ARCHAEOLOGICAL IMPACT ASSESSMENT

PROPOSED DEVELOPMENT OF AN 80 MW PHOTOVOLTAIC SOLAR FARM ON PORTION 3 OF THE FARM KOPJE ALLEEN NO. 81, KHAUTA WEST SOLAR PV FACILITY NEAR RIEBEECKSTAD, MATJHABENG LOCAL MUNICIPALITY FREE STATE PROVINCE

Prepared for:

ENVIROWORKS
Suite 116, Private Bag X01, Brandhof, 9324
EAP Ms Elana Mostert
elana@enviroworks.co.za

Applicant

Khauta West Solar PV Facility RF (Pty) Ltd

By

ACRM
5 Stuart Road, Rondebosch, 7700
jonathan@acrm.co.za

AUGUST
2022

Executive summary

1. Introduction

ACRM was appointed by King's Landing Trading 507 (Pty) Ltd t/a Enviroworks (hereafter referred to as Enviroworks) to conduct an Archaeological Heritage Impact Assessment for the proposed 80MW Khauta West Solar PV Facility on Portion 3 of the Farm Kopje Alleen No. 81, near Riebeeckstad (Matjhabeng Local Municipality) near Welkom, in the Free State Province.

Riebeeckstad is located about 15kms north of Welkom, and about 155kms north east of Bloemfontein. Portion 3 of Farm 81 Kopje Alleen measures 254ha in extent, while 101ha has been set aside for the Solar PV facility including associated infrastructure. The topography of the receiving environment is fairly level and covered in thick grassland vegetation. There are no significant landscape features such as rocky kopjes, outcrops, streams or pans, in the application area. A few small earth dams occur in the surrounding area. The current land use is grazing. There is virtually no surface stone covering the land surface. Existing infrastructure comprises mostly farm roads, fencing and isolated windmills.

2. The development proposal

The infrastructure associated with the proposed 80MW Khauta West Solar PV Facility includes the following:

- PV modules and mounting structures with fixed, single or double axis tracking mounting structures;
- Battery Energy Storage System (BESS);
- Site and internal access roads (up to 6 m wide);
- Auxiliary buildings (offices, parking etc.);
- Temporary laydown area (and a latter permanent laydown area for BESS);
- Facility Substation;
- Grid connection infrastructure, includes (underground cabling where practical) medium voltage cabling between the project components and the facility substation;
- Perimeter fencing, and
- Rainwater and/or groundwater storage tanks and associated water transfer infrastructure.

Enviroworks is the appointed Environmental Assessment Practitioner (EAP) responsible for facilitating the Environmental Impact Assessment (EIA) process for Environmental Authorisation.

The proposed 33/132 kV Overhead Powerline to the Main Eskom Transmission substation(s) will be assessed as part of a separate Application for Environmental Authorisation.

3. Aim

The overall purpose of the study is to assess the sensitivity of archaeological resources on the proposed development site, to determine the potential impacts of the development on such resources, and to avoid and/or minimise such impacts by means of management and/or mitigation measures.

A field based Palaeontological Impact Assessment for the proposed development was conducted by Dr John Almond of Natura Viva cc.

4. Constraints and limitations

The proposed development site is covered in extremely thick grassland vegetation, resulting in poor archaeological visibility. However, the results of the study indicate that the proposed development site is not a sensitive archaeological landscape.

5. Findings

5.1 Archaeology

A field assessment of the proposed Khauta West Solar PV Facility took place on the 13th of April 2022 in which the following observations were made.

▪ No pre-colonial Stone Age, or historical archaeological heritage resources were recorded during the study.

5.2 Late Iron Age

▪ No evidence of any Late Iron Age archaeological heritage was noted during the field assessment, which appears to be absent from the study area.

5.3 Anglo Boer War

▪ No evidence of any Anglo-Boer War battlefield sites (1899-1904), war graves or memorials were encountered during the study.

According to Mr Louis Venter of the War Museum in Bloemfontein (pers. comm. May 2022), there are no references to any Anglo Boer War skirmishes in the area.

5.3 Palaeontological heritage

According to Almond (2022), `no fossil remains of any kind were recorded from the Permian bedrocks and Late Caenozoic superficial sediments that underly the study area, and that no palaeontological High Sensitivity or No-Go areas were identified'. Almond (2022) concludes that the `site is in practice of Low to Very Low palaeo-sensitivity'.

6. Potential impacts

Stone Age resources may be buried below the coversands, but overall, the impact of the proposed Khauta West Solar PV Facility on pre-colonial archaeological resources is rated as being very low.

7. Conclusions

The study has identified no impacts to Stone Age archaeological heritage that will need to be mitigated prior to construction activities commencing.

The assessment has shown that the site for the proposed 80MW Khauta West Solar PV Facility, on Portion 3 of Farm 81(Kopje Alleen) near Riebeeckstad, is not a sensitive archaeological landscape.

The assessment is supported by the literature study, as well as several recent studies, which have shown that no Stone Age archaeological resources have been recorded in Riebeeckstad, or in the surrounding area.

The overall impact significance of the proposed 80MW Khauta West Solar PV Facility on archaeological heritage is assessed as LOW, and therefore there are no objections, to the development proceeding.

Almond (2022) has also shown that that the site is of `Low to Very Low palaeosensitivity'.

The cultural landscape, primarily agriculture, with farm fences, tracks, and isolated windmills being the main tangible evidence of the landscape, has low heritage significance.

The study has shown that there are no fatal flaws in the development proposal.

8. Recommendations

8.1 Archaeology

1. It is recommended that the proposed development should be authorised.

2. No mitigation of archaeological resources is required is required prior to construction activities commencing.

3. If any human burials are uncovered during construction activities then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and will require inspection by a professional archaeologist.

8.2 Palaeontology

1. Provided that the Chance Fossil Finds Protocol tabulated in Appendix 1 of the PIA is incorporated into the EMPr and fully implemented during the construction phase, there are no objections on palaeontological heritage grounds to their authorisation (Almond 2022).

Table of contents

1. INTRODUCTION

ACRM was appointed by Enviroworks, on behalf of Khauta West Solar PV Facility FR (Pty) Ltd, to conduct an Archaeological Heritage Impact Assessment for the proposed 80MW Khauta West Solar PV Facility on Portion 3 of the Farm Kopje Alleen No. 81 near Riebeeckstad (Matjhabeng Local Municipality), near Welkom, in the Free State Province (Figures 1 & 2).

Riebeeckstad is located about 15kms north of Welkom, and about 155kms north east of Bloemfontein.

Portion 3 of Farm 81 (Kopje Alleen) measures 254ha in extent, where 101ha has been set aside for the proposed Solar PV facility.

Figure 1. Google Earth satellite map indicating the location of the proposed Khauta West Solar PV Facility (yellow pin) on Portion 3 of Farm 81 Kopje Alleen, near Riebeeckstad in the Free State Province (regional context).

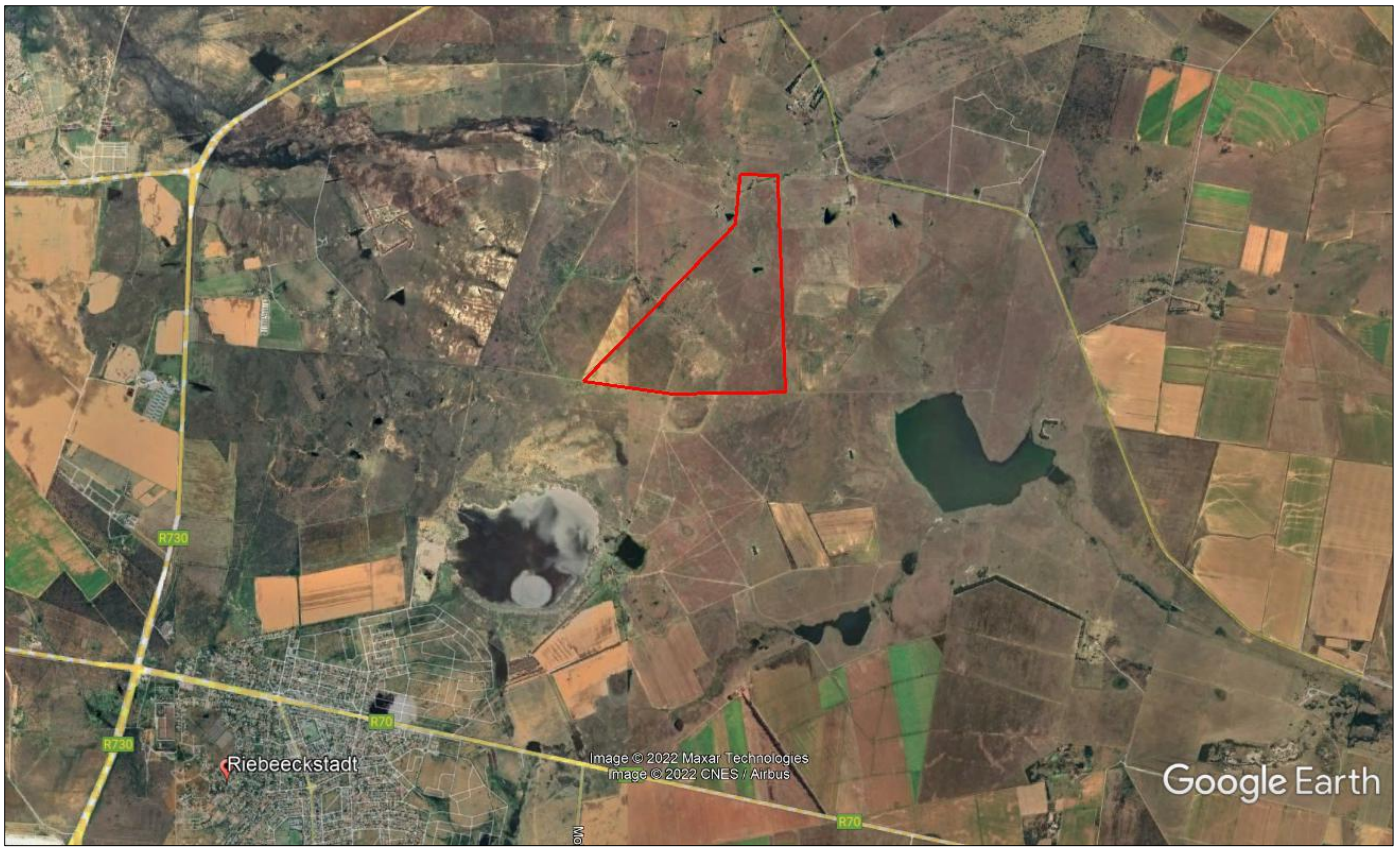

Figure 2. Google Earth satellite map indicating the application area (red polygon) for the proposed Khauta West Solar PV Facility near Riebeeckstad.

2. THE DEVELOPMENT PROPOSAL

The infrastructure associated with the proposed 80MW Khauta West Solar PV Facility near Riebeeckstad includes the following:

- PV modules and mounting structures with fixed, single or double axis tracking mounting structures;
- Battery Energy Storage System (BESS);
- Site and internal access roads (up to 6 m wide);
- Auxiliary buildings (offices, parking etc.);
- Temporary laydown area (and a latter permanent laydown area for BESS);
- Facility Substation;
- Grid connection infrastructure, includes (underground cabling where practical) medium voltage cabling between the project components and the facility substation;
- Perimeter fencing, and
- Rainwater and/or groundwater storage tanks and associated water transfer infrastructure.

A proposed Site Layout Plan is presented in Figure 3.

Enviroworks is the appointed independent Environmental Assessment Practitioner (EAP) responsible for facilitating the Environmental Impact Assessment (EIA) process for Environmental Authorisation.

The proposed 33/132 kV Overhead Powerline to the Main Eskom Transmission substation(s) will be assessed as part of a separate Application for Environmental Authorisation.

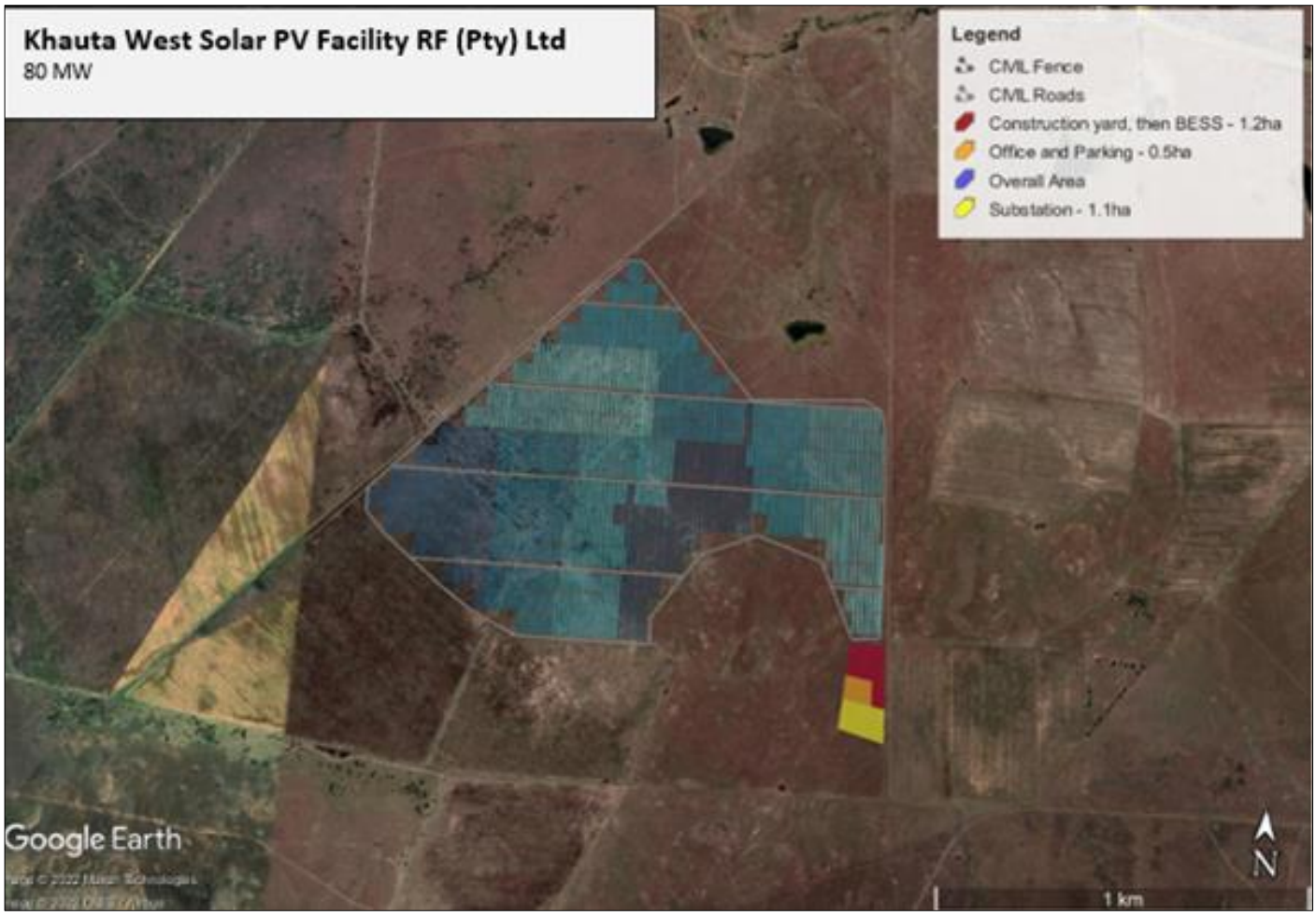

Figure 3. Proposed 80 MW Khauta West Solar PV Facility on Portion 3 of Farm 81 Kopje Alleen. Preliminary layout of the proposed development.

3. HERITAGE LEGISLATION

The National Heritage Resources Act (NHRA No. 25 of 1999) protects archaeological and palaeontological sites and materials, as well as graves/cemeteries, battlefield sites, public monuments and buildings, structures and features over 60 years old.

The South African Heritage Resources Agency (SAHRA) administers this legislation nationally, with Heritage Resources Agencies acting at provincial level.

According to the Act (Sect. 35), it is an offence to destroy, damage, excavate, alter of remove from its original place, or collect, any archaeological, palaeontological and historical material or object, without a permit issued by the South African Heritage Resource Agency (SAHRA) or applicable Provincial Heritage Resources Agency.

Notification of SAHRA is required for proposed developments exceeding certain dimensions (Sect. 38), upon which they will decide whether or not the development must be assessed for heritage impacts (an HIA) that may include an assessment of archaeological (a, AIA) or palaeontological heritage (a PIA).

4. TERMS OF REFERENCE

The terms of reference for the study were to:

- Identify and map archaeological resources that might be impacted by the proposed development activities;
- Assess the sensitivity of archaeological resources in the proposed development site;
- Assess the significance of any impacts resulting from the proposed development, and
- Identify measures to protect any valuable archaeological resources that may exist in the proposed development site.

5. DESCRIPTION OF THE RECEVING ENVIRONMENT

The topography of the receiving environment is mostly flat and covered in thick grassland vegetation (Figures 4-7). The current land use is grazing. There is virtually no surface stone covering the farm. There are no significant landscape features, such as rocky outcrops or kopjes in the application area, or any shallow depressions such as dry pans, streams, wetlands, or rivers. A few small earth dams occur in the surrounding area, while the large Commandants Pan dam is located on the south eastern boundary of the farm. The soils are mostly fine, loamy and orange coloured. Existing infrastructure comprises farm roads, farm tracks, fencing, and isolated windmill. No erosion gullies, or any excavations were noted during the field study.

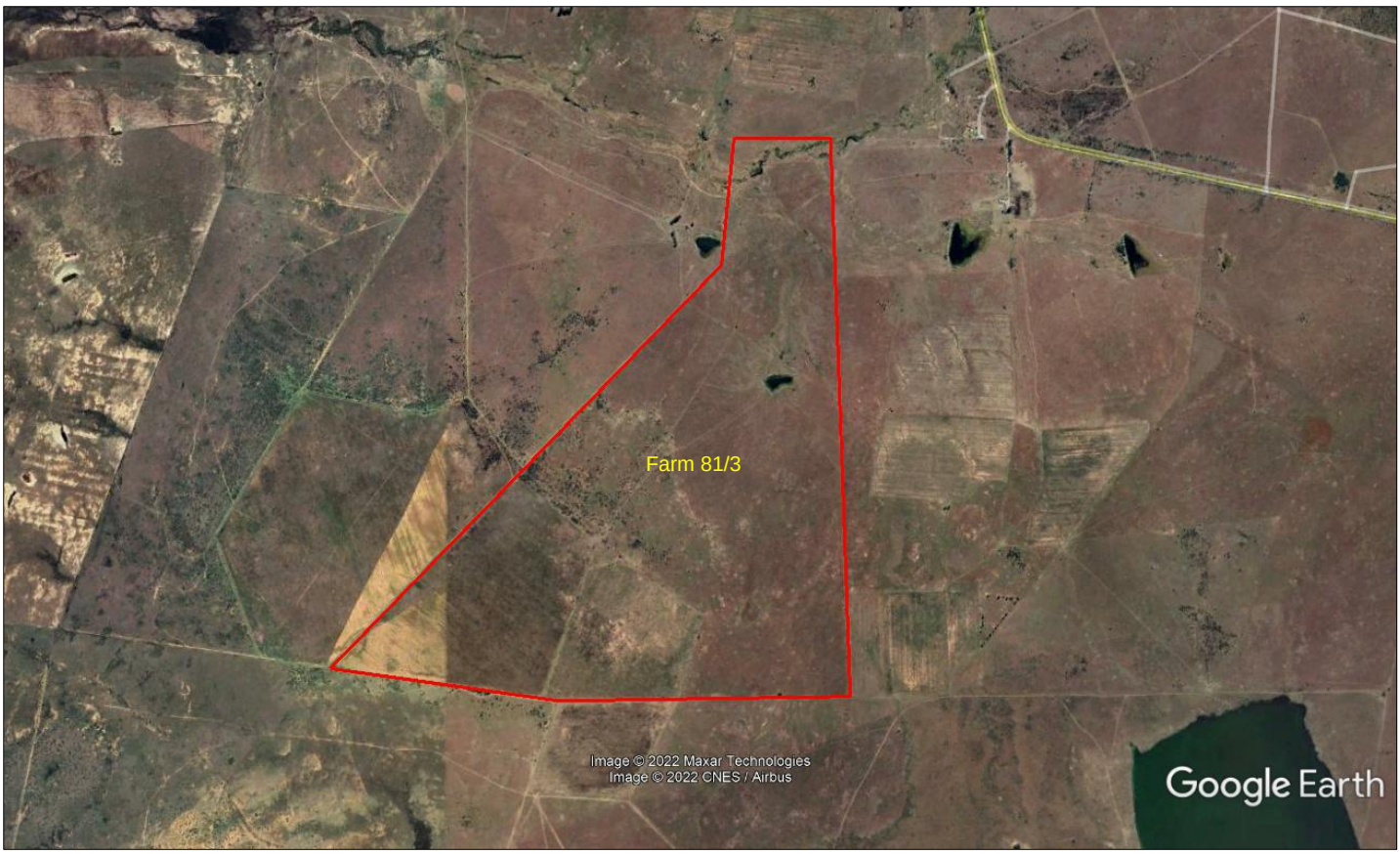

Figure 4. Close up Google satellite map of the application area (red polygon).

Figure 5. View of the study site facing north east.

Figure 6. View of the study site facing south east.

Figure 7. View of the study site facing north east.

6. STUDY APPROACH

6.1 Method of survey

The purpose of the study is to assess the sensitivity of archaeological resources in the study area, to determine the potential impacts of the development on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures.

A field assessment was undertaken on 11th April 2022. The survey was carried out on foot.

A track path of the survey was also captured.

A desktop study was carried out to assess the heritage context surrounding the proposed development site. The literature survey included unpublished commercial reports sourced primarily from the South African Heritage Resources Information System (SAHRIS).

The heritage specialist also consulted with Ms Loudine Philip, Head of the Department of Archaeology, National Museum of Bloemfontein, as well as with Dr Johan van Zyl Head Human Science War Museum in Bloemfontein.

A field based Paleontological Impact Assessment (PIA) was conducted by consulting palaeontologist, Dr John Almond of Natura viva cc (Almond 2022).

6.2 Constraints and limitations

The extensive grass cover posed a severe limitation during the survey (refer to Figures 5-7), and it is likely that isolated artefacts could have gone unnoticed. However, indications are that that such material is unlikely to be of high significance.

6.3 Identification of potential risks

The results of the field assessment, supported by the literature study, as well as several recent studies near Riebeeckstad (see Kaplan 2022a, b, c), indicate that the proposed development of the Khauta West Solar PV Facility will not impact on any important archaeological resources.

Middle Stone Age resources may be buried below the coversands (Kaplan 2022a), but overall, the impact of the proposed development on pre-colonial archaeological resources is rated as being Low.

6.4 Archaeological and heritage context

The primary source of information was the South African Heritage Resources Information System (SAHRIS) national database.

The Free State has a rich archaeological and historical history going back millions of years and includes significant aspects such as Later Stone Age rock art, Anglo Boer War Battlefields and Iron Age stonewalled enclosures. The general surroundings of the area became a melting pot of contact and conflict as it represents one of many frontiers where San/Bushman hunter gatherers, Nguni and Sotho-Tswana agro-pastoralists, Dutch Voortrekkers and British Colonists all came together. The ravages of war also swept across these plains, and in particular the South African War (1899-1902), as well as the Boer Rebellion (1914-1915) (Birkholtz 2017).

The town of Welkom was laid out on a farm of the same name after gold was discovered in the region, and officially proclaimed a town in 1948. Riebeeckstad is named after Jan van Riebeeck and was established as an upper-class suburb void of mine shafts for people working in Welkom and on the Free State goldfields.

The archaeological history of the area can broadly be divided into a Stone Age, Iron Age and Historic Period. Both the Stone Age and Iron Age form part of what is referred to as the Pre-Colonial Period, whereas the Historic Period is referred to as the Colonial Period.

It is interesting to note that no, or very little archaeological or cultural heritage resources were recorded during the majority of the CRM[1] project reports consulted (Coetzee 2008; Dreyer 2011, 2008, 2004; Prins 2013; Van der Walt 2020, 2015), aside from Colonial Period farming infrastructure and cemeteries (Dreyer 2007; Van Ryneveld 2009) – giving the impression of a generally low archaeological and cultural heritage significance to the area. Google satellite imagery also indicates that the surrounding area has been quite heavily impacted on by social housing development, construction of powerlines, roads, agriculture and mining, which have likely impacted on surface indicators of heritage resources.

Heritage resources were recorded during a field study of the Thabong Solar Farm, on the Farm Uitkyk 509, directly to the east of the proposed Khauta Solar PV Cluster (Van Ryneveld 2013). These included several Colonial Period sites including a ruined homestead, a barn and adjoining livestock enclosure. The remains were graded as having Low significance. Three historic cemeteries were also recorded on the 867ha farm. Cemeteries are graded as having High local significance. Two cemeteries were recorded on the adjacent Farm Helderwater 494 (Van Ryneveld 2013).

No pre-colonial Stone Age archaeological heritage resources were recorded during the Thabong study.

Van Ryneveld (2009) also conducted an Archaeological Impact Assessment for the Thandanani Residential Development south west of Riebeeckstad. Heritage sites recorded included one Historical Period farming site, graded as Low significance (Van Ryneveld 2009). No pre-colonial archaeological Stone Age resources were identified across the 180ha study site. No graves, cemeteries, buildings, or historic period middens were encountered either.

Very little is therefore known about the Stone Age archaeology of Riebeeckstad and its immediate surroundings. Middle Stone Age (MSA) and Later Stone Age (LSA) implements associated with mammal fossil remains have been recorded in erosion gullies along the Sand, Doring and Vet Rivers between Virginia and Theunissen 20kms south of Riebeeckstad (Birkholtz 2017; Loudine Philip National Museum Bloemfontein, pers. comm.), but no Stone Age resources have yet been recorded in Welkom or Riebeeckstad.

The arrival of early Black farming communities during the first millennium, heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-colonial farming communities associated with agricultural and pastoralist farming activities, and metal production.

[1] Cultural Resource Management

7. RESULTS

7.1 Archaeology

No pre-colonial Stone Age or historical archaeological resources were recorded in the application area, on Farm Kopje Alleen 81/3 (Figure 8).

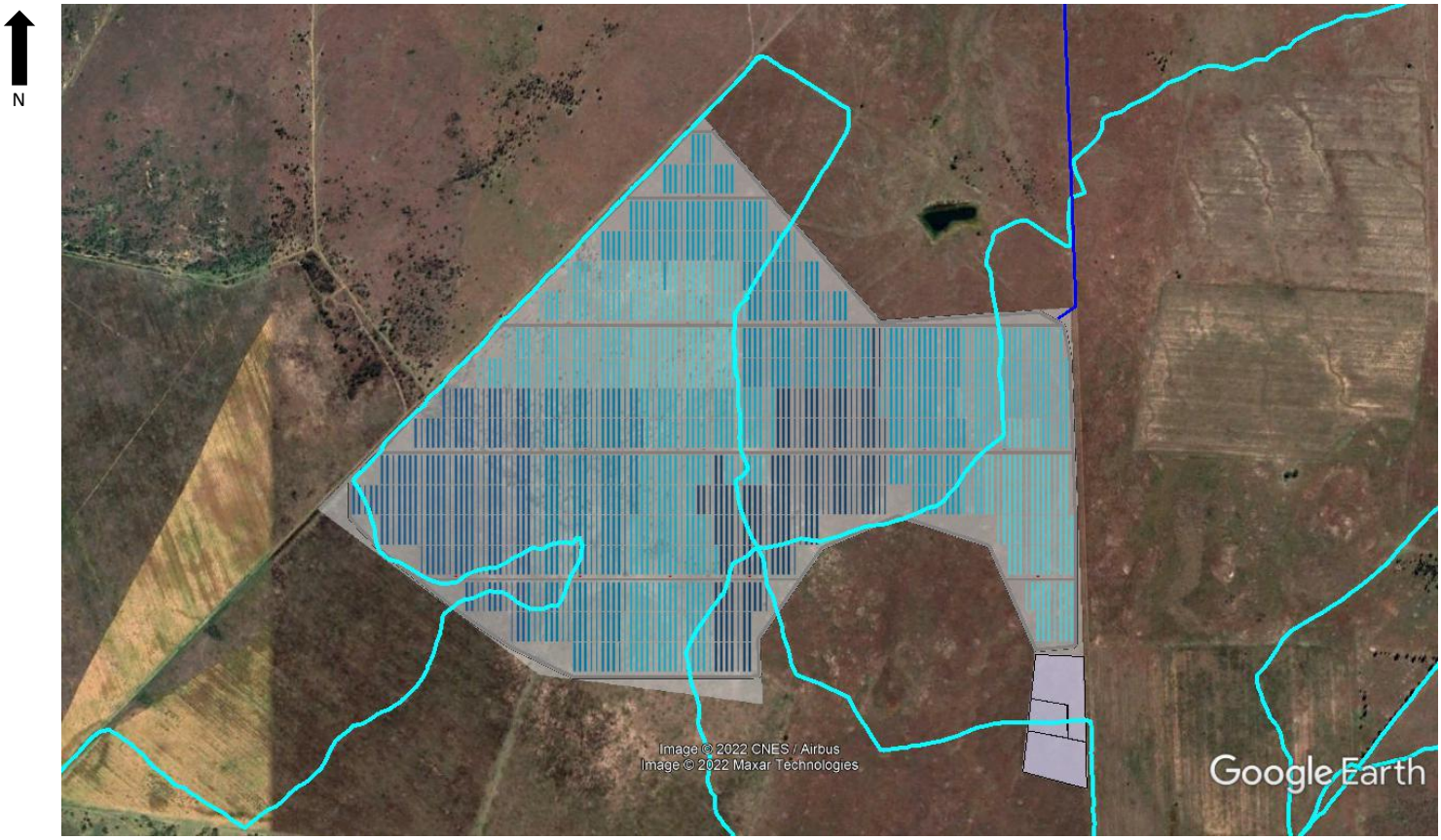

Figure 8. Trackpaths (in blue) overlaid on proposed Site Layout Plan.

7.2 Late Iron Age

No evidence of any Late Iron Age archaeological heritage were noted during the field assessment, which appears to be absent from the study area.

According to the distribution map for Iron Age settlements on the Southern Highveld as published in Maggs (1976), the proposed Khauta SPV Cluster is located to the west of the known distribution of Late Iron Age sites. It is therefore unlikely for any such sites to be located within the study area, or its immediate surroundings.

7.3 Anglo Boer War

No evidence of any Anglo-Boer War battlefield sites (1899-1904), war graves or memorials were encountered during the study.

According to Mr Louis Venter of the War Museum in Bloemfontein (pers. comm. May 2022), there are no references to any Anglo Boer War skirmishes in the area.

7.4 Palaeontology

According to consulting palaeontologist, Dr John Almond (2022), `no fossil remains of any kind were recorded from the Permian bedrocks and Late Caenozoic superficial sediments that underly the study area', during a site visit conducted in May 2022, and that `no palaeontological High Sensitivity or No-Go areas were identified'. Almond (2022) concludes `that the site is in practice of Low to Very Low palaeosensitivity'.

8 IMPACT ASSESMENT AND DESCRIPTION

Tables 1 and 2, assesses the overall impacts to archaeological heritage resources.

8.1 Summary of assessment of potential impact of the proposed activities

Potential impact on archaeological resources	
Nature of impact	Damage to, or destruction of archaeological resources
Extent and duration of impact	Localized short term
Intensity of impact	Low
Probability of occurrence	Improbable
Degree to which impact can be reversed	Reversible
Irreplaceability of resources	Low
Cumulative impact prior to mitigation	Low
Significance of impact pre-mitigation	Low
Degree of mitigation possible	High
Proposed mitigation	None required
Cumulative impact post mitigation	Low
Significance after mitigation	Insignificant

Table 1. Assessment of archaeological impacts: Construction Phase

Potential impact on archaeological resources	
Nature of impact	Damage to, or destruction of archaeological resources
Extent and duration of impact	Insignificant
Intensity of impact	Very Low
Probability of occurrence	Very Low
Degree to which impact can be reversed	Very Low
Irreplaceability of resources	Very Low
Cumulative impact prior to mitigation	Very Low
Significance of impact pre-mitigation	Very Low
Degree of mitigation possible	Very Low
Proposed mitigation	None required
Cumulative impact post mitigation	Low
Significance after mitigation	Insignificant

Table 2. Assessment of archaeological impacts: Operational Phase

9. CONCLUSION

The study has identified no impacts to Stone Age, or historical archaeological heritage that will need to be mitigated prior to construction activities commencing.

The assessment has shown that the site for the proposed 80MW Khauta West Solar PV Facility on Portion 3 of the Farm Kopje Alleen 81 near Riebeeckstad, is not a sensitive archaeological landscape.

The assessment is supported by the literature study which has shown no archaeological resources have previously been recorded in Riebeeckstad, and in the surrounding area.

The assessment is further supported by several recent studies conducted in Riebeeckstad (Kaplan 2022a, b, c).

The overall impact significance of the proposed 80MW Khauta West Solar PV Facility on archaeological heritage is assessed as LOW and therefore there are no objections to the development proceeding.

Almond (2022) has also shown that `that the site is in practice of Low to Very Low palaeosensitivity'.

The cultural landscape, primarily agriculture, with farm fences, windmills, tracks, and small dams being the main tangible evidence of the landscape, has low heritage significance.

The study has shown that there are no fatal flaws in the development proposal.

10. RECOMMENDATIONS

Regarding the proposed 80MW Khauta West Solar PV Facility on Portion 3 of the Farm Kopje Alleen 81, the following recommendation are made:

10.1 Archaeology

1. It is recommended that the proposed development should be authorised.

2. No mitigation of archaeological resources is required is required prior to construction activities commencing.

3. If any human burials are uncovered during construction activities then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and will require inspection by a professional archaeologist.

10. 2 Palaeontology

1. Provided that the Chance Fossil Finds Protocol tabulated in Appendix 1 of the PIA is incorporated into the EMPr and fully implemented during the construction phase, there are no objections on palaeontological heritage grounds to their authorisation (Almond 2022).

11. REFERENCES

Almond, J. 2022. Palaeontological Heritage Site Sensitivity Verification Report. Proposed Khauta Solar PV Cluster and Associated Grid Connections near Welkom, Matjhabeng Local Municipality, Free State Province. Report prepared for Enviroworks. Natura Viva cc, Cape Town

Birkholtz, P. 2017. Heritage Study, Proposed Tetra4 Cluster 1Gas Production Project. Report prepared for Environmental Impact Management Services (Pty) Ltd. PGS Heritage & Grave Relocation Consultants

Coetzee, F.P. 2008. Cultural Heritage Survey of the Proposed Phakisa Housing Development, Welkom, Free State

Dreyer, C. 2011. First Phase Archaeological and Heritage Investigation of the Proposed Chicken Egg Production Developments at Mooidoorns 319, Welkom, Free State.

Dreyer, C. 2008. First Phase Archaeological and Cultural Heritage Investigation of the Proposed Oppenheimer Park Golf Estate, Welkom, Free State. Report prepared for MDA Environmental Consultants. Cobus Dryer Archaeologist/Heritage Specialist, Bloemfontein.

Dreyer, C. 2004. First Phase Heritage / Archaeological Assessment of the Proposed Powerline Route at Phakisa Mine, Welkom

Kaplan, J. 2002a. Archaeological Impact Assessment, proposed development of 110MW Photovoltaic Solar Farm on Portion 9 of the Farm Commandants Pan No. 382, Farm Tafel Baai No. 413 and Portion 12 of the Farm Nooitgedacht No. 74, Riebeeckstad near Welkom, Matjhabeng Local Municipality, Free State Province. Report prepared for Enviroworks. ACRM, Cape Town

Kaplan, J. 2022b. Archaeological Impact Assessment, proposed development of a 50MW Photovoltaic Solar Farm on Portion 3 of the Farm Kopje Alleen No. 81, Riebeeckstad near Welkom, Matjhabeng Local Municipality, Free State Province. Report prepared for Enviroworks. ACRM, Cape Town

Kaplan, J. 2022c. Archaeological Impact Assessment, proposed development of a 165MW photovoltaic farm on Portion 0 of the Farm Kopje Alleen No. 81 and Portion 1 of the Farm Kopje Alleen No. 81, Riebeeckstad near Welkom Matjhabeng Local Municipality, Free State Province. Report prepared for Enviroworks. ACRM, Cape Town

Maggs, T.M. 1976. Iron Age Communities of the Southern Highveld. (Occasional Publication 2). Pietermaritzburg: Natal Museum.

Van der Walt, J. 2020. Heritage Walk Down, for the proposed Tsepong Solar PV Facility near Welkom, Free State Province. Report prepared for Savannah Environmental (Pty) Ltd. HCAC Heritage Consultants, Modimolle

Van der Walt, J. 2015. Archaeological Impact Assessment for the proposed Harmony Gold Nyala PV Facility in Welkom, Free State Province. *Report prepared for Savannah Environmental (Pty) Ltd HCAC Heritage Consultants, Modimolle*

Van der Walt, J. 2013. Archaeological Scoping Report for the proposed Grootkop Solar Energy facility. Prepared for Savannah Environment (Pty) Ltd.

Van Ryneveld, K. 2013. Phase 1 Archaeological Impact Assessment, The Thabong Solar Farm, Uitkyk 509 Welkom, Free State, South Africa. Report prepared for Enviro Works. ArchaeoMaps Archaeological Consultancy, East London

Van Ryneveld, K. 2009. Phase 1 Archaeological Impact Assessment, Thandanani Residential Development, Portion 19 of Nooitgedacht 74, Portion 1 of Kaalvalley 61 and Portion 26 of Kijknou 81, Welkom, Free State. Report prepared for Y.B. Mashalaba & Associates Consultants. ArchaeoMaps Archaeological Consultancy, East London