

APPENDIX E5: Phase 1 Cultural Heritage Impact Assessment

ONDERSTEPSOORT SOLAR 2 (PTY) LTD

**PROPOSED 240MW ONDERSTEPSOORT SOLAR 2 PHOTOVOLTAIC PROJECT, NORTH WEST OF
RUSTENBURG, NORTH-WEST PROVINCE**

HERITAGE IMPACT ASSESSMENT

9 JUNE 2023

Submitted to : Nema Consulting

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The heritage impact assessment report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below.

Requirements of Appendix 6 – GN R326 EIAs Regulations (2014, amended 2017)	Relevant section in report
1.(1) (a) (i) Details of the specialist who prepared the report	Section 1.1.3 of Report
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.1.3 and of Report and Appendix 2
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page iii of the report
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1
(cA) An indication of the quality and age of base data used for the specialist report	N/A
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 5
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 6
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 7
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 5.2 and 5.4, Section 6
(g) An identification of any areas to be avoided, including buffers	Section 6, Section 12
(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;	Appendix 1
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 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	Sections 6, 8
(k) Any mitigation measures for inclusion in the EMPr	Sections 11, 12
(l) Any conditions for inclusion in the environmental authorisation	N/A
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	N/A
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 12
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and	
(n)(ii) If the opinion is that the proposed activity, activities 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 11, 12
(o) A description of any consultation process that was undertaken during the course of carrying out the study	Not applicable. A public consultation process will be handled as part of the EIAs and EMPr process.

Requirements of Appendix 6 – GN R326 EIAs Regulations (2014, amended 2017)	Relevant section in report
(p) A summary and copies if any comments that were received during any consultation process	Not applicable. To date no comments have been raised regarding heritage resources that require input from a specialist.
(q) Any other information requested by the competent authority.	Not applicable.
(2) Where a government notice 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.	Section 38(3) of the NHRA

Declaration of Independence

The report has been compiled by Nitai Consulting (Pty) Ltd, an appointed Heritage Specialist for Nemai Consulting for the Proposed 240MW Onderstepoort Solar 2 Photovoltaic Project, Northwest of Rustenburg, North West Province. The views contained in this report are purely objective and no other interests are displayed during the Heritage Impact Assessment Process.

I, Jennifer Kitto, declare that –

General declaration:

- I act as the independent heritage specialist*
- I will perform the work in an objective manner, even if this results in views and findings that are not favourable to the project;*
- I declare that there are no circumstances that may compromise my objectivity in performing such work;*
- I have expertise in conducting heritage impact assessments, including knowledge of the National Heritage Resources Act, No 25 of 1999 (NHRA), associated Regulations and any guidelines that have relevance to the proposed activity;*
- I will comply with the NHRA, associated Regulations and all other applicable legislation, specifically the National Environmental Management Act, No 107 of 1998 (NEMA);*
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA;*
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;*
- I undertake to disclose to the project proponent and the competent authority all material information in my possession that reasonably has or may have the potential of influencing -any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;*
- I will ensure that information containing all relevant facts in respect of the project is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;*
- I will provide the competent authority with access to all information at my disposal regarding the project, whether such information is favourable to the project or not*
- All the particulars furnished by me in this form are true and correct;*
- I will perform all other obligations as expected of a heritage specialist in terms of the NHRA and NEMA, associated Regulations, the constitutions of my affiliated professional bodies; and*
- I realise that a false declaration is an offence in terms of regulation 71 of the NEMA Regulations and is punishable in terms of section 24F of the NEMA.*

Disclosure of Vested Interest

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the NEMA Regulations;

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Executive Summary

Onderstepoort Solar 2 (Pty) Ltd (the “Applicant”) has proposed the development of the 240 MW Onderstepoort Solar 2 Photovoltaic (PV) Project near Rustenburg, in the North West Province (the “Project”). The electricity generated by the Project will be transferred via 132 kV powerlines from the Eskom collector switching station, located adjacent to the facility substation, to the Ngwedi Main Transmission Substation (MTS). A separate environmental process is being undertaken to assess the grid connection infrastructure required to evacuate the energy from the Eskom collector switching station to the national grid. The Applicant intends to bid for the current and future Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows and/or other renewable energy markets within SA.

The Project is located approximately 10km to the west of Rasimone central business district (CBD) and falls within Ward 1 of the Rustenburg Local Municipality and Ward 6 of the Kgetlengrivier Local Municipality in the North West Province. The project footprint covers a combined area of approximately 367 ha. The site can be accessed from an unnamed gravel road that joins the Lindleyspoort Road (off the R565) which runs along the southern boundary of the site.

Significance Assessment

The general overview from the historical desktop study indicated that various archaeological and historical resources could be expected to occur in the project area, including Stone Age artefacts, Iron Age stone walling and material culture, sites related to the Second South African War, historical farm structures and historical graves. One previous HIA (van der Walt 2007) had identified eleven sites on the northern section of the farm Onderstepoort (now called Mimosa 81), located north of the Elands River. These included Middle and Late Iron Age pottery scatters and hut circles, as well as two possible graves and one site with historic structure remains. V D Walt also notes that oral histories mention early occupation of the BaTlokwa group on farms such as Zwaarverdiend 234JP, which is one of the farms on which the Onderstepoort Solar 2 PV project is located.

The examination of the earliest edition (1960) of the 1:50 000 topographical maps, produced by overlying the maps with satellite Imagery (Google Earth), depicted no historical structures, graves or stone walling within or adjacent to the project footprint (Alternative 1 or Alternative 2).

The Site Survey fieldwork identified four possible heritage resources occurring within or adjacent to the Onderstepoort Solar 2 PV project area footprint. However, as the western section of the project footprint lies over a portion of the farm Zwaarverdiend 234JP, which is associated with historical occupation by a group of BaTlokwa, there is a possibility that historic-archaeological material related to the historic occupation of this farm may be uncovered during site clearance or construction activities.

Identification of Activities, Aspect and Impacts

The project area that will be impacted by the proposed Onderstepoort Solar 2 PV project contains some areas that are currently disturbed by cattle and game farming activities.

The impact significance of the project on graves and cemeteries is low as no definite grave sites were identified. However, there is a low possibility that unidentified graves could be uncovered.

The impact significance of the proposed project on protected historical structures is low as no historical structures were identified.

The impact significance of the proposed project on archaeological resources is low as no archaeological sites or material were identified. However, as the western section of the project footprint lies over a portion of the farm Zwaarverdiend 234JP, which is associated with historical occupation by a group of BaTlokwa, there is a possibility that historic-archaeological material related to the historic occupation of this farm may be uncovered during site clearance or construction activities.

Mitigation Measures

The site survey identified four possible heritage resources within or close to the Onderstepoort Solar 2 PV project footprint area. However, three of the sites are of modern/recent date and the fourth site is probably the result of field or road clearance. No archaeological material, historical structures or graves were identified. However, there is a low possibility that some archaeological material or unidentified graves could be uncovered sub-surface, specifically within the western section of the project footprint.

Therefore, generally low impacts on heritage resources are anticipated for both the Alternative 1 and Alternative 2 layouts for the proposed Onderstepoort Solar 2 PV project. However, as the western section of the project footprint lies over a portion of the farm Zwaarverdiend 234JP, which is associated with historical occupation by a group of BaTlokwa, there is a possibility that historic-archaeological material related to the historic occupation of this farm may be uncovered during site clearance or construction activities. Monitoring of site clearance and construction activities in this specific portion of the project footprint by a qualified and experienced archaeologist is therefore required.

As both the DFFE Environmental Screening Tool and the SAHRIS Palaeontological Sensitivity Map identified the region of the project footprint as being of Moderate Sensitivity for fossils (with a small area of High sensitivity), a separate palaeontological assessment has been undertaken. The assessment will indicate if significant/sensitive fossils will be impacted by the proposed project and provide mitigation measures and the way forward.

Conclusion

No fatal flaws were identified during this study, therefore, it is the considered opinion of the heritage specialist that the construction of the proposed Solar PV project within the footprint can proceed.

There are no objections from a heritage perspective if the recommendations and mitigation measures contained in this report, specifically regarding the desktop palaeontological assessment, are implemented. From a heritage perspective there is no major difference between the two project layout alternatives (Alternative 1 and Alternative 2) but as Alternative 2 avoids all identified heritage resources that is the preferred alternative.

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List of Abbreviations

APHP	Association of Professional Heritage Practitioners
ASAPA	Association of Southern African Professional Archaeologists
BGG	Burial Grounds and Graves
CRM	Cultural Resources Management
DALRRD	Department of Agriculture, Land Reform & Rural Development
DFFE	Department of Fisheries, Forestry and Environment
EAP	Environmental Assessment Practitioner
EIA	Early Iron Age
EMPr	Environmental Management Programme
ESA	Early Stone Age
ESIA	Environmental and Social Impact Assessment
GIS	Geographic Information System
ha	Hectare
HIA	Heritage Impact Assessment
IAIASa	International Association for Impact Assessment South Africa
km	Kilometre (1 000m)
LIA	Late Iron Age
LSA	Later Stone Age
MSA	Middle Stone Age
NAMA	Nationally Appropriate Mitigation Actions
NEMA	National Environmental Management Act (No. 107 of 1998)
NHA	National Health Act, (No. 61 of 2003)
NHRA	National Heritage Resources Act (No 25 of 1999)
NW PHRA	North West Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

1 INTRODUCTION

Onderstepoort Solar 2 (Pty) Ltd (the “Applicant”) has proposed the development of the 240 MW Onderstepoort Solar 2 Photovoltaic (PV) Project near Rustenburg, in the North West Province (the “Project”). The electricity generated by the Project will be transferred via 132 kV powerlines from the Eskom collector switching station, located adjacent to the facility substation, to the Ngwedi Main Transmission Substation (MTS). A separate environmental process is being undertaken to assess the grid connection infrastructure required to evacuate the energy from the Eskom collector switching station to the national grid. The Applicant intends to bid for the current and future Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows and/or other renewable energy markets within SA.

The Project is located approximately 10km to the west of Rasimone central business district (CBD) and falls within Ward 1 of the Rustenburg Local Municipality and Ward 6 of the Kgetlengrivier Local Municipality in the North West Province. The project footprint covers a combined area of approximately 367 ha. The site can be accessed from an unnamed gravel road that joins the Lindleyspoort Road (off the R565) which runs along the southern boundary of the site.

1.1 Scope & Terms of Reference for the HIA report

1.1.1 Summary of Key Issues & Triggers Identified During Scoping

In terms of the NHRA, the following proposed activities trigger the need for a Heritage Impact Assessment (HIA):

- Potential occurrence of heritage resources, graves and structures older than 60 years within the Project’s footprint.
- Proposed development that is more than 5000m²
- Proposed linear development that is longer than 300m
- Proposed development where an impact assessment is triggered in terms of NEMA.

1.1.2 Approach

- Undertake a Heritage Impact Assessment in accordance with the NHRA.
- Identify and map all heritage resources in the area affected, as defined in Section 2 of the NHRA, including archaeological sites on or near (within 100m of) the proposed developments.
- Assess the significance of such resources in terms of the heritage assessment criteria as set out in the regulations.
- Assess the impacts of the Project on such heritage resources.
- Prepare a heritage sensitivity map (GIS-based), based on the findings of the study.
- Identify heritage resources to be monitored.
- Comply with specific requirements and guidelines of FSHRA and SAHRA.

1.1.3 Nominated Specialist Details

Organisation:	Nitai Consulting
Name:	Jennifer Kitto
Qualifications:	BA Archaeology and Social Anthropology; BA (Hons) Social Anthropology
No. of years' experience:	24
Affiliation (if applicable):	Association of Southern African Professional Archaeologists (ASAPA) - Technical member No.444 International Association for Impact Assessment South Africa (IASAsa) – Member No. 7151

1.2 Project Description

Onderstepoort Solar 2 (Pty) Ltd (the “Applicant”) has proposed the development of the 240 MW Onderstepoort Solar 2 Photovoltaic (PV) Project near Rustenburg, in the North West Province (the “Project”). The electricity generated by the Project will be transferred via 132 kV powerlines from the Eskom collector switching station, located adjacent to the facility substation, to the Ngwedi Main Transmission Substation (MTS). This will form part of a separate application.

The Project is located approximately 10km to the west of Rasimone central business district (CBD) and falls within Ward 1 of the Rustenburg Local Municipality and Ward 6 of the Kgetlengrivier Local Municipality in the North West Province. The project footprint covers a combined area of approximately 367 ha . The site can be accessed from an unnamed gravel road that joins the Lindleyspoort Road (off the R565) which runs along the southern boundary of the site.

2 LEGISLATION

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by various pieces of legislation, including the National Heritage Resources Act, 25 of 1999 (NHRA) and associated Regulations, National Environmental Management Act, Act 107 of 1998 (NEMA) and associated Regulations and, as well as the National Health Act, Act No. 61 of 2003 (NHA), specific Regulations governing human remains.

2.1 National Heritage Resources Act, No 25 of 1999 (NHRA)

The NHRA is the defines cultural heritage resources (section 3), provides protection to specific types of heritage resources (sections 34, 35, 36) and also requires an impact assessment of such resources for specific development activities (section 38(1)). Section 38(8) further allows for cooperation and integration of the management of such impact assessment between the national or provincial heritage authority (SAHRA or a PHRA) and the national environmental authority (DEFF).

In terms of section 38(1)(a) of the NHRA, the specific types of development activity that may require a Heritage Impact Assessment (HIA) include: the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length. As the proposed PV project is larger than 5000m², this study falls under s38(8) and requires comment from the relevant heritage resources authority. (South African Heritage Resources Authority-SAHRA and/or the Free State Provincial Heritage Authority).

Sections 34-36 of the NHRA further stipulate the protections afforded to specific types of heritage resources, *i.e.* structures older than 60 years (s34); archaeological, palaeontological, meteorites (s35); graves and burial grounds (s36), as well as the mitigation process to be followed if these resources need to be disturbed. The construction of the solar PV project and powerline may result in impacts to any of these types of heritage resources.

2.2 National Environmental Management Act, Act 107 of 1998 (NEMA)

NEMA states that an integrated Environment Management Plan (EMP) should, (23 -2 (b)) "...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage". In addition, the NEMA and associated Regulations GNR 982 (Government Gazette 38282, 14 December 2014, amended 2017) state that, "the objective of an environmental impact assessment process is to, ... identify the location of the development footprint within the preferred site ... focussing on the geographical, physical, biological, social, economic, *cultural and heritage aspects* of the environment" (GNR 982, Appendix 3(2)(c), emphasis added).

The EIA Regulations, 2014 (as amended), published in GNR 982 of 2014 (Government Gazette 38282) promulgated under the (NEMA) contain specific requirements to be addressed in the different types or impact assessment reports (Regulations 19, 21 and 23) as well as requirements for Specialist Reports (Appendix 6).

2.3 The National Health Act, No. 61 of 2003 (NHA), Regulations 2013

In the case of graves and/or burial grounds that could be impacted by a proposed development, and which are identified through an impact assessment, specific Regulations relating to the Management of Human Remains (GNR 363 of 2013 in Government Gazette 36473) address the exhumation and reburial of human remains: Regulations 26, 27 and 28.

3 ASSUMPTIONS AND CONSTRAINTS

This assessment assumes that all the information provided by the Environmental Assessment Practitioner (EAP) regarding the project footprint (Including the powerline) is correct and current.

The project area traverses various properties separated by fences, and access was sometimes restricted by locked gates in some areas.

The large area of the project footprint meant that it was not feasible to undertake a pedestrian survey of the whole area and the fieldwork therefore, comprised a combination of vehicle and pedestrian investigation. The extremely dense and long grass and other vegetation in several areas meant that archaeological and heritage visibility was low in those areas. Therefore, there is a possibility that some heritage resources were not identified, specifically, informal graves or burial sites and archaeological material which usually occurs sub-surface.

4 PROJECT DESCRIPTION

4.1 Location

The Onderstepoort Solar 2 Project is located approximately 10km to the west of Rasimone central business district (CBD) and falls within Ward 1 of the Rustenburg Local Municipality and Ward 6 of the Kgetlengrivier Local Municipality in the North West Province. The project footprint covers a combined area of approximately 367 ha.

The project footprint is located on Remaining Extent of Portion 2 of the Farm Onderstepoort No. 98 and Portion 4 of Farm Zwaarverdiend No. 234, approximately 10 km west of Rasimone in the Rustenburg Local Municipality. The site can be accessed from an unnamed gravel road that joins the Lindleyspoort Road (off the R565) which runs along the southern boundary of the site.

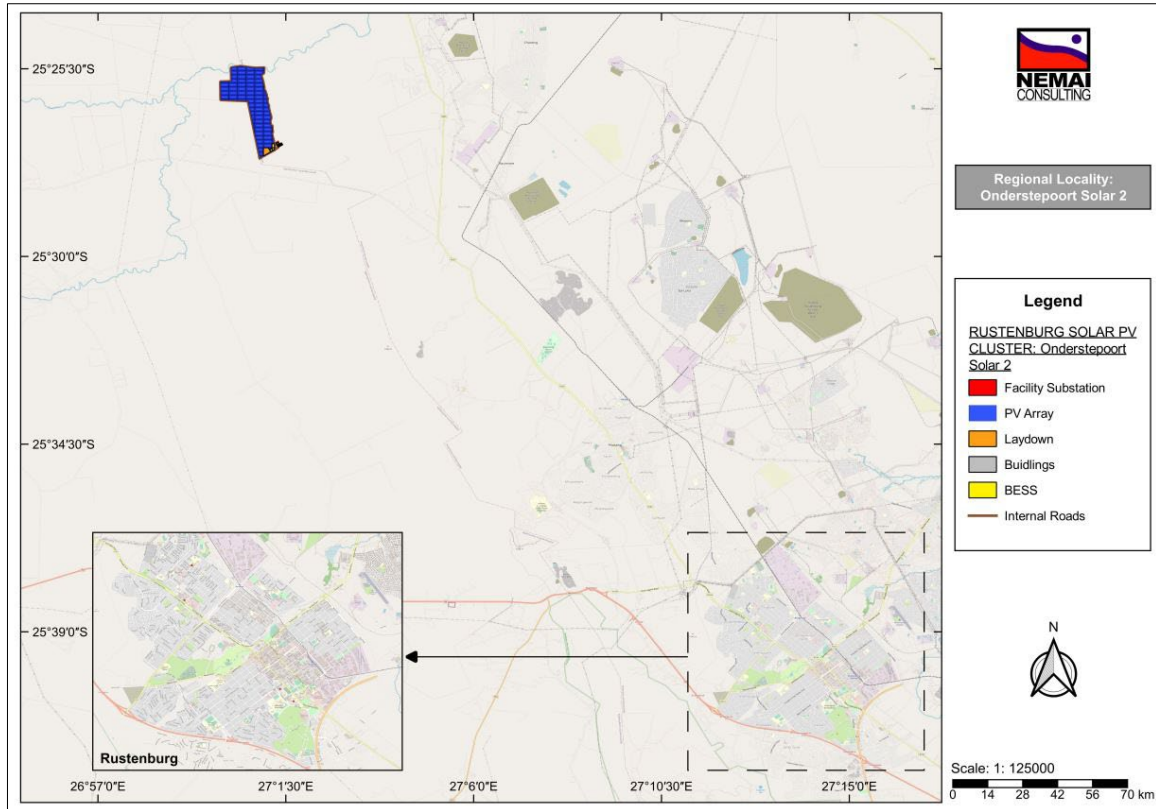


Figure 1: Onderstepoort Solar 2 PV Project Locality near Rustenburg (Nemai 2023)

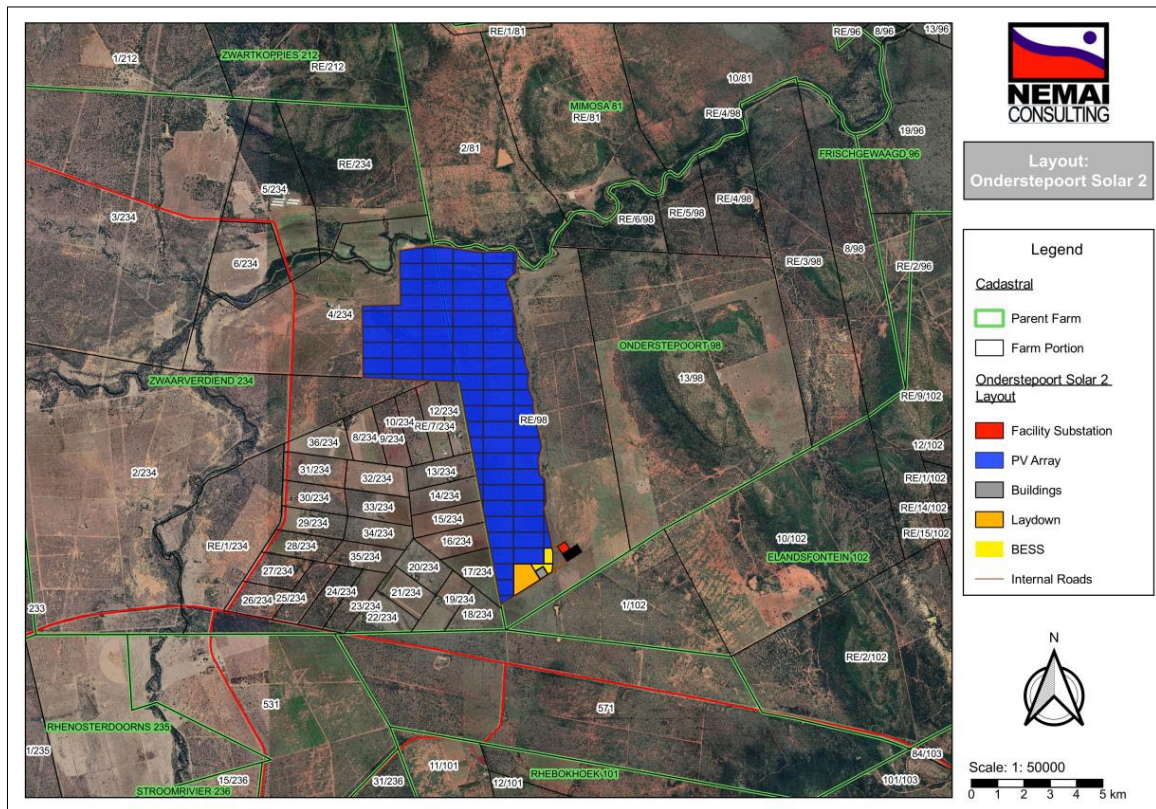


Figure 2: Onderstepoort Solar 2 PV Project Layout – Alternative 1 (blue polygon)

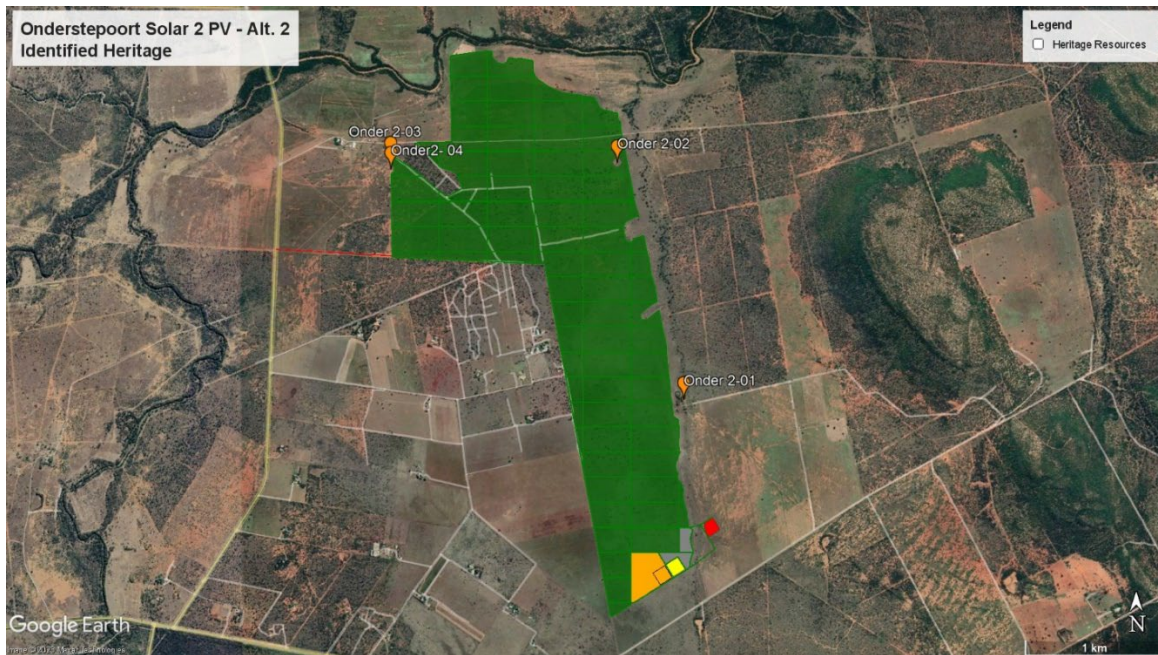


Figure 3: Onderstepoort Solar 2 PV Project Layout – Alternative 2 (green polygon)

4.2 Project Technical Details

4.2.1 Solar Technology

Solar energy facilities operate by converting solar energy into a useful form (i.e., electricity). The use of solar energy for electricity generation is a non-consumptive use of a natural resource and consumes no fuel for continuing operation. Solar power produces an insignificant quantity of greenhouse gases over its lifecycle as compared to conventional coal-fired power stations. The operational phase of a solar facility does not produce carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of air pollution, as fossil fuel power generation technologies do.

4.2.2 PV Technology Overview

PV technology produces direct current (DC) which is then converted to alternating current (AC) via power electronic inverters. The main technology categories are crystalline modules (mono or poly), thin film, and concentrated photovoltaics (CPV). **Figure 4** below provides an overview of a typical Solar PV Power Plant.

The proposed Solar PV Projects have a design life of a minimum of 25 years. The extension of the life of the plant will be considered when assessing the plant's economic viability to remain operational after its end of life.

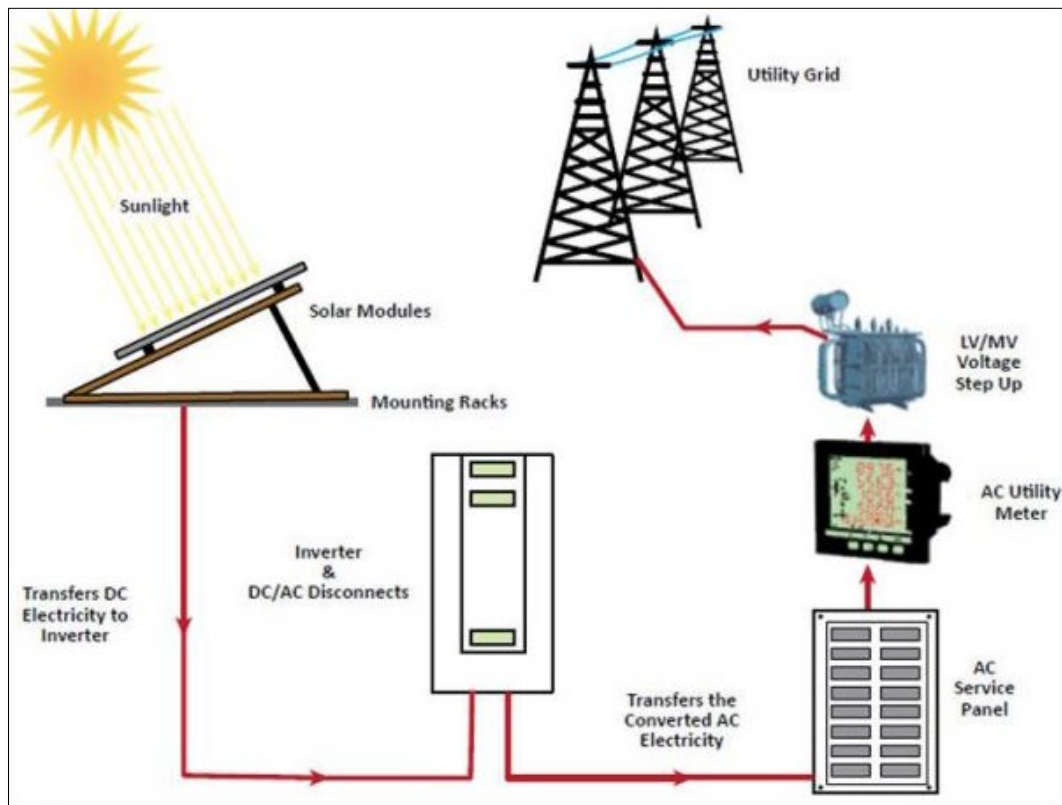


Figure 4: Overview of Solar PV Power Plant (International Finance Corporation, 2015. Utility-Scale Solar Photovoltaic Power Plan.)

4.2.3 Overview of Technical Details: Onderstepoort Solar 2

The technical details of the proposed Onderstepoort Solar 2 PV Plant are captured in Table 1 below:

Table 1: Technical details of the proposed PV Plant

No.	Component	Alternative 1 - Description / Dimensions	Alternative 2 - Description / Dimensions
1.	Height of PV panels	Up to 5.5 m	Up to 5.5 m
2.	Area of PV Array	Up to approximately 420.5 ha	Monofacial or Bifacial PV panels, mounted on either fixed-tilt, single-axis tracking, and/or double-axis tracking systems. Area: Up to 367 ha
3.	Area occupied by substations	Up to 1 ha	It is estimated that the maximum size of the facility substation will not exceed 1 ha. Each facility will require inverter-stations, transformers, switchgear and internal electrical reticulation (underground cabling).

No.	Component	Alternative 1 - Description / Dimensions	Alternative 2 - Description / Dimensions
4.	Capacity of on-site substation	High voltage (132 kV)	The facility substation will collect the power from the facility and transform it from medium voltage (up to 33 kV) to high voltage (132 kV).
5.	BESS	Area up to ± 5.ha	Area: up to ± 5 ha
6.	Area occupied by both permanent and construction laydown areas	Temporary: Up to 7 ha Permanent: Up to 1 ha (located within the area demarcated for temporary construction laydown)	Temporary construction laydown area up to 7 ha. Permanent laydown area up to 1 ha (to be located within the area demarcated for the temporary construction laydown).
7.	Area occupied by buildings	Up to 1.5 ha	Up to 1.5 ha
8.	Length of internal roads	Up to 33 km	Up to 33 km
9.	Width of internal roads	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.
10.	Proximity to grid connection	±5-6 km	Approximately 5 – 6 km
11.	Height of fencing	Up to 3.5 m	Up to 3.5m
12.	Type of fencing	Type will vary around the site, welded mesh, palisade and electric fencing	Type will vary around the site, welded mesh, palisade and electric fencing

4.2.4 Project Layout

The layout of the Solar PV Plant is shown in **Figure 2** and **Figure 3**, above. The desirability of the earmarked site for the development of the proposed Solar PV Plant is due to the following key characteristics:

- Solar Irradiation: The feasibility of a solar facility is dependent on the direct solar irradiation levels.
- Topography: The suitability of the surface area is an important characteristic for the construction and operation of solar facilities. Most of the site has a low gradient slope and is suitable for this development.
- Extent of site: The overall extent of the site is sufficient for the installation of the PV facility.
- Site access: The site can be accessed from an unnamed gravel road that joins Lindleyspoort Road (off the R565) which runs along the southern boundary of the site.

4.2.5 Components of the Proposed Solar PV Plant

The Project consists of the following systems, sub-systems or components (amongst others):

- PV modules and mounting structures which will consist of either Monofacial or Bifacial PV panels, mounted on either fixed-tilt, single-axis tracking, and/or double-axis tracking systems.
- Inverters and transformers.
- Battery Energy Storage System (BESS) area up to 5 ha.
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.
- Temporary construction laydown area up to 7 ha.
- Permanent laydown area up to 1 ha (to be located within the area demarcated for the temporary construction laydown).
- Internal roads will be up to 6 m wide, to allow access to the Solar PV modules for operations and maintenance activities.
- Main access road is up to 8 m wide. The site is accessible from an unnamed gravel road that joins Lindleyspoort Road (which is off R565)

5 STATUS QUO ANALYSIS

5.1 General Existing Condition of Receiving Environment

The project area terrain is situated on the western portion of the farm Onderstepoort (Remaining Extent of Portion 2 the Farm Onderstepoort 98) and the eastern part of Portion 4 of Farm Zwaarverdiend 234 and is situated approximately 10 km west of Rasimone in the Rustenburg Local Municipality. The areas affected by the proposed Project footprint are rural in nature. The Project's PV Site is used for grazing.

The general area is covered mostly with a mixed grassland which varies from shorter to long and dense. Several areas contain isolated stands of trees, mainly acacia thicket. The terrain is mostly flat with some areas that are more undulating. The Elands River runs across the northern boundary of the project footprint.



Figure 5: View of the central section of the project area looking east



Figure 6: View of the central section of the project area, showing the mixed grassland with scattered acacia shrubs



Figure 7: View of the northern section of the project area looking north towards the Elands River



Figure 8: View of the northern section of the project area looking east



Figure 9: View of the project footprint showing variable grass cover, including patches of bare ground



Figure 10: View of northwest section of the project footprint



Figure 11: View of the project area looking northeast from the southern section

5.2 Cultural-Heritage Receiving Environment

5.2.1 DFFE Environmental Screening Tool

The DFFE Environmental Screening Tool was accessed for information on the cultural-heritage sensitivity of the general region. This tool indicated that the Archaeological and Cultural Heritage Sensitivity of the general region is Low, for both Alternative 1 and Alternative 2, although several areas of high sensitivity are indicated in the area north of the project footprint (**Figure 12** and **Figure 13**). However, this tool indicated that the Palaeontological Heritage Sensitivity of the project footprint's underlying geology is mostly Moderate with a small area of High sensitivity along the eastern boundary, for both Alternative 1 and Alternative 2 (**Figure 14** and **Figure 15**).

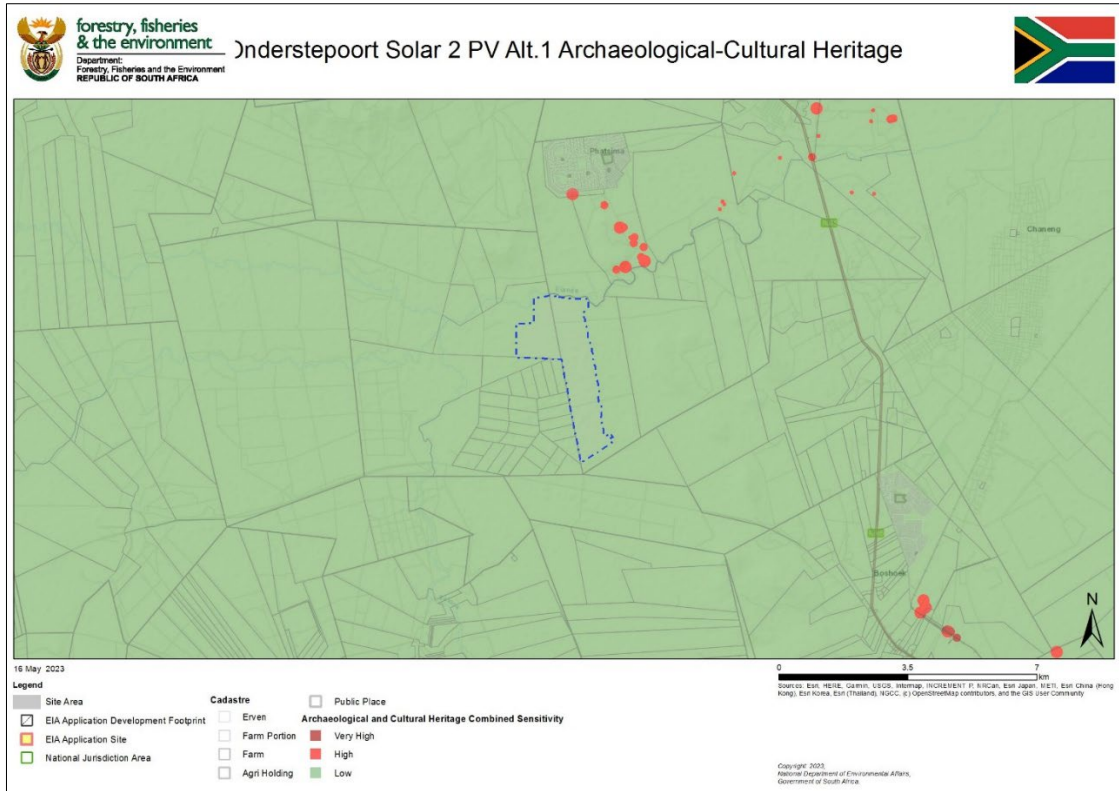


Figure 12: Archaeological Cultural Sensitivity map indicating that the project footprint (Alternative 1) is located within a region of low heritage sensitivity (DFFE Screening Tool).

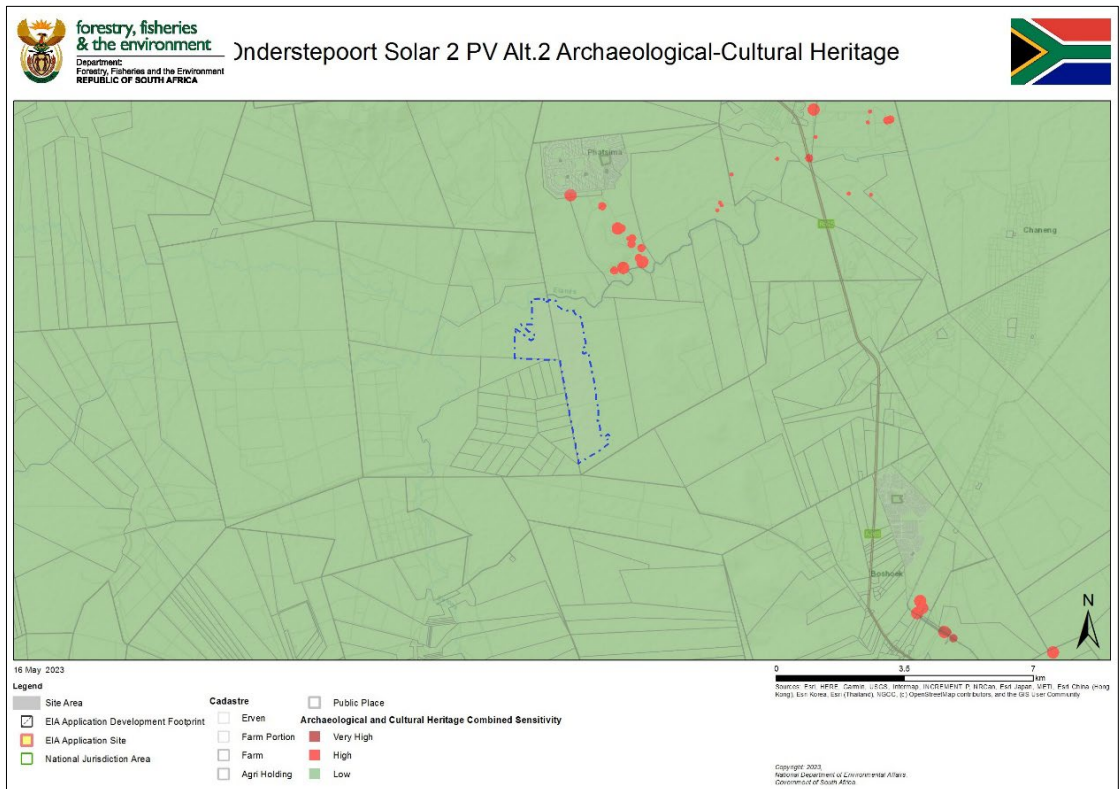


Figure 13: Archaeological Cultural Sensitivity map indicating that the project footprint (Alternative 2) is located within a region of low heritage sensitivity (DFFE Screening Tool).

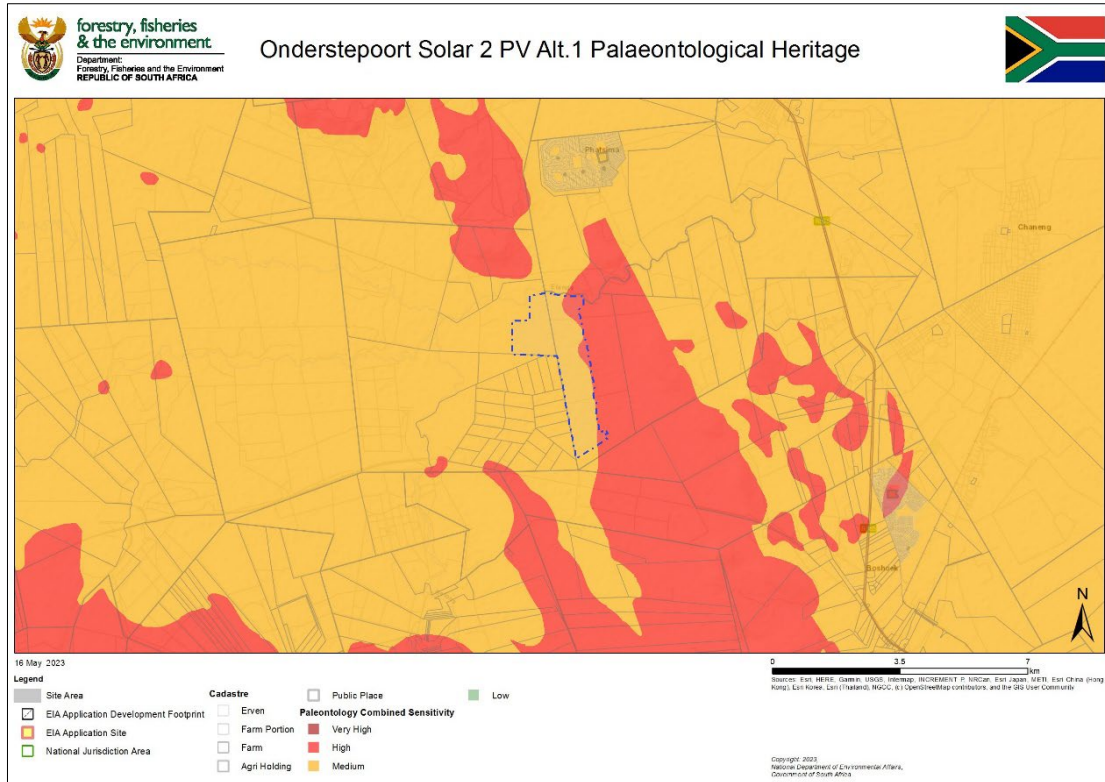


Figure 14: Palaeontological Sensitivity map indicating that the project footprint (Alternative 1) is located within a region of mostly Moderate palaeontological sensitivity with a small area that is High along the eastern boundary (DFFE Screening Tool).

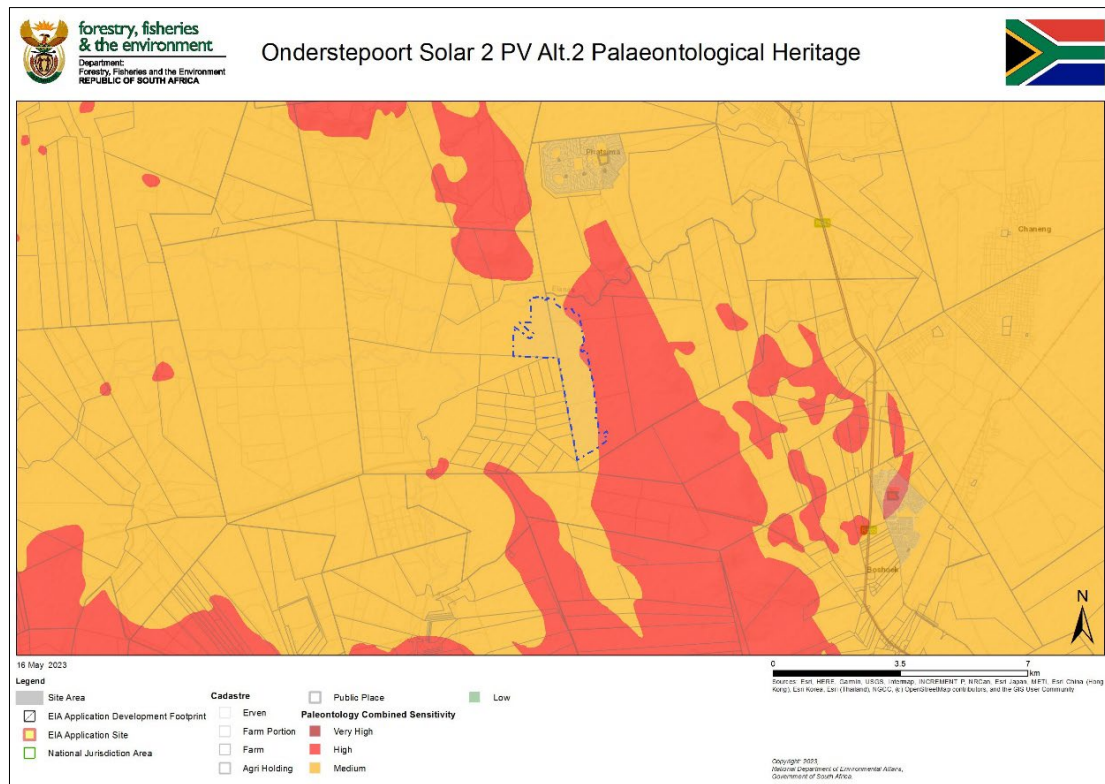


Figure 15: Palaeontological Sensitivity map indicating that the project footprint (Alternative 2) is located within a region of mostly Moderate palaeontological sensitivity with a small area that is High along the eastern boundary (DFFE Screening Tool).

5.2.2 Historical Background of Surrounding Region (archaeological and historical literature survey)

The archaeological history of the area can be divided into a Stone Age, Iron Age and Historic or Colonial Period. An archaeological and historical overview of the general region is presented below.

The Stone Age

The Earlier Stone Age (ESA) is the oldest archaeological period found in Southern Africa. The ESA dates from about 2 million to 250 000 years ago and includes two technological phases or industries. The earliest industry is known as Oldowan, after the Olduvai Gorge in Tanzania where the stone tools were recognised in the 1960s (Esterhuysen and Smith, 2007). This industry is associated with basic flakes and hammer stones. It dates to approximately 2 million years ago. The second phase is known as Acheulian (named after a site in France where they were discovered in the 1800s), which includes stone artefacts that are more specialised, such as the cleaver and bifacial hand axe. The Acheulian dates to approximately 1.5 million years ago. A number of ESA sites have been identified within the general vicinity of Rustenburg. One ESA quarry site that was identified by a previous HIA survey is located roughly 18km north-east of the current study area (Coetzee 2015).

The Middle Stone Age (MSA) period began around 250 000 years ago and is associated with flakes, points and blades produced more intentionally by what is called the “prepared core” technique. Many of these stone tools also show evidence of being attached to bone or wood shafts to produce spears, knives or axes (Esterhuysen and Smith, 2007). This phase is associated with modern humans and evidence of the development of complex cognition (Wadley, 2013). A few MSA tool scatters have been identified in previous surveys, mostly located to the east of Rustenburg, between 30-40km from the current study area (Huffman 2005).

The Later Stone Age (LSA) is the third archaeological phase, which occurred from about 20 000 years ago and is marked by increased technological complexity as well as social transformations. The technological changes include very small stone tools called microliths; innovations such as the bow and the link-shaft arrow; stones with holes bored through the middle (digging-stick weights); polished and decorated bone tools; ostrich eggshell beads. There is also evidence of ritual practices and complex societies (Deacon & Deacon 1999). This period is associated with hunter-gatherer populations (San) as well as early pastoralist groups (Khoekhoe) and continued until the arrival of Iron Age and European communities (including a considerable period of interaction) .

The LSA is also associated with the production of rock engravings and rock paintings. Rock engravings are known from the wider vicinity of the study area (Bergh, 1999). A rock engraving site was identified by Huffman (2005) roughly 44km south-east of the current study area.

The Iron Age

The Iron Age in South Africa (AD 1600 – AD 1840) is associated with pre-colonial farming communities and includes both agricultural and pastoralist farming activities, metal working, cultural customs such as lobola and stone-walled settlements described as the “Central Cattle Pattern” by Huffman (2007). Four main

groups or periods (distinguished by ceramic styles) have been identified by Huffman (2007) as occurring in the general region.

The earliest Iron Age group or period known within the general region dates to AD 1450 – AD 1650 and is represented by the Ntsuanatsatsi sub-group (“facies”) of the Blackburn Branch of the Urewe Ceramic Tradition. The decoration on these ceramics is characterised by a broad band of stamping in the neck, stamped arcades on the shoulder and appliqué designs. Huffman has argued that the Ntsuanatsatsi facies is closely related to the oral histories of the early Fokeng people and represents the earliest known movement of Nguni people out of the area now known as Kwazulu-Natal into the interior of South Africa (Huffman, 2007).

The second Iron Age facies that has been identified around the study area is called the Olifantspoort facies of the Moloko Branch of the Urewe Ceramic Tradition and dates between AD 1500 - AD 1700. The main decorative features of these ceramics are multiple bands of fine stamping or narrow incisions separated by colour (Huffman, 2007). The type-site for this facies is located on the farm Olifantspoort 328 JQ, which is situated approx. 43km south-west of the present study area.

Several sites associated with the Olifantspoort ceramic style are known from the general vicinity of the study area. The closest sites were identified within the Anglo Platinum UG2 Expansion Project Area (Huffman, 2005), which is located roughly 30-40km south-east of the current study area.

The third Iron Age period to be identified within the general region is the Uitkomst facies of the Blackburn Branch of the Urewe Ceramic Tradition (AD 1650 – AD 1850). The decoration on these ceramics is in the form of stamped arcades, appliqué of parallel incisions, stamping and cord impressions and is described as combining the characteristics of both Ntsuanatsatsi (Nguni) and Olifantspoort (Sotho) ceramics (Huffman, 2007). This means that the Uitkomst pottery is viewed as a successor to the Ntsuanatsatsi facies and Huffman has argued that the Uitkomst ceramics are directly associated with the Bafokeng people who had gradually moved from Ntsuanatsatsi Hill in the present-day Free State Province to the north, coming into contact and interacting with Sotho-Tswana groups (Huffman 2007). It should be noted that not all researchers agree with this theory.

The type-site for this ceramic style is Uitkomst Cave, which is situated approximately 86km south-east of the study area. The site was one of five caves excavated in the Magaliesberg area by Professor Revil Mason. Uitkomst sites are well known from the surroundings of the study area. Huffman (2005) noted several examples of Uitkomst sites from the general vicinity, including one stone-walled site associated with a rock engraving (located roughly 37km to the south-east).

The subsequent phase of the Late Iron Age period identified in the general region is known as the Buispoort facies of the Moloko branch of the Urewe Ceramic Tradition. It dates to between AD 1700 and AD 1840. The characteristic decoration on these ceramics includes rim notching, broadly incised chevrons and white bands, as well as the use of red ochre (Huffman, 2007). The Buispoort facies is associated with sites such as Boschhoek, Buffelshoek, Kaditshwene, Molokwane and Olifantspoort (Huffman, 2007). These sites are all situated within the broader Rustenburg/ North-West region.

During the Later Iron Age period, the region around present-day Rustenburg would have been occupied by the Bafokeng and the Tlokwa people (Birkholtz et al 2020). Birkholtz et al (2020) cite Mbenga and Mason's reference to an estimation by Prof. RD. Coertz that the Bafokeng had settled in this area by the end of the 17th century and that the capital of the Bafokeng had moved to the Boschpoort area. The farm Boschpoort 284JQ is situated roughly 38km south-east of the present study area.

Professor Huffman has identified a large number of Late Iron Age sites in the areas to the immediate east of Rustenburg, such as Photsaneng and Thekwane (Huffman, 2005). Photsaneng and Thekwane are located roughly 40-45km south-east of the current project area. Francois Coetzee has also identified large numbers of Late Iron Age sites across the Pilanesberg National Park which is located approximately 8 km north of the present study area.

Three major historical-archaeological sites are located in the immediate vicinity of the current project area: Molokwane, Boitsemagano and Marothodi. A short description of these sites follows below.

Molokwane and Boitsemagano Mega-sites

Molokwane and Boitsemagano are two extensive stone-walled archaeological sites near Rustenburg which were occupied from AD c.1600 by the Bakwena Bamodimosana group (Pistorius 1994). The archaeological site of Molokwane occurs on the farm Selonskraal (3 I7 JQ) in the Rustenburg district of the Transvaal. The site is located 15 km west of Rustenburg and 25km south of the current project area. Boitsemagano is the second mega-site which is located on the farm Shylock (256 JQ). This site is situated 18km south of the current project area.

Pistorius (1994) states that oral tradition, and information from spokesmen of the Bakwena Bamodimosana Bammatau, both confirm that the stone-walled complex on Selonskraal was the previous residence of the Bammatau group and was known as Molokwane. The oral histories further relate that the Bakwena Bamodimosana originated from Rathateng and initially settled at Mafatle in the Rustenburg district where the group divided into four sections. Two of these developed into the groups known as the Bakwena Bamodimosana Bammatau and the Baramanamela who occupied two separate villages, namely, Molokwane and Boitsemagano (Pistorius 1994). Pistorius states that the stone walls on the present-day Selonskraal (317 JQ) and the adjacent farm Moedwil (254 JQ) were built when the Bammatau settled in the area during the early eighteenth century.

Marothodi

During the 1980s, Eskom identified a Late Iron Age stonewalled megasite at Vlakfontein, to the west of the Pilanesberg. The site was assessed initially by Professor Revil Mason of the University of the Witwatersrand (Mason, 1986). More recently, the site was excavated by Dr Mark Anderson for his Doctoral Thesis at the University of Cape Town (Anderson, 2009). Anderson notes that according to oral history the site is associated with the Batlokwa ba ga Sedumedi group which settled at Marothodi from 1815 until c. 1823, when their capital was moved to present-day Botswana (Anderson, 2009). Anderson's excavation at Marothodi confirmed the association of the Tlokwa with the Uitkomst ceramic facies, which is part of the Fokeng cluster. Some elements of Buispoort pottery also appearing in the assemblage. Anderson's research

also revealed a significant emphasis on metal production, especially copper, at Marothodi. He notes that copper could possibly have been valued high enough to be exchanged for cattle, and that the large cattle enclosures at the site may have been the result of trade with other communities (Anderson, 2009). This site is located approximately 16.5km northwest of the project area.

Historical/Colonial Period

During the late 1700s, there was apparently a period of conflict between the Bafokeng and their Batswana neighbours. During this time the Bafokeng established a settlement in the vicinity of present-day Rustenburg which was called Tlhabane (Birkholtz et al 2020). Around 1800, the Bafokeng then moved from Tlhabane to Phokeng, which was situated a distance to the north-west (Birkholtz et al 2020).

Between 1827 to 1832 the Khumalo Ndebele of Mzilikazi moved into the area from the central Vaal River and settled along the Magaliesberg Mountains. Around 1832 the Khumalo Ndebele then moved northwest to the Marico River area (Bergh, 1999).

The first Voortrekker parties started crossing the Vaal River in 1836 (Bergh, 1999). Subsequently, the earliest farms in the region were established from the late 1830s to the early 1840s, around the vicinity of the present day town of Rustenburg (Bergh, 1999). The young Paul Kruger, (who later became President of the Zuid-Afrikaansche Republiek from 1883 to 1902) was one of these farmers. His family had been part of one of the early trek groups which settled in the area (Pretorius 1967). In 1851 both the district and town of Rustenburg were established (Bergh, 1999). The project area fell within the Rustenburg district.

Several mission stations were established in the general region from the mid-nineteenth century. In 1858 a Lutheran Mission Station was opened on the farm Kronendal, in the area of the present town of Kroondal (Erasmus, 2014). The town of Kroondal is situated approx. 38.66km south-east of the present study area. In 1867, a second mission station was established by a Hermannsburg missionary on the farm Tweedepoort 283 JQ (Bergh, 2005) which is located roughly 34km south east of the project area. In December 1869, this mission station (called Kana) was moved to the farm Reinkoyalskraal 278 JQ (Bergh, 2005). The new location of the Kana Mission Station is located roughly 32km south east of the study area.

Between the 1860s to 1870s, the Hermannsburg Missionary Society assisted Kgosi Mokgatle of the Bafokeng and his people to buy a number of farms in the area around Rustenburg (Bergh, 2005). Birkholtz et al (2020) cite Mbenga & Manson's statement that a total of 24 farms were acquired by the Bafokeng. Two of these farms are located relatively close to the present project area: Turffontein (located roughly 38km south east of the current project area) and a portion of the farm Klipfontein (the present farm Waterval 303 IQ was created from a portion of the original farm Klipfontein).

The First South African War (First Boer War) between the British Empire and the Boer Republics took place from 1880-1881. The most significant event of the war for the town of Rustenburg would have been a three month long siege by Boer forces of a company of 2nd Battalion Royal Scots Fusiliers in the town ((Birkholtz et al 2020).

During the Second South African War (1899-1902), the Rustenburg area was significant due to its strategic position halfway between Zeerust and Pretoria as well as near the two main passes over the Magaliesberg

range of Olifants Nek and Magato's Nek. This resulted in the town suffering a series of occupations by both the British and the Boer forces. Between 15 June and 7 August 1900, the town was occupied by a British force under Major-General Baden-Powell until Lord Roberts' decision to evacuate all the smaller British positions in the Western Transvaal. After the British evacuation, the Boer forces occupied Rustenburg from 7 August until 16 August 1900, when a British force under Lord Methuen succeeded in reoccupying the town. However, the British evacuated the town again at the end of August 1900. On 26 September 1900 General Cunningham's column occupied the town and Rustenburg remained in British hands until the end of the war in 1902 (Birkholtz et al 2020).

Although several battles occurred in the general region around Rustenburg, an engagement that happened relatively close to the project area is the Battle of Moedwil. During September 1901, the Boer General de la Rey had moved closer to Rustenburg, with two British columns under Colonels Kekewich and Fetherstonhaugh actively searching for him and his men. On 22 September 1901, Colonel Kekewich had begun marching his column along the Elands River and by the afternoon of 29 September they had arrived at Moedwil Farm which was situated on the Selons River, about 25 km west of Rustenburg and made camp there overnight. The column had not encountered any Boers during the previous week and they believed there were no Boers in the area. In the meantime, de la Rey had made contact with General Kemp and they had planned to attack Kekewich's camp. Just before 5 am on the morning of 30 September Kemp began his attack on the camp. He sent two outflanking wings to surround the British camp, while the main centre thrust advanced from the Selons River. The attack surprised the British and many of the horses stampeded which left the camp-site in confusion. The British first moved towards the river to confront their attackers when they received reports that the Boers were attacking the rear of the camp as well. As the camp contained a large number of stores, which Kekewich was unwilling to abandon, he directed his forces to close in upon the river bank and fight at close quarters to drive the Boers out from their command of his camp. Wulfohn's account of this battle states that the Boers began to withdraw at around 6am as they realised they were heavily outnumbered and running out of ammunition ([Moedwil - Battle Tours ZA](#); Birkholtz et al 2020). The British losses were 61 killed or fatally wounded and 158 wounded, including Kekewich himself and a large number of horses and draught animals were lost. The Boer losses were 11 killed and 35 wounded (Birkholtz et al 2020; [Moedwil - Battle Tours ZA](#)). The Moedwil Battlefield and Anglo Boer War Gravesite is located approximately 19.60km south of the current project area, near the N4 highway.

The next significant development in the Rustenburg area was the discovery of platinum ore. In 1924, the geologist Hans Merensky was shown a sample of ore that had been found near Lydenburg by Mr. Andries Lombard. Merensky subsequently was able to trace a platinum reef all the way from Lydenburg to Rustenburg. This reef became known as the Merensky Reef (Carruthers, 2007). Following this discovery, several companies were floated between 1925-1927 to mine the platinum reef in the area around Rustenburg (Carruthers, 2007). These companies included the following: Potgietersrust Platinums was registered 27 August 1925, the Waterval (Rustenburg) Platinum Mining Company Limited was registered on 29 September 1926 and in 1927 the Potgietersrust Platinum Mines Limited applied for the re-proclamation of the farm Rustenburg Townlands (Birkholtz et al 2020). On 11 September 1931, the Rustenburg Platinum

Mines Ltd was formed by the amalgamation of Potgietersrust Platinums and the Waterval (Rustenburg) Platinum Mining Company (Birkholtz et al 2020).

Recent/ Modern history

In 1966 the Apartheid government forcibly relocated the Bakubung ba Ratheo from Molotestad near Boons (roughly 69km south-east of the present study area) to the farms Wydhoek, Ledig and Koedoesfontein near Saulspoort in the Pilanesberg district. When Bophutatswana was established a decade later, these farms were handed over to the Bantustan (Oosthuizen and Molokoe 2000). These farms are located directly north of the study area. The South African government granted independence to Bophutatswana on 6 December 1977 (Oosthuizen and Molokoe 2000).

On 16 August 2012, the South African Police Service (SAPS) opened fire on a crowd of striking mineworkers at Marikana, in the North West Province. This action resulted in the deaths of 44 mineworkers with 78 being seriously injured. Subsequently, a large number (250) of the miners were arrested.

This event followed a series of incidents between 9-14 August associated with an unsupported strike called by a large section of the mineworkers at Lonmin platinum mine. Subsequent events became increasingly violent, resulting in the deaths of at least four miners, two police officers and two security guards between 12- 14 August. On 14 August Lonmin officially halted production at the Marikana platinum mine. The miners had congregated on a hill called Wonderkop near the Lonmin mine and a large number of police had been deployed, including military police vehicles and helicopters. Sources are unclear on what led to the police opening fire, as some accounts blame the police and others blame the mineworkers. The role of the two mineworker Unions and the reaction of Lonmin management in the situation has also been questioned. This terrible event resulted in the establishing of a judicial commission of inquiry to investigate the matters that resulted in the tragedy ([Marikana Massacre 16 August 2012 | South African History Online \(sahistory.org.za\)](https://sahistory.org.za/marikana-massacre-16-august-2012)).

5.2.3 Cartographic findings

An assessment of available historical topographical maps was undertaken to establish a historic layering for the study area. Overlays of the maps were made on Google Earth. These historic maps are valuable resources in identifying possible heritage sites and features located within the study area. It should be noted that the earliest edition of the map sheets for this area dates to the 1960s. As the first edition of this sheet dates to 1963, it was not considered necessary to examine the later edition map sheets. Any heritage resources that are 60 years or older would be depicted on the 1963 edition sheet. The topographical maps were obtained from the Department of Agriculture, Land Reform and Rural Development (DALRRD) in Cape Town.

The following 1:50 000 map sheet was assessed for the Onderstepoort Solar 2 footprint: 2527AC Heystekrand Edition 1 1963. The map was surveyed in 1963 and drawn in 1964 by the Trigonometrical Survey Office of the Republic of South Africa from aerial photographs taken in 1961.

As can be seen in **Figure 16** and **Figure 17**, below, the 1963 edition map depicts no heritage features within or close to the Onderstepoort Solar 2 footprint, for either Alternative 1 or Alternative 2 layouts.

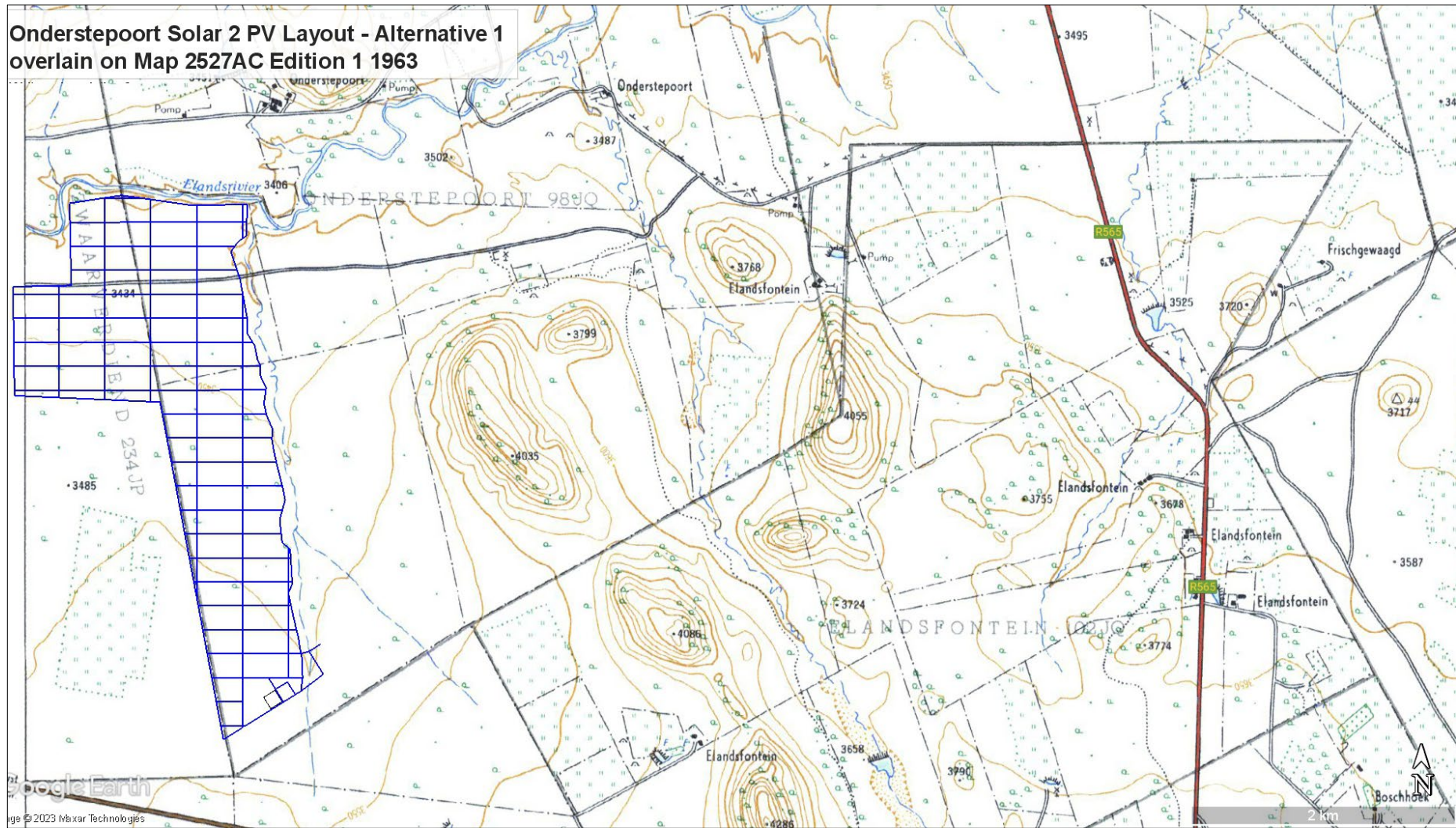


Figure 16: Enlarged view of topographic map 2527AC Ed 1 1963, depicting no heritage features within or close to the Onderstepoort Solar2 footprint – Alternative 1 layout

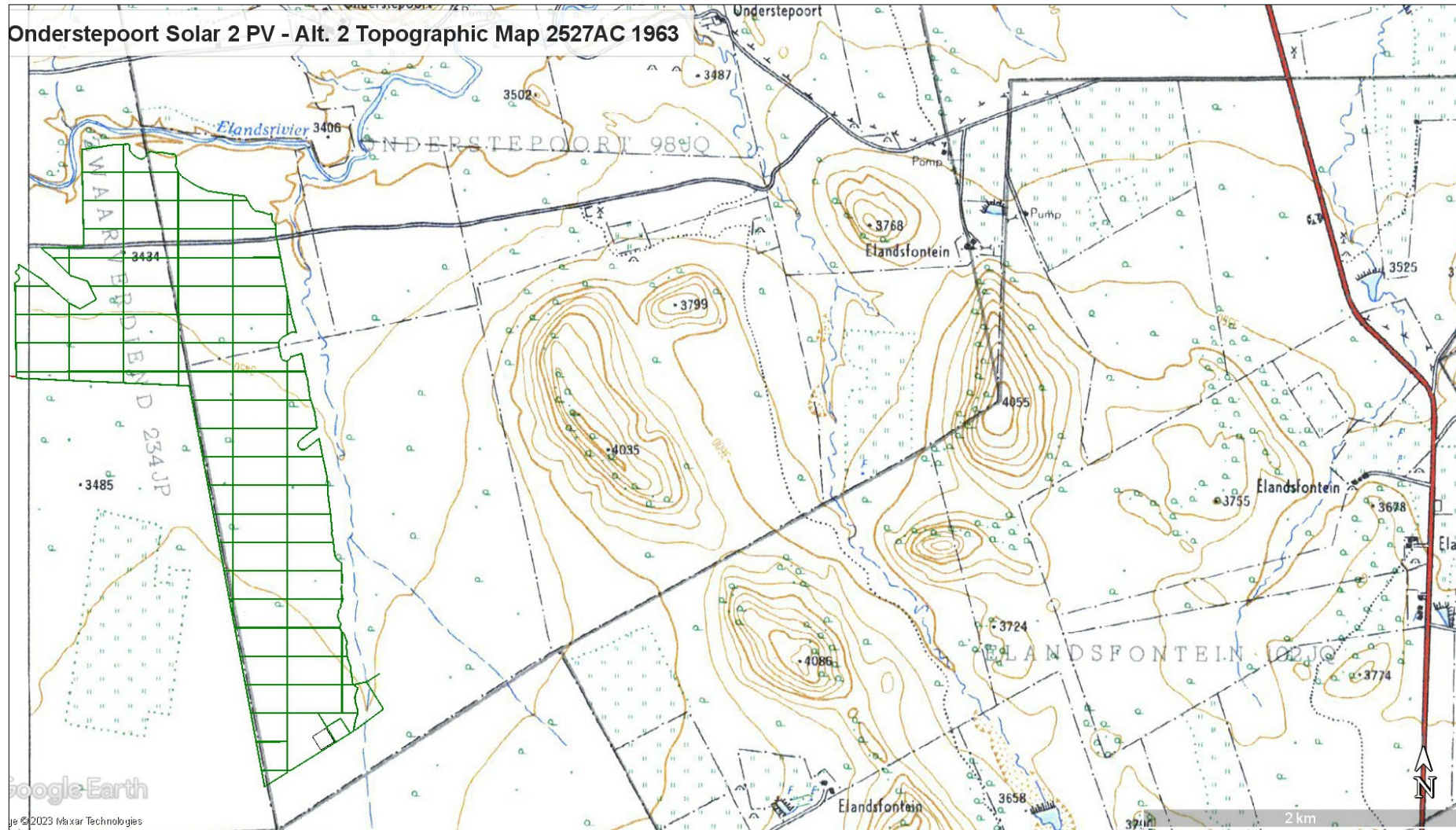


Figure 17: Enlarged view of topographic map 2527AC Ed 1 1963, depicting no heritage features within or close to the Onderstepoort Solar2 footprint – Alternative 2 layout

5.3 Previous HIA reports in the area

A search on the South African Heritage Resources Information System (SAHRIS) has identified several Heritage Impact Assessments conducted in and around the study area. The project area of one of these reports included the northern section of the Farm Onderstepoort (now called Mimosa 81), located north of the Elandsrivier (vd Walt 2007). V D Walt also notes that oral histories mention early occupation of the BaTlokwa group on farms such as Zwaarverdiend 234JP, which is one of the farms on which the Onderstepoort Solar 2 PV project is located.

VD Walt, J. 2007. *Wesizwe Heritage Impact Assessment- Proposed platinum mining on portions of the farms Ledig 909JQ, Frischgewaagd 96JQ & Mimosa 81 JQ, North West Province Version 1.0*. Twenty-four heritage resource sites were identified, most of them being Iron Age ceramic scatters or settlement sites, with three possible grave sites and one historic settlement site. Early Stone Age tools were also identified at one of the Iron Age scatter sites. Eleven of these sites were situated on the northern section of the farm Onderstepoort (now called Mimosa 81), located north of the Elandsrivier.

Pistorius, J. 2000. *An Archaeological Scoping Report Supplemented With A Phase I Archaeological Survey For Sa Chrome's Proposed New Ferrochrome Smelter On The Farm Boschhoek 103jq In The Rustenburg District Of The Central Bankeveld In The North West Province*. Two historical structures, two recent graveyards and a third possible graveyard were identified in the study area.

Dreyer, C. 2006. *First Phase Archaeological And Cultural Heritage Assessment Of The Proposed Development Site At The Farm Wildebeestfontein JQ274, Rustenburg, North West Province*. The site is part of the existing mining activities and no cultural or historical remains were found in the development area.

Fourie, W. 2009. *Isotium (Pty) Ltd (Isotium) – Royalty Fair Resort on Portion 35 of the farm Buffelspoort 343 JQ, District Rustenburg, North West Province*. Five sites of cultural significance were identified in this study area: two Iron age stone walling sites, two historical mine cuttings and one comprising possible homestead remains.

Pistorius J. 2011. *A Phase I Heritage Impact Assessment (HIA) Study for Lonmin Platinum's Proposed Exploration Activities on Vlakfontein 20JPp and Diamand 206JP near The Pilanesberg in the North-West Province*. The HIA investigated Lonmin's proposed exploration activities of ten drill holes on the farms Vlakfontein 207JP and Diamand 206JP to the south-west of the Pilanesberg. The farm Vlakfontein contains the Late Iron Age/historical stone-walled town known as Marothodi, which was the Tlokwa capital and is one of four mega-sized stone walled settlements in the North-West province.

Coetzee, FP. 2015. *Cultural Heritage Assessment for the Proposed Styldrift Shaft 2 and Associated Infrastructure at Royal Bafokeng Platinum Styldrift Mine Complex, Rustenburg Local Municipality, Bojanala District Municipality, North West Province*. The Royal Bafokeng Platinum Mine Styldrift Mine Complex is situated on the farm Styldrift 90 JQ. This study identified an extensive Early Stone Age manufacturing assemblage, as well as several historical settlements and graves or graveyards.

Magoma M. 2016. *Phase 1 Archaeological Impact Assessment Specialist Study Report For The Proposed Rustenburg Strengthening Project Within Rustenburg Local Municipality Of Bojanala Municipality. North West Province.* The project area for the AIA report is located on Farm Klipgat 281 JQ and Portion 2 of the Farm Elandsheuvel 282 JQ. Late Iron Age stone walled sites, Late Stone Age tools, historical terracing and undecorated potsherds were identified in the project area.

Coetzee, FP. 2017. *Phase 1 Investigation of the Proposed 1 ML Reservoir at Bakubung Lodge, Pilanesberg National Park, Bojanala District Municipality, Moses Kotane Local Municipality, North West Province.* The survey formed part of a Basic Assessment (BA) for the construction of a new 1ML (1000 m³) potable water reservoir to replace the three existing aging reservoirs for the Bakubung Lodge which is located on Portion 6 of the farm Ledig 909JQ. No cultural heritage remains were identified.

5.4 Palaeontological sensitivity

Note that this section was compiled by the author and not by a palaeontological specialist. A basic palaeontological sensitivity was determined using the SAHRIS database South African Palaeontological Sensitivity Map (<http://www.sahra.org.za/sahris/map/palaeo>). This map indicates that the project footprint falls within an area where the underlying geology in the western section has High fossil sensitivity (orange) with the eastern section having Moderate (green) sensitivity, for both Alternative 1 and Alternative 2 layouts (see **Figure 18** and **Figure 19** below). The different palaeontological sensitivities that are defined on the SAHRIS Palaeontological Sensitivity Map SAHRIS, are outlined in the table below. Due to most of the underlying geology being of Moderate sensitivity for fossils, with a small area of High sensitivity along the eastern boundary, a separate palaeontological assessment has been undertaken. The recommendations and mitigation measures provided in the assessment report must be implemented where necessary.

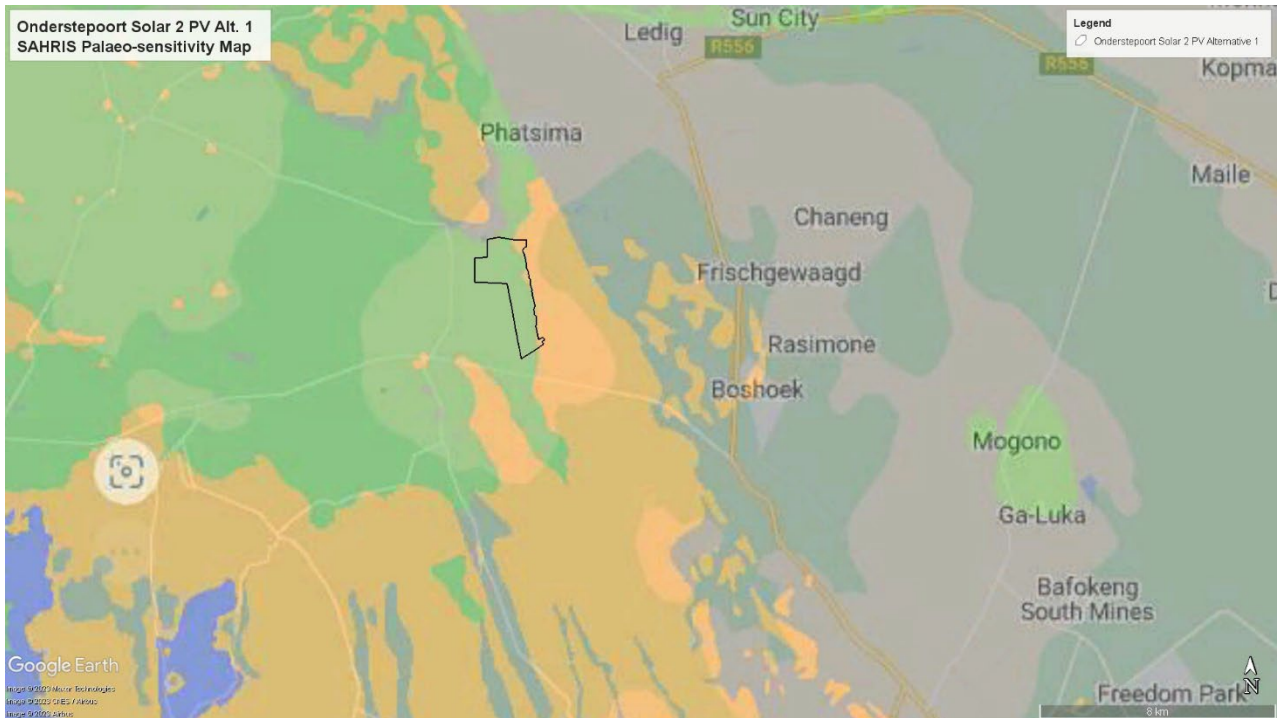


Figure 18: SAHRIS Palaeo sensitivity map overlain on the Onderstepoort Solar 2 project footprint – Alternative 1 layout (black polygon). The underlying geology is shown as of Moderate (green) sensitivity for fossils, with a small area of High sensitivity (orange) along the eastern boundary.

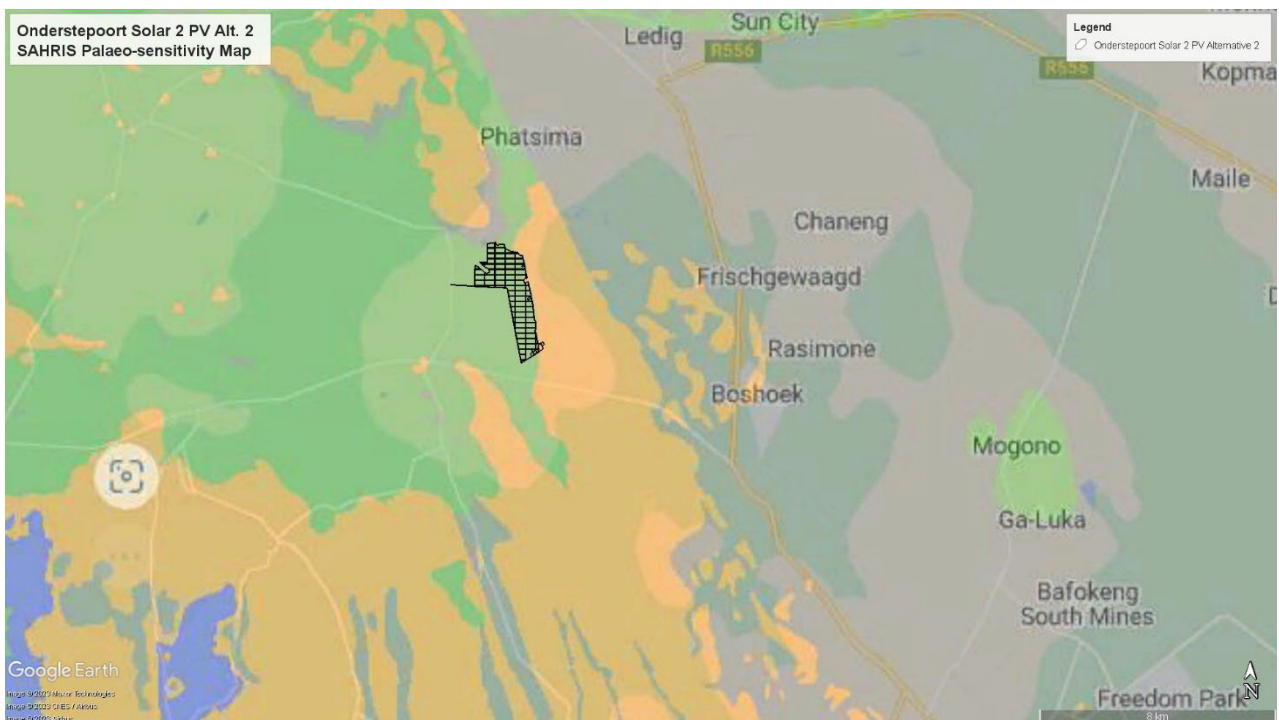


Figure 19: SAHRIS Palaeo sensitivity map overlain on the Onderstepoort Solar 2 project footprint - Alternative 2 layout (black polygon). The underlying geology is shown as of Moderate (green) sensitivity for fossils, with a small area of High sensitivity (orange) along the eastern boundary

Table 2: SAHRIS Fossil Map Palaeontological Sensitivity Ratings and Required Actions

Colour	Sensitivity	Required Action
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 to be requested.
GREEN	MODERATE	Desktop study is required.
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required.
GREY	INSIGNIFICANT /ZERO	No palaeontological studies are required.
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information becomes known, SAHRA will continue to populate the map.

5.5 Findings of the Historical Desktop Study

The general overview from the historical desktop study has shown that various archaeological and historical resources can be expected to occur in the project area, including Stone Age artefacts, Iron Age stone walling and material culture, sites related to the Second South African War, historical farm structures and historical graves. One previous HIA (van der Walt 2007) had identified eleven sites on the northern section of the farm Onderstepoort (now called Mimosa 81), located north of the Elands River. These included Middle and Late Iron Age pottery scatters and hut circles, as well as two possible graves and one site with historic structure remains. V D Walt also notes that oral histories mention early occupation of the BaTlokwa group on farms such as Zwaarverdiend 234JP, which is one of the farms on which the Onderstepoort Solar 2 PV project is located.

The general overview from the historical desktop study has shown that various archaeological and historical resources can be expected to occur in the project area. However, the examination of the earliest edition (1960) of the 1:50 000 topographical maps produced by overlying the maps with satellite Imagery (Google Earth) depicted no historical structures, graves or stone walling within or adjacent to the project footprint.

The Site Survey fieldwork identified four possible heritage resources occurring within or adjacent to the Onderstepoort Solar 2 PV project area footprint. However, as the western section of the project footprint lies over a portion of the farm Zwartverdiend 234JP, which is associated with historical occupation by a group of BaTlokwa, there is a possibility that historic-archaeological material related to the historic occupation of this farm may be uncovered during site clearance or construction activities.

6 SITE SURVEY/FIELDWORK RESULTS

The survey of the Onderstepoort Solar 2 project footprint took place over two days (15 and 24 January 2023) by the author (heritage specialist) as part of a specialist team. A vehicle was used to access the project footprint area and the survey was conducted by both vehicle and on foot (at selected areas). The survey covered as much of the project footprint area as was feasibly accessible, given the long grass and patches of dense acacia thicket covering several areas, as well as certain sections which were not accessible due to locked gates.

The author used a Global Positioning System (GPS) application to navigate access roads in the study area and for recording the tracklog of the survey and waypoints of the identified heritage resources. A Sony digital camera was used for photographic recording of identified heritage resources and general images of the project study area.

The survey aimed to find and identify archaeological and other heritage resources such as burial grounds and graves (BGG), archaeological material or sites, historic built environment and landscape features of cultural heritage significance. The survey of the area identified four possible heritage resources within or close to the project footprint.

Identified Heritage Sites

Site Name	Onder 2-01_Farm Dam Wall
GPS Coordinates	25°26'47.95"S, 27° 1'11.31"E
Site Description	<p>The site comprises a depression in the ground (stream bed?), adjacent to a farm dam, which is filled with rocks, stones and building rubble. There are also stones covering the old dam wall. The stones are likely serving as flood control and to strengthen the dam wall.</p> <p>Estimated extent (from satellite images) = 55m x20m</p>
Approximate Age	Not more than 60 years old. A dam wall is depicted at this location on the map editions from 1982 and later.
NHRA, No. 25	N/A
Field Grading and Ratings	
Site context and description	<p>The site comprises a depression in the ground adjacent to a farm dam, which is filled with rocks, stones and building rubble. There are more stones over the old dam wall. The stones are likely serving as flood control and to strengthen the dam wall. Historical satellite imagery does show that there was flooding in this location in 2008.</p> <p>The site is located between the boundary of Onderstepoort Solar 1 and Onderstepoort Solar 2 PV areas, but just within the Onderstepoort Solar 2 footprint (Alternative 1). There is also a modern cattle kraal and feeding station situated within this area. The site is avoided by the Alternative 2 layout.</p>
Site Density	N/A
Uniqueness	Low
Heritage Significance	NCW
Mitigation	No mitigation is required.



Figure 20: View of dam wall showing concentration of stones and rocks



Figure 21: View of the rocks and stones along the stream bed

Site Name	Onder 2-02_Field clearance cairns
GPS Coordinates	-25°25'52.83"S, 27° 0'54.16"E
Site Description	The site comprises two piles of sandstone rocks, one is located underneath a tree and one is opposite the tree (on the other side of a fence). These seem to be the results of field or road clearance as no structures are depicted at this location on any of the map editions for this area.
Approximate Age	Unknown. Nothing is depicted in this location on the 1963 topographic map or later editions
NHRA, No. 25	N/A
Field Grading and Ratings	
Site context and description	The site comprises several clusters of sandstone rocks. No structures are depicted on the 1963 topographic map or later editions. The site is located within the eastern boundary of the northern section of the project footprint and within the PV area (Alternative 1). The site is avoided by the Alternative 2 layout.
Site Density	Unknown
Uniqueness	Low
Heritage Significance	NCW
Mitigation	No mitigation is required



Figure 22: View of the pile of rocks under a tree



Figure 23: View of the pile of rocks and stones on the other side of the fence

Site Name	Onder 2-03_Recent/modern structure
GPS Coordinates	25°25'52.10"S, 26°59'55.79"E
Site Description	The site comprises a recent structure that is probably farm worker housing. Nothing is depicted in this location on the 1963 topographic map.
Approximate Age	Younger than 60 years.
NHRA, No. 25	N/A
Field Grading and Ratings	
Site context and description	The site comprises a recent structure that is probably farm worker housing. The site is located just outside the western boundary of the north-west section of the project footprint (Alternative 1 and Alternative 2 layouts), very close to the fence. The structure seemed to be occupied.
Site Density	N/A
Uniqueness	Low
Heritage Significance	NCW
Mitigation	No mitigation is required.



Figure 24: View of the recent/modern structure at Onder 2-03

Site Name	Onder 2-04_Recent/modern structures
GPS Coordinates	25°25'54.38"S, 26°59'55.84"E
Site Description	The site comprises several modern/recent buildings which could be worker housing or farm outbuildings. They are located outside the footprint and a distance away from the western boundary of the northern section of the footprint.
Approximate Age	Younger than 60 years
NHRA, No. 25	N/A
Field Grading and Ratings	
Site context and description	The buildings are located outside the footprint and a distance away from the western boundary of the northwest corner of the footprint (between 140-250m) – Alternative 1 and Alternative 2 layout.
Site Density	Eight structures are visible on satellite imagery.
Uniqueness	Low
Heritage Significance	NCW
Mitigation	No mitigation is required



Figure 25: View of two of the recent/modern buildings at Onder 2-04



Figure 26: View of one of the recent/modern buildings

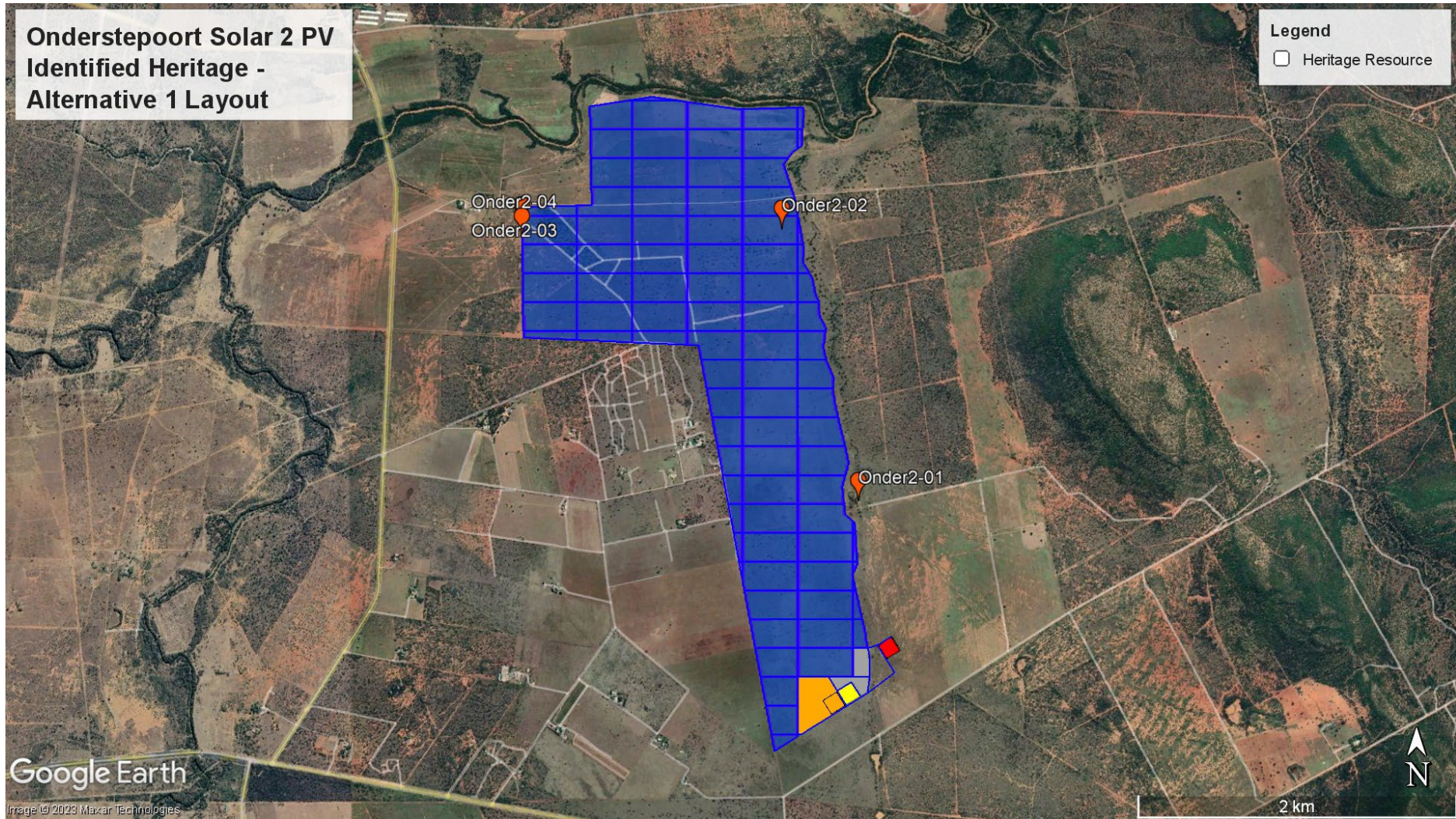


Figure 27: During the survey four heritage resources were identified within the project footprint (Alternative 1)

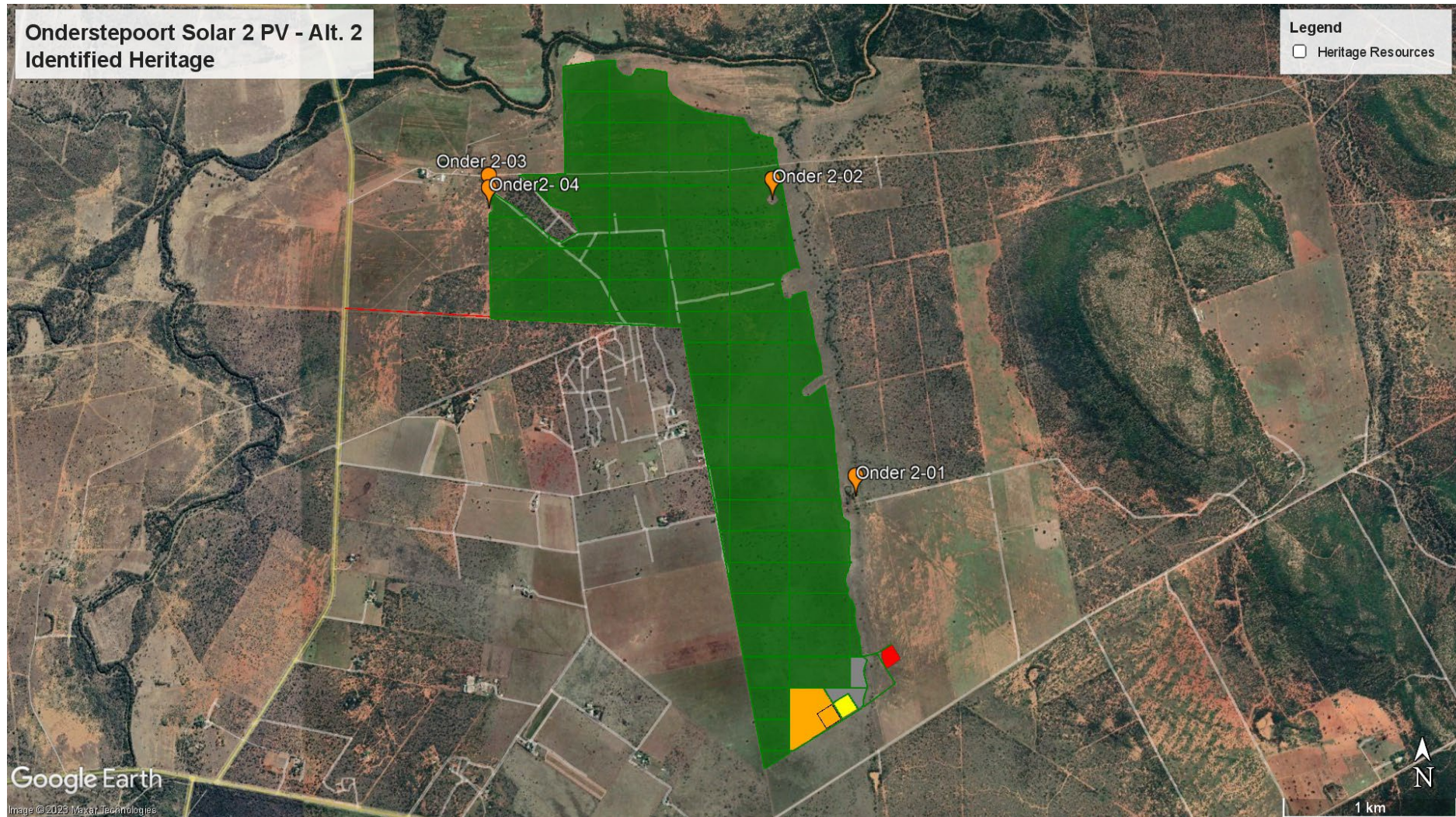


Figure 28: The four heritage resources identified are avoided by the project footprint (Alternative 2)

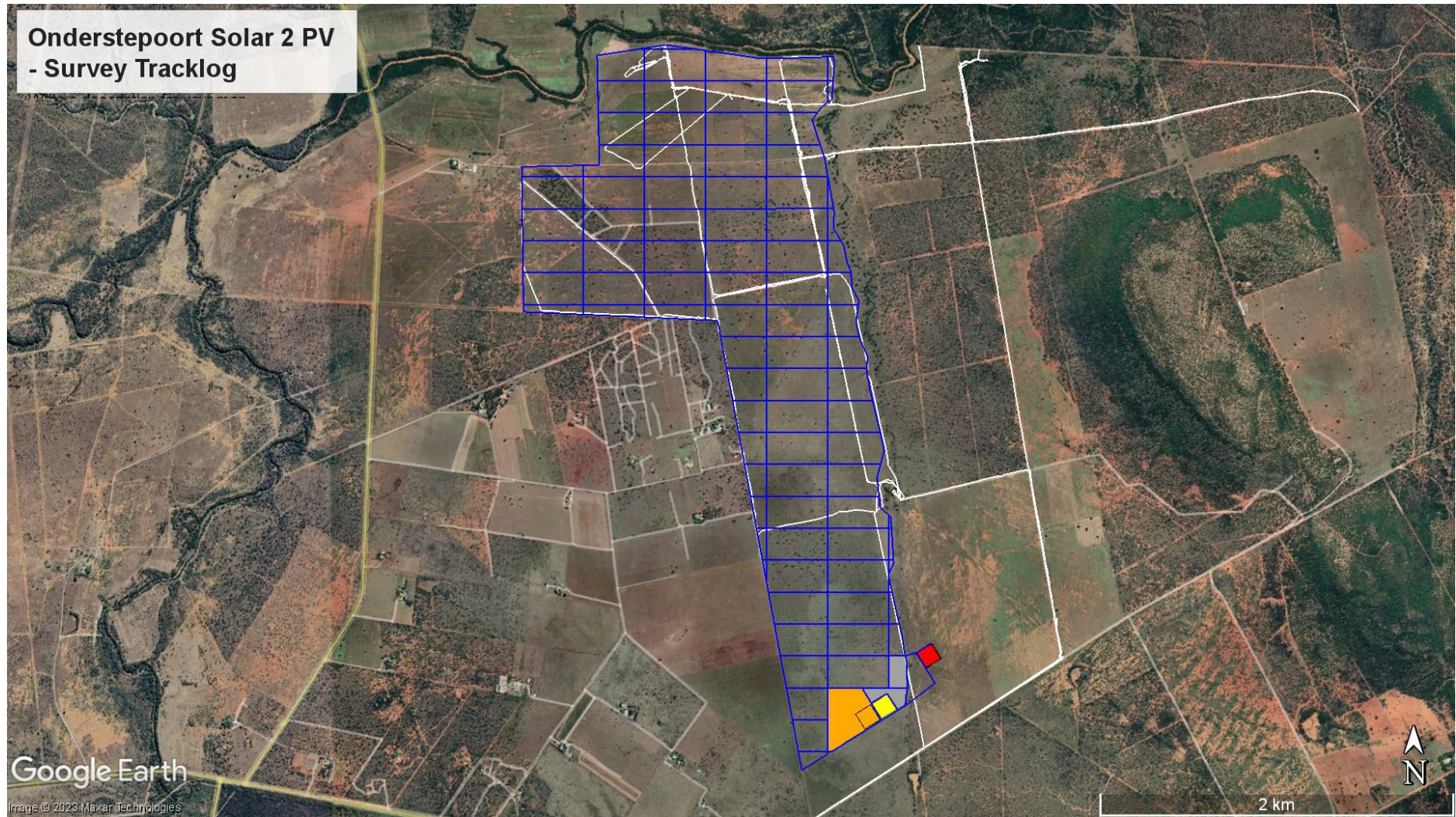


Figure 29: Site Survey Tracklog (white lines) overlaid on the general project layout (blue polygon)

7 SITE SENSITIVITY VERIFICATION

The Historical Desktop study showed that that no specific heritage features were depicted on the historical topographic maps within the project footprint (for either Alternative 1 or Alternative 2). However, information from the past HIAs indicated that the farm Zwaarverdiend 234JP, is associated with historical occupation by a group of BaTlokwa people. As the western section of the project footprint lies over a portion of the farm Zwaarverdiend 234JP, there is a low possibility that historical-archaeological material related to the historical occupation of this farm could be present on this section of the project footprint.

The Site Survey fieldwork identified four heritage resources within or close to the project footprint. However, three of the sites are of modern/recent date and the fourth site is probably the result of field or road clearance. No archaeological sites or material were identified. No graves or potential graves were identified. No historical structures or remains were identified.

However, there is a low possibility that unidentified graves could be uncovered. There is a low possibility that historical-archaeological material related to the historical occupation of the farm Zwaarverdiend 234JP could be present on the western section of the project footprint.

However, overall, the combined results from the desktop study and the site survey confirmed the initial PV Site screening results that the Archaeological Cultural Heritage sensitivity of the general region is low.

The palaeontological sensitivity verification will be discussed in the separate palaeontological report.

8 SIGNIFICANCE ASSESSMENT

Methodology for Assessing Heritage Site Significance

The applicable maps, tables and figures are included, as stipulated in NHRA and NEMA. The HIA process consists of three steps:

Literature Review

The desktop literature review provided information on the Heritage Background of the general region and project area. This included investigating published sources as well as past HIA studies conducted for the project area and surrounding region. An examination of historical 1:50 000 topographical maps and/or archival maps (if available) was also undertaken. The relevant early editions of the 2527AC topographical map sheets were obtained from the Department of Rural Development & Land Reform, Cape Town.

A number of internet sites were also accessed for information, specifically, the website of SA History Online (<https://www.sahistory.org.za>).

Literature resources accessed are listed in Table 3.

Table 3: Literature sources accessed

Source	Information
Background Information Document - Nemaï	Project location and description details
Published sources and Past HIAs	Historical and archaeological background on Rustenburg and surrounding region
Directorate: National Geo-spatial Information of the Department of Rural Development & Land Reform, Cape Town	Historical topographic maps, 1:50 000 2527AC Heystekrand Edition 1 1963

Field Survey

A physical Site Inspection or Field Survey was conducted, predominantly by vehicle and on foot through the project area by an experienced heritage specialist, as part of a specialist team. This focussed on identifying and documenting heritage resources situated within and immediately adjacent to the proposed project area footprint, such as graves, historical structures or remains and archaeological sites or material.

HIA Report

The final step involved the recording and documentation of the identified heritage resources, the assessment of such resources in terms of heritage significance and impact assessment criteria, producing a heritage sensitivity map and compiling the heritage impact assessment report with constructive recommendations for mitigation, if required.

Impacts on these sites by the development will be evaluated as follows:

Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2021) is implemented in this report.

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (set out below in **Table 4** and **Table 5**).

Table 4: Rating system for archaeological resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table 5: Rating system for built environment resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by Provincial Heritage Authority.	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
IIIC	Such a resource is of contributing significance to the environs These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e., in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by the PHRA for structures in this category if they are older than 60 years.	Not Conservation worthy – no research potential or other cultural significance

Table 6: Site significance classification standards as prescribed by SAHRA.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	Very High - of National Significance	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	Very High – of Provincial Significance	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)		High / Medium Significance	Mitigation before destruction

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
Generally Protected B (GP.B)		Medium Significance	Recording before destruction
Generally Protected C (GP.C)		Low Significance	Destruction

9 IDENTIFICATION OF IMPACTS

9.1 Impacts and Mitigation Framework

All impacts are analysed in the section to follow with regard to their nature, extent, magnitude, duration, probability and significance.

ISO 14001-2004 defines impacts as “any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization’s environmental aspects”.

When considering an assessment of the impacts and their mitigation, the following definitions as per Table 7 apply.

Table 7: Impact and Mitigation Quantification Framework

Nature	The project could have a positive, negative or neutral impact on the environment.
Extent	<p>Local – extend to the site and its immediate surroundings.</p> <p>Regional – impact on the region but within the province.</p> <p>National – impact on an interprovincial scale.</p> <p>International – impact outside of South Africa.</p>
Magnitude	<p>Degree to which impact may cause irreplaceable loss of resources:</p> <p>Low – natural and socio-economic functions and processes are not affected or minimally affected.</p> <p>Medium – affected environment is notably altered; natural and socio-economic functions and processes continue albeit in a modified way.</p> <p>High – natural or socio-economic functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.</p>
Duration	<p>Short term – 0-5 years.</p> <p>Medium term – 5-11 years.</p> <p>Long term – impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention.</p> <p>Permanent – mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.</p>

Probability	<p>Almost certain – the event is expected to occur in most circumstances.</p> <p>Likely – the event will probably occur in most circumstances.</p> <p>Moderate – the event should occur at some time.</p> <p>Unlikely – the event could occur at some time.</p> <p>Rare/Remote – the event may occur only in exceptional circumstances.</p>
Significance	<p>Provides an overall impression of an impact’s importance, and the degree to which it can be mitigated. The range for significance ratings is as follows-</p> <p>0 – Impact will not affect the environment. No mitigation necessary.</p> <p>1 – No impact after mitigation.</p> <p>2 – Residual impact after mitigation.</p> <p>3 – Impact cannot be mitigated.</p>
Mitigation	<p>Information on the impacts together with literature from socio-economic science journals, case studies and field work will be used to provide mitigation recommendations to ensure that any negative impacts are decreased and positive benefits are enhanced.</p>
Monitoring	<p>Monitoring usually involves developing and implementing a monitoring programme to identify deviations from the proposed action and to manage any negative impacts. The recommended mitigation measures will also include monitoring measures.</p>

Table 8: Impact Methodology Table

Nature				
Negative		Neutral		Positive
-1		0		+1
Extent				
Local	Regional		National	International
1	2		3	4
Magnitude				
Low		Medium		High
1		2		3
Duration				
Short Term (0-5yrs)	Medium Term (5-11yrs)		Long Term	Permanent
1	2		3	4
Probability				
Rare/Remote	Unlikely	Moderate	Likely	Almost Certain
1	2	3	4	5
Significance				
No Impact/None	No Impact After Mitigation/Low	Residual Impact After Mitigation/Medium	Impact Cannot be Mitigated/High	
0	1	2	3	

9.2 Identification of Activities and Aspects

An “Activity” is defined as a distinct process or risks undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation (International Organization for Standardization, 2011).

An aspect is defined as elements of an organisation’s activities or products or services that can interact with the environment.

In order to capture the impacts associated with the proposed infrastructure, an activity – aspect – impact table was created refer to 9 below.

Table 9: Activity, Aspects and Impacts of the Project

Activity	Aspect	Potential Impact – Positive	Potential Impact – Negative
Site clearance/ construction camp	Heritage	N/A	Damage to unidentified graves or archaeological material
Construction	Heritage	N/A	Damage to unidentified graves or archaeological material
Operation	Heritage	N/A	N/A

9.3 Impact and Mitigation Assessment

The site survey identified four possible heritage resources within or close to the Onderstepoort Solar 2 PV project footprint area. However, three of the sites are of modern/recent date and the fourth site is probably the result of field or road clearance. No archaeological material, historical structures or graves were identified. However, there is a low possibility that some archaeological material or unidentified graves could be uncovered sub-surface, specifically within the western section of the project footprint. Therefore, generally low impacts on heritage resources are anticipated for both the Alternative 1 and Alternative 2 layouts.

9.4 Impacts During the Planning, Construction and Operation Phases

Although a low impact on heritage resources is anticipated for this project, impact/mitigation tables have been generated for Chance Finds- Archaeological material and for Unidentified Graves/burials (**Table 10**, and **Table 11** below), as there is a low probability that some archaeological material or unidentified graves could be uncovered sub-surface, specifically within the western section of the project footprint (Alternative 1 and Alternative 2). The heritage management guidelines provided in **Section 12** also address this possibility.

Table 10: Impact on Heritage Resources – Archaeological Chance Finds

Environmental Feature		Chance finds: Heritage resources - Archaeological material				
Project life-cycle		Planning, Construction				
Potential Impact		Proposed Management Objectives / Mitigation Measures				
Possible damage to or destruction of unidentified archaeological material		<p>Monitoring of site clearance activities in the western section of the project footprint must be undertaken by an archaeologist to identify any archaeological sites or material</p> <p>If any changes are made to the final design footprint prior to construction, monitoring of site clearance activities must be undertaken by an archaeologist to identify any archaeological material</p>				
Alternative 1	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	High	Permanent	Moderate	3
After Mitigation	Negative	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	No visible heritage resources were identified within the project area for Alternative 1. However, there is a low to moderate possibility that unidentified archaeological material could be uncovered during site clearing or construction activities within the western section of the project footprint.					
Alternative 2	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	High	Permanent	Moderate	3
After Mitigation	Negative	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	No visible heritage resources were identified within the project area for Alternative 2. However, there is a remote possibility that unidentified archaeological material could be uncovered during site clearing or construction activities within the western section of the project footprint.					

Table 11: Impact on Heritage Resources – Unidentified Graves/burials

Environmental Feature		Chance finds: Heritage resources – Unidentified graves/burials				
Project life-cycle		Planning, Construction				
Potential Impact		Proposed Management Objectives / Mitigation Measures				

Possible damage to or destruction of unidentified graves or burials		Monitoring of site clearance activities in the western section of the project footprint must be undertaken by a heritage specialist or archaeologist to identify any graves or burials If any changes are made to the final design footprint prior to construction, monitoring of site clearance activities must be undertaken by a heritage specialist/archaeologist to identify any graves/burials				
Alternative 1	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	High	Permanent	Unlikely	3
After Mitigation	Negative	Local	Low	Long- term	Remote	1
Significance of Impact and Preferred Alternatives	No visible heritage resources were identified within the project area for Alternative 1. However, there is a remote possibility that unidentified graves/burials could be uncovered during site clearing or construction activities.					
Alternative 2	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	High	Permanent	Unlikely	3
After Mitigation	Negative	Local	Low	Long- term	Remote	1
Significance of Impact and Preferred Alternatives	No visible heritage resources were identified within the project area for Alternative 2. However, there is a remote possibility that unidentified graves/burials could be uncovered during site clearing or construction activities.					

9.5 Cumulative impacts

The project area and surrounding region has been affected by impacts of activities occurring in the past, current activities and proposed future developments. These will be discussed below.

Past impacts: The past HIA reports recovered from the SAHRIS database indicated that the Onderstepoort Solar 2 PV project footprint and surrounding region has been affected by several development and other activities that would have disturbed the heritage resources which occur in the area. These include prospecting and mining related projects, powerline construction and recreation developments, in addition to historical farming and platinum mining activities in the general region around Rustenburg.

Current impacts: the immediate area of the Onderstepoort Solar 2 PV footprint is affected mainly by farming activities (cattle and game).

The baseline impacts are considered to be Low for Heritage resources, and additional project impacts (if no mitigation measures are implemented) will increase the significance of the existing baseline impacts, where the cumulative unmitigated impact will probably be of a low significance. The impact is going to happen and will be long-term in nature, however, the impact risk class will remain Low.

10 ALTERNATIVES

10.1 Introduction

Alternatives are the different ways in which the Project can be executed to ultimately achieve its objectives. Examples could include carrying out a different type of action, choosing an alternative location or adopting a different technology or design for a project.

10.2 Site Alternatives

No site alternatives are proposed for this Project. Favourable location factors for the PV Site include suitable solar irradiation levels, short distance to grid connection point, flat topography, suitable site access and availability of land.

10.3 Layout / Design Alternatives

It is anticipated that the space available at the PV Site will be adequate to position the facility and its associated infrastructure to avoid areas of sensitive environmental features, which will be determined in the EIA Phase through the specialist studies. The extent of the site allows for the identification of layout/design alternatives to manage impacts to environmental sensitivity.

Two alternative layouts have been provided for the Onderstepoort Solar 2 PV project footprint: Alternative 1 is the original layout provided by the client at the time of the site survey; and Alternative 2 has been designed with an adjusted PV footprint that avoids environmentally sensitive areas.

10.4 No-Go Option

As standard practice and to satisfy regulatory requirements, the option of not proceeding with the Project is included in the evaluation of the alternatives.

The no-go alternative can be regarded as the baseline scenario against which the impacts of the Project are evaluated. This implies that the current status and conditions associated with the proposed Project footprint will be used as the benchmark against which to assess the possible changes (impacts) associated with the Project.

In contrast, should the proposed Project not go ahead, any potentially significant environmental issues would be irrelevant, and the status quo of the local receiving environment would not be affected by the project-related activities. The objectives of the Project, including the benefits (such as the exploitation of SA's renewable energy resources, potential economic development and related job creation, and increased security of electricity supply), will not materialise.

11 STATEMENT OF IMPACT SIGNIFICANCE

The project area that will be impacted by the proposed Onderstepoort Solar 2 PV project contains some areas that are currently disturbed by cattle and game farming activities.

The proposed Onderstepoort Solar 2 PV project contained four possible heritage resources within or adjacent to the project footprint, however, three of the four possible heritage resources proved to be of recent/modern date, while one is probably the result of field or road clearance activities.

The impact significance of the project on graves and cemeteries is low as no definite grave sites were identified. However, there is a low possibility that unidentified graves could be uncovered.

The impact significance of the proposed project on protected historical structures is low as no historical structures were identified.

The impact significance of the proposed project on archaeological resources is low as no archaeological sites or material were identified. However, as the western section of the project footprint lies over a portion of the farm Zwaarverdiend 234JP, which is associated with historical occupation by a group of BaTlokwa, there is a low possibility that historical-archaeological material related to the pre-colonial occupation of this farm may be uncovered during site clearance or construction activities. Monitoring of site clearance and construction activities in the western section of the project footprint by a qualified and experienced archaeologist is therefore required.

12 HERITAGE MANAGEMENT GUIDELINES

12.1 General Management Guidelines

The following general heritage management guidelines should be followed:

1. It is advisable that an information section on cultural resources be included in the SHEQ training given to contractors involved in surface earthmoving activities. These sections must include basic information on:
 - a. Heritage;

- b. Graves;
- c. Archaeological finds; and
- d. Historical Structures.

This module must be tailor made to include all possible finds that could be expected in that area of construction. Possible finds include:

- a. Unidentified graves or burials.
 - b. Remains of historical structures.
 - c. Palaeontological deposits such as bones and teeth and plant fossils.
2. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.
 3. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
 4. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.
 5. After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
 6. If during the initial survey sites of cultural significance are discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological/palaeontological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist.
 7. In the event that human remains are uncovered, or previously unknown graves are discovered, a qualified archaeologist needs to be contacted and an evaluation of the finds made.
 8. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA need to be followed. This includes an extensive social consultation process.

13 RECOMMENDATIONS/CONCLUSION

The site survey identified four possible heritage resources within or close to the Onderstepoort Solar 2 PV project footprint area. However, three of the sites are of modern/recent date and the fourth site is probably the result of field or road clearance. No archaeological material, historical structures or graves were identified. However, there is a low possibility that some archaeological material or unidentified graves could be uncovered sub-surface, specifically within the western section of the project footprint.

Therefore, generally low impacts on heritage resources are anticipated for both the Alternative 1 and Alternative 2 layouts for the proposed Onderstepoort Solar 2 PV project. However, as the western section of the project footprint lies over a portion of the farm Zwaarverdiend 234JP, which is associated with historical occupation by a group of BaTlokwa, there is a possibility that historic-

archaeological material related to the historic occupation of this farm may be uncovered during site clearance or construction activities. Monitoring of site clearance and construction activities in this specific portion of the project footprint by a qualified and experienced archaeologist is therefore required.

As both the DFFE Environmental Screening Tool and the SAHRIS Palaeontological Sensitivity Map identified the region of the project footprint as being of Moderate Sensitivity for fossils (with a small area of High sensitivity), a separate palaeontological assessment has been undertaken. The assessment will indicate if significant/sensitive fossils will be impacted by the proposed project and provide mitigation measures and the way forward.

No fatal flaws were identified during this study, therefore, it is the considered opinion of the heritage specialist that the construction of the proposed Solar PV project within the footprint can proceed. There are no objections from a heritage perspective provided the recommendations and mitigation measures contained in this report are implemented. From a heritage perspective there is no major difference between the two project layout alternatives (Alternative 1 and Alternative 2) but as Alternative 2 avoids all identified heritage resources that is the preferred alternative.

14 REFERENCES

- Anderson, MS. 2009. *Marothodi: The Historical Archaeology of an African Capital*. Atikkam Media, Woodford. Ebook
- Bergh, J.S. 1999. *Geskiedenisatlas van die Vier Noordelike Provinsies*. Van Schaik, Pretoria.
- Bergh, J.S. 2005. We Must Never Forget Where We Come From: The Bafokeng and Their Land in 19th Century Transvaal. *History in Africa, Vol. 32* (2005), pp. 95 – 115.
- Birkholtz, P; J Kitto & M Naude. 2020. *Phase I Heritage Assessment Of Three Structures Associated With The Central Shaft At Sibanye-Stillwater Rustenburg Platinum Mines, Rustenburg Local Municipality, Bojanala District Municipality, North West Province*
- Coetzee, FP. 2015. *Cultural Heritage Assessment for the Proposed Styldrift Shaft 2 and Associated Infrastructure at Royal Bafokeng Platinum Styldrift Mine Complex, Rustenburg Local Municipality, Bojanala District Municipality, North West Province*.
- Coetzee, FP. 2017. *Phase 1 Investigation of the Proposed 1 ML Reservoir at Bakubung Lodge, Pilanesberg National Park, Bojanala District Municipality, Moses Kotane Local Municipality, North West Province*.
- Deacon, HJ. & J Deacon. 1999. *Human beginnings in South Africa: uncovering the secrets of the Stone Age*. Rowman Altamira.

- Dreyer, C. 2006. *First Phase Archaeological and Cultural Heritage Assessment of the Proposed Development Site at the Farm Wildebeestfontein JQ274, Rustenburg, North West Province.*
- Esterhuysen A and J Smith. 2007. *The Archaeology of Mpumalanga*
- Erasmus, BPJ. 2014. *On Route in South Africa.* Third edition. Jonathan Ball Publishers: Johannesburg
- Fourie, W. 2009. *Isotium (Pty) Ltd (Isotium) – Royalty Fair Resort on Portion 35 of the farm Buffelspoort 343 JQ, District Rustenburg, North West Province.*
- Huffman, TN. 2005. *The Archaeology of the Anglo Platinum Lease Area Rustenburg – A consolidated Report prepared for Anglo Platinum.* Archaeological Resources Management, School of Geology, Archaeology and Environmental Management, University of the Witwatersrand
- Huffman, TN. 2007. *Handbook to the Iron Age: The archaeology of Pre-Colonial Farming Societies in Southern Africa.* University of KwaZulu-Natal Press, Scottsville
- Magoma M. 2016. *Phase 1 Archaeological Impact Assessment Specialist Study Report for the Proposed Rustenburg Strengthening Project within Rustenburg Local Municipality of Bojanala Municipality. North West Province.*
- Oranje, M., Nel, V. & Van Huyssteen, E. 2021. A brief history of platinum mining with a focus on the Rustenburg region. In *Mining and Community in the South African Platinum Belt: A Decade after Marikana.* L. Marais & M. e Campbell, Eds. S.l.: Nova Science Publishers, Inc: Hauppauge, New York, United States. <http://hdl.handle.net/10204/12095> .
- Pistorius, JCC. 1994. Molokwane, a seventeenth century Tswana village. *South African Journal of Ethnology*, 1994, 17(2)
- Pistorius, J. 2000. *An Archaeological Scoping Report Supplemented With a Phase I Archaeological Survey for SA Chrome's Proposed New Ferrochrome Smelter on the Farm Boschhoek 103JQ in the Rustenburg District of the Central Bankeveld in the North West Province.*
- Pistorius J. 2011. *A Phase I Heritage Impact Assessment (HIA) Study for Lonmin Platinum's Proposed Exploration Activities on Vlakfontein 20JPP and Diamand 206JP near The Pilanesberg in the North-West Province.*
- Pretorius, ZL. *Die Geskiedenis Van Rustenburg 1851-1918.* Zacharias Lodewickus Pretorius, B. A. Honns. Voorgele ter vervulling van 'n deel van die vereistes vir die graad M.A.(Geskiedenis) in die Fakulteit van Lettere en Wysbegeerte van die Potchefstroomse Universiteit vir Christelike Hoer Onderwys. Potchefstroom
- Raper, PE. 2004. *Dictionary of Southern African Place Names.* Jonathan Ball Publishers
- Van der Walt, J. 2007. *Wesizwe Heritage Impact Assessment- Proposed platinum mining on portions of the farms Ledig 909JQ, Frischgewaagd 96JQ & Mimosa 81 JQ, North West Province Version 1.0*

Wadley, L. 2013. Recognizing complex cognition through innovative technology in Stone Age and Palaeolithic sites. *Cambridge Archaeological Journal* 23: 163-183.

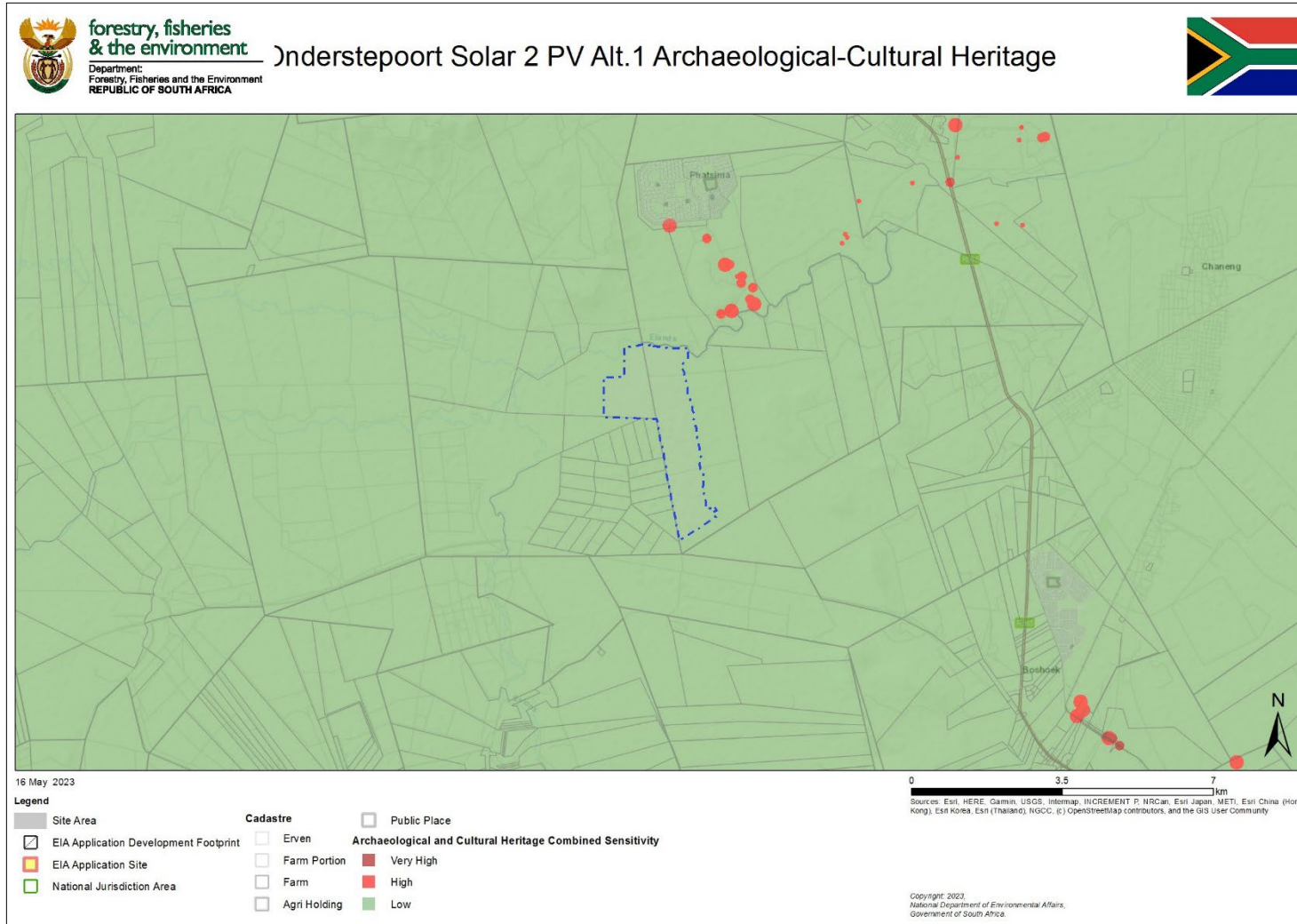
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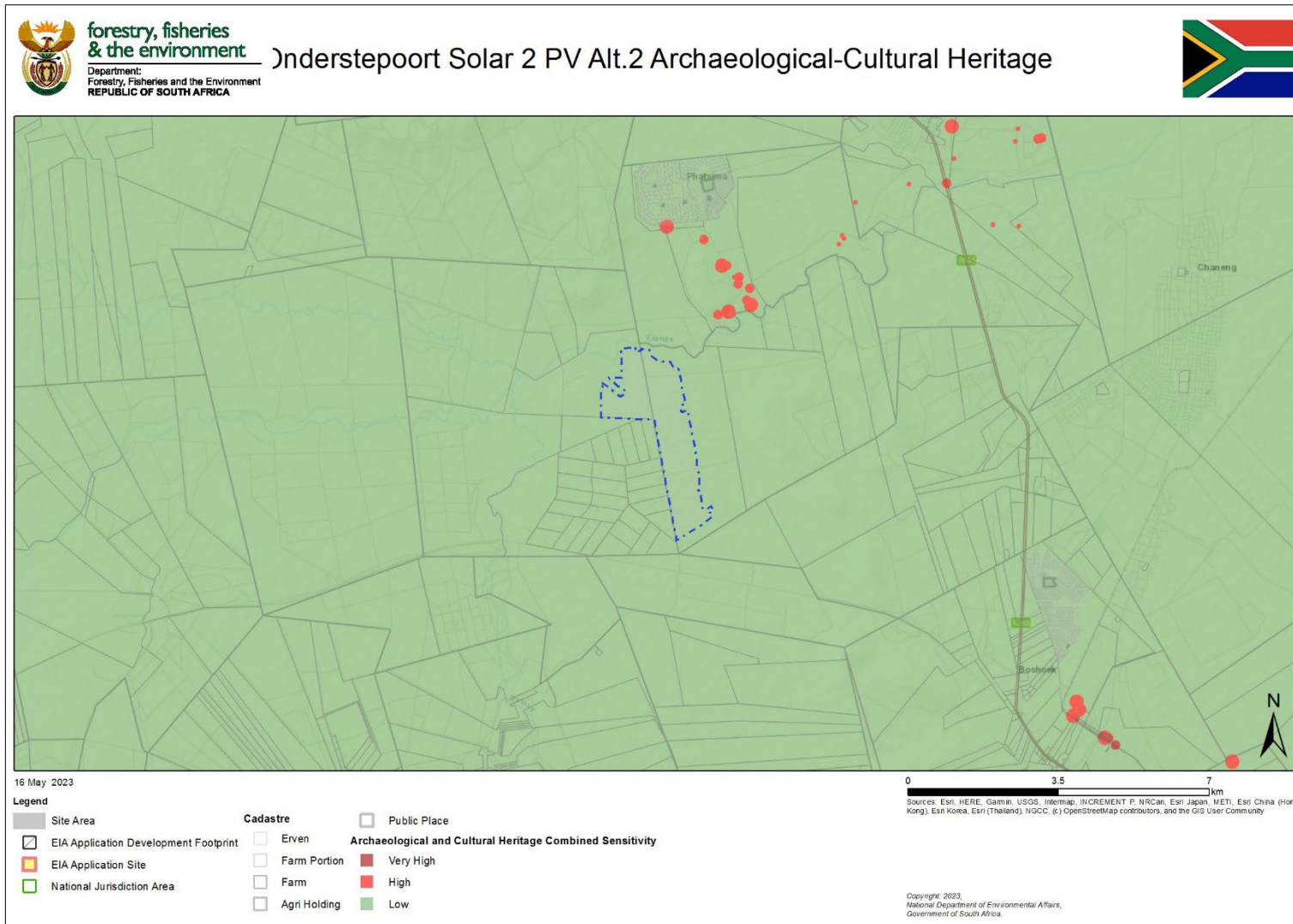
<https://www.battletoursza.com/moedwil> [Moedwil - Battle Tours ZA](#)

[Marikana Massacre 16 August 2012 | South African History Online \(sahistory.org.za\)](#).

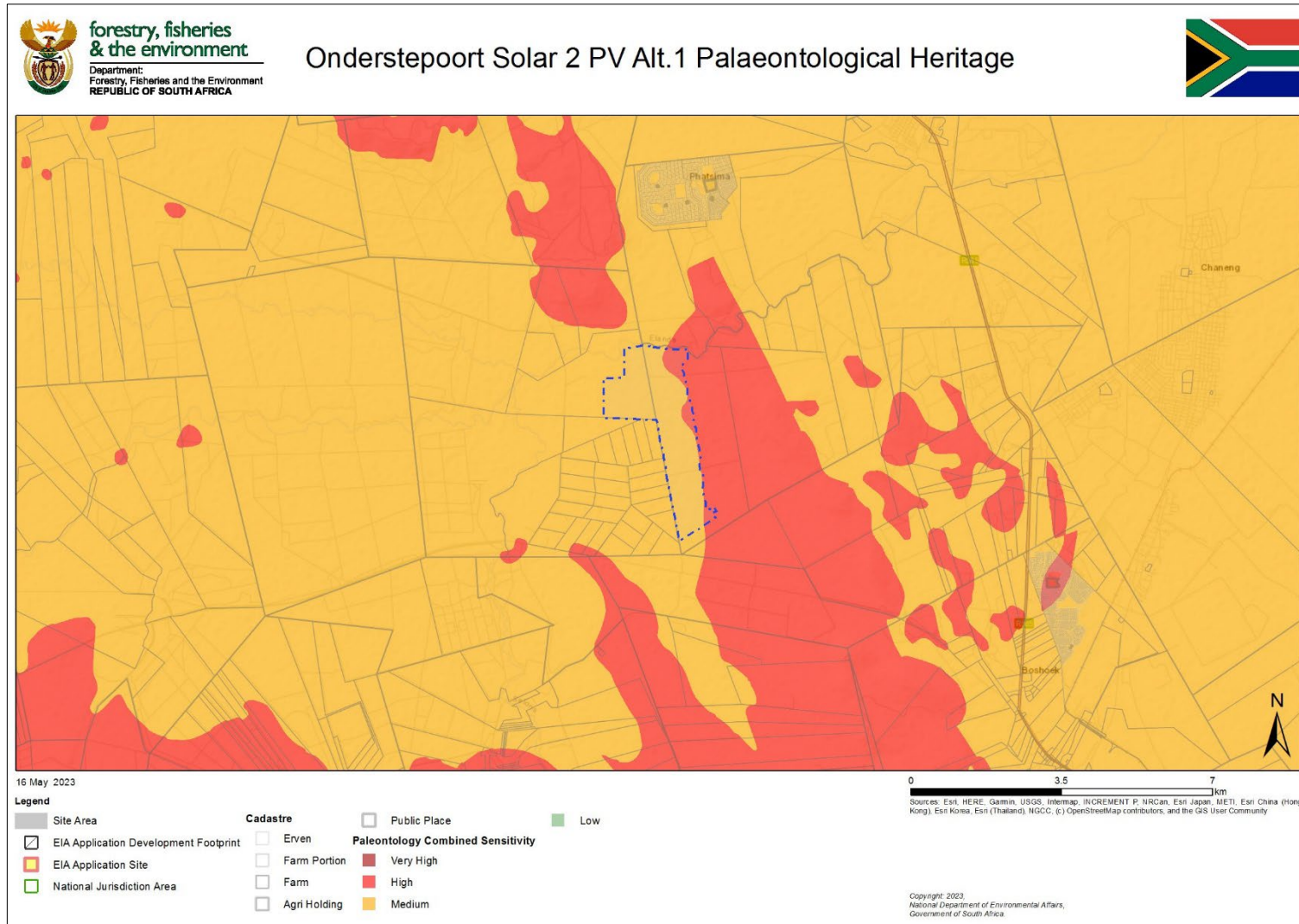
APPENDIX 1: HERITAGE SENSITIVITY MAP/S

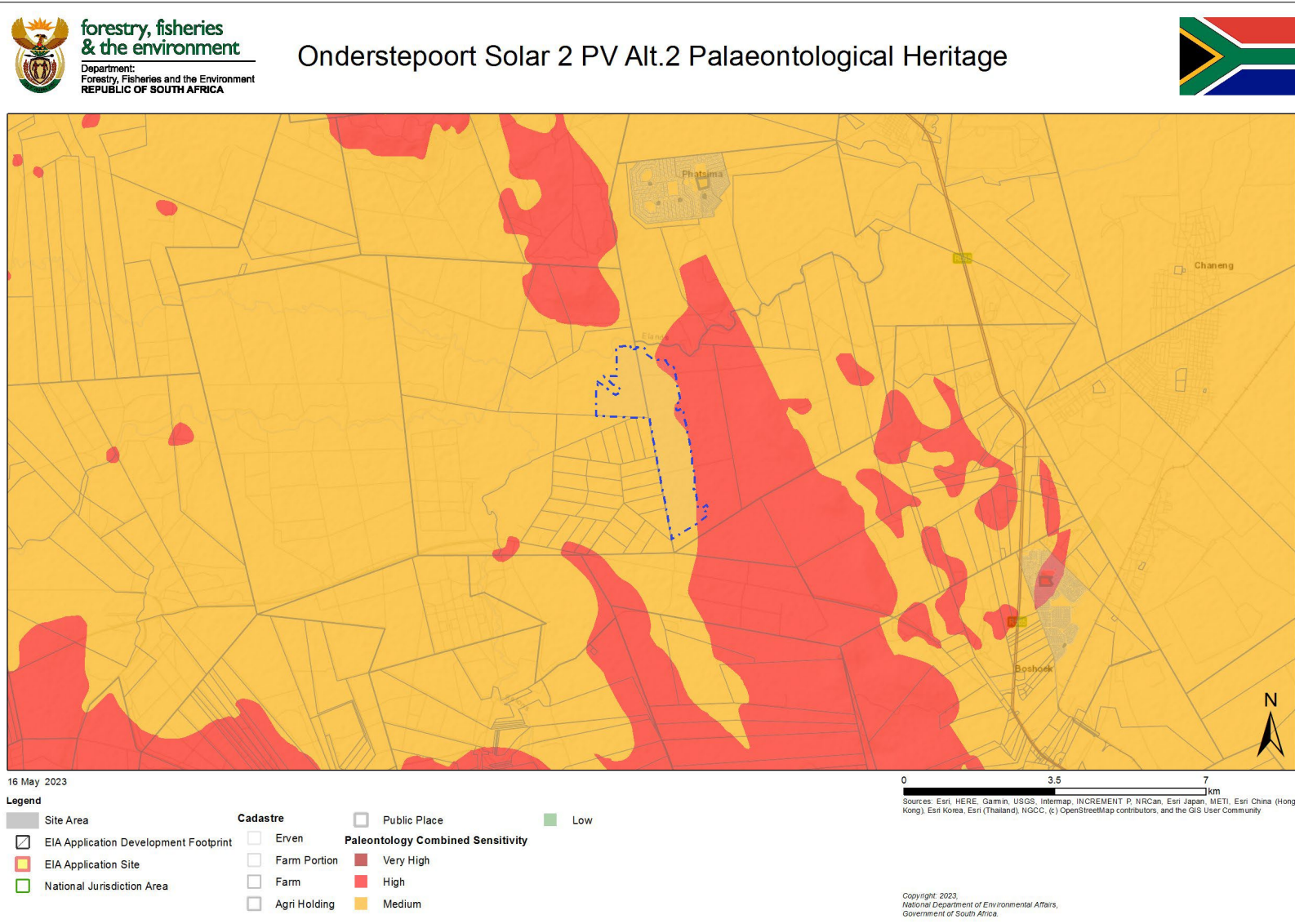
1. Cultural Heritage Sensitivity maps from DFFE screening tool



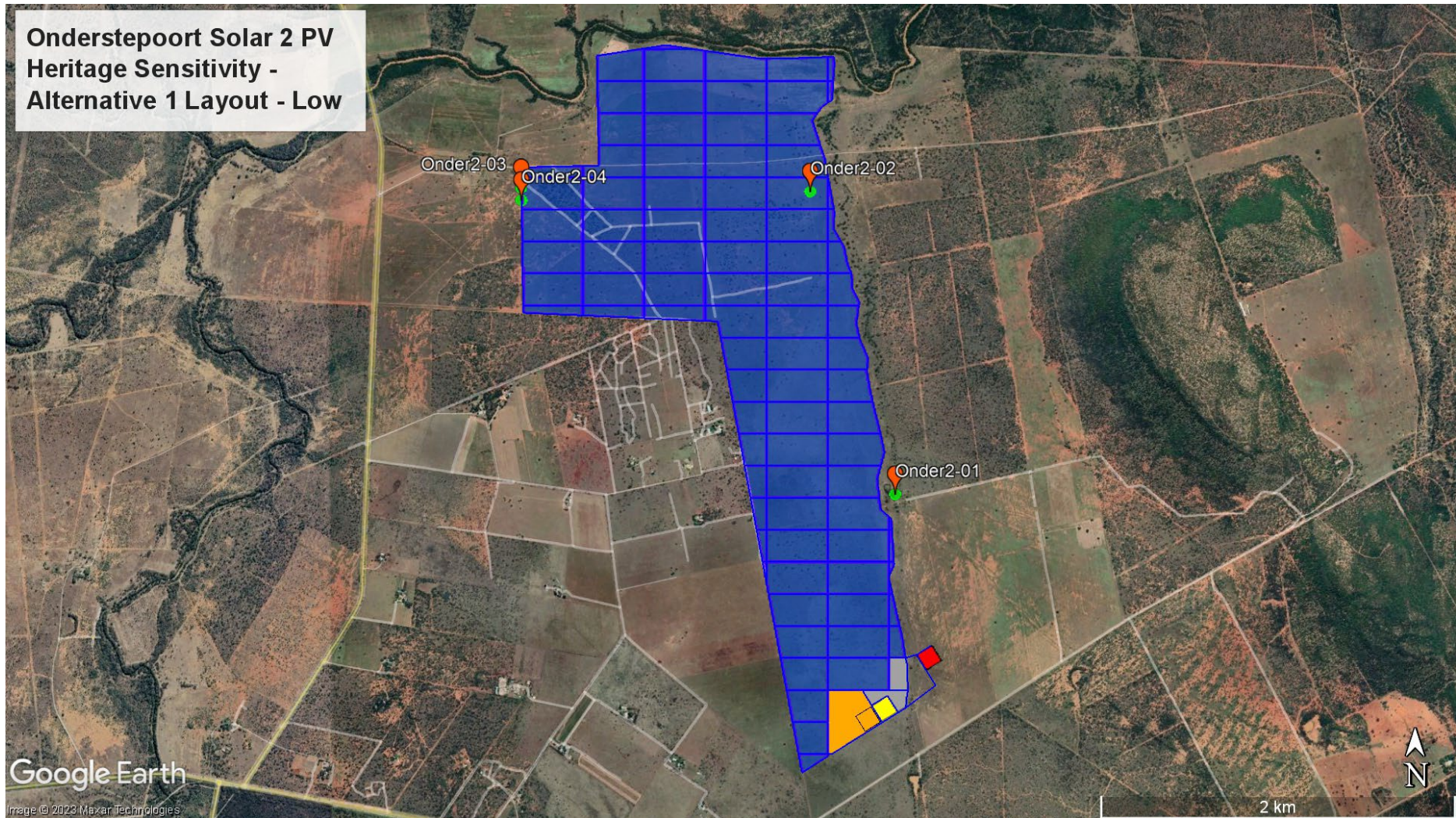


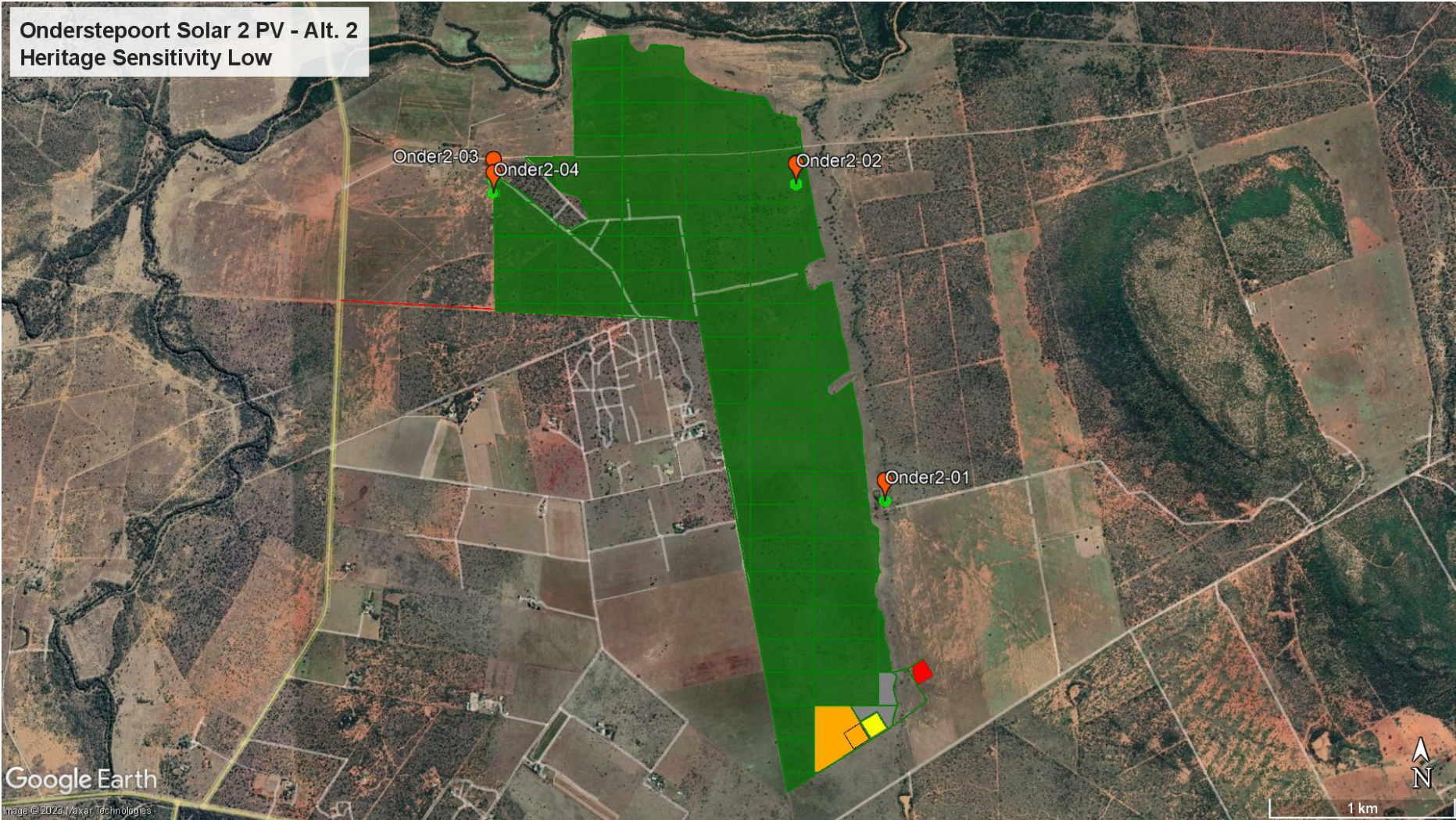
2. Palaeontological Sensitivity maps from DFFE screening tool





3. Heritage Sensitivity Maps based on the Site Inspection / Field survey





APPENDIX 2: CURRICULUM VITAE OF HERITAGE SPECIALIST

1 Personal Particulars

Profession:	Heritage Specialist
Date of Birth:	11 September 1966
Name of Firm:	Nitai Consulting
Name of Staff:	Jennifer Kitto
Nationality:	RSA
Membership of Professional Societies	Association of Southern African Professional Archaeologists (444); International Association for Impact Assessment South Africa (7151)

2 Education:

BA Hons Social Anthropology, WITS, South Africa, 1994

BA. Archaeology and Social Anthropology, WITS, South Africa, 1993

Higher National Diploma, Practical Archaeology, Dorset Institute for Higher Education (now Bournemouth University), UK, 1989

3 Employment Record:

2022 – Present *Heritage Specialist, Nitai Consulting*

Conduct Heritage Impact Assessments;

2012 – 2021 *Heritage Specialist, PGS Heritage (Pty) Ltd*

Conduct Heritage Impact Assessments

Compile Desktop Historical Research

Compile Heritage Audit and Management Plans

Compile and submit permit applications to National and Provincial Heritage Authorities for Section 34 building alterations and demolitions (under National Heritage Resources Act, 25 of 1999)

Compile and submit permit applications to Provincial and Municipal Health Authorities for Section 36 relocations of graves and burial grounds (under National Heritage Resources Act, 25 of 1999 and National Health Act, No 61 of 2003)

2008 – 2011 *Cultural Heritage Officer (National), Burial Grounds and Graves Unit: South African Heritage Resources Agency (SAHRA)*

Review and assessing permit applications for relocation of historical graves and burial grounds.

1998 – 2008 *Cultural Heritage Officer (Provincial), Provincial Office – Gauteng: SAHRA*

Review and comment on heritage and archaeological impact reports

Research for the nomination and grading process for related to the declaration of specific heritage resources as National Heritage Sites

Monitoring of certain archaeological and built environment National Heritage Sites (e.g. The Cradle of Humankind World Heritage Site)

4 Selected Consultancies

4.1 GDID East Corridor, OHS Implementation, Tambo Memorial Regional Hospital (as sub-contractor to PGS Heritage (Pty) Ltd

2022 Independent Heritage Specialist. Compile Historical Archival Report of Tambo Hospital Boksburg, Gauteng for PGS Heritage (Pty) Ltd, Finalise HIA Report and submit HIA report to Gauteng Provincial Heritage Resources Authority

4.2 GDID East Corridor, OHS Implementation, Tembisa Regional Hospital (as sub-contractor to PGS Heritage (Pty) Ltd

2022 Independent Heritage Specialist. Compile Historical Archival Report of Tembisa Hospital, Ekurhuleni, Gauteng for PGS Heritage (Pty) Ltd, Finalise HIA Report and submit HIA report to Gauteng Provincial Heritage Resources Authority.

4.4 Kroonstad South Solar PV Facilities

2022/2023 Heritage Specialist, Development of five Solar PV facilities near Kroonstad, Free State Province, South Africa, Undertake Heritage Impact Assessment of all heritage resources associated with the five solar PV facilities

4.5 Kroonstad Cluster Solar PV Facilities

2022/2023 Heritage Specialist, Development of three Solar PV facilities west of Kroonstad, Free State Province, South Africa, Undertake Heritage Impact Assessment of all heritage resources associated with the three solar PV facilities

4.6 Seelo Solar PV Cluster

2022/2023 Heritage Specialist, Development of three Solar PV facilities near Carletonville, North West Province, South Africa, Undertake Heritage Impact Assessment all heritage resources associated with the three solar PV facilities

4.7 Decommissioning of Komati Power Station

2023, Heritage Specialist, Proposed Decommissioning of the Komati Power Station, Middelburg, Mpumalanga, Undertake Heritage Impact Assessment of all heritage structures within the power station

4.8 Carbon Capture Utilisation & Storage Pilot Project

2023 Heritage Specialist, Proposed pilot project for the capture and storage of CO₂, in Mpumalanga, comprising a 3D seismic survey and test drilling for the purpose of geological characterisation of the project area. Undertake Heritage Impact Assessment all heritage resources associated with the CCUS Pilot Project.

5 Languages:

English - excellent speaking, reading, and writing

Afrikaans –fair speaking, reading and writing