HIA FOR THE HEMPIRE CORPORATION FARM, EMPANGENI, KZN.

FOR ENPROCON (PTY) LTD

DATE: 22 OCTOBER 2022

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Abbreviations

EIA	Early Iron Age
ESA	Early Stone Age
HIA	Heritage Impact Assessment
HP	Historical Period
IIA	Indeterminate Iron Age
ISA	Indeterminate Stone Age
KZNARI	KwaZulu-Natal Amafa & Research Institute
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency

INTRODUCTION

Hempire Corporation ("Hempire") appointed Enprocon (Pty) Ltd as the Environmental Assessment Practitioner (EAP) to assist them in obtaining an Environmental Authorisation (EA) and a Water Use Authorisation (WUA) as may apply to the proposed GACP & EU GMP Cannabis facility. The proposed site for this facility is located on Valley Farm No. 16786 GU (SG Code: N0GU00000001678600000) in the Ntambanana Local Municipality at the following co-ordinates: Lat -28.716789 Lon 31.750698.

It is evident from historical orthophotos that agriculture activities e.g., irrigated crops, irrigation infrastructure and a dam was developed on site. Agriculture development on site continued in the 2000's and was well established at 2006. However, between 2006 and 2010 agriculture activities on site discontinued and the land lay fallow."

Umlando was requested to undertake an HIA of the proposed irrigation developments. Figures 1 – 4 show the location of the development.

FIG. 1 GENERAL LOCATION OF THE PROPOSED DEVELOPMENT

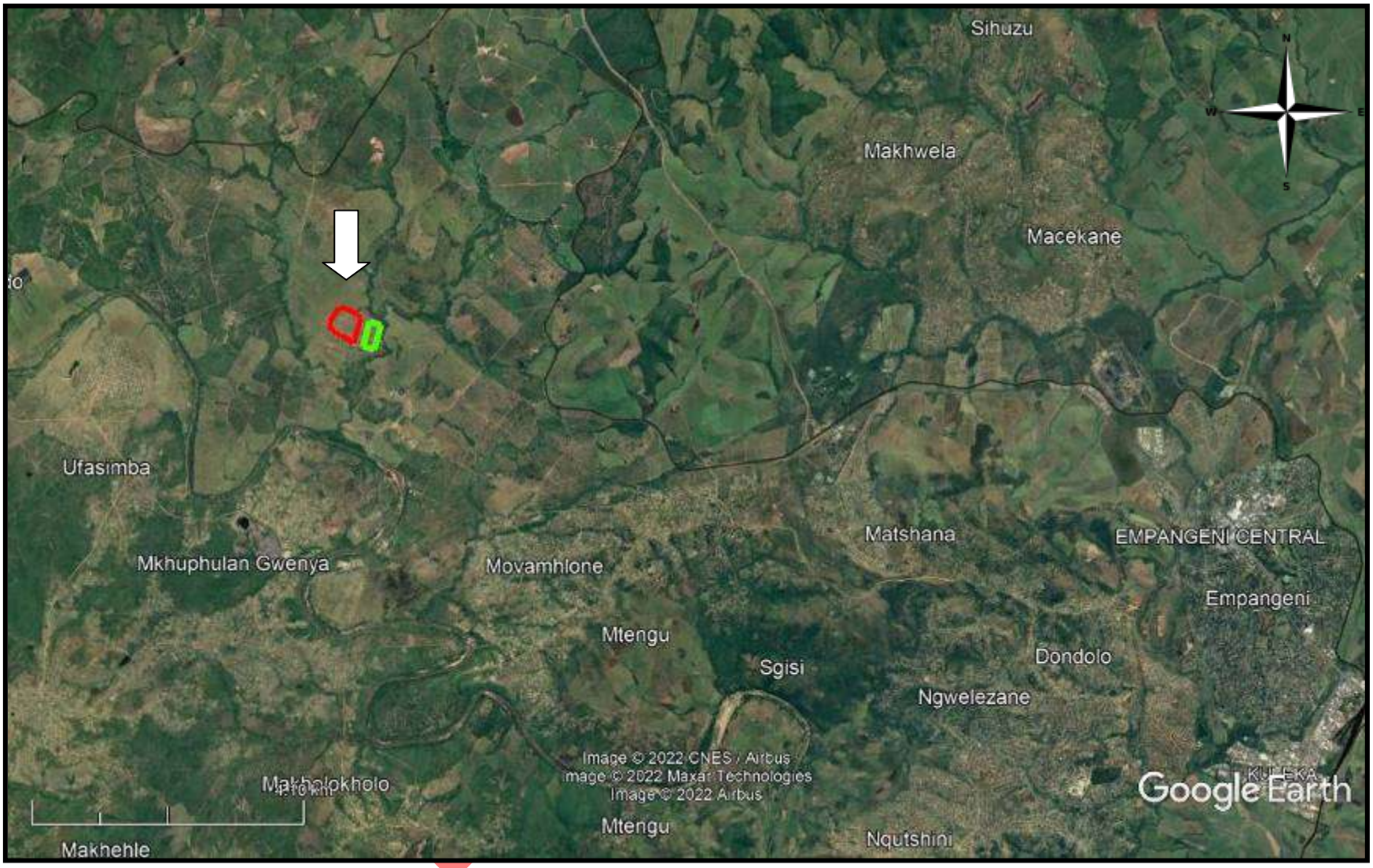


FIG. 2: AERIAL OVERVIEW OF THE PROPOSED DEVELOPMENT

FIG. 3: TOPOGRAPHICAL MAP OF THE PROPOSED DEVELOPMENT (2000)

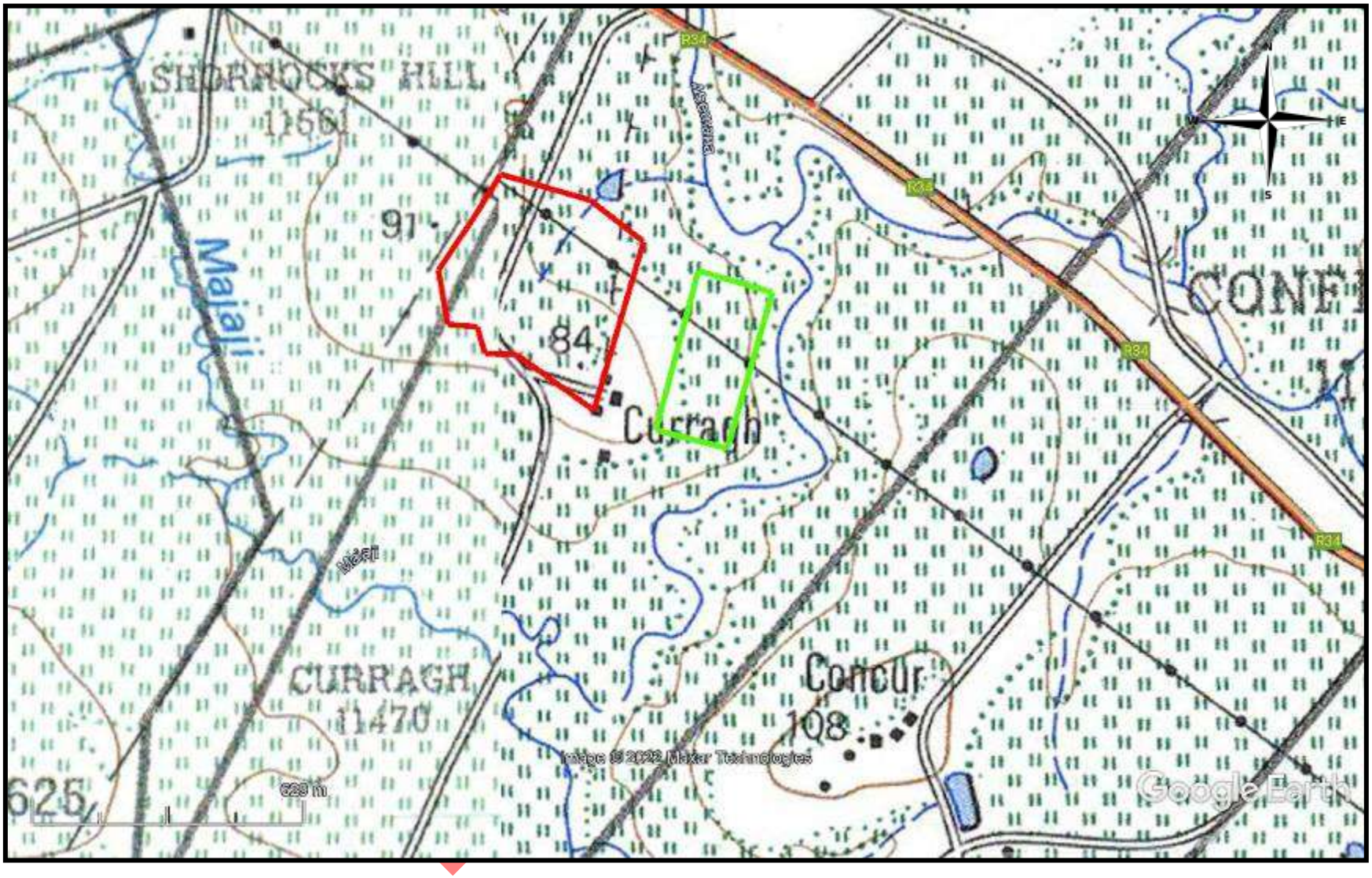


FIG. 4: SCENIC VIEWS OF THE STUDY AREA

KWAZULU NATAL AMAFA AND RESEARCH INSTITUTE, ACT 05, 2018

"General protection: Structures.—

- No structure which is, or which may reasonably be expected to be older than 60 years, may be demolished, altered or added to without the prior written approval of the Council having been obtained on written application to the Council.
- Where the Council does not grant approval, the Council must consider special protection in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
- The Council may, by notice in the *Gazette*, exempt—
- A defined geographical area; or
- defined categories of sites within a defined geographical area, from the provisions of subsection where the Council is satisfied that heritage resources falling in the defined geographical area or category have been identified and are adequately protected in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
- A notice referred to in subsection (2) may, by notice in the *Gazette*, be amended or withdrawn by the Council.

General protection: Graves of victims of conflict.—No person may damage, alter, exhume, or remove from its original position—

- the grave of a victim of conflict;
- a cemetery made up of such graves; or
- any part of a cemetery containing such graves, without the prior written approval of the Council having been obtained on written application to the Council.
- General protection: Traditional burial places.—
- No grave—
- not otherwise protected by this Act; and
- not located in a formal cemetery managed or administered by a local authority, may be damaged, altered, exhumed, removed from its original

position, or otherwise disturbed without the prior written approval of the Council having been obtained on written application to the Council.

The Council may only issue written approval once the Council is satisfied that—

- the applicant has made a concerted effort to consult with communities and individuals who by tradition may have an interest in the grave; and
- the applicant and the relevant communities or individuals have reached agreement regarding the grave.

General protection: Battlefield sites, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites.—

- No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.
- Upon discovery of archaeological or palaeontological material or a meteorite by any person, all activity or operations in the general vicinity of such material or meteorite must cease forthwith and a person who made the discovery must submit a written report to the Council without delay.
- The Council may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Council to be inappropriate within 50 metres of a rock art site.
- No person may exhume, remove from its original position or otherwise disturb, damage, destroy, own or collect any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.
- No person may bring any equipment which assists in the detection of metals and archaeological and palaeontological objects and material, or

excavation equipment onto any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, or meteorite impact site, or use similar detection or excavation equipment for the recovery of meteorites, without the prior written approval of the Council having been obtained on written application to the Council.

- The ownership of any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site, on discovery, vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government."

METHOD

The method for Heritage assessment consists of several steps.

The first step forms part of the desktop assessment. Here we would consult the database that has been collated by Umlando. This databases contains archaeological site locations and basic information from several provinces (information from Umlando surveys and some colleagues), most of the national and provincial monuments and battlefields in Southern Africa (http://www.vuvuzela.com/googleearth/monuments.html) and cemeteries in southern Africa (information supplied by the Genealogical Society of Southern Africa). We use 1st and 2nd edition 1:50 000 topographical and 1937 aerial photographs where available, to assist in general location and dating of buildings and/or graves. The database is in Google Earth format and thus used as a quick reference when undertaking desktop studies. Where required we would consult with a local data recording centre, however these tend to be fragmented between different institutions and areas and thus difficult to access at times. We also consult with an historical architect, palaeontologist, and an historian where necessary.

The survey results will define the significance of each recorded site, as well as a management plan.

All sites are grouped according to low, medium, and high significance for the purpose of this report. Sites of low significance have no diagnostic artefacts or features. Sites of medium significance have diagnostic artefacts or features and these sites tend to be sampled. Sampling includes the collection of artefacts for future analysis. All diagnostic pottery, such as rims, lips, and decorated sherds are sampled, while bone, stone, and shell are mostly noted. Sampling usually occurs on most sites. Sites of high significance are excavated and/or extensively sampled. Those sites that are extensively sampled have high research potential, yet poor preservation of features.

Defining significance

Heritage sites vary according to significance and several different criteria relate to each type of site. However, there are several criteria that allow for a general significance rating of archaeological sites.

These criteria are:

1. State of preservation of:

1.1. Organic remains:

1.1.1. Faunal

1.1.2. Botanical

1.2. Rock art

1.3. Walling

1.4. Presence of a cultural deposit

1.5. Features:

1.5.1. Ash Features

1.5.2. Graves

1.5.3. Middens

1.5.4. Cattle byres

1.5.5. Bedding and ash complexes

2. Spatial arrangements:

2.1. Internal housing arrangements

2.2. Intra-site settlement patterns

2.3. Inter-site settlement patterns

3. Features of the site:

3.1. Are there any unusual, unique or rare artefacts or images at the site?

3.2. Is it a type site?

3.3. Does the site have a very good example of a specific time period, feature, or artefact?

4. Research:

4.1. Providing information on current research projects

4.2. Salvaging information for potential future research projects

5. Inter- and intra-site variability

5.1. Can this particular site yield information regarding intra-site variability, i.e. spatial relationships between various features and artefacts?

5.2. Can this particular site yield information about a community's social relationships within itself, or between other communities?

6. Archaeological Experience:

6.1. The personal experience and expertise of the CRM practitioner should not be ignored. Experience can indicate sites that have potentially significant aspects, but need to be tested prior to any conclusions.

7. Educational:

7.1. Does the site have the potential to be used as an educational instrument?

7.2. Does the site have the potential to become a tourist attraction?

7.3. The educational value of a site can only be fully determined after initial test-pit excavations and/or full excavations.

8. Other Heritage Significance:

8.1. Palaeontological sites

8.2. Historical buildings

8.3. Battlefields and general Anglo-Zulu and Anglo-Boer sites

8.4. Graves and/or community cemeteries

8.5. Living Heritage Sites

8.6. Cultural Landscapes, that includes old trees, hills, mountains, rivers, etc related to cultural or historical experiences.

The more a site can fulfill the above criteria, the more significant it becomes. Test-pit excavations are used to test the full potential of an archaeological deposit. This occurs in Phase 2. These test-pit excavations may require further excavations if the site is of significance (Phase 3). Sites may also be mapped and/or have artefacts sampled as a form of mitigation. Sampling normally occurs when the artefacts may be good examples of their type, but are not in a primary archaeological context. Mapping records the spatial relationship between features and artefacts. Table 1 lists the grading system.

TABLE 1: SAHRA GRADINGS FOR HERITAGE SITES

SITE SIGNIFICANCE	FIELD RATING	GRADE	RECOMMENDED MITIGATION
High Significance	National Significance	Grade 1	Site conservation / Site development
High Significance	Provincial Significance	Grade 2	Site conservation / Site development
High Significance	Local Significance	Grade 3A / 3B	
High / Medium Significance	Generally Protected A		Site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B		Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C		On-site sampling monitoring or no archaeological mitigation required prior to or during development / destruction

RESULTS

DESKTOP STUDY

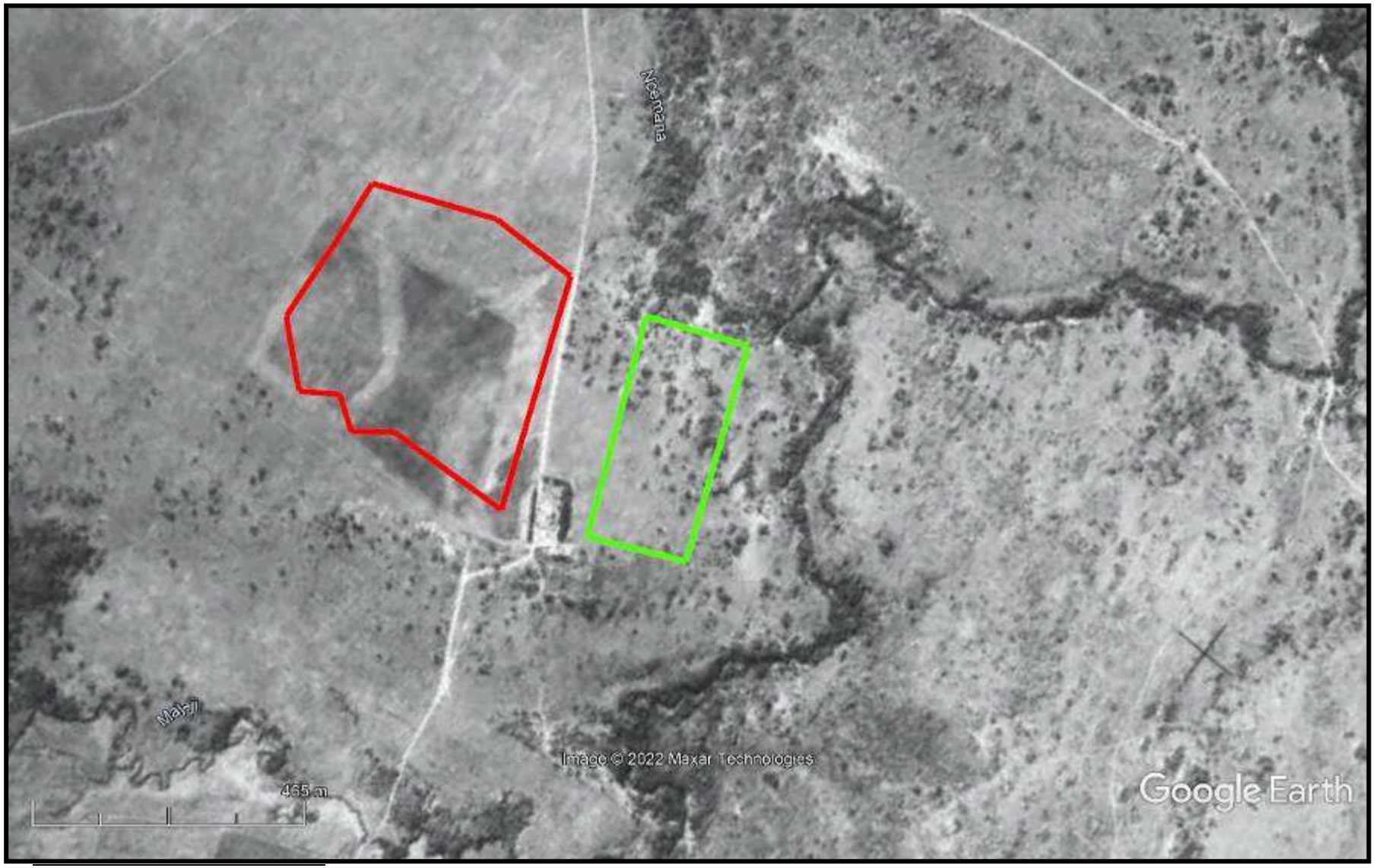
The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. The general area is known for its (fig. 5). No surveys have occurred near the study area; however, the general area is known to be archaeologically sensitive for Stone Age scatters.

The 1937 aerial photograph indicates that the area is under agricultural cultivation (fig. 6). There are built structures between the two proposed fields and these are probably the original farm buildings.

The 1968 topographical map indicates that the built structures between the two fields are for the Farm Curragh (fig. 7). Several more buildings have been built since 1937. The farm and some of its buildings are thus over 60 years in age and are protected by heritage legislation.

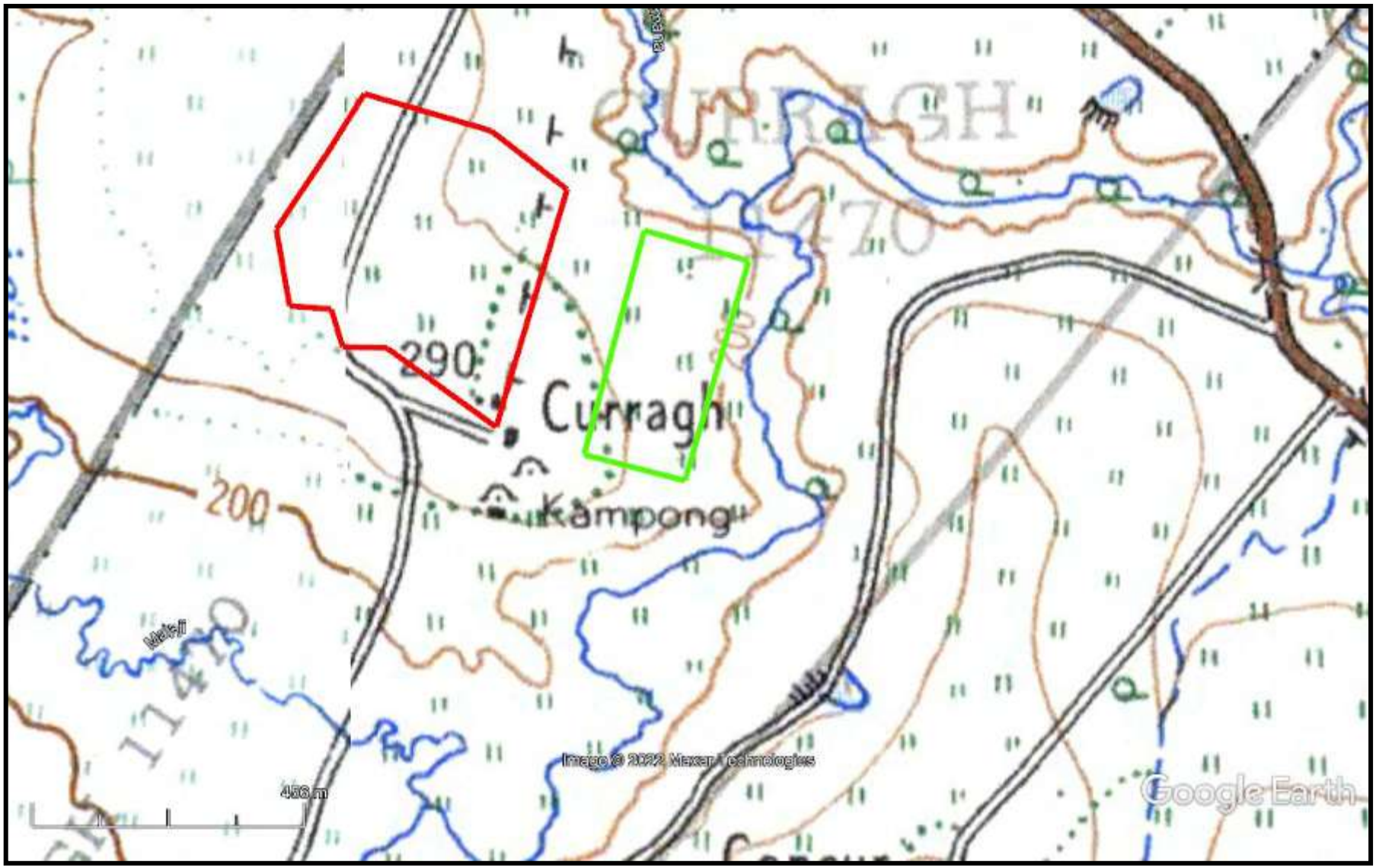
FIG. 5: LOCATION OF KNOWN HERITAGE SITES IN THE GENERAL AREA

FIG. 6: LOCATION OF THE STUDY AREA IN 1937[1]



[1] 117C_044_37774

FIG. 7: LOCATION OF THE STUDY AREA IN 1964



PALAEONTOLOGICAL SENSITIVITY

The area is in an area of very high palaeontological sensitivity (fig. 8). A desktop PIA was undertaken by Dr Alan Smith. The following rock formations (from oldest to youngest) may be present: Ntabene Formation, Nyoka Formation and Karoo Dolerite.

These lithologies are provisionally correlated with the Molteno (Ntabene) and Nyoka (Elliot) Formations from the Main Karoo Basin. These are known to be highly fossiliferous (SACS, 1980). The Ntabene and Nyoka Formations are very poorly exposed in this area. Further, it must also be stated that this region of South Africa has not been adequately researched from a geological and palaeontological perspective. No significant fossils have been found in this area.

Further this area is very poorly exposed. A “Chance Find Protocol” has been inserted into this report to cover any palaeontological findings.

FIG. 8: PALAEONTOLOGICAL SENSITIVITY MAP

COLOUR	SENSITIVITY	REQUIRED ACTION
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome

		of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

FIELD SURVEY

A field survey was undertaken on the 27 September 2022. Ground visibility was very good. The soil is ~1m deep and then there is weathered Ntabene Formation (fig. 9). Both study areas have been systematically ploughed and contoured since at least 1930s. There is thus a very low chance of any *insitu* material occurring within the boundaries.

FIG. 9: GEOLOGICAL PROFILE OF THE MAIN FIELD

No archaeological material was noted in either of the proposed agricultural fields.

There is a historical farmhouse and related infrastructures between the two fields. The related infrastructures include:

- The main farmhouse
- farm labourers' houses
- several rubbish dumps that appear to be post 1970s
- sheep dip
- a stone canal
- unknown (collapsed) platform
- water tank platform

These have been built at various stages of Curragh's existence. The main farmhouse has had several additions; however, it is currently dilapidated with poor structural integrity.

The buildings will not be affected by the proposed project. If the buildings are to be destroyed, it will require a permit from KZNARI. They will also require an assessment by a Built Environment specialist.

The main farm buildings predate 1937

FIG.10: MAIN FARM HOUSE AND ASSOCIATED BUILDINGS

RECOMMENDATIONS & MANAGEMENT PLAN

No heritage material or features were located within the two proposed fields.

Some of the farm buildings will be protected by the KZNARI Act of 2018; however, these do not form part of this study. Notice is given that if they are to be affected in any manner, then they will require an assessment and a permit.

A Chance Find Protocol was initiated for the palaeontological remains.

CONCLUSION

A heritage survey was undertaken for the proposed medicinal cannabis farm, Empangeni, KZN. The intention is to use two fields that have gone fallow for the project. The fields, and surrounding areas, have been in use since 1930s, at least. The landscape shows evidence of consistent furrowing and ploughing. No heritage sites or artefacts were noted in the two fields.

The area is rated as having very high palaeontological sensitivity. However, fossils in the Ntabene Formation are rare, especially in the upper weathered levels. A Chance Find Protocol was initiated for the palaeontology.

Some of the buildings between the two fields predate 1937 and are thus protected. The buildings are, however, not part of this development and their occurrence is noted.

The project should be exempt from further heritage mitigation.

REFERENCES

1:50 000 Topographical Maps

2831DA Nkwalini 1965, 1982

2831DB Empangeni 1964, 1982

Aerial Photographs

117C_044_37774

Database

KZN Museum

SHARIS

Umlando

EXPERIENCE OF THE HERITAGE CONSULTANT

Gavin Anderson has a M. Phil (in archaeology and social psychology) degree from the University of Cape Town. Gavin has been working as a professional archaeologist and heritage impact assessor since 1995. He joined the Association of Professional Archaeologists of Southern Africa in 1998 when it was formed. Gavin is rated as a Principle Investigator with expertise status in Rock Art, Stone Age and Iron Age studies. In addition to this, he was worked on both West and East Coast shell middens, Anglo-Boer War sites, and Historical Period sites.

DECLARATION OF INDEPENDENCE

I, Gavin Anderson, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

Gavin Anderson
Archaeologist/Heritage Impact Assessor

Appendix a

PIA desktop

PALAEONTOLOGICAL DESK-TOP INVESTIGATION REPORT: HEMPIRE CORPORATION, UMHLATHUZE LOCAL MUNICIPALITY, KWAZULU-NATAL

FOR

UMLANDO: Archaeological Surveys & Heritage Management
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12 October, 2022

Declaration of Independence

This report has been compiled by Dr Alan Smith (Pr. Sc. Nat.) of Alan Smith Consulting, Durban. The views expressed in this report are entirely those of the author, if not then the source has been duly acknowledged. No other interest was displayed during the decision making process for the Project.

Specialist: Dr Alan Smith

Signature: 

EXECUTIVE SUMMARY

It is proposed to develop the Hempire Corporation within an agricultural area within the uMhlathuze Local Municipality, KwaZulu-Natal. This report was compiled by Dr Alan Smith of Alan Smith Consulting (Appendix 1). The proposed agricultural project area is characterized as red by the SAHRIS Palaeosensitivity Map ("very high" sensitivity; see section 4: Palaeontology). However this area has previously been under agriculture and this proposal simply requires a change in crop, so in the opinion of the palaeontologist a field visit is not warranted. Further this area is very poorly exposed. A "Chance Find Protocol" has been inserted into this report (Appendix 2) to cover any palaeontological findings.

The following rock formations (from oldest to youngest) may be present:

- Ntabene Formation
- Nyoka Formation
- Karoo Dolerite.

These lithologies are provisionally correlated with the Molteno (Ntabene) and Nyoka (Elliot) Formations from the Main Karoo Basin. These are known to be highly fossiliferous (SACS, 1980). The Ntabene and Nyoka Formations are very poorly exposed in this area. Further, it must also be stated that this region of South Africa has not been adequately researched from a geological and palaeontological perspective. No significant fossils have been found in this area.

1. PROPOSED PROJECT

It is proposed to develop a cannabis farm, called the Hempire Corporation . This development will straddle the R34 national road near Ntambanana, uMhlathuze Local Municipality, KwaZulu-Natal (Figure).

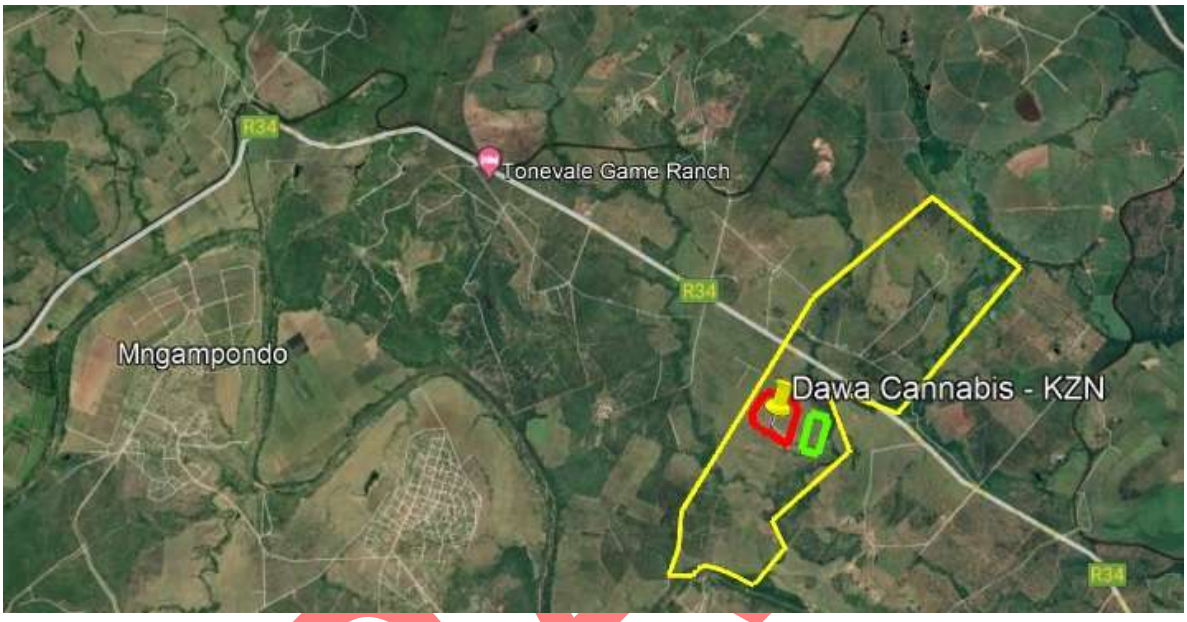

Figure 1: Location of the proposed Hempire Corporation . The location is superimposed on a GoogeEarth image.

2. METHODOLOGY

Geological maps, Google Earth and personal experience (Appendix 1) where used in this desk-top investigation.

3 GEOLOGY

The proposed Hempire Corporation footprint overlies rocks of the Karoo Supergroup. The approximate area of the project is illustrated in Figure 2. Examples of the Ntabene and Nyoka Formations, which may be encountered, are illustrated in Figures 3 and 4.

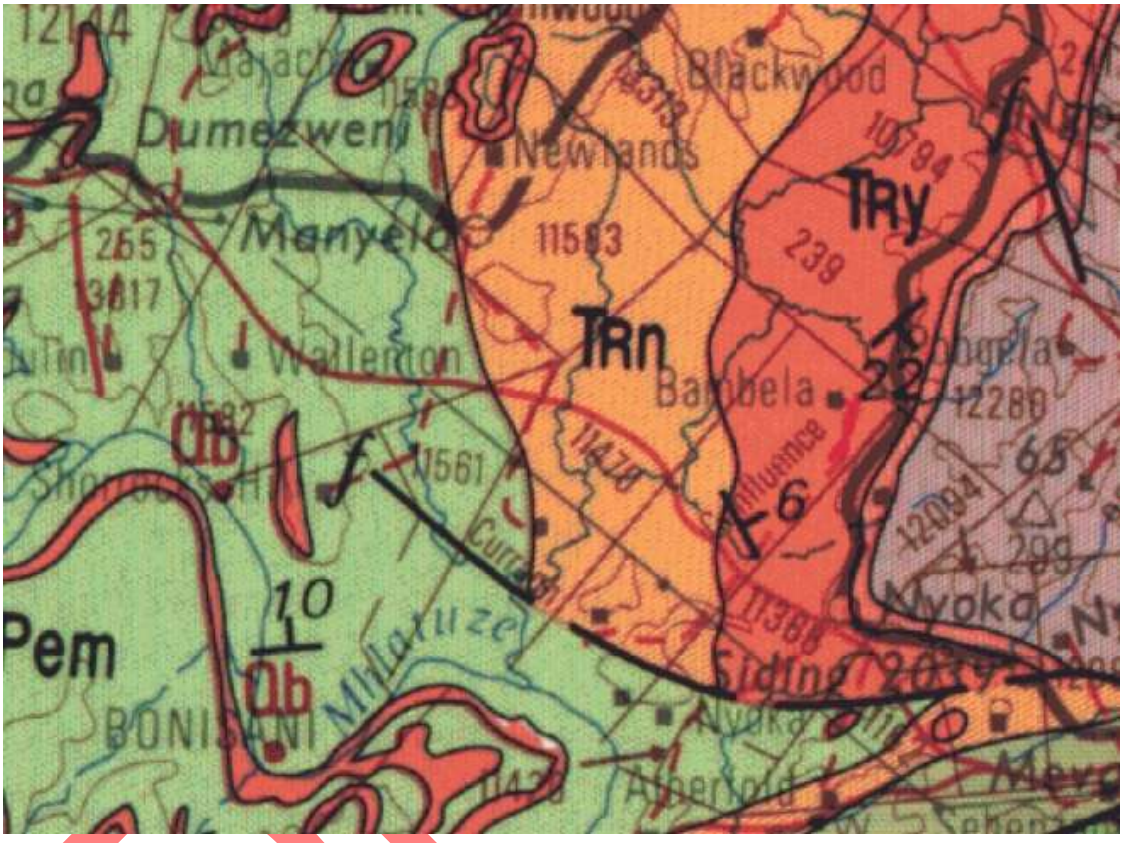

Figure 2: Extract from the Dundee (2830) 1:250 000 Geological Map. Showing the approximate area of the Hempire Corporation This shows the lithologies likely to be encountered: Ntabene Formation (Trn); Nyoka Formation (Try) and Karoo dolerite (red).

Ntabene Formation

The Ntabene Formation is described as medium-to-coarse-grained glittering sandstone (Dundee: (Geological Map) (Figure 3). It is correlated with the coarse-grained Molteno Formation, although their ages and correlation are uncertain (Cataneneau et al., 2005). The Molteno is 216 – 220 million years (Ma) old (Triassic) and occurs above an angular unconformity which marks a phase of the Cape Mountain orogeny (Cataneneau et al., 2005)

Figure 3: Ntabene Formation example. This is correlated with the Molteno Formation in the Main Karoo Basin, which is known to be fossiliferous (SACS, 1980). This image comprises sandstone which may be of fluvial origin. See hammer for scale.

Nyoka Formation

The Elliot Formation, with which the Nyoka Formation is correlated (SACS, 1980), spans the Late Triassic to the Early Jurassic. The Nyoka Formation is described as red and purple mudstone, interbedded with medium-grained sandstone (Dundee Geological Map) (Figure 4). This unit is correlated with the Elliot Formation, but this is still uncertain, as insufficient research has been carried out.

Figure 4: Nyoka Formation example. This is correlated with the Elliot Formation in the Main Karoo Basin, which is known to be fossiliferous (SACS, 1980). This image comprises a red shale containing a 5cm thick sandstone bed (see hammer).

Karoo dolerite

This dolerite was intruded as part of the Karoo Large Igneous Province, which preceded the fragmentation of the Gondwana Supercontinent. This rock occurs as sills and dykes and served as the plumbing that fed the >4km thick Letaba Formation basalts 184 Million years age (Misra et al., 2020) located to the east.

4. PALAEONTOLOGY

The Palaeosensitivity of this area, as shown in the SAHRIS Palaeosensitivity map, is provided in Figure 5. The Ntabene and Nyoka Formations appear as red.

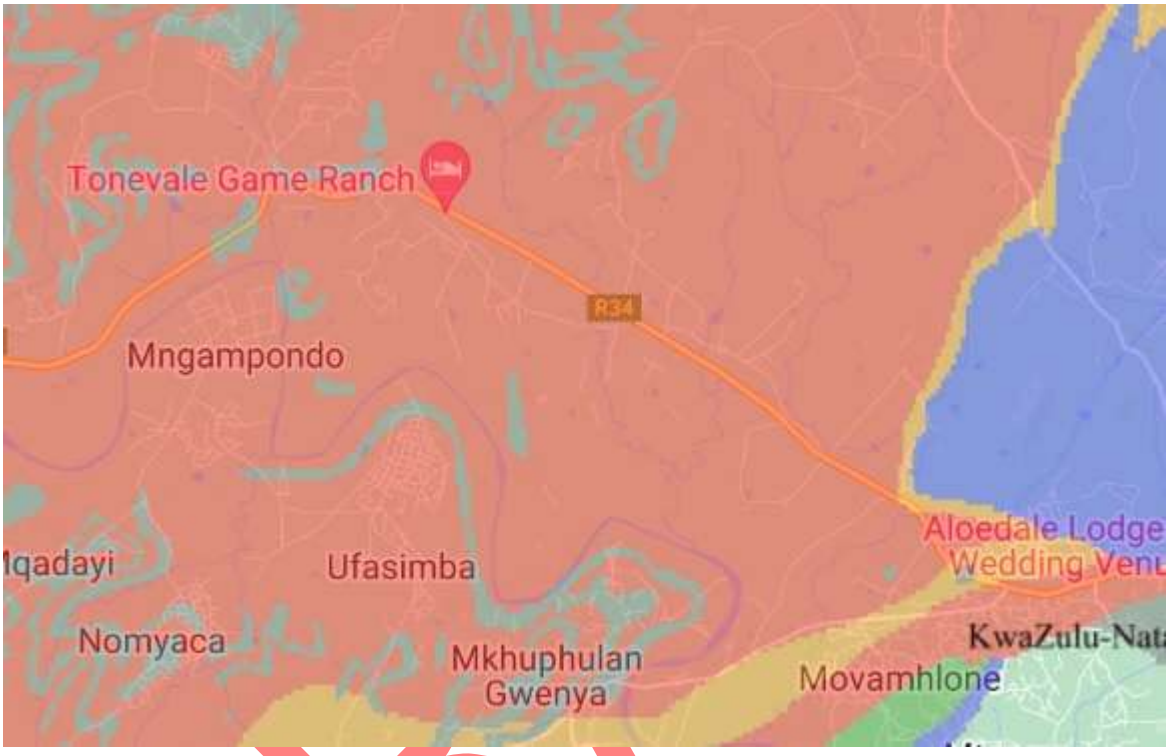

Figure 5: Palaeosensitivity of rocks in the Hempire Corporation Farmdevelopment area.

Ntabene Formation

The Ntabene Formation is correlated with the Molteno Formation. No fossils have been reported from within this lithology in this area, however in the Cape, the Molteno Formation is known to be fossiliferous (Bordy et al., 2005). This lithology is generally composed of coarse-grained sandstones and less likely to contain fossils. However finer-grained rocks are fossiliferous (Bordy et al., 2005) containing plant and insect fossils (Anderson, 1974).

Elsewhere the Molteno Formation contains fossils of 204 plant species and 333 insect species. It is one of the richest Upper Triassic-age plant and insect assemblages.

The insect fauna contains well-preserved fossil insects which are very rare (Anderson and Anderson, 1997). The dominant fossil flora is associated with seven recognized habitat types, , two of these include *Dicroidium*, an extinct arboreal genus of seed fern that grew in either riparian forests or temperate woodlands. Nineteen species of *Dicroidium* alone have been recovered from the Molteno Formation (Anderson & Anderson, 1997).

Nyoka Formation

This is correlated with the Elliot Formation. Elsewhere the Elliot Formation is known to be fossiliferous (MacRae, 1999; Rubidge, 2005). The Elliot Formation is significant because it can contain a range of vertebrate fossils and ichnofossils (Green, 1997)..

Karoo dolerite

This is an intrusive igneous rock and cannot be fossiliferous.

5. SUMMARY AND CONCLUSIONS

The proposed Hempire Corporation will be developed on a sequence of possible fossiliferous rocks. This site is underlain by the Ntabene (correlated with the Molteno Formation), the Nyoka Formation (correlated with the Elliot Formation) and Karoo dolerite (SACS, 1980). Elsewhere these lithologies are known to be fossiliferous, but no research has been done on the paleontology in this part of South Africa and the fossil content, if any, is unknown.

As this area has already been used for agriculture and exposure is very poor a "Chance Find Protocol" should suffice. Should any palaeontological material be uncovered during the operation of the farm I recommend that a suitably qualified palaeontologist be brought on site to investigate further.

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APPENDIX 1: DETAILS OF SPECIALIST

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Private Consultant: ***Alan Smith Consulting, 29 Brown's Grove, Sherwood, Durban, 4091***

&

Honorary Research Fellow: ***Discipline of Geology, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Pietermaritzburg***.

Role: Specialist Palaeontological Report production

Expertise of the specialist:

- PhD in Geology (University of KwaZulu-Natal), Pr. Sc. Nat., I.A.H.S.
- Expert in Vryheid Formation (Ecca Group) in northern KZN, this having been the subject of PhD.
- Scientific Research experience includes: Fluvial geomorphology, palaeoflood hydrology, Cretaceous deposits.
- Experience includes understanding Earth Surface Processes in both fluvial and coastal environments (modern & ancient).
- Alan has published in both national and international, peer-reviewed journals. He has published more than 50 journal articles with 360 citations (detailed CV available on request).
- Attended and presented scientific papers and posters at numerous international and local conferences (UK, Canada, South Africa) and is actively involved in research.

Selected recent palaeo-related work includes:

- Desktop PIA: Proposed middle income housing units on Portion 23 of Farm Lot H Weston 13026, Bruntville, Mpofana Local Municipality. Client: UMLANDO.
- Desktop PIA: Proposed ByPass Pipeline for Ulundi bulk water pipeline upgrade. Client: UMLANDO.
- Fieldwork PIA: Bhekuzulu Epangweni KZN water reticulation project, Cathkin Park. Client: Mike Webster, HSG Attorneys.
- Desktop PIA: Zuka valley, Ballito. Client: Mike Webster, HSG Attorneys.
- Mevamhlope proposed quarry palaeontology report. Client: Enviropro.
- Desktop PIA: Proposed Lovu Desalination site. Client: eThembeni Cultural Heritage.
- Desktop PIA: Tinley Manor phase 2 North & South banks: eThembeni Cultural Heritage
- Desktop PIA: Tongaat. Client: eThembeni Cultural Heritage.
- Palaeontological Assessment Reports (3) to Scatec Solar SA (Pty) Ltd on an Appraisal of Inferred Palaeontological Sensitivity for a Potential Photo Voltaic

Park at (1) Farm Rooilyf near Groblershoop, N Cape; (2) Farm Riet Fountain No. Portions 1 and 6, 18km SE of De Aar, N Cape; and (3) Dreunberg, near Burgersdorp, Eastern Cape. Client: Sustainable Development Projects.

APPENDIX 2: CHANCE FIND PROTOCOL

This Chance Find Protocol must be included in the site EMPr.

If any fossils are found, a Palaeontologist must be notified immediately by the ECO and/or EAP and a site visit must be arranged at the earliest possible time with the Palaeontologist.

In the case of the ECO or the Site Manager becoming aware of suspicious looking palaeo-material:

- The construction must be halted in that specific area and the Palaeontologist must be given enough time to reach the site and remove the material before excavation continues.

- Mitigation will involve the attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labeled, and boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.

Functional responsibilities of the Developer

1. At full cost to the project, and guided by the appointed Palaeontological Specialist, ensure that a representative archive of palaeontological samples and other records is assembled to characterize the palaeontological occurrences affected by the excavation operation.

2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas.

3. Facilitate systematic recording of the stratigraphic and palaeo-environmental features in exposures in the fossil-bearing excavations, by described and measured geological sections, and by providing aid in the surveying of positions where significant fossils are found.

4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as “normal” fossil finds.

5. Provide covered, dry storage for samples and facilities for a work area for sorting, labeling and boxing/bagging samples.

6. Costs of basic curation and storage until collected. Documentary record of palaeontological occurrences must be done.

7. The contractor will, in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which appropriate information regarding plans for excavations and work schedules must be indicated on the plan of the excavation sites. This must be done in conjunction with the appointed specialist.

8. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period.

9. Locations of samples and measured sections are to be pegged, and routinely and accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation.

APPENDIX 3: GPS REFERENCE POINTS

NAME	Latitude	Longitude	Elevation	Datetime (UTC)
NTAM D	-28.7159	31.86725	15.42	2022-03-30T09:51:33Z
NTAM E	-28.6691	31.66331	28.74	2022-03-30T09:54:11Z
NTAM C	-28.6183	31.75628	46.29	2022-03-30T09:56:15Z
NTAM A	-28.5652	31.69753	50.47	2022-03-30T09:57:27Z
NTAM B	-28.6058	31.68769	24.14	2022-03-30T09:58:47Z
NTAM1	-28.7206	31.8677	84.71	2022-03-30T10:50:49Z
NTAM2	-28.6999	31.86125	134.31	2022-03-30T11:15:10Z
NTAM3	-28.7079	31.84866	97.64	2022-03-30T11:28:13Z
NTAM4	-28.7128	31.81731	161.31	2022-03-30T11:58:12Z
NTAM5	-28.6923	31.80101	116.51	2022-03-30T12:24:23Z
NTAM6	-28.6608	31.78221	107.37	2022-03-30T12:49:26Z
NTAM7	-28.6606	31.78031	101.74	2022-03-30T12:58:30Z
NTAM8	-28.6585	31.77385	99.56	2022-03-30T13:20:47Z
NTAM9	-28.6542	31.76892	106.06	2022-03-30T13:25:22Z
NTAM10	-28.638	31.76378	135.51	2022-03-30T13:36:08Z
NTAM11	-28.6286	31.75921	190.00	2022-03-30T13:59:14Z
NTAM12	-28.6271	31.75862	184.46	2022-03-30T14:23:32Z
NTAM13	-28.6096	31.74448	219.13	2022-03-30T14:43:59Z
NTAM14	-28.5895	31.72519	235.18	2022-03-30T15:04:28Z
NTAM15	-28.6636	31.69652	166.65	2022-03-31T09:32:05Z
NTAM16	-28.6674	31.68057	196.78	2022-03-31T10:02:00Z
NTAM17	-28.6571	31.67336	283.32	2022-03-31T10:12:39Z
NTAM18	-28.6471	31.68204	301.51	2022-03-31T10:23:18Z
NTAM19	-28.625	31.72208	325.03	2022-03-31T10:50:34Z
NTAM20	-28.6221	31.72309	318.27	2022-03-31T11:02:19Z
NTAM21	-28.6018	31.74981	278.41	2022-03-31T11:16:28Z
NTAM22	-28.5917	31.75696	214.72	2022-03-31T11:26:54Z
NTAM23	-28.5989	31.73986	268.89	2022-03-31T11:48:08Z

APPENDIX 4: IMAGES CAPTURED BUT NOT USED IN THIS REPORT.

STN NO	DESCRIPTION	IMAGE
1	Loose rocks, Probably Emakwezini Formation (Fm)	
2	Letaba Fm, this comprises basalts which are highly weathered.	
3	Letaba Fm, view towards proposed Reservoir site.	

4	Road to Ntanbanana. Road material is basalt but source unknown.	
5	Letaba Fm basalt exposed along the roadside. White colour is due to weathering.	
6	Nyoka Fm, correlates with the Elliot Fm	Figure 5 in report
7	Ntabene Fm, correlates with the Molteno Fm.	Figure 6 in report
8	Ntabene Fm, very weathered.	

9	Ntabene Fm (above arrow) and Emakwezini Fm (below arrow).	
10	Emakwezini Fm, note the bedding and wave ripples. See also Figure 7 in report.	
11	Emakwezini Fm, note the thin coal seam arrowed.	
12	Emakwezini Fm.	See Figures 8 and 16 in report.
13	Emakwezini Fm.	See Figure 17 in report
14	Volksrust Fm.	See Figure 9 in report

15	Emakwezini Fm quarry. See also Figure 11 in report.	
16	Emakwezini Fm exposed in borrow pit.	
17	Emakwezini Fm	No image
18	Proposed reservoir site. Emakwezini Fm but very badly weathered.	
19	Emakwezini Fm	See Figure 11 in report
20	Could be Volksrust Fm but very poorly exposed/weathered.	No image

21	Reference GPS station. Very weathered shale but Fm unknown.	
22	Emakwezini Fm poorly exposed and badly weathered at road side, Ntambanana – Phinda road.	
23	Karoo Dolerite Sill outcropping as a hill in Ntambanana	See Figure 12 in report.