

**HIA FOR THE NONOTI BEACH DEVELOPMENT
AND ACCESS ROAD UPGRADE
FOR AFZELIA ENVIRONMENTAL CONSULTANTS**

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Abbreviations

HP	Historical Period
IIA	Indeterminate Iron Age
LIA	Late Iron Age
EIA	Early Iron Age
ISA	Indeterminate Stone Age
ESA	Early Stone Age
MSA	Middle Stone Age
LSA	Late Stone Age
HIA	Heritage Impact Assessment
PIA	Palaeontological Impact Assessment

INTRODUCTION

“It is proposed that Nonoti Beach Node be developed. The beach node is planned to include: an access road and turning circle, parking area, arts and craft kiosks, informal and formal trading kiosks, ablutions, conservancy tanks, a lifeguard tower / house and service road, swimming pool, bicycle and skateboarding track and outdoor amphitheatre. These features will all form part of the environmental authorisation process. Refer to figure 2 below for the proposed development layout.

The proposed development footprint is approximately 2.2 hectares. Although the proposed location of the beach node falls within coastal forests and coastal dunes, the footprint proposed for the development has been strategically planned for an area which is currently transformed and used as an informal access point to the beach.

The proposed development is planned for various areas across several portions of Hyde park Farm, these being Portion 0, 42, 43, 44, 53, 54 and 55 of 10233 Hyde Park Farm, KwaDukuza Local Municipality. The proposed development is located along the coastline between Prince’s Grant in the south and Zinkwazi in the north.

The proposed development is situated on the eastern seaboard of KwaZulu-Natal, approximately 13km from the town of Stanger; 28km from the Ballito (Dolphin Coast) area and 55km north of King Shaka International Airport in the KwaDukuza Local Municipality. The site is accessed from the R102, across the N2 and through the existing road network, over sugar cane farms, inland of the site” (Afzelia BID 2021)

Umlando was requested to undertake an HIA of the proposed development. Figures 1 – 3 show the location of the development.

FIG. 1 GENERAL LOCATION OF THE PROPOSED DEVELOPMENT



FIG. 2: AERIAL OVERVIEW OF THE PROPOSED DEVELOPMENT

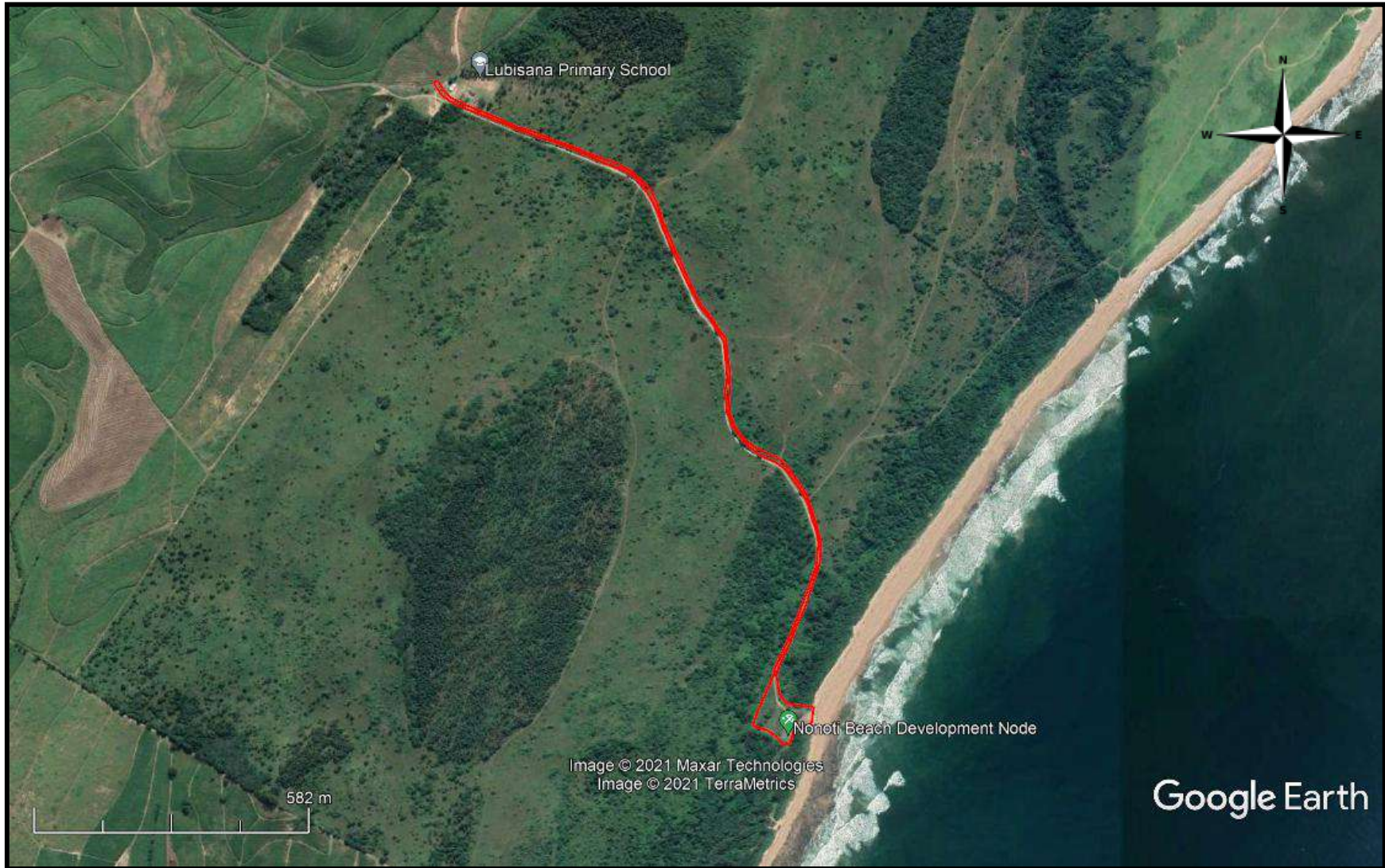


FIG. 3: TOPOGRAPHICAL MAP OF THE PROPOSED DEVELOPMENT (2002)

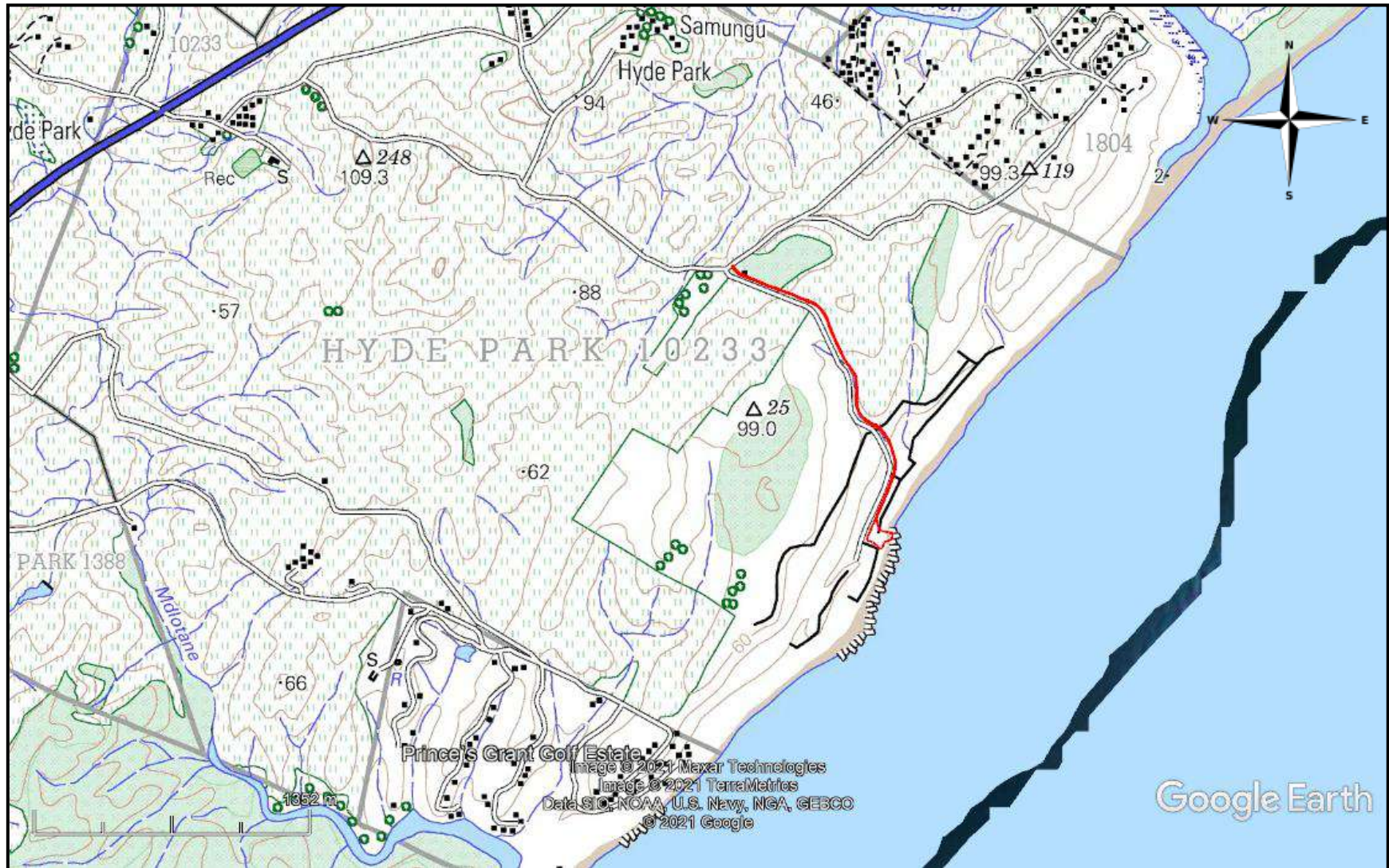


FIG. 4: SCENIC VIEWS OF THE STUDY AREA



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. Many archaeological sites occur in the general area. The archaeological sites are two Early Stone Age scatters and one Late Iron Age settlement (fig. 5). Anderson (2015, 2021) undertook two surveys near the study area. These surveys recorded sites that were LIA/HP sites, while a large shell midden was recorded at Prince's Grant.

Any rock outcrop near the beach has a very high archaeological sensitivity for shell middens. These middens can date to the LSA, EIA, LIA or HP, and some contain human remains. It is highly unlikely that shell middens do not occur within a 1km radius, if not closer, from these rock outcrops.

The Erf was initially referred to as farm Hyde Park 1388 in 1906. It was then changed in 1921 and the Remainders were consolidated into Hyde Park 10233 (fig. 6 - 7). Some of the original Hyde Park 1388 contained Prince's Grant in the 1853 SG map. The 1853 surveyor map for Blythedale shows Prince's Grant on its northern border (fig. 8). It specifically refers to the area as "Land granted to Mr Prince". Part of the farm was acquired by Mr. Babu Bodasing, in the 1850s/1860s, who was an indentured cane cutter from India. The land was left as a grant and not a title deed. This could be the difference between Granted Land and Title Deeds and may relate to landownership politics of the time.

"A grant deed and title deeds may prove to be somewhat similar for they both will deal with aspects regarding ownership of property or real estate. However,

there is quite a significant difference between the two, for they both signify different things.

Title deeds are documents that essentially provide for proof of ownership over property, real estate, and in some cases, vehicles as well. Property or real estate will be described in full and the owner's name and signature will also be included in title deeds.

A grant deed, on the other hand, will not necessarily provide for proof of ownership. A grant deed is the legal document that is used to indicate the transfer of property or real estate from one party to another. A grant deed will act more along the lines of a contract, where the involved parties, the grantor and grantee, will abide by certain provisions in order to secure the transfer of ownership of the property at hand.

In other words, the grantor gives up the rights of ownership to the property and transfers them to the grantee, effectively making him/her the new owner. The grant deed is essentially the document that legally allows for the transfer of title deeds between two parties." (<https://probate.laws.com/deed/grant-deed-vs-title-deed>).

The 1937 aerial photograph indicates that the area is covered by grassland or sugarcane (fig. 9). Several agricultural fields and built structures are noted on the map, but none occur within the study area.

The 1968 topographical map indicates that there are several buildings near the proposed road upgrade and one at the Beach Node. (fig. 10).

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



FIG. 6: SURVEYOR GENERAL MAP OF HYDE PARK 1906

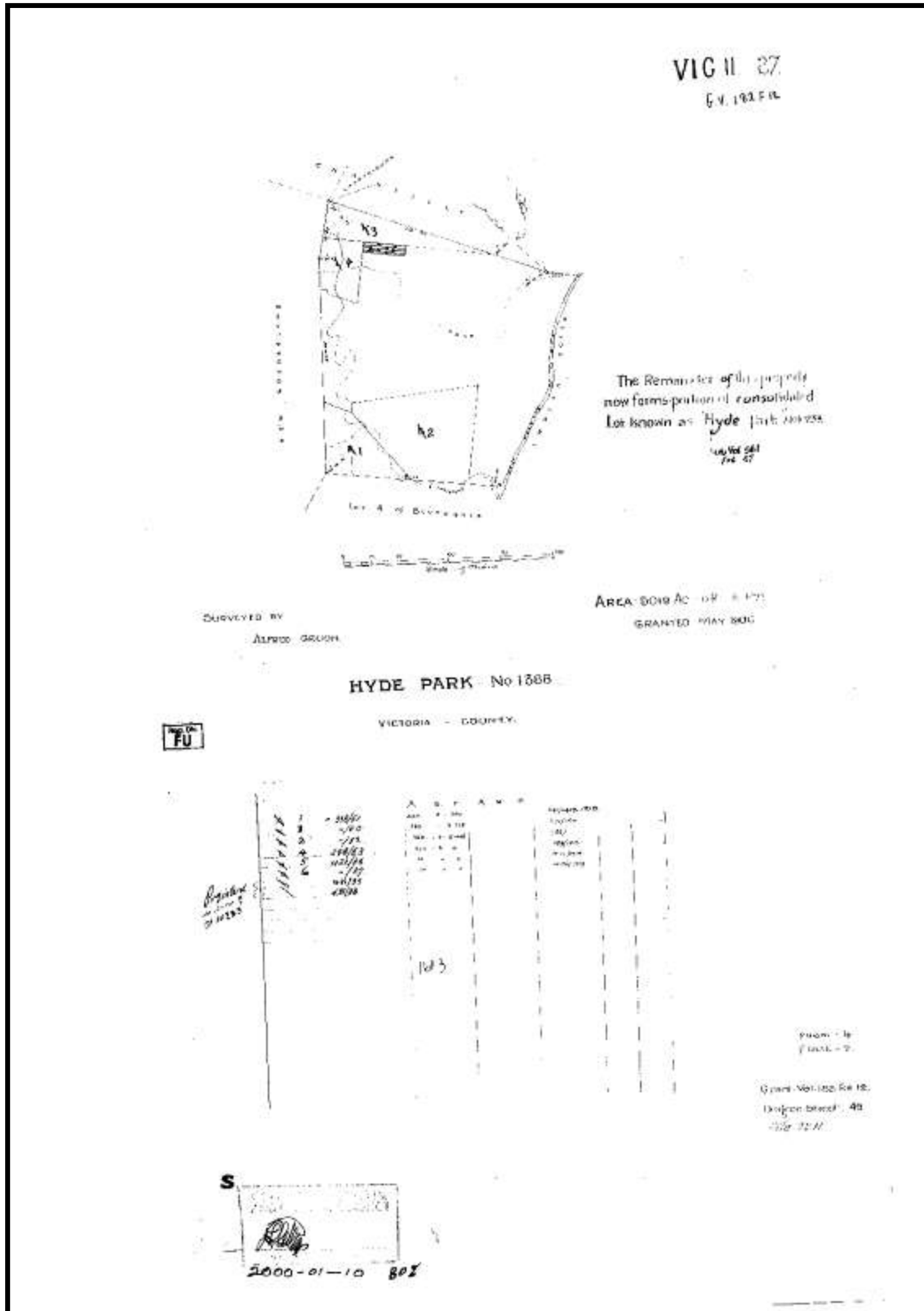


FIG. 7: SURVEYOR GENERAL MAP OF HYDE PARL 10223 (1921)

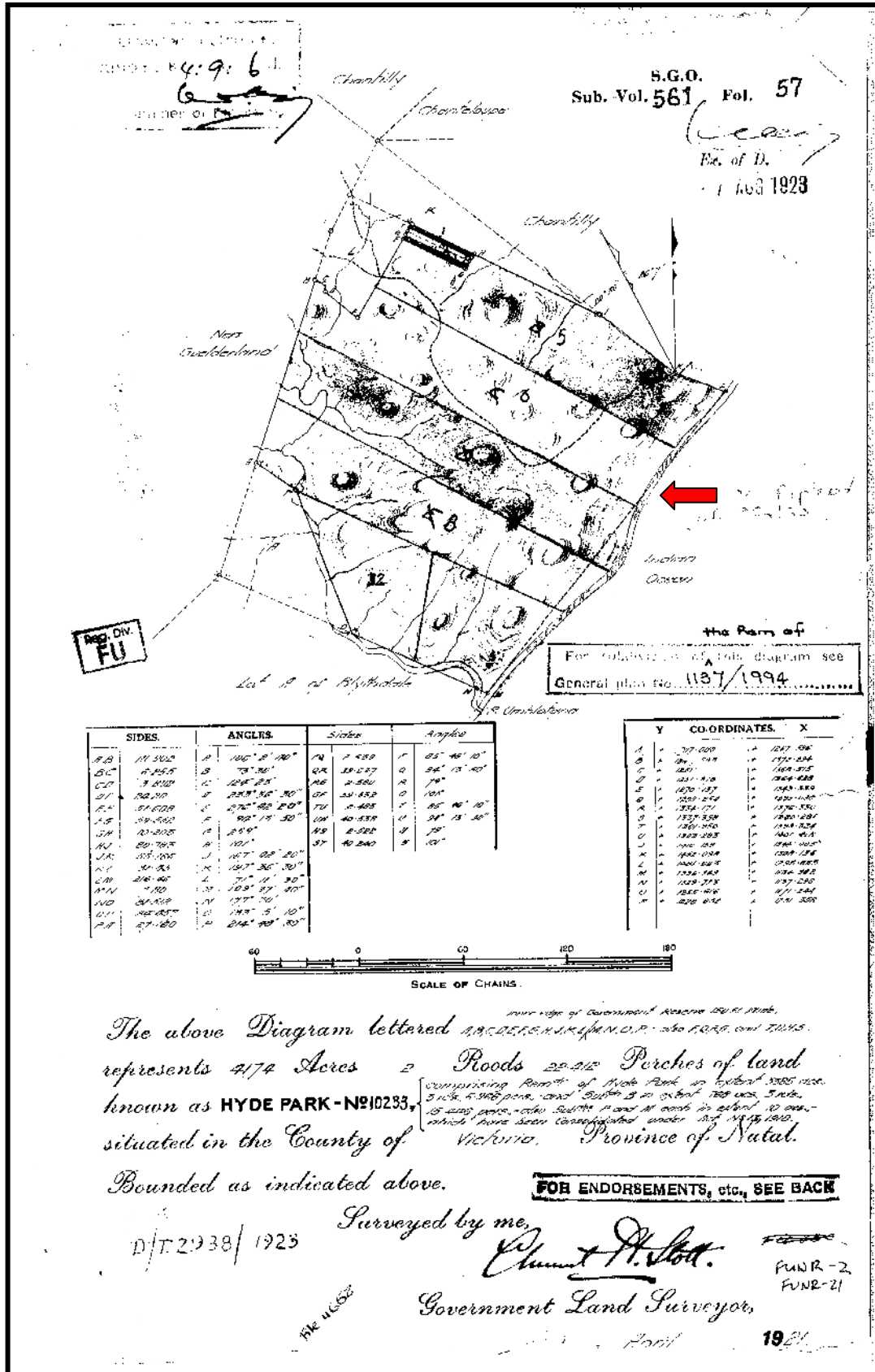


FIG. 8: SURVEYOR GENERAL MAP INDICATING PRINCE'S GRANT 1855

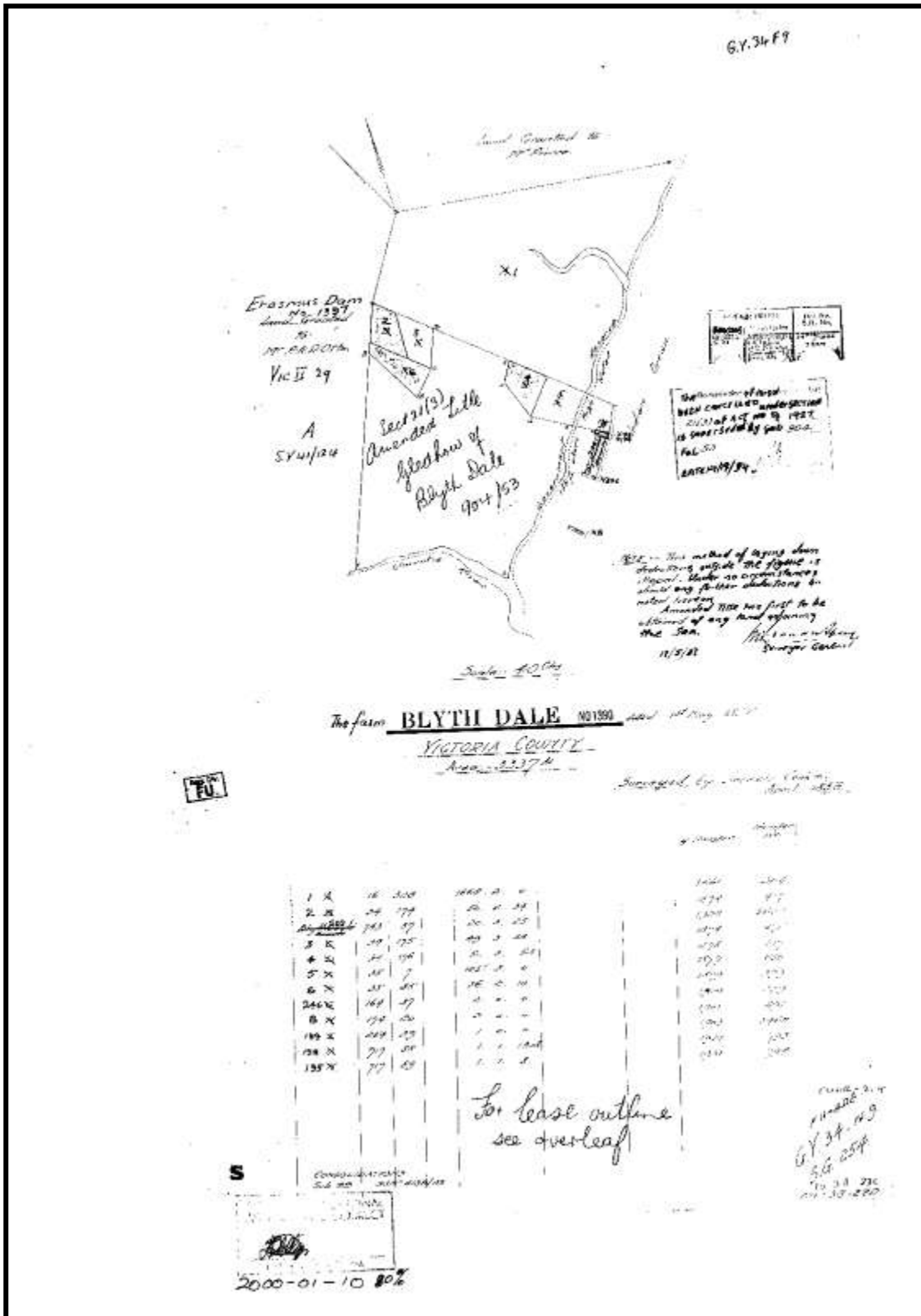
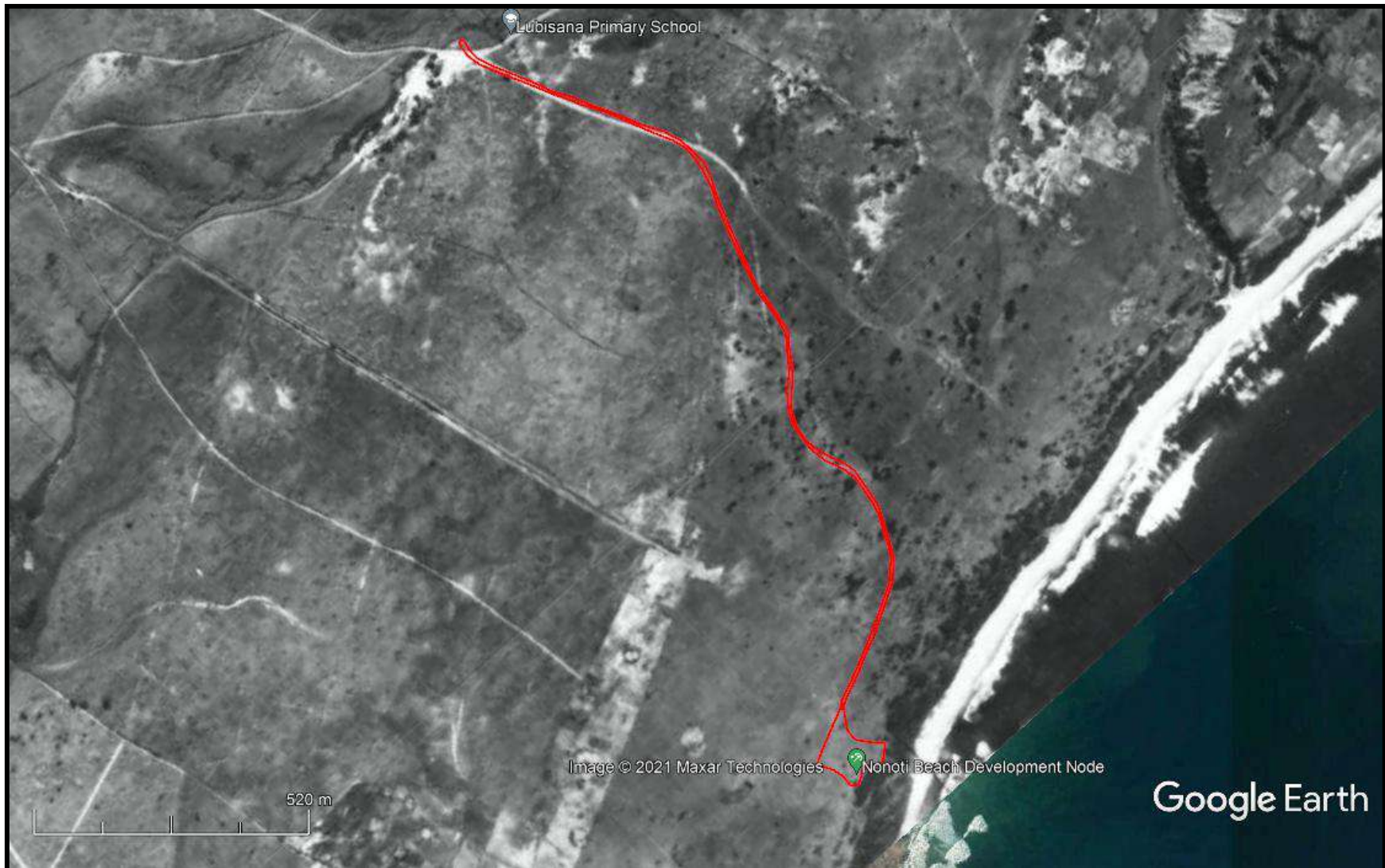


FIG. 9: LOCATION OF THE STUDY AREA IN 1937¹



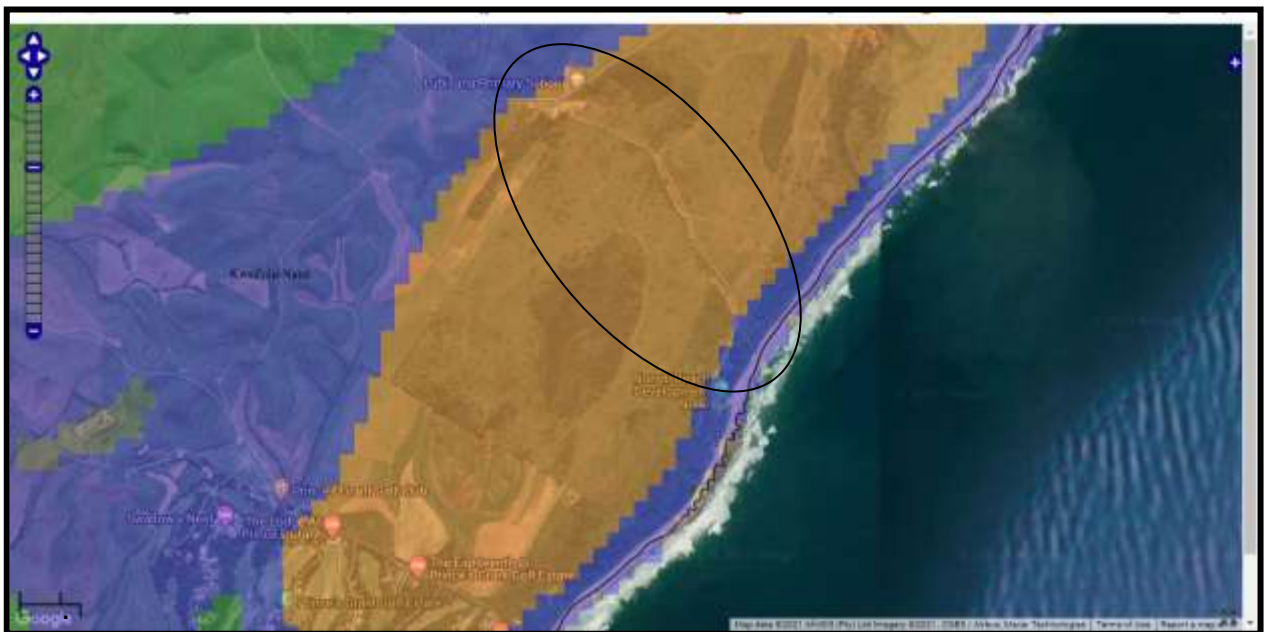
¹ 17B_053_54437

PIA PALAEOLOGICAL SENSITIVITY

The road is in an area of high sensitivity, and thus a desktop study was initially undertaken. The PIA desktop was undertaken by Dr. Alan Smith (appendix A). He states:

“Theoretically, there is no reason why fossils should not be found in the Umkwelane Formation, but in practice nothing has been found. Although the SAHRIS Map considers this as a **High Palaeosensitivity Zone...** in practice it is a **Low Palaeosensitivity** risk, as it consists of weathered sand where the chances of encountering palaeontological material are low. The possibility of finding fossils is low but not zero so a “Chance Find Protocol” has been inserted.”

FIG. 7: PALAEOLOGICAL 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

The field survey was undertaken on 19 October 2021. Ground visibility was good in most places. The current road has cuttings allowing soil profiles to be visible and some areas around the beach development have been recently burnt.

The built structures near the road, and at the beach, no longer exist. The buildings near the road were 20m+ from the road, but no evidence of the ruins was visible. Similarly, the building at the beach node has been removed. While there are two bricked structures on the edge of the development, these appear to be small rubbish bins.

At the entrance to the beach is an area cleared of grass with a high concentration of shell (fig. 11). While this is not an old midden, due to the lack of older artefacts, it does suggest that a midden is in the area. The area behind the first dune cordon would have acted as a windbreak and is ideal for processing shellfish and/or being a domestic area.

RECOMMENDATIONS

There is a high likelihood of shell middens being exposed by excavations. The older shell middens would be 20cm+ below the surface. Any excavations, or earth moving activity, in the beach node area should be monitored by a suitably qualified archaeologist. This may lead to salvage excavations and/or sampling.

I would suggest that any excavations for the pipelines, or cables, be undertaken at the beginning of the construction phase. In this way any archaeological excavations that may be needed, can occur timeously and not hinder development. This will involve monitoring an excavator whilst it removes soil. This will be especially important for the proposed pool area.

The construction company should include delays for archaeological excavations.

A permit to destroy and to sample/excavate the site should be obtained prior to construction. This can take 1 – 3 months to obtain.

FIG. 11: BEACH ENTRANCE



CONCLUSION

A heritage survey was undertaken for the proposed Nonoti Beach development and road upgrade/ The area is of high archaeological sensitivity and is normally associated with shell middens and/or domestic areas dating from the Late Stone Age to the recent historical past.

No heritage sites were noted along the road footprint or at the beach node/ However, the middens are probably below the surface and not visible. It is for this

reason that any excavations in this node will require on-site monitoring. Archaeological excavations and/or sampling may occur.

REFERENCES

Anderson, G. 2015. Proposed Construction Of Off Take 5b Potable Water Pipeline As Part Of The Lower Thukela Bulk Water Supply At Hyde Park, Ilembe District Municipality, KZN. For Triplo4 Sustainable Solutions (Pty) Ltd

Anderson, G. 2021. HIA Survey Of Proposed Residential Development On Erf 308, Princes Grant Estate, Kwadukuza, KZN. For Triplo4 Sustainable Solutions (Pty) Ltd

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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.

A handwritten signature in black ink, appearing to read 'G. Anderson', with a horizontal line underneath.

Gavin Anderson
Archaeologist/Heritage Impact Assessor

APPENDIX A
PIA DESKTOP STUDY

**DESKTOP PALEONTOLOGICAL
ASSESSMENT FOR THE PROPOSED
ESTABLISHMENT OF THE NONOTI BEACH
DEVELOPMENT NODE, LOCATED WITHIN
THE ILEMBE DISTRICT MUNICIPALITY,
KWADUKUZA MUNICIPALITY, KWA-ZULU
NATAL**

FOR

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29 OCTOBER, 2021

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

Alan Smith Consulting was appointed by UMLANDO: Archaeological Surveys & Heritage Management to conduct a Desk-Top field assessment of the potential impacts to **Palaeontology Resources** that might occur through the activities of the proposed Nonoti Beach Development Node construction, located in the KwaDukuza Local Municipality of the iLembe District Municipality, KwaZulu-Natal

Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), requires a Palaeontological Impact Assessment (PIA) to assess any potential impacts to palaeontological heritage.

The chances of encountering fossils on this site is **Low**, but **Not Zero**; consequently a ***“Chance Find Protocol”*** has been included.

ACRONYMS

BA:	Basic Assessment
EDTEA:	(Department of) Economic Development, Tourism and Environmental Affairs
HIA:	Heritage Impact Assessment
PIA;	Palaeontological Impact Assessment
SAHRA:	South African Heritage Resource Agency
SAHRIS:	South African Heritage Resources Information System

1. BACKGROUND

It is proposed to develop the Nonoti Beach Development Node, KwaDukuza Local Municipality of the iLembe District Municipality, KwaZulu-Natal (Figure 1).



Figure 1: Location map of proposed Nonoti Beach Development Node.

2. TERMS OF REFERENCE

Alan Smith Consulting was requested by Gavin Anderson of UMLANDO: Archaeological Surveys & Heritage Management to provide a Desk-Top Palaeo Impact Assessment for the proposed Nonoti Beach Development Node to assess the likelihood of encountering palaeontological material and potential impacts on Palaeontological Resources. The work was to be based on the knowledge gained from desktop review, maps, reviewed literature, onsite fieldwork and personal experience (see Section 11). This report is to meet the requirements of the National Environmental Management Act (Act 107 of 1998) [as amended] Environmental Impact Assessment (EIA) regulations, Appendix 6.

3. SCOPE AND PURPOSE OF REPORT

A Palaeontological Impact Assessment (PIA) is a means of identifying any significant palaeontological material before development begins, so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This field Desk-Top investigation fulfills the requirements of the heritage authorities (SAHRA), such that a comment can be issued by them for consideration by the competent authority (EDTEA), who will review the Basic Assessment (BA) and grant or refuse authorisation. The PIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation, should this be granted.

4. METHODOLOGY

Geological maps, literature review and personal experience were used in this desk-top research.

5. GEOLOGY

The geology of the Nonoti Beach Node and surrounding area is shown in Figure 2. The stippled ornament on the coast represents beach and dune sands. The dune sand is referred to as the Kosi Bay Formation (Botha, 2018) The Umkwelane Formation (Qb: yellow) and the Natal Group Sandstone (O-Sn: light blue) are also present on this site (Figure 2).



Figure 2: Approximate area of proposed Nonoti Beach Development Node. According to this extract from the Durban 2930 1:250 000 Geological map, the proposed footprint will overly mainly the Umkwelane Formation (Qb: yellow on map), although the Kosi Bay Formation (Coastal Dunes) and Natal Group Sandstone (O-Sn: light blue) may be encountered.

Kosi Bay Formation

This comprises the mobile dune sand on the coast (Botha, 2018).

Umkwelane Formation (Berea Red Sand)

This is Mid-Miocene to Pliocene (14 - 4 million years ago (Ma) in age (Botha, 2018). It is an ancient dune cordon, composed of fossil aeolian coastal dunes (Figure 2). The feldspar component has been strongly weathered to give a red clay matrix. This soil is a characteristic red colour (Figure 3). The top metre of this lithology has been deeply disturbed due to prehistorical, historical and current agricultural practises.



Figure 3: The characteristic appearance of the Umkwelane Formation (Berea Red Sand).

Natal Group Sandstone

The Natal Group comprises reddish coloured sandstones, when seen in the field. This sandstone is Ordovician (485-443 Ma) millions of years in age (Vorster et al., 2015). Deposition took place in a terrestrial-dominated setting on the Gondwana Supercontinent.

PALAEONTOLOGY

Fossils could be encountered in the Kosi Bay Formation, but this is unlikely.

Theoretically, there is no reason why fossils should not be found in the Umkwelane Formation, but in practice nothing has been found. Although the SAHRIS Map considers this as a **High Palaeosensitivity Zone** (Figure 4 – orange shaded area – see Table 1), in practice it is a **Low Palaeosensitivity** risk, as it consists of weathered sand where the chances of encountering palaeontological material are low. The possibility of finding fossils is low but not zero so a “Chance Find Protocol” has been inserted.



Figure 4: Palaeosensitivity of the proposed Nonoti Beach Development Node. The approximate location is boxed. (Extract from Sahr's Palaeosensitivity Map).

Table 1: Summary of SAHRIS categories

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

Fossils have never been found in the Natal Group. During the Ordovician Period in the Earth's history there was very little life on land. The possibility of finding fossils is low but not zero so a "Chance Find Protocol" has been inserted.

7. SUMMARY

The chance of fossils being found on this site is **Low**, but not **Zero**. A “**Chance Find Protocol**” has been included to cover this eventuality. No further palaeontological work is required, unless triggered by the “**Chance Find Protocol**”, which must form part of the Environmental Management Programme (EMPr) for the site

8. 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.

9, CONCLUSIONS

This project will be constructed within soil formed from the Umkwalene Formation, and possibly the Vryheid Formation. Although paleontological material is unlikely to be encountered in the soil, a “Chance Find Protocol” has been included. No further **palaeontological work** is required unless the “Chance Find Protocol” is triggered.

10. REFERENCES

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11. DETAILS OF SPECIALIST

Dr Alan Smith

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, Durban.*

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 + 50 journal articles with 497 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.
- Fieldwork PIA: Mpungoze water supply scheme, Empangeni. Client: Enviropro.
- Fieldwork PIA: Helpmekaar Dam. Client: Afzelia environmental consultants.
- 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.