OSLAAGTE SOLAR 3 (PTY) LTD

PROPOSED 480MW OSLAAGTE SOLAR 3 PHOTOVOLTAIC PROJECT, SOUTHEAST OF KROONSTAD, FREE STATE PROVINCE

HERITAGE IMPACT ASSESSMENT

29 MAY 2023

Submitted to : Nemai Consulting

Prepared by:

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NITAI CONSULTING

SPECIALIST ENVIRONMENTAL CONSULTING

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 480MW Oslaagte Solar 3 Photovoltaic Project, Southeast of Kroonstad, Free State 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 for this project*
- *I will perform the work relating to the project in an objective manner, even if this results in views and findings that are not favourable to the applicant*
- *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, including 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 when preparing the application and any report relating to the application;*
- *I have no, and will not engage in, conflicting interests in the undertaking of the activity;*
- *I undertake to disclose to the applicant 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 application 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 applicant 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 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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PRINCIPAL HERITAGE PRACTITIONER – Jennifer Kitto

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SIGNATURE - _____

ACKNOWLEDGEMENT OF RECEIPT

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Executive Summary

Oslaagte Solar 3 (Pty) Ltd (the "Applicant") has proposed the development of the 480MW Oslaagte Solar 3 Photovoltaic (PV) Project near Kroonstad, in the Free State Province (the "Project"). The electricity generated by the Project will be transferred via 33kV or 132kV cabling or powerline between the facility substation and the proposed132 kV powerlines, Eskom collector switching station/Main Transmission Substation (MTS). The Applicant also proposed proposes the development of the 400/132kV Main Transmission Substation (MTS) and 400 kV LILO Powerlines between the new MTS and existing Eskom 400kV Powerlines. The Project is located approximately 20km to the south east of Kroonstad central business district (CBD) and falls within Ward 1 of the Moqhaka Local Municipality, in the Free State Province. The R76 runs along the eastern boundary of the site

Nemai Consulting has been appointed as the independent Environmental Assessment Practitioner (EAP) to conduct the Environmental Authorisation (EA) process for the Proposed Oslaagte Solar 3 PV Project. Nitai Consulting has been appointed by Nemai Consulting to conduct the specialist studies, one of which is the Heritage Impact Assessment (HIA).

.Methodology/ Significance Assessment

The Site Survey fieldwork provided confirmation of the existence of heritage resources occurring adjacent to the Oslaagte Solar 3 PV and MTS/LILO Corridor footprints.

The survey of the Oslaagte Solar 3 PV footprint identified six heritage resources within or adjacent to the general footprint. Four are located within and two outside or adjacent to the PV project footprint (Alternative 1). These include: a historical farmhouse with an outbuilding and a stone kraal (Os3-01), a railway culvert (Os3-04) and a disused road culvert (Os3-05), two areas with demolished structure remains (Os3-02 and Os3-06) and a possible grave (at Os3-02). One site could be the remains of a farm dam wall (Os3-03). The Alternative 2 layout avoids the heritage rsources.

The survey of the MTS/LILO Corridor footprint identified a total of six heritage resources within or adjacent to the footprint. Two of these sites are located just outside the project footprint: the remains of a homestead which may contain potential graves (LILO-03) and two informal graveyards located adjacent to each other (LILO-06A and LILO 6B). The remaining four sites are located within the Corridor footprint (Alternative 1 and Alternative 2) and include two potential graves (LILO-01, LILO-02) and two sites with historical structure remains (LILO-04 and LILO-05).

Identification of Activities, Aspect and Impacts

The project area that will be impacted by the proposed Oslaagte Solar 3 PV and MTS/LILO Corridor footprints contains some areas that are currently disturbed by farming (cattle and game) activities.

The impact significance of the project on graves and cemeteries is Medium (before mitigation) and Low (after mitigation) as three potential graves were identified within the combined Oslaagte Solar 3

PV (Alternative 1 and Alternative 2) and MTS/LILO Corridor footprints. The only clear grave sites are situated outside the LILO corridor footprint. Implementation of the mitigation measures required (set out in Table 10, below) will retain the impact as low.

The impact significance of the proposed project on protected historical structures is Medium (before mitigation) and Low (after mitigation) as three extant historical structure sites were identified within the Oslaagte Solar 3 PV footprint (Alternative 1). Two sites containing historical structure remains were identified within the Solar PV footprint (Alternative 1) and two sites containing historical structure remains were identified within the MTS/LILO Corridor footprint (Alternative 1 and Alternative 2).

Mitigation Measures

The proposed Oslaagte Solar 3 PV and MTS/LILO Corridor projects could impact on twelve heritage resources identified within and adjacent to the combined project footprints. The recommendations below are provided to mitigate the potential impact of the proposed project on the identified heritage resources:

Historical Structures

- The sites with extant historical structures (Site Os3-01, Os3-04, Os3-05) must be avoided and a buffer of at least 30m must be implemented;
- The materials demarcating the 30m buffer must be highly visible and made of durable material to ensure that they are still in place during the operation of the PV site so that work crews are aware of the sites.
- If any impact on the historical structures is anticipated, then a permit will be required for the alteration or destruction of any of the structures (from FS PHRA);
- If a permit is required, as above, then a photographic record of the structures should be undertaken by an architectural historian;
- The sites with remains of Historical structures (Os3-02, Os3-06, LILO-04, LILO-05) are protected by section 34 of the NHRA and will require a permit from FSPHRA before any historical-archaeological materials or remains can be destroyed;

Informal Graveyard / Potential Graves

- A buffer of at least 30m must be placed around the informal graves at LILO-06 to ensure that during construction, the graves are not damaged
- The materials demarcating the 30m buffer must be highly visible and made of durable material to ensure that they are still in place during the operation of the PV site so that maintenance crews are aware of the sites.
- If, for any reason, the identified graveyard (or potential graves) cannot be avoided, then a Phase 2 mitigation process can be considered. During this process, the family and relevant communities will have to be engaged with to obtain their permission and discuss to where the remains are to be moved. In addition, application will have to be made to SAHRA for the necessary permits.

- Sub-sections (4) and (5) of section 36 of the NHRA regarding the removal of graves must be adhered to. The exhumation and removal of graves is strongly discouraged as graves are highly significant to many people and there are many traditional, cultural and personal sensitivities concerning the removal of graves.

Palaeontology

- A separate palaeontological study is being undertaken by a professional palaeontologist. The assessment will indicate if significant/sensitive fossils would be impacted by the proposed project and provide mitigation measures.

No fatal flaws were identified during this study, therefore, it is the considered opinion of the heritage specialist that the construction of the proposed Oslaagte Solar 3 PV project and MTS/LILO Corridor within the project footprints can proceed. There are no objections from a heritage perspective provided the recommendations and mitigation measures contained in this report and in the palaeontological assessment are implemented where necessary. It should be noted that the original layout for the Oslaagte Solar 3 PV footprint (Alternative 1) has been revised to exclude certain environmentally and heritage sensitive areas (Alternative 2). The Alternative 2 layout avoids the identified heritage resources that would be impacted by the Alternative 1 layout. Therefore, from a heritage perspective, Alternative 2 is the preferred layout. However, some of these heritage resources still could be subject to indirect impact, specifically during site clearance or construction activities, therefore the mitigation measures set out above and below will still apply.

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List of Abbreviations

APHP	Association of Professional Heritage Practitioners
ASAPA	Association of Southern African Professional Archaeologists
BESS	Battery Energy Storage System
CRM	Cultural Resources Management
DALRRD	Department of Agriculture, Land Reform & Rural Development
DFFE	Department of Forestry, Fisheries and Environment
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EAP	Environmental Assessment Practitioner
EIA	Early Iron Age
EMPr	Environmental Management Programme
ESA	Early Stone Age
GIS	Geographic Information System
ha	Hectare
HIA	Heritage Impact Assessment
IAP	Interested and Affected Party
IAIAsa	International Association for Impact Assessment South Africa
km	Kilometre (1 000m)
LIA	Late Iron Age
kV	Kilo Volt
LSA	Later Stone Age
MSA	Middle Stone Age
MTS	Main Transmission Station
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)
NHS	National Heritage Site
PHRA	Provincial Heritage Resources Authority
PV	Photo Voltaic
FSHRA	Free State Heritage Resources Authority
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAHRA	South African Heritage Resources Agency

1 INTRODUCTION

Nemai Consulting CC (Nemai) was appointed by Oslaagte Solar 3 (Pty) Ltd (the "Applicant") to conduct the Environmental Impact Assessment (EIA) for the proposed Solar PV Project (up to 480MW) south east of Kroonstad, in the Free State Province (the "Project"), including 400/132 kV Main Transmission Substation (MTS) and 400kV Loop in Loop out (LILO) Powerlines between the new MTS and existing Eskom 400kV Powerlines.

Oslaagte Solar 3 (Pty) Ltd (the "Applicant") has proposed the development of the 480MW Oslaagte Solar 3 Photovoltaic (PV) Project near Kroonstad, in the Free State Province (the "Project"). The electricity generated by the Project will be transferred via 33kV or 132kV cabling or powerline between the facility substation and the proposed Eskom collector switching station/Main Transmission Substation (MTS) he applicant has also proposed the development of the 400/132kV Main Transmission Substation (MTS) and 400kV Loop in Loop Out (LILO) Powerlines between the new MTS and existing Eskom 400kV Powerlines, south east of Kroonstad, Free State Province (the "Project").

The Oslaagte Solar 3 PV-project will be located on the Farm Oslaagte 2564, approximately 20 km southeast of Kroonstad. The project footprint covers a combined area of approximately 810 hectare (ha) including the 132 kV powerlines, 3.35km in length, from the facility substation to a new 132/400 kV Main Transmission Substation (MTS). The proposed 400/132 kV MTS and the 400 kV LILO Powerlines between the new MTS and existing Eskom 400kV Powerlines are located on various properties.

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 5000m^2
- 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 (IAIAsa) – Member No. 7151

1.2 Project Description

Oslaagte Solar 3 (Pty) Ltd (the "Applicant") has proposed the development of the up to 480MW Oslaagte Solar 3 Photovoltaic (PV) Project near Kroonstad, in the Free State Province (the "Project"). The electricity generated by the Project will be transferred via 132 kV powerlines from the facility substation to a new 132/400 kV Main Transmission Substation (MTS). The applicant has also proposed the development of the 400/132kV Main Transmission Substation (MTS) and 400kV Loop in Loop Out (LILO) Powerlines between the new MTS and existing Eskom 400kV Powerlines.

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 5000m^2 and the proposed powerline is km long, 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 repots (Regulations 19, 21 and 23) as well as requirements for Specialist Reports (Appendix 6).

2.2 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 often restricted by heavily eroded farm roads, localised flooding due to the rainy (summer) season and extremely dense vegetation (acacia thicket) 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 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, graves or burial sites.

4 PROJECT DESCRIPTION

4.1 Location

The Oslaagte Solar 3 PV Project is located approximately 20km to the south east of Kroonstad's central business district (CBD) and falls within Ward 1 of the Moqhaka Local Municipality (MLM), within the Fezile Dabi District Municipality in the Free State Province. The R76 runs along the eastern boundary of the site. The project footprint is located on the Farm Oslaagte 2564 and covers a combined area of approximately 810 hectare (ha). The electricity generated by the Project will be transferred via 33kV or 132kV cabling or powerline between the facility substation and the proposed Eskom collector switching station/Main Transmission Substation (MTS) The associated 400kV Powerlines are located immediately south of the Oslaagte Solar 3 PV project footprint on certain portions of the Farms Oslaagte 2564, Mooidraai 953, Wolvekop 314, Klein Geluk 2088, Fraaiuitzicht 576, Zonderweg 1699.

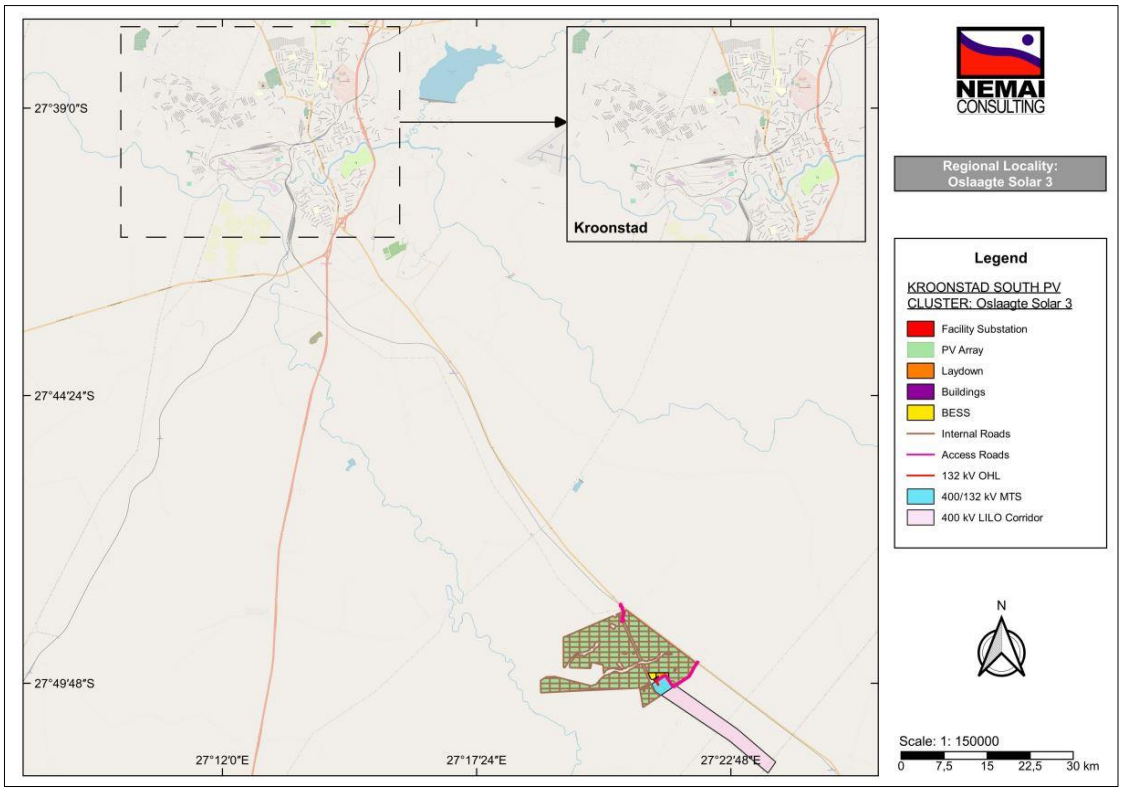

Figure 1: Oslaagte Solar 3 PV Project Locality south of Kroonstad (Nemai 2023)

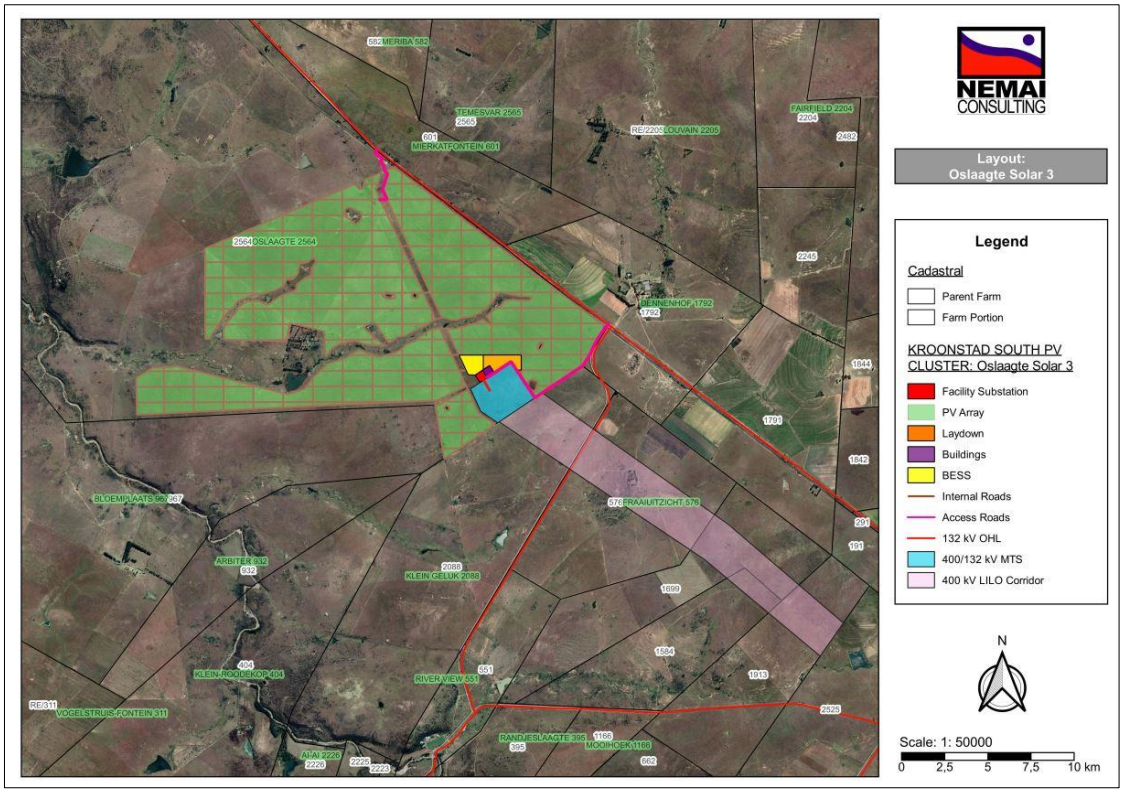

Figure 2: Oslaagte Solar 3 PV Project Layout – Alternative 1 (Nemai 2023)

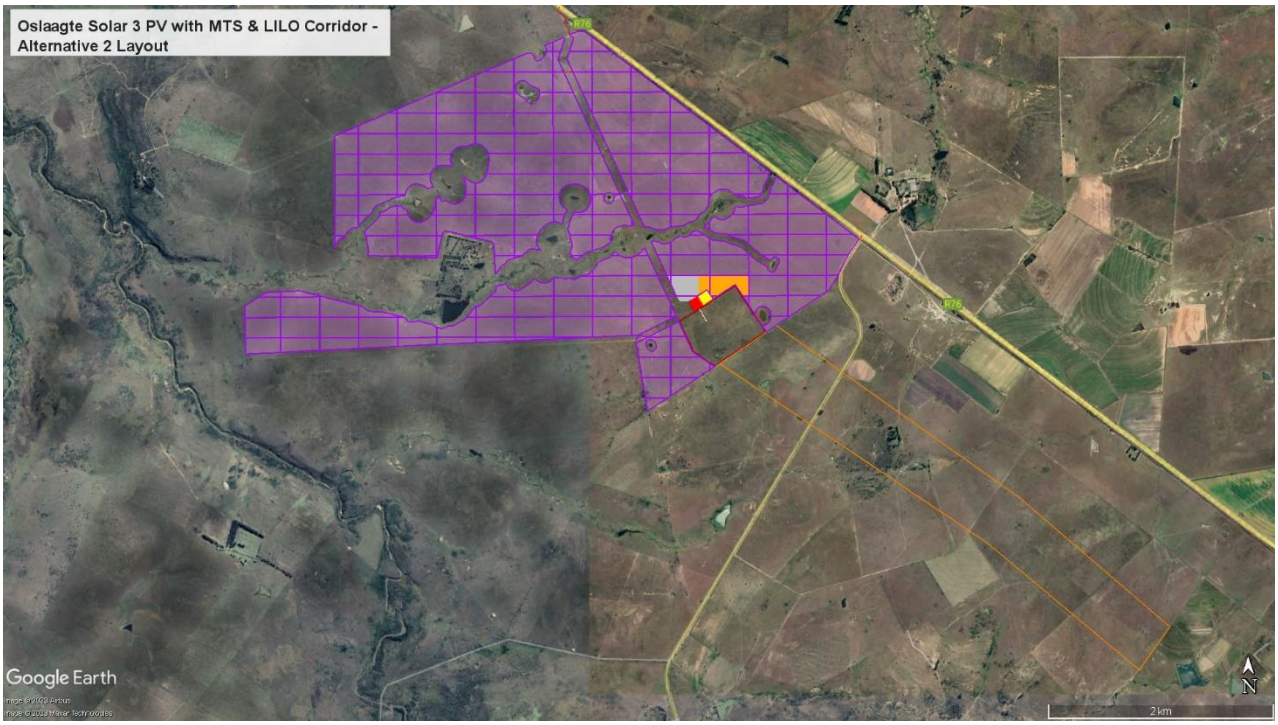

Figure 3: Oslaagte Solar 3 PV Project Layout – Alternative 2

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.

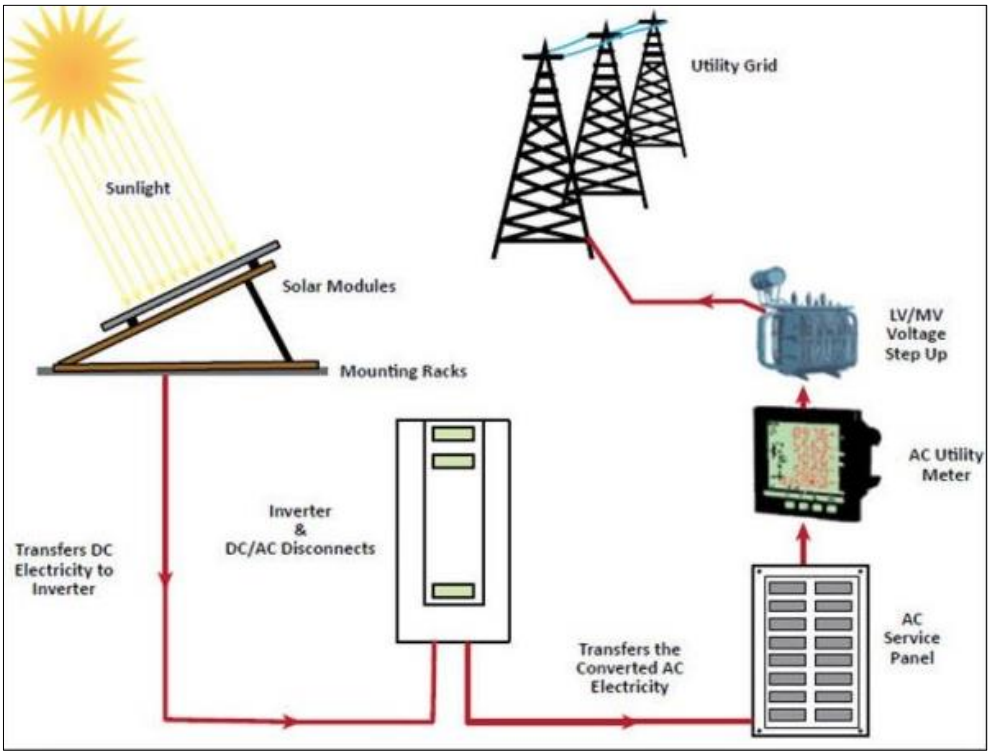

Figure 4: Overview of Solar PV Power Plant (International Finance Corporation, 2015. Utility-Scale Solar Photovoltaic Power Plan.)

4.2.3 Overview of Technical Details: Oslaagte 3 Solar PV Project

The technical details of the proposed Solar 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 m	Up to 5.5 m
2.	Area of PV Array	Up to approximately 445.5 ha	Monofacial or Bifacial PV panels, mounted on either fixed-tilt, single-axis tracking, and/or double-axis tracking systems. Area: Up to 760 ha
3.	Area occupied by inverter / transformer stations / substations	Up to 1 ha	It is estimated that the maximum size of the facility substation will not exceed 2 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 ± 5ha	Area: up to ± 5 ha
6.	Area occupied by both permanent and construction laydown areas	Temporary: Up to 7ha Permanent: Up to 1 ha (located within the area demarcated for temporary construction laydown)	Temporary construction laydown area up to 10 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.	Height of fencing	Up to 3.5m	Up to 3.5m
11.	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 Solar PV 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.
- Proximity to Grid
- 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 via the R76, which runs along the eastern 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 5ha.

- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.
- Facility grid connection infrastructure, including:
  - 33kV cabling between the project components and the facility substation
  - A 132kV facility substation
  - 33kV or 132kV cabling or powerline between the facility substation and the proposed Main Transmission Substation or the Kroonstad Switching Station.
  - 400kV LILO powerlines between the Eskom Collector Switching Station/Main Transmission Substation (MTS) and the existing Eskom 400 kV powerlines
- Temporary construction laydown area up to 5 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 via the R76.

4.2.6 Overview of Technical Details of the Main Transmission Substation and 400kV Powerlines

The technical details of the proposed Project are captured in **Table 2** below.

Table 2: Technical details of the proposed project

Component	Description / Dimensions
New MTS	Maximum 600meters (m) x 600m i.e 36ha
400kV Powerlines	400kV within a 500m corridor

4.2.7 400kV Powerlines

A power line typically consists of pylons, which are tower-like structures that support electrical cables above the ground. The distance between each pylon is dependent on the type of terrain the lines cross. The standard width of a servitude for a 400kV Transmission line is 55m (27.5m on either side of the power line). There are several types of towers/pylons. The types of pylons chosen for the project depend on several factors, these include:

- Terrain;
- Expense; and
- Recommendations from the visual specialist.

In order for maintenance staff to access the lines and undertake routine maintenance or repair faults, it may be necessary to construct access roads. To protect the surrounding landscape from soil erosion stormwater infrastructure may be required. Very few new access roads may be required during installation of some sections of the towers and powerline; however, Eskom have advised that these access roads do not exceed any thresholds in terms of the EIA Regulations. Below are several examples of 400kV power line types, which might be used (**Figure 5**, Error! Reference source not found., **Figure 7**: and **Figure 8**:).

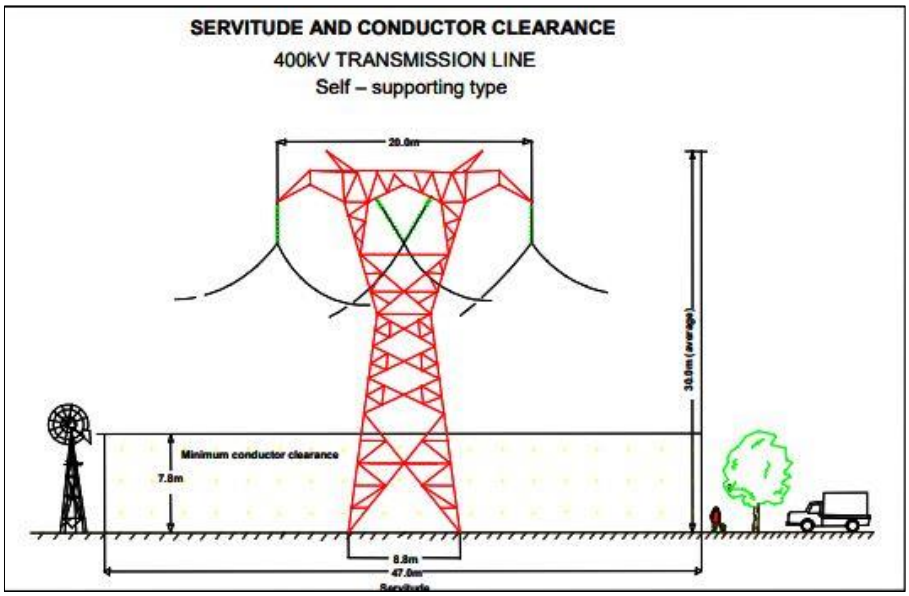

Figure 5: Servitude and Conductor Clearance for a 400kV Transmission Line, Self – Supporting Type Tower/Pylon

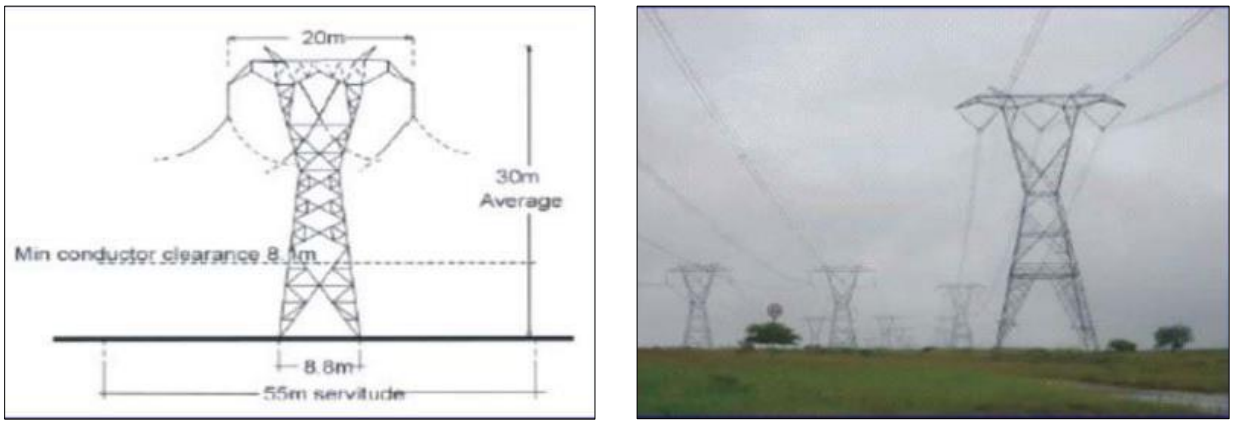

Figure 6: Strain Tower Lines

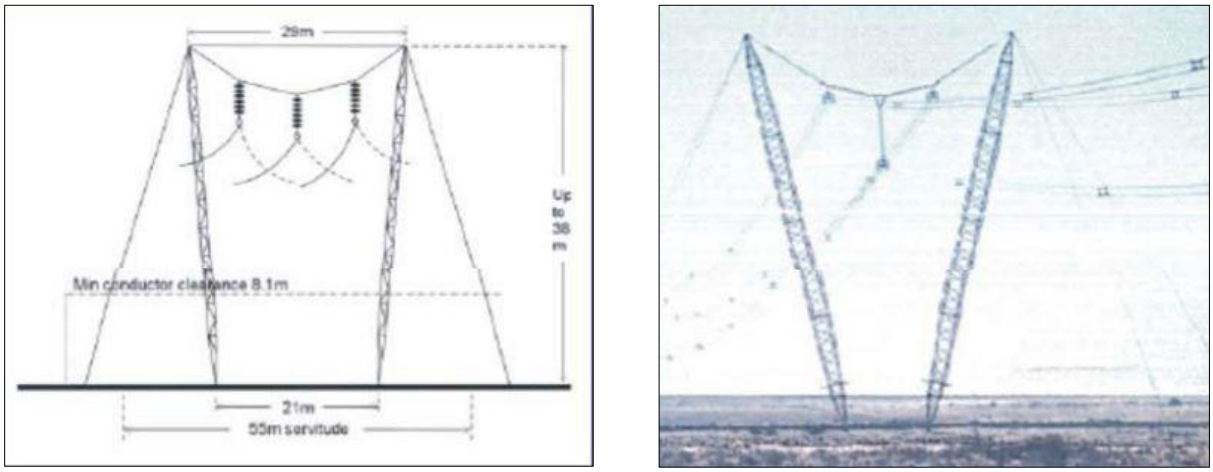

Figure 7: Cross Rope Suspension Lines

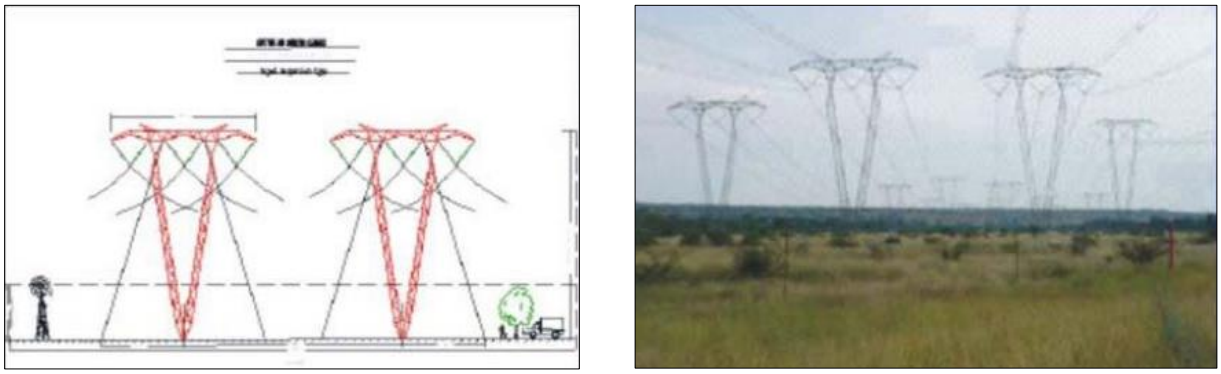

Figure 8: 400kV guyed V-Tower Structures

5 STATUS QUO ANALYSIS

5.1 General Existing Condition of Receiving Environment

The Oslaagte Solar 3 PV project footprint is situated on the southern portion of the farm Oslaagte 2564 A railway line runs along the eastern boundary of the site, adjacent to the R76 road. The general area is covered with a combination of acacia thickets and grassland which varies from shorter to long dense grass. Several farm dams occur and there are several outcrops of sandstone. There are also many termite mounds occurring on the property. The topography varies from relatively flat to gently undulating. The project area is currently used for cattle grazing. The property is currently used for cattle grazing with some game (gemsbok and springbok) present as well. **Figure 9** to **Figure 14** provide views of the general terrain and vegetation cover.

The MTS and LILO lines corridor footprint is located immediately south of the Oslaagte Solar 3 PV footprint and situated over certain portions of the following farms: Oslaagte 2564, Mooidraai 953, Wolvekop 314, Klein Geluk 2088, Fraaiuitzicht 576, Zonderweg 1699. The general area is covered with a combination of acacia thickets and meadow grassland which varies from shorter to long and dense. Several farm dams occur and there are outcrops of sandstone present. There are also several wetland areas and streams running through the project footprint (**Figure 15** to **Figure 22**).

Figure 9: View of the north-east section of the Oslaagte Solar 3 PV Project area, showing varying grass coverage

Figure 10: View of the north-west section of the Oslaagte Solar 3 PV project footprint, showing long dense grass coverage with scattered acacia shrubs

Figure 11: View of stand of eucalyptus trees on the central west boundary of Oslaagte Solar 3 PV footprint

Figure 12: View of part of the southern section of the Oslaagte Solar 3 PV footprint, showing an area with shorter grass coverage

Figure 13: Another view of the southern section of the Oslaagte Solar 3 PV footprint

Figure 14: View of the south-west section of Oslaagte Solar 3, looking North from the southern boundary

Figure 15: View of grassland vegetation interspersed with occasional stands of acacia, over the northern section of the LILO Corridor

Figure 16: View of the northern section of the LILO Corridor footprint, looking into the MTS area

Figure 17: View of wetland situated on the southern portion of the northern section of the LILO Corridor footprint

Figure 18: View of dense vegetation and acacia thickets in the northern area of the southern section of the LILO Corridor footprint

Figure 19: View of grassland area around an existing powerline servitude on the southern section of the LILO Corridor footprint

Figure 20: View of vlei/wetland with areas of very long dense grass, situated in the central area of the southern section of the LILO Corridor footprint

Figure 21: View of a stream that crosses the central area of the southern section of the LILO Corridor footprint

Figure 22: View towards the existing powerline servitude in the southernmost section of the LILO Corridor, showing the mainly grassland vegetation in this 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 (**Figure 23**); however, the Palaeontological Sensitivity of the underlying geology of the solar PV project and LILO Corridor footprints is indicated as Very High (**Figure 24**).

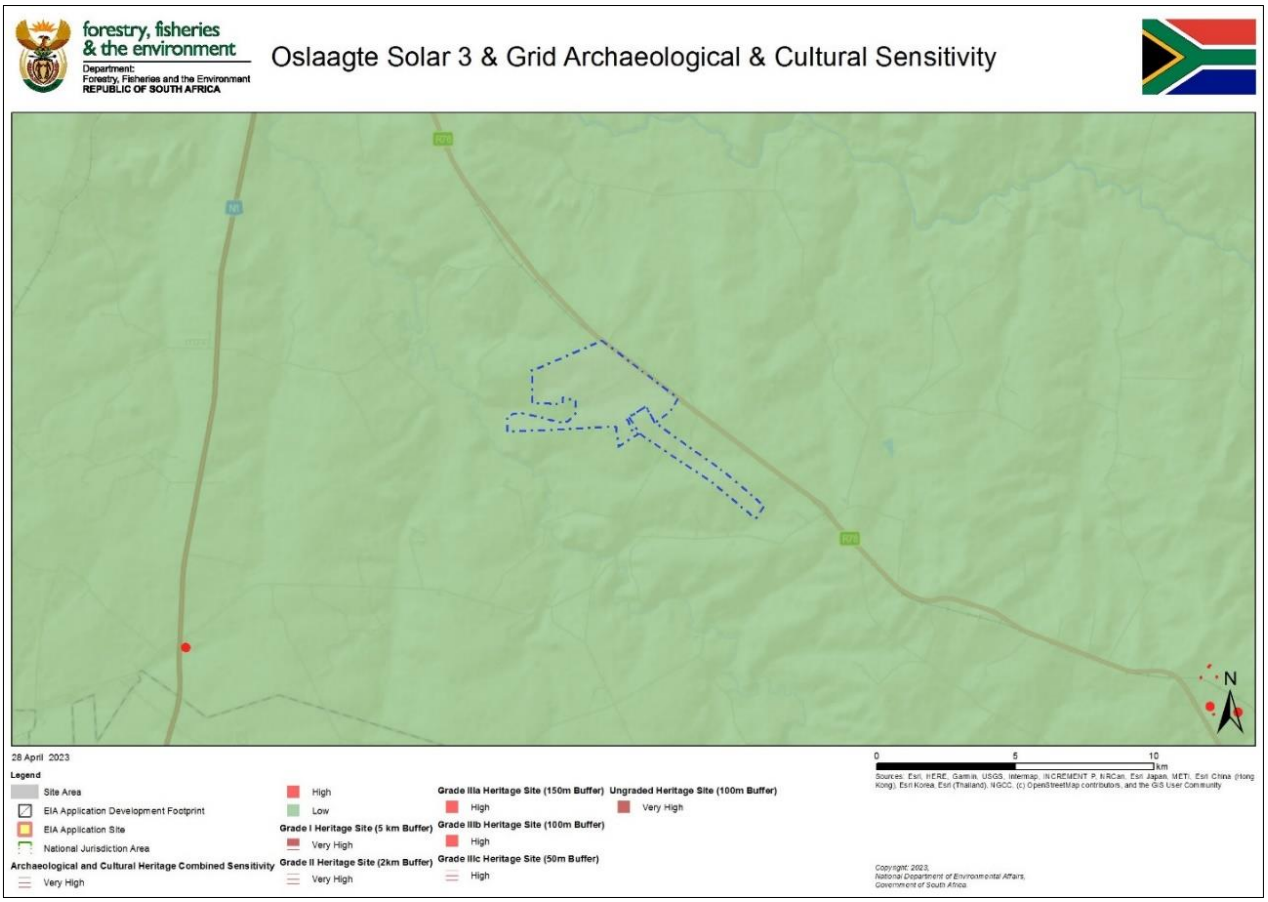

Figure 23: Archaeological Cultural Sensitivity Map indicating that the project footprint is located within a region of low heritage sensitivity (DFFE Screening Tool)

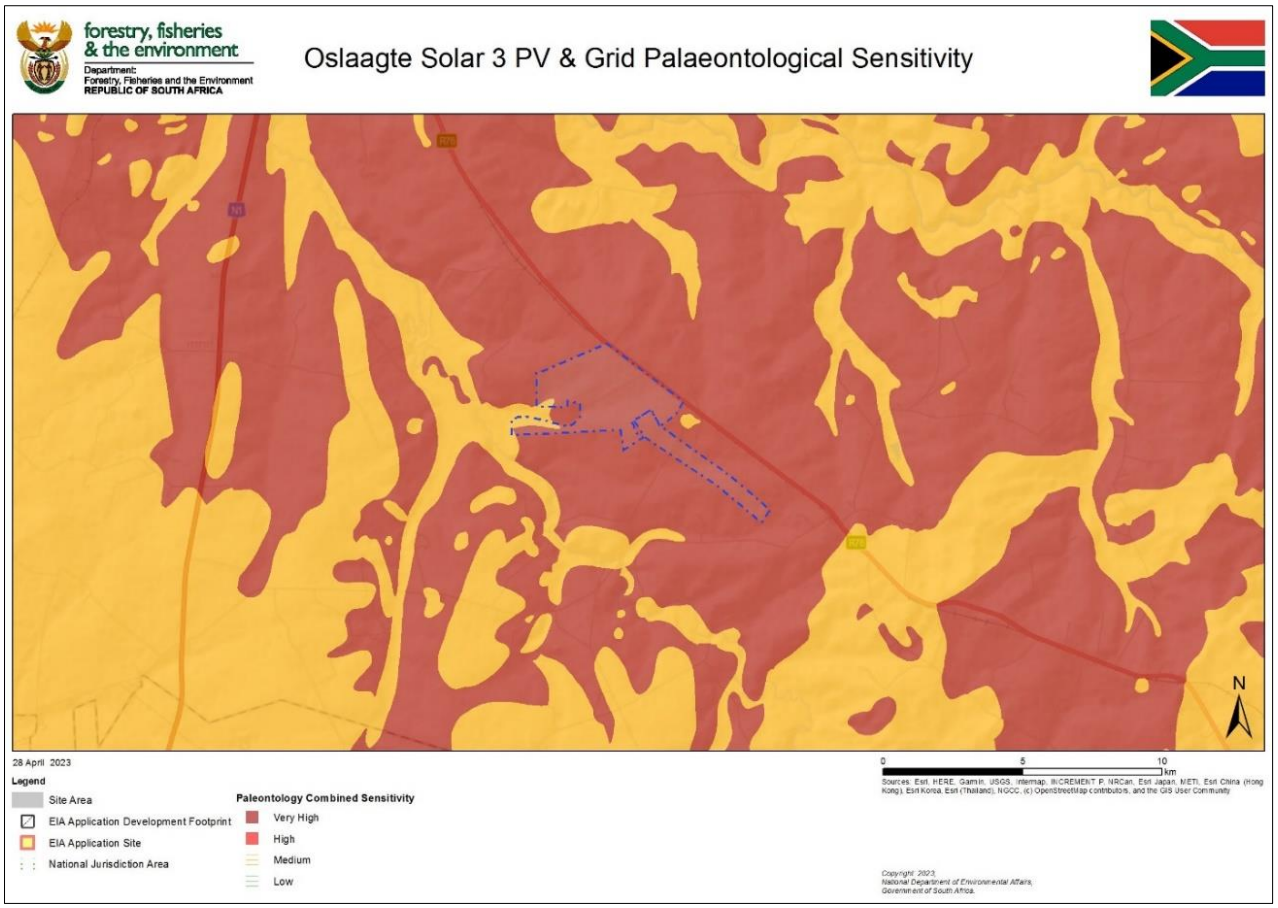

Figure 24: Palaeontological Sensitivity Map indicating that the project footprint is located within a region of Very High sensitivity

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

The Free State is rich in archaeological and historical resources and includes significant aspects such as Later Stone Age rock art, Battlefields and Iron Age stonewalled enclosures. The general region of the project area was a frontier region where San hunter-gatherers, Nguni and Sotho-Tswana agro-pastoralists, Dutch Voortrekkers and British Colonists all interacted.

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

The Stone Age

The Earlier Stone Age (ESA) is the first and oldest phase identified in South Africa's archaeological history and the material culture of the earliest people comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian which is comprised of more refined stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates to approximately 1.5 million years ago. No ESA sites are known from the study area and surrounding region (Fourie 2021; Angel and Kitto 2018).

The Middle Stone Age (MSA) material culture is associated with flakes, points and blades manufactured by means of the prepared core technique. This phase is furthermore associated with modern humans and complex cognition (Wadley, 2013). Not many sites are known in the immediate area of the project footprint, however, research fieldwork by the National Museum in Bloemfontein, recorded ten sites where MSA and/or Later Stone Age lithics were identified in association with mammal fossil remains from erosion channels along the Sand, Vet and Doring Rivers (De Ruiter *et. al*. 2011; Fourie 2021; Angel and Kitto 2018).

The Later Stone Age (LSA) is the third archaeological phase and is characterised by very small stone tools known as microliths. This period is associated with hunter-gatherers (San) as well as early pastoralists (Khoekhoe) and lasted until the arrival of Iron Age and European communities (and in some areas, for a considerable period). Apart from the occurrence of LSA stone tools along the Sand, Vet and Doring Rivers (see above), no other LSA sites are known from the surroundings of the study area.

The Later Stone Age 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). The closest rock art site in the general area is Spitskop. Spitskop is located 12 km west of Verkeerdevlei on the link road to the N1 in the Brandfort District. The Spitskop site consists of three San or 'Bushman', as well as Khoe or 'Khoi' rock-engraving sites located on adjacent farms which are all relatively close to a sandstone mountain known as Spitskop. There are images of eland, geometric forms, human figures, and ostrich (Ouzman, S. 2001); http://www.nasmus.co.za/departments/rock-art/public-rock-art-sites).

The Iron Age

The Iron Age in South Africa (c.AD 1600 – c.AD 1840) is associated with pre-colonial farming communities and includes both agricultural and pastoralist farming activities, metal working and stone-walled settlements known as the 'Central Cattle Pattern' (Huffman, 2007), as well as cultural customs such as lobola. According to the distribution map for Iron Age settlements on the Southern Highveld as published in Maggs (1976:38-39), the project area is located within the western boundary of the known distribution of such Late Iron Age sites. The distribution maps as published by Huffman (2007) also indicate that the project area is located very close to the periphery of two Iron Age ceramic typological sub-groups known as facies. These two Iron Age facies are known as Thabeng and Makgwareng.

The Thabeng facies of the Moloko Branch of the Urewe Tradition is one of the facies identified within the study area. The decoration on the ceramics associated with this facies is characterised by incised triangles, coloured chevrons and arcades. The Tlhaping at Dithakong, Rolong at Platberg and the Kubung from the Free State form a Southwestern Sotho-Tswana cluster that is associated with this Thabeng facies pottery and so-called 'Type Z' settlement layouts (Huffman, 2007). The Type Z settlements are one of the Late Iron Age stonewalled settlement types identified initially by Tim Maggs during his extensive archaeological research project on the Iron Age of the southern Highveld (Maggs, 1976), which includes the present project area. These Type Z sites are characterised by large primary enclosures surrounded by characteristic dwellings, the layout of which comprises two sections or lobes, one being larger than the other. Each of these 'bilobial' dwellings comprises a hut at its front with a semi-circular courtyard at the back. While a number of Type Z sites are located within the general region of the project area, one of the more well-

known ones is OXF1, situated a short distance north-west of the town of Ventersburg. Ventersburg is located approx.45km south of Kroonstad. This site was excavated by Tim Maggs during the 1970s as part of his overall research project (Maggs, 1976).

The next known Iron Age period within the surroundings of the study area is represented by the Makgwareng facies of the Blackburn Branch of the Urewe Ceramic Tradition (Huffman 2007). The decoration on the ceramics from this sub-group is characterised by finely stamped triangles, rim notching and appliqué (Huffman, 2007). This sub-group developed from Ntsuanatsatsi south of the Vaal River and can be associated with the so-called 'Type V' stone walling settlement type (Huffman, 2007). Dreyer (1990) also conducted excavations on Type V Late Iron Age stonewalled settlements located a short distance south-west of Winburg, which is approx. 100km south of Kroonstad. The Type V settlements comprise a core of cattle enclosures surrounded by beehive huts. Corbelled stone huts are associated with this walling type. They are low stone huts located at the edge of the cattle enclosures (Huffman 2007).

The best known site of this type found within the surroundings of the study area, is a site known as "Early Sotho Settlement, Waterval, Sandrivierhoogte" that was originally declared a National Monument and which is now registered as a Provincial Heritage Site in terms of the National Heritage Resources Act (No 25 of 1999). The site is located roughly 42km south-east of the present study area. The original declaration as a national monument was on 17 December 1982. In the declaration, the site is described as a "Leghoya Village" comprising corbelled huts and stonewalls (Govt. Gazette No. 8481, 1982).

Historical/Colonial Period

From roughly the 1820s, there was a period characterised by conflict across the Southern Highveld. This resulted from the migration of three Nguni groups from the current Kwazulu-Natal province into the present-day Free State province which was a result of the expansion of the Zulu kingdom under King Shaka. The three Nguni groups were the Hlubi of Mpangazitha, the Ngwane of Matiwane and the Khumalo Ndebele (Matabele) of Mzilikazi. The migrations of all three groups would have had a definite impact on the northern Free State (Fourie 2021).

During the early Colonial Period (early 1800s) the study area and surroundings became known as Transorangia. The people called the Griqua had moved into the area in the years prior to 1804. Then a few white Trekboers started moving across the Orange River from the Cape Colony in search of better grazing for their livestock during times of drought. At first the farmers requested permission from the Cape authorities before crossing the river. However, later groups moved into the Transorangia region without permission (Fourie 2021, citing Schoeman, 1980). During the 1830s, this occasional movement developed into a mass migration of Afrikaner families from the Cape Colony to the interior. This mass migration became known as the 'Great Trek' and the families were known as Voortrekkers (Fourie 2021, citing Visagie, 2011). The first Voortrekker party of some 70 wagons crossed over the Orange River during early 1836. More groups followed and established themselves along the Vet River (Fourie 2018, citing Schoeman, 1980).

In 1841 the town of Winburg was established on the banks of the Vet River. It was laid out on the farm Waaifontein in 1841 and became a municipality in 1872. Raper (2014) notes that the name, originally spelt Wenburg, which means 'town of winning'. He considered that this original spelling may refer to a military victory over the Matabele at Mosega on 17 January 1837, or to the triumph of those residents of the town who were in favour of Waaifontein as the site of the town (Raper 2014). After the annexation of Natal by the British in 1843 and the subsequent dissolution of the Voortrekker Republic of Natalia, Winburg became the capital of the Voortrekkers in what is today known as the Free State (Erasmus, 2014). Winburg is located nearly 83km south-west of the project area.

In 1846, Major H.D. Warden was appointed British Resident of the area between the Orange and the Vaal rivers, to maintain peace between the various population groups. In 1848, General Harry Smith annexed the area between the Orange and Vaal rivers as British territory and named it the Orange River Sovereignty. However, due to ongoing conflict between the Boers, the Griqua people and the Basotho people, the British government subsequently withdrew from the Orange River Sovereignty in 1854 and the area became an Afrikaner republic, the Orange Free State, with JP Hoffman as first Afrikaner State President and Bloemfontein as the state capital (Afrikaans community 1820-1899 | South African History Online (sahistory.org.za)).

On 16 January 1852, the Sand River Convention was signed between the British Government and the Transvaal Boers. This convention formally recognised the existence and independence of a Boer Republic north of the Vaal River by the British Government, namely the Zuid-Afrikaansche Republiek (South African Republic). The site where the signing of the convention took place, was declared a monument and for many years was marked by a stone cairn and plaque (Fourie 2021, citing Oberholster, 1972). The site is located near the bridge where the N1 highway passes over the Sand River and is located approximately 53.36 km south- west of the present project area.

The Town of Kroonstad was laid out on the farm Klipplaatsdrift in 1855. It is generally accepted to have been named after Kroondrift, a ford on the Vals/Valsch River, so called because a horse named Kroon broke its leg there (Raper 2014).

After the end of the Anglo-Transvaal War (also referred to the First South African War) which ended the two-year British annexation of the Zuid-Afrikaansche Republiek (ZAR), the Pretoria Convention of 1881 redefined the western boundary of the ZAR which was moved from the Makwassie Spruit to roughly the Harts River. In 1884, the western boundary of the Z.A.R. was again moved further west following the recommendations of the London Convention (Bergh, 1999).

The railway line between Bloemfontein and Johannesburg was built during the early 1890s, and eventually reached Johannesburg during September 1891 and Pretoria in January 1892 (Fourie 2021, citing Schoeman, 1980).

The Second South African War (1899 – 1902) was fought between the Boer Republics of the Transvaal and Free State against Great Britain but the victims and participants of the war were not excluded to British or Boer citizens alone.

During this war, a concentration camp was located at Kroonstad, somewhere in the vicinity of the Valsch Rivier. This was at first divided into two sections, with people from the Lindley district on the south side of the river and those from other districts on the north side. However, flooding of the river cut off the Lindley people completely and made it impossible to provide them with rations, so the Lindley people were transferred to the main section south of the river. The camp at Kroonstad seems to have been formed between September and November 1900. Quite a few farms had been burnt by 1900, resulting in a substantial influx of homeless families into the town. A camp for black people was also established but information on the location and other details is lacking (British Concentration Camps of the South African War 1900-1902 (uct.ac.za).

At the beginning of the First World War (1914-1918) when the South African Government of General Louis Botha notified Great Britain of their willingness to support that country against Germany several former Boer Generals, such as Christiaan de Wet, JCG Kemp and General Christiaan Frederik Beyers led an armed rebellion. An incident which occurred close to Kroonstad was an attempt by De Wet with about 1500 or more men to capture the railway station at Virginia, roughly 55km southwest of Kroonstad, which was held by about 250 government troops. The troops held off the rebels until government reinforcements and a train arrived (The-Boer-Rebellion-in-South-Africa-pdf.pdf (moltenofamily.net). Several casualties of the Rebellion are buried in the old Kroonstad Cemetery (SJ de Klerk 2021, Battlefields Route – Koppies to Kroonstad | The Heritage Portal).

In 1975, Winnie Mandela was incarcerated at the Kroonstad Prison. In February 1975, our founding President, the late Nelson Mandela, wrote her a letter where he was encouraging her not to let Prison break her down (www.sahistoryonline).

In 2014 the Kroonstad Correctional Centre was officially renamed to the 'Bizzah Makhate Correctional Centre". This name pays tribute to the late Comrade; Wilfred Sefularo 'Bizzah' Makhate who was incarcerated at this facility in the eighties (https://www.gov.za/kroonstad-correctional-centre-officially-renamed-bizzah-makhate-correctional-centre).

Reverend Zaccheus Richard "ZR" Mahabane, lived and worked in Kroonstad for most of his long career, and is buried in Seeisoville Cemetery in Maokeng, although he was born in Thaba Nchu. Rev. Mahabane was one of the Founding Fathers of the ANC, and was elected ANC President in 1924. He constantly strove for black unity and together with Mr A Abdurahman established the non-European Unity Movement (NEUM) between 1927 and 1934. In 1935 he served as an executive committee member of the All Africa Convention (AAC), a federal body that gave expression to the aspirations of black people and fought against the Native trust and Land Act promulgated in 1936. He was elected as ANC President for the second time from 1936 – 1940. He also played a prominent role in the development of the Methodist Church in South Africa and helped draft the church's constitution and define the equal status of all in the church (Verwey 1995, SA History Online). His grave in Seeisoville Cemetery was recently declared as a National Heritage Site (Govt Gazette Notice No.380 2019).

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 1960, 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 1960 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 Oslaagte Solar 3 PV and LILO Corridor footprints: 2727CD Wonderhoek Edition 1 1960. The map was surveyed in 1960 and drawn in 1962 by the Trigonometrical Survey Office of the Republic of South Africa from aerial photographs taken in 1951.

Figure 25 and **Figure 26,** below, both show an enlarged view of the 1960 edition map which depicts two heritage features within the Oslaagte Solar 3 PV footprint – Alternative 1 and Alternative 2 layout (both are homesteads) and one historical farmstead just on/outside the western central boundary.

Figure 27, below, shows a second enlarged view of the 1960 edition map which depicts two heritage features within the MTS and LILO Corridor footprint. One shows structures of a historical farmstead and the other shows homesteads. There are also two homestead clusters located outside the LILO Corridor footprint.

Therefore, a total of six heritage features are depicted on the 1960 edition of the topographic map, four which are located within the combined footprints for the Oslaagte Solar 3 PV project and the LILO Connection corridor and three are located outside the respective footprints.

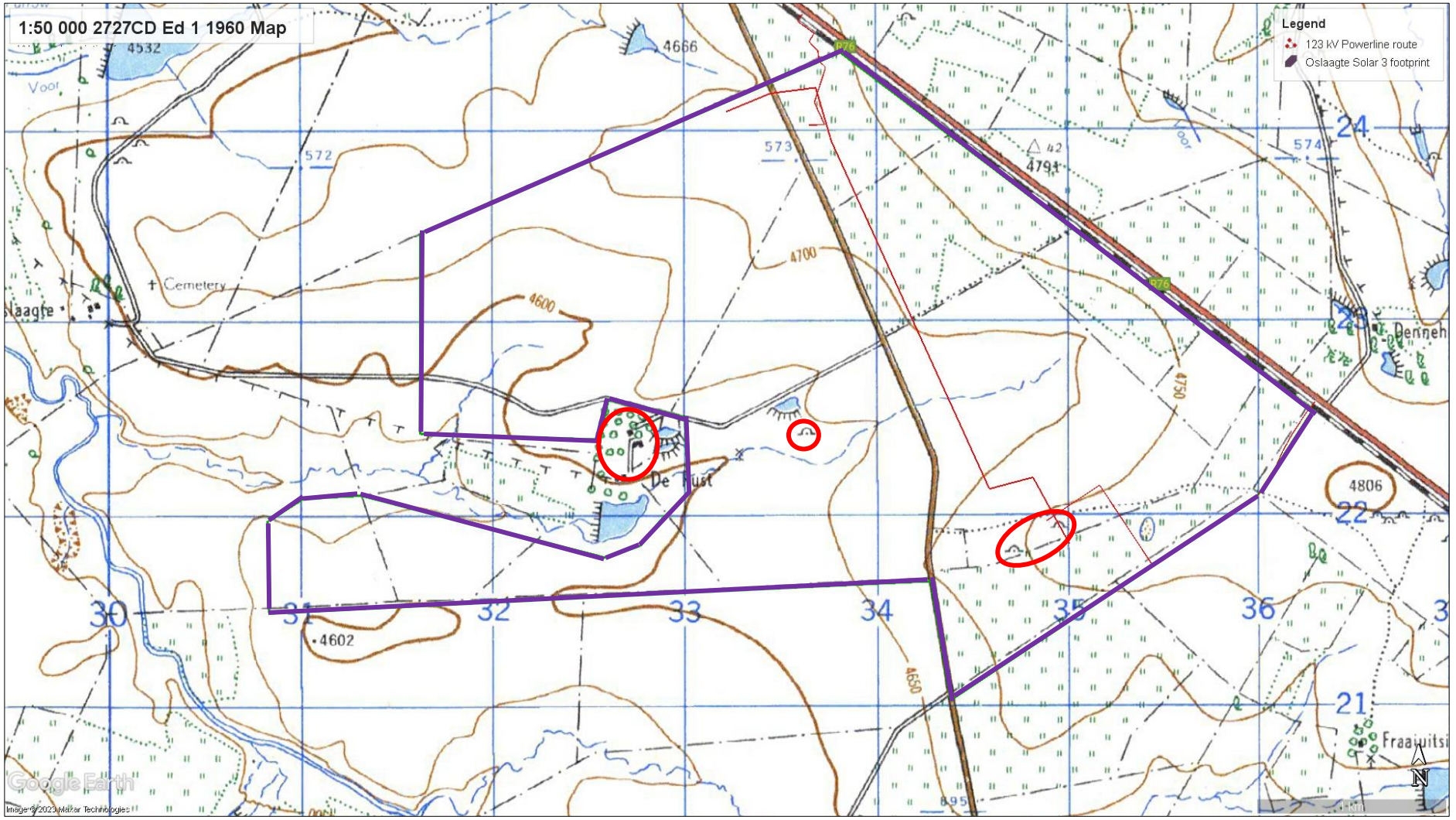

Figure 25: Enlarged view of topographic map 2727CD Ed 1 1960, depicting two heritage features within the Oslaagte Solar 3 PV footprint – Alternative 1 layout. One single homestead and a group of two homesteads are depicted in the southern section of the footprint area. A historical farmstead is depicted just outside the western central boundary of the project footprint (red polygons).

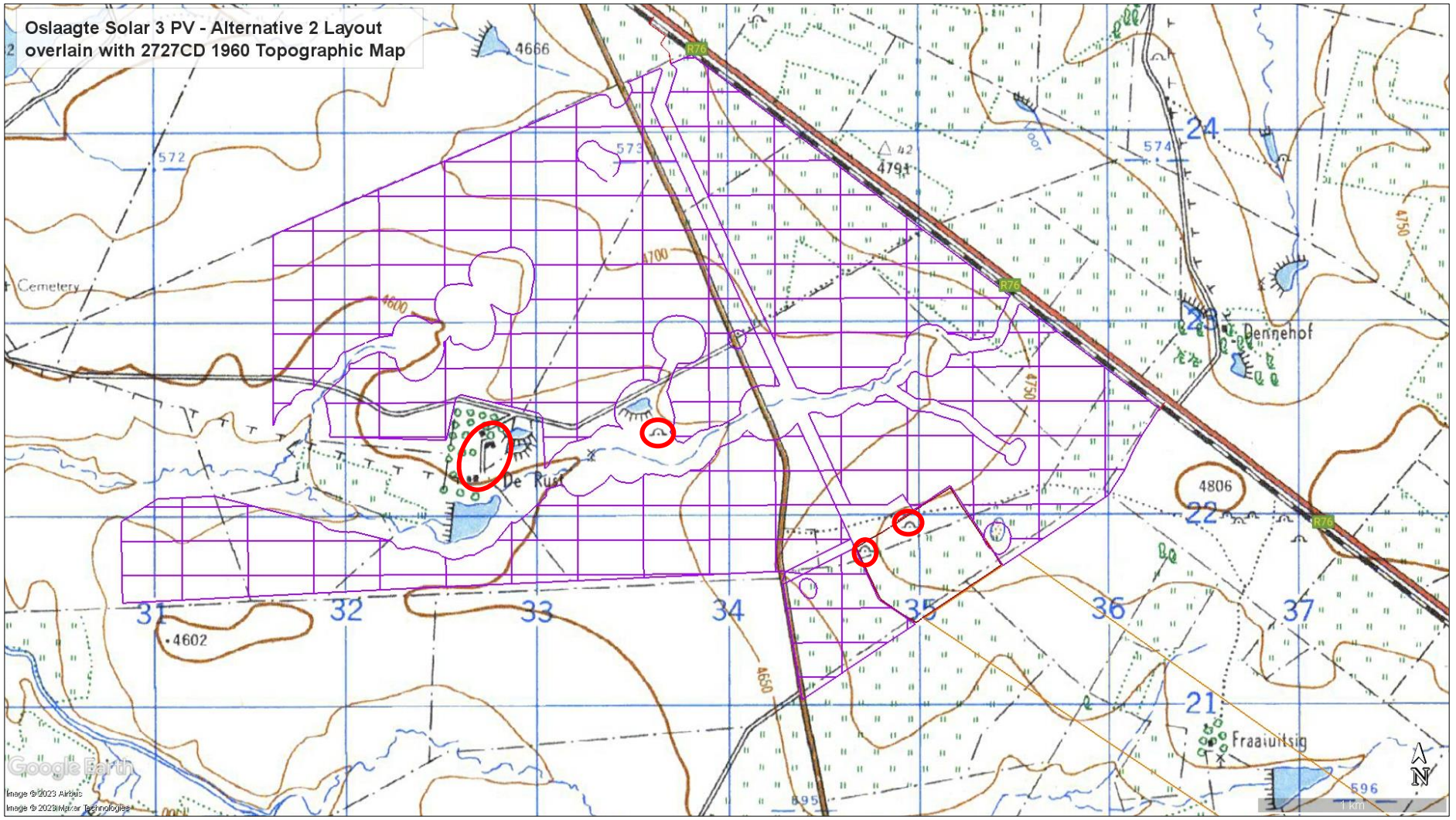

Figure 26: Enlarged view of topographic map 2727CD Ed 1 1960, depicting two heritage features adjacent to the Oslaagte Solar 3 PV footprint – Alternative 2 layout red polygons); A historical farmstead is depicted just outside the western central boundary of the project footprint and a single homestead is depicted close to a farm dam. Two single homesteads are depicted in the MTS footprint area (red polygons).

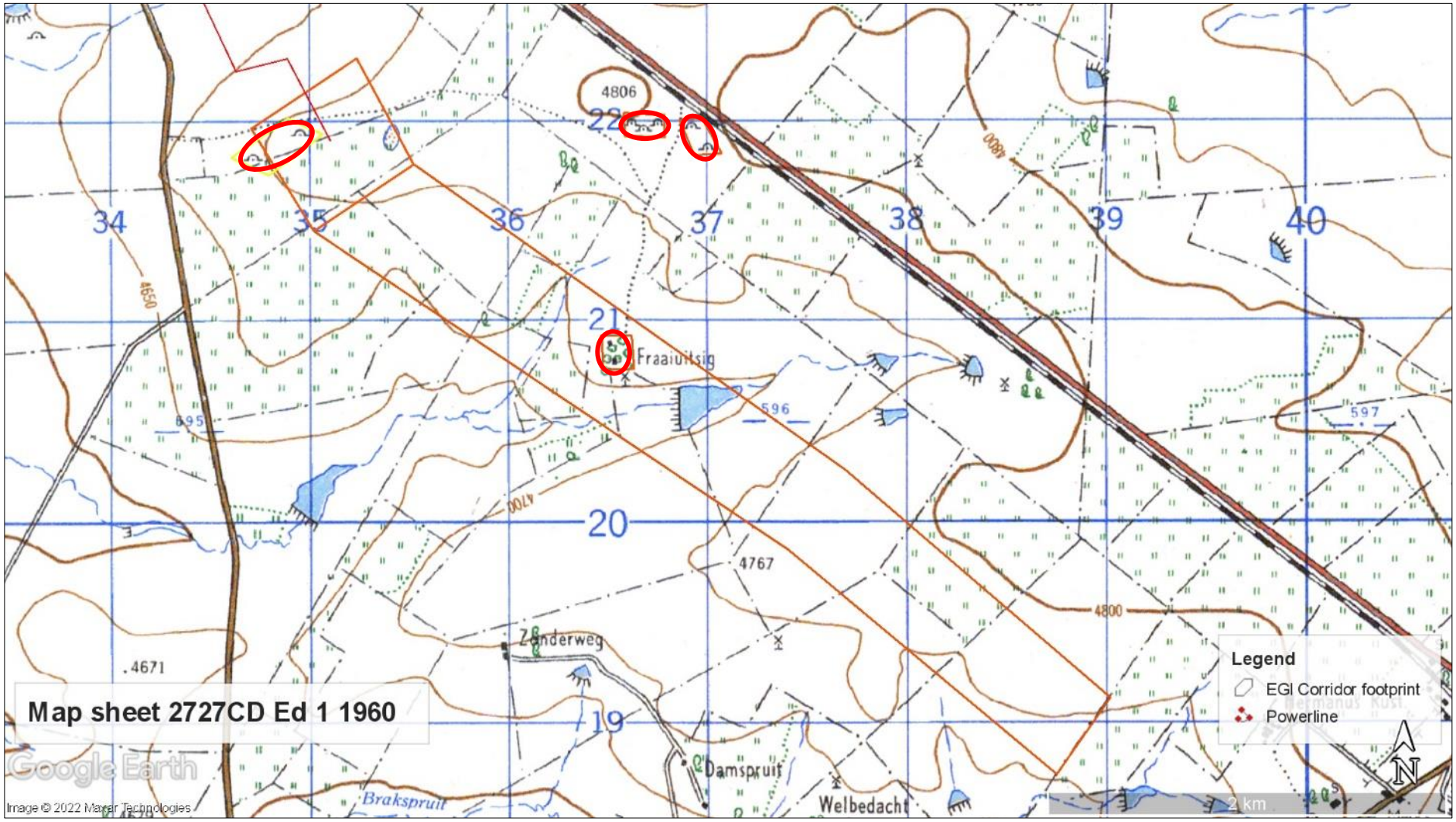

Figure 27: Enlarged view of topographic map 2727CD Ed 1 1960, depicting two heritage features within the MTS and LILO Corridor footprints (orange polygon). One depicts structures of a historical farmstead and the other depicts homesteads. There are also two homestead clusters located outside the LILO Corridor footprint (red polygons)

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.

Fourie, W. 2021. HIA for *The Proposed Harmony Fss6 Reclamation Pipeline, Welkom, Free State Province.* During the survey, no heritage sites were identified.

Lavin, J. 2020. *Archaeological Specialist Study In terms of Section 38(8) of the NHRA for a Proposed development of the Vrede and Rondavel Solar Energy Facilities near Kroonstad, Free State Province*. Two Later Stone Age scatters and one isolated flake (RDW003) were identified within the area proposed for the Rondavel SEF. A series of four stone cairns were also identified, as possible graves.

Van der Walt, J. 2019. *Heritage Desktop Report Lengana Health SA Prospecting Application, Koppies, Free State Province.* The proposed prospecting activities were located on Felix 318, Goedgunst 315, Kronenbloem 51, Ventersbloem 163, Oceaan 64, Oceaan 99, Broodkop 304, Enkelsbosch 31, Hooge Bult 542, Geluk 237, Verdeel 278, Goudlaagte 238, Ongegund 507. The desktop study noted that structures of unknown age occur within the prospecting right area, no stone walled settlements were visible on aerial images consulted and no known graves occur in the study area, although informal graves could be expected in the study area.

Angel, J and J Kitto. 2018. *Kophia Diamonds (Pty) Ltd Catherine's Fancy 831, which forms part of the Blaauwbosch Mine, Boshof District, Free State Province Heritage Impact Assessment.* The HIA was necessitated by the discovery of skeletal material during mining activities on the farm Catherine's Fancy. Seven heritage resources were located, not including the accidentally discovered burial ground. These included three Middle Stone Age sites and four historical structures.

De Bruyn, C. 2018. *Basic Assessment Report for the Prospecting Right and Environmental Authorisation Application for Kroonstad South Situated in the Free State Province*. A cemetery with several marked and unmarked graves as well as two historical farmhouses were found within the project area.

De Jong, RC. 2011. *Specialist Study: Heritage Impact Assessment for the Installation of the Sirius Fibre Optic Cable between Johannesburg and Yzerfontein, Gauteng, Free State, Eastern and Western Cape Provinces.* The cable corridor included the section of the N1 roads between northern Johannesburg and Bloemfontein via Kroonstad, Ventersburg and Winburg. No significant heritage resources were identified along the N1 in the Kroonstad area.

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 Fossil Sensitivity Map (http://www.sahra.org.za/sahris/map/palaeo). This map indicates that the combined footprint for the Oslaagte Solar 3 PV project and LILO Corridor falls within an area of mainly Very High (red colour) fossil sensitivity (see **Figure 28** below), with a small section shown as moderate sensitivity (green). The different

palaeontological sensitivities that are defined on the SAHRIS Palaeontological Sensitivity Map are outlined in the table below. Due to the underlying area being mainly of Very High sensitivity for fossils, a separate palaeontological assessment is being undertaken by a professional palaeontologist. The recommendations and mitigation measures provided in the assessment must be implemented where necessary.

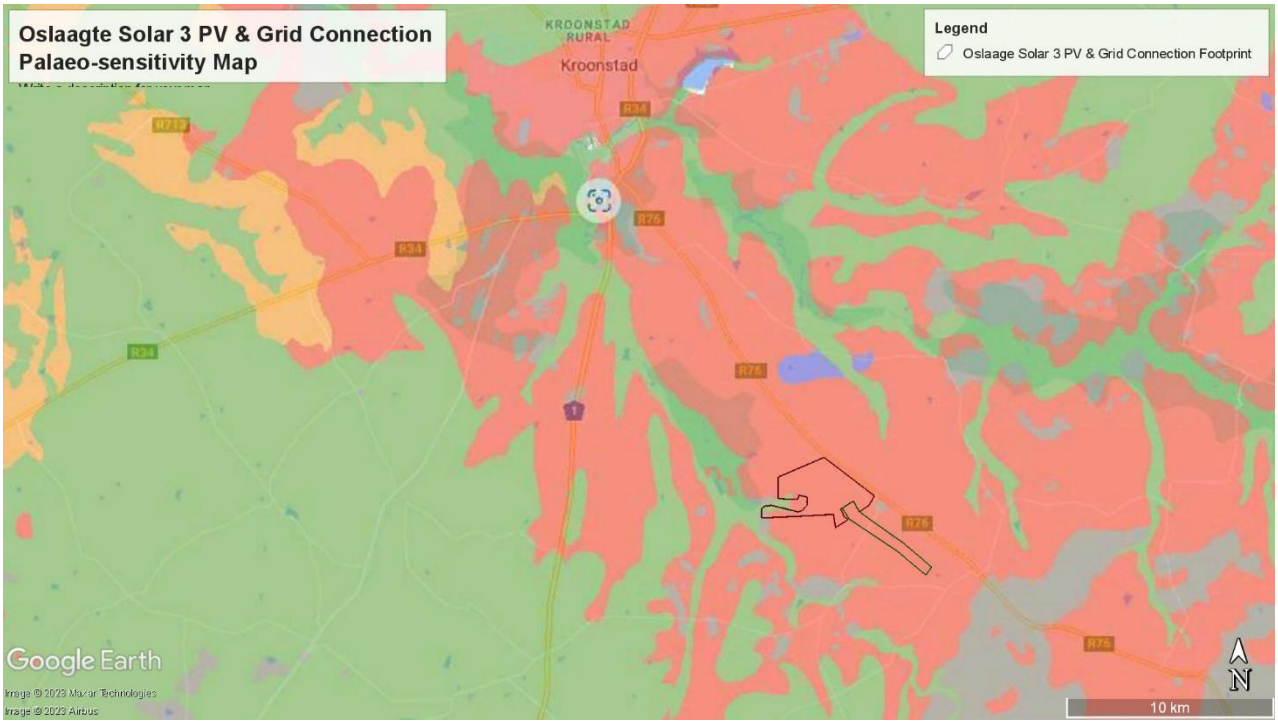

Figure 28: SAHRIS Palaeo sensitivity map overlain on the combined footprint for the Oslaagte Solar 3 PV project (red polygon) and LILO Corridor (green polygon). The underlying geology is shown as having mainly Very High fossil sensitivity (red).

Table 3: 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. Furthermore, the examination of the earliest edition (1960) of the 1:50 000 topographical maps produced by overlying the maps with satellite Imagery (Google Earth) has shown that at least four heritage features could be present within the project footprint.

The Site Survey fieldwork provided confirmation of the heritage features depicted as occurring within and close to the PV project and LILO connection footprints.

6 SITE SURVEY/FIELDWORK RESULTS

The survey of the Oslaagte Solar 3 PV project and MTS/LILO corridor footprints took place over three days (21 December 2022, 7 January 2023 and 12 April 2023) by the author (heritage specialist) with an assistant and as part of a specialist team. A vehicle was used to access the project footprint areas 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 dense acacia thicket covering several areas, certain sections of wetlands and roads which were flooded due to rain, as well as certain sections which were not accessible due to locked gates or a combination of dense vegetation and animal burrows.

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 and Samsung mobile phone were 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 structures or remains and landscape features of cultural heritage significance.

The inspection of the Oslaagte Solar 3 PV footprint identified six heritage resources within or adjacent to the general PV footprint. Four are located within and two adjacent to the project footprint (Alternative 1). These include: a historical farmhouse with an outbuilding and a stone kraal (Os3-01), a railway culvert (Os3-04) and a disused road culvert (Os3-05), two areas with demolished structure remains (Os3-02 and Os3-06) and a possible grave (at Os3-02). One site could be the remains of a farm dam wall (Os3-03). The identified heritage resources are all avoided by the Alternative 2 layout.

The survey of the MTS/LILO Corridor footprint identified a total of six heritage resources within or adjacent to the footprint. Two of these sites are located just outside the boundary of the project footprint, the remaining four sites are located within the project footprint (Alternative 1 and Alternative 2). These included the remains of an historical farmstead (LILO-05), the remains of a stone wall (LILO-04, probably a kraal) and three informal graveyards or potential graves (LILO-01, LILO-02, LILO-06). One site is the remains of a homestead which may contain potential graves (LILO-03).

The description of the sites identified has been separated between the Oslaagte Solar 3 PV footprint area and the MTS/LILO Corridor area.

Identified Heritage Sites – Oslaagte Solar 3 PV Footprint

Site Name	Os3-01. Historical Farmhouse Structures
GPS Coordinates	27°49'30.62"S, 27°19'56.25"E (Os3-01.1); 27°49'35.50"S, 27°19'48.42"E (Os3-01.2)
Site Description	The site comprises a historical farmstead with a house (Os1-01.1) and one visible outbuilding. A historical stone kraal is situated near to the house. Approx. extent 24.6 ha (estimate from satellite imagery).
Approximate Age	More than 60 years old as it is depicted on the 1960 topographical map.
NHRA, No. 25	Section 34 of the Act
Field Grading and Ratings	
Site context and description	The site contains at least two historical buildings (farm house and outbuilding) situated within a grove of eucalyptus trees and is fenced. A partially collapsed stone kraal is situated outside the eucalyptus grove and fence. There are five structures depicted in this location on the 1960 topographic map 2727CD.
Site Density	Only two structures were visible within the fenced area. The kraal is situated outside the fenced area. However, more structures could be present. The site was extremely overgrown and time constraints did not allow a detailed investigation.
Uniqueness	Low
Heritage Significance	IIIB / GP.B - Medium, as at least two buildings and the kraal are still extant.
Mitigation	The site is situated immediately adjacent to the western-central boundary of the project footprint (Alternative 1 and Alternative 2). However, the site should be avoided and demarcated as a “no go” area to avoid any indirect impact.

Figure 29: View of historical farmhouse at Os3-01, showing the eucalyptus trees and dense vegetation.

Figure 30: View of associated brick outbuilding, with the roof missing

Figure 31: View of the partially collapsed stone kraal, overgrown with vegetation

Figure 32: View of the kraal showing animal ramp which may still be in use

Site Name	Os3-02_Structure remains
GPS Coordinates	27°49'12.29"S; 27°19'50.35"E
Site Description	Probable structure remains and a potential grave
Approximate Age	Unknown. Nothing is depicted in this location on the 1960 map or later editions.
NHRA, No. 25	Section 34 of the Act
Field Grading and Ratings	
Site context and description	The site comprises foundation remains of structures: a cluster of stones and rocks associated with a rectangular cement foundation and a circular cement foundation with adjacent stone cairn (potential grave). These foundation remains are located approx. 352m north of the historical farmhouse and buildings at Os3-01. The extent is roughly 875m^2.
Site Density	Two foundations with wall remains and one stone cairn
Uniqueness	Low
Heritage Significance	IIIC / GP.C – Low; except for potential grave
Mitigation	The circular foundation and adjacent stone cairn (potential grave) are located just inside the PV array area on the central-west section of the Solar PV footprint – Alternative 1. but avoided by the Alternative 2 layout. Due to the presence of a potential grave, the site should be avoided with a 20-30m buffer and any site clearance activities should be monitored by a heritage specialist/archaeologist.

Figure 33: View of cement foundation with remains of stone walls at Os3-02

Figure 34: View of circular cement foundation at Os3-02

Figure 35: View of the stone cairn (potential grave) situated adjacent to the cement circle

Site Name	Os3-03_Structure Remains?
GPS Coordinates	27°48'46.14"S; 27°20'18.75"E
Site Description	Excavation with a line of stones along one edge.
Approximate Age	Unknown. Nothing is depicted at this location on the 1960 map or later editions.
NHRA, No. 25	N/A
Field Grading and Ratings	
Site context and description	This is a large, shallow excavation into a sandstone outcropping, with a linear stone concentration along one edge. It could possibly be the remains of a farm dam wall.
Site Density	N/A
Uniqueness	Low
Heritage Significance	Not Conservation Worthy
Mitigation	No mitigation required

Figure 36: View of the excavation showing linear stone concentration along one edge, Os3-03

Figure 37: View along the linear stone concentration

Site Name	Os3-04_Historical Structure
GPS Coordinates	27°49'7.26"S; 27°21'36.92"E
Site Description	Historical Railway culvert
Approximate Age	Likely to be more than 60 years old as the railway is depicted on the 1960 topographical map.
NHRA, No. 25	Section 34 of the Act
Field Grading and Ratings	
Site context and description	The site is a concrete railway culvert, located within the railway reserve, just outside (± 15m) the eastern boundary of the PV array footprint (Alternative 1). It is avoided by the Alternative 2 layout.
Site Density	N/A
Uniqueness	Low
Heritage Significance	IIIC/ GP.C
Mitigation	The site is located within the fenced off railway reserve. No further mitigation required.

Figure 38: View of the concrete railway culvert at Os3-04

Site Name	Os3-05_Historical structure
GPS Coordinates	27°49'26.59"S; 27°20'48.08"E
Site Description	Concrete road bridge/ culvert over river
Approximate Age	More than 60 years old as the road (and river) is depicted on the 1960 topographical map.
NHRA, No. 25	Section 34 of the Act
Field Grading and Ratings	
Site context and description	The site comprises a concrete bridge/ culvert for a disused road crossing a river (road shown on 1960 map). It is located outside the PV array area of the footprint (Alternative 1 and Alternative 2) in the central section of the site area.
Site Density	N/A
Uniqueness	Low
Heritage Significance	IIIC / GP.C – Low
Mitigation	The site is avoided by both layout alternatives, but should be demarcated with a 30m buffer to prevent any indirect impact.

Figure 39: View of concrete road bridge/ culvert at Os3-05

Figure 40: View of the top of the disused road bridge/culvert

Site Name	Os3-06_Structure Remains
GPS Coordinates	27°49'7.79"S; 27°19'49.02"E
Site Description	Structure remains
Approximate Age	Nothing is depicted on the 1960 map in this location. A farm dam is depicted on the 1975, 1997 and 2007 maps.
NHRA, No. 25	N/A
Field Grading and Ratings	
Site context and description	The site comprises stone foundations with wall remains of a rectangular structure. It is located close to the site Os3-02 and a short distance away from Os3-01 (523m). The site falls within the Alternative 1 Layout and is avoided by the Alternative 2 layout.
Site Density	N/A
Uniqueness	Low
Heritage Significance	NCW
Mitigation	No mitigation required

Figure 41: View of the rectangular stone wall remains at Os3-06

Identified Heritage Sites –LILO Corridor Footprint

Site Name	LILO-01
GPS Coordinates	-27.834651°; 27.360782°
Site Description	Stone Cairn. The site comprises several stones forming a cluster adjacent to an acacia shrub, and could be a potential grave
Approximate Age	Nothing is depicted on the 1960 topographic map in this location. It is unlikely to be more than 60 years old.
NHRA, No. 25	Section 36
Field Grading and Ratings	
Site context	The site comprises several stones forming a pile adjacent to an acacia shrub and is a potential grave. The stone cairn is located within northern section of the LILO Corridor footprint.
Site Density	The site consists of a possible stone cairn overgrown by dense vegetation which obscured the visibility.
Uniqueness	Low
Heritage Significance	IIA / GP.A - High (if it is confirmed to be a grave)
Mitigation	To be avoided with a buffer of at least 30m. Due to the presence of a potential grave, the site should be avoided with a 20-30m buffer and any site clearance activities should be monitored by a heritage specialist/archaeologist.

Figure 42: General view of the stone cluster among dense vegetation, LILO-01

Figure 43: Closer view of the stone cluster forming a potential grave

Site Name	LILO-02
GPS Coordinates	-27.832688°; 27.357009°
Site Description	Stone cluster located adjacent to a fence boundary (potential grave).
Approximate Age	Estimated to be younger than 60 years as it is not depicted on the 1960 topographical map.
NHRA, No. 25	Section 36 of the Act
Field Grading and Ratings	
Site context	The site is a stone cluster located adjacent to a fence and is a potential grave. It is situated next in the northern section of the LILO Connection corridor footprint.
Site Density	Stone cluster forming potential grave
Uniqueness	Low
Heritage Significance	IIIA / GP. A - High (if confirmed to be a grave)
Mitigation	Due to the presence of a potential grave, the site should be avoided with a 20-30m buffer and any site clearance activities should be monitored by a heritage specialist/archaeologist.

Figure 44: View of stone cluster forming potential grave (LILO-02)

Figure 45: Closer view of stone cluster among dense vegetation

Site Name	LILO-03 Homestead with potential graves
GPS Coordinates	-27.846546°; 27.362618°
Site Description	Homestead with potential graves. Open area containing several stone concentrations.
Approximate Age	Nothing is depicted in this location on the 1960 map or later editions, so it could be older or younger than 60 years. The site was pointed out by the farmer's son who indicated that he thought it was quite old.
NHRA, No. 25	Section 34, Section 36 of the Act
Field Grading and Ratings	
Site context	The site comprises an area of open ground with vegetation that grows on disturbed ground. Part of the area is covered with many stones that could be the remains of an old kraal or could be possible graves. The site is located outside the LILO connection footprint area (approx. 800m west of the western boundary) but has been noted due to the possible presence of graves. The extent is estimated to be at least 50m by 100m.
Site Density	A large number of stones forming several concentrations.
Uniqueness	Low
Heritage Significance	IIIC / GP.C – Low (Structure Remains) IIIA / GP. A - High (potential graves)
Mitigation	As the site is located outside the footprint no mitigation is required; unless an alteration in the project design would result in an impact on the site.

Figure 46: General view of the possible homestead site, LILO-03

Figure 47: View of one of the stone concentrations

Site Name	LILO-04
GPS Coordinates	-27.839902°; 27.366812° (LILO-04A) and -27.839501°, 27.366272°(LILO-04B)
Site Description	Curved Stone wall (waypoints 04A and 04B).
Approximate Age	Although it is not depicted on the 1960 map it could be older than 60 years.
NHRA, No. 25	Section 34 or Section 35 of the Act (depending on age)
Field Grading and Ratings	
Site context	The site comprises the remains of an old, curved stone wall. It could be the remains of a historical kraal . The extent of the wall remains is approx.80m. The site is located within the upper portion of the southern section of the LILO Connection footprint area.
Site Density	Partial remains of an old stone wall.
Uniqueness	Low
Heritage Significance	IIIC / GP.C -Low
Mitigation	The site should be avoided with a buffer of 20-30m. If any impact is anticipated, a permit for demolition of the wall could be required from FS PHRA.

Figure 48:: View of southern end of the stone wall remains, LILO-04

Figure 49: View of the central section of the wall remains

Site Name	LILO-05
GPS Coordinates	-27.838937°, 27.370603° (05A); -27.839766°, 27.370857° (05B); -27.839896°, 27.371597° (05C)
Site Description	Historical farmstead (Waypoints 05A, 05B and 05C)
Approximate Age	Older than 60 years as this site is depicted on the 1960 map
NHRA, No. 25	Section 34 of the Act
Field Grading and Ratings	
Site context	The site is an historical farmstead. It comprises the remains of an extremely dilapidated farmhouse (LILO-05A), an outbuilding that was a barn/shed (LILO-05B) and an old kraal (LILO-05C) that has been repaired and seems to be in use still. The site extent is approx. 1.94ha. The site is located within the central portion of the southern section of the LILO Connection footprint area. It is possible that an associated graveyard may be present in the vicinity, but nothing was visible through the dense vegetation growing over the site.
Site Density	The remains of at least three historical farm buildings.
Uniqueness	Low
Heritage Significance	IIIC / GP. C - Low -Medium
Mitigation	It is recommended that the buildings should be avoided with a buffer of 30m. The project could have a direct impact on the farmstead and a permit for demolition or alteration of the buildings would be required from FS PHRA. The permit application would require that the structure remains be recorded photographically by an architectural historian.

Figure 50: View of the ruins of the farmhouse (LILO-05A)

Figure 51: View of the farmhouse construction materials; showing sandstone foundation, mud bricks and commercial bricks

Figure 52: View of historical barn/shed building (LILO-05B)

Figure 53: View of entrance to historical barn/shed, showing sandstone construction material

Figure 54: View of historical kraal (LILO-5C) that is still in use

Figure 55: View of kraal wall, showing past repair work

Site Name	LILO-06A and 06B
GPS Coordinates	-27.845269°, 27.370236° (06A); -27.845320°, 27.370764° (06B)
Site Description	Two groups of informal stone graves located close to each other
Approximate Age	It is unknown if the graves are older than 60 years
NHRA, No. 25	Section 36 of the Act
Field Grading and Ratings	
Site context	The site comprises two groups of informal stone covered graves located close to each other. The graves were pointed out by a local farmworker. The total extent of the two groups together is approx. 60m x 20m. The number of graves is not clear, there could be 5-10 graves in each group. The site is located outside of the LILO connection footprint, approx. 240m away from the western boundary.
Site Density	Two groups each containing an unknown number of graves, possibly 5-10 in each area.
Uniqueness	Low
Heritage Significance	IIIA/ GP.A - High
Mitigation	It is recommended that the graves should be avoided and demarcated with a buffer of at least 30m. No specific mitigation is required unless an alteration in the project design would result in an impact on the site.

Figure 56: View of informal stone graves at LILO-06A

Figure 57: View of informal stone graves at LILO-06B

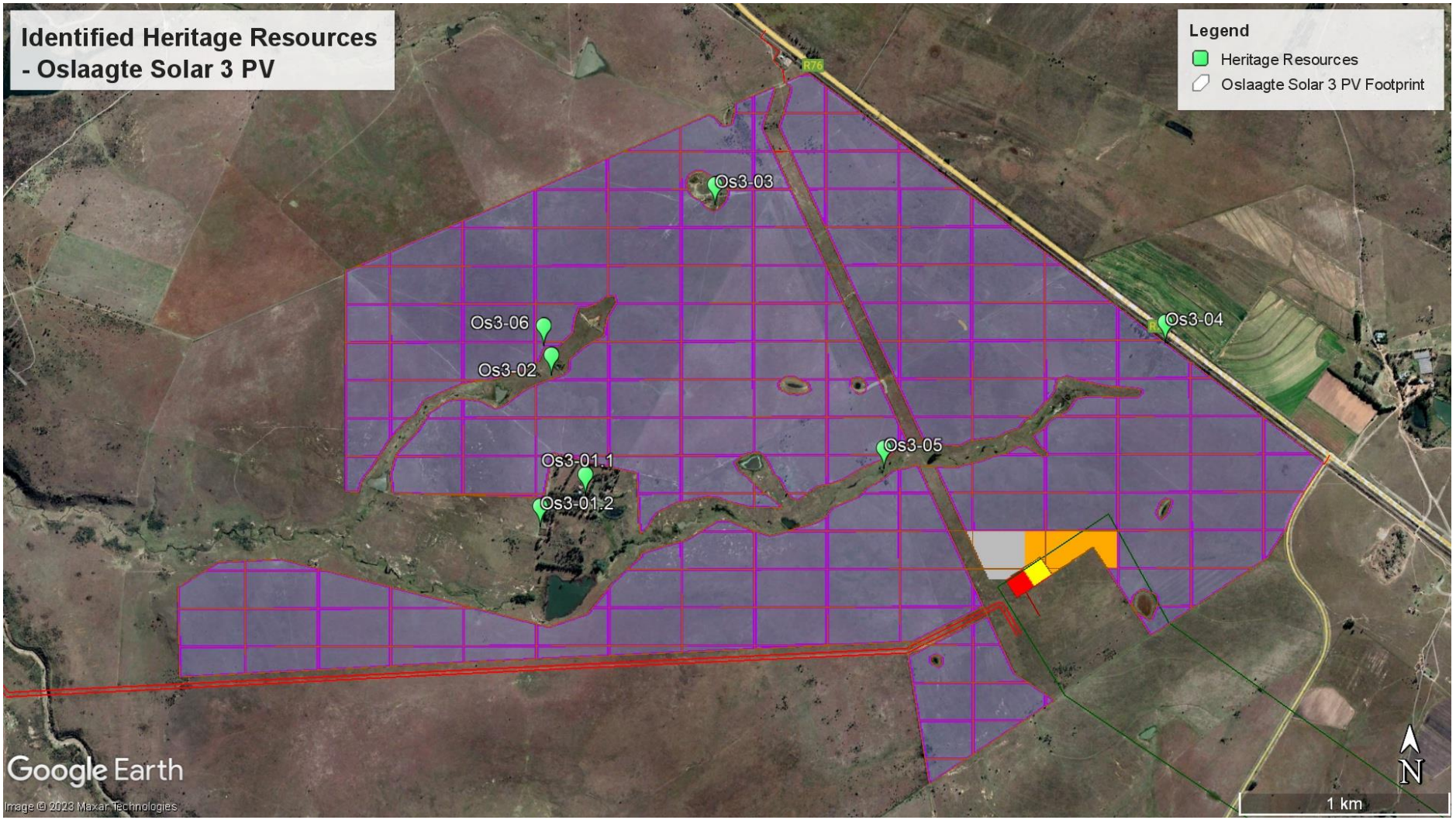

Figure 58: Heritage resources identified during the survey (green icons), in relation to the Oslaagte Solar 3 PV Alternative 1 project layout (Google Earth satellite view)

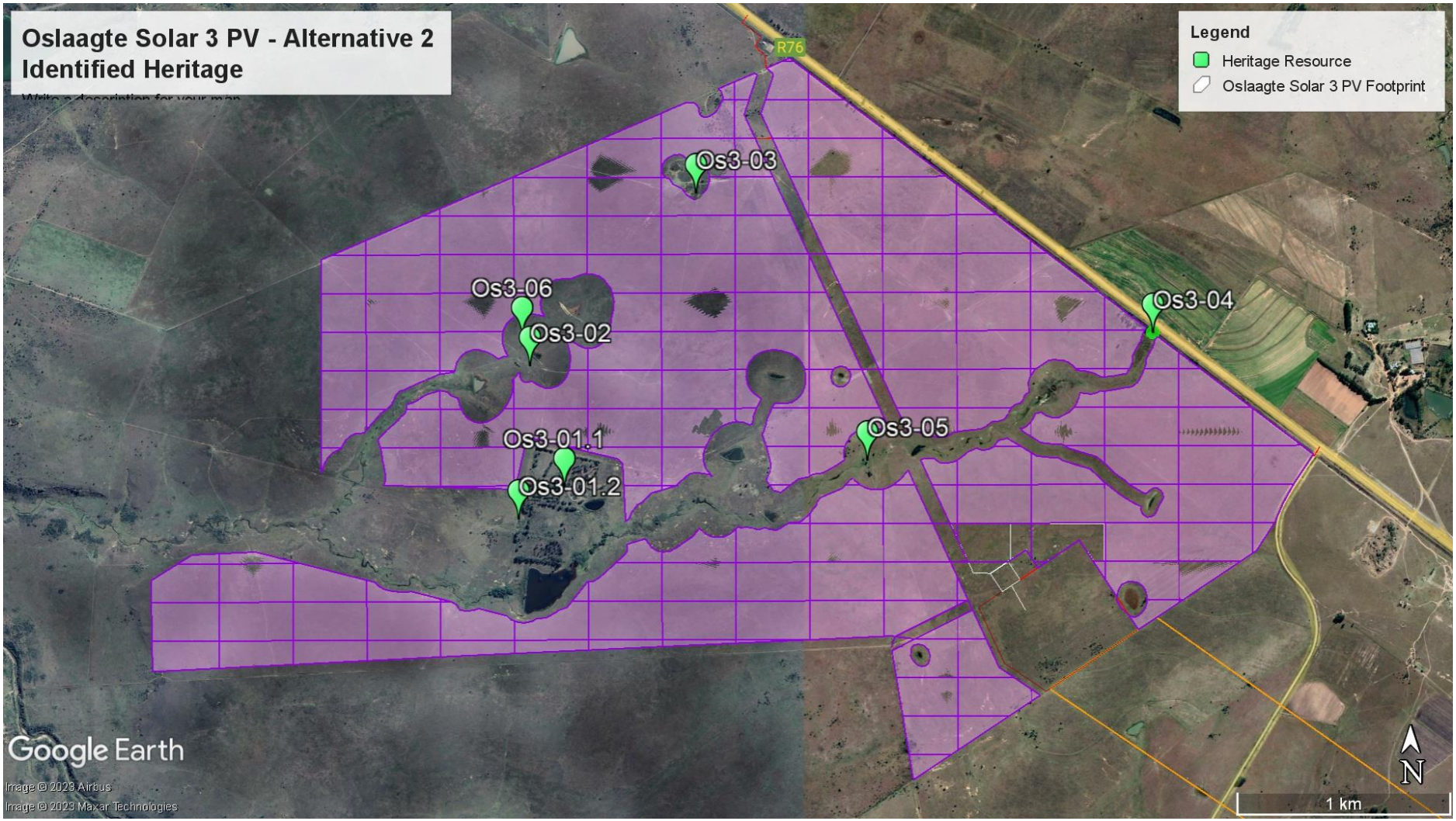

Figure 59: Heritage resources identified during the survey (green icons), in relation to the Oslaagte Solar 3 PV Alternative 2 project layout (Google Earth satellite view)

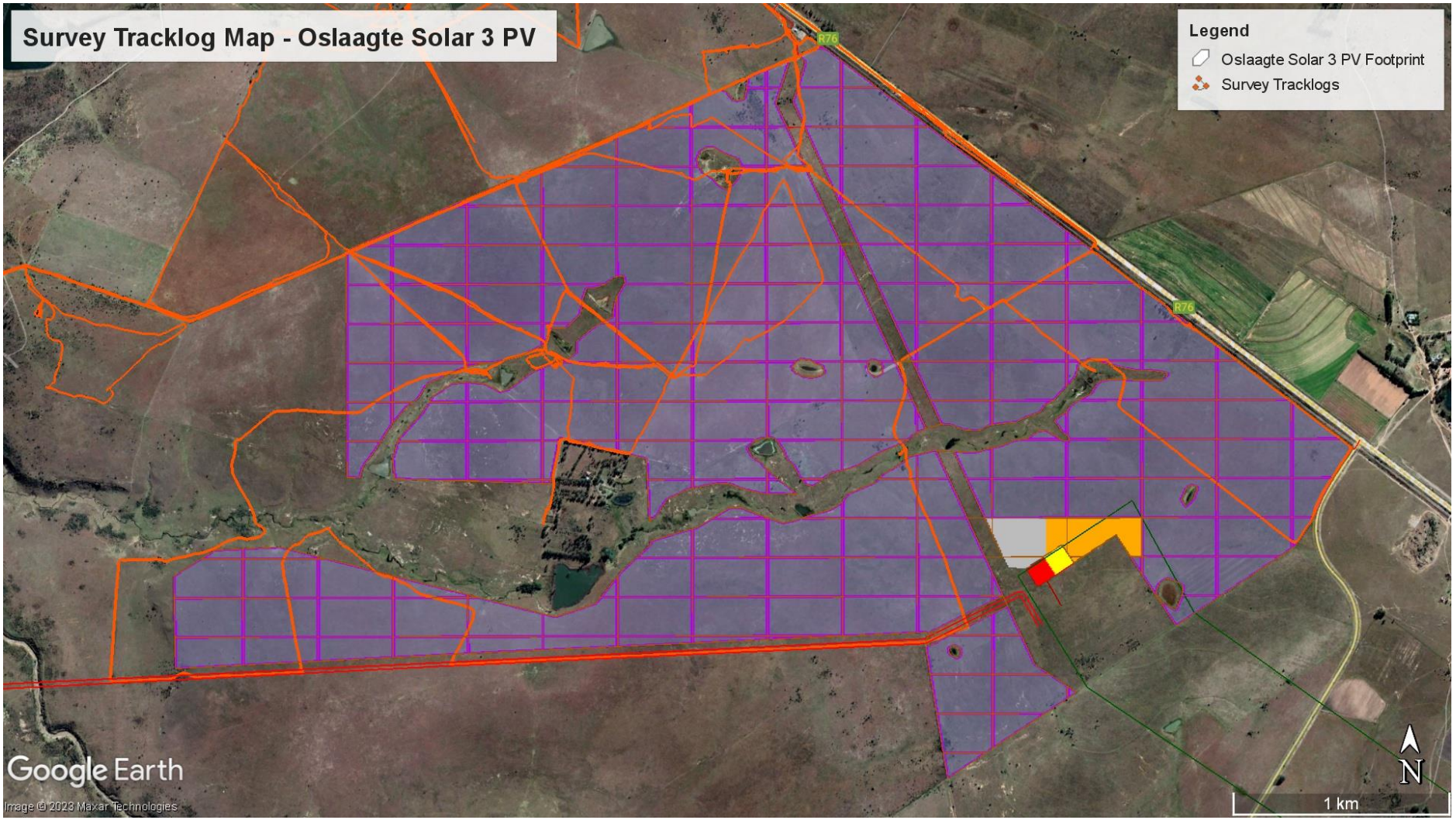

Figure 60: Site Survey Tracklog (orange lines) overlaid on the Oslaagte Solar 3 PV project footprint (Alternative 1)

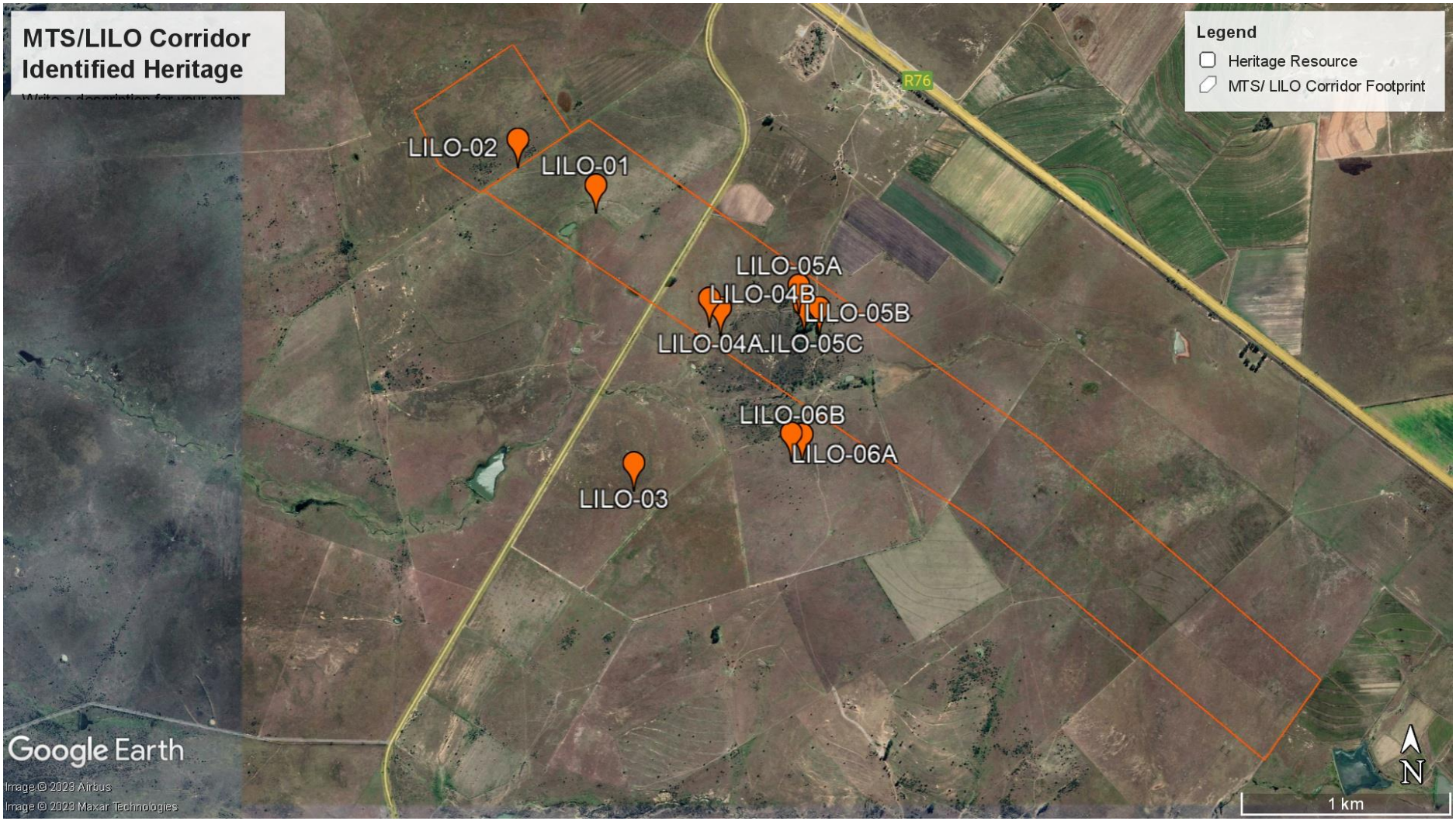

Figure 61: Heritage resources identified during the site survey (orange icons), in relation to the MTS/LILO Corridor footprint (Google Earth satellite view)

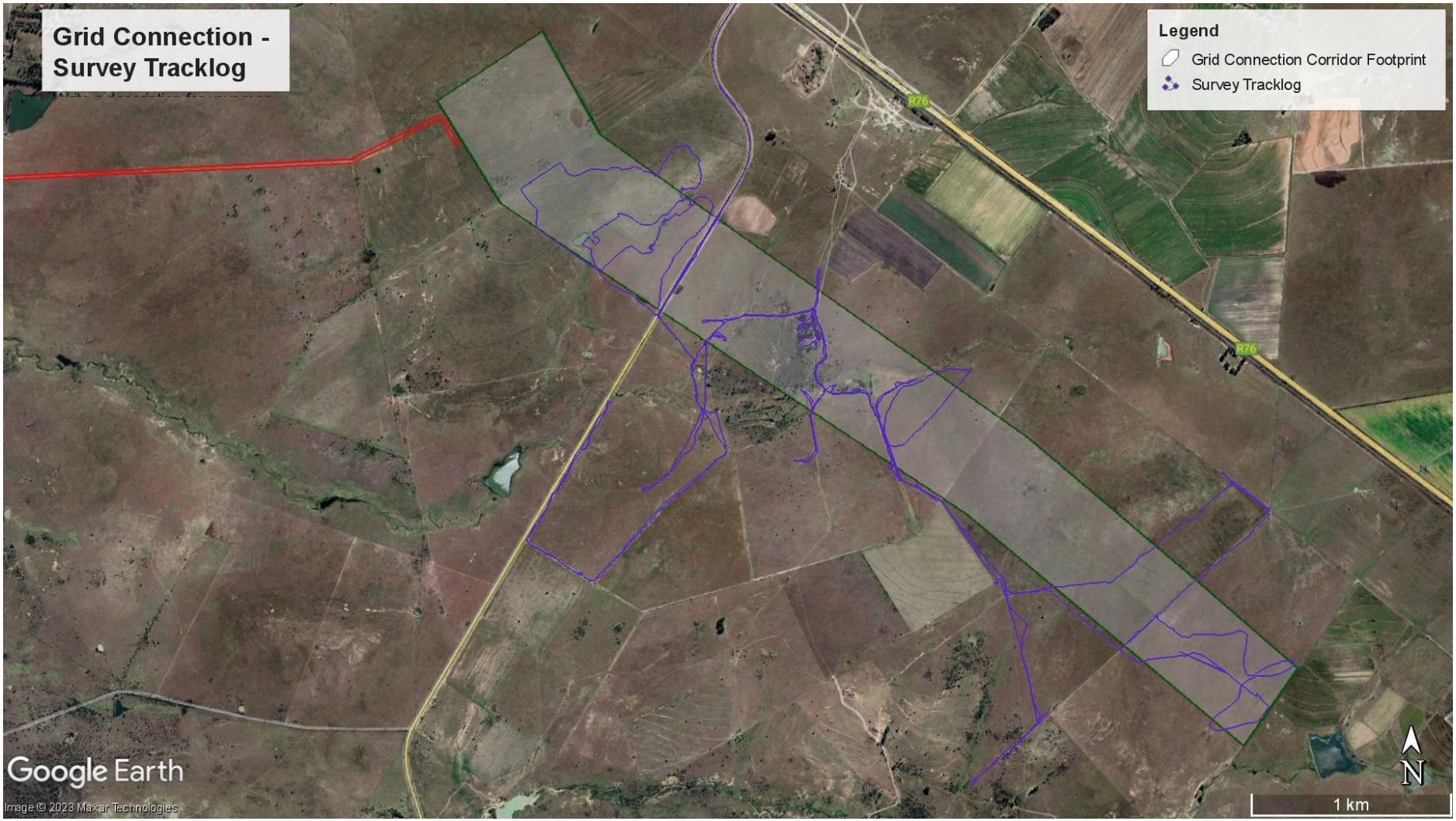

Figure 62: Site Survey Tracklog (purple lines) overlaid on the LILO Corridor footprint

7 SIGNIFICANCE ASSESSMENT

7.1 Methodology for Assessing Heritage Site Significance

The applicable maps, tables and figures are included, as stipulated in NHRA and NEMA. The HIA methodology 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 2727CD 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 including ,amongst others, the website of SA History Online (https://www.sahistory.org.za), and the concentration camp database website of the University of Cape Town (British Concentration Camps of the South African War 1900-1902 (uct.ac.za)

Literature resources accessed are listed in Table 4.

Table 4: Literature sources accessed

Source	Information
Background Information Document - Nemai	Project location and description details
Published sources and Past HIAs	Historical and archaeological background on Kroonstad and surrounding region
Directorate: National Geo-spatial Information of the Department of Rural Development & Land Reform, Cape Town	Historical topographic maps, 1:50 000 2727CD Ed 1 1960

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 and an assistant. 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 (**Table 5** and **Table 6**).

Table 5: 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

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage 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 6: 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.		

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
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
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	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	Not Conservation worthy –

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	retained as part of the National Estate.	lifted by the PHRA for structures in this category if they are older than 60 years.	no research potential or other cultural significance

Table 7: 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
Generally Protected B (GP.B)		Medium Significance	Recording before destruction
Generally Protected C (GP.C)		Low Significance	Destruction

8 IDENTIFICATION OF IMPACTS

8.1 Impacts and Mitigation Framework

All impacts are analysed in the section to follow regarding 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 8 apply.

Table 8: Impact and Mitigation Quantification Framework

Nature	The project could have a positive, negative or neutral impact on the environment.
Extent	**Local** – extend to the site and its immediate surroundings. **Regional** – impact on the region but within the province. **National** – impact on an interprovincial scale. **International** – impact outside of South Africa.
Magnitude	Degree to which impact may cause irreplaceable loss of resources: **Low** – natural and socio-economic functions and processes are not affected or minimally affected. **Medium** – affected environment is notably altered; natural and socio-economic functions and processes continue albeit in a modified way. **High** – natural or socio-economic functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.
Duration	**Short term** – 0-5 years. **Medium term** – 5-11 years. **Long term** – impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention. **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.
Probability	**Almost certain** – the event is expected to occur in most circumstances. **Likely** – the event will probably occur in most circumstances. **Moderate** – the event should occur at some time. **Unlikely** – the event could occur at some time. **Rare/Remote** – the event may occur only in exceptional circumstances.
Significance	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- **0** – Impact will not affect the environment. No mitigation necessary. **1** – No impact after mitigation. **2** – Residual impact after mitigation. **3** – Impact cannot be mitigated.
Mitigation	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.
Monitoring	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.

Table 9: 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

8.2 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 10 below.

Table 10: Activity, Aspects and Impacts of the Project

Activity	Aspect	Potential Impact – Positive	Potential Impact – Negative
Site clearance/ construction camp	Heritage		Damage to existing historical structures or unidentified graves
Construction	Heritage	Positive - if historical structures are reused	Damage to existing historical structures or unidentified graves
Operation	Heritage	Positive – if historical structures are reused	Damage to existing historical structures

8.3 Impact and Mitigation Assessment

The impact significance of the project on graves and cemeteries is Medium (before mitigation) and Low (after mitigation) as three potential graves (Os3-02, LILO-01, LILO-02) were identified within the combined Oslaagte Solar 3 PV (Alternative 1 and Alternative 2) and MTS/LILO Corridor footprints. One definite gravesite (LILO-06) is situated outside the MTS/LILO corridor footprint. Implementation of the mitigation measures required (set out in Table 10, below) will retain the impact as low.

The impact significance of the proposed project on protected historical structures is Medium (before mitigation) as three extant historical structure sites (Os3-01, Os3-04, Os3-05), were identified within or adjacent to the Oslaagte Solar 3 PV footprint (Alternative 1). Two sites containing historical structure remains (Os3-02 and Os3-06), were identified also situated within the Solar PV footprint (Alternative 1) and two sites containing historical structure remains (LILO-05 and LILO-04) were identified within the MTS/LILO Corridor footprint. The heritage resource sites identified within the PV footprint area are all avoided by the Alternative 2 layout. There is no difference in impact between the Alternative 1 and Alternative 2 layouts for the LILO Corridor.

8.4 Impacts During Planning, Construction and Operation Phases

As a result of the analysis above,**Error! Reference source not found.** the following impact/mitigation tables have been generated.

Table 11: Heritage Resources – Historical Structures Mitigation Table

Environmental Feature		Heritage resources – Historical structures				
Project life-cycle		Planning, Construction and Operation				
Potential Impact		Proposed Management Objectives / Mitigation Measures				
Possible damage to or destruction of extant historical structures (Site Os3-01, Os3-05)		• A buffer of at least 30m must be placed around these sites (Site Os3-01, Os3-05) to ensure that during construction, no indirect impact occurs. • The materials demarcating the 30m buffer must be highly visible and made of durable material to ensure that they are still in place during the operation of the PV site so that work crews are aware of the sites. • If any impact is anticipated, then a permit will be required for the alteration or destruction of these structures (from FS PHRA) • If a permit is required, then a photographic record of the structures should be undertaken by an architectural historian				
Possible damage to or destruction of remains of historical structures (Os3-02, Os3-06; LILO-04, LILO-05)		• A buffer of at least 30m must be placed around these sites to ensure that during construction, no historical-archaeological material is damaged • If any impact on these sites is anticipated, a permit will be required for the destruction/clearance of the area (from FS PHRA or SAHRA)				
Alternative 1	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Permanent	Moderate	2

After Mitigation	Positive	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	Site Os3-01 has medium significance as the structures are extant and can be recorded. Since the site is situated immediately adjacent to the Alternative 1 footprint layout, it is recommended that a buffer of at least 30m is implemented to avoid any indirect impact. Both site Os3-01 and Os3-05 are older than 60 years and protected by s34 of the NHRA, as well as LILO 04 and LILO 05.					
Alternative 2	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Permanent	Unlikely	2
After Mitigation	Positive	Local	Low	Long- term	Remote	1
Significance of Impact and Preferred Alternatives	Site Os3-01 has medium significance as the structures are extant and can be recorded. Even though the site is avoided by the Alternative 2 layout, the 30m buffer should still be demarcated to avoid any indirect impact. Both site Os3-01 and Os3-05 are older than 60 years and protected by s34 of the NHRA, as well as LILO 04 and LILO 05.					

Table 12: Heritage Resources – Historical Graves Mitigation Table

Environmental Feature	Heritage resources – Graves and burial grounds					
Project life cycle	Planning, Construction and Operation					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Possible damage to or destruction of identified historical graves (LILO-06)	• A buffer of at least 30m must be placed around the graveyards at LILO-06 to protect them from any indirect impact • The materials demarcating the 30m buffer must be highly visible and made of durable material to ensure that they are still in place during the operation of the PV site so that work crews are aware of the sites. • If, for any reason, the graves cannot be avoided, then a Phase 2 mitigation process can be considered. During this process, the family and relevant communities will have to be engaged with to obtain their permission and discuss to where the remains should be moved. In addition, application will have to be made to SAHRA for the necessary permits. • Sub-sections (4) and (5) of section 36 of the NHRA regarding the removal of graves must be adhered to. The exhumation and removal of graves is strongly discouraged as graves are highly significant to many people and there are many traditional, cultural and personal sensitivities concerning the removal of graves.					
Potential or unidentified graves (Os3-02, LILO-01, LILO-02)	• A buffer of at least 30m must be placed around the sites to ensure that during construction, the sites are not damaged • Monitoring of site clearance activities in the vicinity of these sites must be undertaken by a heritage specialist					
Alternative 1	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	High	Permanent	Unlikely	2
After Mitigation	Negative	Local	Low	Long- term	Unlikely	1
Significance of Impact and	The graveyard site (LILO-06) is located outside the proposed LILO corridor footprint of the project (Alternative 1). Two of the potential grave sites are located inside the LILO					

Preferred Alternatives	corridor (Alternative 1) and one is located inside the Alternative 1 layout for the PV footprint. Therefore, monitoring of site clearance and construction activities in the vicinity of all three sites should be undertaken.					
Alternative 2	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	High	Permanent	Unlikely	2
After Mitigation	Negative	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	The graveyard site (LILO-06) is located outside the proposed LILO corridor footprint of the project (Alternative 2). Two of the three potential grave sites are located inside the LILO corridor (Alternative 2) and the other one is avoided by the Alternative 2 layout for the PV project. Therefore, monitoring of site clearance and construction activities in the vicinity of LILO-01 and LILO-02 should be undertaken.					

8.5 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 Oslaagte Solar 3 PV and LILO 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 other solar PV projects, prospecting and mining projects, pipeline and fibre optic cable construction and the construction of the N1 national road and R76 regional road as well as the railway line, in addition to historical farming activities around Kroonstad and the development of Kroonstad town.

Current impacts: the immediate area of the Oslaagte Solar 3 PV footprint is affected by farming activities (cattle and game) and the R76 regional road is currently being upgraded with roadworks in progress along the eastern boundary of the project area.

The baseline impacts are considered to be low to moderate 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 moderate to high significance. The impact is going to happen and will be long-term in nature, therefore the impact risk class will be Moderate to High. However, with the implementation of the recommended management and mitigation measures this risk class can be minimized to a Low rating.

9 ANALYSIS OF ALTERNATIVES

9.1 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.

The sub-sections to follow discuss the project alternatives considered during the EIA process.

9.2 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.

9.3 Layout / Design Alternatives

In terms of the impact on the identified heritage resources, the original layout for the Oslaagte Solar 3 PV footprint (Alternative 1) has been revised to exclude certain environmentally sensitive areas (Alternative 2). The Alternative 2 layout avoids the identified heritage resources that would be impacted by the Alternative 1 layout. Therefore, from a heritage perspective, Alternative 2 is the preferred layout. However, some of these heritage resources still could be subject to indirect impact, specifically during site clearance or construction activities, therefore the mitigation measures set out above and below will still apply.

9.4 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.

10 STATEMENT OF IMPACT SIGNIFICANCE

The project area that will be impacted by the proposed Oslaagte Solar 3 PV project and MTS/LILO Corridor contains some areas that are currently disturbed by cattle and game farming activities and other animal activity (e.g., burrows and termite mounds).

The survey of the Oslaagte Solar 3 PV footprint identified six heritage resources within or adjacent to the general project footprint. Four are located within and two adjacent to the boundary of the project footprint (Alternative 1). These include: a historical farmhouse with an outbuilding and a stone kraal (Os3-01), a railway culvert (Os3-04) and a disused road culvert (Os3-05), two areas with demolished structure remains (Os3-02 and Os3-06) and a possible grave (at Os3-02). One site could be the remains of a farm dam wall (Os3-03). All of these sites are avoided by the Alternative 2 layout.

The survey of the MTS/LILO Corridor footprint identified a total of six heritage resources within or adjacent to the footprint. Two of these sites are located just outside the boundary of the project footprint (LILO-03 and LILO-06), the remaining four sites are located within the project footprint (Alternative 1 and Alternative 2). The identified heritage resources include the remains of an historical farmstead (LILO-05), the remains of a stone wall (LILO-04, probably a kraal) and three sites identified as an informal graveyard (LILO-06) or potential single graves (LILO-01, LILO-02). One site is the remains of a homestead which may contain potential graves (LILO-03).

The impact significance of the project on graves and cemeteries is Medium as three potential graves were identified within the combined footprint for the Oslaagte Solar 3 PV project and MTS/LILO Corridor (Os3-02, LILO-01, LILO-02), while one informal grave site was identified (LILO-06) situated outside the LILO Corridor footprint. Only the LILO-06 grave site is located outside the Alternative 1 layout while two sites (Os3-02 and LILO-06) are avoided by the Alternative 2 layout.

The impact significance of the proposed project on protected historical structures is medium as three sites comprising historical structures and four sites containing the remains of historical structures were identified within or adjacent to the combined footprint. Most of these structures or structure remains are over 60 years of age and therefore protected by s.34 of the NHRA. Even though most of these sites are avoided by the Alternative 2 layout, there is a possibility of indirect impact during construction activities.

It should be noted that the original layout for the Oslaagte Solar 3 PV footprint (Alternative 1) has been revised to exclude certain environmentally and heritage sensitive areas (Alternative 2). The Alternative 2 layout avoids the identified heritage resources that would be impacted by the Alternative 1 layout. Therefore, from a heritage perspective, Alternative 2 is the preferred layout. However, some

of these heritage resources still could be subject to indirect impact, specifically during site clearance or construction activities, therefore the mitigation measures set out above and below will still apply.

11 HERITAGE MANAGEMENT GUIDELINES

11.1 General Management Guidelines

The following General Heritage Management Guidelines are recommended:

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. Historical-archaeological material, including middens;
    c. Historical structure remains;
    d. Palaeontological deposits such as bones and teeth or plant fossils.

2. If a possible find is discovered during construction, all activities must be halted around 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. If human remains are uncovered, or previously unknown graves are discovered, a qualified archaeologist needs to be contacted and an evaluation made of the finds.
8. If the remains or grave/s are to be exhumed and relocated, the relocation procedures as accepted by SAHRA need to be followed. This includes an extensive social consultation process.

12 RECOMMENDATIONS AND CONCLUSION

The project area that will be impacted by the proposed Oslaagte Solar 3 PV project and MTS/LILO Corridor contains some areas that are currently disturbed by cattle and game farming activities and other animal activity (e.g., burrows and termite mounds).

The survey of the combined footprint for the Oslaagte Solar 3 PV project and the MTS/LILO Corridor identified a total of twelve heritage resources within or adjacent to the general footprint. These have been separated between the Oslaagte Solar 3 PV project and the MTS/LILO Corridor footprints.

Six heritage resources were identified within or adjacent to the general Oslaagte Solar 3 PV footprint. Four are located within and two outside or adjacent to the project footprint (Alternative 1). These include: a historical farmhouse with an outbuilding and a stone kraal (Os3-01), a railway culvert (Os3-04) and a disused road culvert (Os3-05), two areas with demolished structure remains (Os3-02 and Os3-06) and a possible grave (at Os3-02). One site could be the remains of a farm dam wall (Os3-03).

Six heritage resources were identified within or adjacent to the MTS/LILO Corridor footprint. Two of these sites are located outside the project footprint for both Alternative 1 and Alternative 2: a group of graves (LILO-06) and the remains of a homestead which may contain potential graves (LILO-03). The remaining four sites are located within the project footprint (Alternative 1 and Alternative 2). These included the remains of an historical farmstead (LILO-05), the remains of a stone wall (LILO-04, probably a kraal) and two potential graves (LILO-01, LILO-02,).

The recommendations below are provided to mitigate the potential impact of the proposed PV project on the identified heritage resources:

Historical Structures

- The sites with extant historical structures (Site Os3-01, Os3-04, Os3-05) must be avoided and a buffer of at least 30m must be implemented;
- The materials demarcating the 30m buffer must be highly visible and made of durable material to ensure that they are still in place during the operation of the PV site so that work crews are aware of the sites;
- If any impact is anticipated on these sites, a permit will be required for the alteration or destruction of any of these structures (from FS PHRA);
- If a permit is required, as above, then a photographic record of the structures should be undertaken by an architectural historian;
- The sites with remains of Historical structures (Os3-02, Os3-06, LILO-04, LILO-05) are also protected by section 34 of the NHRA and will require a permit from FSPHRA before any historical-archaeological materials or remains can be destroyed;

Informal Graveyard / Potential Graves

- A buffer of at least 30m must be placed around the informal graveyard at LILO-06 to ensure that during construction, the graves are not damaged by any indirect impacts

- The materials demarcating the 30m buffer must be highly visible and made of durable material to ensure that they are still in place during the operation of the PV site so that work crews are aware of the sites.
- If, for any reason, the identified graveyard (or potential graves) cannot be avoided, then a Phase 2 mitigation process can be considered. During this process, the family and relevant communities will have to be engaged with to obtain their permission and discuss to where the remains are to be moved. In addition, application will have to be made to SAHRA for the necessary permits.
- Sub-sections (4) and (5) of section 36 of the NHRA regarding the removal of graves must be adhered to. The exhumation and removal of graves is strongly discouraged as graves are highly significant to many people and there are many traditional, cultural and personal sensitivities concerning the removal of graves.

Palaeontology

- A separate palaeontological assessment is being undertaken as the project area falls into an area of Very High fossil sensitivity. The assessment will indicate if significant/sensitive fossils would be impacted by the proposed project and provide mitigation measures.

No fatal flaws were identified during this study, therefore, it is the considered opinion of the heritage specialist that the construction of the proposed Oslaagte Solar 3 PV project and MTS/LILO Corridor within the project footprints can proceed. There are no objections from a heritage perspective provided the recommendations and mitigation measures contained in this report and in the palaeontological assessment are implemented where necessary. It should be noted that the original layout for the Oslaagte Solar 3 PV footprint (Alternative 1) has been revised to exclude certain environmentally and heritage sensitive areas (Alternative 2). The Alternative 2 layout avoids the identified heritage resources that would be impacted by the Alternative 1 layout. Therefore, from a heritage perspective, Alternative 2 is the preferred layout. However, some of these heritage resources still could be subject to indirect impact, specifically during site clearance or construction activities, therefore the mitigation measures set out above and below will still apply.

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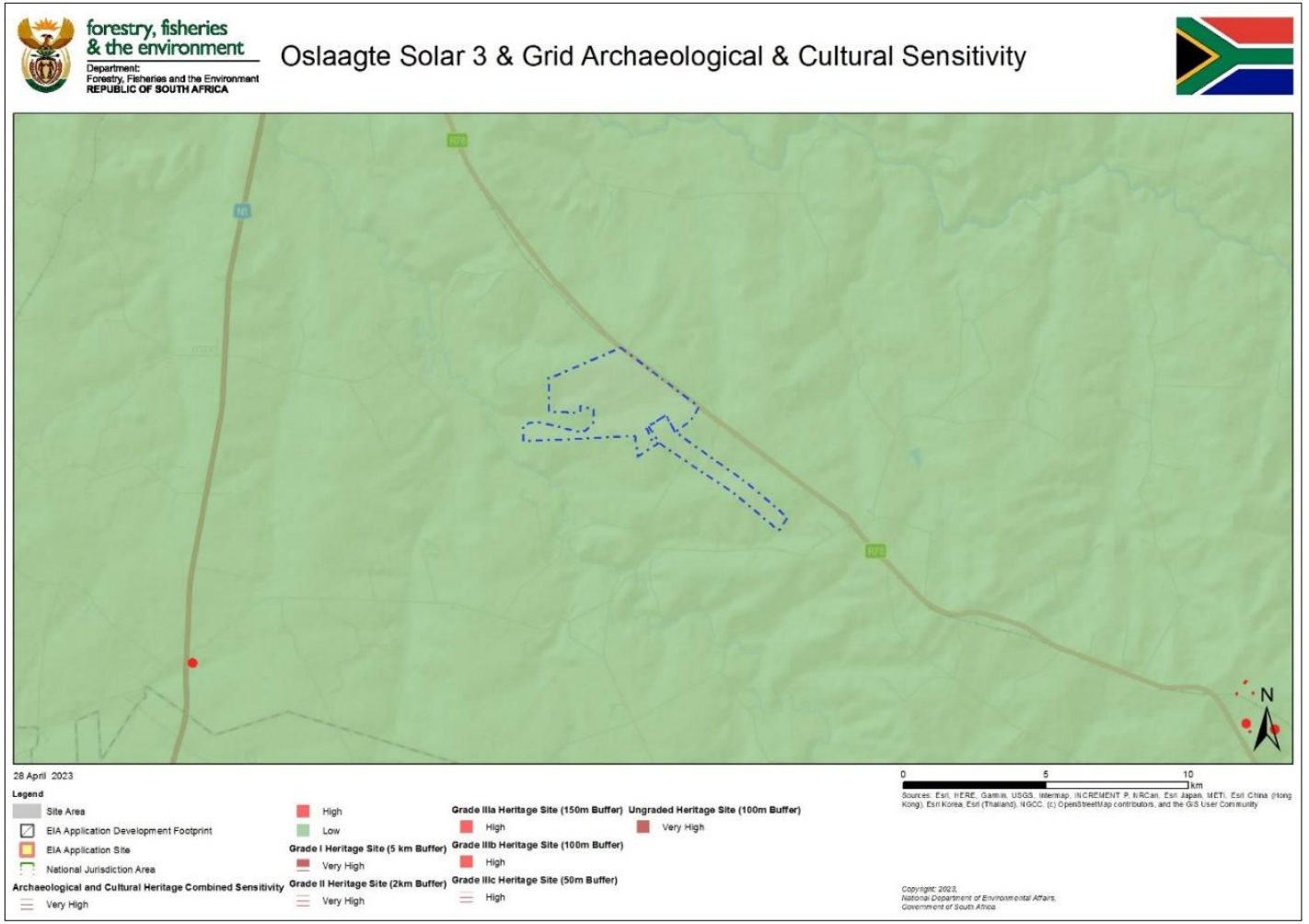
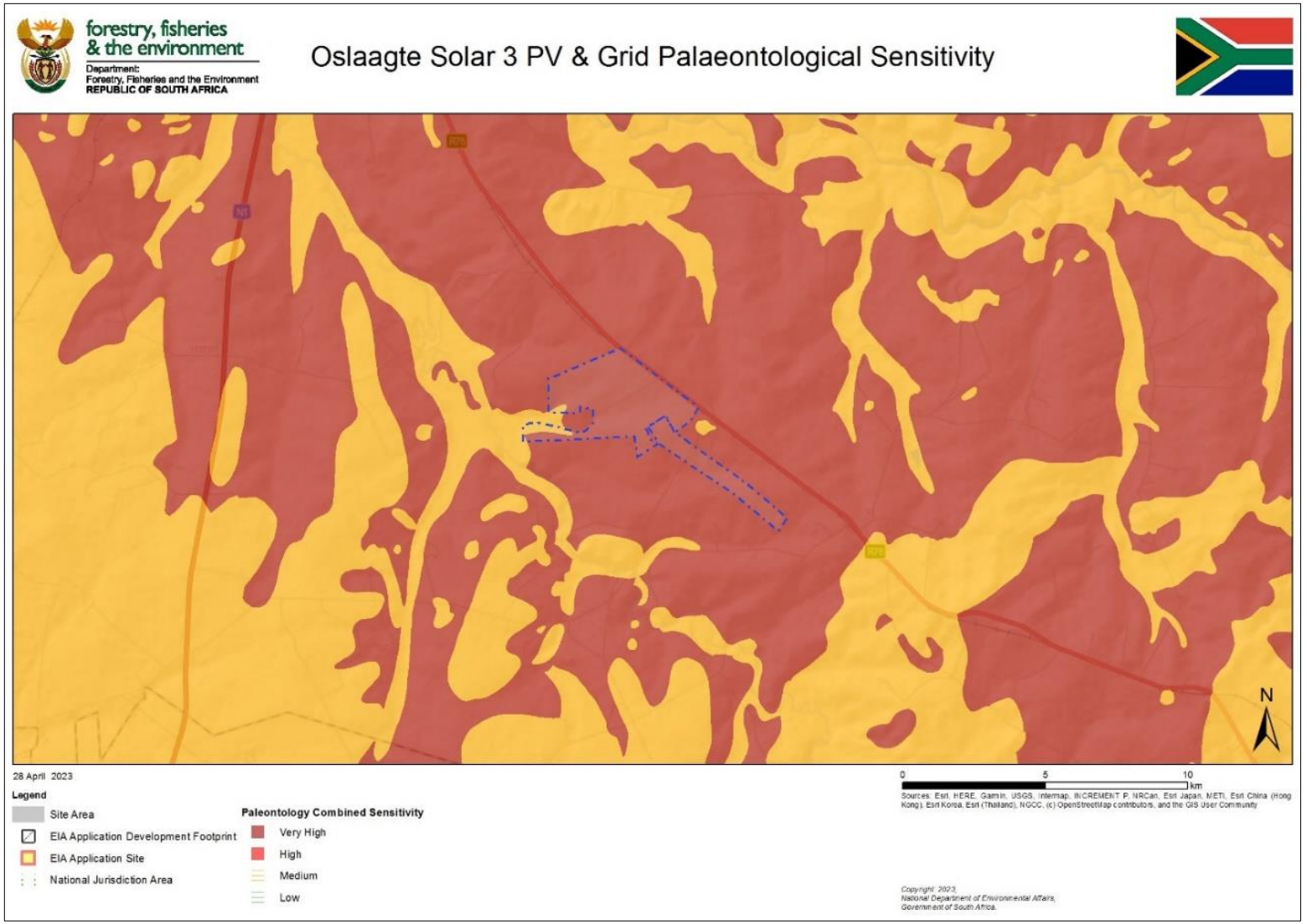
APPENDIX 1: HERITAGE SENSITIVITY MAP/S

1. Cultural Heritage Sensitivity map from DFFE screening tool

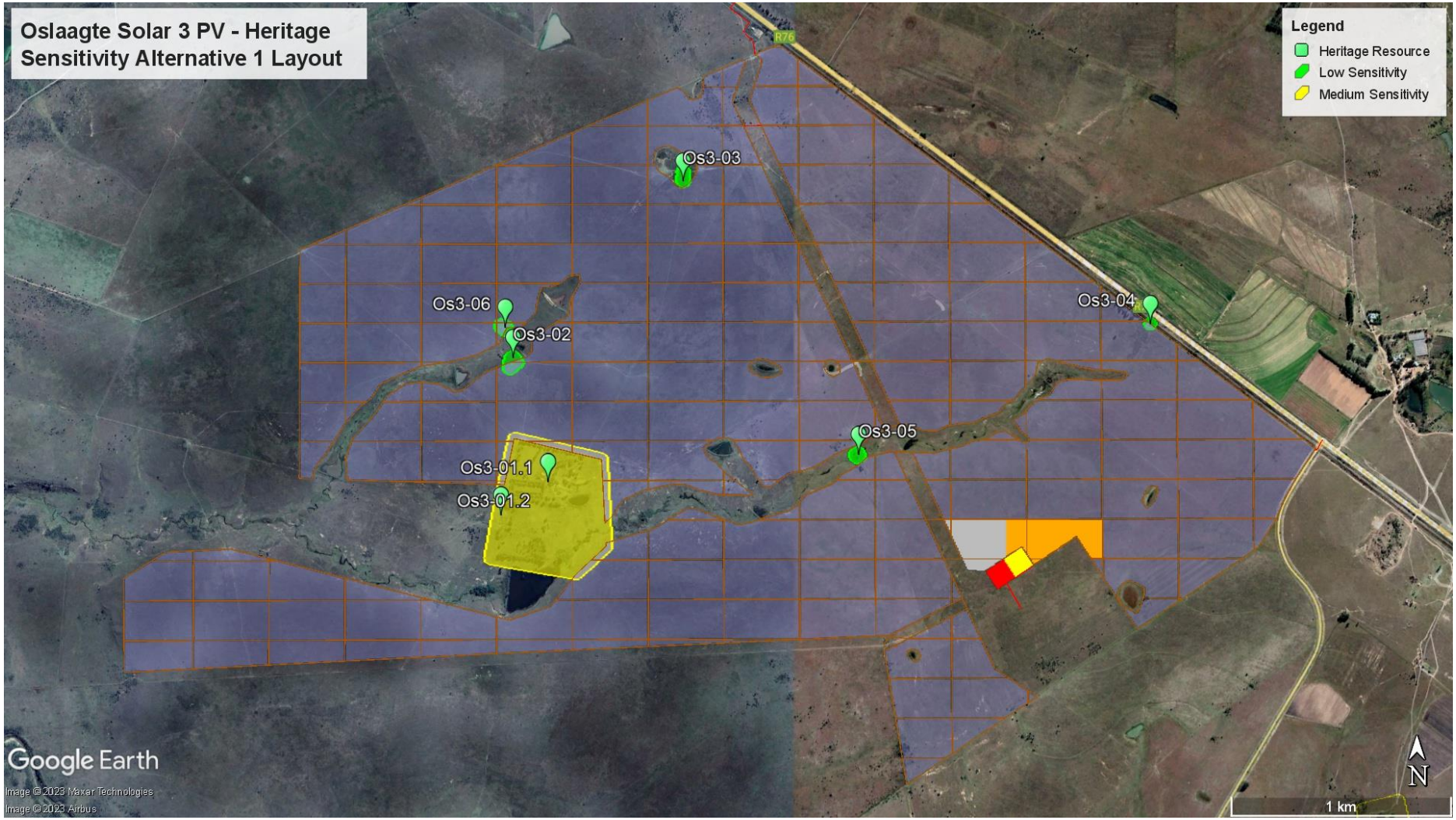


2. Palaeontological Sensitivity map from DFFE screening tool

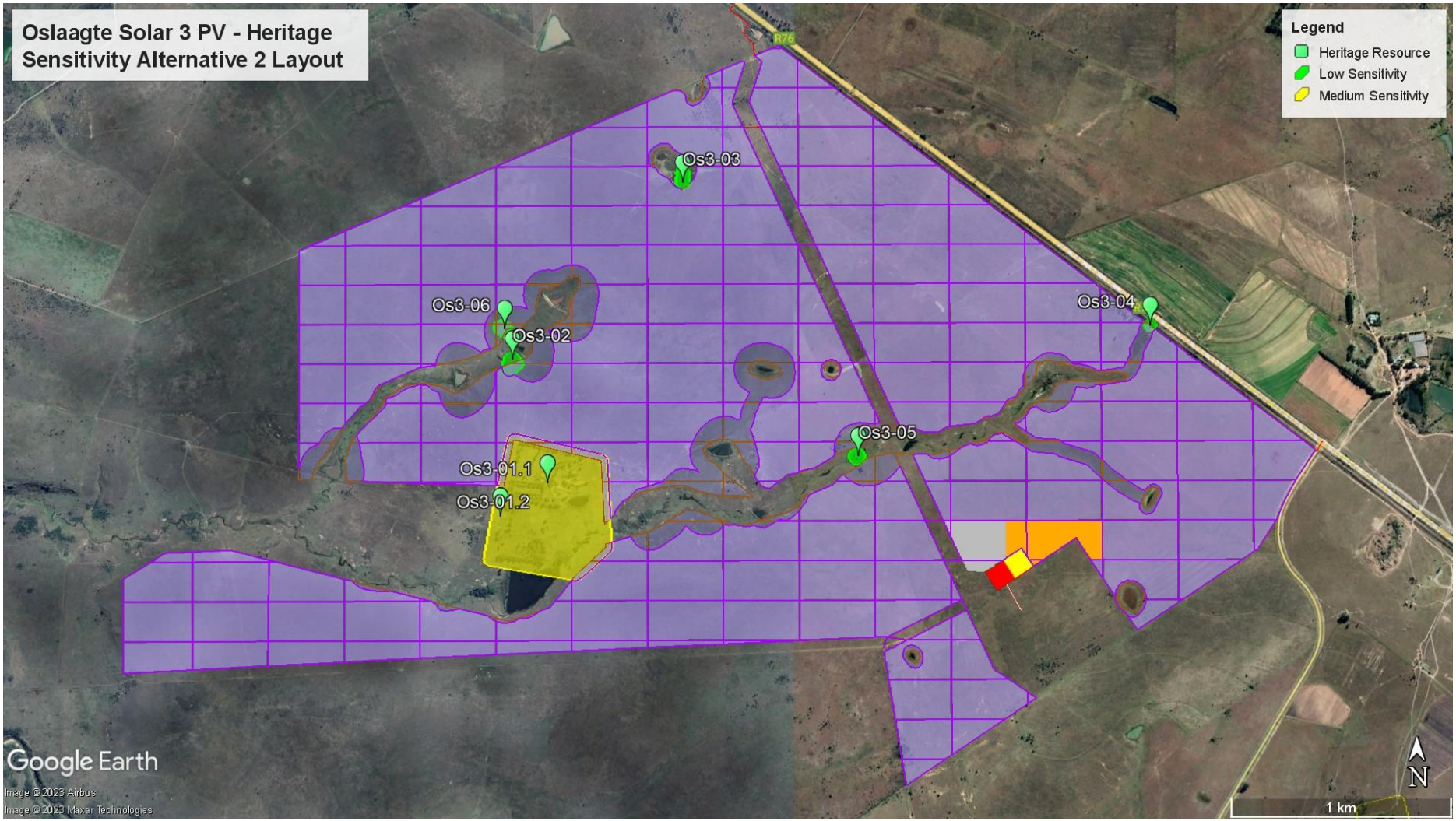


3. HERITAGE SENSITIVITY MAPS BASED ON THE SITE INSPECTION / FIELD SURVEY AND TOPOGRAPHICAL MAP SHEET

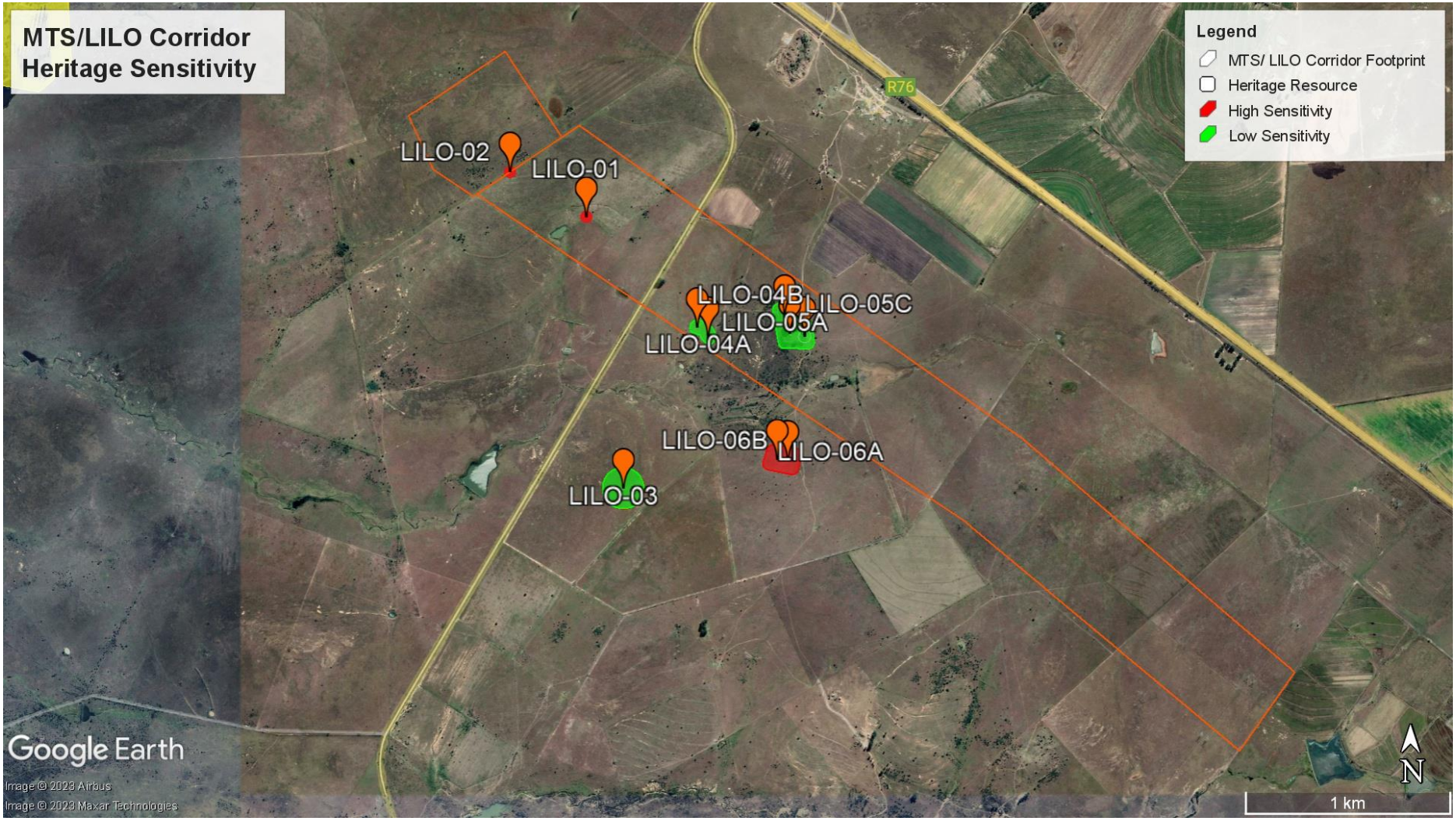
3A. Heritage Sensitivity for Oslaagte Solar 3 PV footprint – Alternative 1



3B. Heritage Sensitivity of Combined footprint for Oslaagte Solar 3 PV footprint – Alternative 2



3C. Heritage Sensitivity for MTS/LILO footprint



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.

4.3 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

4.4 Rustenburg Solar PV Facilities

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

4.5 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

4.6 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

4.7 Carbon Capture Utilisation & Storage Pilot Project

2023 Heritage Specialist, Proposed pilot project for the capture and storage of CO_2, 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