CTS HERITAGE

HERITAGE SCREENER

CTS Reference Number:	**CTS21_232**
SAHRIS CaseID:	**18306**
Client:	**Landscape Dynamics**
Date:	**March 2022**
Title:	**Proposed development of the Mercury Solar PV Cluster near Orkney in the Free State**

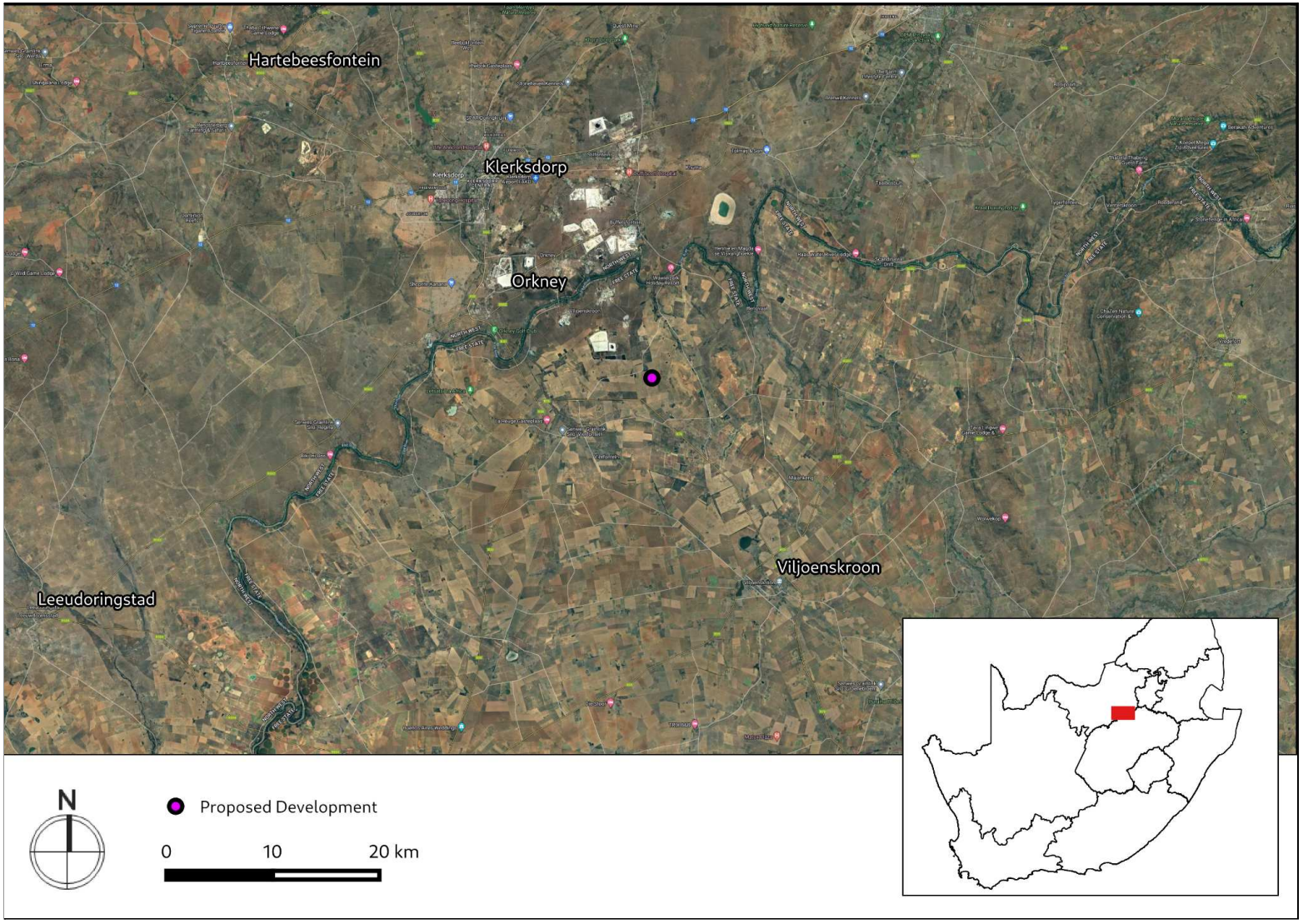

Figure 1a. Satellite map indicating the location of the proposed development in the Free State Province.

CTS Heritage
34 Harries Street, Plumstead, Cape Town, 7800
Tel: +27 (0)82 303 7870/ 083 619 0854 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

1. Proposed Development Summary

The assessment area for the proposed PV Solar farms and grid connections is situated north and south of the R76 close to the town of Viljoenskroon in the Free State Province. It falls within the jurisdiction of the Moqhaka Local Municipality in the Fezile Dabi District Municipality. The fourteen proposed applications described below are the result from the Basic Screening Assessment referred to above, as well as consideration by Mulilo in terms of financial viability and landowner/farmer recommendations. The number of these applications can however change and/or the site areas could be redefined within the total assessment area during the course of the EIA process. Changes will be based on findings and recommendations from the specialists (which are currently underway) as well as comment received during the public participation process.

Project components to be confirmed for each separate application could include the following:

- Solar PV Farm 132kV Grid Connections with switching station/substations for each PV facility
- Battery Energy Storage Systems (BESS) Laydown area for the construction period
- Diesel storage facility of less than 500m3 Operational & Maintenance Buildings
- Auxiliary Generator Set (GENSET) Additional infrastructure (Access Roads - new and/or upgrade; stormwater; water pipelines, etc.)

The majority of the total assessment area of the 3 400 hectares site has a high agricultural sensitivity according to the Screening Tool of the Department of Forestry, Fisheries and the Environment (DFFE). The Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA) requires that any long term lease or a change of land use on agricultural land be approved by the Department of Agriculture, Land Reform and Rural Development (DALRRD). It is one of the main reasons that a Basic Screening Assessment was done of the entire assessment area as indicated on the map on Page 4 of this document. The No Go areas in terms of terrestrial and aquatic ecology and wetlands as well as avi-fauna were also identified to guide decision-making by Mulilo. This approach was followed to ensure that areas that will definitely not be considered for approval by the authorities are excluded from further consideration and unnecessary time delays and cost expenditure.

2. Application References

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

3. Property Information

Latitude / Longitude	27° 1'58.15"S 26°49'2.79"E
Erf number / Farm number	See attached BID document
Local Municipality	Moqhaka
District Municipality	Fezile Dabi, Free State Province

Province	Free State
Current Use	Agricultural
Current Zoning	Agricultural

4. Nature of the Proposed Development

Total Surface Area of development	See attached BID document
Depth of excavation (m)	See attached BID document
Height of development (m)	See attached BID document

5. Category of Development

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

6. Additional Infrastructure Required for this Development

NA

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

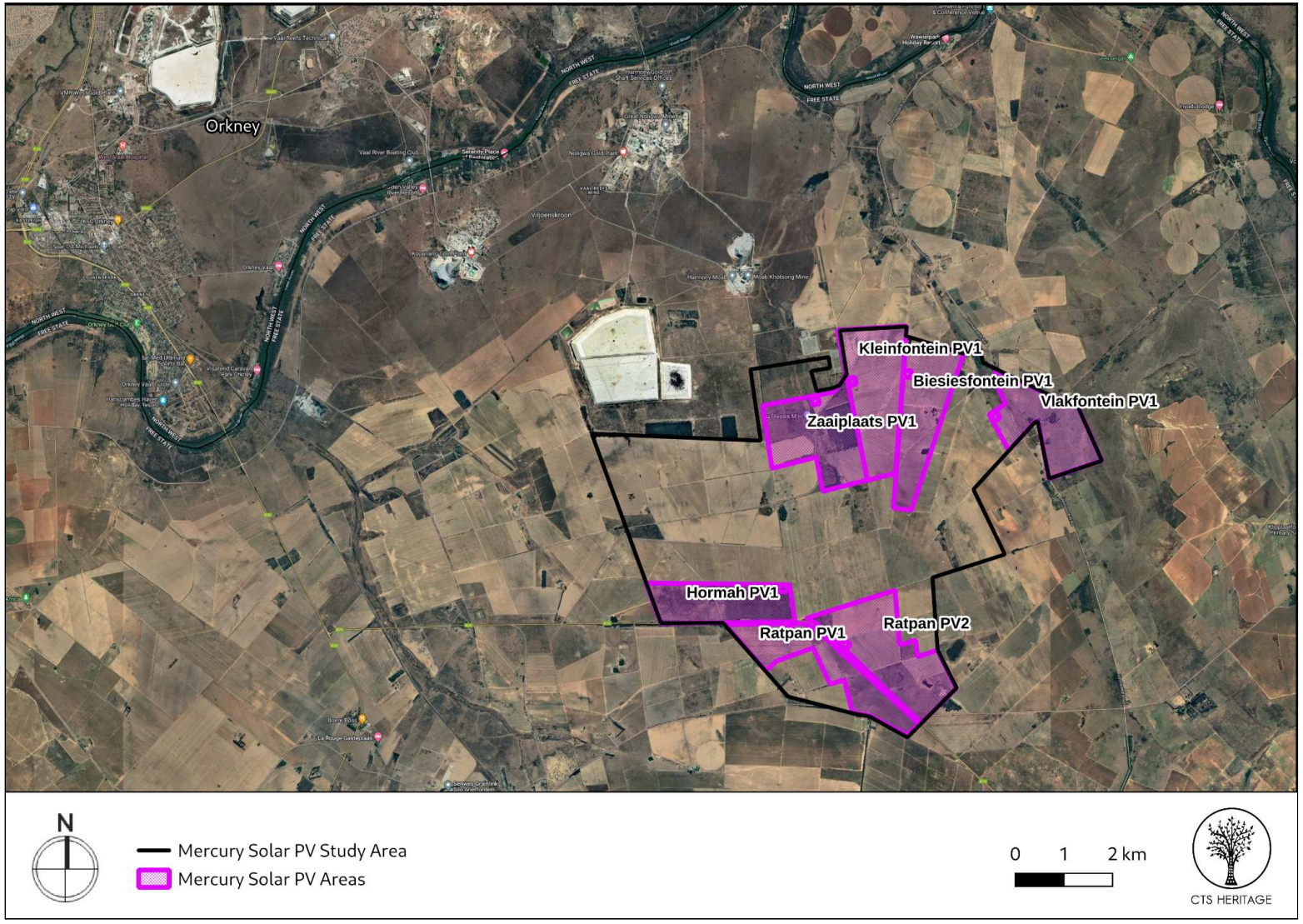

Figure 1b Overview Map. Satellite image (2019) indicating the proposed development area at closer range.

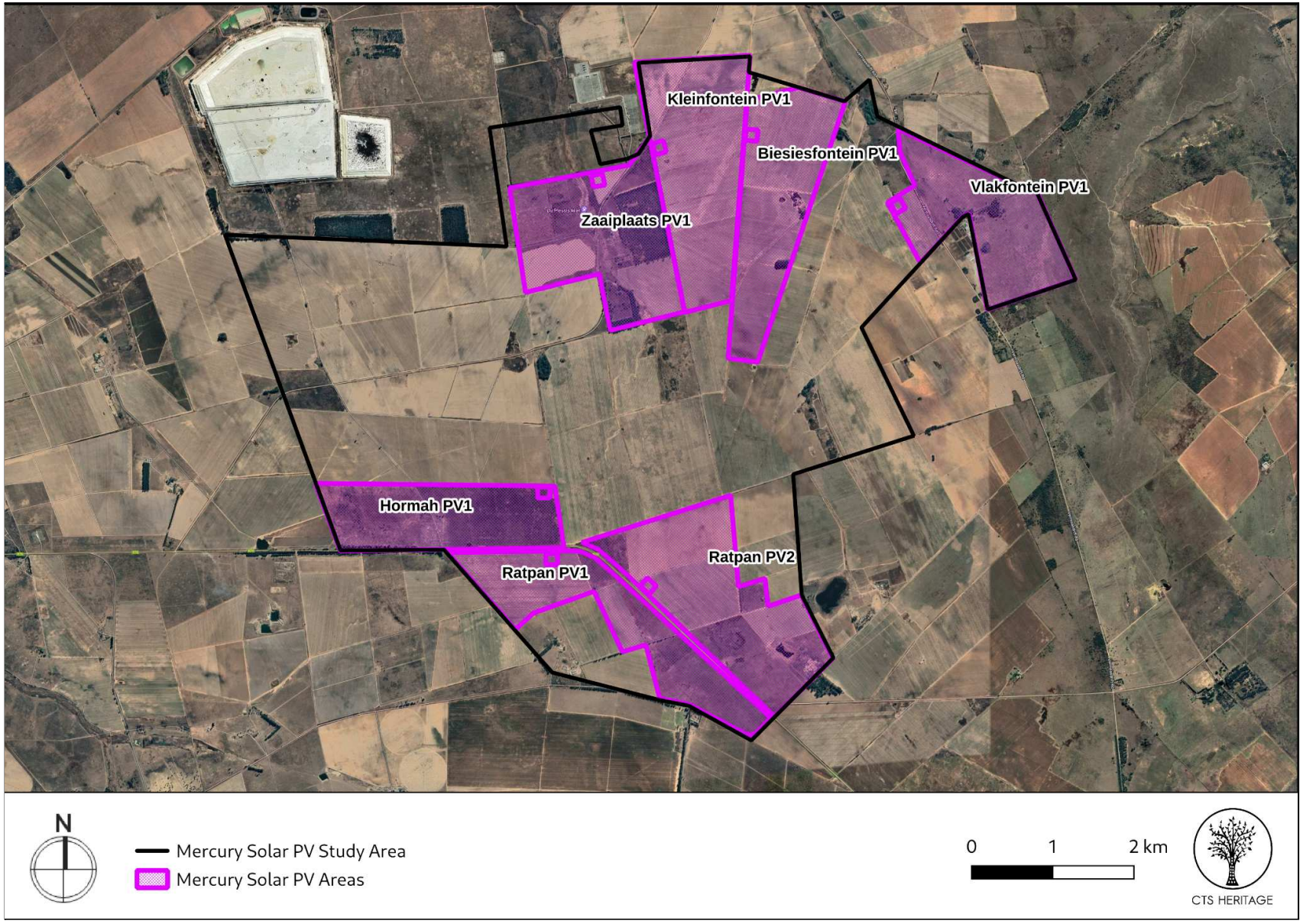

Figure 1c. Overview Map. Satellite image (2019) indicating the proposed development at closer range.

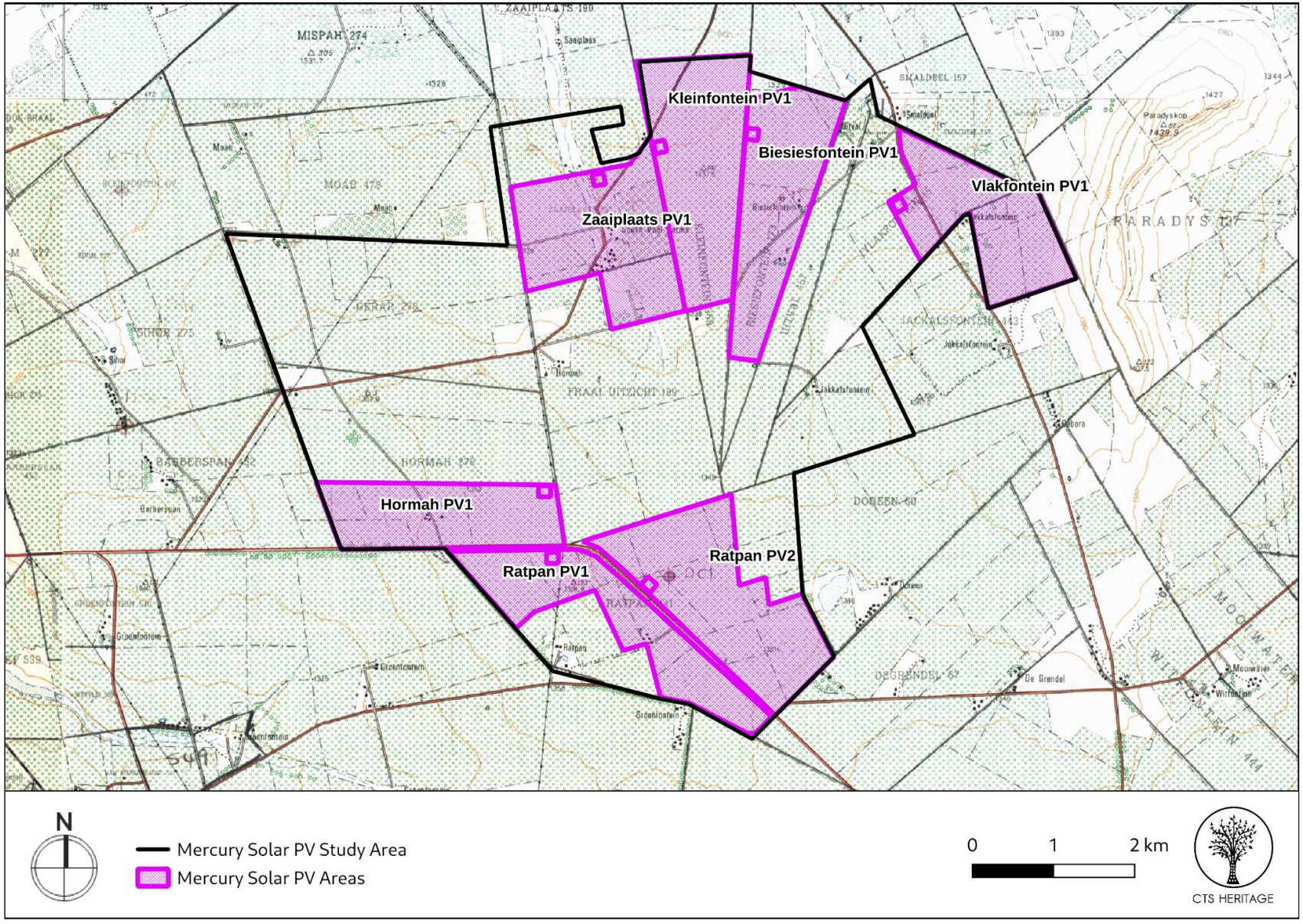

Figure 1d. Overview Map. 1:50 000 Topo Map for the development area

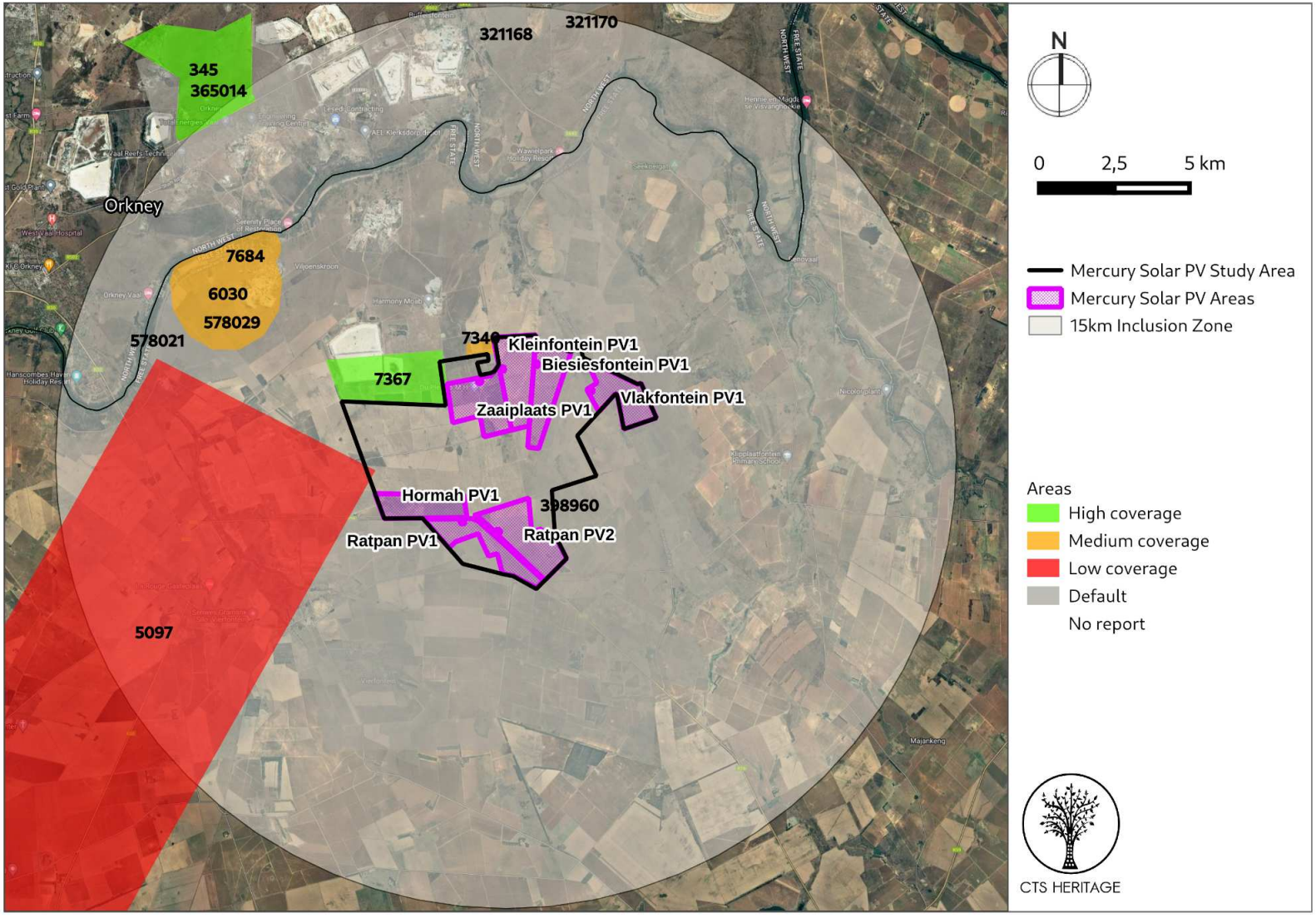

Figure 2. Previous HIAs Map. Previous Heritage Impact Assessments surrounding the proposed development area, with SAHRIS NIDS indicated. Please see Appendix 2 for a full reference list.

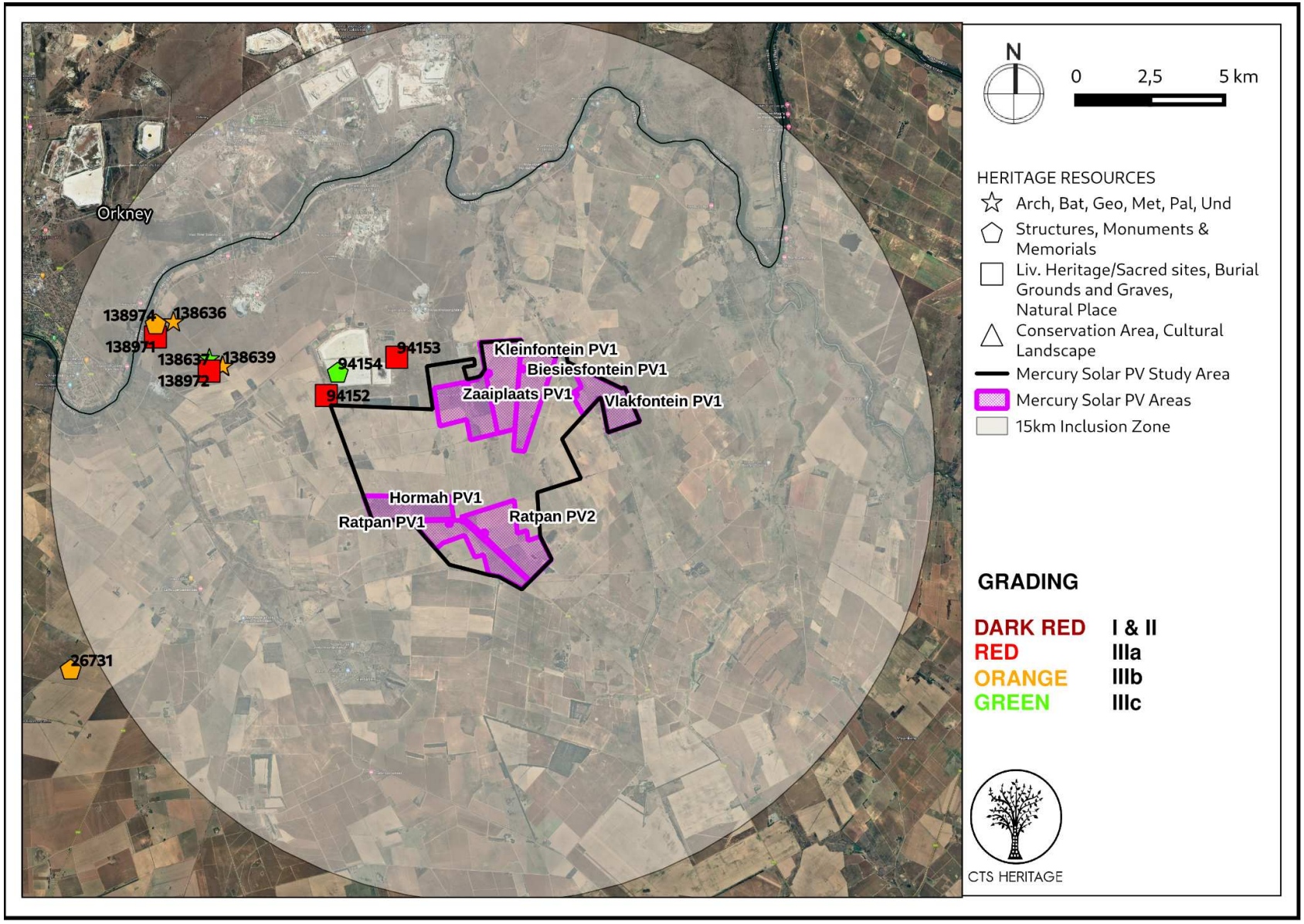

Figure 3a. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated. Please See Appendix 4 for a full description of heritage resource types.

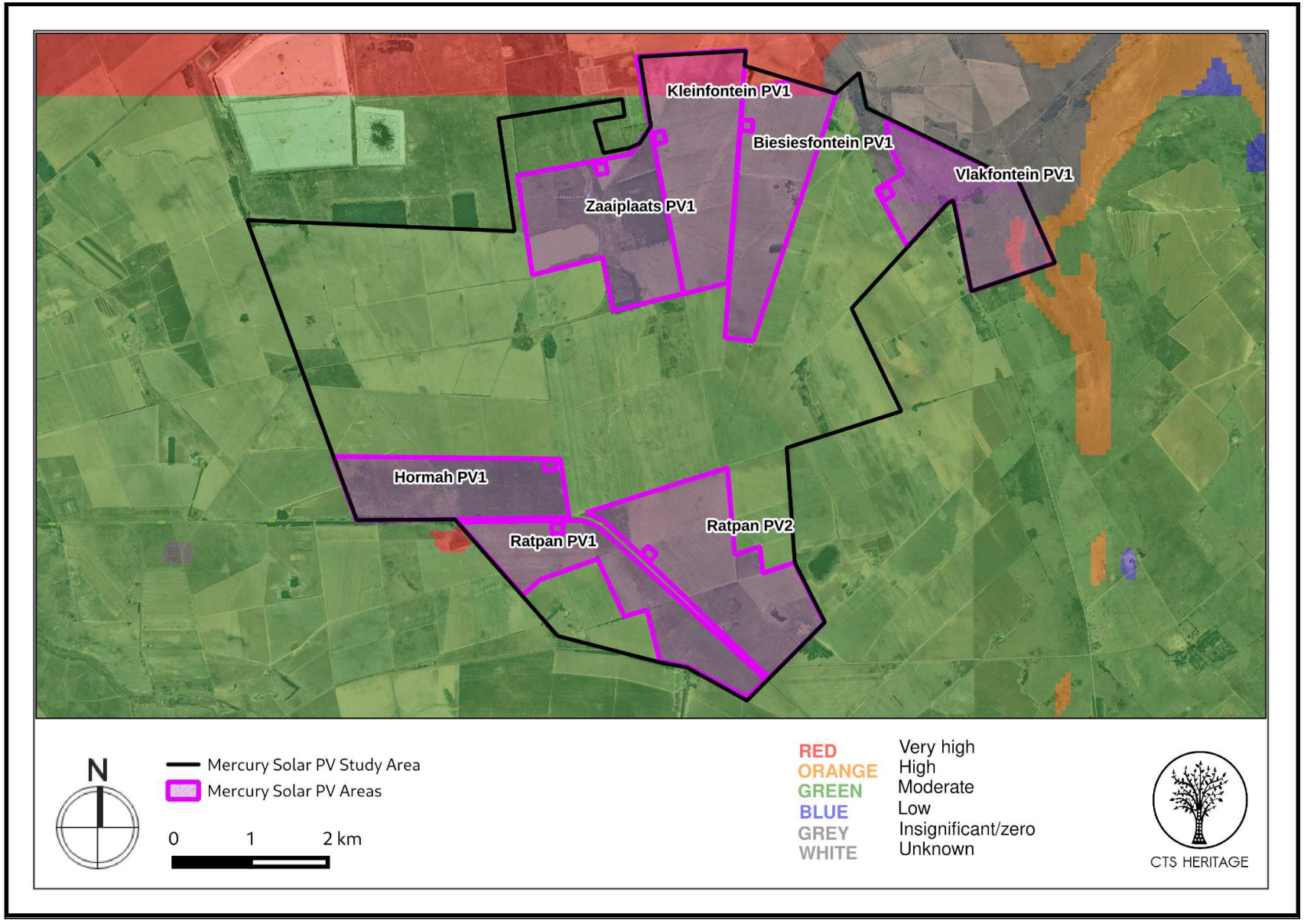

Figure 4. Palaeosensitivity Map. Indicating Low to Very High fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

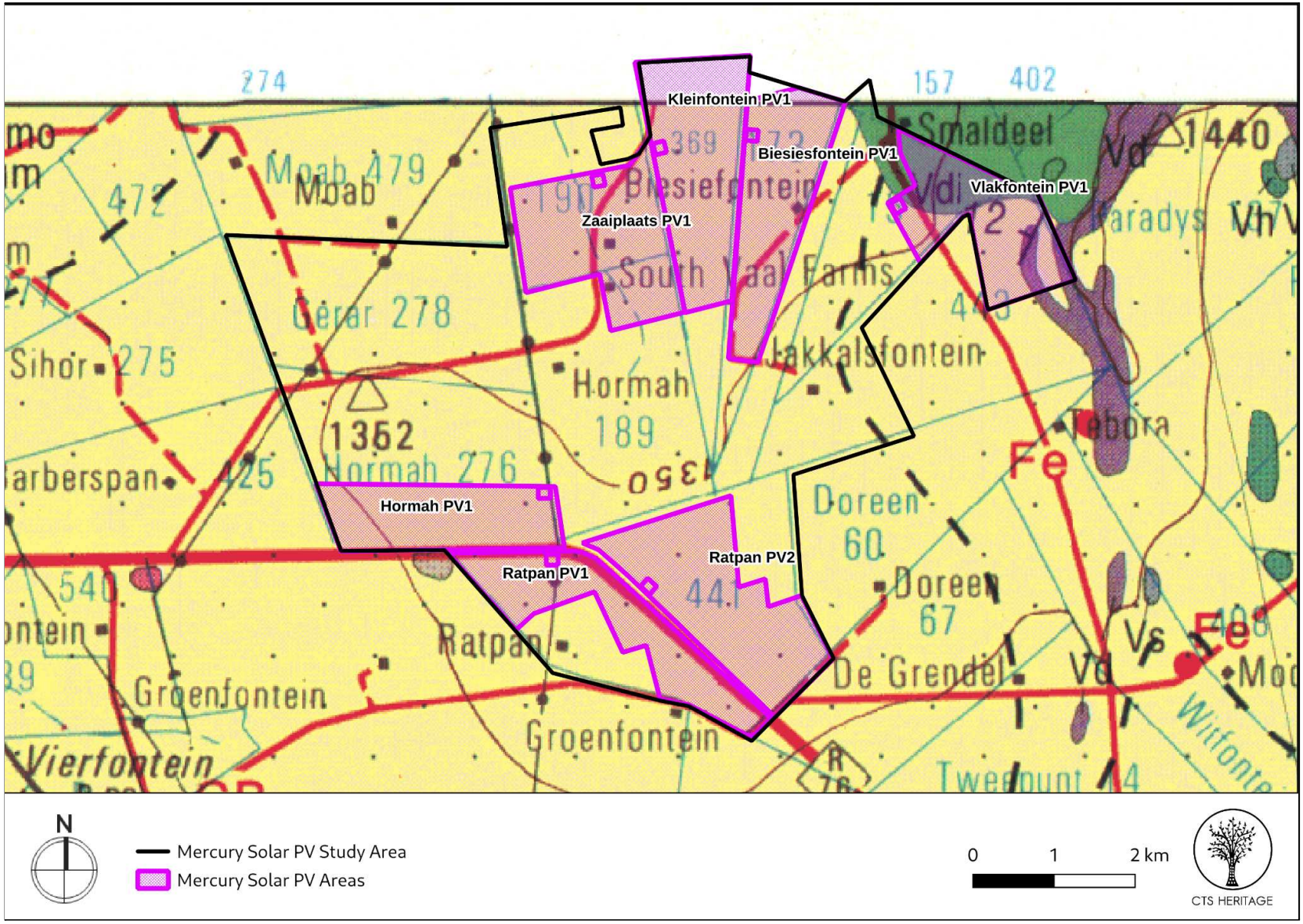

Figure 5. Geology Map. Extract from the CGS 2726 Kroonstad Geology Map indicating that the development area is underlain by quaternary aged sands (Qs) along the proposed powerline route south of Pretorius Kraal 53.

Figure 6.1. GoogleStreetView. Image looking northwest along the R76 in between the areas proposed for Ratpan PV1 and PV2

Figure 6.2. GoogleStreetView. Image facing west along the R76 with Hormah PV 1 proposed to the east. Indicating existing avenue of trees

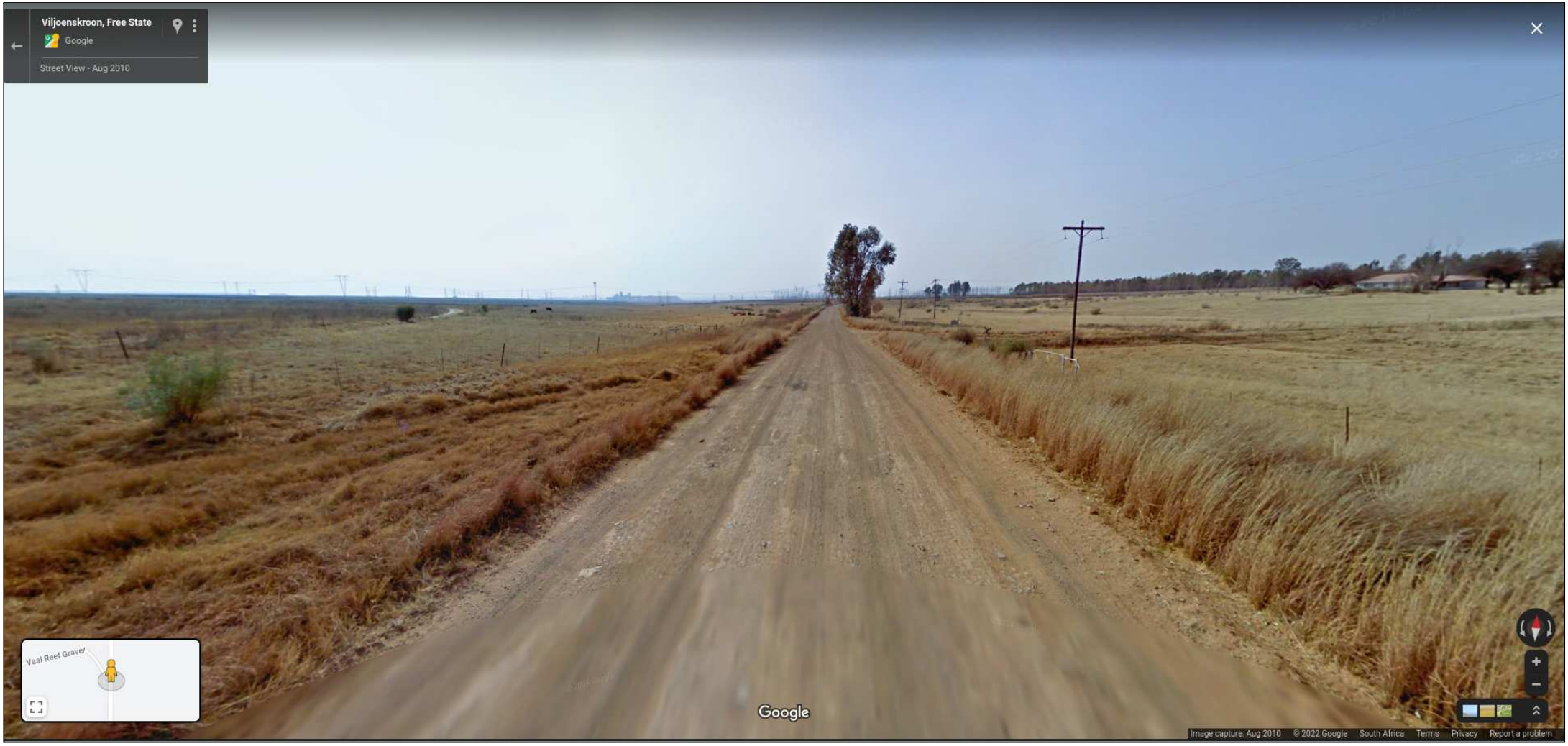

Figure 6.3. GoogleStreetView. Image taken from the dirt road running through Zaaiplaats PV1 facing the existing Mercury Substation

8. Heritage statement and character of the area

Background

The assessment area for the proposed PV Solar farms and grid connections is situated north and south of the R76 close to the town of Viljoenskroon in the Free State Province. It falls within the jurisdiction of the Moqhaka Local Municipality in the Fezile Dabi District Municipality.

Archaeology

Archaeological sites spanning the Earlier, Middle and Later Stone Age have been found in the region despite the extensive agricultural transformation of the area. In Dreyer (2005) and Van der Walt's (2007) heritage impact assessments of Pretorius Kraal 53, various modern buildings were recorded that are located near the banks of the Vaal River that were deemed as not conservation worthy. Van der Walt identified some Middle to Later Stone Age artefacts scattered across the farm but did not map them. In Van Schalkwyk's (2021) impact assessment of the Siyanda Solar farm on Grootdraai 468 (which lies on the western border of Pretorius Kraal 53), visibility issues were a major problem,
"Due to the very dense vegetation cover that occur in the project area, natural as well as agricultural fields, it was impossible to obtain any ground visibility. The strategy was therefore to examine natural and man-made features that are usually associated with human habitation and activities such as clumps of trees and rock outcrops. The proposed power line corridor connecting the Solar Power Plant to the the existing Vaal Reef Substation was not surveyed as access to the relevant properties (Pretoriuskraal 53) was not possible. It is proposed that once the power line route has been confirmed within the 100m corridor a heritage walk-though needs to be undertaken." Two burial sites were recorded during this survey despite the lack of Stone Age sites with the help of a local informant who had been working on the property for a number of years.

In his assessment of an area immediately adjacent to the project area, Huffman (2005, SAHRIS ID 7367) identified no sites of archaeological interest. In their assessment of an area located immediately adjacent to the areas proposed for development, Henderson and Koortzen (2007, SAHRIS ID 7340) noted that while no sites were found in the area surveyed, a number of previously excavated inspection pits yielded archaeological material in the form of stone artefacts. Henderson and Koortzen (2007, SAHRIS ID 7340) note that "These artefacts had been brought up from an unknown depth (probably no more than a metre or two), and were mostly undiagnostic flakes with one blade-like flake which could be Middle Stone Age. Raw material included cryptocrystalline, chert and quartz." It is therefore highly likely that further burials may be located on the proposed solar PV areas as well as Stone Age material similar to the artefacts recorded but not mapped by Van der Walt. An archaeological field survey is therefore recommended.

Built Environment & Cultural Landscapes

The development areas are located in peri-urban farms just outside the towns of Orkney (North West) and Viljoenskroon (Free State). The town of Orkney was established in 1940 at the junction of the various railway lines. It was name after the old gold mine opened by Thomas Leask, who came from the Orkney Islands, in 1880 (SESA 1973 in Van Schalkwyk 2021). Viljoenskroon is a maize and cattle farming town located in the Free State province of South Africa. It was named after the original farm owner J. J. Viljoen and his horse Kroon. The town was laid out in 1921 on the farm "Mahemskuil" and became a municipality in 1925. A number of large gold and diamond mines are also located inbetween the three solar PV sites, namely Taulekoa Mine next to Goedgenoeg 433, Kopanong Gold Mine next to Pretorius Kraal 53 and Great Noligwa Mine next to Groot Vaders Bosch 592. Ruins of or intact avenues of trees, historical farmsteads and farm labourer's cottages may potentially be found within the proposed development areas. The cultural landscape is characterised by a agriculture with abrupt transitions into extremely heavy industrial areas in and around the mining compounds. The installation of solar PV plants is therefore unlikely to have any impacts on the landscape character of the area but a foot survey identifying potentially conservation-worthy cultural landscape (eg. tree avenues) and built environment structures is recommended.

Palaeontology

According to the SAHRIS Palaeosensitivity Map the development sites are underlain by sediments of Low to Very High fossil sensitivity (Figure 4). The two Free State solar PV sites are underlain by sediments of the Malmani subgroup (Vmd) while the North West site is underlain by sediments of the Allanridge Formation (Va) (Figure 5a) and quaternary aged sands (Qs) cover the proposed powerline route south of Pretorius Kraal 53. In his assessment of the Siyanda Solar Plant, Almond (2021) found "*several large float blocks on either*

side of farm track comprising pale grey to yellowish-weathering chert within mm-scale fine internal lamination, locally convolute or with zones of regular, stromatolite-like, upward-convex stacked laminae. These might be pseudostromatolites - i.e. abiogenic sedimentary structures formed by isopachous cement growth - rather than true microbially-bound stromatolites."

Given the identification of palaeontological sites near part of the study area and the indicators of fossil sensitivity identified during the Screening assessment, it is recommended that a palaeontologist conduct a field survey of the proposed solar PV areas.

RECOMMENDATIONS

(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 including a palaeontological and archaeological field survey as well as the recording and assessment of any built environment heritage resources.

CTS HERITAGE

APPENDIX 1

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

Site ID	Site no	Full Site Name	Site Type	Grading
94152	Moab 01	Moab 271 / 01	Burial Grounds & Graves	Grade IIIa
94154	Moab 03	Moab 271 / 03	Building	Grade IIIc
94153	Moab 02	Moab 271 / 02	Burial Grounds & Graves	Grade IIIa
138636	GTI/468-001	GROOTDRAAI 468	Palaeontological	Grade IIIb
138637	GTI/468-002	GROOTDRAAI 468	Palaeontological	Grade IIIc
138638	GTI/468-003	GROOTDRAAI 468	Palaeontological	Grade IIIb
138639	GTI/468-004	GROOTDRAAI 468	Palaeontological	Grade IIIb
138971	GDI-001	Grootdraai 468	Burial Grounds & Graves	Grade IIIa
138972	GDI-002	Grootdraai 468	Burial Grounds & Graves	Grade IIIa
138973	GDI-003	Grootdraai 468	Structures	
138974	GDI-003	Grootdraai 468	Structures	Grade IIIb

CTS HERITAGE

APPENDIX 2

Reference List from SAHRIS

NID	Author(s)	Date	Type	Title
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
345	Marion Bamford	18/05/2012	PIA Phase 1	Palaeontological Impact Assessment for Kabi Vaalkop Solar PV Facility
365014	Sidney Miller	02/03/2015	HIA Phase 1	Cultural Heritage Impact Assessment for Shafts #1 to #7, Orkney, Northwest Province, South Africa, for CAPM Gold.
5097	Johnny Van Schalkwyk	07/03/2003	AIA Phase 1	Mercury-Perseus 400 kV Transmission Line, Cultural Heritage Resources
6030	Cobus Dreyer	20/06/2005	AIA Phase 1	Archaeological and Historical Investigation of the Proposed Residential Developments on Subdivision 13 of the Farm Pretoriuskraal 53, Viljoenskroon, Free State
7340	**Zoe Henderson, C Koortzen**	**19/06/2007**	**AIA Phase 1**	**Heritage Assessment Report Mercury Substation Expansion, Zaaiplaats 190/3, Fezile Dabi (DC20) District, Free State, South Africa**
7367	**Thomas Huffman**	**01/03/2005**	**AIA Phase 1**	**Archaeological Assessment of the Mispah Tailings Dam Extension**

7684	Jaco van der Walt	25/09/2007	AIA Phase 1	Archaeological Impact Assessment. Township Development and Sub Division of AH18, Pretoriuskraal, Orkney, North West Province
7685	Jaco van der Walt	25/09/2007	AIA Phase 1	Archaeological Impact Assessment. Township Development on Sub Division of AH19, Pretoriuskraal, Orkney, North West Province
9124	Francois P Coetzee	01/04/2012	Heritage Study	Cultural Heritage Survey of the Proposed Kabi Vaalkop PV Facility near Orkney, Dr Kenneth Kaunda District, North West Province

CTS HERITAGE

APPENDIX 3 - Keys/Guides

Key/Guide to Acronyms

AIA	Archaeological Impact Assessment
DARD	Department of Agriculture and Rural Development (KwaZulu-Natal)
DEA	Department of Environmental Affairs (National)
DEADP	Department of Environmental Affairs and Development Planning (Western Cape)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism (Eastern Cape)
DEDECT	Department of Economic Development, Environment, Conservation and Tourism (North West)
DEDT	Department of Economic Development and Tourism (Mpumalanga)
DEDTEA	Department of economic Development, Tourism and Environmental Affairs (Free State)
DENC	Department of Environment and Nature Conservation (Northern Cape)
DMR	Department of Mineral Resources (National)
GDARD	Gauteng Department of Agriculture and Rural Development (Gauteng)
HIA	Heritage Impact Assessment
LEDET	Department of Economic Development, Environment and Tourism (Limpopo)
MPRDA	Mineral and Petroleum Resources Development Act, no 28 of 2002
NEMA	National Environmental Management Act, no 107 of 1998
NHRA	National Heritage Resources Act, no 25 of 1999
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
VIA	Visual Impact Assessment

Full guide to Palaeosensitivity Map legend

	RED:	VERY HIGH - field assessment and protocol for finds is required
	ORANGE/YELLOW:	HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely
	GREEN:	MODERATE - desktop study is required
	BLUE/PURPLE:	LOW - no palaeontological studies are required however a protocol for chance finds is required
	GREY:	INSIGNIFICANT/ZERO - no palaeontological studies are required
	WHITE/CLEAR:	UNKNOWN - these areas will require a minimum of a desktop study.

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.