

**Our Ref:** HM/WEST COAST /MATZIKAMA/VANRHYNSDORP/  
PORTION 7 OF FARM DUINEN 258  
**Case No.:** HWC23012506CM0126  
**Enquiries:** Cecilene Muller  
**E-mail:** Cecilene.Muller@westerncape.gov.za  
**Tel:** 021 483 5959



**Applicant:** Mr. Weyers Janse van Rensburg  
**Email:** weyers@kerenenergy.com

**RESPONSE TO NOTIFICATION OF INTENT TO DEVELOP: NO FURTHER STUDIES REQUIRED**  
**In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape**  
**Provincial Gazette 6061, Notice 298 of 2003**

**NOTIFICATION OF INTENT TO DEVELOP: PROPOSED HYDROGEN PLANT ON PORTION 7, FARM DUINEN 258, VANRHYNSDORP, MATZIKAMA, WEST COAST, IN TERMS OF SECTION 38(1) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)**

Heritage Western Cape is in receipt of the above matter. This matter was discussed at the Heritage Officers Meeting held on 6<sup>th</sup> of February 2023.

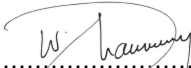
You are hereby notified that, since there is no reason to believe that the proposed Hydrogen plant on portion 7 of farm Duinen 258, Vanrhynsdorp off the N7, Matzikama local municipality, West Coast, Western Cape Province will not negatively impact on heritage resource, no further action under Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) is required.

However, should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities above, all works must be stopped immediately, and Heritage Western Cape must be notified without delay.

This letter does not exonerate the applicant from obtaining any necessary approval from any other applicable statutory authority.

HWC reserves the right to request additional information as required.

Should you have any further queries, please contact the official above and quote the case number.

  
.....  
Waseefa Dhansay  
**Assistant Director: Professional Services**



[www.westerncape.gov.za/cas](http://www.westerncape.gov.za/cas)

**Street Address:** Protea Assurance Building, Green Market Square, Cape Town, 8000 • **Postal Address:** P.O. Box 1665, Cape Town, 8000  
• **Tel:** +27 (0)21 483 5959 • **E-mail:** ceoheritage@westerncape.gov.za

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**APPLICATION FORM  
NOTIFICATION OF INTENT TO DEVELOP (NID)  
SECTION 38 (1) AND SECTION 38 (8)**

**Heritage Western Cape Reference No:**

*To be completed by the applicant*

**Completion of this form is required by Heritage Western Cape for the initiation of all impact assessment processes under Section 38 (1) & (8) of the National Heritage Resources Act (NHRA)**

**As per Section 38 (1) (e) of the NHRA, submission of the NID must be initiated at the earliest stage of development. Should the development trigger any other legislation, practitioners may submit the NID without formal submission to other statutory bodies in order to comply with the NHRA.**

*This form is to be read in conjunction with the HWC Notification of Intent to Develop, Heritage Impact Assessment, (Pre-Application) Basic Assessment Reports, Scoping Reports and Environmental Impact Assessments, Guidelines for Submission to HWC*

Whilst it is not a requirement, it may expedite processes and in particular avoid calls for additional information if certain of the information required in this form is provided by a heritage specialist/s with the necessary qualifications, skills and experience. All sections of the form must be completed in order to deem the application to be complete.

Making an incorrect statement or providing incorrect information may result in all or part of the application having to be reconsidered by HWC in the future, or submission of a new application.

The following information is to be included upon submission to HWC:

1. Proof of payment with correct reference number
2. Completed and signed application form – the application form must be completed in full in order to be considered
3. Power of Attorney
4. Locality Map
5. Images of the site and its context
6. Additional information pertaining to the heritage of the site

**Application and associated documentation to be emailed to [ceoheritage@westerncape.gov.za](mailto:ceoheritage@westerncape.gov.za)**

**A. APPLICABILITY OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA)**

Department of Environmental Affairs Development Planning (Western Cape); Department of Mineral Resources (National); Department of Environmental Affairs (National);  
Reference Number (if applicable):

**Please tick the applicable section:**

This application is made in terms of Section 38(8) of the NHRA and an application under NEMA has been made to the following authority: **Department of Environment Affairs and Development Planning (DEADP)**

This development will not require a NEMA application.

**B. BASIC DETAILS****PROPERTY DETAILS:**

Name of property: <b>Proposed Hydrogen Plant on the Farm Duinen No. 258/7, Vanrhynsdorp</b>	
Street address or location (eg: off R44): <b>Off the N7, near Vanrhynsdorp (Figures 1-4)</b>	
Erf or farm number/s: <b>Duinen 258/7</b>	Coordinates: <b>S 31°34'50.96"</b> <b>E 18°44'53.00"</b> (A logical centre point. Format based on WGS84.)
Town or District: <b>Vanrhynsdorp</b>	Municipality: <b>Matzikama Local Municipality</b>
Extent of property: <b>708ha, but the application area for the proposed hydrogen plant is less than 1.0ha in extent</b>	Current use: <b>Currently vacant (refer to Figures 8-14), although the Roma Energy PV Plant, has already been approved on the subject property (refer to Figures 5 &amp; 6)</b>
Predominant land use/s of surrounding properties: <b>Agriculture, and vacant agricultural land</b>	

**REGISTERED OWNER OF PROPERTY:**

Name and Surname: <b>Frederick Johannes Schade (Schade Boerdery (Pty) Ltd (Reg nr: 2022/429916/07))</b>		
Address <b>De Duine Farm, Vanrhynsdorp</b>		
Telephone <b>082 467 0218</b>	Cell	E-mail <a href="mailto:fritzs@absa.africa">fritzs@absa.africa</a>
APPLICANT/ AUTHORISED AGENT: <b>Roma Energy Vanrhynsdorp (Pty) Ltd</b>		
Name and Surname : <b>Mr Weyers Janse van Rensburg</b>		
Address: <b>PO Box 73, Somerset Mall, 7137</b>		
Telephone	Cell <b>082 631 7496</b>	E-mail <a href="mailto:weyers@kerenenergy.com">weyers@kerenenergy.com</a>

By the submission of this form and all material submitted in support of this notification (ie: 'the material'), all applicant parties acknowledge that they are aware that the material and/or parts thereof will be put to the following uses and consent to such use being made: filing as a public record; presentations to committees, etc; inclusion in databases; inclusion on and downloading from websites; distribution to committee members and other stakeholders and any other use required in terms of powers, functions, duties and responsibilities allocated to Heritage Western Cape under the terms of the National Heritage Resources Act. Should restrictions on such use apply or if it is not possible to copy or lift information from any part of the digital version of the material, the material will be returned unprocessed. All sections of the form have been completed.

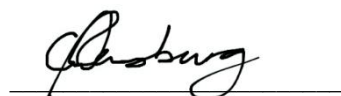
Signature of Owner:

Date:

Should the owner not be able to sign, the applicants/ agents must attach copy of power of attorney to this form.

Signature of Applicant/ Authorised Agent:

Date: 18 January 2023



Applicants/ agents must attach copy of power of attorney to this form.

### C. DEVELOPMENT DETAILS:

Please indicate below which of the following Sections of the National Heritage Resources Act, or other legislation has triggered the need for notification of intent to develop.

<input type="checkbox"/> S38(1)(a) Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.	S38(1)(c) Any development or activity that will change the character of a site -
<input type="checkbox"/> S38(1)(b) Construction of a bridge or similar structure exceeding 50m in length.	<input type="checkbox"/> (i) exceeding 5 000m <sup>2</sup> in extent;
<input checked="" type="checkbox"/> S38(1)(d) Rezoning of a site exceeding 10 000m <sup>2</sup> in extent.	<input type="checkbox"/> (ii) involving three or more existing erven or subdivisions thereof;
<p>Other triggers, eg: in terms of other legislation, (ie: National Environment Management Act, etc.) Please set out details:</p> <p><b>NEMA</b></p> <p><input checked="" type="checkbox"/> <b>Amendment of an Environmental Authorisation in terms of Part 2 of Chapter 5 of the Environmental Impact Assessment Regulations, 2014 (i.e., Regulation 31).</b></p>	<input type="checkbox"/> (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years. <p>If you have checked any of the three boxes above, describe how the proposed development will change the character of the site:</p> <p><b>The proposed development will change the character of the site.</b></p> <p><b>Note: the proposed Roma Energy PV plant on the Farm Duinen 258/7 has already been approved.</b></p>

If an impact assessment process has also been / will be initiated in terms of other legislation please provide the following information:

Authority / government department (ie: consenting authority) to which information has been /will be submitted for final decision: **Department of Environment Affairs and Development Planning (DEADP)**

Present phase at which the process with that authority stands: **Initiation of the project, but a Basic Assessment (BA) process will be followed in the application. Enviroafrica is the appointed Environmental Assessment Practitioner (EAP) responsible for facilitating environmental authorisation for the proposed development**

Provide a full description of the nature and extent of the proposed development or activity including its potential impacts:

**The proposed development entails construction of a 10MW Hydrogen plant and a 10MW Module array PV installation on the Farm Duinen 258/7, near Vanrhynsdorp. The proposed Hydrogen plant will be built alongside the already approved Roma Energy PV Plant, within the approved footprint area (refer to Figure 6).**

**The site will accommodate support infrastructure such as a site office, switching gear and internal roads. The site will be secured with a fence and the facility will be connected to the nations grid with a grid connection line. The combined Solar PV and Hydrogen energy farm will occupy a footprint of approximately 20ha**

**A Site Layout Plan is presented in Figure 7.**

**NB: A HIA for the proposed Roma Energy Solar PV Plant on the Farm Duinen 258/7 was conducted by ACRM in 2012 (Kaplan 2012 & attached). No mitigation was recommended, and the recommendations were supported by HWC (Case No. 124019)**

**A PIA for the proposed Solar PV Plant was also conducted by Natura Viva (John Pether 2012 & attached)**

**A VIA has also been conducted (attached)**

Estimated value cost of the project in South African Rands: R \_\_\_\_\_

#### **D. ANTICIPATED IMPACTS ON HERITAGE RESOURCES**

Section 3 of the National Heritage Resources Act sets out the following categories of heritage resource as forming part of the national estate. Please indicate the known presence of any of these by checking the box alongside and then providing a description of each occurrence, including nature, location, size, type

Failure to provide sufficient detail or to anticipate the likely presence of heritage resources on the site may lead to a request for more detailed specialist information.

Provide a short history of the site and its environs (Include sources where available):

**Vacant agricultural land for many years.**

**Please indicate which heritage resources exist on the site and in its environs, describe them and indicate the nature of any impact upon them:**

<input type="checkbox"/>	<p><b>Places, buildings, structures and equipment of cultural significance</b></p> <p>Description of resource: <b>Buildings and structures</b></p> <p>Description of impact on heritage resource: <b>No buildings or structures will be impacted by the development</b></p>
<input type="checkbox"/>	<p><b>Places to which oral traditions are attached or which are associated with living heritage</b></p> <p>Description of resource:</p>

	Description of impact on heritage resource: <b>n/a</b>
<input type="checkbox"/>	<p><b>Historical settlements and townscapes</b></p> <p>Description of resource:</p> <p>Description of impact on heritage resource: <b>n/a</b></p>
<input type="checkbox"/>	<p><b>Landscapes and natural features of cultural significance</b></p> <p>Description of resource:</p> <p>Description of impact on heritage resource: <b>n/a</b></p>
<input type="checkbox"/>	<p><b>Geological resources of scientific or cultural importance</b></p> <p>Description of resource:</p> <p>Description of impact on heritage resource: <b>n/a</b></p>
<input type="checkbox"/>	<p><b>Archaeological resources</b> (Including archaeological sites and material, rock art, battlefields &amp; wrecks):</p> <p>Description of resource: <b>Stone tools</b></p> <p>Description of impact on heritage resource: <b>A relatively large number of stone tools were recorded across the footprint area of the proposed development site during an HIA conducted by ACRM in 2012 (Kaplan 2012). Most of the remains were assigned to the Middle Stone Age (MSA), but some Later Stone Age (LSA) tools were also encountered, including two Early Stone Age (ESA) flakes. More than 80% of the implements recorded were in quartzite and silcrete, but a few lithics in indurated shale, quartz, chalcedony and ironstone were also noted. Most of the tools comprised isolated finds on calcareous red sands but implements were also clustered on patches of quartz gravels at higher elevations overlooking the floodplain of the Droerivier.</b></p> <p><i>Kaplan, J. 2012. Heritage Impact Assessment, the proposed Roma Energy Solar Farm on Portion of the Farm De Duinen No. 258 near Vanrhynsdorp, Western Cape. Report prepared for EnviroAfrica. ACRM, Cape Town</i></p>
<input type="checkbox"/>	<p><b>Palaeontological resources</b> (ie: fossils):</p> <p>Description of resource: <b>Fossils</b></p> <p>Description of impact on heritage resource: <b>A desktop PIA for the proposed Roma Vanrhynsdorp Solar PV Plant was conducted by John Almond (Almond 2012). According to Almond (2012:3), 'the overall palaeontological sensitivity of the Vanrhynsdorp solar plant study area is assessed as LOW.</b></p> <p><i>Almond, J. 2012. Recommended exemption from further palaeontological studies and mitigation, proposed Vanrhynsdorp Roma Solar Plant, near Vanrhynsdorp. Report prepared for EnviroAfrica. Natura Viva, Cape Town</i></p>

<input type="checkbox"/>	<p><b>Graves and burial grounds</b> (eg: ancestral graves, graves of victims of conflict, historical graves &amp; cemeteries):</p> <p>Description of Resource: <b>Graves</b></p> <p>Description of Impact on Heritage Resource: <b>No graves or typical grave markers were identified by Kaplan (2012) during a HIA for the proposed Roma Solar PV Plant on Duinen 258/7</b></p>
<input type="checkbox"/>	<p><b>Other human remains:</b></p> <p>Description of resource:</p> <p>Description of impact on heritage resource: <b>n/a</b></p>
<input type="checkbox"/>	<p><b>Sites of significance relating to the history of slavery in South Africa:</b></p> <p>Description of resource:</p> <p>Description of impact on heritage resource: <b>n/a</b></p>
<input type="checkbox"/>	<p><b>Other heritage resources:</b></p> <p>Description of resource:</p> <p>Description of impact on heritage resource: <b>n/a</b></p>
<p>Describe elements in the environs of the site that could be deemed to be heritage resources:</p> <p><b>MSA and LSA tools, graded as having Low archaeological significance (see Kaplan 2012)</b></p> <p>Description of impacts on heritage resources in the environs of the site:</p> <p><b>Impact on Stone Age archaeological heritage resources</b></p>	

Summary of anticipated impacts on heritage resources:

**Anticipated impact on important heritage resources: LOW**

#### **E. ILLUSTRATIVE MATERIAL:**

Attach to this form a minimum A4 sized locality plan showing the boundaries of the area affected by the proposed development, its environs, property boundaries and a scale. The plan must be of a scale and size that is appropriate to creating a clear understanding of the development.

Attach also other relevant graphic material such as maps, site plans, satellite photographs and photographs of the site and the heritage resources on it and in its environs. These are essential to the processing of this notification.

Please provide all graphic material on paper of appropriate size and on CD/ USB in JPEG format. It is essential that graphic material be annotated via titles on the photographs, map names and numbers, names of files and/or provision of a numbered list describing what is visible in each image.

**F. RECOMMENDATION**

In your opinion do you believe that a heritage impact assessment is required?  Yes  No

Recommendation made by:

Name **Jonathan Kaplan (agency for cultural resource management)**  
**ASAPA CRM Membership No. 64 (in Good Standing)**

Capacity **Heritage practitioner/archaeologist**

**PLEASE NOTE:** No Heritage Impact Assessment should be submitted with this form or conducted until Heritage Western Cape has expressed its opinion on the need for such and the nature thereof.

**G. INFORMATION TO BE PROVIDED AND STUDIES TO BE CONDUCTED AS PART OF THE HERITAGE IMPACT ASSESSMENT (HIA)**

If it is recommended that an HIA is required, please complete this section of the form.

## DETAILS OF STUDIES TO BE CONDUCTED IN THE INTENDED HIA

In addition to the requirements set out in Section 38(3) of the NHRA, indicate envisaged studies:

<input type="checkbox"/>	Heritage resource-related guidelines and policies.
<input type="checkbox"/>	Local authority planning and other laws and policies.
<input type="checkbox"/>	Details of parties, communities, etc. to be consulted.
<input type="checkbox"/>	Specialist studies, eg: archaeology, palaeontology, architecture, townscape, visual impact, etc. Provide details:
<input type="checkbox"/>	Other. Provide details:

**PLEASE NOTE:** Any further studies which Heritage Western Cape requires should be submitted must be in the form of a single, consolidated report with a single set of recommendations. Specialist studies must be incorporated in full, either as chapters of the report, or as annexures thereto.  
Please refer to the *Guidelines for Heritage Impact Assessments required in terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999)*



# Proposed Hydrogen Plant on the Farm Duinen No. 258/7, near Vanrhynsdorp, Western Cape

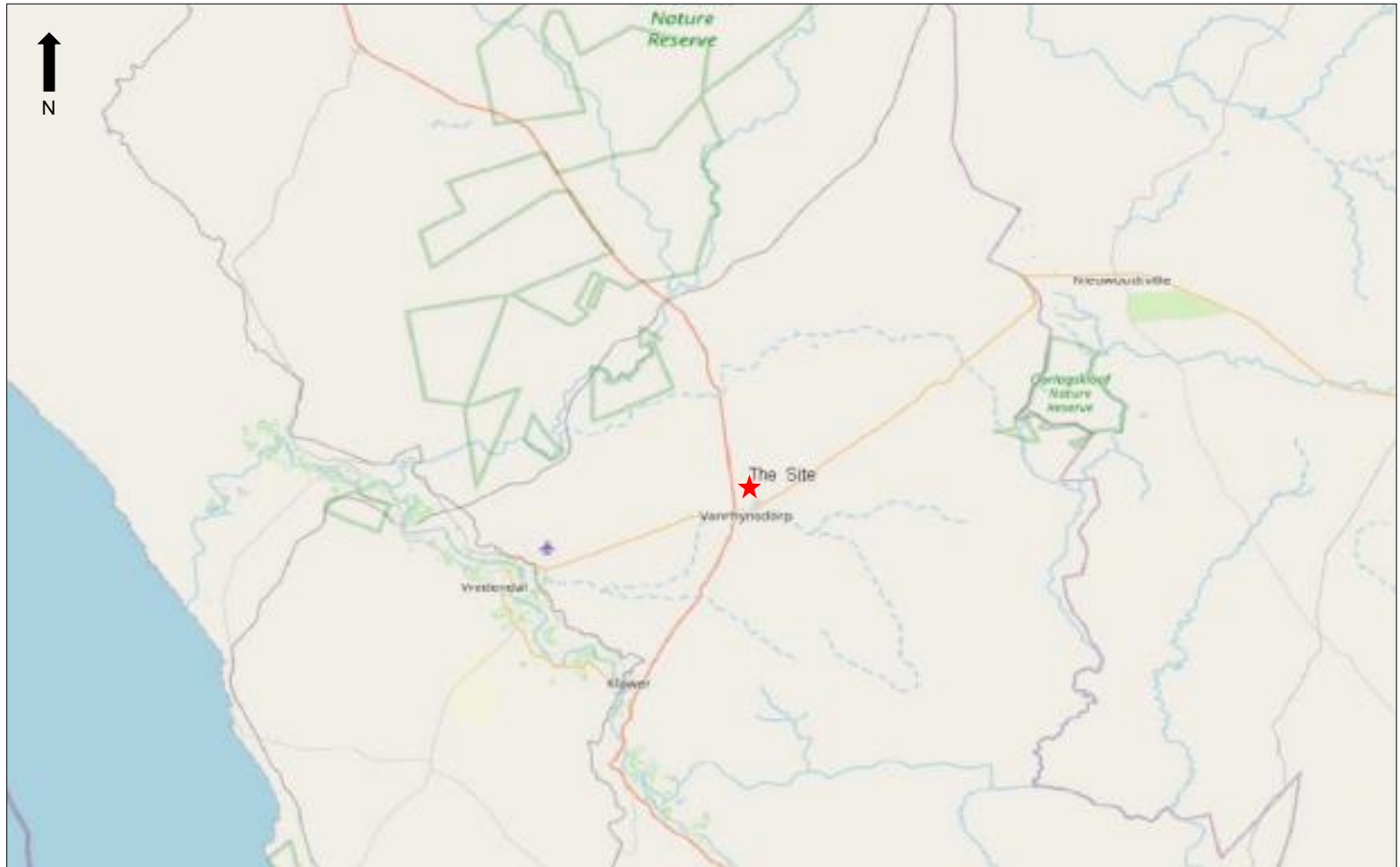


Figure 1. Locality map. Red star indicates the location of the proposed Roma Energy Hydrogen Plant on the Farm Duinen No. 257/7 near Vanrhynsdorp



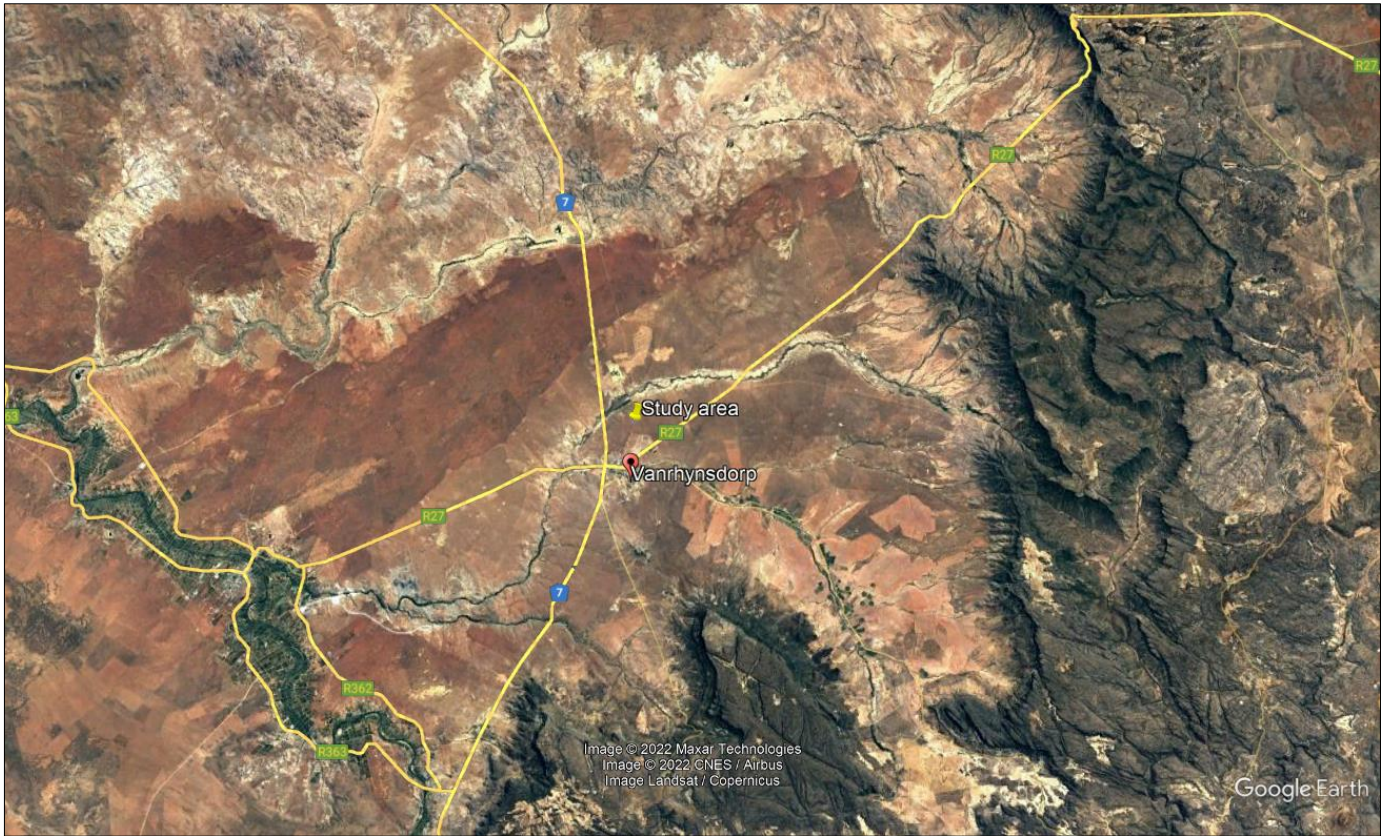


Figure 2. Google satellite map indicating the study area (yellow pin), in Vanhynsdorp.

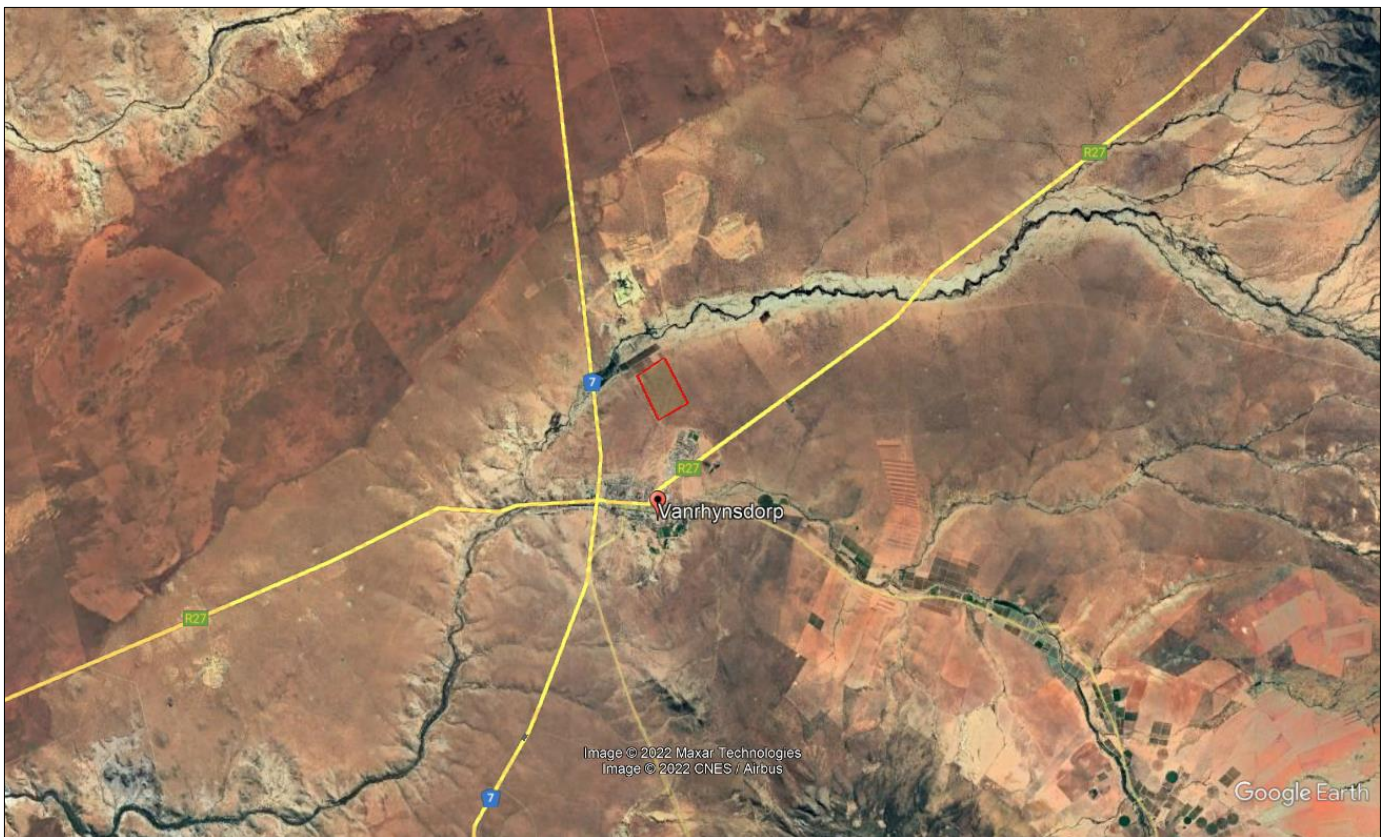


Figure 3. Google satellite map showing the approved footprint area for the approved Vanhynsdorp Solar Energy Farm





Figure 4. Close up Google satellite map showing the footprint area (red polygon) of the already approved Roma Energy PV plant in Vanrhynsdorp



Figure 5. 20ha footprint area (red polygon) for the Roma Energy PV plant in Vanrhynsdorp. The blue polygon is the already approved footprint area for the PV plant.



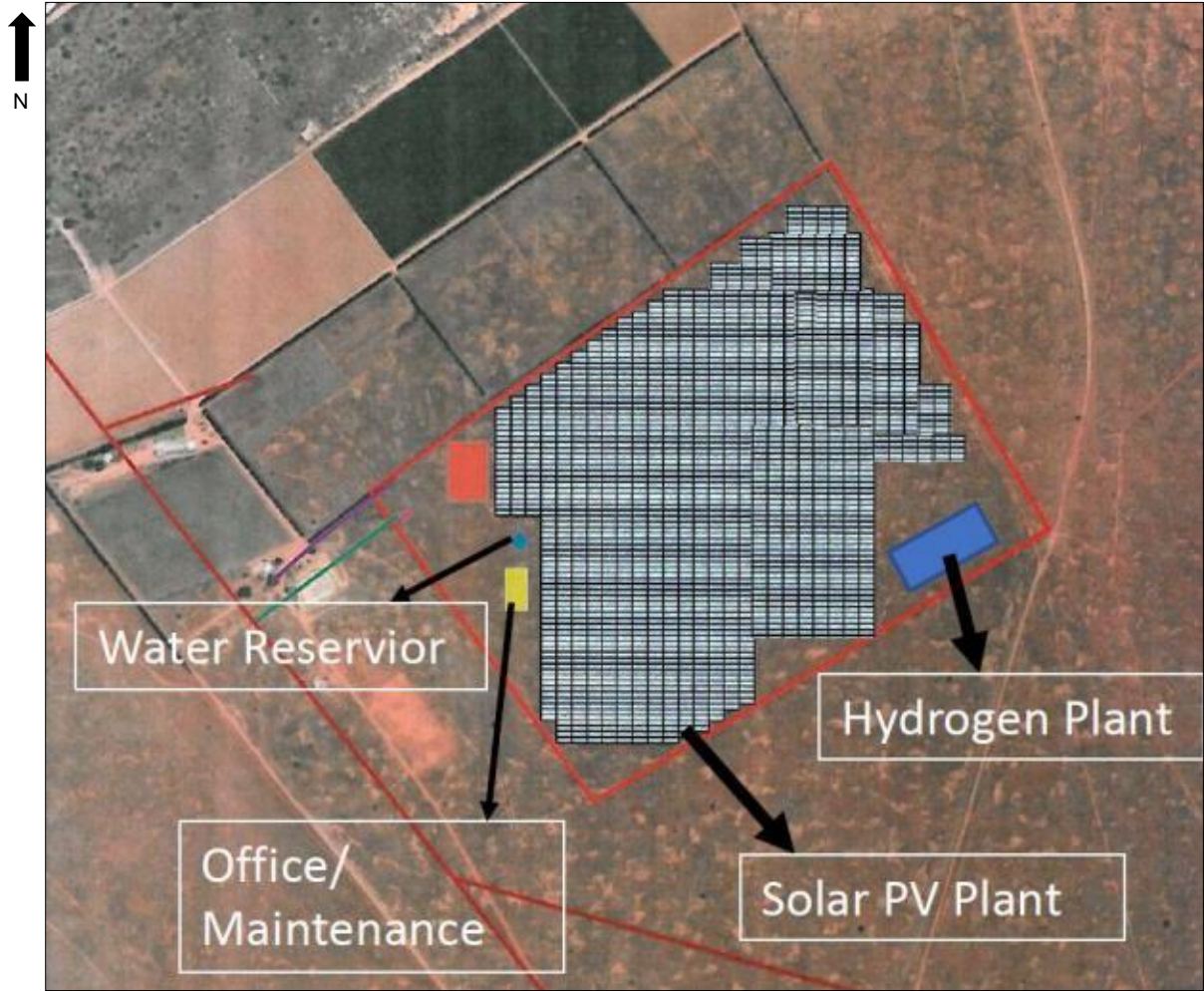


Figure 7. Proposed Layout Plan for the both the solar PV Plant and the Hydrogen plant



Figure 8. View of the study site facing north



Figure 9. View of the study site facing north





Figure 10. View of the study site facing south



Figure 11. View of the study site facing south



Figure 12. View of the study site facing south east



Figure 13. View of the study site facing south east





Figure 14. View of the study site facing south



**Appendix D3a: Updated Archaeological Assessment/Addendum  
(2017 revision)**



15 April, 2017

Att: Mr Bernard de Wit  
EnviroAfrica  
PO Box 5367  
Somerset West  
7135

Dear Mr De Wit,

**HERITAGE IMPACT ASSESSMENT, ROMA ENERGY SOLAR ENERGY FARM ON FARM DE DUINEN NO 258, VAN RHYSNDROP: CONFIRMATION OF ARCHAEOLOGICAL FINDINGS**

An Archaeological Impact Assessment (AIA) for the construction of the proposed 10MW Roma Energy Solar Energy Farm (SEF) on Farm De Duinen No. 258 in Vanrhynsdorp was undertaken by ACRM in 2012<sup>1</sup> (Figures 1 & 2).

The AIA formed part of a wider Heritage Impact Assessment (HIA) for the proposed development which included a Visual Impact Assessment (VIA) and Palaeontological Impact Assessment (PIA).

The report was submitted as part of a Basic Environmental Assessment process undertaken by independent environmental consultants EnviroAfrica cc.

114 archaeological occurrences were documented on the proposed development site. The majority of the remains were assigned to the Middle Stone Age (MSA), but Later Stone Age (LSA) tools were also encountered, including two Early Stone Age (ESA) flakes. More than 80% of the implements are in quartzite and silcrete, but a few lithics in indurated shale, quartz, chalcedony and ironstone were also noted. Most of the tools comprised single, dispersed and isolated occurrences on calcareous red sands, but implements were also clustered on patches of quartz gravels on higher elevations overlooking the floodplain of the Droerivier. No graves or grave markers were found.

Heritage Western Cape (HWC), the delegated Provincial Heritage Authority, reviewed the HIA and issued a Final Comment, indicating that it has 'no objections to the proposed development'<sup>2</sup>.

The proposed development was approved by the Department of Environment Affairs, but did not proceed, and Environmental Authorization lapsed in 2015, necessitating a new Basic Assessment process.

ACRM was subsequently appointed to review the proposal and notes the following:

➤ The footprint for the new ± 7MW SEF is not significantly different from the footprint area assessed during the 2012 study, and the layout of the modules now covers a much smaller area (Figures 3 & 4).

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<sup>1</sup> Kaplan, J. Heritage Impact Assessment, proposed Roma Energy Solar Energy Farm on Farm No. 258, Van Rhynsdorp, Western Cape. Report prepared for EnviroAfrica. ACRM, Cape Town

<sup>2</sup> HWC Case No. 120419JL11 letter dated 20 June, 2012



# Agency for Cultural Resource Management

Specialists in Archaeological Studies and Heritage Resource Management

ACRM therefore confirms the findings of the 2012 study, and has no objections to the new development proceeding.

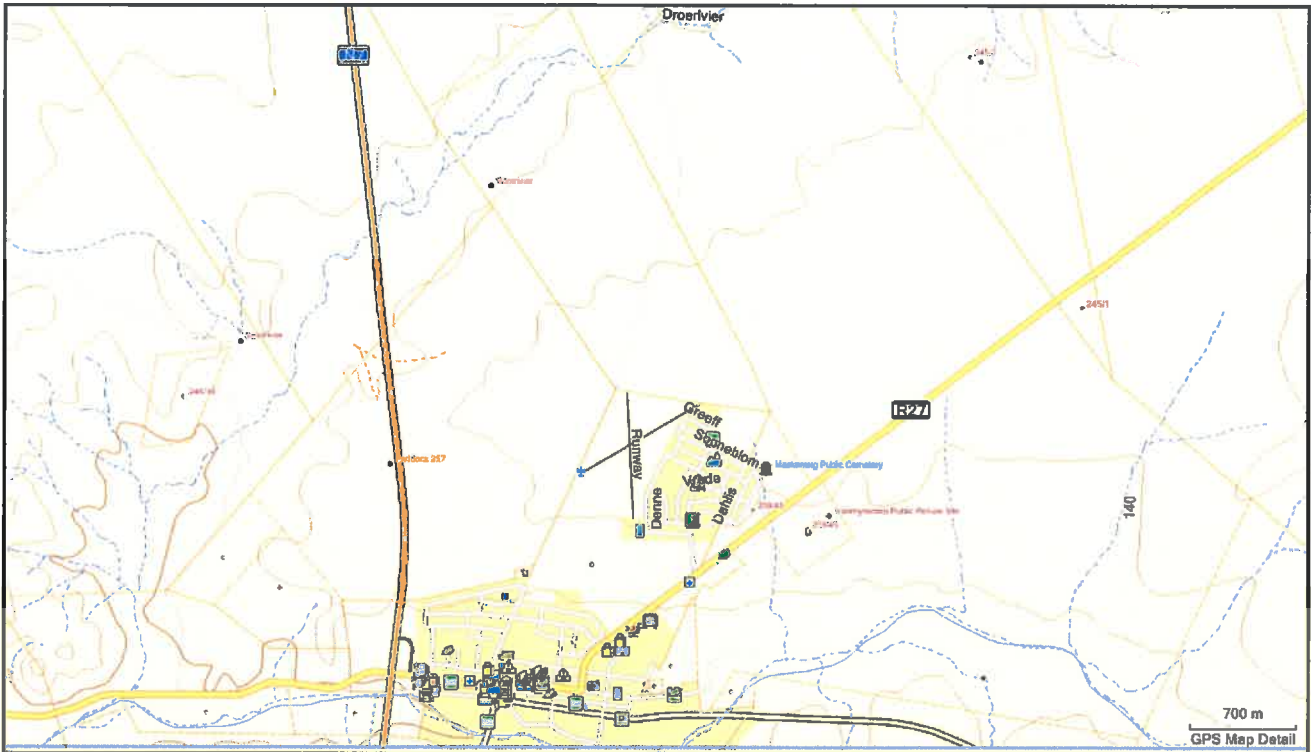


Figure 1. Locality Map



Figure 2. 2012 layout plan for the Roma Energy Vanrhynsdorp 10MW Solar Energy Farm (blue polygon)

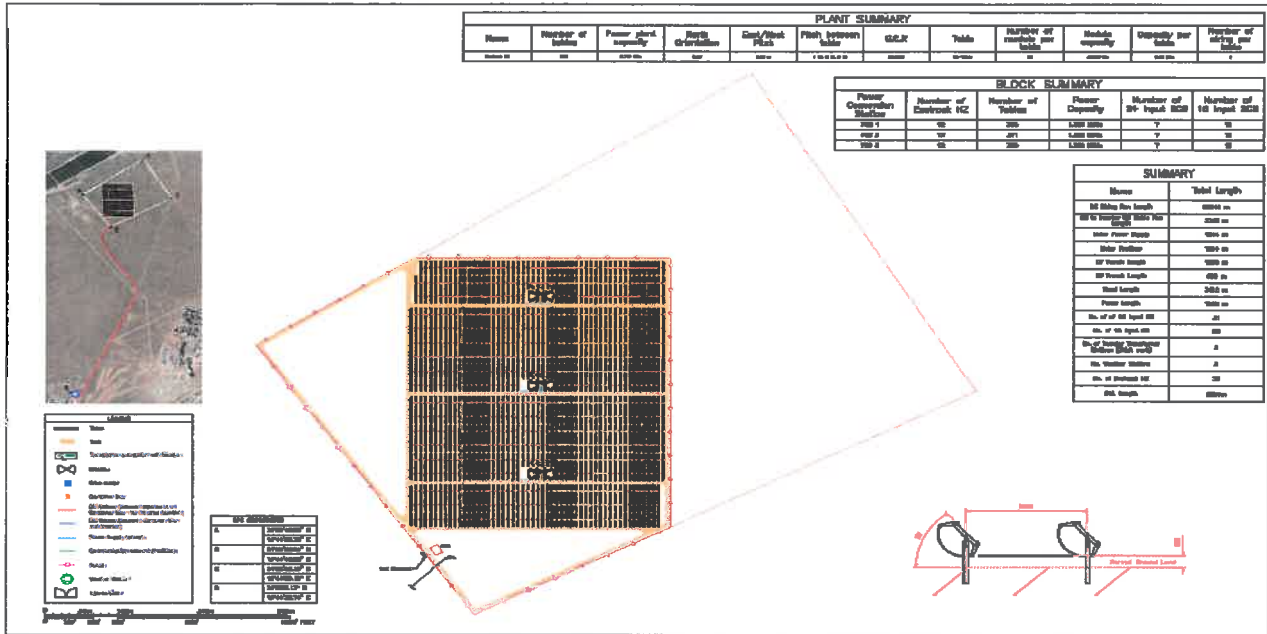


Figure 2. 2017 layout plan for the proposed Roma Energy Vanrhynsdorp 7MW Solar Energy Farm.

### Cumulative impacts on archaeological heritage

According to the Department of Environmental Affairs (DEA) Renewable Energy EIA Application Database for renewable projects (new builds)<sup>3</sup>, there are at least 6 approved renewable energy (RE) (i.e. wind & solar) projects planned within a 30km radius of Vanrhynsdorp. However, despite the presence of these RE sites in the region, it will not have a significant impact on archaeological resources on the proposed Roma Energy Vanrhynsdorp PV facility.

Yours sincerely

Jonathan Kaplan

**Appendix D3a: Original Archaeological Assessment (2012)**

**HERITAGE IMPACT ASSESSMENT  
THE PROPOSED ROMA ENERGY SOLAR FARM ON  
PORTION OF THE FARM DE DUINEN NO. 258  
NEAR VANRHYNSDORP  
WESTERN CAPE PROVINCE**

**Assessment conducted under Section 38 (3) of the National Heritage  
Resource Act (No. 25 of 1999)**

Prepared for:

**ENVIROAFRICA**

Att: Mr Bernard de Wit  
PO Box 5367  
Heiderberg  
7135

E-mail: [Bernard@enviroafrica.co.za](mailto:Bernard@enviroafrica.co.za)

On behalf of:

**ROMA ENERGY VANRHYNSDORP (PTY) LTD**

By



Jonathan Kaplan  
**Agency for Cultural Resource Management**

P.O. Box 159  
Riebeek West  
7306

Ph/Fax: 022 461 2755

Cellular: 082 321 0172

E-mail: [acrm@wcaccess.co.za](mailto:acrm@wcaccess.co.za)

**MAY  
2012**

### Executive summary

The Agency for Cultural Resource Management was requested by EnviroAfrica to conduct a Heritage Impact Assessment (HIA) for a proposed 10 Mega Watt (MW), solar energy farm on Portion of the Farm De Duinen No. 258, near Vanrhynsdorp in the Western Cape.

The HIA forms part of the Basic Assessment Process that is being conducted by environmental consultants, EnviroAfrica cc.

The site for the proposed solar energy farm (SEF) is located just to the south of the Droerivier, and about 2 kms north of the town of Vanrhynsdorp. The proposed activity entails the construction of blocks of photovoltaic solar panels covering a footprint area of about 20 ha. The PV panels will be mounted on pedestals drilled and set into the ground. Associated infrastructure includes single track internal access roads, underground cables, a switching station, maintenance shed and a temporary construction camp. The electricity that will be generated from the project will be fed directly into the national grid at the nearby Eskom Vanrhynsdorp substation that is situated about 1.5 kms south west of the proposed site. The proposed development will make use of an existing Eskom servitude.

A Notification of Intent to Develop (NID) was completed by EnviroAfrica and submitted to Heritage Western Cape (HWC) for comment. In a letter dated 23 May 2012 (Case No. 124019JL11) HWC requested that a HIA, consisting of an archaeology and visual impact study must be done.

With regard to the specialist archaeology study, 114 archaeological occurrences (numbering nearly 130 stone implements) were counted and documented on the proposed site for the Vanrhynsdorp solar energy farm. All of the remains have been mapped in-situ using a hand held GPS device. The majority of archaeological remains are assigned to the Middle Stone Age (MSA), but a relatively large number of Later Stone Age implements were also encountered. MSA lithics typically comprise larger, thicker, chunky and triangular shaped flakes with convergent dorsal scars. Only one round core and one flaked chunk/minimal core was found. Only two Early Stone Age flake tools were found in the proposed footprint area. Only one convex scraper was found, but a relatively large number of miscellaneous retouched, partially retouched and utilized flakes were logged. More than 80% of the implements are in quartzite and silcrete, but a few lithics in indurated shale, quartz, chalcedony and ironstone were also noted.

Most of the tools comprise single, isolated occurrences that are spread very thinly and unevenly over the surrounding, undulating landscape, but there does appear to be a clustering of implements on hard patches of washed quartz gravels (mixed quartz and rolled pebbles) on higher elevations overlooking the floodplain of the Droerivier. The lower portions of the site are underlain by loose, red and slightly calcareous sands, where archaeological finds are very, dispersed and ephemeral.

One piece of weathered ostrich eggshell and one small piece of refined earthenware were found.

## Heritage Impact Assessment, proposed Solar Energy Farm in Vanrhynsdorp

As archaeological sites are concerned the occurrences are lacking in context and no organic remains such as bone, pottery or larger numbers of ostrich eggshell was found.

Overall, the relatively small numbers and isolated and dispersed context in which they were found means that the remains on the proposed site have been rated as having low archaeological (Grade 3C) significance.

The results of the study indicate that the proposed development will not have an impact of great significance on the archaeological heritage. It is maintained that most of the archaeological heritage has been captured during the specialist study.

Indications are that in terms of archaeological study the proposed activity (i. e. the construction of a solar energy farm) is viable and no fatal flaws have been identified.

The Visual Impact Assessment (VIA) for the proposed Vanrhynsdorp SEF was done by Sarien Lategan of Geostatics. It is important to note that while the VIA does address the visual impacts associated with the proposed development, a site visit has yet to be undertaken by the specialist. A field study was done for the original proposed site (closer to the town), but due to botanical constraints, a site closer to the Droerivier has now been identified, which is more acceptable. Site 1 has therefore been screened out. The VIA report thus includes a full assessment of Site 1, as well as a desk top review of Site 2 alongside the river, including the anticipated visual impacts. Importantly, the desk top review considers worst case scenarios such as height of the tracking units.

With regard to the VIA, the primary potential visual receptor is the N7 which is located to the west of Site 2. According to Lategan, it is envisaged that the intrusion level of the solar modules on road users will be of low-medium significance, depending on the size of the modules. Neither module will have a significant impact on obstruction levels, and the overall conclusion is that the visual impact of Site 2 is 'within acceptable levels'. According to Lategan, any units within the height scale of 8m is expected to be within acceptable levels. Smaller tracking units or smaller panels will obviously have a lesser visual impact.

With regard to the archaeological heritage, the following recommendations are made:

### Archaeology

1. No further archaeological mitigation is required.

With regard to the visual impact assessment:

1. It is recommended that should the assessment of Site 2 be confirmed by an on-site visit, the development should be allowed to proceed.



**DECLARATION OF INDEPENDENCE**

I, **Jonathan Kaplan**, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in the compilation of the above report;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
- have and will not have any vested interest in the proposed activity proceeding;
- have disclosed to the EAP any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management act;
- have provided the EAP with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543, 2010.

Signature of the specialist

A handwritten signature in black ink, appearing to be 'JK' with a long horizontal stroke extending to the right.

Date: 24 May, 2012

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## 1. INTRODUCTION

ACRM was requested by EnviroAfrica to conduct a Heritage Impact Assessment (HIA) for a proposed 10 Mega Watt (MW), solar energy farm (SEF) on Portion of the Farm De Duinen No. 258, near Vanrhynsdorp (Matzikama Municipality) in the Western Cape (Figure 1).

The HIA forms part of the Basic Assessment Process that is being conducted by EnviroAfrica.

The site for the proposed SEF is located just to the south of the Droerivier, and about 2 kms north of the town of Vanrhynsdorp. The proposed activity entails the construction of blocks of photovoltaic (PV) solar panels covering an area of about 20 ha (Figure 2). The PV panels will be mounted on pedestals drilled and set into the ground. Extensive excavations are not envisaged, but some vegetation may need to be cleared from parts of the site. The electricity that will be generated from the project will be fed directly into the national grid at the nearby Eskom Vanrhynsdorp substation that is situated about 1.5 kms south west of the proposed site. The proposed development will make use of an existing Eskom servitude. The infrastructure associated with project includes the construction of internal access roads, trenches for underground cables, a control room, security room, a small office and security fencing around the perimeter of the site.

A Notification of Intent to Develop (NID) was completed by EnviroAfrica and submitted to Heritage Western Cape (HWC) for comment. In a letter dated 23 May 2012 (Case No. 124019JL11) HWC requested that a HIA, consisting of an archaeology and visual impact study must be done.

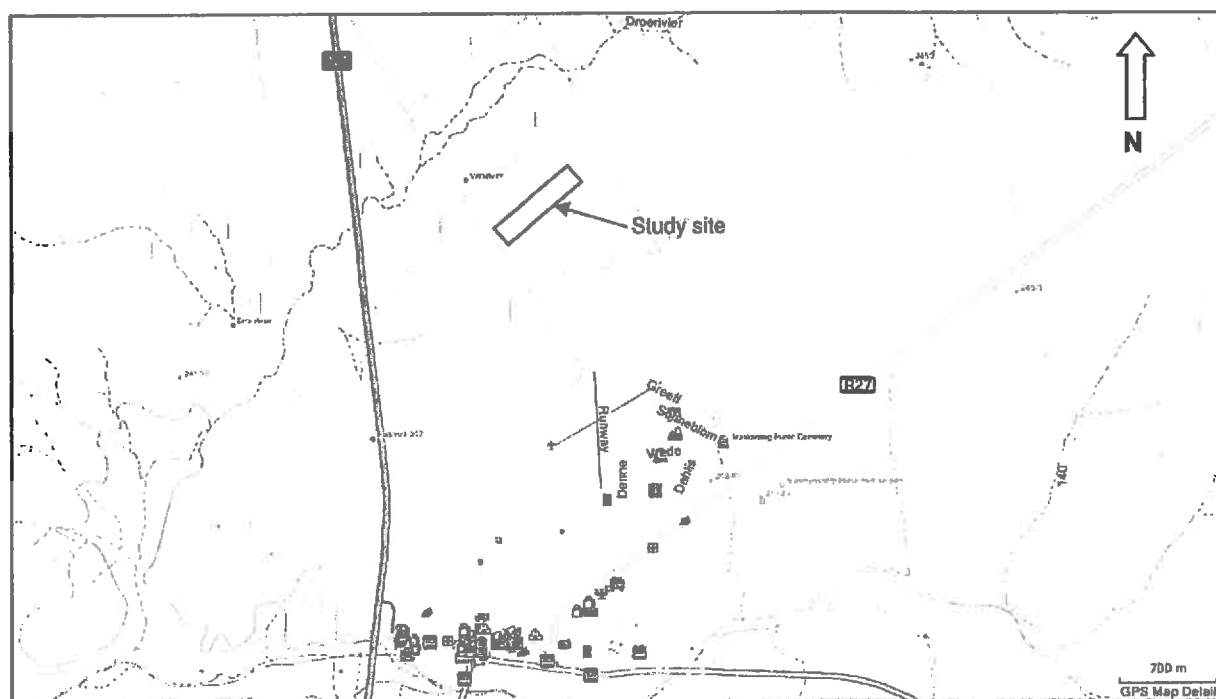


Figure 1. Locality map indicating the location site for the proposed Roma Energy Vanrhynsdorp Solar Energy Farm

## Heritage Impact Assessment, proposed Solar Energy Farm in Vanrhynsdorp



Figure 2. Plan of the proposed Vanrhynsdorp SEF. The layout of the solar panels is in the blue hatched lines.

## 2. HERITAGE LEGISLATION

The National Heritage Resources Act (Act No. 25 of 1999) makes provision for a compulsory Heritage Impact Assessment (HIA) when an area exceeding 5000 m<sup>2</sup> is being developed. This is to determine if the area contains heritage sites and to take the necessary steps to ensure that they are not damaged or destroyed during development.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

### 3. DESCRIPTION OF THE RECEIVING ENVIRONMENT

The site for the proposed solar energy farm is located just to the south of the Droërivier, and about 2 kms north of the town of Vanrhynsdorp (Figures 3 & 4). The actual proposed site is located directly adjacent to a block of vineyards. The original proposed site (since screened out due to botanical constraints) was situated on flat sandy terrain on the higher slopes above the river, closer to the northern boundary of the farm. According to Ms Anna Wiese, the owner of the farm, De Dulne has been vacant since 1988, with some grapes (raisons) currently been grown along the floodplain of the river adjacent the proposed footprint area. Prior to that, sheep were grazed on the property, while some Lucerne was also cultivated. Much of the natural veld has returned due to sensitive veld management. The proposed site for the SEF is slightly undulating and covered in natural veld. It slopes north toward the river. The higher, flatter elevations in the northwest are covered in large, hard patches of quartz gravels (typical of the Knersvlakte region), while the lower lying areas and stream channels are underlying by soft loose, red calcareous sands. There are no eroded or deflated areas on the proposed site (Figures 5-8). There is a dusty soccer field in the south western corner of the proposed site, an informal dumping site alongside the gravel road and a small concrete dam in the north western corner. Apart from the river, there are no significant landscape features on the proposed site. Surrounding land use is agriculture (vineyards immediately to the north alongside the Droërivier and vast tracts of vacant land (marginal grazing). The PPC gypsum mine is located directly north of the river.



Figure 3. Google satellite photograph showing the proposed study site in relation to Vanrhynsdorp .

Heritage Impact Assessment, proposed Solar Energy Farm in Vanrhynsdorp



Figure 4. Google satellite photograph of the study site, including the approximate boundary of the footprint area

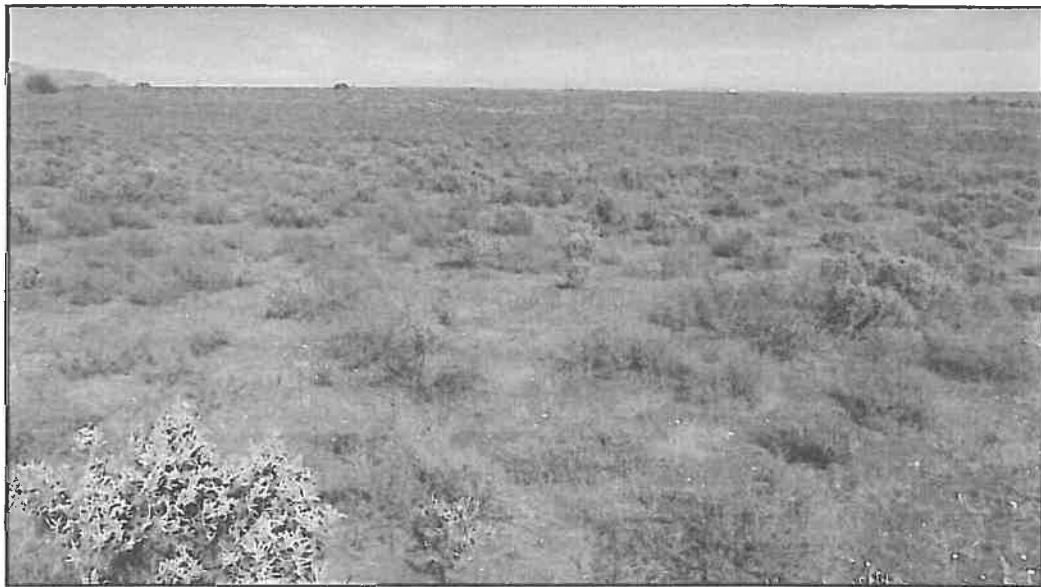


Figure 5. View of the proposed site facing west

Heritage Impact Assessment, proposed Solar Energy Farm in Vanrhynsdorp

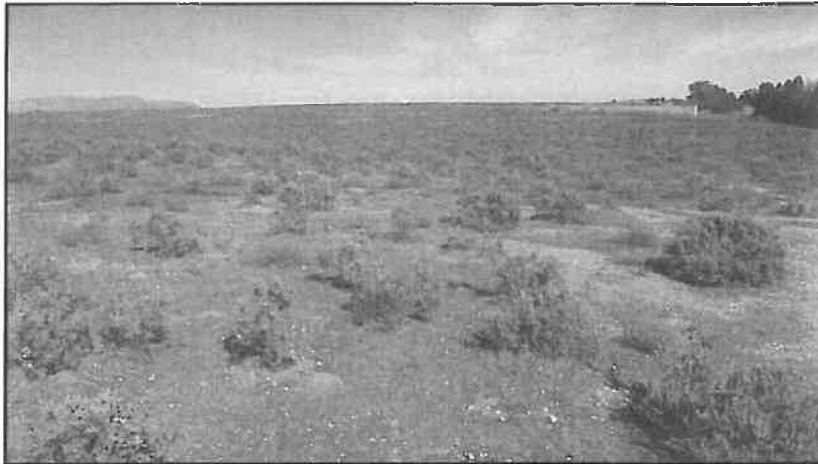


Figure 6. View of the proposed site facing west. Note the quartz sheet wash

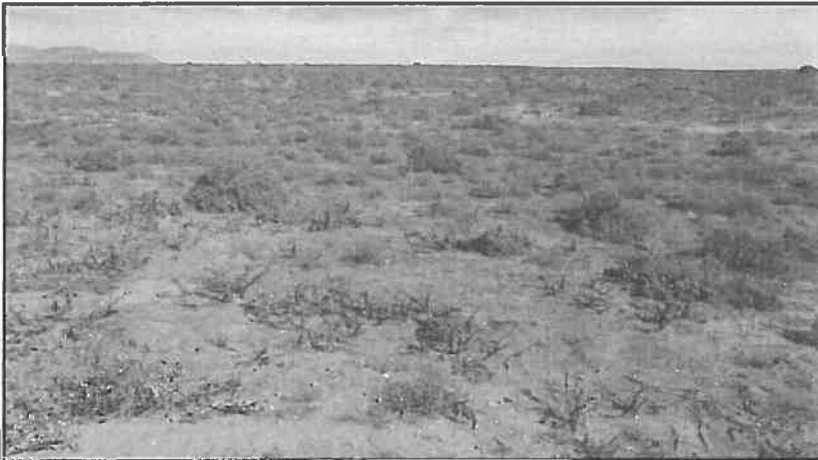


Figure 7. View of the proposed site facing west. Note the softer red sands

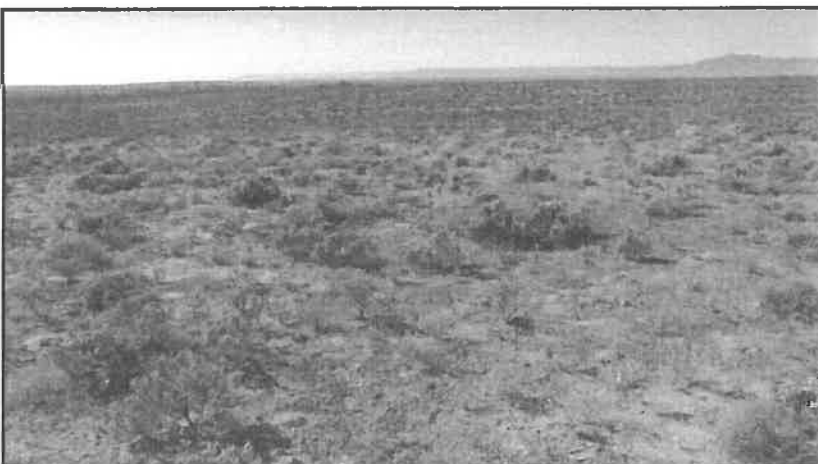


Figure 8. View of the site facing east.

#### **4. STUDY APPROACH**

##### **4.1 Method of survey**

A detailed foot survey of the proposed footprint area was undertaken by J. Kaplan of ACRM on the 9<sup>th</sup> May, 2012.

A track path of the survey was created (refer to Figure 14 in Appendix II).

All archaeological remains documented during the study have been mapped in-situ using a hand held Garmin Oregon 300 GPS device set on the map datum WGS 84.

A desk top study was also done.

##### **4.2 Constraints and limitations**

There were no constraints or limitations associated with the study. Archaeological visibility was very good over most of the proposed site. Some areas were covered in thicker vegetation but this did not hinder the study.

##### **4.3 Identification of potential risks**

Based on the results of the specialist study, there are no archaeological risks associated with the proposed development.

##### **4.4 Results of the archaeological desk top study**

North of Vanrhynsdorp, the landscape is dominated by the semi-arid flatlands of the Knersvlakte. Studies have shown that archaeological visibility is very high in this dry region of the south Western Cape Province, where many implements of mixed age are found on eroded surfaces (Orton 2011a). J. Orton (pers. comm.) has undertaken extensive fieldwork in the Knersvlakte, as part of his research for his PhD, and has mapped scatters of both Middle and Later Stone Age (MSA & LSA) material alongside the Sout and Varsche River. He and others have also excavated MSA, and LSA rock shelters with contact period deposits on the Varsche River (Orton et al 2011). His work has shown that MSA and LSA archaeological remains are strongly concentrated around the floodplains of the many drainage channels that occur in the surrounding landscape, and are usually revealed in eroding and deflated areas. Early Stone Age (ESA) occurrences on the other hand tend to be found among the (older) river gravel terraces further away. Mackay et al (2010) have documented an open air bifacial point manufacturing site, possibly dating to the Still Bay period of the MSA more than 70 000 years ago. Orton (2011b) also documented dispersed scatters of LSA, and some MSA implements mostly associated with dry pans and heuweltjies during a study for a proposed landfill site north of Vredendal. Large numbers of LSA implements were also documented on the flat mountain tops on the farm Zoutfontein about 1 km north of the Sout River by Kaplan (2010a) during scoping for a proposed wind energy farm north west of Vanrhynsdorp. Thin scatters of mostly isolated quartz, silcrete and quartzite tools were documented during a study east of the PPC gypsum mine in Vanrhynsdorp (Smith 2011). Orton (2012) very recently documented several hundred MSA and LSA lithics on the Farm Paddock 257, situated adjacent to and east of the N7, directly alongside De Duinen 258. According to Orton (2012) the remains were rated as having limited



importance due to their disturbed context. J. Kaplan (2010b) has also documented relatively large numbers of LSA and some MSA stone implements north of the Wiedou River about 5 kms south of Van Rhynsdorp. Well preserved Bushman paintings, and caves with archaeological deposits are also known from the Gifberg, about 15 kms south of the town.

## **5. FINDINGS**

### **5.1 Archaeology**

114 archaeological occurrences (numbering nearly 130 stone implements) were counted and documented on the proposed site for the Vanrhynsdorp solar energy farm. All of the remains have been mapped in-situ (refer to Figure 14 in Appendix II). A spreadsheet of waypoints and description of the archaeological finds is presented in Table 1 (refer to Appendix I).

The majority of the archaeological remains that have been documented during the study are assigned to the MSA, but a relatively large number of LSA lithics were also encountered. MSA tools typically comprise larger, thicker, chunky and triangular shaped flakes with convergent dorsal scars. A number of flakes are broken or snapped. Two MSA utilized & partially retouched silcrete blades (550 & 629) were also found. Only one round core (537) and one flaked chunk/minimal core (595) was found over the footprint area. Only two Early Stone Age bifaces (542 & 605) were encountered. One MRP/silcrete convex scraper (554) was found, but a relatively large number ( $n = 23$ ) of miscellaneous retouched, partially retouched and utilized flakes were noted. One miscellaneous LSA upper grindstone (376) was found. More than 80% of implements are in quartzite and silcrete (red, greys and pinks), but a few lithics in indurated shale, quartz, chalcedony and ironstone were also noted.

Most of the tools comprise single, isolated occurrences that are spread very thinly and unevenly over the surrounding, undulating landscape, but there does appear to be a clustering of implements on the sheet washed quartz gravels (mixed quartz and rolled pebbles) on the higher elevations overlooking the floodplain of the river in the south western portion of the site. The lower lying portions of the site are underlain by loose, red and slightly calcareous sands.

One piece of weathered ostrich eggshell (562) and one small piece of refined earthenware (580) were also logged.

A collection of tools is presented in Figures 9-14.

#### **5.1.1 Significance of the archaeological remains**

As archaeological sites are concerned the occurrences are lacking in context and no organic remains such as bone, pottery or larger numbers of ostrich eggshell was found.

Overall, the relatively small numbers and fairly isolated and dispersed context in which they were found means that the remains on the proposed site have been rated as having low archaeological (Grade 3C) significance.

Heritage Impact Assessment, proposed Solar Energy Farm in Varrhynsdorp

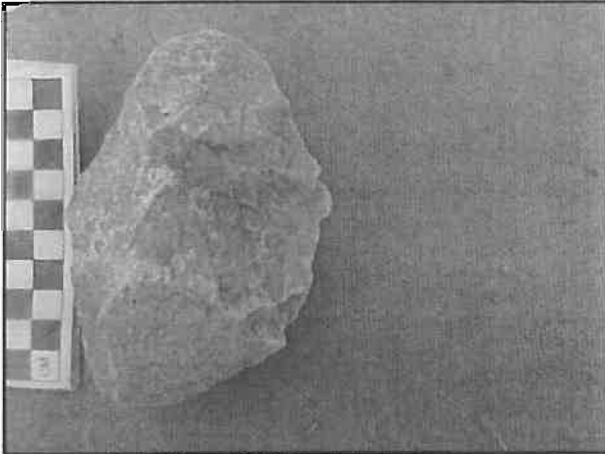


Figure 9. ESA biface (542) Scale is in cm



Figure 12. Collection of tools Scale is in cm



Figure 10. Collection of tools Scale is in cm

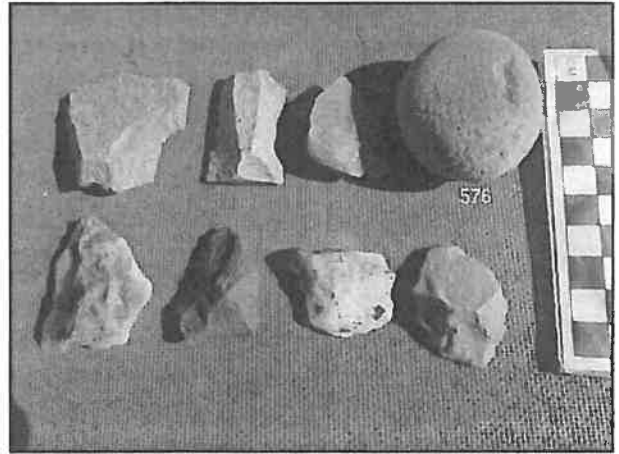


Figure 13. Collection of tools Scale is in cm

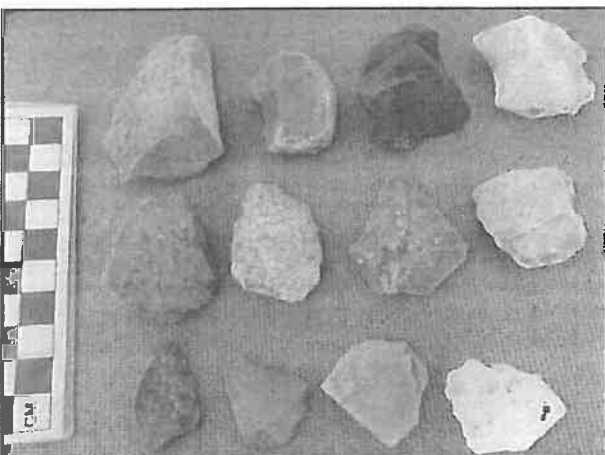


Figure 11. Collection of tools Scale is in cm

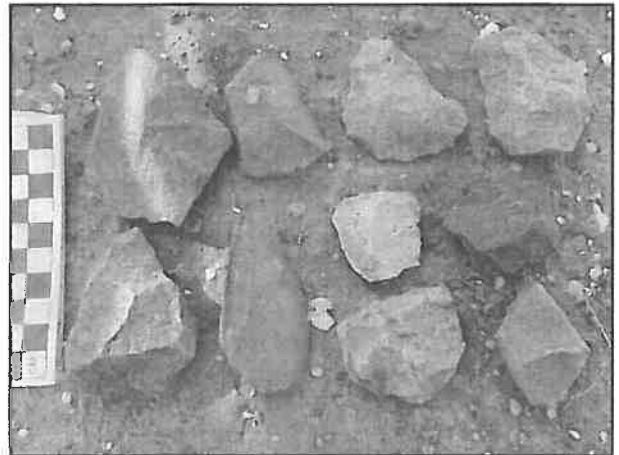


Figure 14. Collection of tools Scale is in cm

## 5.2 Visual Impact Study

The Visual Impact Assessment (VIA) for the proposed Vanrhynsdorp SEF was done by Sarien Lategan of Geostatics (refer to Appendix III). It is important to note that while the VIA does address the visual impacts associated with the proposed development, a site visit has yet to be undertaken by the specialist. A field study was done for the original proposed site – Site 1 (closer to the town), but due to botanical constraints, a site closer to the Droerivier has now been identified, which is more acceptable. Site 1 has therefore been screened out of the proposed development. The VIA report thus includes a full assessment of Site 1, as well as a desk top review of Site 2 alongside the Droerivier, including the anticipated visual impacts. Importantly, the desk top review considers worst case scenarios such as height of the tracking units.

With regard to the VIA, the primary potential visual receptor is the N7 which is located to the west of Site 2. According to Lategan (2012), it is envisaged that the intrusion level of the solar modules on N7 road users will be of low-medium significance, depending on the size of the modules. Neither module will have a significant impact on obstruction levels, and the overall conclusion is that the visual impact of Site 2 is 'within acceptable levels'. According to Lategan (2012), any units within the height scale of 8m is expected to be within acceptable levels. Smaller tracking units or smaller panels will obviously have a lesser visual impact.

## 6. IMPACT STATEMENT

The specialist archaeological study have shown that the proposed site for the Roma Energy Vanrhynsdorp Solar Energy Farm will not have an impact of great significance on the archaeological heritage.

Assuming that mitigation action is implemented, the visual impact of the proposed project is assessed as **low/medium visual impact**.

## 7. CONCLUSION

The specialist study has captured a good record of the archaeological record that is present on the proposed site,

Indications are that in terms of archaeological heritage, and the visual impact study, the proposed activity (i. e. the construction of a solar energy farm) is viable and no fatal flaws have been identified.

## **8. RECOMMENDATIONS**

With regard to the proposed development of a solar energy farm on Portion of the Farm De Duine No. 258 in Vanrhynsdorp, the following recommendations are made:

### Archaeology

1. No further archaeological mitigation is required.

### Visual Impacts

- 1 It is recommended that should the assessment of Site 2 be confirmed by an on-site visit (due to be done in June 2012) the development should be allowed to proceed.

## 9. REFERENCES

Kaplan, J. 2010a. Archaeological scoping study of a proposed wind energy facility on Zoutfontein and other properties near Juno Substation, Vredendal. Report prepared for DJ Environmental Consultants. ACRM

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Smith, A. 2011. An Archaeological Impact Assessment Portion of Farm 251 Remainder, Vanrhynsdorp. Report prepared for Site Plan Consulting. Department of Archaeology, University of Cape Town

Heritage Impact Assessment, proposed Solar Energy Farm in Vanrhynsdorp

Appendix I

Spreadsheet of waypoints and description of archaeological finds

Heritage Impact Assessment, proposed Solar Energy Farm in Vanrhynsdorp

Site	Name of Farm	Lat/Long	Description of archaeological finds
	Portion of the Farm De Duinen No. 258		
532		No GPS reading taken	X 2 small silcrete flakes
533		S31 34.896 E18 44.396	MSA quartzite flake and chunk
534		S31 34.894 E18 44.402	Small indurated shale flake/chip
535		S31 34.893 E18 44.403	Quartzite flake
536		S31 34.888 E18 44.406	Utilized blade on fine grained quartzite
537		S31 34.885 E18 44.405	Quartzite core
538		S31 34.886 E18 44.389	Large MSA quartzite flake
539		S31 34.893 E18 44.396	Large chunk
540		S31 34.899 E18 44.395	Quartzite flake
541		S31 34.904 E18 44.382	Quartzite flake
542		S31 34.944 E18 44.512	ESA biface
543		S31 34.876 E18 44.606	MSA chunk
544		S31 34.868 E18 44.600	Cortex flake
545		S31 34.866 E18 44.608	Chunk
546		S31 34.857 E18 44.613	MSA quartzite flake
547		S31 34.861 E18 44.591	Small triangular shaped MSA flake
548		S31 34.859 E18 44.647	Miscellaneous retouched MSA silcrete flake, & partially retouched quartz flake
549		S31 34.848 E18 44.666	Indurated shale chunk (blank)
550		S31 34.845 E18 44.665	Broken silcrete MSA flake, and partially retouched and utilized silcrete MSA blade
551		S31 34.845 E18 44.685	Thin silcrete flake & indurated shale chunky flake
552		S31 34.816 E18 44.729	Quartzite chunks and flake
553		S31 34.816 E18 44.729	Broken silcrete MSA flake
554		S31 34.804 E18 44.739	Silcrete MRP/convex scraper
555		S31 34.821 E18 44.702	Snapped silcrete flake
556		S31 34.822 E18 44.701	Silcrete chunk and fine grained quartzite flake
557		S31 34.824 E18 44.698	Triangular shaped flake
558		S31 34.821 E18 44.685	Flake
559		S31 34.823 E18 44.681	Large silcrete flake/chunk
560		S31 34.874 E18 44.606	Large silcrete worked out flake
561		S31 34.900 E18 44.547	Small piece of OES (weathered)
562		S31 34.918 E18 44.504	Quartzite chunk
563		S31 34.908 E18 44.482	Quartz flake
564		S31 34.911 E18 44.475	MSA quartzite flake
565		S31 34.877 E18 44.484	Quartzite chunk
566		S31 34.879 E18 44.475	Triangular shaped flake
567		S31 34.882 E18 44.475	Large utilized quartzite flake
568		S31 34.878 E18 44.449	MSA flake
569		S31 34.882 E18 44.444	Cortex chunk
570		S31 34.831 E18 44.545	Fine grained quartzite blade
571		S31 34.828 E18 44.560	Small chunk
572		S31 34.825 E18 44.564	Red silcrete utilized flake
573		S31 34.841 E18 44.497	Snapped MSA quartzite flake
574		S31 34.895 E18 44.427	MSA flake
575		S31 34.874 E18 44.434	Broken/snapped silcrete ?MSA flake
576		S31 34.796 E18 44.536	Small misc. u/grindstone
577		S31 34.794 E18 44.530	Small chunk

Heritage Impact Assessment, proposed Solar Energy Farm in Vanrhynsdorp

578		S31 34.790 E18 44.528	Silcrete chunk
579		S31 34.835 E18 44.458	Piece of <b>earthenware</b>
580		S31 34.836 E18 44.455	Weathered quartzite flake
581		S31 34.838 E18 44.468	Pebble flake
582		S31 34.888 E18 44.409	Ironstone flake
583		S31 34.760 E18 44.541	MSA silcrete flake
584		S31 34.761 E18 44.540	Quartzite flake
585		S31 34.763 E18 44.538	Chunk/flake
586		S31 34.765 E18 44.539	Pebble chunk
587		S31 34.764 E18 44.534	Thick misc. <b>retouched</b> silcrete flake
588		S31 34.762 E18 44.535	Quartzite chunk
589		S31 34.799 E18 44.457	Chunk
590		S31 34.721 E18 44.549	Chunk
591		S31 34.707 E18 44.572	Silcrete MSA flake
592		S31 34.666 E18 44.645	<b>Indurated shale retouched flake</b>
593		S31 34.652 E18 44.671	MSA silcrete flake
594		S31 34.651 E18 44.877	Chunk
595		S31 34.649 E18 44.682	Flaked chunk/minimal <b>core</b>
596		S31 34.584 E18 44.784	Red silcrete chunk
597		S31 34.602 E18 44.780	Flat quartzite flake
598		S31 34.639 E18 44.745	Chunk
599		S31 34.646 E18 44.725	MSA <b>side retouched</b> quartzite flake
600		S31 34.646 E18 44.720	X 2 small quartzite flakes
601		S31 34.669 E18 44.685	Large side struck quartzite flake
602		S31 34.711 E18 44.612	Silcrete chunk
603		S31 34.724 E18 44.616	Chunk
604		S31 34.667 E18 44.704	<b>Utilized</b> triangular shaped quartzite flake
605		S31 34.656 E18 44.719	Large <b>indurated shale</b> flake (?ESA)
606		S31 34.685 E18 44.712	Flat chunk
607		S31 34.708 E18 44.674	Thick quartzite flake
608		S31 34.711 E18 44.667	Chunk, and broken silcrete flake
609		S31 34.724 E18 44.646	Weathered <b>indurated shale</b> chunk
610		S31 34.752 E18 44.570	MSA quartzite flake
611		S31 34.731 E18 44.651	Quartz flake, <b>?retouched</b>
612		S31 34.727 E18 44.656	Chunk
613		S31 34.696 E18 44.692	MSA quartzite flake
614		S31 34.688 E18 44.701	MSA quartzite flake
615		S31 34.655 E18 44.773	Chunk
616		S31 34.668 E18 44.768	<b>Utilized</b> silcrete flake ?LSA
617		S31 34.692 E18 44.729	X 2 small chunks
618		S31 34.739 E18 44.654	Chunky flake with <b>utilized edge</b>
619		S31 34.771 E18 44.607	X 2 chunks, and 1 small quartzite flake
620		S31 34.772 E18 44.611	Large quartzite flake
621		S31 34.747 E18 44.676	Nicked, broken silcrete flake
622		S31 34.762 E18 44.646	Silcrete chunk & silcrete MSA flake
623		S31 34.774 E18 44.613	Chunk
624		S31 34.775 E18 44.603	MSA <b>utilized</b> , snapped flake
625		S31 34.772 E18 44.640	Silcrete chunk
626		S31 34.753 E18 44.724	Large <b>utilized &amp; retouched</b> quartzite flake
627		S31 34.777 E18 44.639	Small flake
628		S31 34.775 E18 44.684	Broken/snapped quartzite MSA flake
629		S31 34.774 E18 44.688	Snapped silcrete <b>utilized</b> MSA blade
630		S31 34.752 E18 44.742	Large silcrete chunk



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631		S31 34.744 E18 44.778	Snapped silcrete <b>utilized</b> MSA flake
632		S31 34.778 E18 44.703	Small chunk
633		S31 34.811 E18 44.635	Large, chunky broken silcrete MSA flake
634		S31 34.824 E18 44.643	Large chunk
635		S31 34.822 E18 44.650	MSA quartzite flake
636		S31 34.803 E18 44.699	Quartzite flake
637		S31 34.778 E18 44.740	Broken flat silcrete flake
638		S31 34.777 E18 44.742	Chunk
639		S31 34.753 E18 44.774	Large quartzite <b>side retouched</b> flake
640		S31 34.706 E18 44.827	Chunky MSA quartzite flake
641		S31 34.722 E18 44.761	<b>Diggings</b>
642		S31 34.764 E18 44.757	MSA <b>utilized and partially retouched</b> triangular shaped silcrete flake
643		S31 34.771 E18 44.782	<b>Chalcedony</b> flake/blank
644		S31 34.778 E18 44.777	Chunk
645		S31 34.806 E18 44.729	Side struck indurated shale pointed flake
646		S31 34.807 E18 44.727	Large, wide MSA silcrete <b>utilized and partially retouched</b> flake
647		S31 34.820 E18 44.700	Chunk
648		S31 34.829 E18 44.657	Small broken silcrete flake

Table 1. Spreadsheet of waypoints and description of archaeological finds

**Heritage Impact Assessment, proposed Solar Energy Farm in Vanrhynsdorp**

**Appendix II**

**Track paths and waypoints of archaeological finds**



**Appendix D3b: Updated Palaeontological Assessment/Addendum  
(2017 revision)**

## **RECOMMENDED EXEMPTION FROM FURTHER PALAEOLOGICAL STUDIES & MITIGATION:**

### **PROPOSED VANRHYNSDORP ROMA SOLAR PLANT, NEAR VANRHYNSDORP, WESTERN CAPE**

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**February 2017**

#### **EXECUTIVE SUMMARY**

Roma Energy Vanrhynsdorp (Pty) Ltd is proposing to construct a 5 MW Photovoltaic (PV) Energy Generation Facility, the Vanrhynsdorp Roma Solar Plant, on De Duinen Remainder of Farm 258, situated on the north-eastern outskirts of Vanrhynsdorp, Western Cape. The study area is underlain by weathered and highly deformed metasediments of the Gariep Supergroup (possibly Aties Formation) that are mantled by calcareous and gypsiferous soils. Both the bedrocks and overlying superficial sediments are of low palaeontological sensitivity. The overall palaeontological impact significance of the proposed Vanrhynsdorp Roma Solar Plant development on fossil heritage is considered to be LOW because:

- The study area is mantled by superficial sands of low palaeontological sensitivity;
- Extensive, deep excavations are unlikely to be involved in this sort of solar park project.

**It is therefore recommended that, pending the exposure of significant new fossils during development, exemption from further specialist palaeontological studies and mitigation be granted for this solar plant development.**

There are no objections on palaeontological heritage grounds to authorisation of the proposed power plant. Should any substantial fossil remains (e.g. vertebrate bones and teeth, shells, calcretised burrows) be encountered during excavation, however, these should be reported to Heritage Western Cape for possible mitigation by a professional palaeontologist (Contact details: Protea Assurance Building, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 086-142 142. Fax: 021-483 9842. Email: hwc@pgwc.gov.za).

The only studies located that deal specifically with potential palaeontological impacts in the Vanrhynsdorp region are those for gypsum and limestone mining developments by Almond (2011a, 2011b, in prep. 2017). In general, the anticipated impact significance on local fossil heritage of developments proposed in the Vanrhynsdorp region is rated as low. It is concluded that cumulative impacts on the very sparse local fossil assemblages posed by the Vanrhynsdorp Keren Solar Plant and other developments in the Vanrhynsdorp region is low.

## 1. OUTLINE OF DEVELOPMENT

Roma Energy Vanrhynsdorp (Pty) Ltd is proposing to construct a 5 MW Photovoltaic (PV) Energy Generation Facility, the Vanrhynsdorp Roma Solar Plant, on De Duinen Remainder of Farm 258, situated on the north-eastern outskirts of Vanrhynsdorp, Western Cape.

The proposed activity entails the construction of about 18540 Solar modules with a footprint of less than 20 ha. The PV panels will be mounted on pedestals drilled and set into the ground. Extensive bedrock excavations are not envisaged, but some vegetation will need to be cleared from the site. Associated infrastructure includes a perimeter access road, single track internal access roads, trenches for underground cables, 2 to 4 transformer pads, a switching station, a maintenance shed, and a temporary construction camp.

The present palaeontological heritage comment has been commissioned by EnviroAfrica cc, Somerset West as part of a comprehensive Heritage Impact Assessment of the proposed development (Contact details: Mr Bernard de Witt, EnviroAfrica cc, P. O. Box 5367, Helderberg, 7135; 29 St James St, Somerset West; mobile: +27 82 4489991; tel: +27 21 851 1616; fax: 086203308).

### 1.1. Legislative Framework

The present palaeontological heritage assessment report contributes to the consolidated Heritage Impact Assessment for the proposed solar plant and falls under the South African Heritage Resources Act (Act No. 25 of 1999). It will also inform the Environmental Management Programme (EMPr) for this alternative energy project.

The various categories of heritage resources recognised as part of the National Estate in Section 3 of the National Heritage Resources Act include, among others:

- geological sites of scientific or cultural importance;
- palaeontological sites; and
- palaeontological objects and material, meteorites and rare geological specimens.

According to Section 35 of the National Heritage Resources Act, dealing with archaeology, palaeontology and meteorites:

- (1) The protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority.
- (2) All archaeological objects, palaeontological material and meteorites are the property of the State.
- (3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.
- (4) No person may, without a permit issued by the responsible heritage resources authority—
  - (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 which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

- (5) When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedure in terms of section 38 has been followed, it may—
- (a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;
  - (b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;
  - (c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and
  - (d) recover the costs of such investigation from the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

Minimum standards for the palaeontological component of heritage impact assessment reports (PIAs) have been published by Heritage Western Cape, HWC (2016) and the South African Heritage Resources Agency, SAHRA (2013).

### **1.1. Study approach and methodology**

Due to (1) the small footprint of the proposed solar plant development as well as (2) the inferred very low palaeontological sensitivity of the study area - based on previous desktop and field-based assessments by the author and others in the region (e.g. Almond 2011a, 2011b, in prep. 2017), only a desktop palaeontological impact assessment is submitted here.

In preparing a palaeontological desktop study the potentially fossiliferous rock units (groups, formations *etc.*) represented within the study area are determined from geological maps and satellite images. The known fossil heritage within each rock unit is inventoried from the published scientific literature, previous palaeontological impact studies in the same region, and the author's field experience (Consultation with professional colleagues as well as examination of institutional fossil collections may play a role here, or later following field assessment during the compilation of the final report). This data is then used to assess the palaeontological sensitivity of each rock unit to development (provisional tabulations of palaeontological sensitivity of all formations in the Northern Cape have already been compiled by Almond & Pether (2008); see also the palaeosensitivity maps provided on the SAHRIS website). The likely impacts of the proposed development on local fossil heritage are then determined on the basis of (1) the palaeontological sensitivity of the rock units concerned and (2) the nature and scale of the development itself, most significantly the extent of fresh bedrock excavation envisaged. When rock units of moderate to high palaeontological sensitivity are present within the development footprint, a Phase 1 field-based assessment study by a professional palaeontologist is usually warranted to identify any palaeontological hotspots and make specific recommendations for any mitigation or monitoring required before or during the construction phase of the development.

### 1.3. Limitations of this study

The accuracy and reliability of palaeontological specialist studies as components of heritage impact assessments are generally limited by the following constraints:

1. Inadequate database for fossil heritage for much of the RSA, given the large size of the country and the small number of professional palaeontologists carrying out fieldwork here. Most development study areas have never been surveyed by a palaeontologist.
2. Variable accuracy of geological maps which underpin these desktop studies. For large areas of terrain these maps are largely based on aerial photographs alone, without ground-truthing. The maps generally depict only significant ("mappable") bedrock units as well as major areas of superficial "drift" deposits (alluvium, colluvium) but for most regions give little or no idea of the level of bedrock outcrop, depth of superficial cover (soil *etc*), degree of bedrock weathering or levels of small-scale tectonic deformation, such as cleavage. All of these factors may have a major influence on the impact significance of a given development on fossil heritage and can only be reliably assessed in the field.
3. Inadequate sheet explanations for geological maps, with little or no attention paid to palaeontological issues in many cases, including poor locality information.
4. The extensive relevant palaeontological "grey literature" - in the form of unpublished university theses, impact studies and other reports (e.g. of commercial mining companies) - that is not readily available for desktop studies.
5. Absence of a comprehensive computerized database of fossil collections in major RSA institutions which can be consulted for impact studies. A Karoo fossil vertebrate database is now accessible for impact study work.

In the case of palaeontological desktop studies without supporting Phase 1 field assessments these limitations may variously lead to either:

- a) *underestimation* of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- b) *overestimation* of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by tectonism or weathering, or are buried beneath a thick mantle of unfossiliferous "drift" (soil, alluvium *etc*).

Since most areas of the RSA have not been studied palaeontologically, a palaeontological desktop study usually entails *inferring* the presence of buried fossil heritage within the study area from relevant fossil data collected from similar or the same rock units elsewhere, sometimes at localities far away. Where substantial exposures of bedrocks or potentially fossiliferous superficial sediments are present in the study area, the reliability of a palaeontological impact assessment may be significantly enhanced through field assessment by a professional palaeontologist.

In the case of the present study area near Vanrhynsdorp in the Northern Cape, preservation of potentially fossiliferous bedrocks is favoured by the semi-arid climate and sparse vegetation. However, high rates of subsurface weathering are retained from more pluvial periods in the past, as witnessed by the mantle of deeply-weathered saprolite commonly encountered in the Knersvlakte region. Fresh bedrock exposure is also constrained by extensive superficial deposits, such as surface gravels and soils, and there has been little formal palaeontological fieldwork in this area. Confidence levels for this impact assessment are nevertheless rated as *medium to high*.



## 2. GEOLOGICAL BACKGROUND

The proposed Vanrhynsdorp solar plant study area, De Duinen Remainder of Farm 258 (31° 35' S, 18° 45' E), is on flat, semi-arid sandy terrain of the southern Knersvlake region, between the courses of the Langkloofrivier that flows through Vanrhynsdorp and the Droërvier that flows to the north (Fig. 2). The area lies at c. 150 m amsl and lies just north of the airstrips on the north-eastern outskirts of town. The N1 trunk road to Namibia runs 1.7 km to the west, and the R27 tar road to Nieuwoudtville 0.8 km to the southeast.

The geology of the study area near Vanrhynsdorp is shown on the 1: 250 000 geology map 3118 Calvinia (Council for Geoscience, Pretoria; Fig. 1 herein). A comprehensive sheet explanation for this map has been published by De Beer *et al.* (2002). The older sheet explanation to the 1: 125 000 geology sheet Doring Bay & Lambert's Bay by Visser and Toerien (1971) is also relevant (but not seen by author).

The solar plant study area is entirely mantled by **calcareous and gypsiferous soils (Q-r2)** that are the target for the gypsum mining operations elsewhere in the Vanrhynsdorp area (Almond 2011). These soils cover large areas of the Knersvlake region around Vanrhynsdorp and are often capped by a reddish, well-consolidated calcareous or siliceous hardpan or *dorbank*. The soils comprise a spectrum of gravally conglomerates, grit, sand and finer sediment showing a variable degree of calcretisation (*i.e.* pedogenic limestone formation typical of semi-arid climates). At depth, these surface sands probably overlie highly deformed metasediments of the Late Precambrian **Gariep Supergroup** such as the Aties Formation that is mapped on the western side of the Droërvier (Gresse *et al.* 2006).

## 3. PALAEOLOGICAL HERITAGE

Satellite images of the study area near Vanrhynsdorp show that the landscape here is covered with dense populations of termitaria, giving a speckled appearance from above. The main Late Caenozoic fossils mentioned in the 1: 250 000 Calvinia sheet explanation by De Beer *et al.* (2002) are calcretised subfossil termitaria (termite mounds or *heuweltjies*) that may be several thousand years old and reflect past, more pluvial (*i.e.* rainy) climatic episodes. Recent carbon dating gives dates in the range of 30-40 000 years BP for fossil termitaria in the West Coast region, *i.e.* preceding the last glacial maximum (Midgley *et al.* 2002, Potts *et al.* 2009 and refs. therein). Examples of these complex calcareous structures embedded within the Quagga's Kop Formation to the north of Vanrhynsdorp have probably been mistaken in the past as fossil corals, while freshwater unionid bivalves have been erroneously taken to be marine mussel shells (De Beer *et al.* 2002 p. 79, and Lamont 1947).

Calcareous and gypsiferous soils (Q-r2) mapped in the study area are probably unfossiliferous. While older alluvial gravels of the Quagga's Kop succession are not mapped here, the possibility of comparable, fossil-bearing alluvial deposits associated with the Droërvier system should be borne in mind. Residual gravels within the calcareous and gypsiferous soils that are probably derived from the Quagga's Kop Formation might contain derived (reworked) fossil remains such as resistant mammalian teeth or bones as well as Early Stone Age (Pleistocene) artefacts (De Beer *et al.* 2002, p. 81).

Gariep Supergroup metasediments beneath the cover sands are highly deformed and unlike to be fossiliferous. However, various forms of stromatolite (fossil microbial mounds) have been reported from carbonate units near Vredendal and the Bokkeveldberge Escarpment, respectively west and east of Vanrhynsdorp (Reimer 1978, De Beer *et al.* 2002, Almond in prep. 2017).

The overall palaeontological sensitivity of the Vanrhynsdorp solar plant study area is assessed as LOW.

### 3.1. Cumulative impacts on palaeontological heritage

In order to assess cumulative impacts on palaeontological heritage, previous palaeontological impact assessment reports (PIAs) for alternative energy and other developments in the Vanrhynsdorp region were accessed using the SAHRIS website as well as the author's own database. It is noted that for the great majority of development proposals in the region a PIA report has not been submitted, reflecting its low palaeontological sensitivity. Proposals documented are largely for mineral prospecting (e.g. gypsum, mining; Almond 2011). In practice, the only strictly relevant studies are those that deal with comparable fossil heritage assemblages from the same sedimentary rock units that are represented in the Vanrhynsdorp Keren solar plant study area itself, in particular Late Caenozoic superficial sediments overlying Gariep Supergroup bedrocks.

The only studies located that deal specifically with potential palaeontological impacts in the Vanrhynsdorp region are those for gypsum and limestone mining developments by Almond (2011a, 2011b). In general, the anticipated impact significance on local fossil heritage of developments proposed in the Vanrhynsdorp region is rated as low.

It is concluded that cumulative impacts on the very sparse local fossil assemblages posed by the Vanrhynsdorp Keren solar plant and other developments in the Vanrhynsdorp region is low.



Fig. 1. Extract from 1: 250 000 geological map 3118 Calvinia (Council for Geoscience, Pretoria) showing approximate location of proposed Vanrhynsdorp Roma Solar Plant study area on the north-eastern outskirts of Vanrhynsdorp, Western Cape Province (small blue rectangle). The study area is underlain by calcareous and gypsiferous soils of Quaternary to Recent age (Q-r2, yellow areas with stipple).



**Fig. 2. Google earth© satellite image showing the study area for the Vanrhynsdorp Roma Solar Plant to the north of the airstrips on the north-eastern outskirts of Vanrhynsdorp, Western Cape (red polygon). The Droërivier runs north of the study site and the Langkloofrivier to the south.**

#### **4. CONCLUSIONS & RECOMMENDATIONS**

The overall impact significance of the proposed Vanrhynsdorp Roma Solar Plant development on fossil heritage is considered to be LOW because:

- The study area is mantled by superficial sands of low palaeontological sensitivity;
- Extensive, deep excavations are unlikely to be involved in this sort of solar park project.

**It is therefore recommended that, pending the exposure of significant new fossils during development, exemption from further specialist palaeontological studies and mitigation be granted for this solar plant development.**

There are no objections on palaeontological heritage grounds to authorisation of the proposed power plant. Should any substantial fossil remains (e.g. vertebrate bones and teeth, shells, calcretised burrows) be encountered during excavation, however, these should be reported to Heritage Western Cape for possible mitigation by a professional palaeontologist (Contact details: Protea Assurance Building, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 086-142 142. Fax: 021-483 9842. Email: hwc@pgwc.gov.za).

The Environmental Control Officer (ECO) responsible for the solar plant development should be made aware of the potential occurrence of scientifically-important fossil remains such as stromatolites within the development footprint. During the construction phase all major clearance operations (e.g. for new access roads) and deeper (> 1 m) excavations (e.g. for solar panel footings) should be monitored for fossil remains on an on-going basis by the ECO. Should substantial fossil remains - such as stromatolites, vertebrate bones and teeth - be encountered at surface or exposed during construction, the ECO should safeguard these, preferably *in situ*. They should then alert the relevant provincial heritage management authority as soon as possible - *i.e.* Heritage Western Cape. This is to ensure that appropriate action - *i.e.* recording, sampling or collection of fossils, recording of relevant geological data - can be taken by a professional palaeontologist at the developer's expense.

These mitigation recommendations should be incorporated into the Environmental Management Programme (EMPr) for the solar plant project.

Please note that:

- All South African fossil heritage is protected by law (South African Heritage Resources Act, 1999) and fossils cannot be collected, damaged or disturbed without a permit from SAHRA or the relevant Provincial Heritage Resources Agency (in this case Heritage Western Cape);
- The palaeontologist concerned with potential mitigation work will need a valid fossil collection permit from Heritage Western Cape and any material collected would have to be curated in an approved depository (e.g. museum or university collection);
- All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies developed by HWC (2016) and SAHRA (2013).

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## 6. QUALIFICATIONS & EXPERIENCE OF THE AUTHOR

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral research fellowships at Cambridge University and in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape, Limpopo, Gauteng, KwaZulu-Natal, Mpumalanga, Northwest and Free State under the aegis of his Cape Town-based company *Natura Viva* cc. He has been a long-standing member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape for SAHRA and HWC. Dr Almond is an accredited member of PSSA and AHP (Association of Professional Heritage Practitioners – Western Cape).



## **Declaration of Independence**

I, John E. Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

A handwritten signature in black ink that reads "John E. Almond". The signature is written in a cursive style with a clear, legible font.

**Dr John E. Almond**  
**Palaeontologist**  
***Natura Viva* cc**

**Appendix D3b: Original Palaeontological Assessment (2012)**

# RECOMMENDED EXEMPTION FROM FURTHER PALAEOLOGICAL STUDIES & MITIGATION:

## PROPOSED VANRHYNSDORP ROMA SOLAR PLANT, NEAR VANRHYNSDORP, WESTERN CAPE

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March 2012

### 1. OUTLINE OF DEVELOPMENT

Roma Energy Van Rhynsdorp (Pty) Ltd is proposing to construct a 10 MW Concentrating Photovoltaic (CPV) Energy Generation Facility, the Vanrhynsdorp Roma Solar Plant, on Duinen Remainder of Farm 258, situated on the north-eastern outskirts of Van Rhynsdorp, Western Cape.

The proposed activity entails the construction of about 140 CPV solar panels with a footprint of about 20 ha. The CPV panels will be mounted on pedestals drilled and set into the ground. Extensive bedrock excavations are not envisaged, but some vegetation will need to be cleared from the site. Associated infrastructure includes a perimeter access road, single track internal access roads, trenches for underground cables, 2 to 4 transformer pads, a switching station, a maintenance shed, and a temporary construction camp.

The present palaeontological heritage comment has been commissioned by EnviroAfrica cc, Somerset West as part of a comprehensive Heritage Impact Assessment of the proposed development (Contact details: Mr Bernard de Witt, EnviroAfrica cc, P. O. Box 5367, Helderberg, 7135; 29 St James St, Somerset West; mobile: +27 82 4489991; tel: +27 21 851 1616; fax: 086203308).

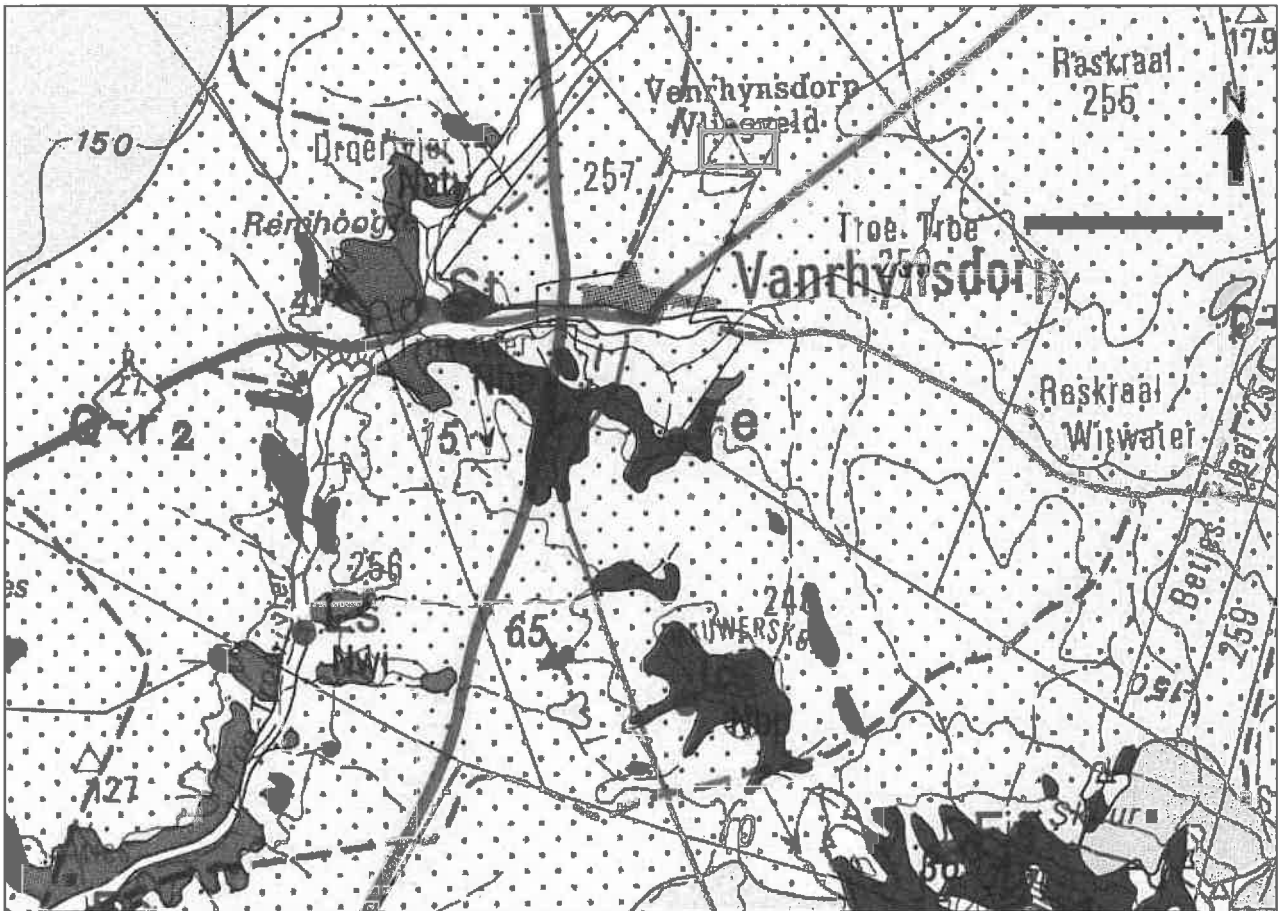
### 2. GEOLOGICAL BACKGROUND

The proposed Vanrhynsdorp solar plant study area, Duinen Remainder of Farm 258 (31° 35' S, 18° 45' E), is on flat, semi-arid sandy terrain of the southern Knersvlake region, between the courses of the Langkloofrivier that flows through Vanrhynsdorp and the Droërivier that flows to the north (Fig. 2). The area lies at c. 150 m amsl and lies just north of the airstrips on the north-eastern outskirts of town. The N1 trunk road to Namibia runs 1.7 km to the west, and the R27 tar road to Nieuwoudtville 0.8 km to the southeast.

The geology of the study area near Vanrhynsdorp is shown on the 1: 250 000 geology map 3118 Calvinia (Council for Geoscience, Pretoria; Fig. 1 herein). A comprehensive sheet explanation for this map has been published by De Beer *et al.* (2002). The older sheet explanation to the 1: 125 000 geology sheet Doring Bay & Lambert's Bay by Visser and Toerien (1971) is also relevant (but not seen by author).

The solar plant study area is entirely mantled by **calcareous and gypsiferous soils (Q-r2)** that are the target for the gypsum mining operations elsewhere in the Vanrhynsdorp area (Almond 2011). These soils cover large areas of the Knersvlake region around Vanrhynsdorp and are often capped by a reddish, well-consolidated calcareous or siliceous hardpan or *dorbank*. The soils comprise a

spectrum of gravally conglomerates, grit, sand and finer sediment showing a variable degree of calcretisation (*i.e.* pedogenic limestone formation typical of semi-arid climates). At depth, these surface sands probably overlie highly deformed metasediments of the Late Precambrian **Gariiep Supergroup** such as the Aties Formation that is mapped on the western side of the Droërvier (Gresse *et al.* 2006).



**Fig. 1.** Extract from 1: 250 000 geological map 3118 Calvinia (Council for Geoscience, Pretoria) showing approximate location of proposed Vanrhynsdorp Roma Solar Plant study area on the north-eastern outskirts of Vanrhynsdorp, Western Cape Province (small blue rectangle). The study area is underlain by calcareous and gypsiferous soils of Quaternary to Recent age (Q-r2, yellow areas with stipple).

### 3. PALAEOLOGICAL HERITAGE

Satellite images of the study area near Vanrhynsdorp show that the landscape here is covered with dense populations of termitaria, giving a speckled appearance from above. The main Late Caenozoic fossils mentioned in the 1: 250 000 Calvinia sheet explanation by De Beer *et al.* (2002) are calcretised subfossil termitaria (termite mounds or *heuweltjies*) that may be several thousand years old and reflect past, more pluvial (*i.e.* rainy) climatic episodes. Recent carbon dating gives dates in the range of 30-40 000 years BP for fossil termitaria in the West Coast region, *i.e.* preceding the last glacial maximum (Midgley *et al.* 2002, Potts *et al.* 2009 and refs. therein). Examples of these complex calcareous structures embedded within the Quagga's Kop Formation to the north of Vanrhynsdorp have probably been mistaken in the past as fossil corals, while freshwater unionid bivalves have been erroneously taken to be marine mussel shells (De Beer *et al.* 2002 p. 79, and Lamont 1947).

Calcareous and gypsiferous soils (Q-r2) mapped in the study area are probably unfossiliferous. While older alluvial gravels of the Quagga's Kop succession are not mapped here, the possibility of comparable, fossil-bearing alluvial deposits associated with the Droërivier system should be borne in mind. Residual gravels within the calcareous and gypsiferous soils that are probably derived from the Quagga's Kop Formation might contain derived (reworked) fossil remains such as resistant mammalian teeth or bones as well as Early Stone Age (Pleistocene) artefacts (De Beer *et al.* 2002, p. 81).

Gariep Supergroup metasediments beneath the cover sands are highly deformed and unlike to be fossiliferous.

The overall palaeontological sensitivity of the Vanrhynsdorp solar plant study area is assessed as LOW.



**Fig. 2. Google earth© satellite image showing the study area for the Vanrhynsdorp Roma Solar Plant to the north of the airstrips on the north-eastern outskirts of Vanrhynsdorp, Western Cape. The Droërivier runs north of the study site and the Langkloofrivier to the south.**



#### 4. CONCLUSIONS & RECOMMENDATIONS

The overall impact significance of the proposed Vanrhynsdorp Roma Solar Plant development on fossil heritage is considered to be LOW because:

- The study area is mantled by superficial sands of low palaeontological sensitivity;
- Extensive, deep excavations are unlikely to be involved in this sort of solar park project.

**It is therefore recommended that exemption from further specialist palaeontological studies and mitigation be granted for this solar plant development.**

Should any substantial fossil remains (e.g. vertebrate bones and teeth, shells, petrified wood) be encountered during excavation, however, these should be reported to Heritage Western Cape for possible mitigation by a professional palaeontologist.

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## 6. QUALIFICATIONS & EXPERIENCE OF THE AUTHOR

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral research fellowships at Cambridge University and in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape under the aegis of his Cape Town-based company *Natura Viva* cc. He is a long-standing member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape as well as Limpopo, Free State and Gauteng for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHP (Association of Professional Heritage Practitioners – Western Cape).

### Declaration of Independence

I, John E. Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.



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