

ARCHAEOLOGICAL IMPACT ASSESSMENT

PROPOSED DEVELOPMENT OF A 110 MW SOLAR PHOTOVOLTAIC (PV) FACILITY ON PORTION 9 OF THE FARM COMMANDANTS PAN NO. 382, FARM TAFEL BAAI NO. 413, AND PORTION 12 OF THE FARM NOOIT GEDACHT NO. 74, KHAUTA SOUTH SOLAR PV FACILITY NEAR RIEBEECKSTAD, MATJHABENG LOCAL MUNICIPALITY, FREE STATE PROVINCE

Prepared for:

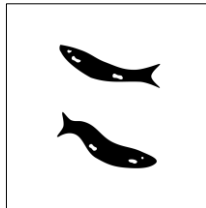
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Executive summary

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 110MW Khauta South Solar PV Facility on Portion 9 of the Farm Commandants Pan No. 382, Farm Tafel Baai No. 413, and Portion 12 of the Farm Nooitgedacht No. 74, 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. Combined the three farms measure 1680ha in extent, while \pm 168ha has been set aside for the Solar PV facility including associated infrastructure.

The topography of the receiving environment is fairly level and covered in dense grassland vegetation. There are no significant landscape features such as rocky kopjes, outcrops, rivers or pans, in the application area. A few small woodlots occur, while the large Commandants Pan dam is located on the south western boundary of the application area. The current land use is grazing. There is virtually no surface stone covering the land surface. Existing infrastructure comprises farm roads, fencing and isolated windmills.

2. The development proposal

The infrastructure associated with the proposed 110MW Khauta South 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.

Regarding the powerline grid connection, the route selection for the overhead powerline has not yet been finalized, and that a report for the powerline will be commissioned once the final route options have been decided.

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 (PIA) for the proposed development was also conducted by consulting palaeontologist, 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

A field assessment of the proposed Khauta South Solar PV Facility took place on the 13th and 14th of April 2022, in which the following observations were made.

5.1 Archaeology

- 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 encountered during the study, which appears to be absent from the 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.

- A possible Boer 'Outspan' on the Farm Commandants Pan 382/9 was shown to the heritage practitioner.

However, 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.

In addition, there are no references to Commandants Pan or Kommandantspan, in the *Times History* (Louis Venter, pers. comm.).

As a precautionary measure, however, a 150m buffer, or 'No Go' area has been established around the 'Outspan'.

5.4 Graves

A graveyard (probably that of earlier farm labourers) was also recorded on the Farm Commandants Pan 382/9, ± 500m east of the edge of the Commandants Pan dam and about 200m south of the 'Outspan'. Approximately 40-50 barely visible graves were counted among the thick Winter grass, in an area measuring about 30 x 40m in extent. The majority of graves

comprise low mounds of clay and stone without headstones or footstones. Several graves with engraved headstones were also identified, including an isolated grave that has been fenced off and set slightly apart from the others.

Graves are graded as having High social value.

A 50m buffer, or 'No Go' area has been established around the graveyard.

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 South Solar PV Facility on Stone Age archaeological resources is rated as being Low.

As a precaution, a 150m buffer/'No Go' area has been established around the 'Outspan', and a 30m buffer/'No Go' area has been established around the farm labourer graves. This will ensure that these heritage features will not be impacted by proposed development activities.

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 110MW Khauta South Solar PV Facility, on Farm 382/9, Farm 413/0 and Farm 74/12 near Riebeeckstad, is not a sensitive archaeological landscape.

The assessment is supported by the literature study, as well as several recent studies conducted, 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 110MW Khauta South 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.

A farm labourer cemetery/graveyard, and a possible Outspan on the Farm Commandants Pan 382/9 has been accommodated in the Site Development Plan and will not be impacted by proposed construction activities.

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 unmarked human burials are uncovered during construction excavations then work in the immediate area must 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).

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1. INTRODUCTION

ACRM was appointed by Enviroworks, on behalf of WKN Windcurrent SA (Pty) Ltd, to conduct an Archaeological Heritage Impact Assessment for the proposed 110MW Khauta South Solar PV Facility on Portion 9 of the Farm Commandants Pan No. 382, Farm Tafel Baai No. 413, and Portion 12 of the Farm Nooitgedacht No. 74, 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.

Combined the three farms measures 1680ha in extent, while ± 168ha has been set aside for the proposed Solar PV facility including associated infrastructure.

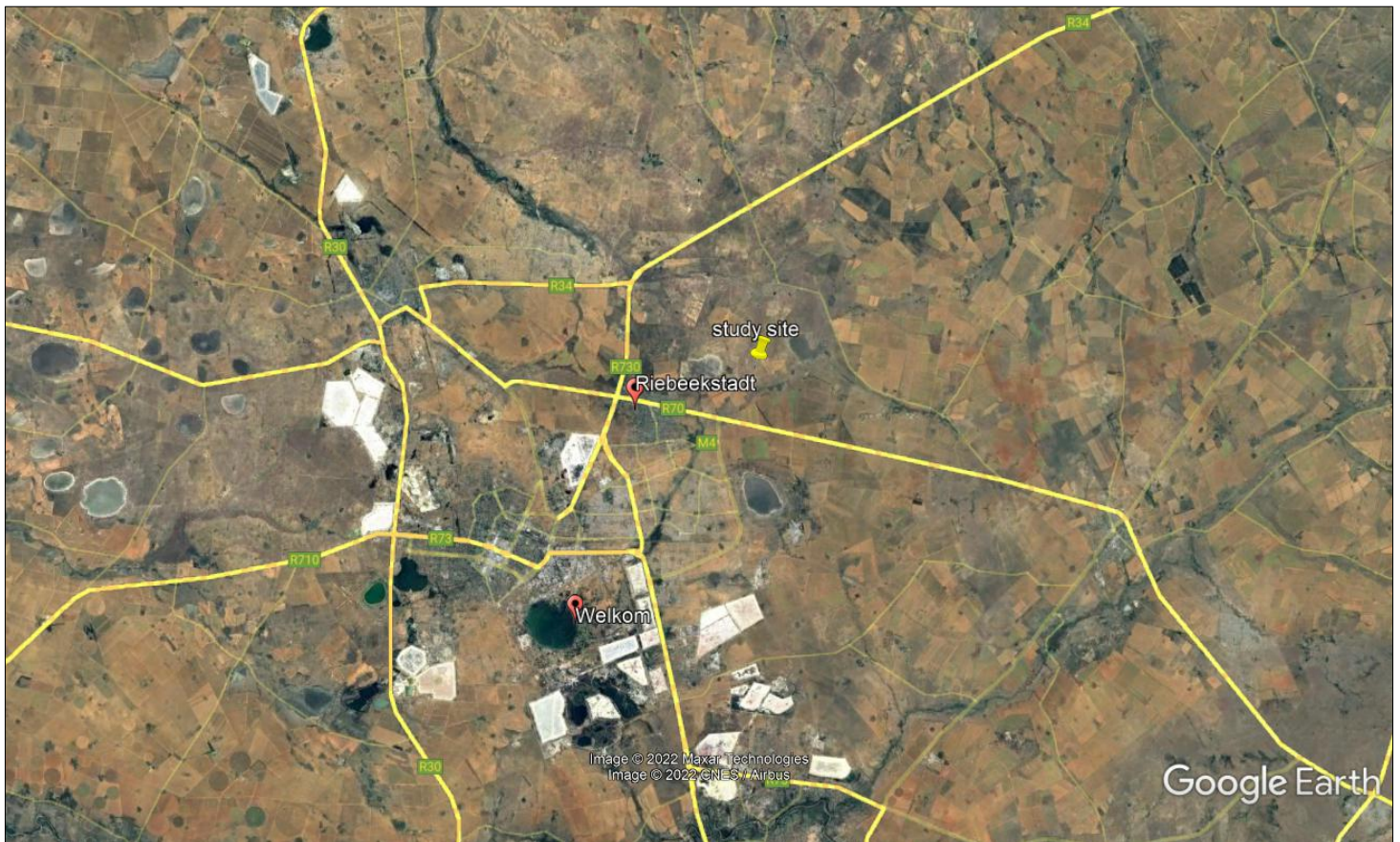


Figure 1. Google Earth satellite map indicating the location of the proposed Khauta South Solar PV Facility (yellow pin) near Riebeeckstad in the Free State Province (regional context).



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

2. THE DEVELOPMENT PROPOSAL

The infrastructure associated with the proposed 110MW Khauta South 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.

Regarding powerline grid connections, the route selection for the overhead powerline has not been finalized and that reports for the powerline will be commissioned once the final route options have been decided.

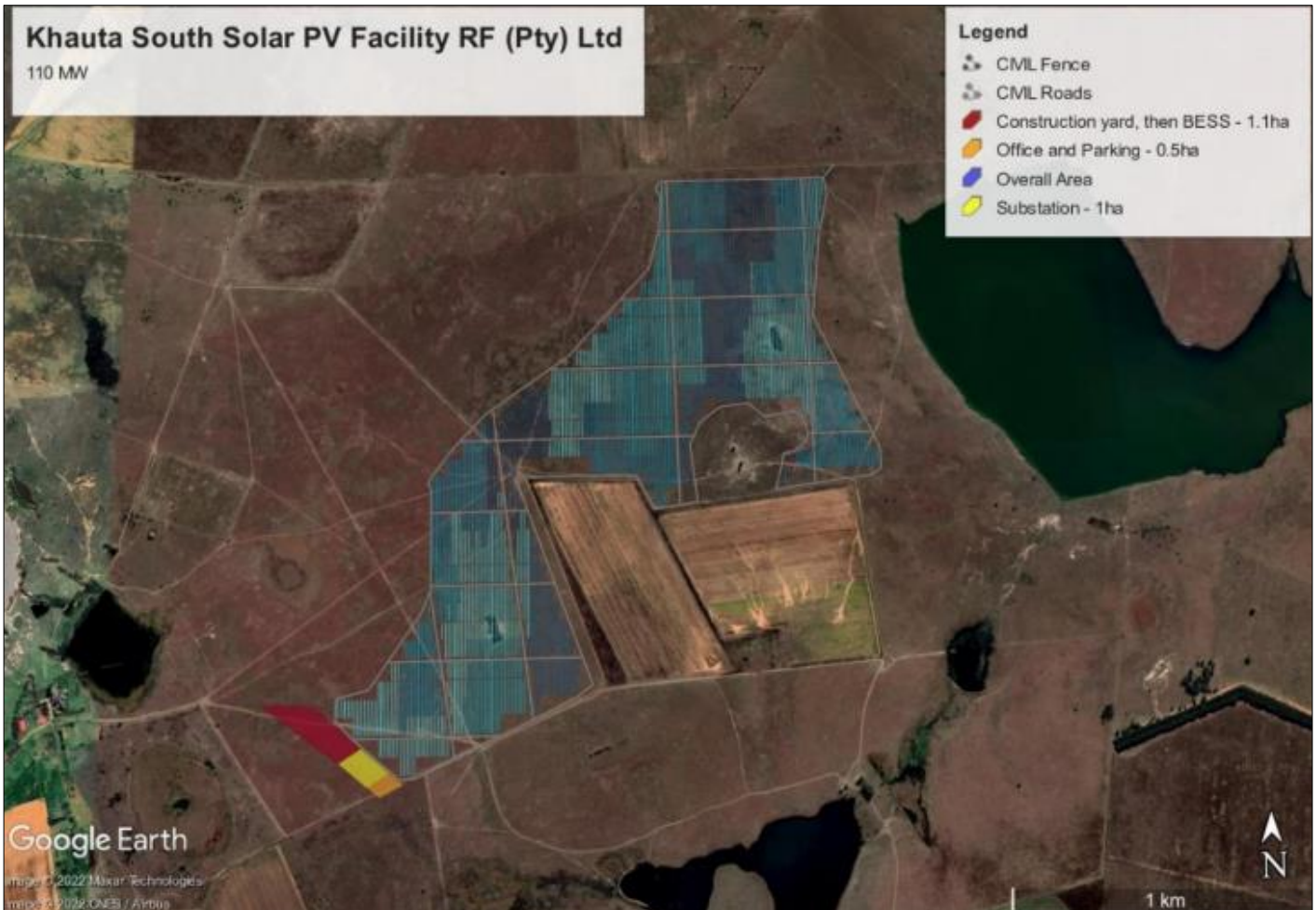


Figure 3. Proposed 110MW Khauta South Solar PV Facility near Riebeeckstad. Preliminary layout of the proposed development.

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 or 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 Stone Age archaeological and other heritage resources that might be impacted by 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 RECEIVING ENVIRONMENT

The site for the proposed Khauta South Solar PV facility is located on the north eastern outskirts of Riebeeckstad, near Welkom. The topography of the receiving environment is fairly level and covered in thick grassland vegetation (Figure 4-10). The current land use on the three affected farms is grazing. There is virtually no surface stone covering the farm. There are no significant landscape features, such as rocky outcrops or kopjes, or any shallow depressions such as dry pans, or rivers in the application area. A few small earth dams occur on the surrounding farms, while the large Commandants Pan dam is located on the eastern boundary of Farm 382/9. The soils are mostly fine, loamy and orange coloured. Existing infrastructure comprises farm roads, fencing, and isolated windmill. No erosion gullies, or any excavations were noted during the 2-day field study.

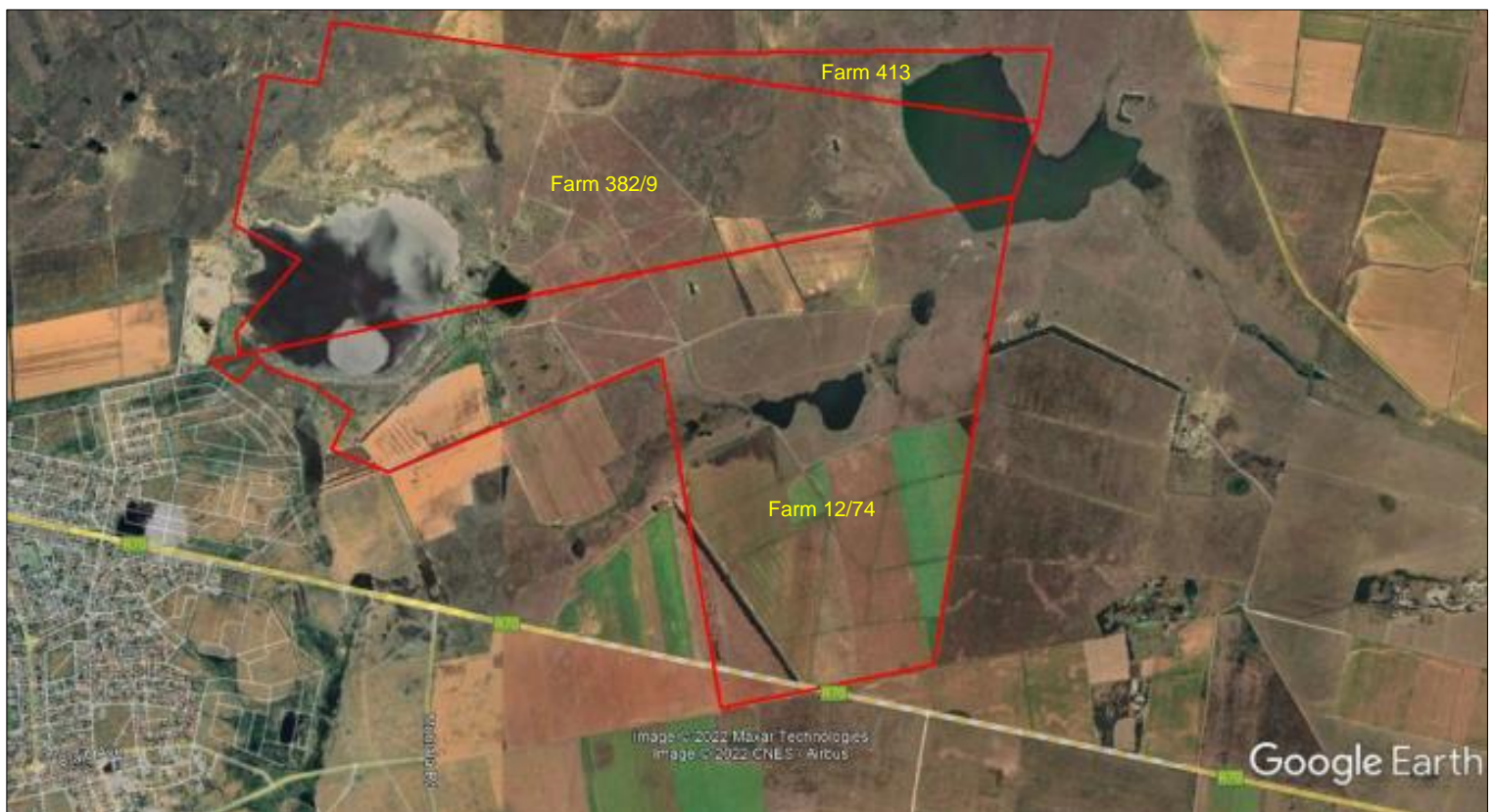


Figure 4. Close up Google Earth Satellite map of the application area (red polygon).



Figure 5. View of the site facing north



Figure 6. View of the site facing east



Figure 7. View of the site facing north east



Figure 8. View of the site facing north



Figure 9. View of the site facing south 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 12th and 13th of April 2022.

The survey was carried, out on foot and by vehicle.

A track path of the survey was also captured.

A desktop study was conducted 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 practitioner 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 5-9), 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, and supported by the literature study, as well as several recent studies conducted in Riebeeckstad (see Kaplan 2022a, b, c), indicate that the proposed 110MW Khauta South Solar PV Facility near Riebeeckstad will not impact on important Stone Age 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.

A possible Boer Outspan, and a farm labourer cemetery/graveyard were identified in a Heritage Scoping Assessment (on Farm 382/9) conducted, in April 2002 (Kaplan 2022d).

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 CRM¹ 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 (Van Ryneveld 2013), which is located to the east of the proposed Khauta Solar PV Cluster. 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 2013).

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 (Van Ryneveld 2009).

Very little therefore is, 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 for the proposed 110MW Khauta South Solar PV Facility (Figure 11).

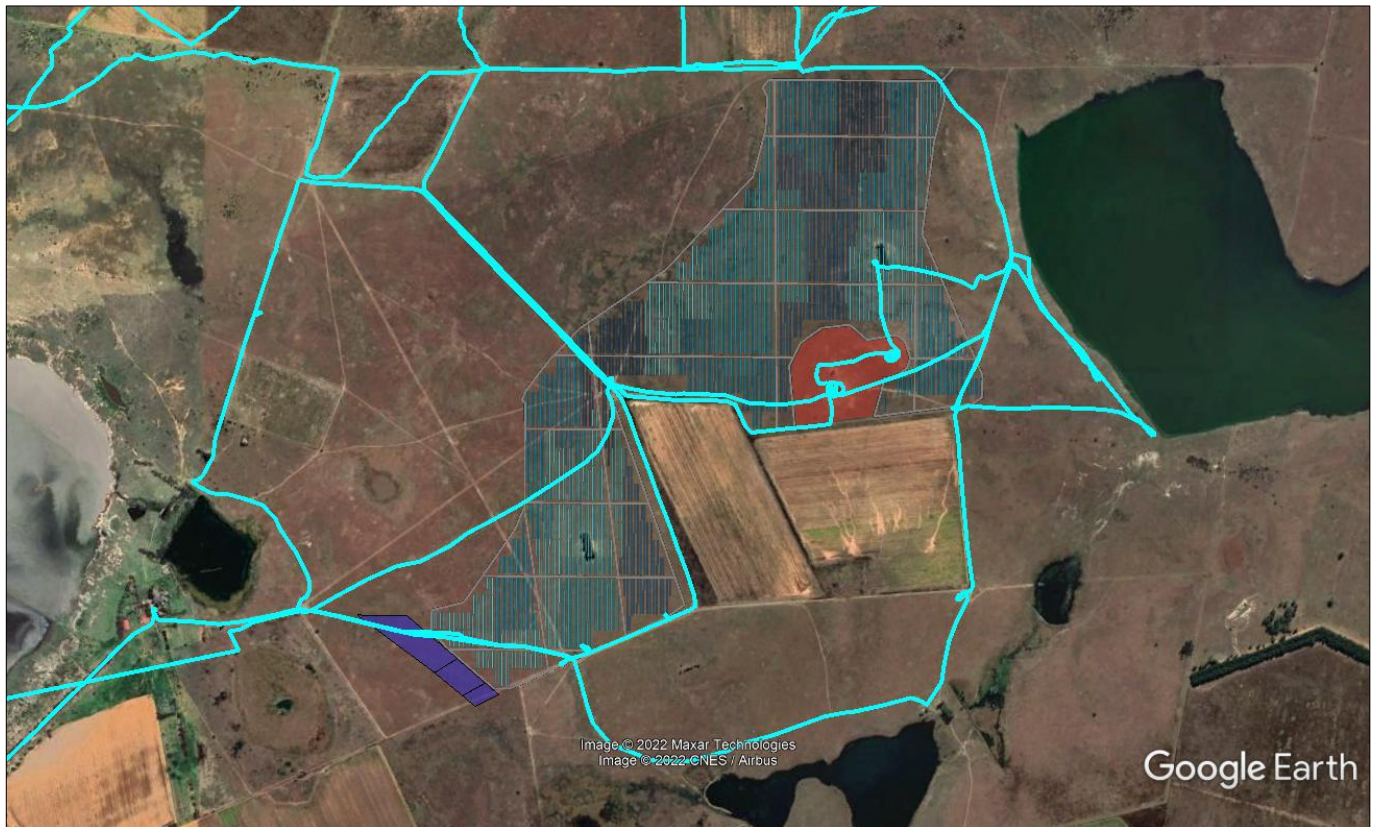


Figure 11. Trackpaths (in blue). The red polygon is a `No Go` area. The blue polygon is the proposed construction compound, offices, parking and substation.

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 Khauta Solar PV area 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. A possible Boer Outspan (Point 0036) on a low rise on the Farm Commandants Pan 382/9, was pointed out the heritage practitioner (Figures 12). Three large trees potentially mark the `site` (Figure 13). The surrounding area was searched, where the base of a rusted 3-pointed potjie pot was No other heritage resources were found.

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

There are also no references to Commandants pan or Kommandantspan in the *Times History* (Louis Venter email correspondence dated November 2021).

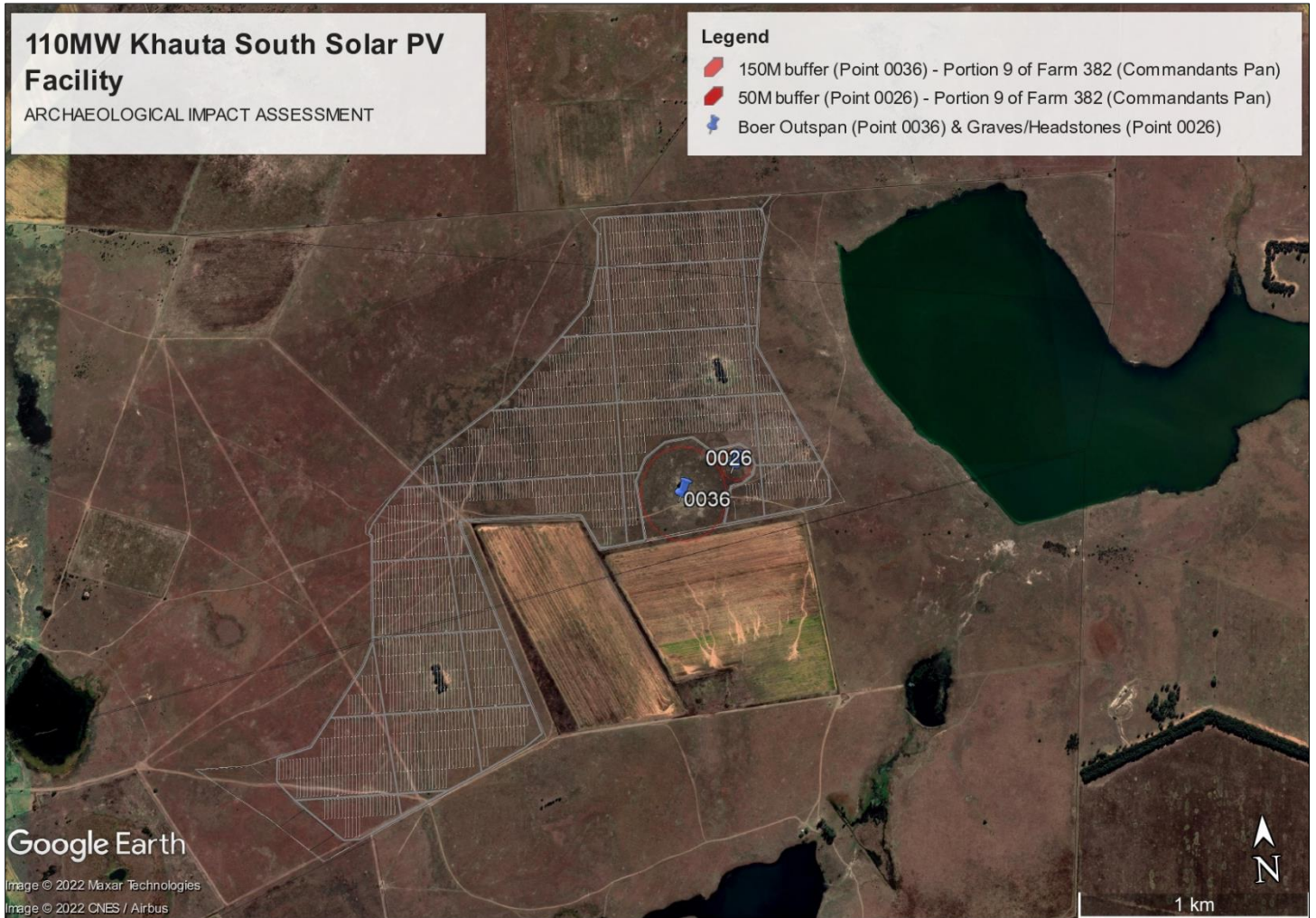


Figure 12. Proposed 110MW Khauta South Solar PV Facility near Riebeeckstad. Possible Outspan (Point 0036) and graves (Point 0026). A 150m & 50m buffer/No-Go area respectively has been established around the 'Outspan' and graves.



Figure 13. Possible Boer Outspan on Farm 382/9. View facing east

7.4 Graves

A farm labourer graveyard/cemetery (Point 0026) was recorded on the Farm Commandants Pan 382/9, ± 500m east of the edge of the Commandants Pan dam and about 200 west of the Outspan (Figure 12 and Figures 14-17). Approximately 40-50 barely visible graves were counted among the dense Winter grass, in an area measuring about 30 x 40m in extent. The majority of graves comprise low mounds of clay and stones without headstones or footstones. Several graves with engraved headstones were also identified (Figures 18 & 19), including a grave that has been fenced off and set slightly apart from the others (Figure 17).

Graves are graded as having High social value.



Figure 14. Arrows indicates the graveyard & headstones on Farm 382/9 which is barely visible in the surrounding dense grassland vegetation



Figure 15. Graveyard on Farm 382/9. View facing east



Figure 16. Graveyard on Farm 382/9, view facing north east



Figure 17. Fenced off grave on Farm 382/9. View facing northwest



Figure 18. Grave and headstone on Farm 382/9



Figure 19. Engraved headstone on Farm 382/9

7.5 Palaeontology

According to consulting palaeontologist, Dr John Almond (2022), 'no fossil remains of any kind were recorded from the Permian bedrocks and Late Cenozoic 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 & heritage 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 & heritage 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 resources that will need to be mitigated prior to construction activities commencing.

The assessment has shown that the site for the proposed 110MW Khauta South Solar PV Facility on Farm No. 382/9, Farm No. 413, and Farm No. 74/12 near Riebeeckstad, is not a sensitive archaeological landscape.

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

The assessment is further supported by several recent studies conducted in Riebeeckstad (Kaplan 2022a, b, c), as part of the Khauta Solar PV Cluster Project (Kaplan 2022a).

The overall impact significance of the proposed 110MW Khauta South Solar PV Facility on archaeological heritage is assessed as LOW and therefore there are no objections to the development proceeding.

Almond (2022:1) has also shown that that the proposed site 'is in practice of Low to Very Low palaeo-sensitivity'.

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 110MW Khauta South Solar PV Facility on Portion 9 of the Farm Commandants Pan No. 382, Farm Tafel Baai No. 413, and Portion 12 of the Farm Nooitgedacht No. 74, near Riebeeckstad, 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).

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