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**Abbreviated 1st phase¹ heritage assessment of proposed alterations to the
Bronkhorstspuit Biogas Plant on a portion of the farm Boskop 543 JR, Gauteng.**

For the client

Bio2Watt



Date. September 2020.

Through project coordinator: -

Lee-Anne Fellows

Shangoni Environmental Consultants +27 (0)12 807 7036

Report prepared by: -

SIDNEY MILLER.

B.Sc (Engineering) Civil, M. (Architecture) Conservation. Asapa member no 087.

¹ *This is an abbreviated report owing to the small size of the property (5 hectares) and the fact that all proposed new work will be executed within the existing plant (2 hectares) and on disturbed areas adjacent, to the east and north of the site.*

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1. Contact Details.

Client	Environment.	Heritage
Bio2Watt Reg no 2007/014974.07	Shangoni Management Services (Pty.) Ltd.	Sidney Miller Heritage Consultant
Sean Thomas	Lee-Anne Fellows.	Sidney Miller.
011 463 4200	012 807 7036.	082 939 6536.
sean@bio2watt.com	leeanne@shangoni.co.za .	sidneymears@gmail.com .

1.2. Type of Development.

Extension to existing Biogas Plant

1.3. Zoning of Site.

Industrial.

1.4. Description of the site.

The site (originally farmland) is situated as indicated in *figs 01 and 02* below. It falls on the old Bosch kop farm as indicated on Jeppe's Map in *fig 09* below. It was developed to turn bio-waste from the cattle feed-lots into an economical energy resource. At present there are proposed alternations and extensions to be considered.

2. Location and GPS Coordinates of the site investigated.



Fig. 01. This image shows the location of the Bronkhorstspruit Biogas Plant. The yellow markers indicate the extent of the area investigated.

Beacon	Degrees south	Degrees east	Beacon	Degrees south	Degrees east
1	25°54'47.07"S	28°36'17.77"E	2	25°54'43.81"S	28°36'20.91"E
3	25°54'45.40"S	28°36'25.64"E	4	25°54'49.60"S	28°36'23.58"E

Fig. 02. Above table shows the G.P.S. coordinates of the beacons defining the property under investigation. (GPS coordinates from Google Earth.)

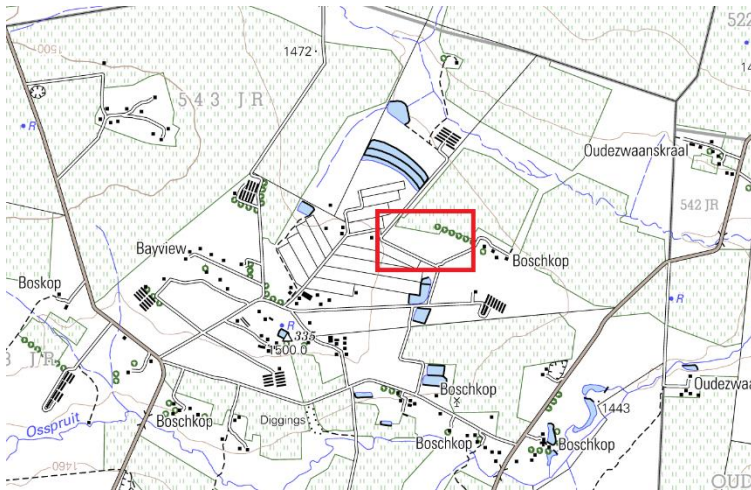


Fig. 03. This image taken from the 1: 50 000 map RIETVLEIDAM 2528 DC (2001 edition) shows that the Biogas plant did not exist at that stage. But the extent of cattle feed-lots and ploughing impact is clearly recorded. (The Bronkhorstspruit Biogas Plant is located in the area marked in red.)



Fig. 04. This image shows that its construction commenced circa 2014 and apparently by 2017 it appears to be operational. (Google Earth time view 2014.)²

² Note the extent of disturbance on and around the site under investigation.

3. Executive Summary.

3.1. Mandate of the Heritage Consultant

Shangoni Management Services (Pty.) Ltd originally requested the Heritage Consultant to procure a “Letter of Exemption” as mentioned in the letter from SAHRA³. It was agreed upon that an “Abbreviated HIA” would be prepared owing to the small area of the site (5 hectares in extent) and the fact that all proposed new work will be in existing disturbed areas (2 hectares).

3.2. Intent of Bio2Watt.

It is the intent of Bio2Watt to upgrade its existing Bronkhorstspruit Biogas Plant.

3.3 The project description.⁴

The following additions and alterations are proposed: -

1. Digestate Separation.
2. Dewatering System.
3. Mixing Tank.
4. Two x Digester with Gas Storage.
5. Two x CHP.
6. Desulphurisation.
7. Gas-cooling.
8. Option Gas Storage.
9. Condensation Pit.

3.4. Historical milieu.⁵

A. In the 1899 Map of the Transvaal the farm Boschkop⁶ can be seen as a single large “burger farm” between others such as Roode Koppies, Witfontein, Vlakfontein, Morskop (also known as Rietvlei), Klein Zonderhout (also known as Driefontein), Kameelkraal, Oude Zwaanskraal and Tweefontein. At present the original owners are not known. But as can be seen on the 2528DC (Bronkhorstspruit) and 2528 CD (Rietvleidam)⁷ 1: 50 000 maps the extension of Pretoria/Tshwane towards the east during the last century have had the effect to cut the original farms into smallholdings of sometimes only a few hectares in extent. This is also true of Boschkop. There is no indication of an original farmyard on the site under investigation.

B. The area investigated revealed no indication of Stone Age or Iron Age settlement.

C. There is no site of cultural/spiritual significance located on the area investigated.

D. There are no sites connected to slavery located on or near the property under investigation.

E. There are no people of importance or historical events connected to the site.

F. There is no historical special technological or scientific advancement of standing that can be linked to the site under investigation.

3.5. Environmental milieu.

Geology. The geology of the area consists of shale and other intrusions that were brought about after the forming of the Bushveld Igneous Complex. The best known geological feature around is the Cullinan Kimberlite diamond pipe located on some twenty kilometres to the north.

³ See appendix 3

⁴ See fig 10 for detail

⁵ See section 8 for full detail.

⁶ See figure 09.

⁷ See figure 03.

Vegetation. The farm Boschkop is located on veld-type 61 as described by Acocks (1988 - 112). It is called Bankenveld, a false grassland and is divided into western, central en eastern variants.

3.6. Summary of findings.

No heritage remains were observed.

3.7. Recommendation.

It is recommended that proposed work may proceed.



Sidney Miller

B.Sc. (Engineering) Civil, M. (Architecture) Conservation. Asapa no 087

4. Definitions.

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of paleontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

5. Protected Sites in Terms of the National Heritage Act, Act 25 of 1999.⁸

The following are the most important sites and objects protected by the National Heritage Act:

- a. Structures or parts of structures older than 60 years
- b. Archaeological sites and objects
- c. Paleontological sites
- d. Meteorites
- e. Ship wrecks
- f. Burial grounds
- g. Graves of victims of conflict
- h. Public monuments and memorials
- i. Structures, places and objects protected through the publication of notices in the Gazette and Provincial Gazette
- j. Any other places or object which are considered to be of interest or of historical or cultural significance
- k. Geological sites of scientific or cultural importance
- l. Sites of significance relating to the history of slavery in South Africa
- m. Objects to which oral traditions are attached
- n. Sites of cultural significance or other value to a community or pattern of South African history

6. Methodology.

6.1. The site was visited on the 29th of September 2020.

6.2. The Heritage consultant interviewed the site manager Mr. Douglas Button (cell 0733582166).

6.3. The site was inspected in an orderly manner so as to visit and record all places to be impacted on by the proposed alterations.

⁸ *None of these are applicable.*

- 6.4.** Areas of proposed impact were recorded by photography. An approximation of the location of positions from where photos were taken was recorded in Fig 11.
- 6.5.** The above information was recorded and collated in section 9 of this report.
- 6.6.** Background information concerning the geology and vegetation of the region was collected from reliable resources and is presented in section 7 of this report.
- 6.7.** Background information concerning the archaeology and historical milieu of the region was collected from reliable resources and is presented in section 8 of this report.
- 6.8.** In sections 10 and 11 field ratings (SAHRA minimum standards May 2007) and statements of significance (SAHRA minimum standards May 2007) were attributed as necessitated by situation. (Not applicable in current report.)
- 6.9.** Section 12 contains a summary of the research results with a recommendation in section 13.
- 6.10.** The collective gist of the information collated in the report is summarised in the executive summary in section 3.



Fig. 05. The on-foot route taken by the heritage consultant during the site investigation is marked in red. (Google Earth 2020.)

7. Environment.

7.1. Geology.⁹

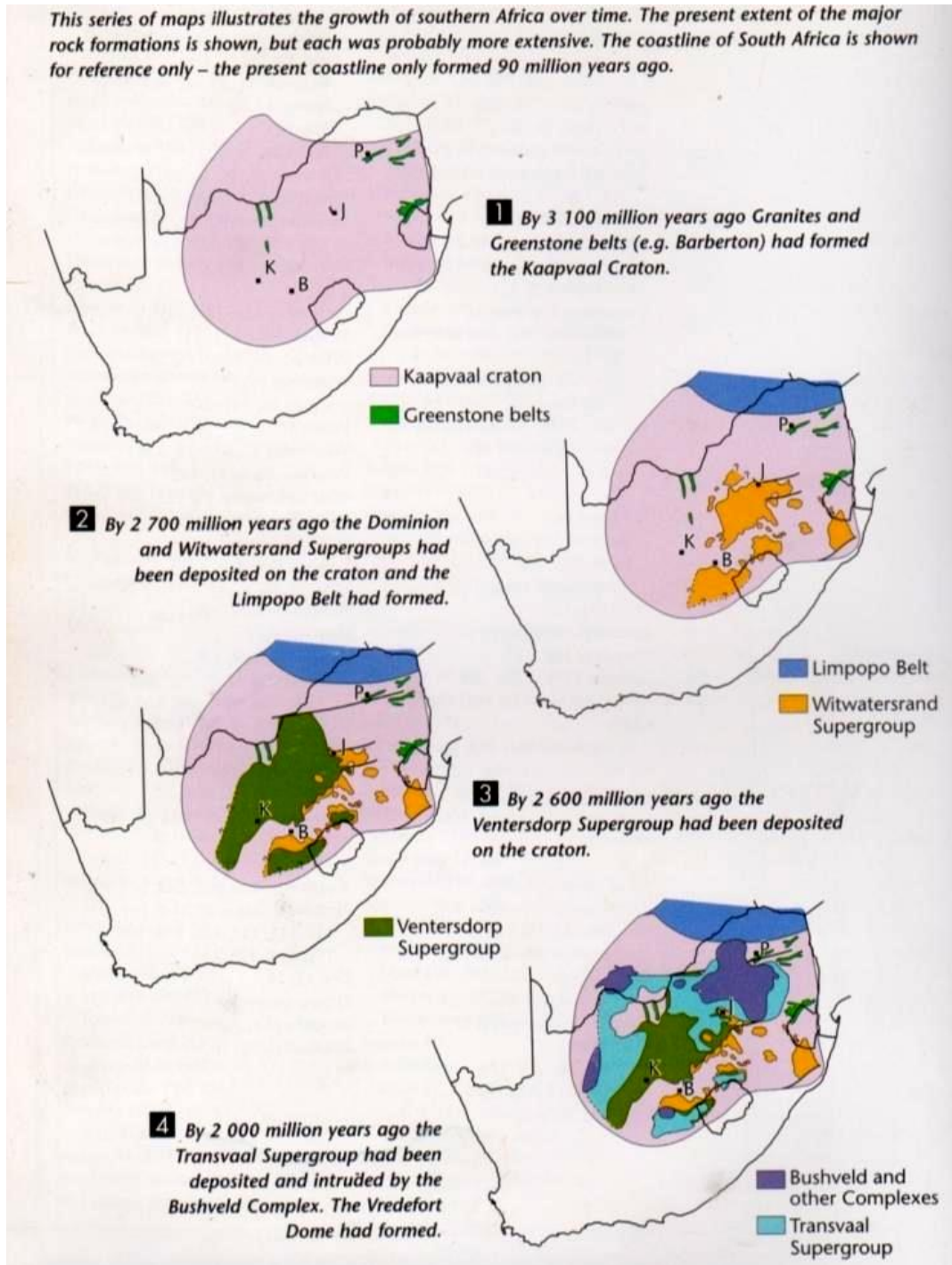


Fig. 06. Above is illustrated the formation of the South African geological substructure between 3100 million years ago and 2000 million years ago. In our present study area the Kaapvaal Craton had formed and the Transvaal Supergroup had been deposited. The Bushveld Complex had appeared and the Vredefort meteorite impact had occurred. J in the illustrations marks Johannesburg, adjacent to the study area. (McCarthy & Rubidge: 334.)

⁹ See McCarthy & Rubidge 2005 and Haughton 1940 for full description.

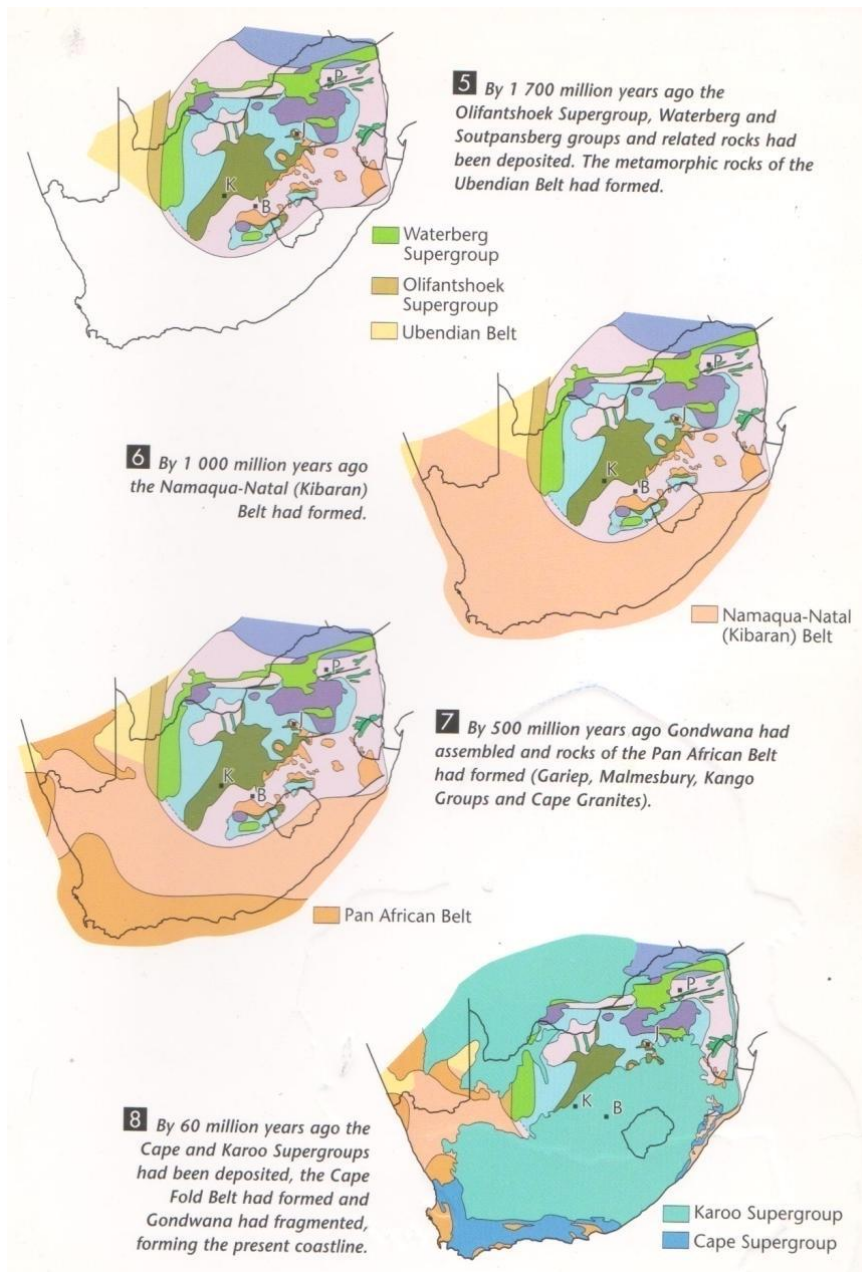


Fig. 07. Above is illustrated the formation of the South African geological substructure between 2000 million years ago and 60 million years ago. As can be seen above it is only the Karoo Supergroup that had any further significant impact on the study area. J, in the illustrations, marks Johannesburg. (McCarthy & Rubidge: 335.)

The property under investigation is located only a few kilometres south of the Cullinan Kimberlite diamond mine. For a full description see McCarthy and Rubidge, 2005 and Haughton, 1940.

7.2. Vegetation. ¹⁰



Fig. 08. The Bronkhorstspruit Biogas Plant is located between Onbekend and Bronkhorstspruit on the veldt type zone 61. (The green area in the map.) Acocks has named it Bankenveld false grassveld types. Owing to the geological under-built and the precipitation he has divided this large area into three variants; - 61a the Western Variation, 61b the Central variation and 61c the Eastern Variation. (For full description see Acocks, 1988.)¹¹

8. Archaeological and Historical Background.

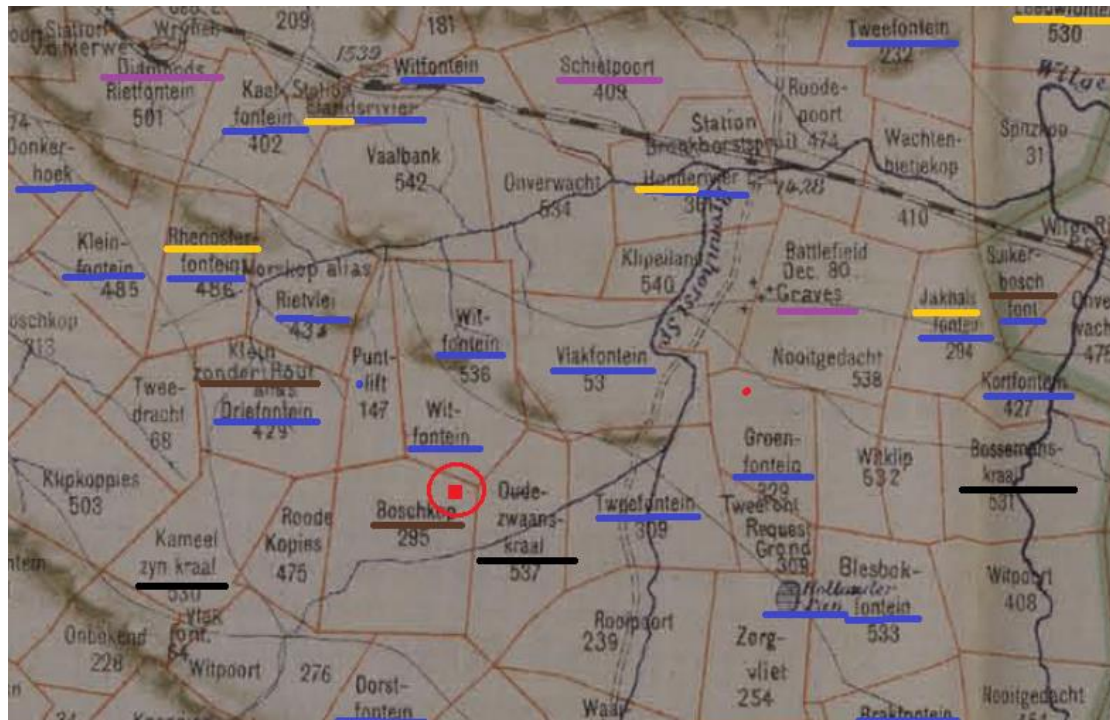


Fig. 09. Location of the Biogas Plant is indicated in red on the 1899 Jeppé's Map of the Transvaal, sheet 5. Note at the environmental and historical information that is captured in the farm names. Position of the biogas plant is marked in red.

¹⁰ For a full and accurate description of the vegetation see Mucina & Rutherford, 2006.

¹¹ The author is aware of the updated version of Acocks's work by Mucina & Rutherford, 2010, but for the purposes of this investigation Acocks version is preferred by the present author.

8.1. Stone Age.

Large and important assemblages of Stone Age material culture relics like stone tools, caves, middens and rock art are relatively scarce in the general area. The best known being the early stone tools of Wonderboom in Tshwane, the cradle of humankind to the west and the rock engravings around Vereeniging on the Vaal River.

It is also known that later Stone Age people utilized the well-watered lake areas on the eastern Highveld well into the time that white pioneers arrived. See in *fig 09* the farm name “Bossemanskraal” implying the presence of San People when the European Pioneers arrived.

Regarding the small size of the Biogas Plant and its disturbed surface it is expected that no Stone Age remains may be encountered.

8.2. Iron Age.¹²

The nature of Iron Age settlement in southern Africa is well understood and well documented. Iron Age settlers were not only users of the natural environment’s resources, but they were essentially farmers. They raised stock and also planted crops that needed specific environmental conditions such as summer rainfall and soils suited for cultivation. Owing to the large tracts of “suitable environmental conditions” available in this general area it was well utilized by both Sotho and Ndebele peoples. Eco’s of this Iron Age presence in the area is the farm names “Kameel zyn kraal” and “Oude Zwaanskraal as can be seen in *fig. 09*.

Regarding the small size of the Biogas Plant and its disturbed surface it is expected that no Iron Age remains may be encountered.

8.3. Historical Period.

The arrival of Europeans in the region was heralded by the Battle of Vegkop to the South of Heidelberg, the notorious leaders Potgieter and Pretorius settling in Klerksdorp, Potchefstroom and the Magaliesberg. After the defeat of Mzilikazi at Zeerust the areas towards Ohrighstad, Lydenburg and Zoutpansberg was explored and settled. In 1855 Pretoria became the new focal point for governance of the ZAR. After the discovery of gold on the rand mines, the likes of Sammy Marks started “Die Eerste Fabrieken” to the east of Pretoria, and it was then also through this area that the ZAR railway to Maputo was launched before the Second South African War.

In 1902 the Cullinan Mine brought mining hope to the area, but pioneer European farmers mainly used the area for raising cattle to supply to the ever increasing demand from the growing towns and cities.

In *fig.09* the farm names “Diamonds” (Diamond Hill), “Schietpoort“ and “Battlefield” reflect the retreat actions fought by the ZAR at the end of the Second South African War

Regarding the small size of the Biogas Plant and its disturbed surface it is expected that no Historical remains may be encountered.

¹² See Huffman 2007.

9. Documentation of Data on the Premises under Investigation.

9.1. Layout of the proposed alterations and additions to the Biogas Plant

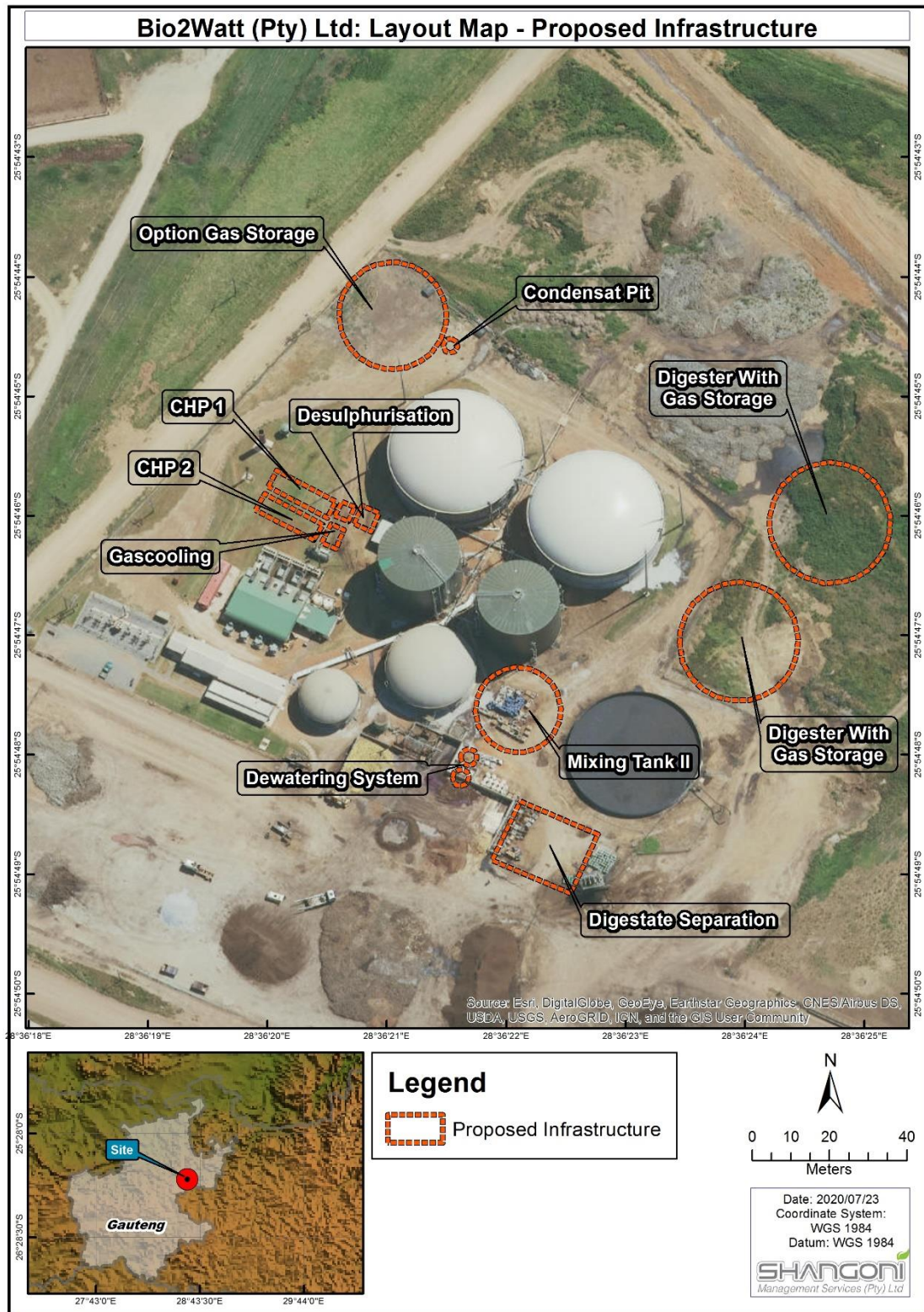


Fig. 10. Existing site plan of the Bronkhorstspuit Biogas Plant showing proposed extensions and additions.

9.1. Layout of the proposed alterations and additions to the Biogas Plant



Fig. 11. Google Earth image of the Bronkhorstspruit Biogas Plant showing positions from where photos of the proposed impact areas were taken.



Figs. 12 and 13. Photos taken from position 1 in fig. 11 covering proposed Mixing Tank II and Dewatering System in fig 10. (S.M.Miller September 2020.)



Fig. 14. Photo taken from position 1 in fig 11 covering proposed Digestate Separation in fig. 10. (S.M.Miller September 2020.)



Figs. 15 and 16. Photos taken from positions 5 and 6 in fig. 11 covering the southern proposed Digester with Gas Storage in fig 10. (S.M.Miller 2020.)



Figs. 17 and 18. Photos taken from positions 7 and 8 in fig. 11 covering the northern proposed Digester with Gas Storage in fig 10. (S.M.Miller 2020.)



Fig. 19. Photo taken from position 9 in fig 11. General view. (S.M.Miller September 2020.)



Figs. 20 and 21. Photos taken from positions 12 and 13 in fig. 11 covering the proposed Option Gas Storage and Condensation Pit in fig 10. (S.M.Miller 2020.)



Fig. 22. Photo taken from position 14 in fig 11 covering proposed Desulphurisation CHP 1 & 2 and Gas cooling in fig. 10. (S.M.Miller September 2020.)

10. Field Rating. (SAHRA minimum standards May 2007.)

Not Applicable.

11. Statements of Significance. (SAHRA minimum standards May 2007.)

Not Applicable.

12. Summary

12.1. Mandate of the Heritage Consultant

Shangoni Management Services (Pty.) Ltd originally requested the Heritage Consultant to procure a “Letter of Exemption” as mentioned in the Letter from SAHRA¹³. It was agreed upon that an “Abbreviated HIA” would be prepared owing to the small area of the site (5 hectares in extent) and the fact that all proposed new work will be in existing disturbed areas (2 hectares).

12.2. Intent of Bio2Watt.

It is the intent of Bio2Watt to upgrade its existing Bronkhorstspuit Biogas Plant.

12.3 The project description.¹⁴

Provisions are made for the following additions and alterations: -

1. Digestate Separation.
2. Dewatering System.
3. Mixing Tank.
4. Two x Digester with Gas Storage.
5. Two x CHP.
6. Desulphurisation.
7. Gas-cooling.
8. Option Gas Storage.
9. Condensation Pit.

12.4. Historical milieu.

A. In the 1899 Map of the Transvaal the farm Boschkop¹⁵ can be seen as a single large “burger farm” between others such as Roode Koppies, Witfontein, Vlakfontein, Morskop (also known as Rietvlei), Klein Zonderhout (also known as Driefontein), Kameelkraal and Oude Zwaanskraal and Tweefontein. At present the original owners are not known. But as can be seen on the 1 50 000 maps 2528 DC (Bronkhorstspuit) and 2528 CD (Rietvleidam)¹⁶ the extension of Pretoria/Tshwane towards the east during the last century have had the effect to cut the original farms into smallholdings of sometimes only a few hectares in extent. This is also true of Boschkop. There is no indication of an original farmyard on the site under investigation

B. The area investigated revealed no indication of Stone Age or Iron Age settlement.

C. There is no site of cultural/spiritual significance located on the area investigated.

D. There are no sites connected to slavery located on or near the property under investigation.

¹³ See appendix 3

¹⁴ See fig 10 for detail.

¹⁵ See figure 09.

¹⁶ See figure 03.

E. There are no people of importance connected to the site.

F. There is no historical special technological or scientific advancement of standing that can be linked to the site under investigation.

12.5. Environmental milieu.

Geology. The geology of the area consists of shale and other intrusions that were brought about after the forming of the Bushveld Igneous Complex. The best known geological feature around is the Cullinan Kimberlite diamond pipe located on some twenty kilometres to the north.

Vegetation. The farm Tweedragt 516-JR is located on veld-type 61 as described by Acocks (1988 -112). It is called Bankenveld, a false grassland and is divided into western, central en eastern variants.

13. Summary of findings and Recommendation.

13.1. Summary of findings.

No heritage remains were observed.

13. 2. Recommendation.

It is recommended that proposed work may proceed.



Sidney Miller

B.Sc. (Engineering) Civil, M. (Architecture) Conservation. Asapa no 087.

Bibliography.

Publications

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Guidlines

- SAHRA. Mar. 2006 and edtd May 2007. *Guideline: - Minimum standards for the Archaeological & Paleontological Components of Impact Assessment Reports*

Appendix 1: Declaration of Independence.

I, Sidney Mears Miller (ID 5412135029082) declare that:
I act as an independent environmental practitioner in this application;
I will perform the work relating to the application in an objective manner, even if this result in views and findings that is not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting environmental impact assessments, including knowledge of the National Heritage Resources Act (No 25 of 1999) and any guidelines that have relevance to the proposed activity;
I will comply with the Act, regulations and all other applicable legislation;
I will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and any report relating to the application;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing
- any decision to be taken with respect to the application by the competent authority; and
- the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
I will keep a register of all interested and affected parties that participated in a public participation process;
I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not;
all the particulars furnished by me in this form are true and correct;
will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations;
I realize that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity AND OR proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations.



SIDNEY MEARS MILLER.

Appendix 2: Provisional indemnity.

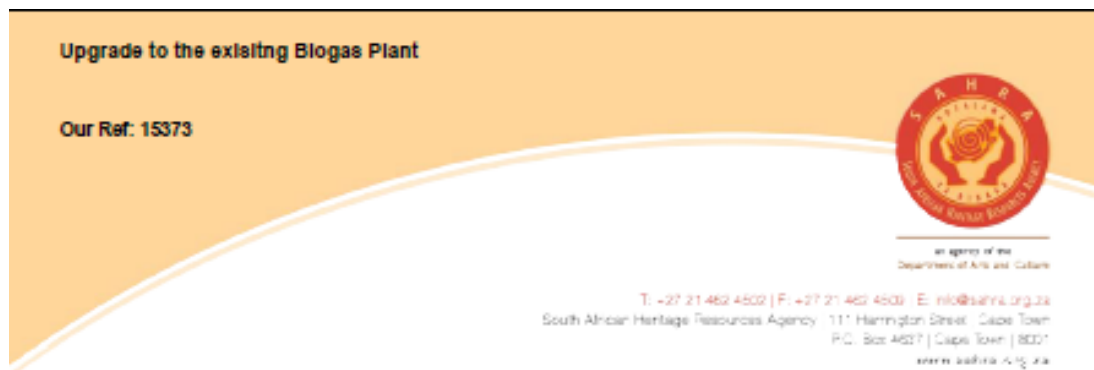
Declaration by author.

I Sidney Miller hereby declare that all reasonable steps were taken to identify the heritage resources on the sites under investigation. For obvious reasons heritage remains that occur underground cannot be vouched for. In the event of such remains being uncovered during the operations, work should be stopped and a heritage practitioner or the heritage authorities must be informed. The cost of such new investigation will be for the account of the client.



SIDNEY MEARS MILLER.

Appendix 3: SAHRA letter dated 31st August 2020.



Enquiries: Andrew Salomon
Tel: 021 462 4502
Email: asalomon@sahra.org.za
CaseID: 15373

Date: Monday August 31, 2020
Page No: 1

Letter

In terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999)

Attention: Bronkhorstspuit Biogas Plant (Pty) Ltd

The Bronkhorstspuit Biogas Plant requires an upgrade that will entail improvements to the original design.

Thank you for your notification regarding this development.

In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that prior to development it is incumbent on the developer to ensure that a **Heritage Impact Assessment** is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.


The quickest process to follow for the archaeological component is to contract an accredited specialist (see the web site of the Association of Southern African Professional Archaeologists www.asapa.org.za) to provide a Phase 1 Archaeological Impact Assessment Report. This must be done before any large development takes place.

The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or excavate material and date the site. At the end of the process the heritage authority may give permission for destruction of the sites.

Where bedrock is to be affected, or where there are coastal sediments, or marine or river terraces and in potentially fossiliferous superficial deposits, a Palaeontological Desk Top study must be undertaken to assess whether or not the development will impact upon palaeontological resources - or at least a letter of exemption

Upgrade to the existing Biogas Plant

Our Ref: 15373



an agency of the
Department of Arts and Culture

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South African Heritage Resources Agency | 111 Harrington Street | Cape Town
P.O. Box 46277 | Cape Town | 8001
www.sahra.org.za

Enquiries: Andrew Salomon
Tel: 021 462 4502
Email: asalomon@sahra.org.za
CaseID: 15373

Date: Monday August 31, 2020
Page No: 2

from a Palaeontologist is needed to indicate that this is unnecessary. If the area is deemed sensitive, a full Phase 1 Palaeontological Impact Assessment will be required and if necessary a Phase 2 rescue operation might be necessary. Please note that a nationwide fossil sensitivity map is available on SAHRIS to assist applicants with determining the fossil sensitivity of a study area.

If the property is very small or disturbed and there is no significant site the heritage specialist may choose to send a letter to the heritage authority motivating for exemption from having to undertake further heritage assessments.

Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewscapes must also be assessed.

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully



Andrew Salomon
Heritage Officer: Archaeology
South African Heritage Resources Agency



Phillip Hine
Manager: Archaeology, Palaeontology and Meteorites Unit
South African Heritage Resources Agency