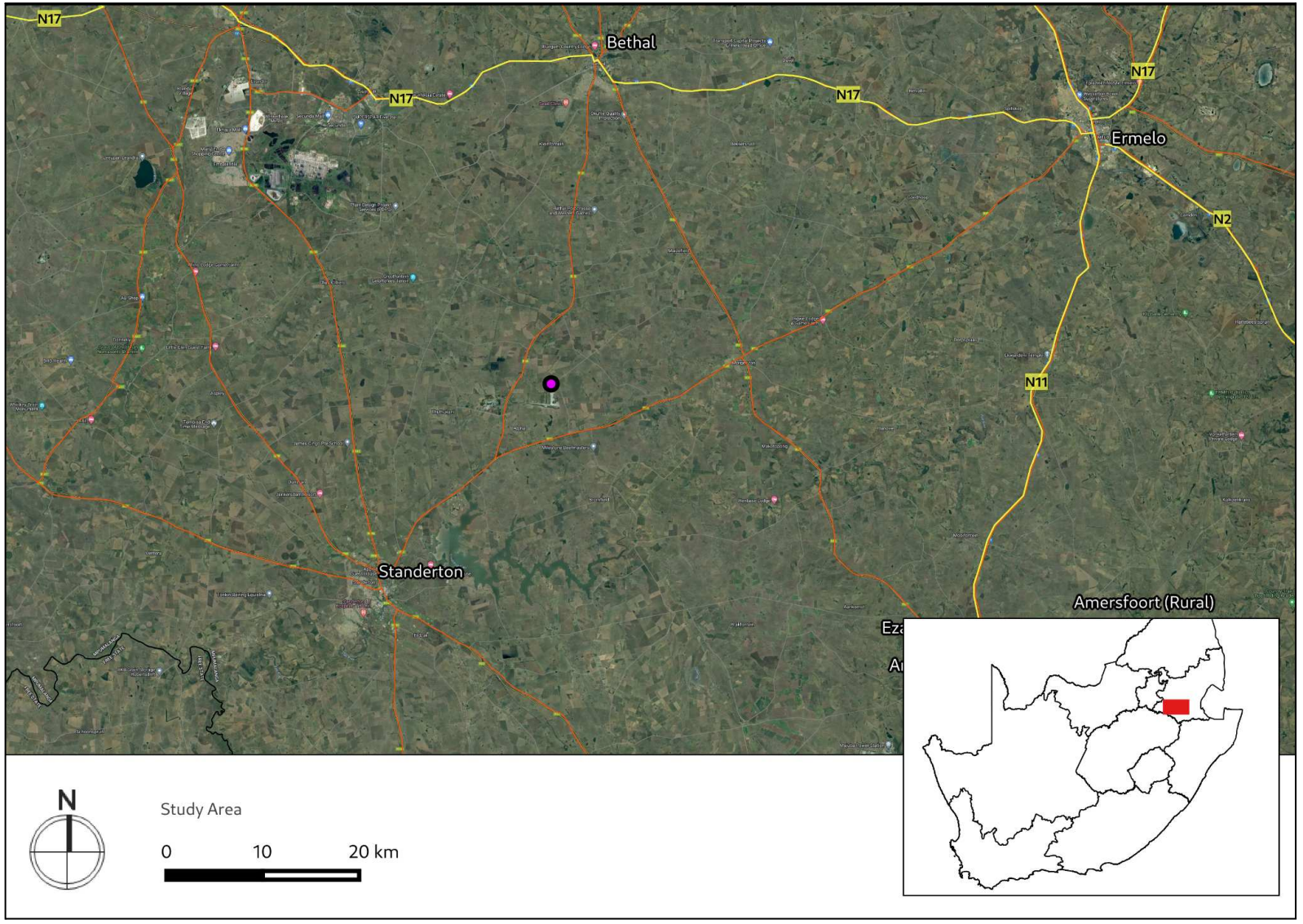

Figure 1.1: Satellite image indicating proposed location of development

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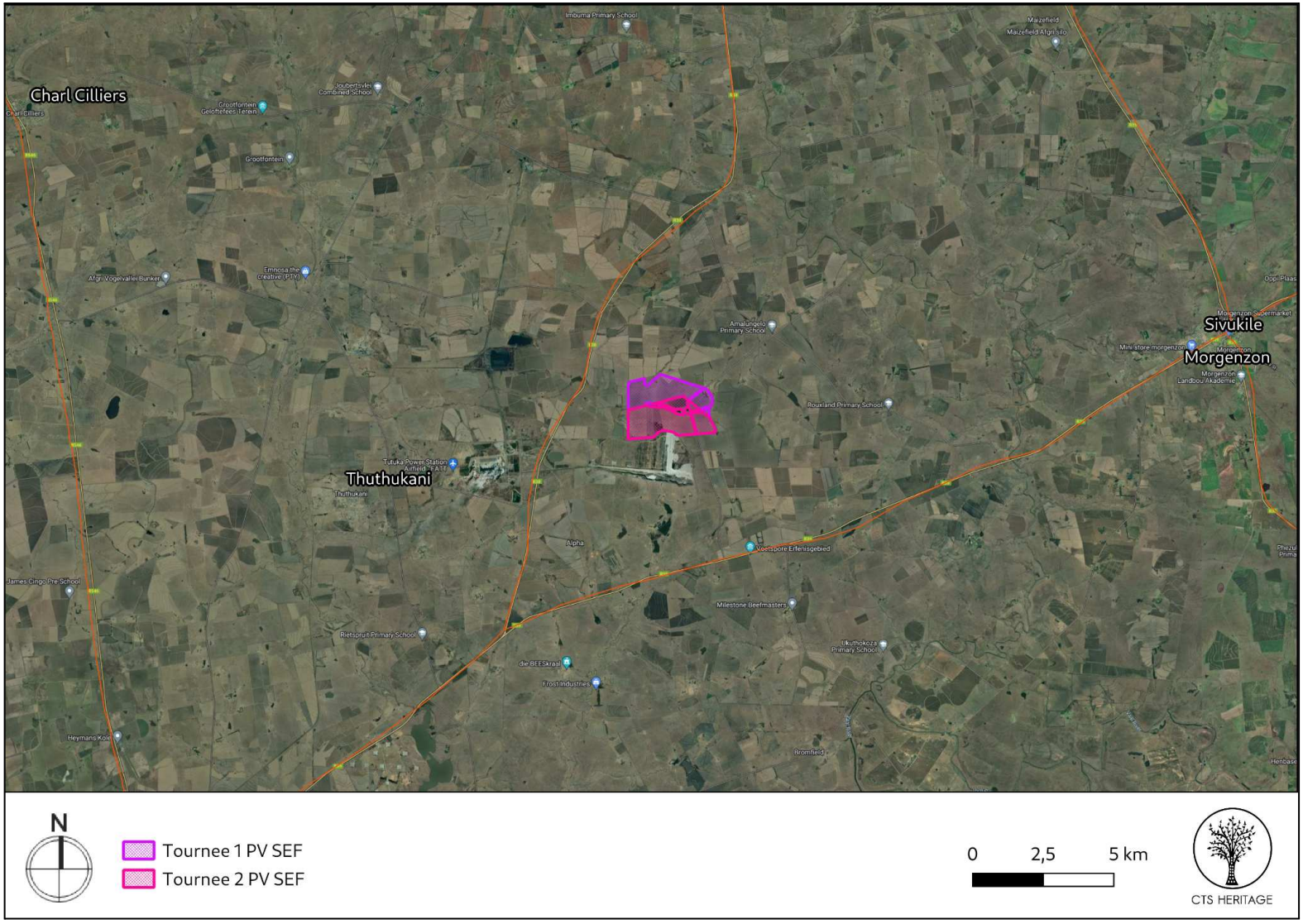

Figure 1.2: Proposed project boundary

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Figure 1.3: Proposed project boundary

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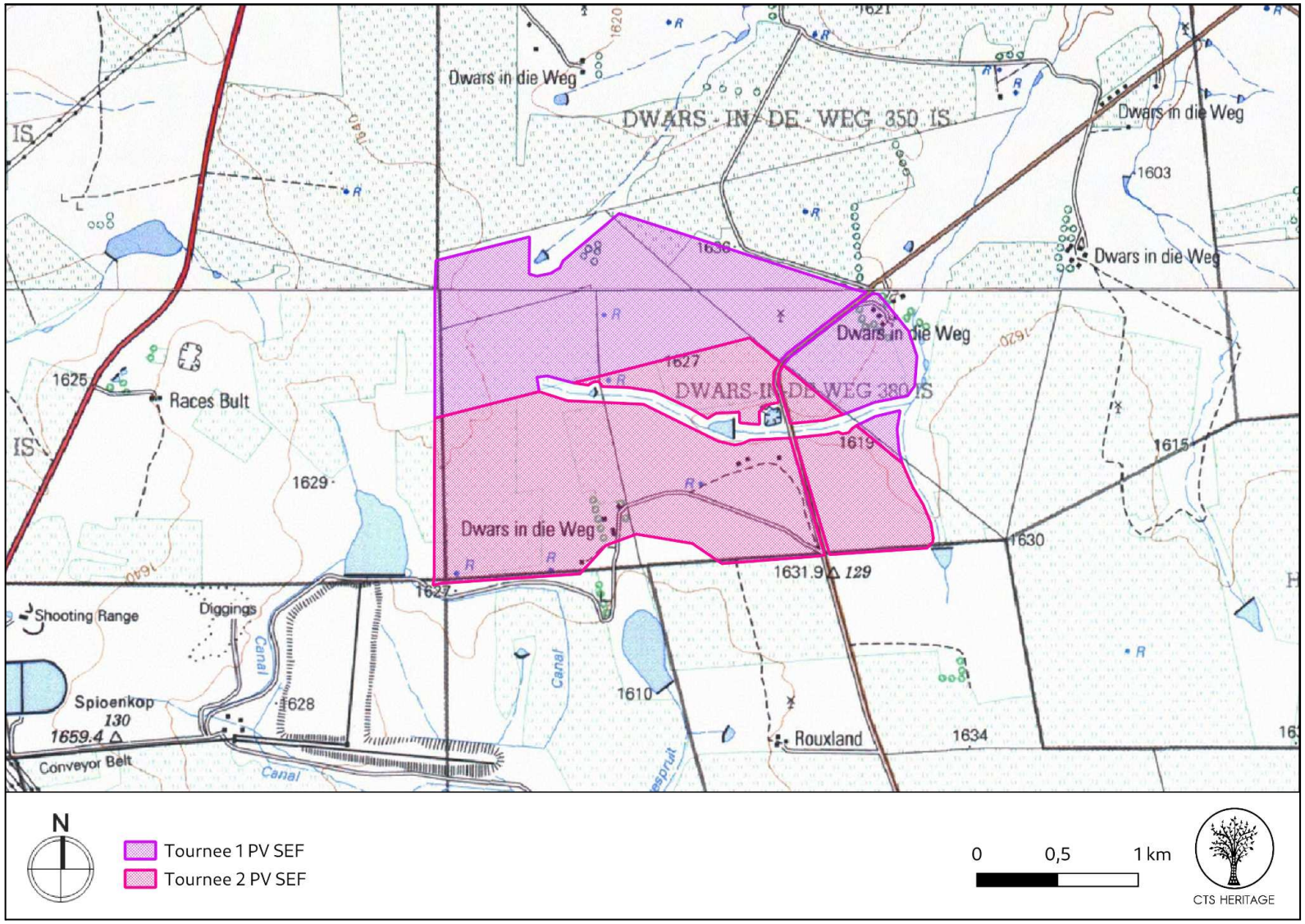

Figure 1.4: Proposed project boundary indicated on the 1:50 000 Topo Map

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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 from 1 to 2 February 2023 to determine what archaeological resources are likely to be impacted by the proposed development of the PV facility and grid connection.
- 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.

2.3 Constraints & Limitations

The local farmers confirmed a rainfall of 70 mm between the 31st of January and the morning of the 1st of February. The rain affected the surface of the development footprint properties and access roads. In addition, the soil was saturated, with waterlogged areas, specifically near the water sources and cultivated areas. The water and mud affected the surface's visibility and made certain areas inaccessible by vehicle and foot.

Several areas were densely vegetated, with various grasses and vegetation affecting the visibility of the surface. Vegetation growth, wet weather, waterlogged areas, and erosion limited the transects that could be undertaken during the survey. Nevertheless, the survey tracks followed the landscape, farm roads, fences and boundaries from which we conducted pedestrian surveys at various points. In addition, the ground surface and areas with noticeable vegetation changes were inspected to the best of our abilities.

The team is confident that the work done accurately reflects the archaeological sensitivity of the development area.

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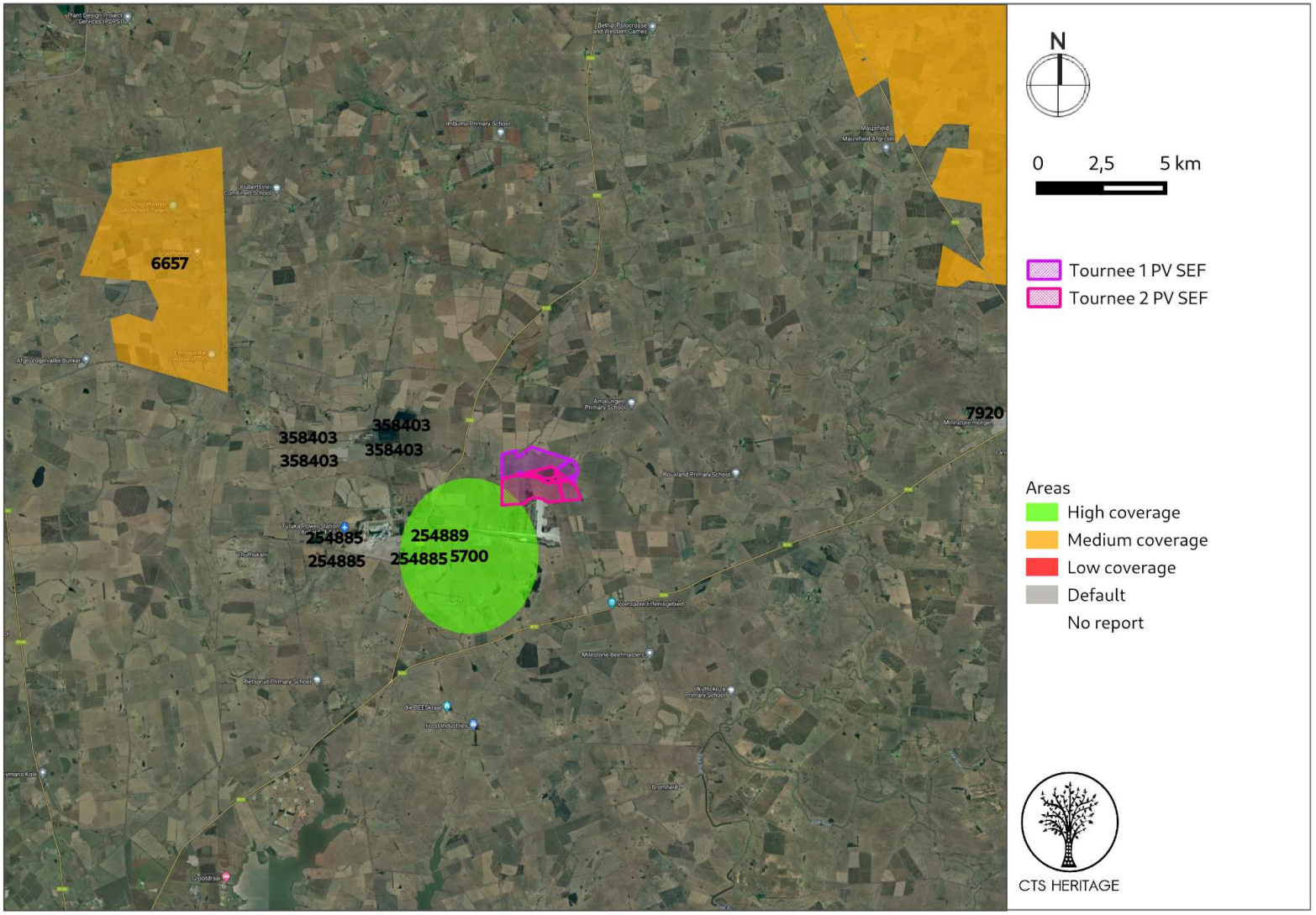

Figure 2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted

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3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

The area proposed for this Solar Energy Development is located immediately east of the R38 between Standerton and Bethal. This area is known for its rolling hills and extensive coal mine infrastructure. The proposed PV development is located in close proximity to the Tutuka Coal Power Station. The broader area in which the proposed development is located is dominated by power generation infrastructure and associated grid connections and as such, the proposed SEF is consistent with the general area uses.

Cultural Landscape

Van Vollenhoven (2015) described the broader assessment area in his assessment completed for a de-stoning plant located near to this proposed development area. Van Vollenhoven (2015) describes the environment as "disturbed by recent human activities, mainly agriculture. This consists of maize fields. Other disturbance visible is mining infrastructure..., a railway track... and power lines... Signs of old fields were also present which could be seen in the pioneer plant species consisting of weeds and grass. Almost half of the surveyed area consists of natural grassland. The vegetation cover varies between short and long grass... The topography of the area forms part of the rolling hills of the surrounding landscape."

Van Vollenhoven (2015) notes that "At the beginning of the 19th century the Phuthing, a South Sotho group, stayed in the vicinity of modern day Bethal. During the Difaquane they fled to the south (Bergh 1999: 10-11; 109). In 1829 the traveller Robert Scoon passed through an area to the north of Bethal (Bergh 1999: 13). The first white farmers only settled here during the late 1850's. By the 1890's this area was inhabited by many white farmers (Bergh 1999: 18-20). The town of Standerton was established in 1879 although it already was a district in 1878. Bethal was established in 1880 and it became an independent district in 1898 (Bergh 1999: 20-21). During the Anglo-Transvaal War (1880-1881) the British garrison in Standerton was beleaguered by the Boer forces (Bergh 1999: 46). The Highveld areas also saw much action consisting of various skirmishes between Boer and Brit during the Anglo-Boer War (1899-1902). It includes skirmishes on the farms Oshoek (4 December 1901), Trigaardsfontein (10 December 1901), Witbank (11 January 1902) and Nelspan (26 January 1902) (Bergh 1999: 51, 54)... At Standerton there was both a concentration camp for white and for black people (Bergh 1999: 54)."

Matenga (2022) notes that the neighbouring "Tutuka Power Station was commissioned in 1985. The Power Station and other associated built elements are therefore less than 60 years old, hence below the threshold of recognition in terms of the Heritage Act as industrial heritage of significance. The six cooling towers and two chimneys are iconic structures dominating the landscape and skyline. They represent coal power generating technology of the period from the late 19th century through to the late 20th century." The proposed SEF is relatively small in both its vertical and horizontal dimensions when compared to the Tutuka Power Station. It is dwarfed by the power plant, and as such its impact on the existing landscape is not likely to be significant. However, cognisance must be taken of this unique cultural landscape, consisting of farm werfs etc in the proposed layout.

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Archaeology

None of the area proposed for development has been previously assessed in any heritage impact assessment process, however Van Schalkwyk surveyed Farm Spioenkop 376IS in 2002 (SAHRIS NID 5700). Van Schalkwyk (2002) notes that "Although sporadic finds of Stone Age tools have been reported in the larger geographical area, all of these are surface finds, with no known stratified site close by. Some Iron Age sites are also known to exit in the larger area, but none are found close to the study area. Similarly, although some Anglo-Boer War II battlefields occur in the area, and some old farmsteads can be identified on some of the farms, none of these occur in the study area." Van Schalkwyk (2002) identified no heritage resources of significance in his assessment.

Heritage Impact Assessments have been completed nearby for projects in Secunda and these can be used to infer the archaeological sensitivity in the development area. Van Vollenhoven (2015) notes that the geographical area around the towns of Standerton and Bethal is not known to conserve Stone Age archaeology. He notes that "No such sites are indicated on maps contained in a historical atlas of this area (Bergh 1999: 4-5). However this may only be since no research has actually been done in this area. The closest known Stone Age occurrences are a Late Stone Age site at the town of Ermelo and rock art sites far to the west of Standerton (Bergh 1999: 4-5)." Van Vollenhoven (2015) noted no natural shelters during the survey; however, the good vegetation in the surrounding area and the rivers indicate that ample grazing and water may have been available, making it a prime spot for hunting in the past. Therefore one may assume that Stone Age people probably would have moved through the area. Late Iron Age sites are found in a large area around the towns of Bethal and Standerton and number at least 585 such sites.

In the heritage assessment of a powerline upgrade at the nearby Syferfontein Mine, Nel & Karodia (2013), noted that "*a heritage assessment was conducted in 2000 by the National Cultural History Museum and included in the Syferfontein Mine EMP in 2010. During the survey, a few Stone Age artefacts were identified. These artefacts were not considered to have any primary context and therefore were interpreted to have low significance value. No Early Iron Age sites were identified. The Late Iron Age sites found here conform to those identified in the literature for the Southern Highveld area (former southern Transvaal, northern Orange Free State) as Type V sites. As the soil is mostly turf, Iron Age settlement usually took place on the various dolerite outcrops. The added benefit of choosing these locations was that it was located at the source of building material used in constructing the settlements. One such site shows interesting features as the living units were actually excavated to obtain enough building material for the surrounding walls. A few of the farmsteads dating to early part of this century were identified as possibly having historical-architectural significance. A number of abandoned homesteads are located in the areas that were investigated. These seem to belong to farm labourers and were all abandoned within the last few years. They are therefore not viewed to be of cultural or historical significance. However, some graves are located in the vicinity of the homesteads and it is possible that more graves will be located nearby*".

CTS Heritage recently completed a field assessment for a proposed REF located approximately 20km away for this development area. This field assessment determined that the area proposed for development has medium to high local historical significance. The broader cultural landscape consists of old farmhouses, kraals, circular stone structures, and

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the remnants of old water pumps, feeding and watering troughs. Even though the area is rich in history, no significant archaeological heritage resources were identified during the field assessment. No Stone Age or Iron Age heritage resources were identified during the survey. The few heritage resources that were identified consist of the ruins of older farm structures and kraals. However, the field assessment identified six burial grounds or graves.

None of the sites identified in the assessment referenced are located within or near the development area, however the text provides a good assessment of resources that may be present in this study area. It is therefore possible that the proposed development will impact negatively on archaeological resources associated with the Late Iron Age, burial grounds and graves as well as stone age archaeological resources.

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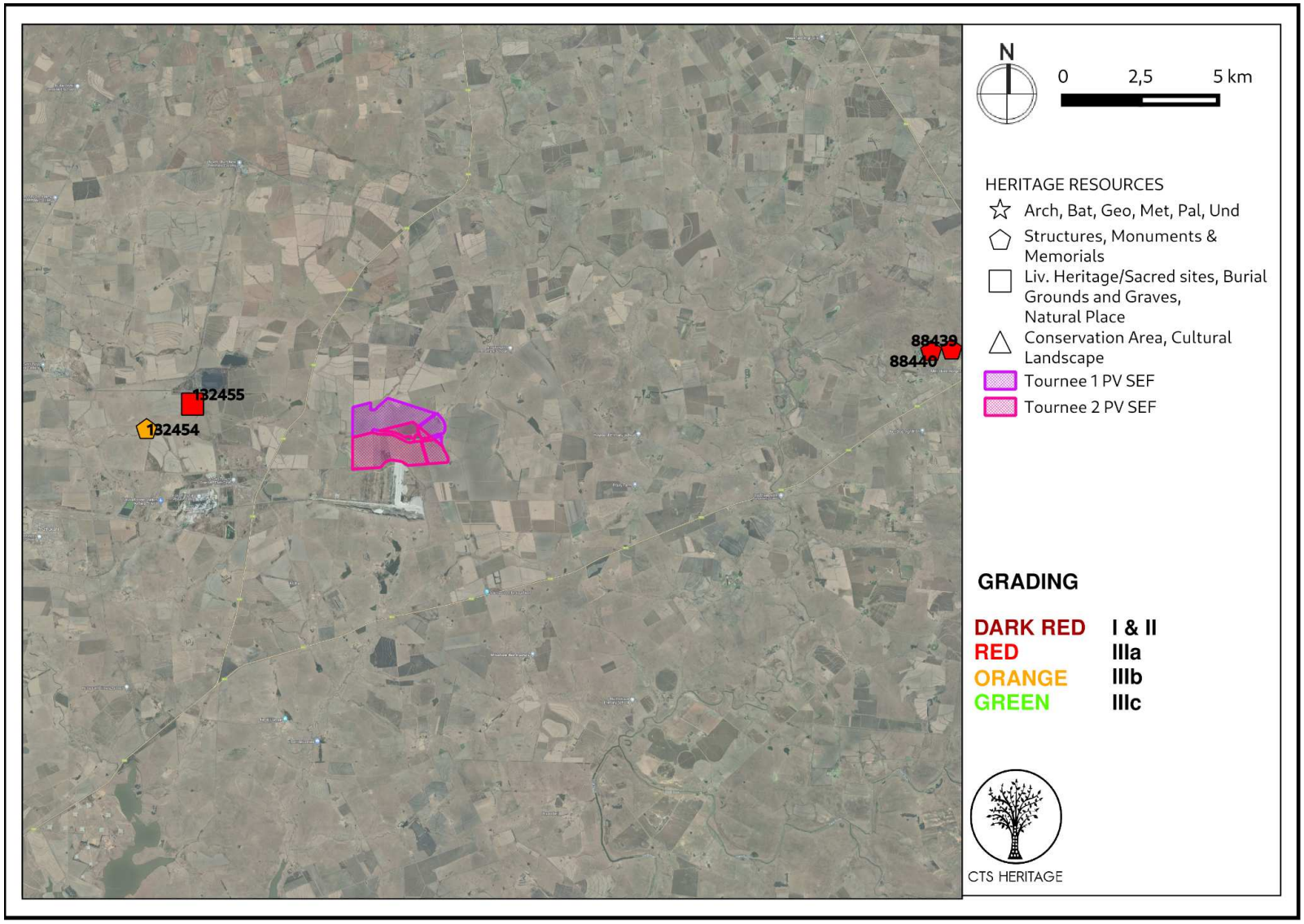

Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated

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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

The field assessment was very thorough over the area proposed for the PV facility where conditions allowed. Three observations were made, two of which reflect significant heritage resources. All are described further below. Most areas within the proposed development footprint have been disturbed through cultivation. The dense vegetation and waterlogged areas affected the surface visibility throughout the site. A farmhouse (still in use) is located on portion 6/350. This structure does not appear to have any historical or cultural significance.

The recorded demolished farmhouse likely dates from the late-1960s/1970s (WP 001). According to the farmer, it was demolished by Eskom, probably to discourage illegal occupation. However, no significant cultural material was found by or near the structure. It is, therefore, considered not to have historical or cultural significance. This observation is therefore considered to be Not Conservation-Worthy.

A total of 8 visible stone cairn graves were observed (WP 002). Further, several loose stones were noted approximately 40 m southeast of the confirmed graves (WP 003). Therefore, there is a slight probability that additional (unmarked) graves could be located in this area. However, these stones may also belong to the prominent grave cairns – they could have been displaced due to heavy rainfalls or farming-related activities.

All graves are of high significance, and a minimum of a 50m buffer should be maintained around the extent of the graves. Graves are readily found within the South African rural landscape, and it should be expected that more graves may be in the area of the earmarked development layout. A modern beer bottle was found adjacent to one of the graves.

Overall, the field assessment has revealed that the area proposed for development has a low level of archaeological sensitivity and it is unlikely that significant archaeological heritage will be located within the areas that were unable to be surveyed.

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Figure 4.1 Contextual Images

Figure 4.2 Contextual Images

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Figure 4.3 Contextual Images

Figure 4.4 Contextual Images

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Figure 4.5 Contextual Images

Figure 4.6 Contextual Images

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Figure 4.7 Contextual Images

Figure 4.8 Contextual Images

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Figure 4.9 Contextual Images

Figure 4.10 Contextual Images

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Figure 4.11 Contextual Images

Figure 4.12 Contextual Image

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Figure 4.13 Contextual Images

Figure 4.14 Contextual Images

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Figure 4.15 Contextual Images

Figure 4.16 Contextual Images

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Figure 5.1. Track paths of archaeological field assessment - the dense vegetation impacted the survey (see Constraints and Limitations)

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4.2 Archaeological Resources identified

Table 1: Observations noted during the field assessment

POINT ID	Description	Density	Co-ordinates		Grading	Mitigation
001	Remains of a broken-down farmhouse, c. 1960's/70's. No Historical period cultural material and/or features were recorded here. According to the farmer, the structure was demolished by Eskom.	NA	26°45'45.34"S	29°24'50.08"E	NCW	NA
002	Fieldstone cairns located next to the border fence (opposite cultivated lands). Eight visible graves. Some headstones visible but no inscriptions	NA	26°45'13.05"S	29°25'21.84"E	IIIA	Buffer recommended
003	Additional unmarked graves may exist at WP 003. However, the loose stones may be related to the graves at WP 002. Heavy rainfalls and/or farming activities may have displaced the identified cairns.	NA	26°45'13.80"S	29°25'23.15"E	IIIA	Buffer recommended

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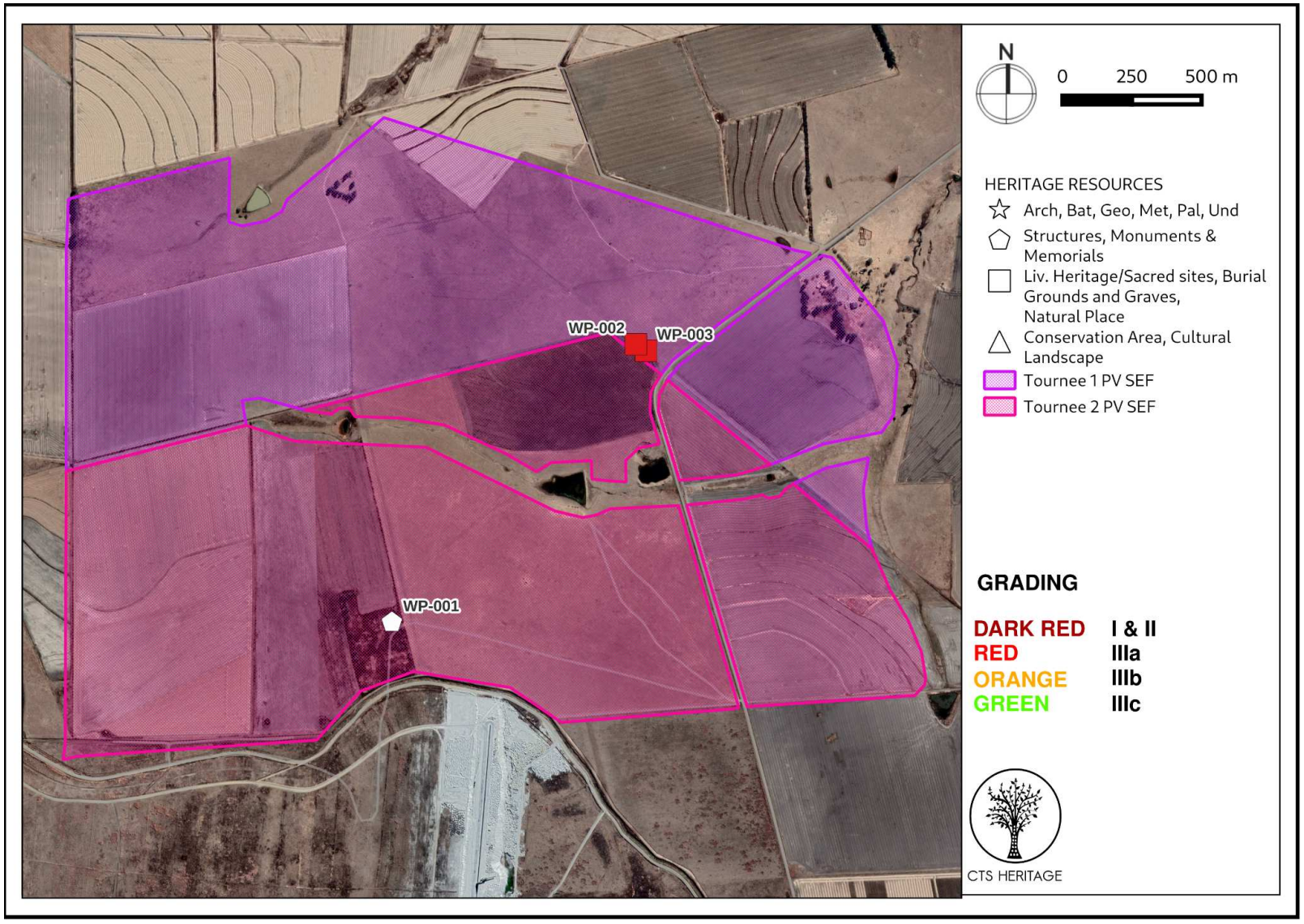

Figure 6.1: Map of all sites and observations noted within the development area

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Figure 6.2: Map of all sites and observations noted within the development area

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4.3 Selected photographic record

(a full photographic record is available upon request)

Figure 7.1 001

Figure 7.2 001

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Figure 7.3 002

Figure 7.4 002

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Figure 7.5 002


Figure 7.6 002


Figure 7.7 003

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Figure 7.8 003

Figure 7.9 003

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5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

The heritage resources observed fall within the area proposed for the PV facilities based on the layout provided. WP 002 and 003 fall within the area proposed for the Tournee 1 PV Facility and WP 001 falls within the area proposed for the Tournee 2 PV Facility. As such, based on the current layouts provided, it is likely that all observed resources will be impacted by the proposed development.

Both WP 002 and WP 003 fall within the areas proposed for the Tournee 1 PV Facility. All the graves are highly significant, and a 50m buffer zone with a fence is recommended to ensure their conservation. Furthermore, it is recommended that a Conservation Management Plan be drafted for the ongoing management and conservation of the identified burials and other heritage resources. The recommended buffer areas are indicated in Figure 6.2.

The structure identified at WP 001 falls within the area proposed for Tournee 2 PV Facility. This structure does not appear to have any archaeological or cultural significance and it has also been disturbed. It is therefore considered to be Not Conservation-worthy and no mitigation is required.

6. CONCLUSION AND RECOMMENDATIONS

The survey proceeded with some constraints and limitations, yet the project area was comprehensively surveyed for heritage resources. The significant heritage resources identified relate to the historic farm occupation of this property. These resources include the remnants of an old farm werf as well as burial sites that were identified.

In order to ensure that no impact to the identified resources occurs during the construction or operational phases of the development, a number of recommendations are made below.

Recommendations

There is no objection to the proposed development from an archaeological perspective on condition that:

- A no development buffer of 50m is implemented around the burial sites identified within the development area for Tournee 1 PV Facility. This buffer area extends into the area proposed for the Tournee 2 PV Facility (Figure 6.2)
- Ongoing community access to these burials, as well as their conservation into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the burials to be implemented for the duration of the project.
- 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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7. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
164217	HIA Phase 1	Francois P Coetzee	15/08/2011	Cultural Heritage Survey of the Proposed Sasol Fine Ash Dams on the Farm Rietvley 320 IS, Secunda, Mpumalanga
254885	Archaeological Specialist Reports	Jaco van der Walt	26/11/2014	Archaeological Scoping Report for the Proposed Establishment of the Tutuka Solar PV Facility, Mpumalanga Province
254889	Palaeontological Specialist Reports	Barry Millsteed	27/11/2014	Desktop Palaeontological Heritage Impact Assessment Report on the Site of a Proposed Power Production Facility (The Tutuka Solar Energy Facility) to be Located on Portions 4, 10 11 and 12 of Farm Pretorius Vley 374 IS, Mpumalanga Province
268333	HIA Phase 2	Francois P Coetzee, Joanna Behrens	23/04/2015	PHASE II: CULTURAL HERITAGE PROJECT OF THE FARM RIETVLEY 320 IS, SASOL FINE ASH DAM (FAD) 6 Investigation focussing on Site 1, Site 3 and Site 6 on the farm Rietvley 320 IS (Portions 3, 8, 9, 10 and Remaining Extent 2), Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga
358403	HIA Phase 1	Anton van Vollenhoven	10/08/2015	A report on a Cultural Heritage Impact Assessment for the Development of a De-stoning Plan at the New Denmark Colliery, close to Standerton, Mpumalanga Province
5059	AIA Phase 1	Johnny Van Schalkwyk	01/05/2003	Archaeological Survey of a Section of the Secunda-Mozambique Gas Pipeline Bethal and Highveld Ridge
5697	AIA Phase 1	Udo Kusel	30/11/2006	Cultural Heritage Resources Impact Assessment of Portion 10 of the Farm Jonkersdam 391 IS Standerton
5700	AIA Phase 1	Johnny Van Schalkwyk	01/10/2002	A Survey of Cultural Resources for the Proposed New Tutuka-Alpha Standerton Power Transmission Line, Standerton District
6657	AIA Phase 1	Johnny Van Schalkwyk	01/05/1998	A Survey of Cultural Resources for the Proposed Escom Rail Line, Highveld Ridge District, Mpumalanga
7870	AIA Phase 1	Julius CC Pistorius	01/07/2008	A Phase I Heritage Impact Assessment Study for Sasol's Proposed New Gas and Liquid Pipelines (Along a Corridor) from Sasol Synfuels in Secunda (Mpumalanga) to Sasol Infrachem and Natref in Sasolburg (Free State) on the Highveld in the Republic of South Af
8331	AIA Phase 1	Zoe Henderson, C Koortzen	19/06/2007	Heritage Assessment Report Zeus Substation Expansion, Vlakfontein 328, Gert Sibande (DC 30) District, Mpumalanga, South Africa

APPENDIX 2: Palaeontological Assessment (2022)

Palaeontological Impact Assessment for the proposed Tournee Solar Energy Facilities 1 & 2, between Bethal and Morgenson, Mpumalanga Province

CTS22_289_WSP

Site Visit Report (Phase 2)

For

CTS Heritage

11 February 2023

Prof Marion Bamford
Palaeobotanist
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Expertise of Specialist

The Palaeontologist Consultant: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, ASSAf
Experience: 34years research; 26 years PIA studies
Over 350 projects completed.

Declaration of Independence

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by CTS Heritage, Simonstown, 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 site visit (Phase 2) Palaeontological impact Assessment was completed for the Tournee 1 Solar Park and Tournee 2 Solar Park projects. The proposed site is on three affected farms:
Portion 7 (Portion of Portion 3) of Farm Dwars-in-die-Weg 350 IS
Portion 6 of Farm Dwars-in-die-Weg 350 IS
Remaining Portion of Portion 3 of Farm Dwars-in-die-Weg 350 IS

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 sites lie on non-fossiliferous Jurassic dolerite and on potentially very highly sensitive rocks of the Vryheid Formation (Ecca Group, Karoo Supergroup) that could preserve impressions of fossil plants of the *Glossopteris* flora. The site visit and walk through by the palaeontologists on 06 February 2023 confirmed that there are NO FOSSIL PLANTS of the *Glossopteris* flora present on the surface. The area has a gently rolling topography with flatter pars, and open with secondary grassland, rare exotic trees. Most of the area appears to have been cultivated previously or cleared for grazing. It is unknown if there are fossils below the ground surface, 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 have commenced. Since the impact will be low to moderate, as far as the palaeontology is concerned, the project should be authorised provided that any fossils found are rescued and that SAHRA is notified.

Table of Contents

1. Background

A site visit (Phase 2) Palaeontological impact Assessment was completed for the Tournee 1 Solar Park and Tournee 2 Solar Park projects. The proposed site is on three affected farms:
Portion 7 (Portion of Portion 3) of Farm Dwars-in-die-Weg 350 IS
Portion 6 of Farm Dwars-in-die-Weg 350 IS
Remaining Portion of Portion 3 of Farm Dwars-in-die-Weg 350 IS

The project falls in the Thuthukani Local Municipality and the Gert Sibande District Municipality. It lies to the east of the R38, south of Bethal and north of Standerton, and west of Morgenson. The combined area is 145.6104 hectares. Currently the three land parcels are used for agriculture by two lessees but are owned by Eskom Holding SOC Ltd.
No details of the project and layout have been provided but as far as the palaeontology is concerned, only the footprint is of relevance.

A Palaeontological Impact Assessment was requested for the Tournee 1 Solar Park and Tournee 2 Solar Park projects. 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 for the proposed development and is reported herein. There is no specific specialist protocol that has been prescribed for Palaeontology and this assessment has been undertaken in terms of the EIA Regulations (Appendix 6).

Table 1: National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6).

	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
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 1
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

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
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 2
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 5
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 4
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 of any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

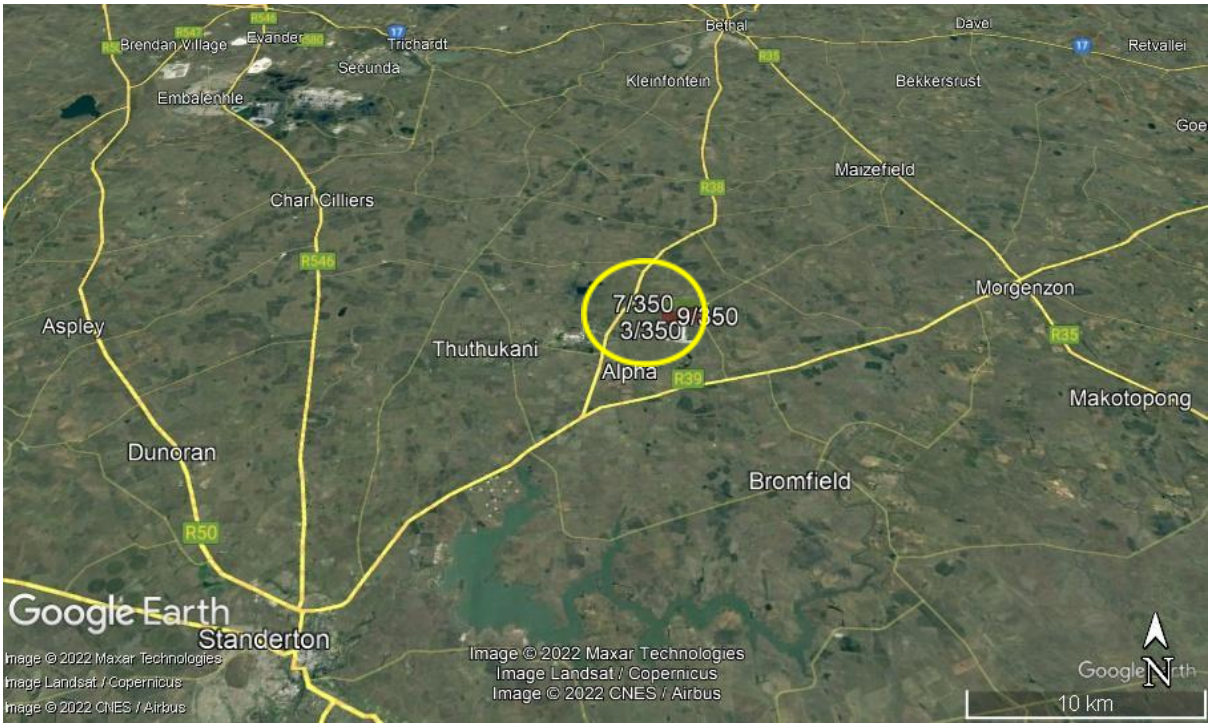

Figure 1: Google Earth map of the proposed Tournee Solar Parks 1 & 2 site on portions of Farm Dwars-in-de-Weg 350 IS showing the relevant landmarks.

Figure 2: Annotated Google Earth map for the proposed Tournee 1 Solar Park (purple) and Tournee 2 Solar Park (pink) sites between Bethal and Standerton.

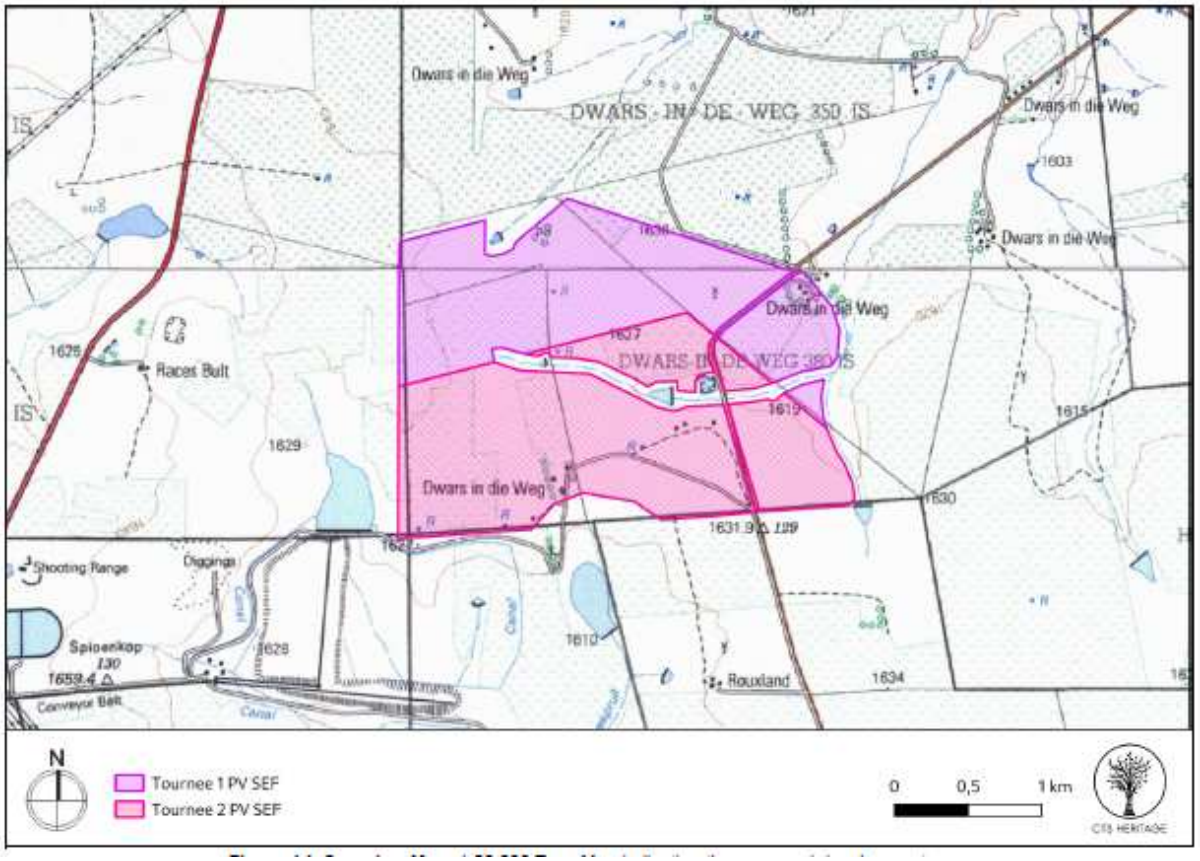

Figure 3: Topographic map with the Tournee Solar Park 1 and Tournee Solar Park 2 locations outlined (from CTS Scoping Report)

2. 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*).

3. Geology and Palaeontology

i. Project location and geological context

The site lies in the northeastern part of the Karoo basin where the lower Karoo Supergroup strata are exposed (Figure 4). Along the rivers and streams much younger reworked sands and alluvium overly the older strata.

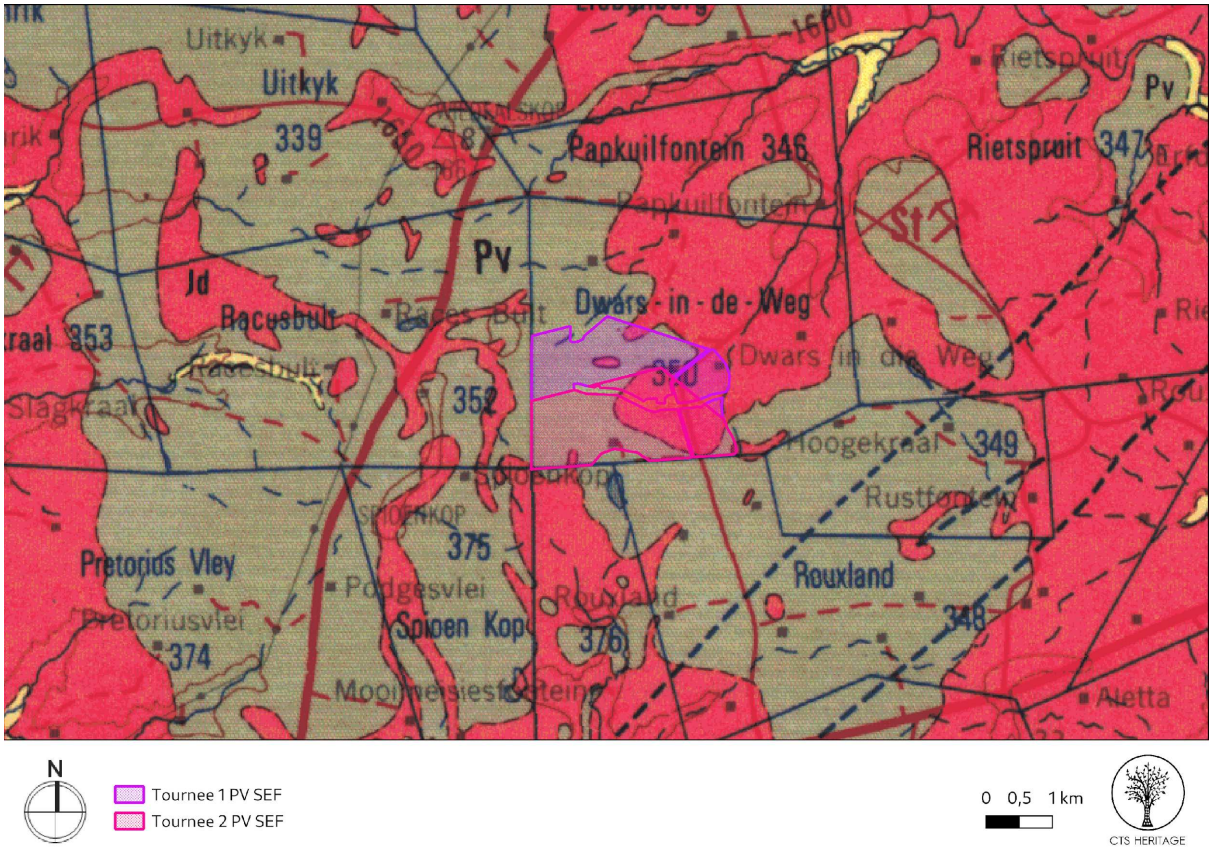

Figure 4: Geological map of the area around Farm Dwars-in-de-Weg 350 for the Tournee PV SEFs. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 2628 East Rand.

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

Symbol	Group/Formation	Lithology	Approximate Age
Qc	Quaternary	Alluvium, sand, calcrete	Neogene, ca 2.5 Ma to present
Jd	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, Ca 183 Ma
Pv	Vryheid Fm, Ecca Group, Karoo SG	Shales, mudstone, sandstone, coal seams	Early Permian Ca 290-270 Ma

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. They comprise tillites, diamictites, mudstones, siltstones and sandstones that were deposited as the basin filled. This group has been divided into two formations with Elandsvlei Formation occurring throughout the basin and the upper Mbizane Formation occurring only in the Free State and KwaZulu Natal (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. In Mpumalanga, the Free State and KwaZulu Natal, from the base upwards are the Pietermaritzburg Formation, **Vryheid Formation** and the Volksrust Formation. All of these sediments have varying proportions of sandstones, mudstones, shales and siltstones and represent shallow to deep water settings, deltas, rivers, streams and overbank depositional environments.

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

ii. Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 5 and lies on Jurassic dolerite and the Vryheid Formation.

The Vryheid Formation lies on the uneven topography of pre-Karoo or Dwyka Group rocks in the northern and northwestern margins, but lies directly on the Pietermaritzburg Formation in the central and eastern part. The lithofacies show a number of upward-coarsening cycles, some very thick, and they are essentially deltaic in origin. There are also delta-front deposits, evidence of delta switching, and fluvial deposits with associated meandering rivers, braided streams, back swamps or interfluves and abandoned channels (Cadle et al., 1993; Cairncross, 1990; 2001; Johnson et al., 2006). Coal seams originated where peat swamps developed on broad abandoned alluvial plains, and less commonly in the backswamps or interfluves. Most of the economically important coal seams occur in the fluvial successions (ibid). In the east (Mpumalanga and northern KwaZulu Natal), the Vryheid formation can be subdivided

into a lower fluvial-dominated deltaic interval, a middle fluvial interval, and an upper fluvial-dominated deltaic interval again (Taverner-Smith et al., 1988).

The Vryheid Formation preserves the distinctive Gondwanan flora, the *Glossopteris* flora. As the climate warmed up and the huge continent drifted polewards the land was rapidly colonised by luxuriant vegetation, in some parts. Peats formed in waterlogged environments and over time were buried, preserved and altered by heat and pressure to eventually form the coal seams typical of this formation and abundant in Mpumalanga and KwaZulu Natal coalfields. Coals themselves do not preserve the original plant structures, but plant impressions or compressions can be preserved in the lenses between the coals or in fine grained sediments. The flora is composed of the dominant *Glossopteris* plants (leaves, seeds, reproductive structures, roots and wood). Other plants are lycopods, sphenophytes, ferns, cordaitaleans and other early gymnosperms. Vertebrates are not found with the fossil plants because they require adifferent set of conditions for preservations. Plants require rapid burial in a reducing and anoxic environment, while bones can be preserved in oxidizing environments (Cowan, 1995).

The Jurassic dolerite does not preserve fossils because it is an intrusive volcanic rock. The very young Quaternary sands along the stream are also very unlikely to preserve fossils as they have been moved by the river floods and fossils would have been destroyed, if present in the first place.

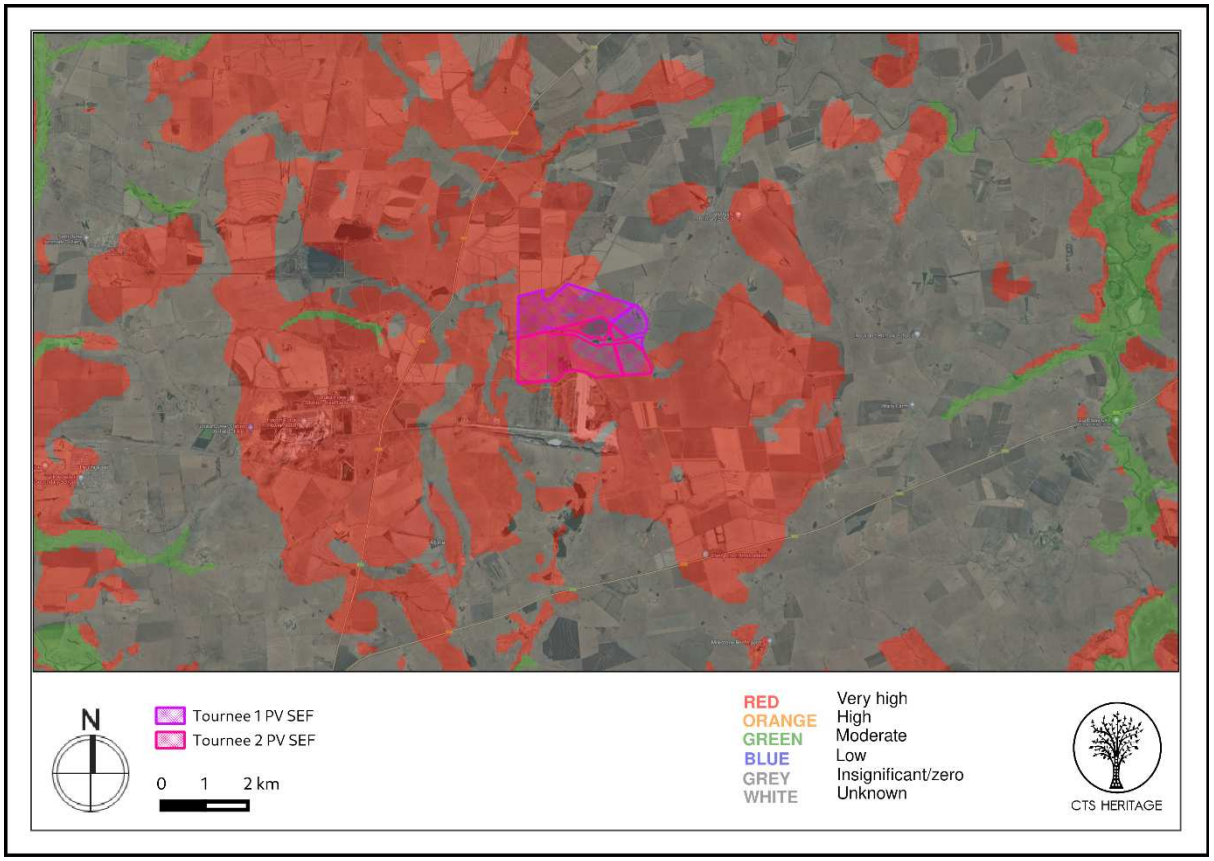

Figure 5: SAHRIS palaeosensitivity map for the site for the proposed Tournee PVs shown within the lilac and pink polygons. Background colours indicate the following

degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

iii. Site visit observations

The proposed project area is situated south of Bethal, north of Standerton and west of Morgenson, adjacent to the R38. The land has been cultivated and/or grazed for decades and so is highly disturbed from clearing of the land of rocks for cultivation and ploughing. There are no rocky outcrops within the cultivated land. With a gently rolling topography covered with either secondary grassland or exposed soils after ploughing, the visibility was generally good. Streams were not surveyed for fossils because they are seldom permitted to be developed, but more importantly, water and water-logged areas are not good for the preservation of fossils.

The palaeontologists tracked their route in the vehicle (Figure 6) but walked into the veld to observe and take photographs. For both Tournee 1 Solar Park (Figure 7) and Tournee 2 Solar Park (Figure 8) the same topography, open grasslands and lack of rocky outcrops were observed. NO FOSSILS of any kind were seen on the ground surface and are unlikely to be found in the overlying soils.

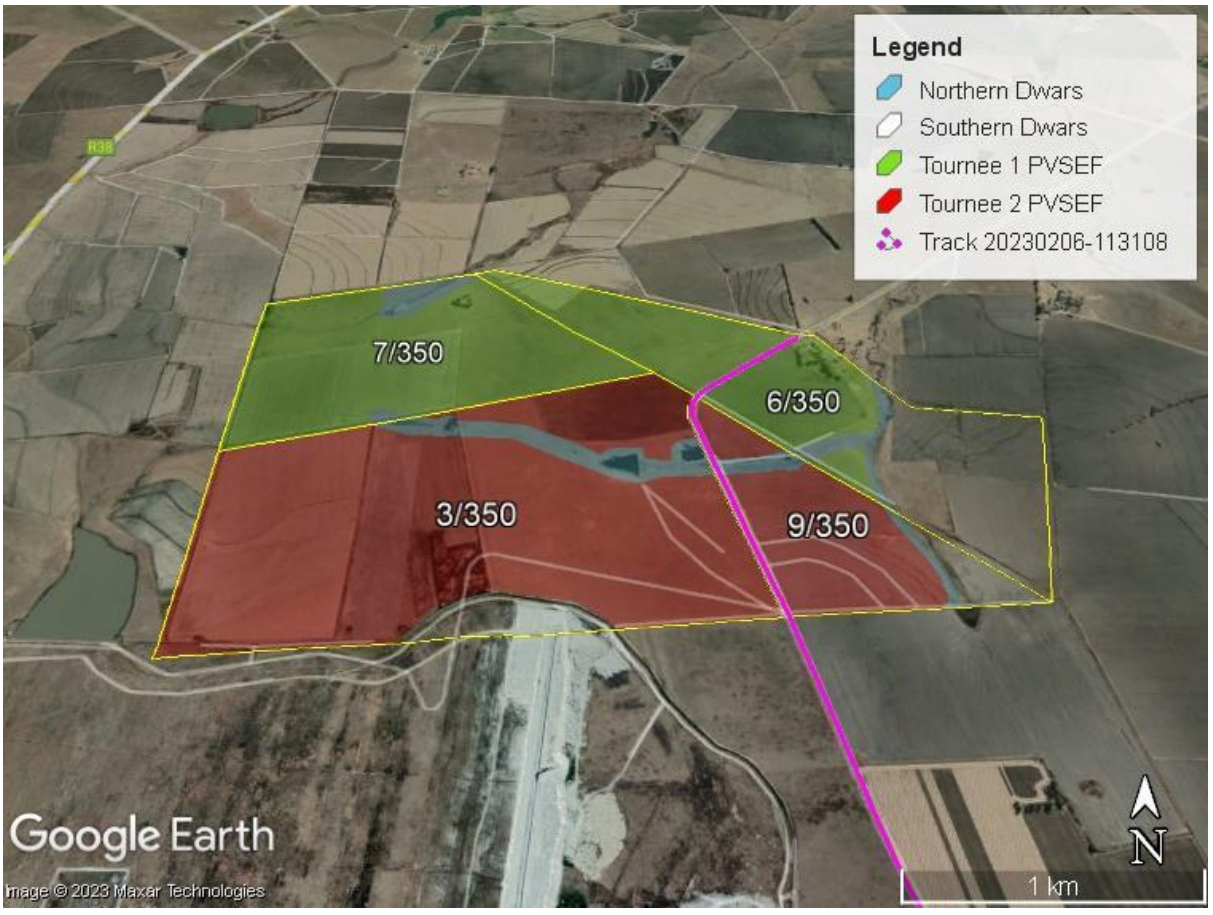

Figure 6: Vehicle route map for the Tournee 1 and 2 site visit (pink line).

Figure 7: Site photographs for the Tournee 1 Solar Park (green shading, east side of the road). A – general view of the area with grasslands. B – another general view showing a flatter part of the area. C- small dam with exposed sandy soils and dolomite boulders that have been brought in. D – other end of the dam with grasslands and no exposed soils or rocks.

Figure 8: Site photographs for the Tournee 2 Solar Park (red shading, west side of road). A – D – general view of the farmland showing no rocky outcrops and only a few trees in the far distance.

4. Impact assessment

An assessment of the potential impacts to possible palaeontological resources considers the criteria encapsulated in Table 4:

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	-
	L	Soils do not preserve plant fossils; so far there are no records from the Vryheid formation of plant or animal fossils in this region so it is very 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 fossil plants from the *Glossopteris* flora in the shales, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	**H**	**-**
	M	**-**
	L	It is extremely unlikely that any fossils would be found in the loose sand that will be developed for infrastructure but it is unknown what lies below the soils. Therefore, a Fossil Chance Find Protocol should be added to the eventual EMPr.

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 of any significance in the project footprint. Furthermore, the surface material to be excavated is soil and this does not preserve fossils. Since there is a small chance that fossils from the Vryheid Formation might occur below ground and might be disturbed when excavations commence for foundations and infrastructure, 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 low to moderate.

5. 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 only some do contain fossil plant, insect, invertebrate and vertebrate material. The site visit and walk through on 06 February 2023 (summer) by palaeontologists confirmed that there are no fossils on the surface. There were no outcrops of shales that could potentially preserve fossils. There were no fossils on the surface. It is not known what lies below the surface but the soils appear to be a metre ot more deep. The overlying soils and sands of the Quaternary period would not preserve fossils.

6. Recommendation

Based on the fossil record but confirmed by the site visit and walk through there are NO FOSSILS of any significance such as those of recognisable *Glossopteris* floral elements, 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 shales of the Vryheid 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 for the foundations and infrastructure, then they should be rescued and SAHRA notified so that a palaeontologist can be called to assess and collect a representative sample.

7. References

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Visser, J.N.J., 1989. The Permo-Carboniferous Dwyka Formation of southern Africa: deposition by a predominantly subpolar marine icesheet. Palaeogeography, Palaeoclimatology, Palaeoecology 70, 377-391.

8. 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 discard 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 Figure 10). 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/miners 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 a SAHRA permit must be obtained. Annual reports must be submitted to 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 and mining have finished then no further monitoring is required.

9. Appendix A – Examples of fossils from the Vryheid Formation

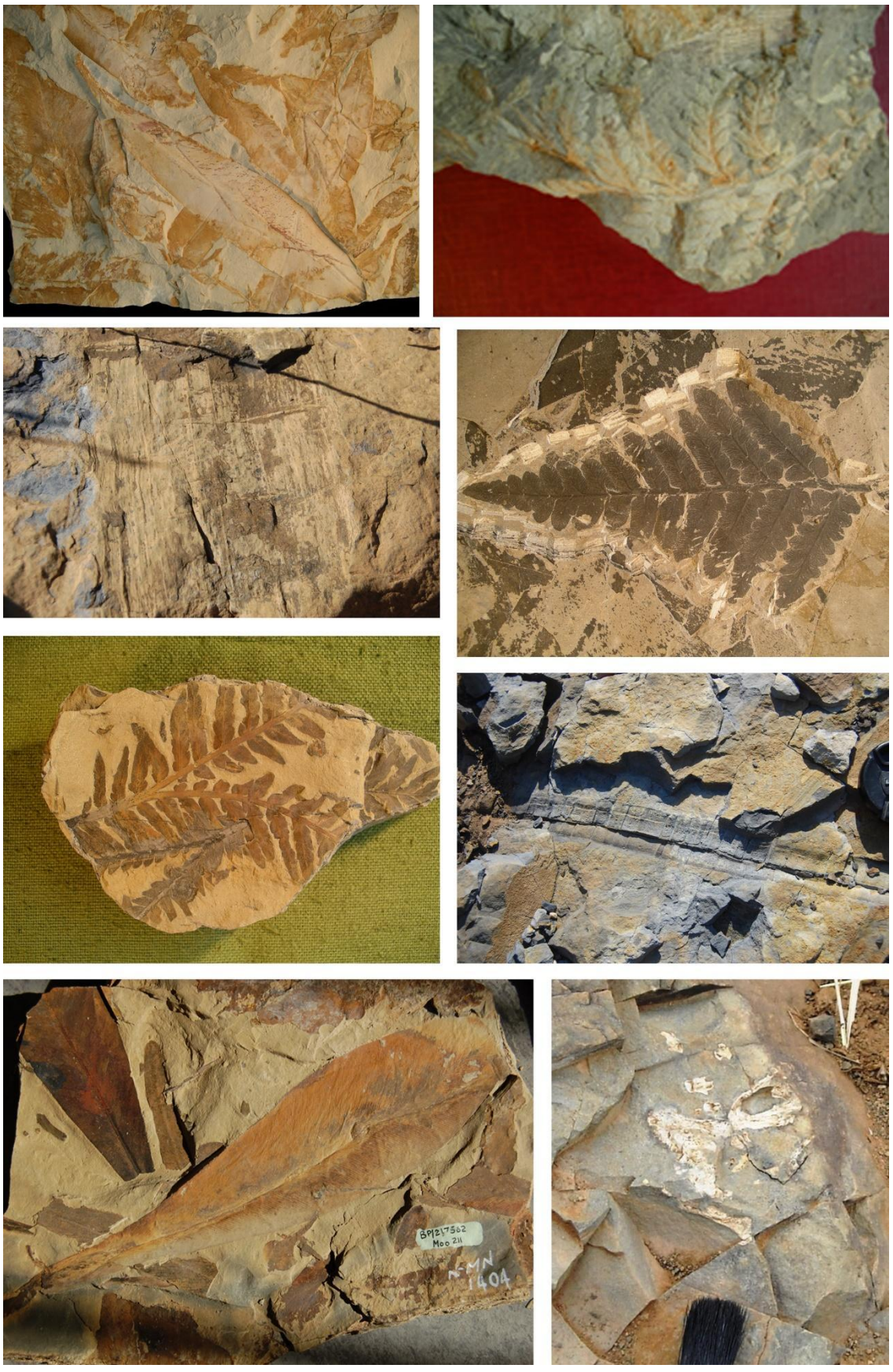

Figure 9: Photographs of fossil plants of the *Glossopteris* flora from the Vryheid formation that would be expected to occur.

10. Appendix B – Details of specialists

Marion Bamford (PhD)

Short CV for PIAs – July 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 July 2022 peer-reviewed journals or scholarly books: over 165 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.

Mr Frederick Tolchard
Brief Curriculum Vitae – January 2023

Academic training
BA Archaeology – University of the Witwatersrand, graduated 2015
BSc (Honours) Palaeontology – University of the Witwatersrand, 2017 with distinction
MSc Palaeontology – University of the Witwatersrand, 2018 – 2019. Graduated 2020 with Distinction
PhD Palaeontology – Wits – 2020 - current

Field Experience
Honours Fieldtrip – Karoo biostratigraphy – April 2017
Research fieldwork – Elliot Formation with Prof Choiniere – April 2018, Nov 2018; April 2019; Sept 2021

Publications
Tolchard, F., Nesbitt, S.J., Desojo, J.B., Viglietti, P.A., Butler, R.J. and Choiniere, J.N., 2019. 'Rauisuchian' material from the lower Elliot Formation of South Africa: Implications for late Triassic biogeography and biostratigraphy. Journal of African Earth Sciences, 160, 103610.

Viglietti, P.A., McPhee, B.W., Bordy, E.M., Sciscio, L., Barrett, P.M., Benson, R.B.J., Wills, F., Tolchard, F., Choiniere, J.N., 2020. Biostratigraphy of the Scalenodontoides Assemblage Zone (Stormberg Group, Karoo Supergroup), South Africa. South African Journal of Geology 123, 239-248.

Tolchard F., Kammerer C., Butler R.J., Abdala F., Hendrickx C., Benoit J., Choinière J.N. (2021.) A very large new trirachodontid from the Triassic of South Africa and its implications for Gondwanan biostratigraphy. Journal of Vertebrate Paleontology. DOI: 10.1080/02724634.2021.1929265.

PIA fieldwork projects
2018 May – Williston area – SARAO project, Digby Wells
2018 September – Lichtenburg PVs – CTS Heritage
2018 November – Nomalanga farming – Digby Wells
2019 January – Thubelisha coal – Digby Wells
2019 March – Matla coal – Digby Wells
2019 March – Musina-Machado SEZ – Digby Wells
2019 June – Temo coal – Digby Wells
2019 September – Makapanstad Agripark – Plantago
2020 January – Hendrina, Kwazamakuhle – Kudzala
2020 February – Hartebeestpoort Dam - Prescali
2020 March – Twyfelaar Coal mine – Digby Wells
2020 March – Ceres Borrow Pits – ACO Associates
2020 March – Copper Sunset Sand – Digby Wells
2020 October – Belfast loop and Expansion – Nsovo
2020 October – VLNR lodge Mapungubwe – HCAC
2020 November – Delmore Park BWSS - HCAC
2020 December – Kromdraai commercial – HCAC
2021 January – Welgedacht Siding – Elemental Sustainability
2021 March – Shango Kroonstad – Digby Wells
2021 May – Copper Sunset sand mining – Digby Wells
2021 August – New Largo Pit – Golder
2021 August – Khutsong Ext 8 housing, Carletonville, for Afzelia
2021 September – Lichtenburg PV facility – CTS Heritage
2021 October – Ogies South MR – beyondgreen
2021 October – Nooitgedacht Colliery MR – Shangoni
2022 January – Sigma PVs Sasolburg – CTS Heritage
2022 March – Taaibosch Puts PVs – CTS Heritage
2022 March – Modder East Operations – Prime Resources
2022 March – Driefontein mine revised infrastructure – Amber Earth
2022 March – Transnet MPP Access routes, inland and coastal - ENVASS
2022 June – Roodepoort MRA, Rietspruit – Eco-Elementum
2022 July – Highveld Colliery for Eco-Elementum
2022 July – Doornrug and Kleinwater Collieries for Eco-Elementum
2022 November – Kendal Plots, Ogies, for Amber Earth
2022 November – Boschmanspoort, Hendrina for Eco-Elementum
2022 December – Newcastle Coal for Cabanga Environmental
2023 January – Virginia SEFs x 4 for AGES Limpopo (Pty) Ltd

Brandon Stuart CV
January 2023

After completing my BSc degree majoring in Zoology and Genetics in 2019, in 2020 I enrolled and completed a BSc Honours degree majoring in Zoology and specializing in Paleontology. My Honours research project was focused on describing the postcranial anatomy of the

therocephalian *Moschorhinus kitchingi,* supervised by Dr. Jennifer Botha at the National Museum, Bloemfontein.

I have just completed my Masters degree at the University of the Free State for in Palaeobiology (awaiting examiners' reports). I carried out my research through the National Museum, Bloemfontein supervised by Dr. Jennifer Botha. My research is focused on studying the postcranial morphology of therocephalian therapsids from the Karoo Basin of South Africa. In February 2023, I will register for a doctoral degree at the University of the Witwatersrand, in the Evolutionary Studies Institute and will be supervised by Prof Botha and Prof Jonah Choiniere.

Qualifications
BSc – Majors: Genetics and Geology - University of the Free State – 2019
BSc Honours – Palaeontology – University of the Free State – 2020
MSc – Palaeontology – University of the Free State – registered 2021, submitted for examination.
PhD – Palaeontology – University of the Witwatersrand – Feb 2023 onwards.

PIA Fieldwork Experience
July 2021 – Sannaspos SEF, Free State, for CTS Heritage
October 2021 – Beatrix Mine-Theunissen Eskom Powerline for 1World
January 2022 – Fouriesburg residential development for Mang Geoenviron-mental
February 2022 – Balkfontein-Doornhoek 11 kV powerline for 1World
March 2022 – Transnet MPP Access routes, inland and coastal for ENVASS
June 2022 – Koria-Boesmanshoek 22 kV powerline for 1World
January 2023 – Virginia SEFs x 4 Phase 2 for AGES Limpopo (Pty) Ltd.

References:
Dr Jennifer Botha, Head of Palaeontology, National Museum, Bloemfontein
jbotha@nasmus.ac.za

Prof Jonah Choiniere, Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg
Jonah.choiniere@wits.ac.za

APPENDIX 3: Heritage Screening Assessment

CTS HERITAGE

HERITAGE SCREENER

CTS Reference Number:	**CTS21_289**
SAHRIS Reference:	
Client:	**WSP**
Date:	**December 2022**
Title:	**Tournée 1 Solar PV Park & Tournée 2 Solar PV Park.**

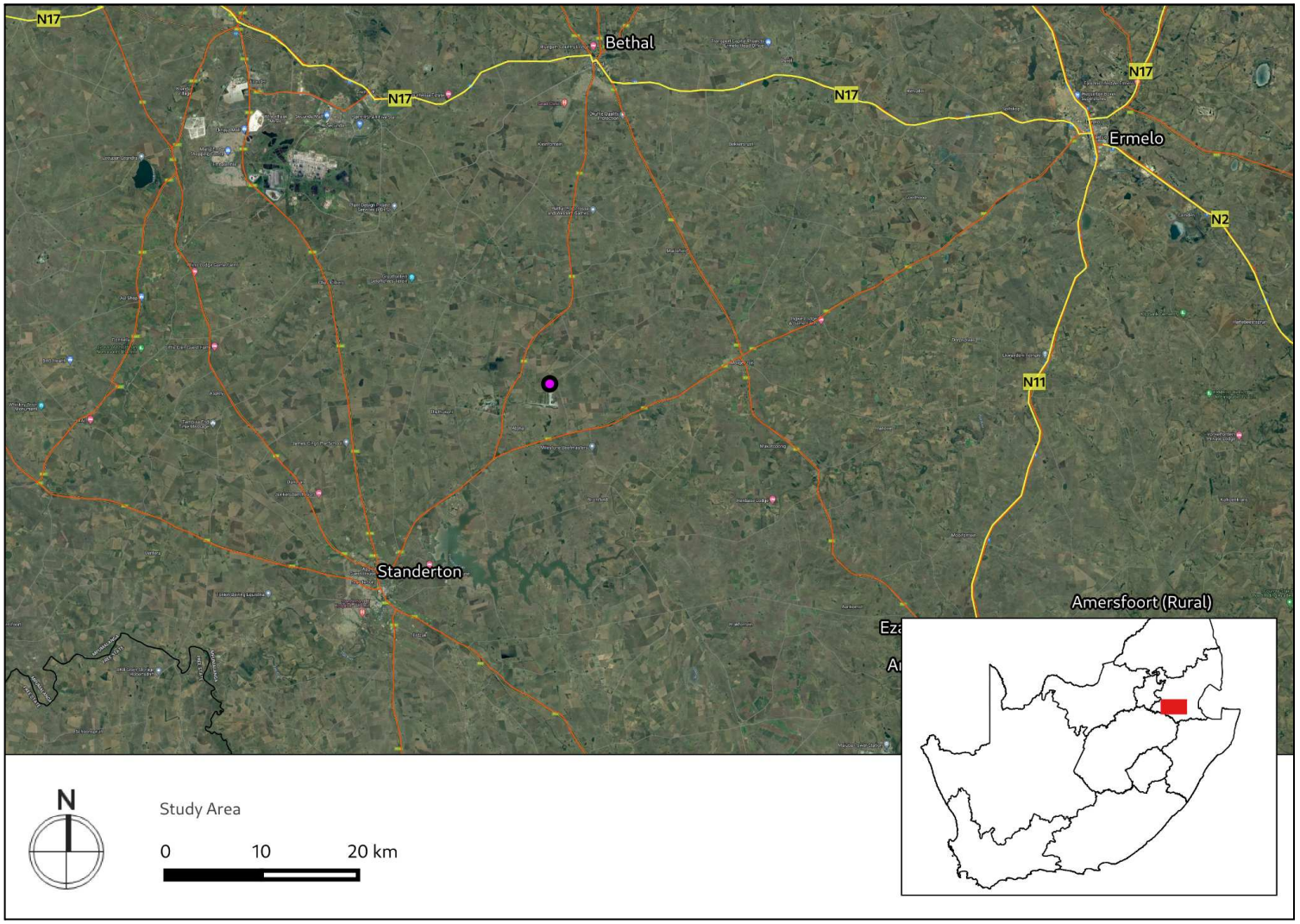

Figure 1a. Satellite map indicating the location of the proposed development in the Mpumalanga Province

CTS HERITAGE

1. Proposed Development Summary

Red Rocket propose to construct the Tournée 1 & 2 Solar PV Parks near Thuthukani in the Mpumalanga Province. The Tournée Solar PV Cluster will include two 150MW Solar Energy Facilities (SEFs).

It is understood that Red Rocket has a corporate Environmental and Social Management System (ESMS) which aligns with the Equator Principles, the International Funding Corporation (IFC) Performance Standards (PS) and applicable World Bank/IFC Environmental, Health and Safety (EHS) and Sector specific Guidelines and applicable Good International Industry Practice (GIIP). All Red Rocket's renewable energy projects, from inception, development, construction, operation, and any decommissioning are required to fully comply with the requirements and expectations of the ESMS.

2. Application References

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

3. Property Information

Latitude / Longitude	26°45'18.71"S 29°24'50.33"E
Farms	**Tournee 1:** Portion 7 (Portion of Portion 3) of Farm Dwars-in-die-Weg 350 IS Portion 6 of Farm Dwars-in-die-Weg 350 IS **Tournee 2:** Remaining Portion of Portion 3 of Farm Dwars-in-die-Weg 350 IS Portion 6 of Farm Dwars-in-die-Weg 350 IS
Local Municipality	Lekwa
District Municipality	Gert Sibande
Province	Mpumalanga
Current Use	Agricultural
Current Zoning	Agricultural

CTS HERITAGE

4. Nature of the Proposed Development

Total Area	Tournee 1 - 306.65 ha Tournee 2 - 505.15
Depth of excavation (m)	TBA
Height of development (m)	TBA

5. Category of Development

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

6. Additional Infrastructure Required for this Development

Grid infrastructure - but this will not be part of the PV applications

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

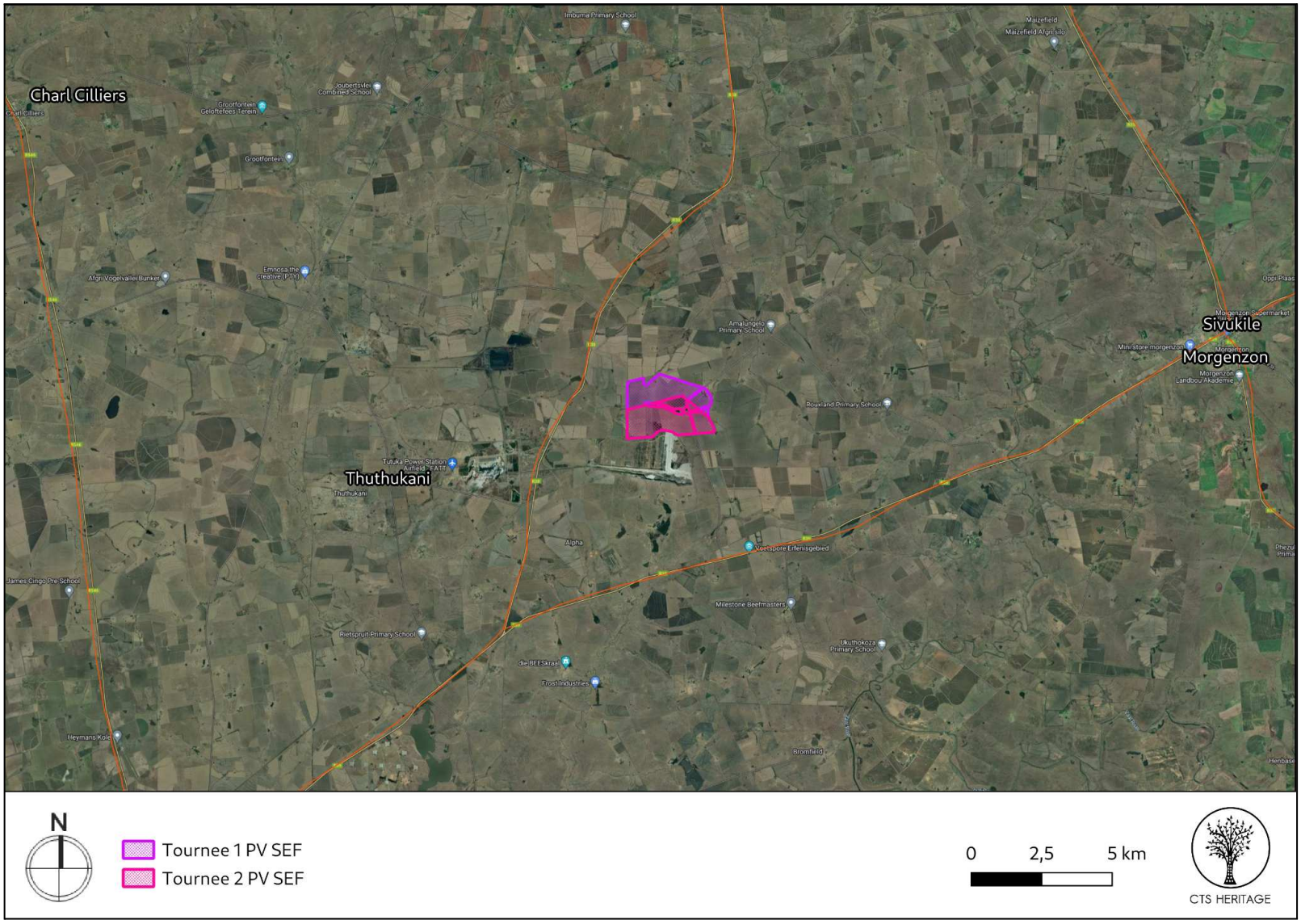

Figure 1b. Overview Map. Satellite image (2022) indicating the proposed development area

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

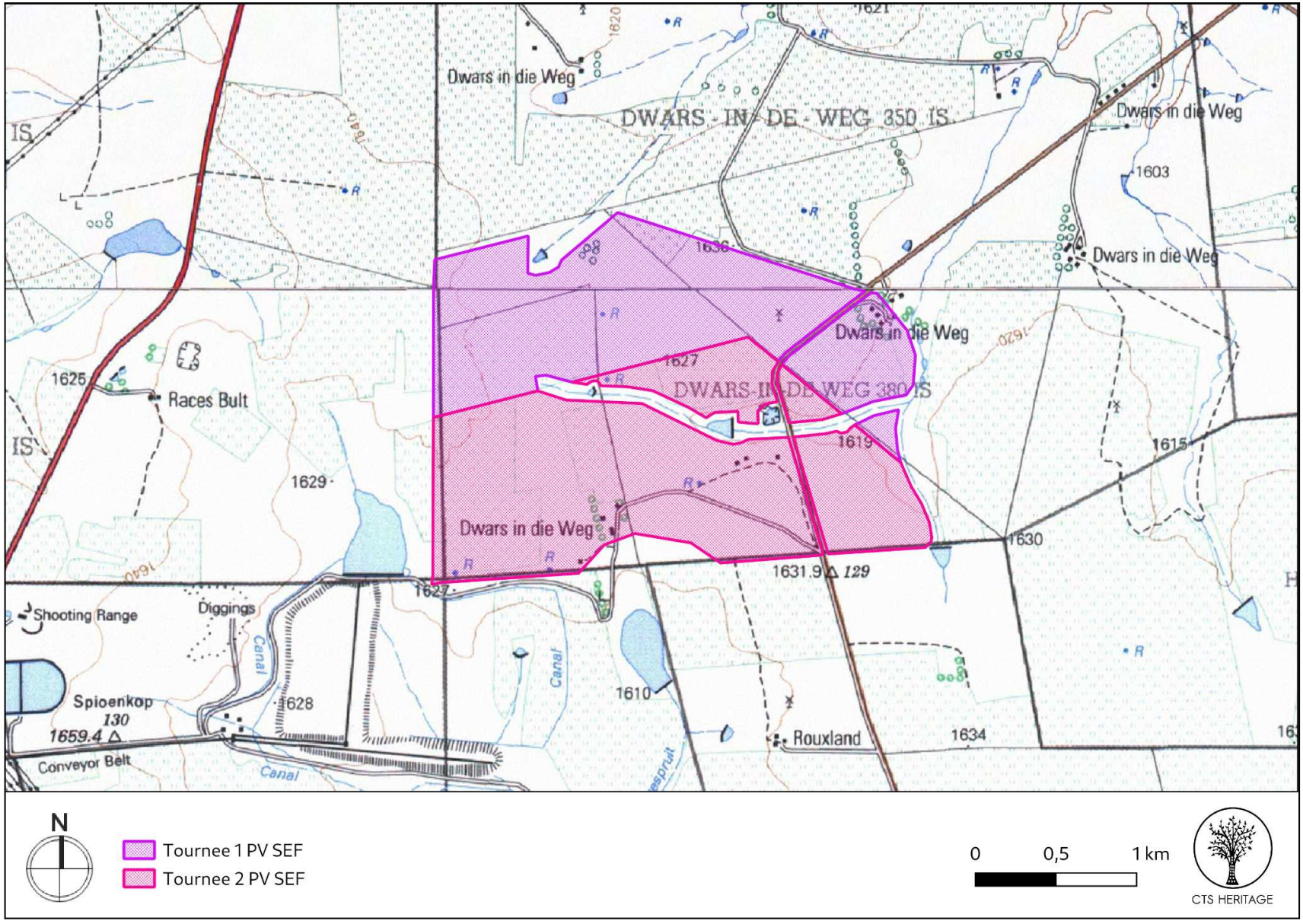

Figure 1d. Overview Map. 1:50 000 Topo Map indicating the proposed development area

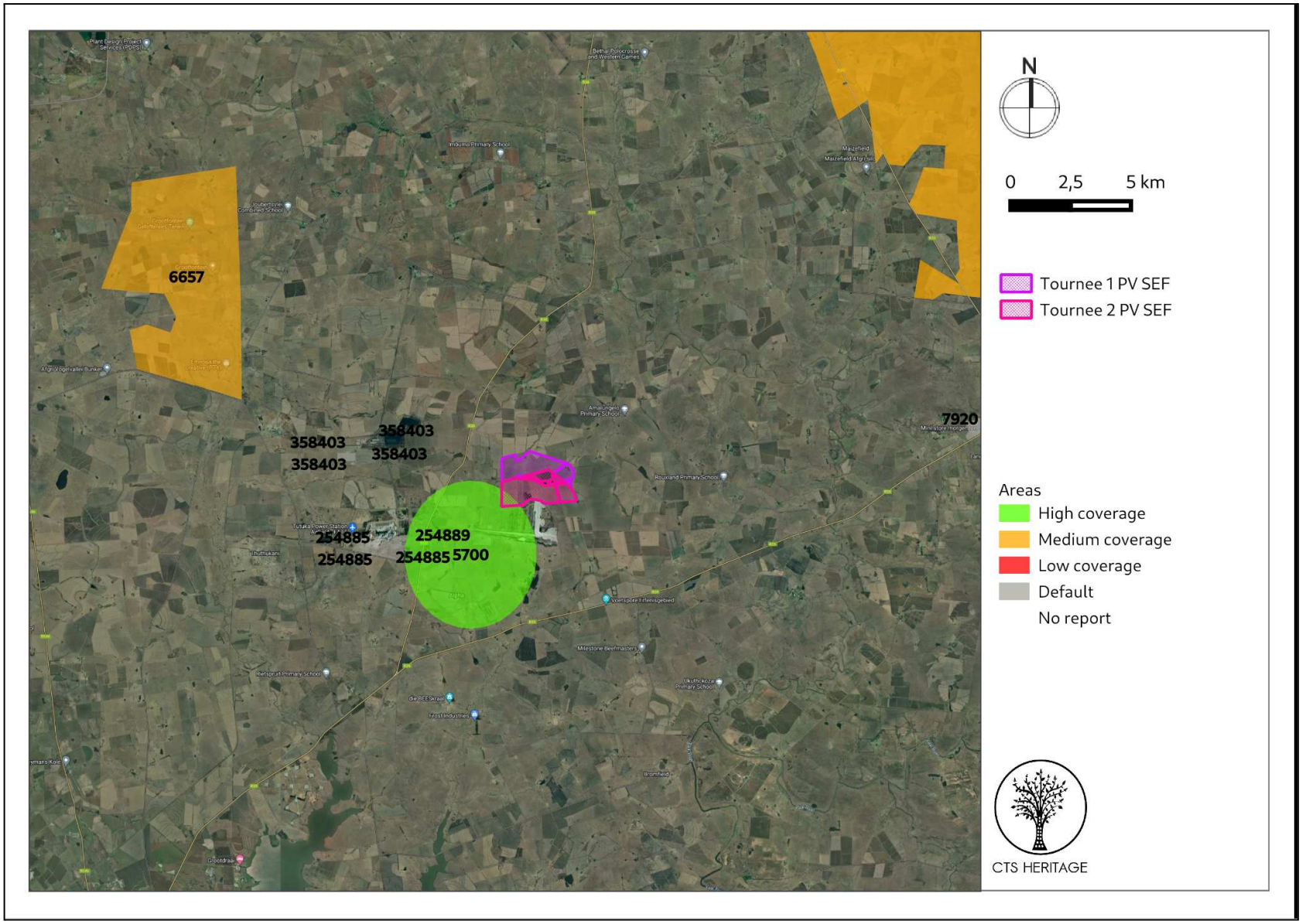

Figure 2a. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.

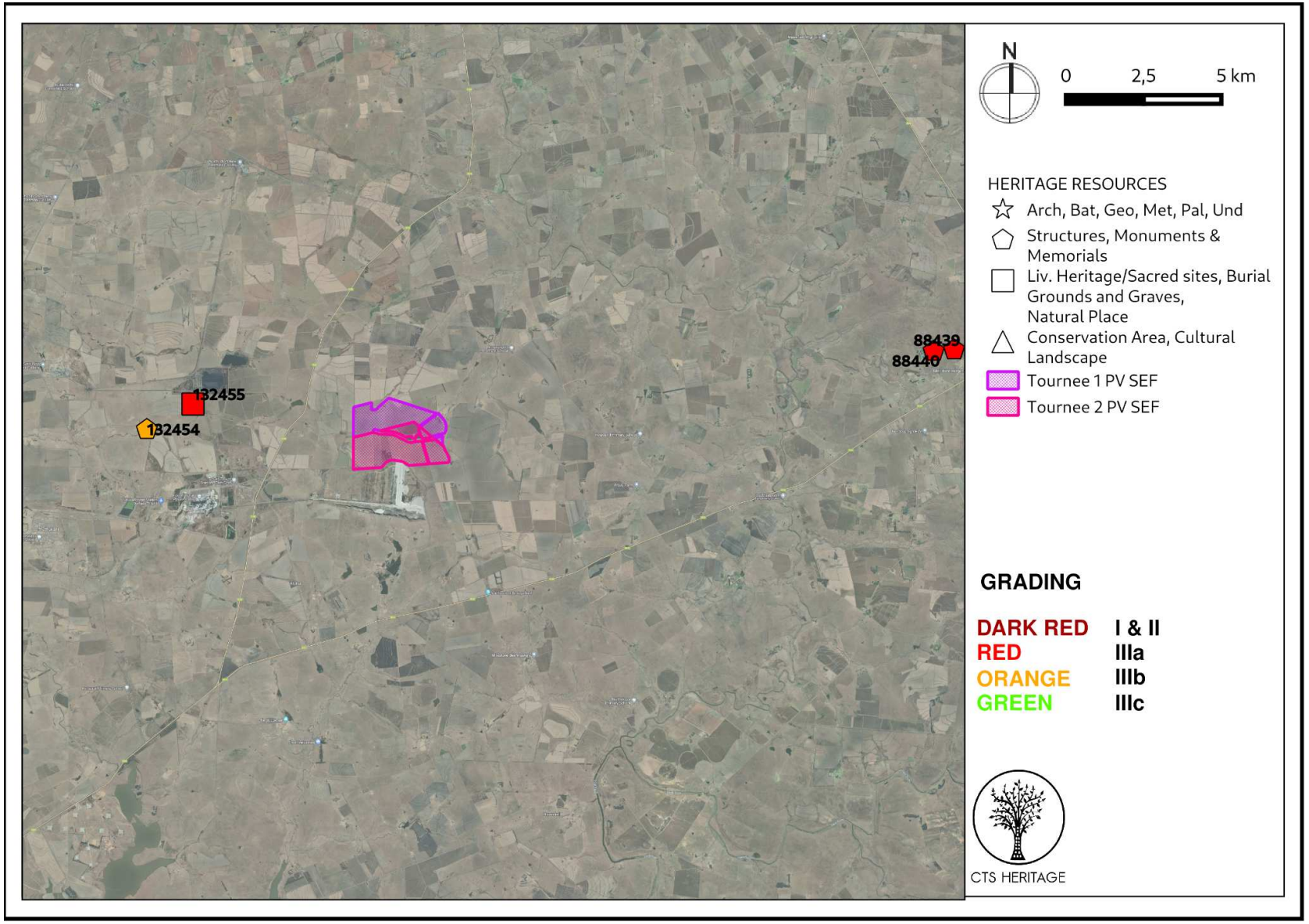

Figure 3. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for a full description of heritage resource types.

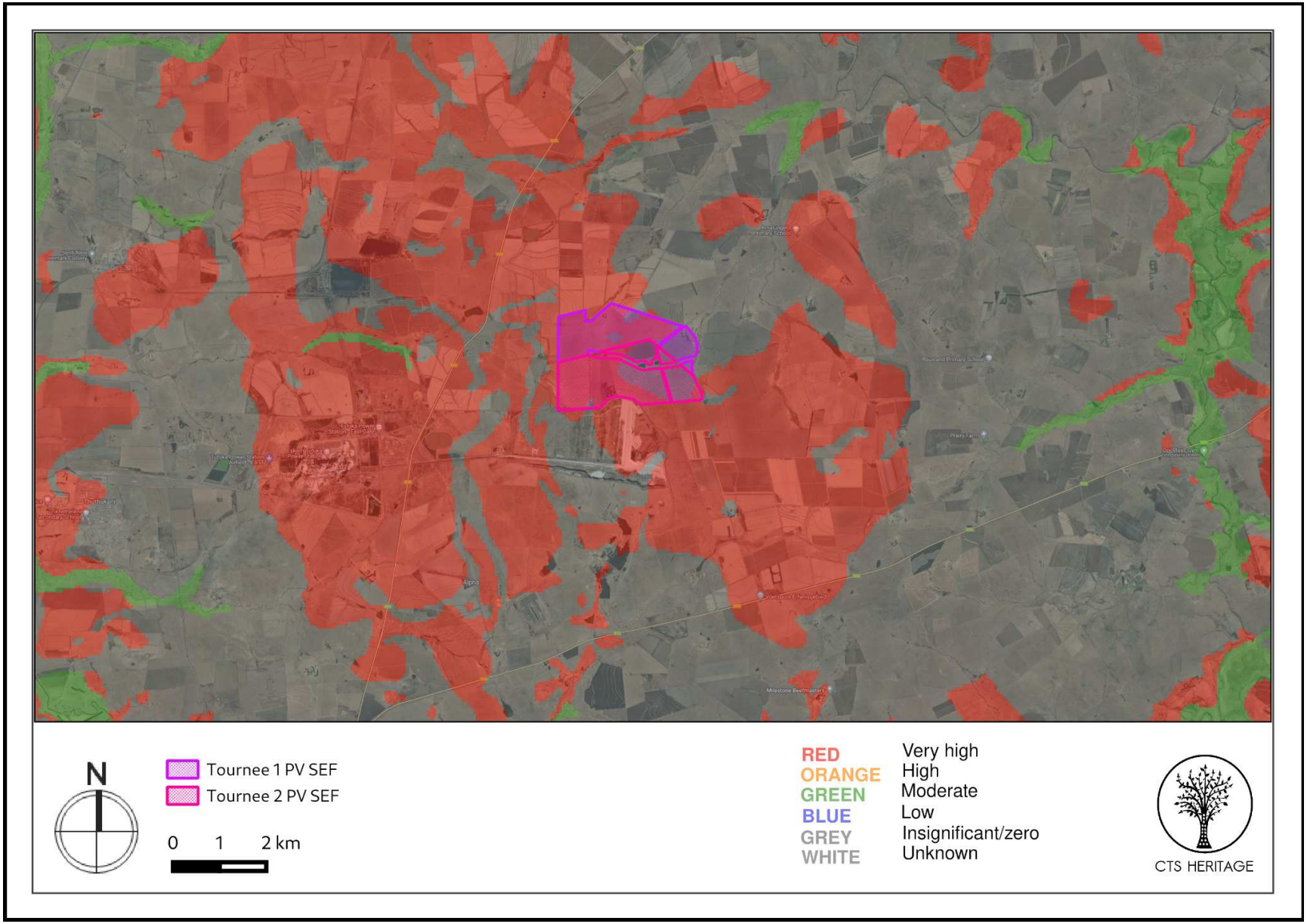

Figure 4a. Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

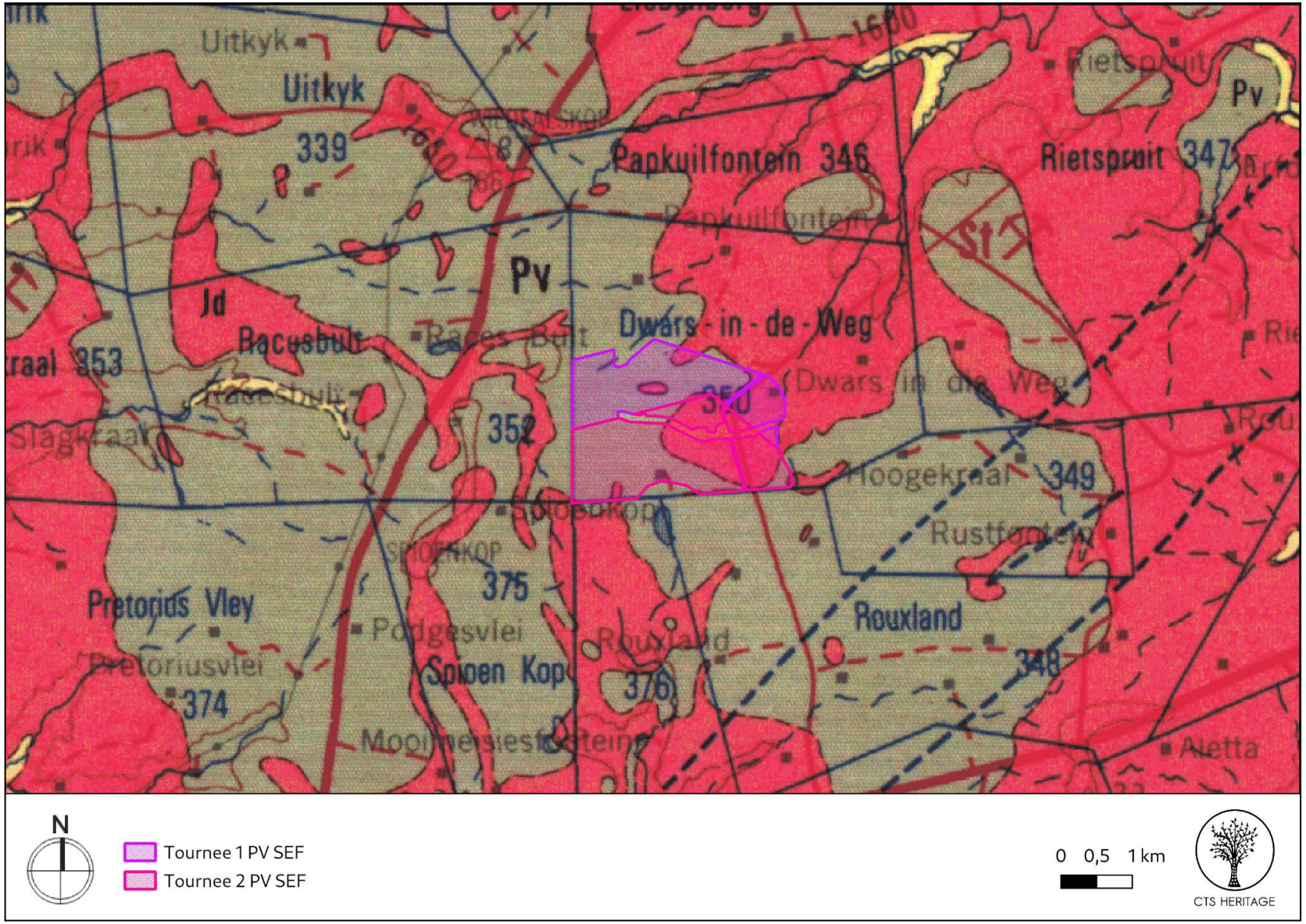

Figure 4b. Geology Map. Extract from the CGS 2628 East Rand Map indicating that the development area for the REF development is underlain by sediments of Pv: Vryheid Formation of the Ecca Group and Jd: Jurassic Dolerite as well as Quaternary Sands

8. Heritage Assessment

The area proposed for this Solar Energy Development is located immediately east of the R38 between Standerton and Bethal. This area is known for its rolling hills and extensive coal mine infrastructure. The proposed PV development is located in close proximity to the Tutuka Coal Power Station. The broader area in which the proposed development is located is dominated by power generation infrastructure and associated grid connections and as such, the proposed SEF is consistent with the general area uses.

Cultural Landscape

Van Vollenhoven (2015) described the broader assessment area in his assessment completed for a de-stoning plant located near to this proposed development area. Van Vollenhoven (2015) describes the environment as "disturbed by recent human activities, mainly agriculture. This consists of maize fields. Other disturbance visible is mining infrastructure…, a railway track… and power lines... Signs of old fields were also present which could be seen in the pioneer plant species consisting of weeds and grass. Almost half of the surveyed area consists of natural grassland. The vegetation cover varies between short and long grass... The topography of the area forms part of the rolling hills of the surrounding landscape."

Van Vollenhoven (2015) notes that "At the beginning of the 19th century the Phuthing, a South Sotho group, stayed in the vicinity of modern day Bethal. During the Difaquane they fled to the south (Bergh 1999: 10-11; 109). In 1829 the traveller Robert Scoon passed through an area to the north of Bethal (Bergh 1999: 13). The first white farmers only settled here during the late 1850's. By the 1890's this area was inhabited by many white farmers (Bergh 1999: 18-20). The town of Standerton was established in 1879 although it already was a district in 1878. Bethal was established in 1880 and it became an independent district in 1898 (Bergh 1999: 20-21). During the Anglo-Transvaal War (1880-1881) the British garrison in Standerton was beleaguered by the Boer forces (Bergh 1999: 46). The Highveld areas also saw much action consisting of various skirmishes between Boer and Brit during the Anglo-Boer War (1899-1902). It includes skirmishes on the farms Oshoek (4 December 1901), Trigaardsfontein (10 December 1901), Witbank (11 January 1902) and Nelspan (26 January 1902) (Bergh 1999: 51, 54)... At Standerton there was both a concentration camp for white and for black people (Bergh 1999: 54)."

Matenga (2022) notes that the neighbouring "Tutuka Power Station was commissioned in 1985. The Power Station and other associated built elements are therefore less than 60 years old, hence below the threshold of recognition in terms of the Heritage Act as industrial heritage of significance. The six cooling towers and two chimneys are iconic structures dominating the landscape and skyline. They represent coal power generating technology of the period from the late 19th century through to the late 20th century." The proposed SEF is relatively small in both its vertical and horizontal dimensions when compared to the Tutuka Power Station. It is dwarfed by the power plant, and as such its impact on the existing landscape is not likely to be significant. However, cognisance must be taken of this unique cultural landscape, consisting of farm werfs etc in the proposed layout.

Archaeology

None of the area proposed for development has been previously assessed in any heritage impact assessment process, however Van Schalkwyk surveyed Farm Spioenkop 376IS in 2002 (SAHRIS NID 5700). Van Schalkwyk (2002) notes that "Although sporadic finds of Stone Age tools have been reported in the larger geographical area, all of these are surface finds, with no known stratified site close by. Some Iron Age sites are also known to exist in the larger area, but none are found close to the study area. Similarly, although some Anglo-Boer War II battlefields occur in the area, and some old farmsteads can be identified on some of the farms, none of these occur in the study area." Van Schalkwyk (2002) identified no heritage resources of significance in his assessment.

Heritage Impact Assessments have been completed nearby for projects in Secunda and these can be used to infer the archaeological sensitivity in the development area. Van Vollenhoven (2015) notes that the geographical area around the towns of Standerton and Bethal is not known to conserve Stone Age archaeology. He notes that "No such sites are indicated on maps contained in a historical atlas of this area (Bergh 1999: 4-5). However this may only be since no research has actually been done in this area. The closest known Stone Age occurrences are a Late Stone Age site at the town of Ermelo and rock art sites far to the west of Standerton (Bergh 1999: 4-5)." Van Vollenhoven (2015) noted no natural shelters during the survey; however, the good vegetation in the surrounding area and the rivers indicate that ample grazing and water may have been available, making it a prime spot for hunting in the past. Therefore one may assume that Stone Age people probably would have moved through the area. Late Iron Age sites are found in a large area around the towns

of Bethal and Standerton and number at least 585 such sites.

In the heritage assessment of a powerline upgrade at the nearby Syferfontein Mine, Nel & Karodia (2013), noted that "*a heritage assessment was conducted in 2000 by the National Cultural History Museum and included in the Syferfontein Mine EMP in 2010. During the survey, a few Stone Age artefacts were identified. These artefacts were not considered to have any primary context and therefore were interpreted to have low significance value. No Early Iron Age sites were identified. The Late Iron Age sites found here conform to those identified in the literature for the Southern Highveld area (former southern Transvaal, northern Orange Free State) as Type V sites. As the soil is mostly turf, Iron Age settlement usually took place on the various dolerite outcrops. The added benefit of choosing these locations was that it was located at the source of building material used in constructing the settlements. One such site shows interesting features as the living units were actually excavated to obtain enough building material for the surrounding walls. A few of the farmsteads dating to early part of this century were identified as possibly having historical-architectural significance. A number of abandoned homesteads are located in the areas that were investigated. These seem to belong to farm labourers and were all abandoned within the last few years. They are therefore not viewed to be of cultural or historical significance. However, some graves are located in the vicinity of the homesteads and it is possible that more graves will be located nearby*".

CTS Heritage recently completed a field assessment for a proposed REF located approximately 20km away from this development area. This field assessment determined that the area proposed for development has medium to high local historical significance. The broader cultural landscape consists of old farmhouses, kraals, circular stone structures, and the remnants of old water pumps, feeding and watering troughs. Even though the area is rich in history, no significant archaeological heritage resources were identified during the field assessment. No Stone Age or Iron Age heritage resources were identified during the survey. The few heritage resources that were identified consist of the ruins of older farm structures and kraals. However, the field assessment identified six burial grounds or graves.

None of the sites identified in the assessment referenced are located within or near the development area, however the text provides a good assessment of resources that may be present in this study area. It is therefore possible that the proposed development will impact negatively on archaeological resources associated with the Late Iron Age, burial grounds and graves as well as stone age archaeological resources. Further investigation of the archaeological significance of the development area is recommended.

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of zero and very high palaeontological sensitivity (Figure 4a). According to the extract from the Council of Science Map for East Rand 2628 (Figure 4b), the palaeontologically sensitive geology of the area is ascribed to the Vryheid Formation of the Ecca Group of sediments. Groenewald (2014, SAHRIS NID 167013) completed a field-based palaeontological assessment for the Waaihoek WEF in which he interrogates the palaeontological sensitivity of this formation. In this assessment, Groenewald (2014) notes that "The Vryheid Formation consists of interbedded very coarse-grained sandstone and mudstone that yields plant and trace fossils as well as some prominent coal seams." In this assessment, Groenewald (2014) made the following recommendations for the WEF development within the Vryheid Formation "The PEA and CEO be made aware of the possibility of finding fossils in the Vryheid and Volksrust Formation sediments during excavation of the foundations for the turbines and other infrastructure. A professional palaeontologist is appointed to monitor possible palaeontological finds during excavation of turbine foundations and infrastructure where turbine positions and infrastructure fall on Vryheid and Volksrust Formation sediments." The sediments underlying the development area have very high levels of palaeontological sensitivity, the nature of the excavations associated with Renewable Energy facilities tends to be deep and as such, the likelihood of impacting intact Vryheid Formation sediments is high. Further investigation of the palaeontological sensitivity of the development area is recommended.

9. Scoping Assessment

Impact Destruction of significant heritage resources			
Issue	**Nature of Impact**	**Extent of Impact**	**No-go Areas**
Destruction of archaeological heritage	Direct impact to archaeological heritage of scientific significance	Within project boundary	None identified at this stage
Destruction of palaeontological heritage	Direct impact to palaeontological heritage of scientific significance	Within project boundary	None identified at this stage
Negative impact to significant cultural landscapes	Indirect impact to significant cultural landscapes and cultural landscape elements including historic farm werfs	Regional	Buffer areas identified around farm werfs - 1km recommended
Description of expected significance of impact Field assessment will determine the significance of the resources likely to be impacted. Impacts can be minimised through the implementation of appropriate mitigation measures.			
Gaps in knowledge & recommendations for further study The project area and the area more broadly have not been subjected to many heritage impact assessments and therefore substantial gaps in knowledge exist. Field assessment will fill these gaps.			
Recommendations with regards to general field surveys Archaeological field surveys must provide sufficient ground-coverage of the areas to be developed to be able to determine the nature of the resources likely to be impacted. Palaeontological and cultural landscape field surveys will target sensitive geological and cultural landscape features.			

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APPENDIX 1

List of heritage resources within close proximity to the development area

Site ID	Site no	Full Site Name	Site Type	Grading
29635	Doornrug Colliery		Burial Grounds & Graves	Grade IIIa
88439	MORG001	Morgenzon 466-IS/ 001	Structures	Grade IIIa
88440	MORG002	Morgenzon 466-IS/ 002	Structures	Grade IIIa
90799	GTKP002	Grootpan-Kromklip 002	Structures	Grade IIIb
132454	NDMC002	New Denmark Colliery	Ruin > 100 years, Building	Grade IIIb
132455	NDMC003	New Denmark Colliery	Burial Grounds & Graves	Grade IIIa
136464	2628/ Infrastructure/ Farm Portion 6 Meyersvallei 354-IS/ Site 1	Cemetery	Burial Grounds & Graves	Grade IIIb

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APPENDIX 2

Reference List with relevant AIAs and PIAs

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
164217	HIA Phase 1	Francois P Coetzee	15/08/2011	Cultural Heritage Survey of the Proposed Sasol Fine Ash Dams on the Farm Rietvley 320 IS, Secunda, Mpumalanga
254885	Archaeological Specialist Reports	Jaco van der Walt	26/11/2014	Archaeological Scoping Report for the Proposed Establishment of the Tutuka Solar PV Facility, Mpumalanga Province
254889	Palaeontological Specialist Reports	Barry Millsteed	27/11/2014	Desktop Palaeontological Heritage Impact Assessment Report on the Site of a Proposed Power Production Facility (The Tutuka Solar Energy Facility) to be Located on Portions 4, 10 11 and 12 of Farm Pretorius Vley 374 IS, Mpumalanga Province
268333	HIA Phase 2	Francois P Coetzee, Joanna Behrens	23/04/2015	PHASE II: CULTURAL HERITAGE PROJECT OF THE FARM RIETVLEY 320 IS, SASOL FINE ASH DAM (FAD) 6 Investigation focussing on Site 1, Site 3 and Site 6 on the farm Rietvley 320 IS (Portions 3, 8, 9, 10 and Remaining Extent 2), Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga
358403	HIA Phase 1	Anton van Vollenhoven	10/08/2015	A report on a Cultural Heritage Impact Assessment for the Development of a De-stoning Plan at the New Denmark Colliery, close to Standerton, Mpumalanga Province
5059	AIA Phase 1	Johnny Van Schalkwyk	01/05/2003	Archaeological Survey of a Section of the Secunda-Mozambique Gas Pipeline Bethal and Highveld Ridge
5697	AIA Phase 1	Udo Kusel	30/11/2006	Cultural Heritage Resources Impact Assessment of Portion 10 of the Farm Jonkersdam 391 IS Standerton
5700	AIA Phase 1	Johnny Van Schalkwyk	01/10/2002	A Survey of Cultural Resources for the Proposed New Tutuka-Alpha Standerton Power Transmission Line, Standerton District
6657	AIA Phase 1	Johnny Van Schalkwyk	01/05/1998	A Survey of Cultural Resources for the Proposed Escom Rail Line, Highveld Ridge District, Mpumalanga
7870	AIA Phase 1	Julius CC Pistorius	01/07/2008	A Phase I Heritage Impact Assessment Study for Sasol's Proposed New Gas and Liquid Pipelines (Along a Corridor) from Sasol Synfuels in Secunda (Mpumalanga) to Sasol Infrachem and Natref in Sasolburg (Free

				State) on the Highveld in the Republic of South Af
8331	AIA Phase 1	Zoe Henderson, C Koortzen	19/06/2007	Heritage Assessment Report Zeus Substation Expansion, Vlakfontein 328, Gert Sibande (DC 30) District, Mpumalanga, South Africa

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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.

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.

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.