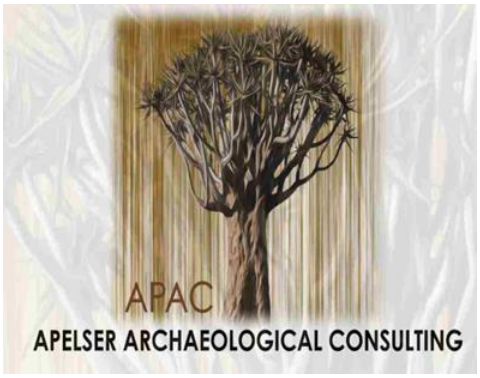

A HERITAGE SCOPING REPORT IMPACT ASSESSMENT RELATED TO THE DEVELOPMENT OF THE SUN CENTRAL1, 300 MW, SOLAR PV FACILITY ADDITIONAL ACTIVITIES ON VARIOUS FARM PORTIONS BETWEEN DE AAR & HANOVER, EMTHANJENI LOCAL MUNICIPALITY, PIXLEY KA SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE, SOUTH AFRICA

For:

Ecoleges Environmental Consultants cc
P.O. Box 516
Machadodorp
1170

REPORT: **APAC023/12**

by:

A.J. Pelser
Accredited member of ASAPA
Member No.106

February 2023

P.O.BOX 73703
LYNNWOOD RIDGE
0040
Tel: 083 459 3091
Fax: 086 695 7247
Email: apac.heritage@gmail.com

Member: AJ Pelser BA (UNISA), BA (Hons) (Archaeology), MA (Archaeology) [WITS]

DISCLAIMER:

Although all efforts are made to identify all sites of cultural heritage (archaeological and historical) significance during an assessment of study areas, the nature of archaeological and historical sites are as such that it is always possible that hidden or subterranean sites, features or objects could be overlooked during the study. APELSER Archaeological Consulting can't be held liable for such oversights or for costs incurred as a result thereof.

Clients & Developers should not continue with any development actions until SAHRA or one of its subsidiary bodies has provided final comments on this report. Submitting the report to SAHRA is the responsibility of the Client unless required of the Heritage Specialist as part of their appointment and Terms of Reference

SUMMARY

APelser Archaeological Consulting cc was appointed by Ecoleges Environmental Consultants, on behalf of SolarAfrica Energy (Pty) Ltd, to undertake a Cultural Heritage Impact assessment related to additional activities associated with the Sun Central Cluster 1, 300MW, Solar PV project in the Northern Cape, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa. The additional activities include the development and widening of roads; extending the transmission line from the Main Transmission Station (MTS) to Line 1 of the 400 kV Eskom powerline; and consolidation of water uses currently authorized under General Authorisation, including additional boreholes, into an Integrated Water Use License.

Previous archaeological and heritage assessments for the Goedehoop Solar PV Project (Phases 1, 2 & 3) recorded a fairly large number of cultural heritage (archaeological & historical) resources of varying extent and significance in the area (**See References List**). These included scatters of open-air surface Stone Age sites, rock engravings, later agro-pastoralist stone-walled sites, as well as historical Anglo-Boer War (1899-1902) sites. No field assessment has been undertaken yet as part of the current study, and this assessment is informed by the results of the previous work, as well as information provided to the Heritage Specialist by the client as a result of field visits conducted by them.

This report discusses the results of the background research and provides recommendations on the way forward at the end, with the potential impacts of the additional activities on the cultural heritage assessed as well.

From a Cultural Heritage point of view, it is recommended that the proposed development activities be allowed to continue, taking into consideration the recommendations put forward at the end of the report.

CONTENTS

1. INTRODUCTION

APelser Archaeological Consulting cc was appointed by Ecoleges Environmental Consultants, on behalf of SolarAfrica Energy (Pty) Ltd, to undertake a Cultural Heritage Impact assessment related to additional activities associated with the Sun Central Cluster 1, 300MW, Solar PV project in the Northern Cape, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa. The additional activities include the development and widening of roads; extending the transmission line from the Main Transmission Station (MTS) to Line 1 of the 400 kV Eskom powerline; and consolidation of water uses currently authorized under General Authorisation, including additional boreholes, into an Integrated Water Use License.

Previous archaeological and heritage assessments for the Goedehoop Solar PV Project (Phases 1, 2 & 3) recorded a fairly large number of cultural heritage (archaeological & historical) resources of varying extent and significance in the area (See References List). These included scatters of open-air surface Stone Age sites, rock engravings, later agro-pastoralist stone-walled sites, as well as historical Anglo-Boer War (1899-1902) sites.

The client indicated the location and boundaries of the areas that had to be assessed and the work was confined to this.

2. TERMS OF REFERENCE

The Terms of Reference for the study was to:

1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the portion of land that will be impacted upon by the proposed development;

2. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;

3. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;

4. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;

5. Review applicable legislative requirements;

3. LEGISLATIVE REQUIREMENTS

Aspects concerning the conservation of cultural resources are dealt with mainly in two Acts. These are the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998).

3.1. The National Heritage Resources Act (Act 25 of 1999)

According to the Act the following is protected as cultural heritage resources:

a. Archaeological artifacts, structures and sites older than 100 years
b. Ethnographic art objects (e.g., prehistoric rock art) and ethnography
c. Objects of decorative and visual arts
d. Military objects, structures and sites older than 75 years
e. Historical objects, structures and sites older than 60 years
f. Proclaimed heritage sites
g. Grave yards and graves older than 60 years
h. Meteorites and fossils
i. Objects, structures and sites of scientific or technological value.

The National Estate includes the following:

a. Places, buildings, structures and equipment of cultural significance
b. Places to which oral traditions are attached or which are associated with living heritage
c. Historical settlements and townscapes
d. Landscapes and features of cultural significance
e. Geological sites of scientific or cultural importance
f. Sites of Archaeological and palaeontological importance
g. Graves and burial grounds
h. Sites of significance relating to the history of slavery
i. Movable objects (e.g., archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.)

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources. An HIA must be done under the following circumstances:

a. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length
b. The construction of a bridge or similar structure exceeding 50m in length
c. Any development or other activity that will change the character of a site and exceed 5 000m^2 or involve three or more existing erven or subdivisions thereof
d. Re-zoning of a site exceeding 10 000 m^2

e. Any other category provided for in the regulations of SAHRA or a provincial heritage authority

Structures

Section 34 (1) of the Act states that no person may demolish any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

Alter means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or the decoration or any other means.

Archaeology, palaeontology and meteorites

Section 35(4) of the Act deals with archaeology, palaeontology and meteorites. The Act states that no person may, without a permit issued by the responsible heritage resources authority (national or provincial)

a. destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
b. destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
c. trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
d. bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.
e. alter or demolish any structure or part of a structure which is older than 60 years as protected.

The above mentioned may only be disturbed or moved by an archaeologist, after receiving a permit from the South African Heritage Resources Agency (SAHRA). In order to demolish such a site or structure, a destruction permit from SAHRA will also be needed.

Human remains

Graves and burial grounds are divided into the following:

a. ancestral graves
b. royal graves and graves of traditional leaders
c. graves of victims of conflict
d. graves designated by the Minister

e. historical graves and cemeteries
f. human remains

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant Heritage Resources Authority:

a. destroy, damage, alter, exhume or remove from its original position of otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

b. destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

c. bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Human remains that are less than 60 years old are subject to provisions of the Human Tissue Act (Act 65 of 1983) and to local regulations. Exhumation of graves must conform to the standards set out in the **Ordinance on Excavations** (**Ordinance no. 12 of 1980**) (replacing the old Transvaal Ordinance no. 7 of 1925).

Permission must also be gained from the descendants (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated to) before exhumation can take place.

Human remains can only be handled by a registered undertaker or an institution declared under the **Human Tissues Act** (**Act 65 of 1983 as amended**).

3.2 The National Environmental Management Act (No. 107 of 1998)

This Act states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made.

Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

The specific requirements that specialist studies and reports must adhere to are contained in Appendix 6 of the EIA Regulations.

4. METHODOLOGY

4.1. Review of Literature

A survey of available literature was undertaken in order to place the development area in an archaeological and historical context. The sources utilized in this regard are indicated in the bibliography. These include Bergh (1999), Huffman (2007) & Lombard et.al (2012).

4.2. Field survey

The field assessment section of any study is conducted according to generally accepted HIA practices and aimed at locating all possible objects, sites and features of heritage significance in the area of the proposed development. The location/position of all sites, features and objects is determined by means of a Global Positioning System (GPS) where possible, while detail photographs are also taken where needed.

No physical assessment of the study area related to the Sun Central Cluster 1 Solar PV Additional Activities has been undertaken yet by the Heritage Specialist

4.3. Oral histories

People from local communities are sometimes interviewed in order to obtain information relating to the surveyed area. It needs to be stated that this is not applicable under all circumstances. When applicable, the information is included in the text and referred to in the bibliography.

4.4. Documentation

All sites, objects, features and structures identified are documented according to a general set of minimum standards. Co-ordinates of individual localities are determined by means of the Global Positioning System (GPS). The information is added to the description in order to facilitate the identification of each locality.

5. DESCRIPTION OF THE AREA

The study and proposed development area is located on portions of various farms situated between De Aar & Hanover in the Emthanjeni Local Municipality of the Pixley Ka Seme District Municipality in the Northern Cape Province of South Africa. The Heritage Impact Assessment forms part of the Basic Assessment for Environmental Authorization for the Main Access Road and Part 2 Amendments for the additional activities e.g. the transmission line, associated with the Sun Central Cluster 1 300MW Solar PV project in the Northern Cape. The additional activities include the development (access road) and widening of roads; extending the transmission line from the Main Transmission Station (MTS) to Line 1 of the 400 kV Eskom powerline; and consolidation of water uses currently authorized under General Authorisation,

including additional boreholes, into an Integrated Water Use License. Access road to MTS and transmission line

The Upper Nama Karoo (Nku3) vegetation of the region is limited by the low annual rainfall (ca. 190 - 200 mm/a) and is dominated by flat plain areas and hills with rocky outcrops. The geology is mostly Dwyka/Ecca shales overlaid with shallow sandy soils that drain well. In general, the topography of the study area is flat and open, with some rocky ridges/outcrops and low hills surrounding present. Tree cover is scarce, but fairly dense ground cover (grass/shrubs/bushes) in some sections did hamper visibility on the ground during the assessment. The focus of the field assessment was therefore on large open patches of soil and erosion dongas, as well as the rocky ridges and outcrops.

For the most part the area has not been disturbed by modern developments, except for a railway line, existing Eskom Powerline corridors that cuts through the areas and have had some impact, with the largest other type of impact being agricultural activities (sheep/cattle; grazing and limited crop growing and ploughing). Farmsteads and related infrastructure are also present, but these will not be directly impacted by the proposed development actions.

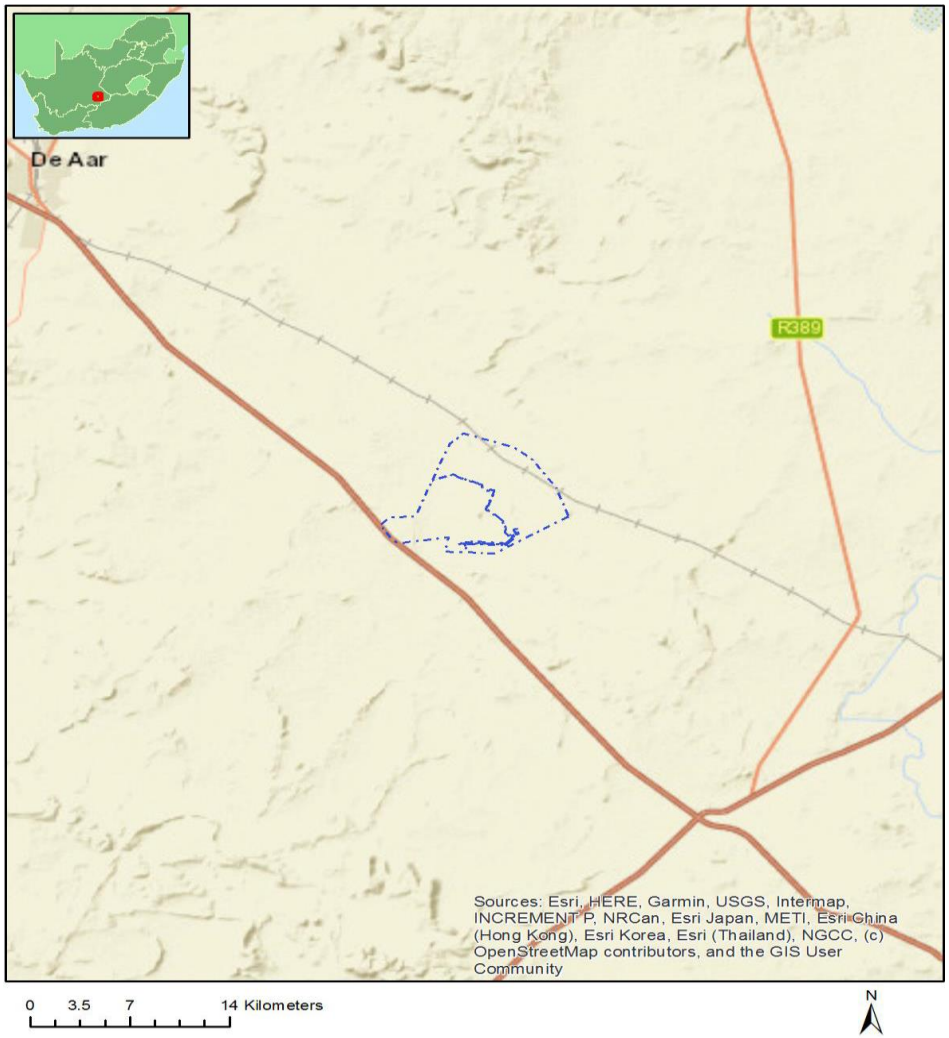

Figure 1: General location of the study & proposed development area footprint (from Screening Report courtesy Ecoleges Environmental Consultants).

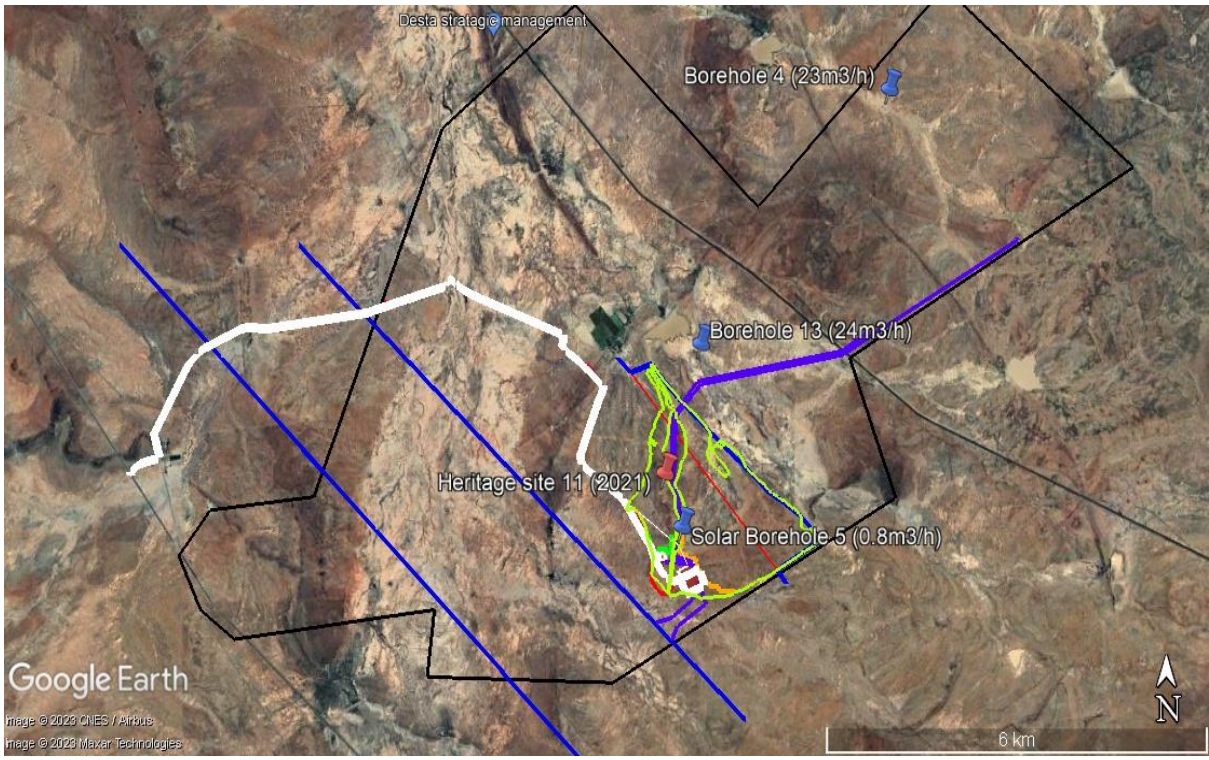

Figure 2: Closer view of the study area showing the proposed transmission lines and Main Transmission Station location (from Google Earth courtesy Ecoleges Environmental Consultants)

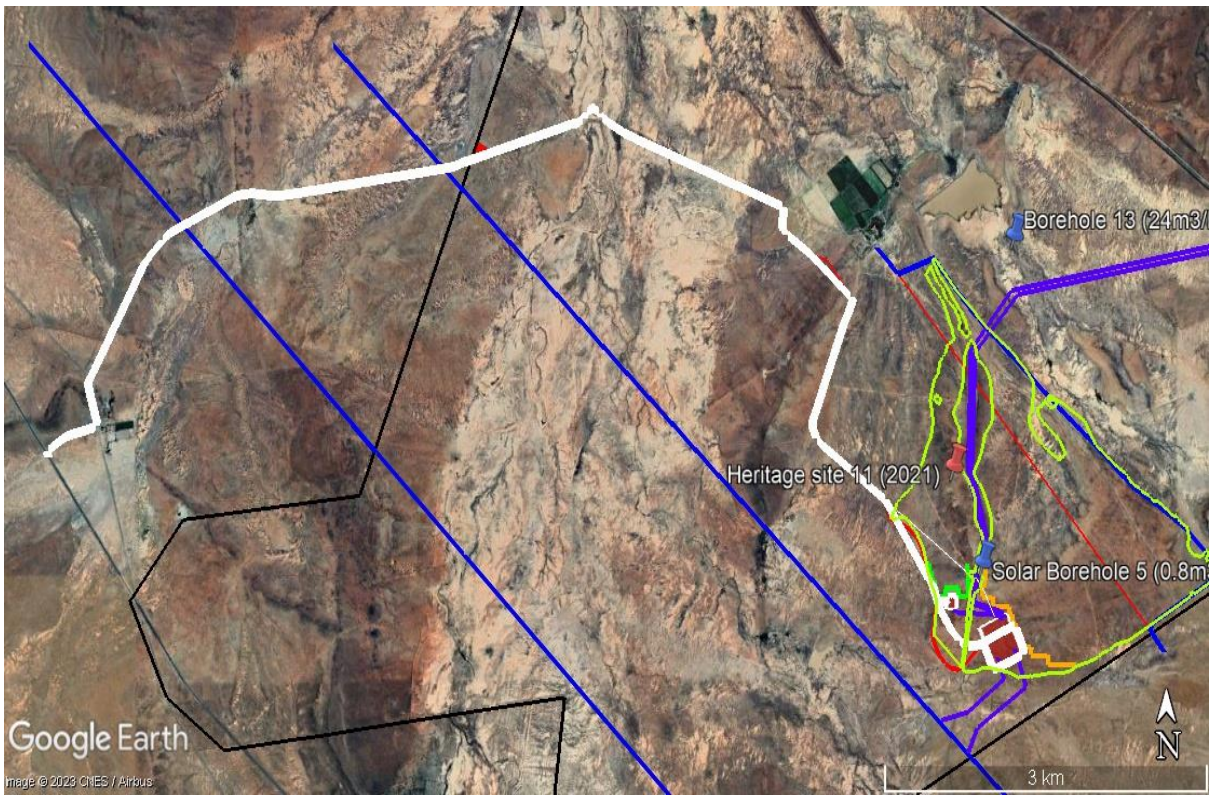

Figure 3: Closer view of Main Access Road from the N10 towards Burgerville (from Google Earth courtesy Ecoleges Environmental Consultants).

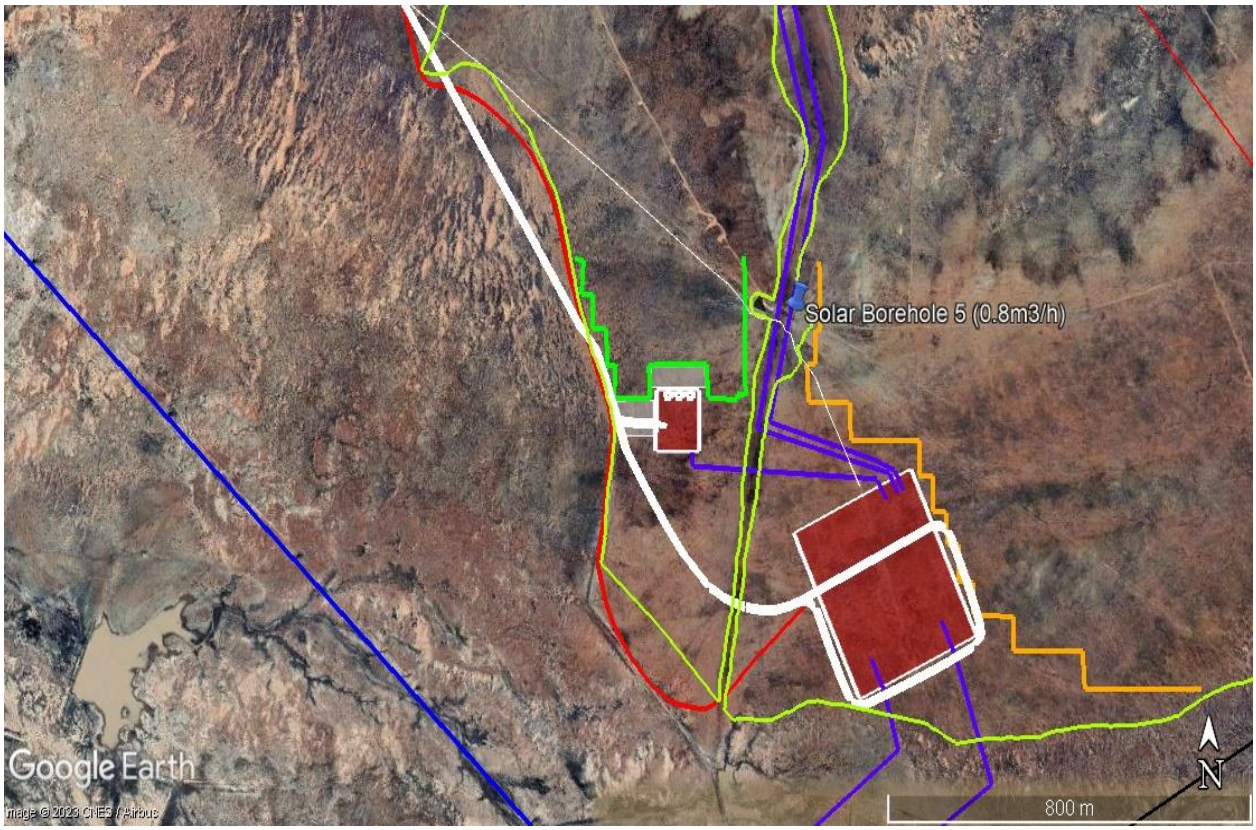

Figure 4: Closer view of MTS and smaller substation location and footprint and access road (from Google Earth courtesy Ecoleges Environmental Consultants).

6. DISCUSSION

In 2016 Ecoleges undertook a S&EIA for the development of a 225 MW Solar PV facility between Hanover and De Aar in the Northern Cape. Three alternative footprints (PV01, PV02, PV03) were investigated during the assessment process. The central footprint (PV02) was identified as the preferred option because of its lower environmental impact and proximity to an existing 400kV Eskom powerline when compared with PV 01 and PV03. The National Department of Environmental Affairs granted an environmental authorization (DEA Reference: 14/12/16/3/3/2/998) on 16th April 2018. This project was originally known as Phase 1. An amendment to increase the capacity (not the footprint) of the facility to 300 MW due to technological advancements in solar photovoltaic efficiency and electrical output was granted on 24th November 2020.

A second amendment was granted in 2021 for the inclusion of containerized lithium-ion battery Storage and dual-fuel backup generators with associated fuel storage as part of the Risk Mitigation Independent Power Producers Procurement Program (RMIPPPP). The competent authority was the National Department of Environmental Affairs because the application was part of the REIPPPP or RMIPPPP BID rounds, which formed part of a Strategic Infrastructure Project (SIP) as described in the National Development Plan, 2011. Soventix SA (Pty) Ltd was an unsuccessful bidder.

Soventix is also currently busy with an application for environmental authorization to develop an additional 300MW on the PV03 footprint (Phase 2) that was considered during the initial S&EIA. It is proposed to connect this second phase to the substation that forms part of the authorized facility on PV02 (Phase 1). Additionally, Soventix is also busy with an application for environmental authorization to develop Phase 3, which involves the development of a third 400 MW Solar Photovoltaic (PV) facility on the Remainder of Farm Goede Hoop 26C and Portion 3 of Farm Goede Hoop 26C. The two additional Solar PV facilities (Phase 2 and 3) will feed into the authorized Main Transmission Sub-station (MTS) on the Phase 1 footprint.

The subsequent expansion of the MTS, inclusion of a 132 kV switching yard, additional access road and staging area, required a third Part 2 amendment to the existing environmental authorization (EA Reference: 14/12/16/3/3/2/998). The amendment (EA Reference: 14/12/16/3/3/2/998/AM4) was granted on 25th November 2022. The same activities and associated infrastructure also required additional water use authorizations in the form of General authorization for specifically Section 21 (a), (b), (c), (i) & (g).

Following the sale of shares and project rights by Soventix SA to SolarAfrica Energy (SAE), another Part 1 amendment (EA Reference: 14/12/16/3/3/2/998/AM4) was granted on 07th December 2022 to reflect the change of contact details and responsible party. The water use authorizations are also being updated.

As the current project scope has grown beyond what was originally envisaged for Phase 1 (now known as Sun Central Cluster 1), additional authorizations will be required to allow necessary road upgrades to the MTS, due to the size and weight of the MTS transformers and associated transport vehicles and to ensure compliance with Eskom minimum road requirements. Additionally, a Cost Estimate Letter (CEL) issued by Eskom during the baseline S&EIA in 2016, made provision for Loop-In, Loop-Out (LILO) into the 400 kV transmission closest to the MTS (known as Line 2). However, Eskom is now allowing SolarAfrica Energy (SAE) to connect to Hydra-Poseidon Line 1, which is a parallel overhead transmission line approximately 2.5 kms away from Line 2 (Figure 1), in case it becomes necessary to utilise this line in future or for future expansion.

Accordingly, we are currently formulating a technical and financial proposal to undertake the following additional activities and associated authorizations:

1. These above-listed changes will result in “triggering” additional Listed Activities not currently included in the EA, necessitating application for additional EA by way of Basic Assessment.

2. The scope of the road upgrades and additional length of transmission line will no longer constitute “low-risk” activities, resulting in an application for a Water Use License, which will also consolidate all the current water uses authorized under General Authorization into an Integrated Water Use License. Furthermore, additional water, by way of groundwater, will be required for the project, to ensure adequate water provision for the road upgrades, on-site concrete batching activities, and transmission line pylons.

3. Finally, concrete batching was not included in the scope of the baseline S&EIA and will need to be included in the scope by way of another Part 2 amendment.

The client or applicant is SolarAfrica Energy (Pty) Ltd, a renewable energy company with its head office in Pretoria. The property owner is Mr. Willem Retief that has entered into a land use agreement with SolarAfrica Energy (SAE). The main access to the site is off the N10 between De Aar & Hanover. The current land use is sheep farming, which will continue within the solar PV plants to ensure minimal reduction (if any) on agricultural potential of the land as well as a management tool to control vegetation growth.

A number of Heritage Impact Assessments have been undertaken in the larger geographical area, as well as for the previous Phases for the Solar PV development (**See List of References**). Although a fairly large number of cultural heritage (archaeological and/or historical) resources were identified and recorded during these assessments, no Grade I or II sites (National or Provincial Heritage Sites) have been identified in close proximity to the proposed development area as yet.

The possible impact of the proposed development on paleontological resources is gauged by using the fossil sensitivity maps available on the SAHRIS and the nature of the proposed development.

Karoo Sedimentary Rocks

The Beaufort Group contains fossils of diverse terrestrial and freshwater tetrapods of Tapinocephalus and Lystrosaurus genere (amphibians, true reptiles, synapsids – especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways) and sparse vascular plants (Glossopteris Flora, including petrified wood) that dates to the Late Permian – Early Triassic Periods (c. 266 – 250 Ma). The area of the proposed development where this geological signature occurs is regarded as highly sensitive with regards to palaeontological heritage (Palaeo Field Services cc 2014: 5).

Karoo Dolorites

No fossil heritage has been recorded in these intrusive dolerites (dykes, sills) and associated diatremes. The dolorite dykes and sills within the area of the proposed development are not palaeontologically significant. Notice must however be taken of the presence of these features as Stone Age quarry sites are usually found at the foot of dolerite hills where hornfels outcrops occur. Dolerite is also associated with engraving sites. One such site has been recorded at the Commonage in Hanover Town (Palaeo Field Services 2014: 5).

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools. In South Africa the Stone Age can be divided basically into three periods. It is however important to note that dates are relative and only provide a broad framework for interpretation. A basic sequence for the South African Stone Age (Lombard et.al 2012) is as follows:

Earlier Stone Age (ESA) up to 2 million – more than 200 000 years ago
Middle Stone Age (MSA) less than 300 000 – 20 000 years ago
Later Stone Age (LSA) 40 000 years ago – 2000 years ago

The Stone Age is well represented in the area by the archaeological remains associated with Stone Age hunter gatherers and herders and includes cave shelters and surface sites. These occurrences cover represent the Early, Middle and Later Stone Ages. Erosion gullies and river/streambeds and dolerite outcrops are usually associated with stone tool assemblages (Palaeo Field Services 2014: 6).

For prehistory, Sampson's (1972, 1974) survey of the Seacow drainage near Hanover (part of his Orange River Scheme) is the most important archaeological project in the Karoo environment of the Northern Cape. His team recorded sites and quarries, ranging from the Earlier, Middle and Later Stone Ages, to proto-historic pastoralist camps and Historic farmyards. Among other things, the research noted a correlation between age and the patina on hornfels (also called lydianite and indurated shale): dark brown to yellow = Earlier Stone Age; red = Middle Stone Age; grey to grey brown = Lockshoek; light brown/tan = Interior Wilton; and black = Smithfield (the last three belonging to the Later Stone Age). This culture-history sequence forms a basis for identifying stone tool industries and historic occupations over the entire district. There have been several investigations in the De Aar district itself because of the ammunition disposal plant to the west and various solar panel projects (e.g., Kaplan 2010; Kruger 2012; Morris 2011). Generally, archaeologists have found scatters of stone tools dating to the Middle and Later Stone Ages. In addition, the ammunition area yielded an Earlier Stone Age scatter, and a few rock art sites are on record for the district (Morris 1988; Rudner and Rudner 1968). These reports show that the De Aar district has a rich archaeological heritage (Huffman 2013: 3).

Surface scatters of stone tools (mostly Early and Middle Stone Age) were recorded during various earlier Heritage Impact Assessments: - The farm Plooysfontein 93 (Palaeo Field Services 2014: 6; 24) in the Hanover District.

- Erf 3094 on the old De Aar 180 farm (Huffman 2013: 5-6)
- A variable density of stone artifacts, mostly of Pleistocene age, was noted over most of the area examined during the Archaeological Specialist Input on the site of the proposed Taaibosch Photovoltaic Plant between De Aar and Hanover (David Morris 2011). Rock art sites have also been recorded (Morris 1988, Rudner & Rudner 1968). Included are the engraving sites at the Hanover Town Commonage and at the farm Groenfontein, Hanover District. (Palaeo Field Services 2014).

A number of Stone Age sites were identified and recorded during the 2017, 2021 & 2022 assessments for the Soventix Solar PV Project (for the Phases 1, 2 & 3 Solar PV Developments). Some of these sites are located in close proximity to the current study area for the additional activities.

The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artifacts. In South Africa it can be divided in two separate phases (Bergh 1999: 96-98), namely:

Early Iron Age (EIA) 200 – 1000 A.D
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

Early Iron Age (EIA) 250 – 900 A.D.
Middle Iron Age (MIA) 900 – 1300 A.D.
Late Iron Age (LIA) 1300 – 1840 A.D.

The Iron Age is not represented in the general area of the development. While no distinct IA sites were found during the previous assessments, one of the sites recorded during the February 2021 assessment could represent a proto-historic pastoralist structure similar to those described by Sampson.

The historical age started with the first recorded oral histories in the area. It includes the moving into the area of people that were able to read and write, but more recently also refers to the last five hundred years of South African history. Farms and other historical settlements in the area date back to the 1840's, while the area also have evidence associated with the South African (Anglo Boer) War. Signs of historical occupation is common in the general area and includes abandoned sheep kraals and homestead ruins. Old railway infrastructure (housing, old railway lines and foundations) was also recorded (at nearby Burgervilleweg (Becker 2012).

The proximity of the railway means that material traces may exist alongside that relate to its construction, maintenance and use, and its protection by way of blockhouses, as a major transport route for British forces further inland during the Anglo-Boer War. The Google Earth image of the area clearly shows different generations of railway alignment within the study area. Jean Beater's heritage report describes Anglo-Boer War redoubts (components of a blockhouse line) on the north side of the older railway (Beater 2011).

A number of historical sites, features and artifacts dating to recent historical times (some also related to the Anglo-Boer War) was identified and recorded during the previous assessments for the various Phases of the proposed Solar PV development in the larger study area.

The Heritage Impact Assessment for the Sun Central Cluster 1, 300MW, Solar PV Facility Additional Activities did not include a physical field visit as this stage. The results of previous work done in the area were utilized in order to determine the possible existence of known (earlier recorded sites) cultural heritage resources in the activity areas, the potential impact of the proposed development activities on these, as well as to indicate the potential of similar,

unrecorded sites, features and material in the study area. Information provided by the client (Ecoleges) from a recent site visit to the area was also used.

The cumulative impacts of similar developments in the larger region were not investigated as they are not particularly applicable to the Cultural Heritage sites, given the fairly localized context.

A fairly large number of archaeological and recent historical sites and features were identified during the 2017, 2021 and 20223 field assessments for Phases 1, 2 & 3 of the Solar PV development in the area. Most of these were open-air surface scatters of Stone Age material, while a number of sites dated to the Anglo-Boer War (or South African War) of 1899-1902 or are related to recent historical farming-related activities. A number of these sites are being archaeologically investigated as part of Archaeological Mitigation measures (under a SAHRA permit), while the sites are also included in a Cultural Heritage Management Plan recently submitted for implementation.

The heritage sites identified and recorded in the larger area for the Solar PV Phases 1, 2 and 3 Developments will not be discussed in this report as they were dealt with in detail in the 2017, 2021 & 2022 HIA Reports. However, some of the sites recorded in 2017 and 2021 are located in relative close proximity to the Additional Activities (Access Road, MTS) for Sun Central Cluster 1 facility, and these will be discussed and included here.

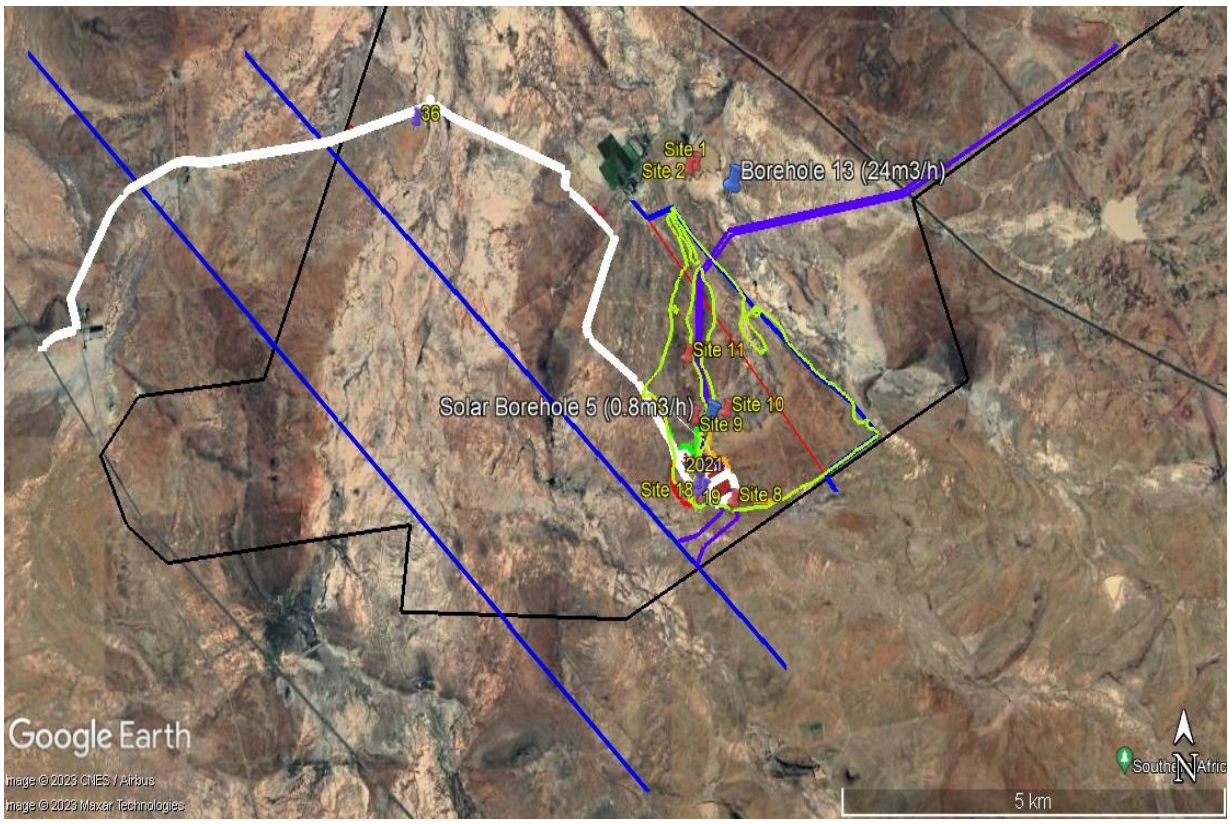

Figure 5: Map showing the location of sites in close proximity to the study & development area (Google Earth 2023). The sites indicated with blue pins were recorded in 2017, with those in red in 2022.

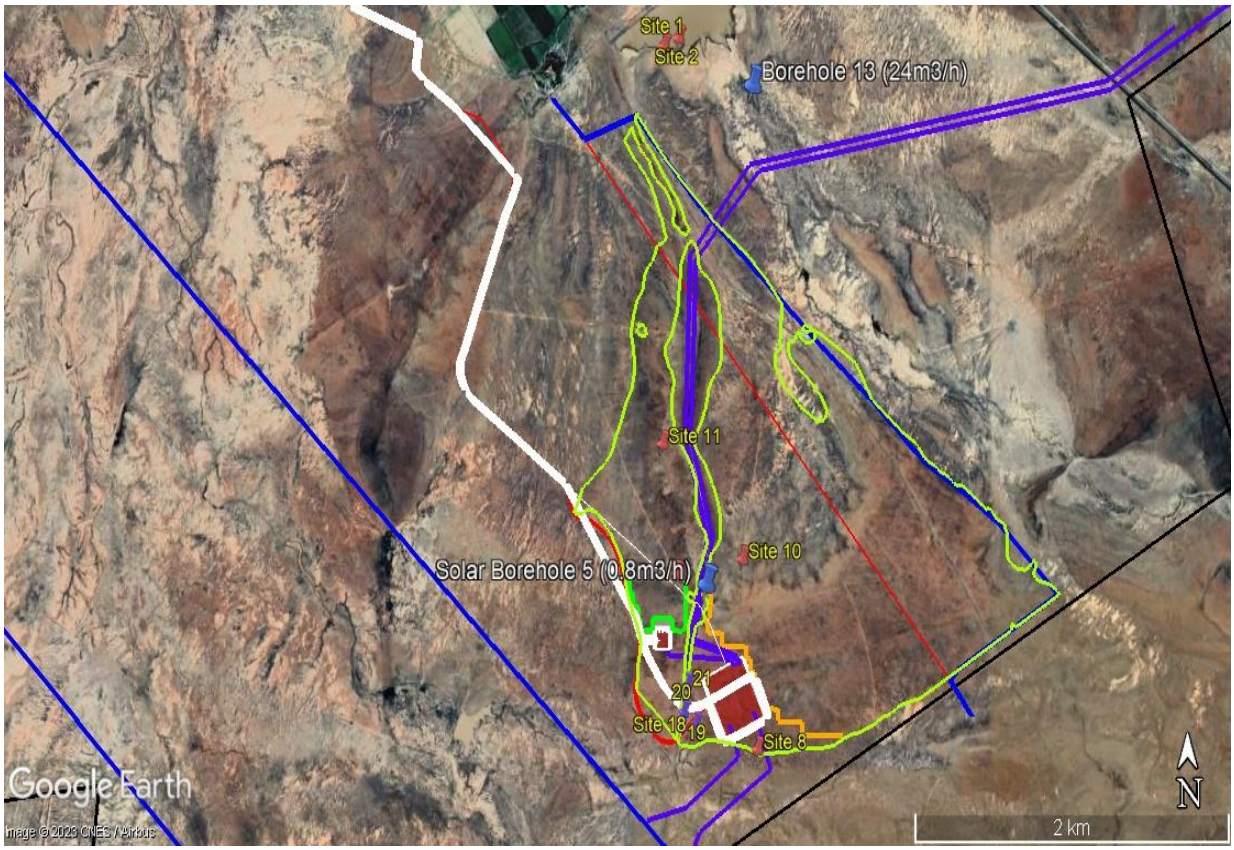

Figure 6: Closer view showing the location of the sites (Google 2023).

Discussion

<u>Sites recorded in 2017</u>

1. **Site 18**

Site 18 is a scatter of low-density stone tools, as well as some ostrich egg shell fragments. The site was given a Medium Heritage Significance rating, and it was recommended that the site be mitigated before destruction. This site is included under SAHRA Permit for Phase 2 Mitigation.

GPS Coordinates: S30.89070 E24.31404.

2. **Sites 19, 20 & 21**

All three these sites are represented by stone-packed enclosures, and were identified as redoubts associated with the Anglo-Boer War. Cultural material in the form of cartridges, porcelains, glass and metal objects were recorded in association with these sites.

The sites were given a Medium Significance Rating and it was recommended that they should be recorded in detail before destruction. The sites are on the banks of watercourse and development exclusion zone and a 30m no-go buffer zone was therefore recommended. These sites are also included under a SAHRA Permit for archaeological mitigation.

GPS Coordinates: S30.89076 E24.31306 (19); S30.89010 E24.31322 (20) & S30.88885 E24.31347 (21).

3. **Site 36**

Site 36 is represented by 3 shallow "excavations", circular in shape, into the bedrock. These features were identified as possible dried-up dams or water reservoirs at the time. The site was given a Medium Heritage Significance Rating. No further mitigation measures were recommended in the 2017 report.

GPS Coordinates: S30.85412 E24.27465.

Figure 7: Stone enclosure/redoubt at Site 19.

Figure 8: late 19th century British .303 cartridge at Site 19.

Figure 9: The stone-packed feature at Site 20.

Figure 10: One of three circular "excavations" on Site 36.
These are most likely dried-up dams/water reservoirs.

Sites recorded in 2021

1. **Site 1**

Site 1 is rocky outcrop with a number of rocks containing possible engravings in the form of various striations and lines. Although the age of the engravings could not be determined without a doubt, it could be related to proto-historic pastoralists that moved through the area. Stone Age material (tools/flakes) was also identified in the general proximity of the site. Should the site be negatively impacted by the proposed development activities it was recommended that Phase 2 Archaeological mitigation work be undertaken. This will entail the detailed mapping, photographic recording and drawing of the site and the individual engravings (through detailed rubbings) to ensure the capturing of the information contained on the site before destruction. The site was given a Medium to High Heritage Significance Rating.

If the development avoids the site and the rock engravings on it, by maintaining a 30m buffer zone around them within which no development is allowed, then no further action will be required for Site 1.

GPS Coordinates: S30 51 32.10 E24 18 43.00.

Figure 11: View of Site 1 with rock engravings.

2. **Sites 2, 8, 9 & 10**

These sites were all open-air surface scatters with differing densities of material (flakes, more formal tools such as blades and scrapers, hammer stones) on them. These artifacts and sites date to between the MSA and LSA and is similar to those found in other areas during the 2017 assessments and in other studies by archaeologists in the larger geographical area. Although only 10 sites were identified, there could potentially be many more located in the area. and the focus was therefore on more open patches of ground, erosion dongas and pans. Some of the sites were located close to and around the low hill that runs through a section of the study area and around rocky outcrops.

Although these sites and finds are open-air surface locations and not in a primary context, it was believed that they would contribute to our knowledge of the Stone Age of the specific and larger geographical area. The sites were given a Medium to High Heritage Significance Rating. If the sites can't be avoided by the development activities and need to be destroyed as a result then the following mitigation measures were recommended prior to development commencing:

1 Mapping of surface sites to determine their extents
2. Surface collection of material to obtain a representative sample of Stone Age material and types to determine the age of the material and sites

GPS Coordinates: S30 51 30.70 E24 18 46.50 (2); S30 53 30.60 E24 19 05.40 (8); S30 53 00.90 E24 18 45.90 (9) & S30 52 58.50 E24 19 01.80 (10).

Figure 12: Some of the material from Site 8. These are typical of the Stone Age scatters at most of the known sites located in the area.

3. **Site 11**

Site 11 contains the remains of what seemed to be a collapsed stone-walled enclosure close to a low hill in the area, situated on a natural rocky terrace, as well as a smaller section of stone walling. A grinding hollow was also recorded in close proximity. Although the age and function of these features could not be determined without a doubt at the time, it is likely related to proto-historical pastoralists and could represent the remnants of a small camp. Although the site was not completely intact, these types of sites are fairly scarce and slowly disappearing from the landscape as a result of various factors such as developments. It was therefore given a Medium to High Significance rating from a Cultural Heritage perspective. It was recommended that the site should be avoided if possible and be preserved in situ & included in a Heritage Management Plan. If the proposed development actions can't avoid the site the following was recommended:

1. Detailed mapping and drawing of the site and its features
2. Limited archaeological excavations on the site before destruction.

GPS Coordinates: S30 52 39.10 E24 18 42.60.

Figure 13: Collapsed stone-walled enclosure on Site 11.

Although none of the sites discussed above will be directly impacted by the additional activities (access road, MTS, transmission lines and boreholes), it is clear from this that there are a range of archaeological and recent historical sites, features and material present in the study and development area. It is highly likely that many similar sites will be present in the areas that have not been physically assessed as yet. This will include to a large degree open-air Stone Age sites with varying densities of tool scatters.

Although there is therefore a likelihood of negative impacts on cultural heritage sites through the development of the access roads, transmission lines and MTS, the fact that there are already archaeological mitigation measures ongoing on similar sites in the area, will minimize the impacts of the Solar PV developments on the archaeological and historical heritage of the area. It is however recommended that a Chance Find Procedure be developed and implemented for the Sun Central Cluster 1 300MW Solar PV Facility Additional Activities.

Further to the above, during an early December 2022 field assessment by representatives of Ecoleges to the study and development area, some archaeological material and a number of recent historical features and associated cultural material were superficially identified by them. The information and photographic record were provided to APAC cc. These finds and sites were located close to and in the “reserve” of the Main Access Road off the N10 to de Aar towards Burgerville. Based on this the following conclusions and recommendations can be made:

1. The remains of recent historical farming-related settlement are located in the area close to and around the access road. This includes stone-walled enclosures (kraals)

and homesteads. Cultural material associated with these remains were found that included fragments of decorated ceramics dating the sites to between the late 19th and early 20th centuries. These sites are given a Medium to High Heritage Significance Rating and should they be impacted directly be the development activities should be mitigated through archaeological measures that will include detailed mapping and drawing, as well as limited excavations. If they can be avoided then these sites should be included in the Cultural Heritage Management Plan for the Solar PV development.

2. Stone Age material, similar to those found on other sites during previous assessments, also occur here. It is envisaged that more of these scatters of material (individual and denser concentrations of tools) will be present in the area as well. These finds and sites will be given a Low to Medium Heritage Significance rating. As many similar sites in the area are already forming the focus of detailed archaeological mitigation work, no further mitigation is required.

GPS Coordinates for finds made by Ecoleges: S30 51 25.58 E24 14 33.51 (stone-walled enclosure/kraal; S30 51 25.58 E24 14 33.51 (homestead remains); S30 51 25.73 E24 14 33.78 (decorated ceramics) and S30 57 22.08 E24 21 05.70 (stone tool).

As the development of the Main Access Road will remain within the road servitude however, the only reaction required going forward is to update the Cultural Heritage Management Plan for the Solar PV Facility, to include the recently identified historical features and remains.

Finally, as mentioned earlier, it is recommended that a Chance Find Procedure is drafted and implemented for the Sun Central Cluster 1 PV Facility additional activities. This will ensure that if any significant archaeological and/or recent historical sites, features or material are exposed during the development actions, that proper measures are taken to investigate and record these before recommendations are made on the way forward (which could include surface sampling, mapping and drawing and possibly excavation).

Figure 14: View of the Main Access Road looking west towards the N10 (courtesy Ecoleges).

Figure 15: View of stone-walled enclosure/kraal next to the Main Access Road looking south (courtesy Ecoleges).

Figure 16: Homestead remains next to the Main Access Road looking north (courtesy Ecoleges).

Figure 17: Late 19th to early 20th century decorated ceramics found in association with the site (courtesy Ecoleges).

Figure 18: MSA/LSA waste-flake found in the general area around the access road (courtesy Ecoleges).

Although a physical assessment of the Sun Central Cluster 1 study and development area (for the associated additional activities) have not been undertaken by the Heritage Specialist and the number of sites that are likely located here has not been determined, the likelihood of sites occurring here is fairly high. Rating the potential impacts of these activities on the cultural heritage of the study area, and providing mitigation measures based on this, is therefore possible.

Impact Assessment and Mitigation Measures

The significance of impacts is determined using the following criteria:

Probability: describes the likelihood of the impact actually occurring

- **Improbable:** the possibility of the impact occurring is very low, due to the circumstances, design or experience.
- **Probable:** there is a probability that the impact will occur to the extent that provision must be made therefore.
- **Highly probable:** it is most likely that the impact will occur at some stage of the development.
- **Definite:** the impact will take place regardless of any prevention plans and there can only be relied on mitigation measures or contingency plans to contain the effect.

Duration: the lifetime of the impact

- **Short Term**: the impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.
- **Medium Term:** the impact will last up to the end of the phases, where after it will be negated.
- **Long Term:** the impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
- **Permanent:** the impact is non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.

Scale: the physical and spatial size of the impact

- **Local:** the impacted area extends only as far as the activity, e.g., footprint
- **Site:** the impact could affect the whole or measurable portion of the abovementioned property.
- **Regional:** the impact could affect the area including the neighboring residential areas.

Magnitude/Severity: Does the impact destroy the environment, or alter its function

- **Low:** the impact alters the affected environment in such a way that natural processes are not affected.
- **Medium:** the affected environment is altered, but functions and processes continue in a modified way.
- **High:** function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

Significance: This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

- **Negligible:** the impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
- **Low:** the impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
- **Moderate:** the impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
- **High:** The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The significance is calculated by combining the criteria in the following formula:
Sum (Duration, Scale, Magnitude) x Probability
S = Significance weighting; Sc = Scale; D = Duration; M = Magnitude; P = Probability

With some sites, features and material of cultural heritage origin and significance found in the general and study area during previous assessments, the current site layout provided will have some impact on the cultural heritage resources of the area.

Aspect	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	**4**
	Definite	5
Duration	Short Term	1
	Medium Term	3
	Long Term	**4**
	Permanent	5
Scale	Local	1
	Site	**2**
	Regional	3
Magnitude/Severity	Low	2
	Medium	**6**
	High	8
Significance	**Sum (Duration, Scale, Magnitude)**	**x Probability**
	Neglible	≤20
	Low	>20≤40
	Moderate	**>40≤60**
	High	>60

Results: 4+2+6×4 = 48 i.e., >40≤60

The impact of the proposed development on the recorded and known cultural heritage sites in the area, as well as those unknown sites likely to occur here, is therefore deemed as Moderate based on the Impact Assessment criteria used. There is also always a possibility of sites, features and material being missed as a result of various factors such as vegetation cover hampering visibility on the ground, as well as the often-subterranean nature of cultural heritage resources (including low stone-packed or unmarked graves). These factors need to be taken into consideration and it is therefore recommended that a Chance Finds Protocol be drafted and implemented for the Sun Central Cluster 1 330MW Solar PV Facility additional activities.

From a Cultural Heritage point of view it can be said that the proposed Sun Central Cluster 1 300MW Solar PV Facility (Additional Activities) on portions of various farms, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa should be allowed to continue once the recommended mitigation measures related to the archaeological & historical sites and features have been implemented.

7. CONCLUSIONS AND RECOMMENDATIONS

APelser Archaeological Consulting cc was appointed by Ecoleges Environmental Consultants, on behalf of SolarAfrica Energy (Pty) Ltd, to undertake a Cultural Heritage Impact assessment related to additional activities associated with the Sun Central Cluster 1, 300MW, Solar PV project in the Northern Cape, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa. The additional activities include the development and widening of roads; extending the transmission line from the Main Transmission Station (MTS) to Line 1 of the 400 kV Eskom powerline; and consolidation of water uses currently authorized under General Authorization, including additional boreholes, into an Integrated Water Use License.

Previous archaeological and heritage assessments for the Goedehoop Solar PV Project (Phases 1, 2 & 3) recorded a fairly large number of cultural heritage (archaeological & historical) resources of varying extent and significance in the area. These included scatters of open-air surface Stone Age sites, rock engravings, later agro-pastoralist stone-walled sites, as well as historical Anglo-Boer War (1899-1902) sites.

It is clear from previous assessments for Phase 1, 2 & 3 of Solar PV Facility Development that a fairly large number of archaeological and recent historical sites occur in the general and specific study area. A number of these identified during the 2017 and 2021 studies are located in close proximity to and in the current study area. Some of these sites are already the focus of Phase 2 Archaeological Mitigation work, while some of the sites are also included in a CHMP recently drafted and submitted for the Solar PV development in the study area. The impacts on these sites will therefore already be mitigated. It is also envisaged that many similar unrecorded sites are highly likely to still occur in the study and development area, and that there will be some impacts on the cultural heritage resources here.

Although a physical assessment of the Sun Central Cluster 1 study and development area (for the associated additional activities) have not been undertaken by the Heritage Specialist and the number of sites that are likely located here has not been determined, the likelihood of sites occurring here is fairly high. Some sites, features and material were identified during a recent site visit by representatives of Ecoleges, especially close to the Main Access Road section, confirming this conclusion. Rating the potential impacts of these activities on the cultural heritage of the study area, and providing mitigation measures based on this, was therefore possible. The impact of the proposed development on the recorded and known cultural heritage sites in the area, as well as those unknown sites likely to occur here, is deemed as Moderate based on the Impact Assessment criteria used. There is also always a possibility of sites, features and material being missed as a result of various factors such as

vegetation cover hampering visibility on the ground, as well as the often-subterranean nature of cultural heritage resources (including low stone-packed or unmarked graves). These factors need to be taken into consideration and it is therefore recommended that a Chance Finds Protocol be drafted and implemented for the Sun Central Cluster 1 330MW Solar PV Facility additional activities.

From a Cultural Heritage point of view it can be said that the proposed Sun Central Cluster 1 300MW Solar PV Facility (Additional Activities) on portions of various farms, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa should be allowed to continue once the recommended mitigation measures related to the archaeological & historical sites and features have been implemented.

8. REFERENCES

General and Closer views of Study Area location & footprints: Google Earth 2022.

Location & Distribution of Sites Found: Google Earth 2022.

Beater, J. 2011. **CULTURAL HERITAGE REVIEW OF PROPOSED ESTABLISHMENT OF PHOTO VOLTAIC (SOLAR POWER) PANELS ON THE FARM TAAIBOSCHFONTEIN, NO 41, HANOVER DISTRICT, NORTHERN CAPE (As part of the Environmental Impact Assessment for the overall project).** Unpublished Report for Scatec Solar SA (Pty) Ltd. February 2011.

Becker, E. 2012. **Transnet Capital Projects. Ngqura 16 Mpta Manganese Rail. Phase 1 Heritage Impact Assessment Kimberley - De Aar**. Unpublished Report. For Transnet. October 2012.

Bergh, J.S. (red.). 1999. **Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies**. Pretoria: J.L. van Schaik.

Huffman, T.N. 2007. Handbook to the Iron Age: **The Archaeology of Pre-Colonial Farming Societies in Southern Africa**. Scotsville: University of KwaZulu-Natal Press.

Huffman, T.N. 2013. **ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE DE AAR PROJECT, NORTHERN CAPE.** A Phase I report prepared for Seaton Thompson & Associates. March 2013.

Knudson, S.J. 1978. **Culture in retrospect**. Chicago: Rand McNally College Publishing Company.

Lombard, M., L. Wadley, J. Deacon, S. Wurz, I. Parsons, M. Mohapi, J. Swart & P. Mitchell. 2012. **South African and Lesotho Stone Age Sequence Updated (I).** South African Archaeological Bulletin 67 (195): 120–144, 2012.

Morris, D. 2011. **ARCHAEOLOGY SPECIALIST INPUT ON THE SITE OF THE PROPOSED**

TAAIBOSCHFONTEIN PHOTOVOLTAIC CONSTRUCTION SITE BETWEEN DE AAR AND HANOVER, NORTHERN CAPE. Unpublished Report for Scatec Solar SA (Pty) Ltd. September 2011.

Palaeo-Field Services cc. 2014. **Phase 1 Heritage Impact Assessment of an existing quarry on the farm Plooysfontein 93 near Hanover, NC Province**. Unpublished Report for EKO Environmental Consultants. 2014.

Pelser, A.J. & A. Radford. 2016**. Soventix Solar PV Project on the farm Goedehoop, near Hanover, Emthanjeni Municipality, Pixley Ka Seme District, Northern Cape**. Unpublished Scoping Report. For EcoLeges Environmental Consultants. November 2016**.**

Pelser, A.J. & A. Van de Venter. 2017. **Report on Phase 1 Heritage Assessment for the Proposed Soventix Solar PV Project on various farms, near Hanover, Emthanjeni Municipality, Pixley Ka Seme District, Northern Cape.** Unpublished Report APelser Archaeological Consulting cc APAC017/11. For: EcoLeges Environmental Consultants. March 2017.

Pelser, A.J. 2021. **Report on a Phase 1 Heritage Impact Assessment for the development of the Goedehoop 300MW Solar PV Facility located on several portions of farms in the Hanover District, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality in the Northern Cape Province.** Unpublished Report APelser Archaeological Consulting cc APAC021/10. For: EcoLeges Environmental Consultants. February 2021.

Pelser, A.J. 2022. **A Report on a Phase 1 Archaeological & Heritage Impact Assessment related to the Development of a 400 MW Solar Photovoltaic (PV) Facility and Associated (Phase 3) on the Remainder of Farm Goede Hoop 26C, Portion 3 of farm Goede Hoop 26C and other properties between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa.** Unpublished Report APelser Archaeological Consulting cc. APAC022/49. For: EcoLeges Environmental Consultants. October 2022.

Republic of South Africa. 1999. **National Heritage Resources Act** (No 25 of 1999). Pretoria: The Government Printer.

Republic of South Africa. 1998. **National Environmental Management Act** (no 107 of 1998). Pretoria: The Government Printer.

APPENDIX A: DEFINITION OF TERMS:

Site: A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artifacts, found on a single location.

Structure: A permanent building found in isolation or which forms a site in conjunction with other structures.

Feature: A coincidental find of movable cultural objects.

Object: Artifact (cultural object).

(Also see Knudson 1978: 20).

APPENDIX B: DEFINITION/ STATEMENT OF HERITAGE SIGNIFICANCE

Historic value: Important in the community or pattern of history or has an association with the life or work of a person, group or organization of importance in history.

Aesthetic value: Important in exhibiting particular aesthetic characteristics valued by a community or cultural group.

Scientific value: Potential to yield information that will contribute to an understanding of natural or cultural history or is important in demonstrating a high degree of creative or technical achievement of a particular period

Social value: Have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.

Rarity: Does it possess uncommon, rare or endangered aspects of natural or cultural heritage.

Representivity: Important in demonstrating the principal characteristics of a particular class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province region or locality.

APPENDIX C: SIGNIFICANCE AND FIELD RATING:

Cultural significance:

- Low: A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings.

- Medium: Any site, structure or feature being regarded less important due to a number of factors, such as date and frequency. Also any important object found out of context.

- High: Any site, structure or feature regarded as important because of its age or uniqueness. Graves are always categorized as of a high importance. Also any important object found within a specific context.

Heritage significance:

- Grade I: Heritage resources with exceptional qualities to the extent that they are of national significance

- Grade II: Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate

- Grade III: Other heritage resources of local importance and therefore worthy of conservation

Field ratings:

i. National Grade I significance: should be managed as part of the national estate

ii. Provincial Grade II significance: should be managed as part of the provincial estate

iii. Local Grade IIIA: should be included in the heritage register and not be mitigated (high significance)

iv. Local Grade IIIB: should be included in the heritage register and may be mitigated (high/ medium significance)

v. General protection A (IV A): site should be mitigated before destruction (high/medium significance)

vi. General protection B (IV B): site should be recorded before destruction (medium significance)

vii. General protection C (IV C): phase 1 is seen as sufficient recording and it may be demolished (low significance)

APPENDIX D: PROTECTION OF HERITAGE RESOURCES:

Formal protection:

National heritage sites and Provincial heritage sites – Grade I and II
Protected areas - An area surrounding a heritage site
Provisional protection – For a maximum period of two years
Heritage registers – Listing Grades II and III
Heritage areas – Areas with more than one heritage site included
Heritage objects – e.g. Archaeological, palaeontological, meteorites, geological specimens, visual art, military, numismatic, books, etc.

General protection:

Objects protected by the laws of foreign states
Structures – Older than 60 years
Archaeology, palaeontology and meteorites
Burial grounds and graves
Public monuments and memorials

APPENDIX E: HERITAGE IMPACT ASSESSMENT PHASES

1. Pre-assessment or Scoping Phase – Establishment of the scope of the project and terms of reference.

2. Baseline Assessment – Establishment of a broad framework of the potential heritage of an area.

3. Phase I Impact Assessment – Identifying sites, assess their significance, make comments on the impact of the development and makes recommendations for mitigation or conservation.

4. Letter of recommendation for exemption – If there is no likelihood that any sites will be impacted.

5. Phase II Mitigation or Rescue – Planning for the protection of significant sites or sampling through excavation or collection (after receiving a permit) of sites that may be lost.

6. Phase III Management Plan – For rare cases where sites are so important that development cannot be allowed.