Archaeological Impact Assessment

In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape Provincial Gazette 6061, Notice 298 of 2003. Requested by Heritage Western Cape on 20 May 2021 (HWC Case No. 21042001SB0421E)

Proposed rezoning, subdivision and residential development: Erf 3122, Hartenbos Garden Estate / Hartenbos Natuur-Landgoed, Mossel Bay Municipality, Western Cape Province

prepared for

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prepared by

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30 May 2022

Executive Summary

Site Name

No registered heritage sites occur on or within direct proximity of Erf 3122, Mossel Bay.

Location

Off Louis Fourie Road and an extension of Kameeldoring Avenue, west of the N2 highway, Hartenbos and Bayview, Erf 3122, Mossel Bay Municipality, Western Cape Province. The approximate centre point of the property is at 34˚07‘44.40“ S 22°05‘05.55“ E.

Locality Plan

Green polygon represents the affected property, Erf 3122, Mossel Bay, Western Cape Province (https://gis.elsenburg.com/apps/cfm/).

Description of Proposed Development

The proposal involves the rezoning, subdivision and residential development of Erf 3122. The development involves a variety of housing types including a retirement complex, group housing and single residential units. Also proposed are a clinic, business area, sports facilities, public open space, community hall, club house, restaurant, roads and bulk services.

Identified Archaeological Resources

Through a desktop study, a literature review, an examination of aerial photographs as well as a comprehensive field investigation, 136 archaeological occurrences of Stone Age origin were identified. These are dominated by Middle Stone Age specimens, followed by those of the Early Stone Age and Later Stone Age artefacts are rare. The contexts of these finds are mostly disturbed and therefore they are of low to no significance, and Not Conservation Worthy. Two archaeological occurrences, one of mainly Middle Stone Age implements and another of mostly Early Stone Age specimens are considered to be of medium significance at the local level (field rating: Grade IIIB) and recommendations for their protection and conservation are made. No tangible heritage resources of the historic period were identified.

Anticipated Impacts on Archaeological Resources

The proposed development will involve substantial earthmoving activities, which will damage or destroy the context of identified Stone Age stone implements, but since the bulk of these are Not Conservation Worthy, the impact to these archaeological resources will be insignificant. Furthermore, due to the geological sequence and depth of disturbances – particularly that of ploughing – it is not expected that *in situ* and significant archaeological materials will be encountered during earthmoving activities associated with the proposed development.

Two archaeological occurrences of medium significance at the local level (Grade IIIB) will be protected and conserved and will not be impacted by the development.

Recommendations

1. There are no fatal flaws or objections to the full authorisation of the proposed development provided that the below recommendations are implemented.
2. Because the Early and Middle Stone Age artefact scatters at waypoints 127 and 34 are considered to be of medium significance at the local level (Grade IIIB), their extents - including 5 m buffers - were mapped via GPS and these are No-Go areas that are already incorporated into the revised development layout.
3. Waypoint 127 should be enclosed with a temporary boundary fence prior to the construction phase and under an archaeologist's supervision to ensure that this No-Go area is avoided during the construction phase of development.
4. Waypoint 34 falls within a conservation area and outside the development footprint, but the installation of a perimeter fence and construction of a service road should be monitored by a suitably qualified and informed archaeologist to avoid or minimize the disturbance or destruction of artefacts.
5. Due to their low densities, temporally mixed and disturbed nature, the remainder of identified Stone Age artefacts are Not Conservation Worthy and therefore their disturbance / destruction does not require a work plan or permit from Heritage Western Cape. No further archaeological studies or mitigation / management measures are necessary for these archaeological resources.
6. If any human remains or significant archaeological materials are exposed during development activities, then the find should be protected from further disturbance and work in the immediate area should be halted and Heritage Western Cape must be

notified immediately. These heritage resources are protected by Section 36(3)(a) and Section 35(4) of the NHRA (Act 25 of 1999) respectively and may not be damaged or disturbed in any way without a work plan and permit from Heritage Western Cape. Any work in mitigation, if deemed appropriate, should be commissioned and completed before construction continues in the affected area and will be at the expense of the developer.

7. Points 2, 3, 4 and 6 of the above recommendations should be included in the Environmental Management Program (EMPr) for the proposed residential development.
8. If an EMPr is not developed for the project, then the above recommendations must be implemented by the applicant or developer.

Author(s) / Contributor(s) and Date

Archaeological specialist study: Peter Nilssen, 2010, 2017 and May 2022

Table of Contents

1. Introduction

1.1. Site, description and location

Erf 3122 is approximately 59 ha in extent, and is situated some 8 km NW of Mossel Bay off Louis Fourie Road and an extension of Kameeldoring Avenue, west of the N2 highway, and west of Hartenbos and Bayview in the Mossel Bay Municipality, Western Cape Province (Figures 1, 2 & 3). The approximate centre point of the property is at 34˚07‘44.40“ S 22°05‘05.55“ E.

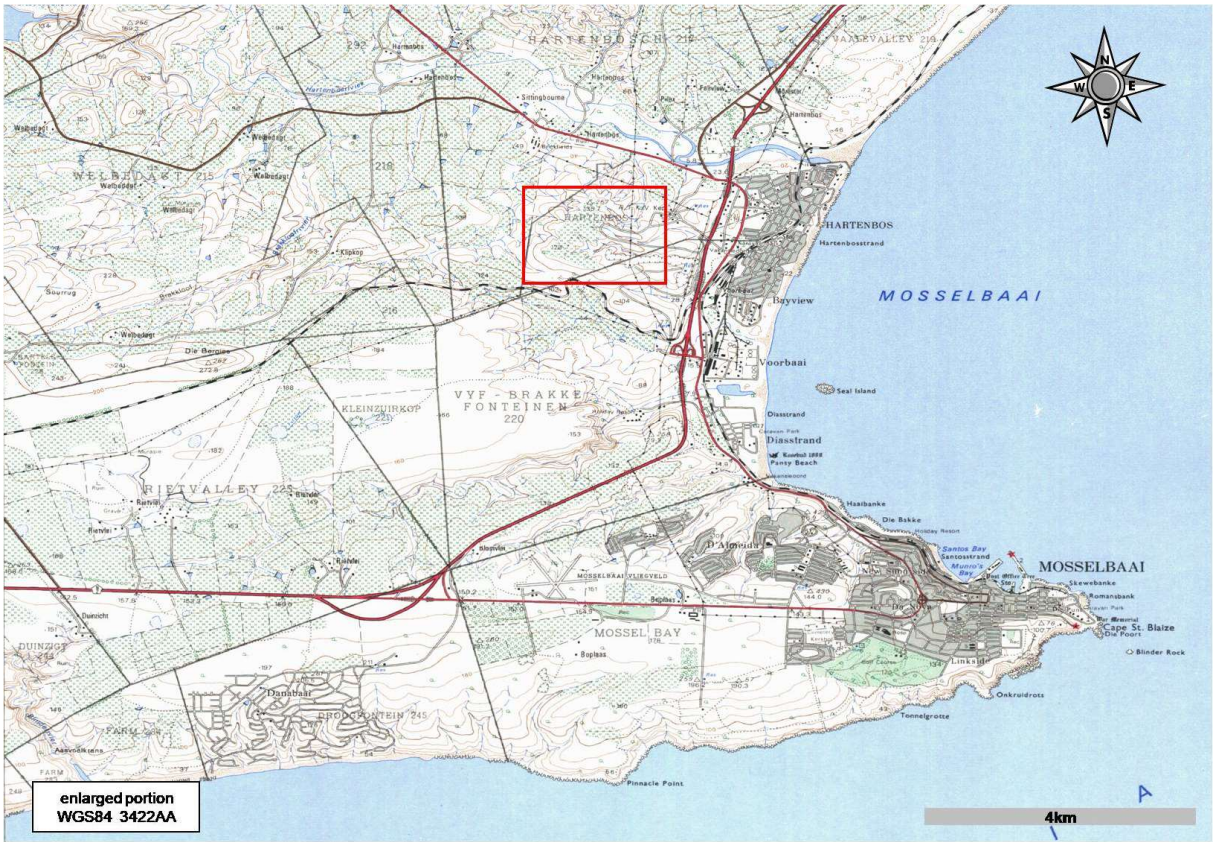

Figure 1. General location of Erf 3122, Mossel Bay, Western Cape Province (red rectangle). Enlarged portion of 1:50 000 topographic map 3422AA MOSSELBAAI (1999). Courtesy of the Chief Directorate: Surveys and Mapping, Mowbray. (A4 version on page 49)

Figure 2. Aerial image showing the general location and surroundings of Erf 3122, Mossel Bay, Western Cape Province (https://gis.elsenburg.com/apps/cfm/). (A4 version on page 50)

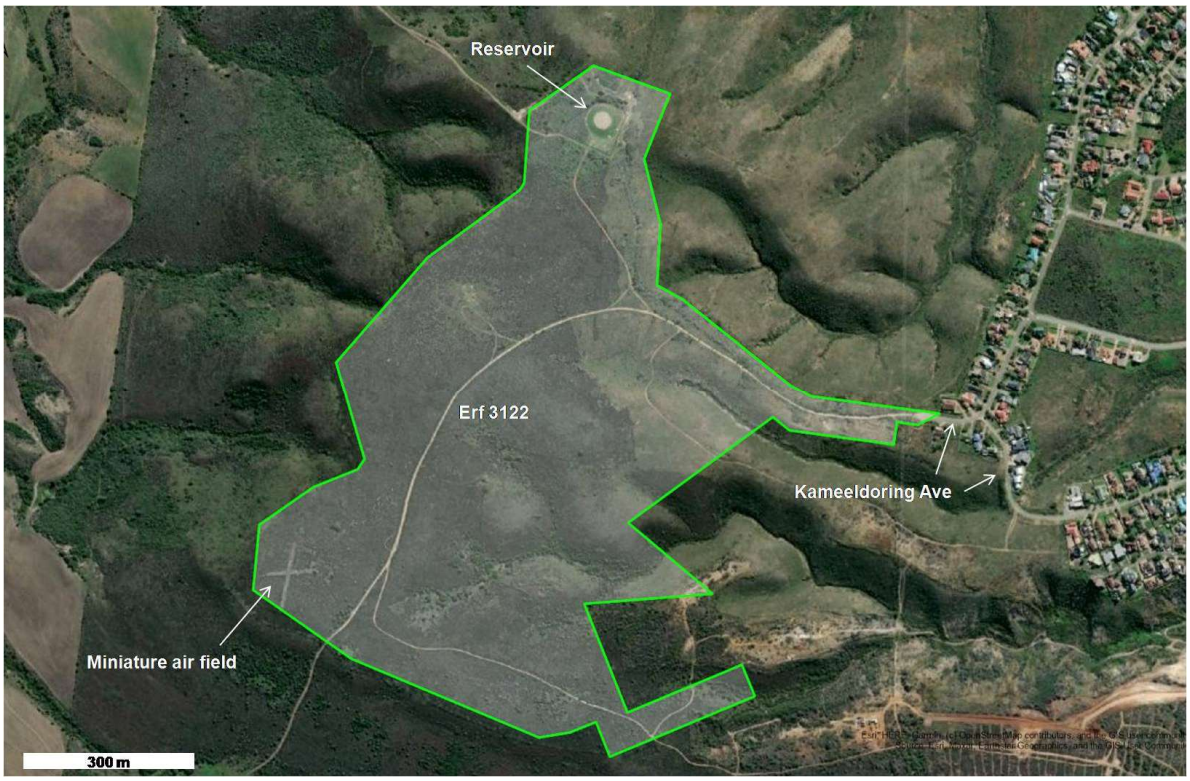

Figure 3. Enlarged from Figure 2 showing the immediate surroundings and context of Erf 3121, Mossel Bay (https://gis.elsenburg.com/apps/cfm/).

1.2. Terms of reference

This author was appointed to compile an Archaeological Impact Assessment (AIA) that meets the requirements of Heritage Western Cape (HWC) and that is founded on both a desktop study and a site investigation. The overall purpose of an AIA is to identify archaeological resources in the affected area, to assess their significance and sensitivity, to determine the potential impacts on such resources, and to make recommendations to avoid and/or minimize such impacts by means of management and/or mitigation measures. This study was undertaken according to best practice principles and meets standards required by the heritage authorities in terms of the National Heritage Resources Act, No. 25 of 1999 (NHRA; Heritage Western Cape 2021b).

Summary objectives of an AIA:

- To identify and assess the nature, sensitivity and significance of archaeological resources in the receiving environment;
- To identify the impact of the proposed development on such resources as well as options for mitigation and/or management in order to minimize potential negative impacts, and to recommend measures for mitigation / management where necessary; and
- To identify archaeological resources and issues that may require further investigation.

A Notification of Intent to Develop (NID) was discussed at a HWC Heritage Officers Meeting on 10 May 2021, to which they responded on 20 May 2021, requesting a Heritage Impact Assessment (HIA) in terms of Section 38 (8) of the NHRA. The report submitted here fulfils the requirement for the archaeological component of the HIA.

1.3. Scope and purpose of the report

"Reports resulting from the assessment of impacts to heritage resources, or their mitigation, may determine the future management of the resources or become the final record regarding these heritage resources. It is necessary to ensure that the quality and content of such reports accurately identify, describe and record the resources prior to alteration or destruction, as well as reflect their significance and provide proposals for their management or a narrative of their alteration" (Heritage Western Cape 2021a, pg 1).

The purpose of an AIA is to identify significant archaeological resources prior to development so that such resources can be protected and/or managed without detrimental and unnecessary negative impacts resulting from development activities. This AIA aims to fulfil the requirements of the heritage authorities so that they can issue a comment for consideration by the relevant environmental authority who will review the environmental application for the approval or denial of authorisation. Where necessary, an AIA provides management and/or mitigation requirements that must be complied with and included in the conditions of authorisation in the event that a project is approved.

1.3. The author

Peter Nilssen has a PhD in archaeology (University of Cape Town, 2000), and is a Professional member - in good standing - of the Association of Southern African Professional Archaeologists (ASAPA), including the Cultural Resource Management section of the same association since 1989 (ASAPA professional member # 097). He is an accredited Principal

Investigator for archaeozoology (specialist analysis), Coastal, Shell Midden and Stone Age archaeology; Field Director for Colonial Period archaeology; and Field Supervisor for Iron Age archaeology and Rock Art. He is an honorary research associate of Iziko South African Museum, has worked as a professional archaeologist in Cultural Resource Management since 1989, and has completed more than 240 heritage-related impact assessments and mitigation projects as Principal Investigator.

Peter co-initiated and co-directed archaeological research into Middle Stone Age cave sites at the Provincial Heritage Site of Pinnacle Point Site Complex near Mossel Bay, which he identified with Jonathan Kaplan in 1997. A brief CV is presented in Appendix B.

2. Development Proposal

2.1. Project description

The proposal involves the rezoning, subdivision and residential development of Erf 3122. The development involves a variety of housing types including a retirement complex, group housing and single residential units and rooms. Also proposed are a clinic, business area, sports facilities, public open space, community hall, club house, restaurant, roads and bulk services as shown in the Subdivision Plan and Site Development Plan (Figure 4). A detailed description of the proposed subdivision, development and required applications are given in the HIA.

The proposed development includes:
- 214 Single residential Erven;
- 240 Terraced apartments;
- 169 Healthcare Village apartments;
- 24 Assisted living apartments;
- 12 Full assistance frail care units;
- Clubhouse and Sport facilities;
- Entrance and ancillary engineering services and infrastructure.

2.2. Identification of Alternatives

Development proposals for Erf 3122 are in an iterative process since at least 2010 and hence many alternatives were tabled, considered and eliminated/adapted up to the latest version shown in Figure 4. Consequently, at the time of this writing no alternatives are presented, but see the HIA for a more complete consideration and discussion. Apart from the No-Go option, alternative development options will not affect this investigation, assessment or recommendations made here.

Due to the identification of an endangered species of butterfly, the northern portion of the property will be a conservation area and apart from a perimeter fence and service road, no other development will take place in this area.

* Convenient shop, beauty salon, laundary

Notes:

1. A servitude right of way and services to be registered over Erf 3122 in favour of Mossel Bay Municipality for services and to access the municipal infrastructure (reservoir) (to be surveyed)
2. All dimentions and areas are provisional and are subject to cadastral survey

Ptn Nos	No of Units	Extent (ha)	%	Zoning	Land Use
1-40, 43-279 287-299	280	±10,9908	18,0	Single Residential I (SRI)	Dwelling house
280-282	3	±0,8394	1,4	General Residential Zone III (RZIII)	Terrace Apartments (Flats)
283-290	8	±12,0989	19,9	Open Space Zone II (OSZII)	Private Open Space with tearooms, telecom station and maintenance shed
291	1	±23,9230	39,6	Open Space Zone III (OSZIII)	Nature conservation area with tearoom and utility
292	1	±0,3686	0,6	Open Space Zone II (OSZII)	Sport Facilities, clubhouse, restaurant, bar, offices utility
294	1	±2,4333	4,0	General Residential Zone III (RZIII)	Village precinct, flats, clubhouse, frailcare & recreation *
295	1	±8,7082	14,4	Transport Zone III (TZIII)	Private Road
296	1	±0,9286	1,5	Utility Zone (UZ)	Municipal Reservoir
TOTAL	296	60,5190ha	100		

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Project: **Application for Rezoning & Subdivision: Erf 3122 Hartenbos**

Description: **Subdivision Plan**

HARTENBOS Garden Estate Natuur-Landgoed

Skaal	NTS	Leer nr.	H 10-113
Teken	PJLR	Datum	NOVEMBER 2021
Keur	PJLR	Tekening nr.	H 10-113 SUB 1-REV 11

Figure 4. Subdivision Plan and Site Development Plan for Erf 3122, Mossel Bay. Courtesy of the applicant.

2.3. Aspects of the Project Relevant to the Archaeological Study

Because the proposed development involves vegetation clearing, earthmoving activities, and construction, it has the potential to damage or disturb archaeological resources that may occur on and in surface sediments. Excavations may reach an approximate maximum depth of 1.5 m. Given the disturbed / ploughed state of surface sediments and great antiquity of subsurface geological sediments, it is not anticipated that significant *in situ* archaeological resources are present in sub-surface sediments.

3. Legislative Context

3.1. National Heritage Resources Act (NHRA), Act No. 25 of 1999

The NHRA protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: “any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith”;
- Place (falling under structures): b) “a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure”; c) “a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures”; d) “an open space, including a public square, street or park”; and e) “in relation to the management of a place, includes the immediate surroundings of a place”;
- Palaeontological material: “any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace”;
- Archaeological material: a) “material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures”; b) “rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation”; c) “wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation”; and d)

"features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found";

- Meteorite: "any naturally-occurring object of extraterrestrial origin";
- Grave: "means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place"; and
- Public monuments and memorials: "all monuments and memorials a) "erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government"; or b) "which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual."

Section 3(2) describes the types of heritage resources that should be considered to form part of the National Estate. These are as follows:

(a) "places, buildings, structures and equipment of cultural significance";
(b) "places to which oral traditions are attached or which are associated with living heritage";
(c) "historical settlements and townscapes";
(d) "landscapes and natural features of cultural significance";
(e) "geological sites of scientific or cultural importance";
(f) "archaeological and palaeontological sites";
(g) "graves and burial grounds, including" (i) "ancestral graves"; (ii) "royal graves and graves of traditional leaders"; (iii) "graves of victims of conflict"; (iv) "graves of individuals designated by the Minister by notice in the Gazette"; (v) "historical graves and cemeteries"; and (vi) "other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983)";
(h) "sites of significance relating to the history of slavery in South Africa";
(i) "movable objects, including" (i) "objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens"; (ii) "objects to which oral traditions are attached or which are associated with living heritage"; (iii) "ethnographic art and objects"; (iv) "military objects"; (v) "objects of decorative or fine art"; (vi) "objects of scientific or technological interest"; and (vii) "books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996)".

Section 3(3) describes the types of cultural significance that a place or object might have in order to be considered part of the National Estate. These are as follows:

a) "its importance in the community, or pattern of South Africa's history";
b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
c) "its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage";
d) "its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects";
e) "its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group";

f) “its importance in demonstrating a high degree of creative or technical achievement at a particular period”;
g) “its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons”;
h) “its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa”; and
i) “sites of significance relating to the history of slavery in South Africa”.

Although cultural landscapes do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c), (d) and (e) list “historical settlements and townscapes”, “landscapes and natural features of cultural significance”, and “geological sites of scientific or cultural importance” as part of the National Estate. All the points in Section 3(3) with the exception of (f) and (i) make direct reference to cultural landscapes.

Human occupation and use of the landscape and its features results in a visually more or less evident modification of that landscape. Human use of the environment, however, may have no visually detectible altering effect at all, but nevertheless, this imprinting of human behaviour on the environment, and the relationship between people and the landscape is what is implied by the term “cultural landscape” (see UNESCO 2008 for definitions, significance and preservation of cultural landscapes).

Cultural landscapes are defined and informed by several elements including, but not limited to; natural landscape features, geology, biomes, palaeontology, archaeology / anthropology, oral histories, public memory, the built environment and social and written histories. The value of cultural landscapes are determined through professional interpretation and opinion, community and public values, as well as environmental and heritage legislation.

Section 38(8) of the NHRA states that, if an impact assessment is required by any other legislation, then it must include a heritage component that satisfies the requirements of Section 38(3). The comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to an environmental application. The report presented here provides archaeological input to the heritage component. HWC are required to provide comment on the proposed project in order to facilitate final decision making by the relevant authority.

3.2. National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended

The following table presents NEMA requirements for specialist reports and where those requirements are covered in this report.

NEMA requirements for Specialist Reports		
Appendix 6	**Specialist Report content as required by the NEMA 2014 EIA Regulations, as amended**	**Section**
1 (1)(a)	(i) the specialist who prepared the report; and	Title page & Section 1.4 and Appendix B
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix D
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.2 & 1.3
(cA)	an indication of the quality and age of the base data used for the specialist report;	desktop study up to 2022 and fieldwork data obtained in 2010.2017 and May 2022; see Sections 4 & 5
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 8
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 4
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process, inclusive of equipment and modelling used;	Section 4
(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Sections 6, 7 & 8
(g)	an identification of any areas to be avoided, including buffers;	Sections 9 & 11
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 6 and associated Figures
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 5
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;	Sections 6, 7 & 8
(k)	any mitigation measures for inclusion in the EMPr;	Sections 9 & 11
(l)	any conditions for inclusion in the environmental authorisation;	Section 9
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 9
(n)	a reasoned opinion-	Sections 9, 10 & 11
	(i) whether the proposed activity or portions thereof should be authorised; and	
	(iA) regarding the acceptability of the proposed activity or activities; and	
	(ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	NA – see HIA
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	NA – see HIA
(q)	any other information requested by the competent authority.	Not at this time
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Sections 1 & 3

4. Description of Property / Affected Environment

4.1. Site Context

The middle of Erf 3122, Hartenbos, is situated some 3 km directly W of Hartenbosstrand and approximately 8 km NW of Mossel Bay (Figures 1, 2 & 3). The surrounding land is used for residential and agricultural purposes with most of the residential developments located to the North, East and South while agricultural activities dominate in the West. Quarries and gravel processing plants for construction and road building are situated from about 1 km to the NW of the property (Locality Plan and Figure 2).

The study area is most readily accessible by vehicle at its NE extent via Kameeldoring Avenue. After taking the Mossel Bay exit from the N2, a turn to the east leads to the intersection with the R328 (Louis Fourie Road). After following the R328 to the north for some 1, 8 km, turn left onto Boekenhout Laan at the intersection and then first left onto Kameeldoring Avenue, which leads to a locked gate and entry point to Erf 3122.

4.2. Site Description

Some 59 ha in extent, Erf 3122 is situated on the high ground of a large, gently undulating hill that slopes down and away from the property boundaries. The trig beacon, 257 Mos 33, at the reservoir in the North is 136, 9 m above mean sea level (amsl), the average height along the higher ground is about 120 m amsl and the lowest point recorded during the foot survey is 96 m amsl. Four small valleys situated to the east of the study area originate along the middle of Erf 3122 (Figure 3).

Surface sediments consist of a 20 to 50 cm thick layer of humic, sandy topsoil that in places appears to contain iron oxides. It is this sediment that was ploughed and used for cultivation. Underlying this is a fluvial deposit of the Kirkwood Formation that in places is reminiscent of Enon. These fluvial sediments are fossiliferous (John Pether pers. comm. & see Figure 5).

Figure 5. Examples of geological test hole and profiles exposed in erosion gullies (See Figure 13 or Appendix A for locality information). GPS unit is 10 cm long.

The vast bulk of the study area was previously cultivated and several events of recent disturbances to geological sediments were noted (Figures 6, 7 & 8). Parts of the study area were used for the dumping of building rubble, and general waste is also common in those areas (Figure 9). This is particularly evident to the north and east of the main vehicle track in the NE part of the property and in the vicinity of the existing reservoir.

A fire swept through the area in 2009 or early 2010 and left most of the property denuded of vegetation (Figures 6 through 9). The exception to this is an area that is roughly in the middle of the property (Figure 10). As a result, accessibility and visibility of ground surfaces were very good and allowed for a comprehensive archaeological inspection and assessment.

Further disturbances by recent human activities include a reservoir and associated pipeline(s), vehicle tracks and what appears to be a small airfield – and associated structure in ruins – that was probably used for light or radio controlled aircraft (Figure 3 and Figure 11). Geological test holes were also seen (Figure 5) and an overhead power line crosses the most easterly part of Erf 3122. No undisturbed indigenous vegetation was seen during the survey. Examples of the receiving environment are shown in Figures 2, 3 and 6 through 11.

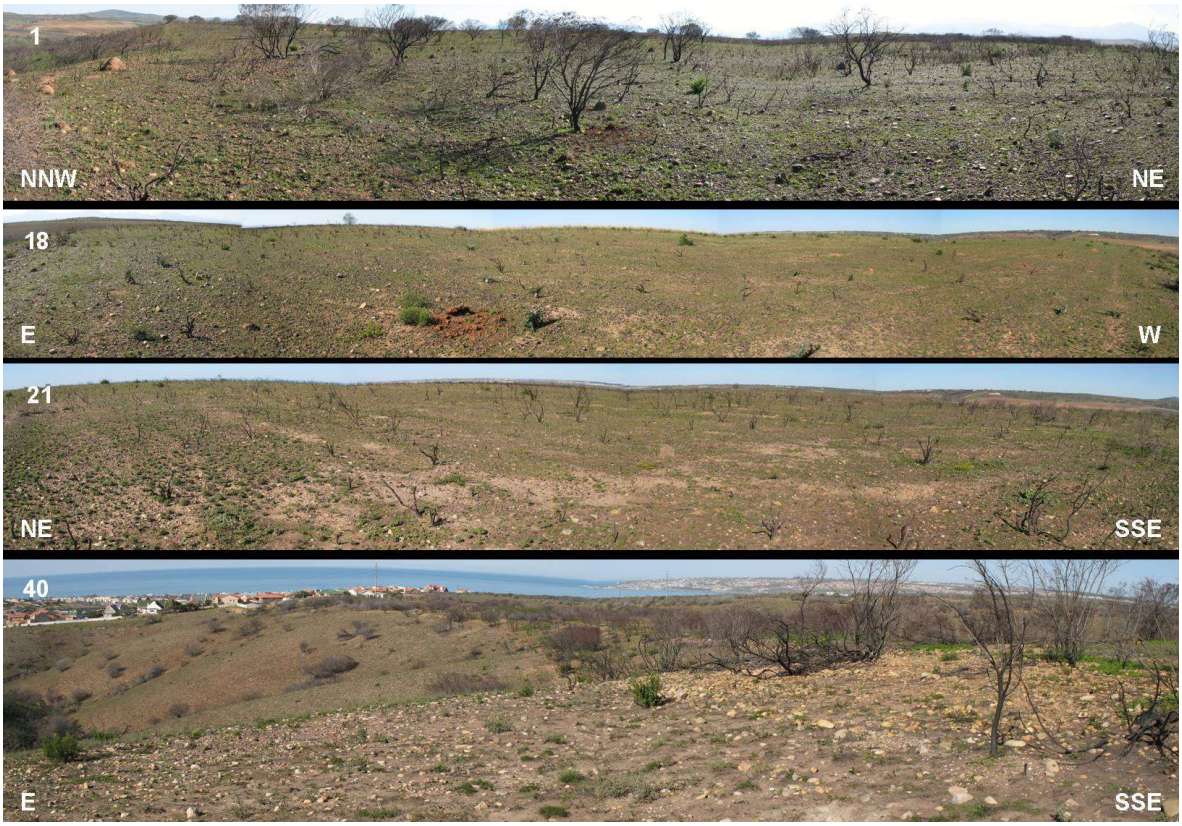

Figure 6. Examples of the environment and surrounds (see Figure 13 or Appendix A). Note evidence for ploughing (1 & 21) and burnt vegetation. (A4 version on page 51)

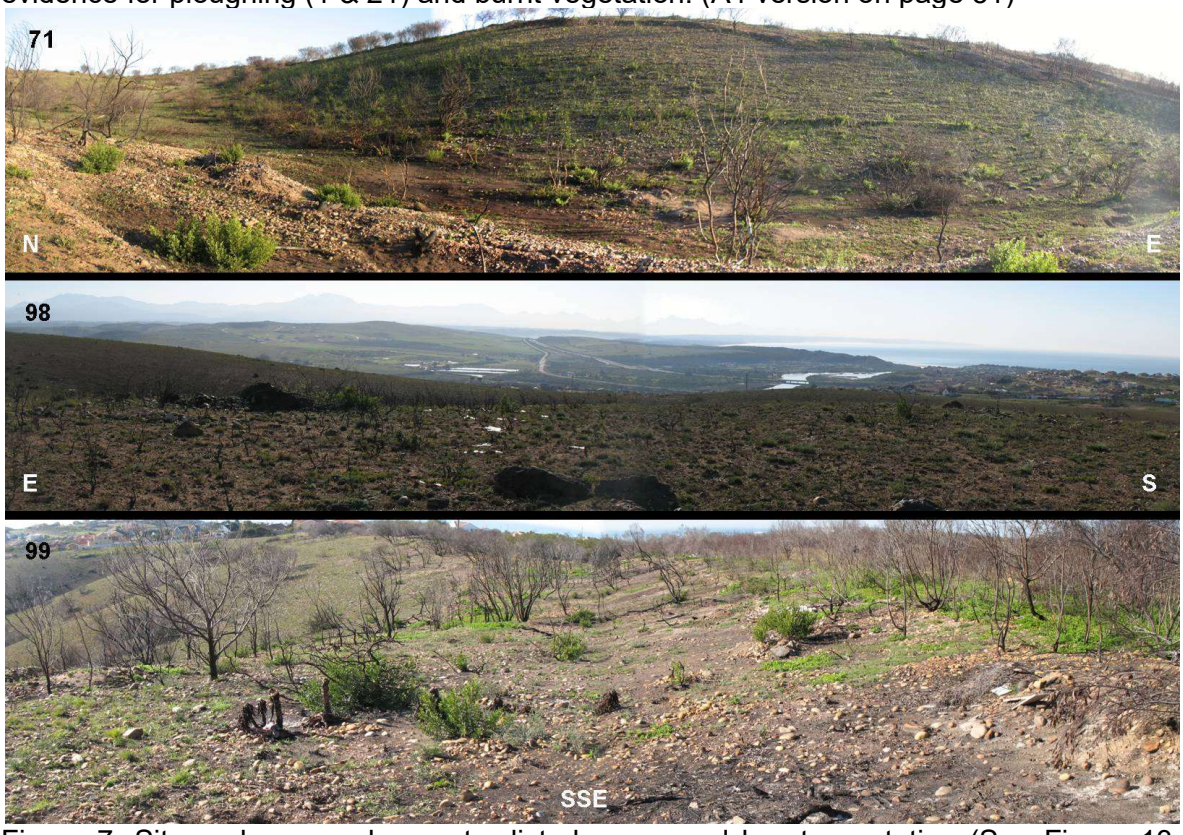

Figure 7. Site and surrounds – note disturbances and burnt vegetation (See Figure 13 or Appendix A for locality information). (A4 version on page 52)

Figure 8. Examples of ploughed area with burnt vegetation and exposed surfaces. See Figure 13 or Appendix A for locality information.

Figure 9. Examples of rubble dumps, vegetation cover, topography and burnt vegetation (See Figure 13 or Appendix A for locality information).

Figure 10. Areas unaffected by the 2009 / 2010 fire (see Figure 13 for locality information).

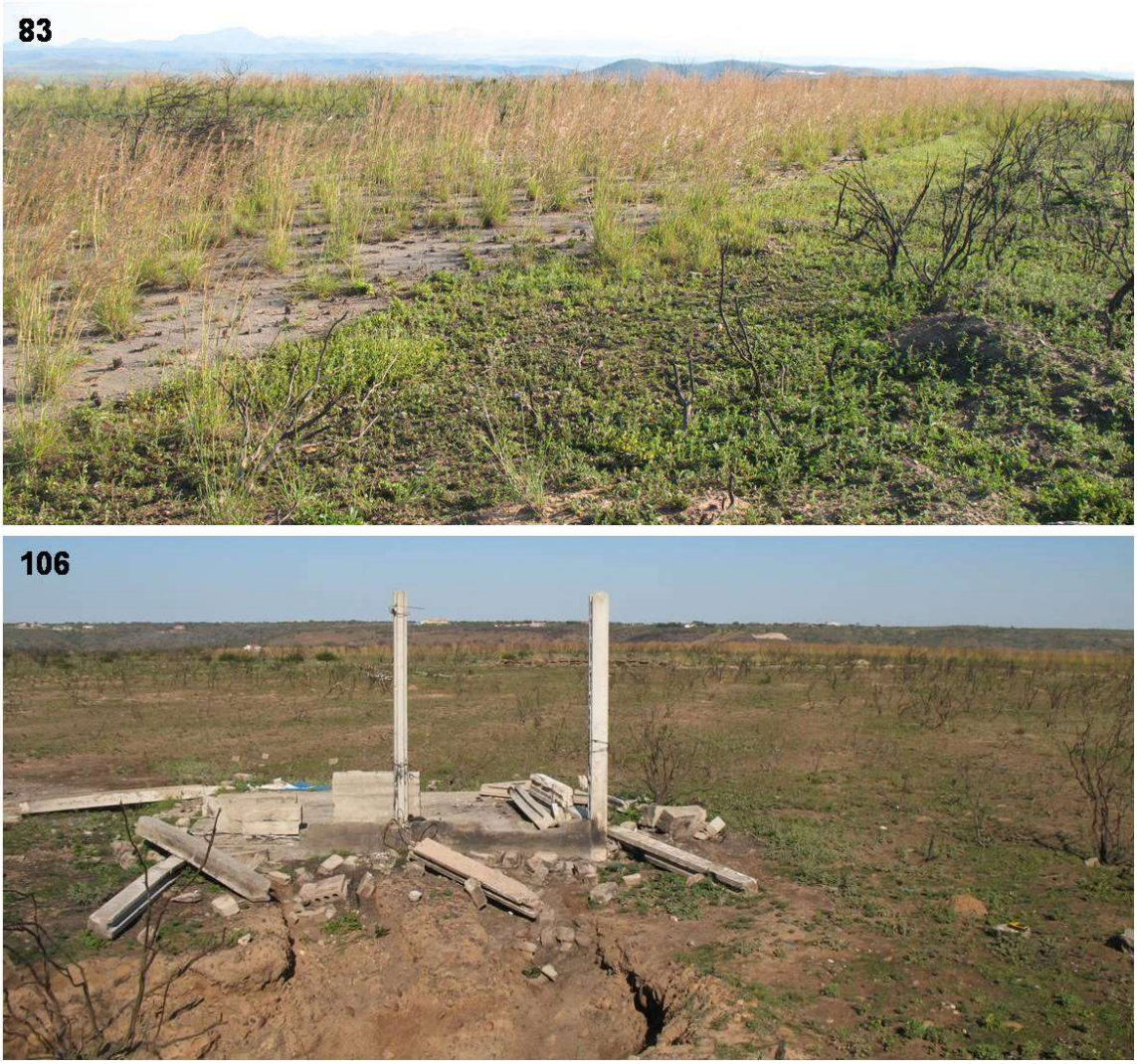

Figure 11. Examples of vegetation and miniature airfield and ruins of associated modern structure. See Figure 13 or Appendix A for locality information.

5. Description of Methodology

This investigation involved a desktop study and literature review as well as a comprehensive archaeological foot survey of Erf 3122. All work was carried out by this author with inputs and information provided by Stefan De Kock of PERCEPTION Planning, who is compiling the integrated HIA for the project (De Kock 2021).

5.1. Desktop Study and Literature Review

A desktop study and literature review was conducted to gain an understanding of the overall landscape and heritage context of the site proposed for development. The focus of the desktop study and literature review was on previous work done in the immediate surroundings with the aim of identifying the types of archaeological resources and concerns already documented in earlier studies, and how these inform the assessment being conducted here. In addition to this author's own work experience in the area and assistance from colleagues, information sources are listed in Table 1.

Table 1: Information sources.

Data / Information	Source	Date	Type	Description
Maps & Aerial Photographs	Chief Directorate: National Geo-Spatial Information http://www.cdngiportal.co.za/cdngiportal/	Historic & Current	Spatial	Maps of various type and scale, and aerial images
Maps & Aerial Photographs	CapeFarmMapper https://gis.elsenburg.com/apps/cfm/#	Historic & Current	Spatial	Maps of various type and scale, and aerial images
Aerial Photographs and for Superimposing Spatial Data	Google Earth Software Application or https://earth.google.com/web/	Historic & Current	Spatial	Aerial images and overlays of SDPs, GPS data, Surveyor General Diagrams and aerial images
Cadastral Data	CapeFarmMapper https://gis.elsenburg.com/apps/cfm/#	Current	Spatial	Cadastral boundaries and extents
Cadastral Data	Chief Directorate: National Geo-Spatial Information http://www.cdngiportal.co.za/cdngiportal/	Various	Survey Diagrams	Historical & current diagrams, survey data and registration dates
Cadastral Data	Chief Surveyor-General http://csg.dla.gov.za/data.htm	Current & Historic	Survey Diagrams	Historical & current diagrams, survey data and registration dates
Background Information	South African Heritage Resources Information System (SAHRIS) https://sahris.sahra.org.za/map/reports	Current	Reports and Spatial	Previous impact assessments for developments in the immediate surroundings area
Title Deeds	Deeds Office https://www.deeds.gov.za/index.php	Historic & Current	Ownership	Registration of property ownership

For the purpose of familiarisation and to obtain and present background information about the project and processes, this author consulted the NID and Background Information Document (BID) and annexures submitted to HWC by PERCEPTION Planning in support of

the NID application (De Kock 2021). Correspondence concerning the project, including HWC's response was obtained and reviewed.

5.2. Field Survey

The purpose of the archaeological foot survey was; to determine whether any archaeological resources occur on the surface of exposed sediments within the study area, to assess the sensitivity of archaeological resources if present in the affected area, to determine the potential impacts on such resources if present, and to avoid and/or minimize such impacts by means of management and/or mitigation measures. Note that the archaeological study presented here considered archaeological materials of pre-colonial and colonial origin. Due to the relatively small size of the study area, a comprehensive archaeological foot survey covered most of the property. This study was undertaken according to best practice principles and meets standards required by the heritage authorities in terms of the National Heritage Resources Act, No. 25 of 1999.

Survey tracks were fixed with a hand held Garmin Camo GPS to record the search area (Figure 13, gpx tracking file is available from author). Observations and photo localities were also fixed by GPS (Figure 13, see numbered images in Figures, Table 2 and Appendix A). Digital audio notes and a high quality, comprehensive digital photographic record were made with a Nikon Coolpix digital camera (full data set available from author).

Due to the relatively high numbers of identified and mostly isolated stone artefacts, all finds were mapped, but only representative samples were photographed. Localities of photographs are established by matching the numbers on photographs with those of waypoints in Figure 13 and coordinate data are given in Table 2 and Appendix A. Directions of views are indicated with abbreviated compass bearing names like E is east; WSW is west south west, and so on. Bearing names on panoramic views are approximate and indicate the bearing at the position of the label on the photograph.

The field survey was conducted independently and on foot. Due to the above-mentioned fire, almost the entire study area was accessible and ground surfaces were well exposed for a detailed and comprehensive archaeological inspection and assessment. The site was revisited in 2017 to map the extents of archaeological occurrences at waypoints 34 and 127; and again in 2022 to check for any significant changes to the property and to relocate archaeological materials at waypoint 127 that were originally photographed in 2010 (Nilssen 2010, 2017 and 2021).

5.3. Grading

According to Section 7(1) of the NHRA, heritage resources are graded according to their National (Grade I), Provincial (Grade II) or Local (Grade III) significance. Grading facilitates the identification of the suitable level of management for a heritage resource. SAHRA (national heritage authority) manages Grade I, HWC (or other provincial heritage authority) manages Grade II, and a local planning authority manages Grade III heritage resources. Although these authorities are responsible for grading, anyone may recommend grading.

Although not completed, Section 7(2) of the NHRA intends for provincial heritage authorities to formulate a more detailed grading system for heritage resources of local

significance (Grade III). HWC distinguishes between heritage resources of high (Grade IIIA), medium (Grade IIIB) and low (Grade IIIC) local significance, while Not Conservation Worthy (NCW) describes those of low or no significance that require no further management or mitigation measures (Heritage Western Cape 2016).

5.4. Assumptions and Limitations

This assessment assumes that all background information and development layout plans provided by the project team are correct and current. This assessment is for the planned development activity on the property and may apply to alternative future plans within the same development footprint.

The assessment is limited to archaeological resources exposed at the surface or that have an above-ground component. Wherever soft surface sediments are present, it cannot be ruled out entirely that archaeological resources may be buried beneath the surface. The surface sediments on Erf 3122 that may contain archaeological materials, however, are substantially disturbed by ploughing. Consequently, the archaeological context over much of the property is compromised. This is a limitation to the archaeological potential of the study area.

Overall, there are no assumptions, limitations or gaps in knowledge that have an influence on this study, assessment, or the recommendations made here.

6. Description of Results from the Archaeological Study

This author has worked in the Mossel Bay area for the past 20 years and has considerable experience with the archaeological record of the coastal regions of the Western and Eastern Cape provinces of South Africa. In general, the coastal strip is rich in archaeological remains due to predictable and reliable food sources in the intertidal zone as well as an abundance of fresh water sources such as rivers, streams, seeps and springs. Shell middens are most commonly found adjacent to rocky intertidal zones, and within a few hundred meters of the present shoreline. Archaeological sites occur either in the open or in caves, rock shelters and overhangs. The latter contexts provide the best opportunities for the accumulation and preservation of remains, while open sites are generally more dispersed and prone to disturbance, erosion and poor preservation of organic remains.

In descending age, the archaeological record in the area includes:

- Early Stone Age (ESA) stone implements such as hammer stones, cores, flakes and core tools (hand axes, cleavers, etc), but at this time no ESA sites with associated organic remains are known to occur in this area;
- Middle Stone Age (MSA) sites with stone artefacts, cultural and food remains are found in caves, such as those in the Provincial Heritage Site of the Pinnacle Point Site Complex west of Mossel Bay, but when they occur in the open, they are normally lacking in organic remains;
- Later Stone Age (LSA) sites with artefacts, cultural and food remains are also present in some of the fore-mentioned caves as well as open sites such as shell middens normally associated with rocky intertidal zones;
- pastoralist or herder (pottery period) sites may occur in caves or in the open and pottery and the remains of sheep are also commonly found in shell middens; and

- historic period sites include ship wrecks, structures, transport infrastructure, middens, burials and cemeteries among others.
- Prehistoric human burials, usually of LSA or more recent age, may occur anywhere in the landscape where soft sediments are present, and are sometimes at or near sites of human occupation both in the open and in caves or rock shelters.

The approximate dates for these phases of hominin and human occupation of the coastal and near coastal zone of the Western and Eastern Cape provinces is as follows:

- ESA = from about 2 million years ago till about 300 000 years ago;
- MSA = 300 000 years ago till between about 40 000 and 20 000 years ago;
- LSA = from between about 40 000 and 20 000 years ago till about 2000 years ago;
- pastoralist or herder = 2000 years ago till present or arrival of colonists;
- colonial period = from late 15th Century (1488 landfall of the seafarer Bartolomeu Dias at Mossel Bay) till present.

6.1. Desktop Study and Literature Review

In addition to a few scientific publications and this author's own work conducted in the surroundings of Mossel Bay, several reports of previous Cultural Resource Management (CRM; archaeological or heritage) studies in the area were downloaded from the SAHRIS website and these include MAPID or SAHRA numbers in the references section (https://sahris.sahra.org.za/map/reports; Figure 12). CRM reports cited below, but that are not in the SAHRIS database were obtained through a desktop study and from colleagues.

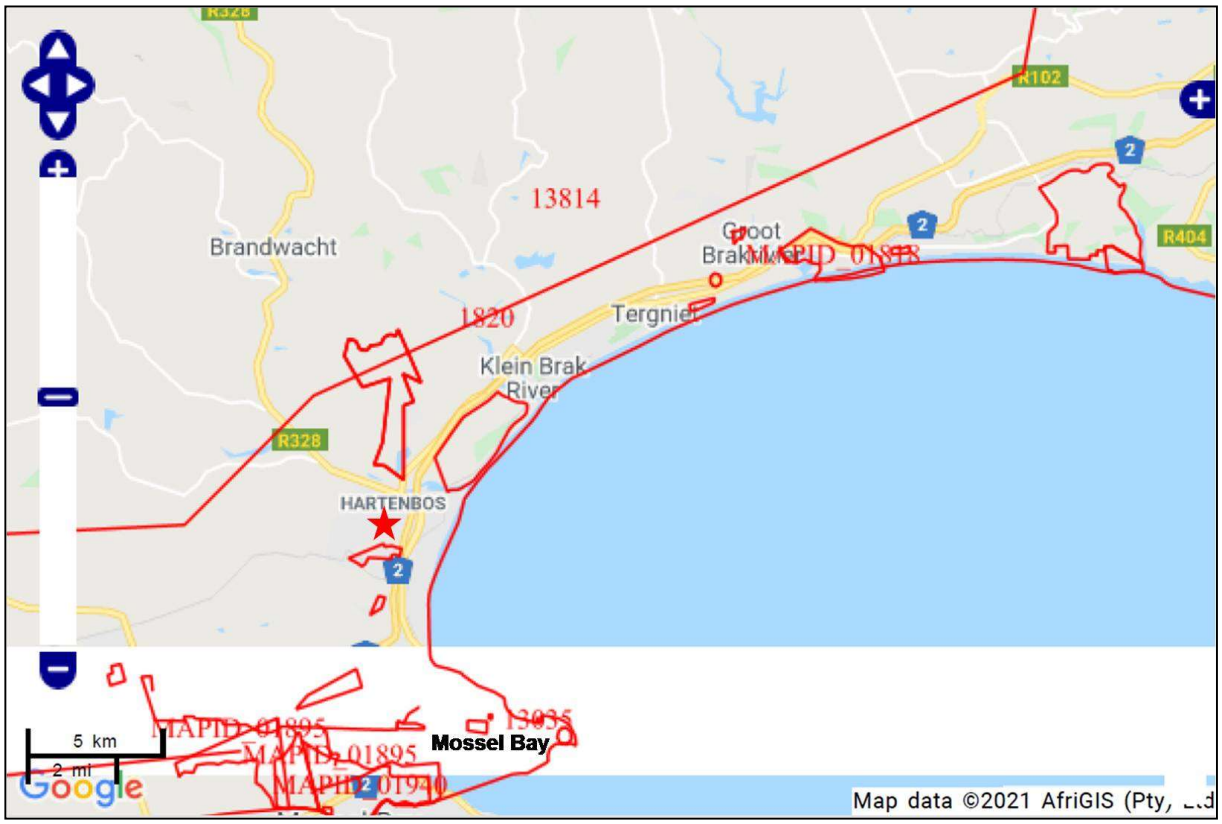

Figure 12. The SAHRIS FindReports Map showing some of the heritage-related studies conducted in the surroundings of Erf 3122 (red star; https://sahris.sahra.org.za/map/reports).

In archaeological circles, and before significant discoveries were made at the Pinnacle Point Site Complex, Mossel Bay was perhaps best known for having hosted one of the earliest archaeological excavations in South Africa. The Provincial Heritage Site of Cape St. Blaize Cave (CSBC) is situated about 9 km SE of Erf 3122 and beneath the lighthouse at The Point of Mossel Bay. The cave was first excavated by George Leith in 1888 and then again by Goodwin and Malan in 1932 (Leith, 1898 and Goodwin & Malan, 1935).

Leith's work in 1888 consisted primarily of collecting certain stone artefacts and excavating a few holes (Leith 1898). Collectively, the stone artefacts recovered by Goodwin, Malan and Leith, among others, were used to describe and define the MSA Industry from Cape St. Blaize Cave. As a result, the Mossel Bay region is well known in Stone Age studies because it lent its name to one of the first formally recognized stone tool industries in South Africa, namely, the Mossel Bay Industry.

The last archaeological excavations in CSBC by Goodwin and Malan in 1932 revealed that the upper deposits are badly disturbed, but that part of the lower MSA material, dating to around 60 000 years ago or earlier, is still intact (Goodwin & Malan 1935). No LSA material or microlithic stone artefacts dating to the last 20 000 years were found and the excavators do not mention the presence of pottery, which would indicate the presence of KhoeKhoen (KhoeKhoe) pastoralists during the last 2000 years. These early excavations used fairly coarse, and now outdated excavation techniques, and excavated material was sieved through coarse or large-grain sieves. Excavated material included stone artefacts, animal bones and a few fragments of human bone. Shellfish was not found in the MSA layers suggesting that when occupied in the MSA, the sea was a considerable distance from the cave. Due to large rock-falls from the cave ceiling, the excavations could not reach bedrock, but they suggest that earlier occupations are likely to be preserved in the cave. After these investigations, archaeological research in and around Mossel Bay effectively stopped until 2000.

Since the initial discovery of numerous Stone Age archaeological sites some 9 km west of Mossel Bay by Kaplan and Nilssen in 1997 (Kaplan, 1997), Pinnacle Point has been under rigorous archaeological and palaeo-scientific research that began in 2000 (Marean & Nilssen, 2002 and Marean *et al.* 2004). Dozens of research articles were published on the archaeological, geological and palaeo-environmental work undertaken at Pinnacle Point. Among the most significant discoveries contributing to our understanding of the origins of modern human behaviour are; 1) early evidence for the consumption of substantial quantities of marine foods, 3) early evidence for the use of ochre, and 3) early evidence for using heat as an engineering tool to improve the fracturing qualities of silcrete (Marean *et al.* 2007 and Brown *et al.* 2009). These finds are dated to between about 100 000 and 160 000 years ago and led to the declaration of the Pinnacle Point Site Complex as a Provincial Heritage Site in 2012.

CRM excavations in mitigation have revealed that the most recent shell middens in the Pinnacle Point Site Complex date to the last 3000 years, including one midden containing Cape coastal pottery as evidence of pastoralists in the landscape from at least 1200 years ago (McGrath *et al.* 2015). At the other extreme, archaeological monitoring during construction has identified the presence of numerous ESA implements in soft sediments above the cliffs. Some of these implements are reminiscent of the Oldowan or developed Oldowan type, suggesting that they may date from between about 2, 6 and 1, 7 million years ago, while others are of Acheulean type and may date to around 1, 5 and 1, 3 million years ago (Nilssen 2005c).

In addition to archaeological research and CRM work described above, much of the information gained about the archaeological record of the surroundings is from archaeological and heritage-related impact assessments conducted for a range of development proposals in terms of the NHRA. The archaeological record has shown that indigenous societies and predecessors of modern humans have occupied the area for more than a million years since the Early Stone Age. The following is a chronological account of the types of archaeological resources documented in the area starting with the Early Stone Age and ending with the colonial period.

ESA stone implements are quite common in the landscape, and particularly in higher lying areas and away from the present shoreline (Hart 2005, Kaplan 2007, Nilssen 2005a, 2005c, 2006, 2009a & 2009b, Pelser 2021 and Thompson 2006). In the immediate surroundings of Erf 3122, ESA pieces are relatively common and are mostly made in quartzite. Artefacts include flaked cobbles, cores, flakes, hammer stones, hand axes and cleavers. Due to their low densities, open and disturbed contexts as well as the complete absence of associated cultural and organic remains, the ESA pieces are considered to be of low significance. There are no known ESA sites in this area that preserve any other cultural or organic remains in addition to stone artefacts.

Apart from *in situ* MSA deposits (including cultural and organic remains) preserved in sites like cave 13B in the Pinnacle Point Site Complex, the MSA in the area is most commonly represented by stone implements such as flakes, blades, cores, and points; often with faceted or prepared striking platforms, that most commonly occur *ex situ* in disturbed areas and in agricultural lands, and without any associated cultural or organic remains (Hart 2005, Kaplan 1997 & 2005, Nilssen 2005a, 2005b, 2005c, 2006, 2009a & 2009b, Pelser 2021, Thompson 2006). MSA pieces are mostly found in isolation or at best in low density scatters, but medium density scatters do occur (personal observations).

Isolated stone tools or low density scatters of LSA stone implements have been identified, but are less common than ESA and MSA pieces in this area (Kaplan 1996, Nilssen 2005a, 2009c and Orton 2021). In the absence of any known caves or rock shelters in the immediate surroundings, the most common LSA sites that preserve other cultural and food remains are shell middens (Kaplan 1996, McGrath *et al.* 2015 and Orton 2021). Shell middens are most commonly found in association with rocky intertidal zones and are usually situated close to the shoreline and rarely more than a few hundred meters inland of the high water mark. It is not surprising, therefore, that shell middens have not been documented in the immediate surroundings or further inland from Erf 3122.

Although indigenous pastoralists, often referred to as KhoeKhoe, were present in the area since about 2000 years ago, archaeological sites with definitive evidence of their presence - pottery and/or sheep - in the surroundings are rare. Only a few sites, including shell middens that contain shards of pottery were recorded in the area (Kaplan 1996, McGrath *et al.* 2015 and Nilssen 2005a).

The colonial period was initiated in the Mossel Bay area by the landfall of Bartolomeu Dias in 1488. Due to the sheltered bay, the presence of fresh water springs, and meat available from local pastoralists, the area was immediately attractive to early explorers and travellers. Despite this early arrival of colonists, the Dutch Governor of the Cape Colony only planted a “possession stone” in 1734, and the granary, the first colonial building in Mossel Bay was only built in 1787 and is situated at today’s site of the Dias Museum (https://en.wikipedia.org/wiki/Mossel_Bay#History). As one of the few sheltered bays on South Africa’s south-eastern coastline, Mossel Bay has served as a maritime port since the first shipment of wheat from the area sailed from Mossel Bay in 1788 (*ibid*). Numerous

structures protected by the NHRA as well as colonial period Provincial Heritage Sites are scattered throughout the town. Erf 3122 formed part of the parent Farm Hartenbosch 217 that was first granted in around 1734 (De Kock 2021). Further details of the colonial period gleaned from historic documents are presented in the HIA.

Early colonists met indigenous societies comprised of pastoralists, foragers and people practicing a mixture of these two economies / lifestyles. A good overview of the social context, perceptions, relationships and conflicts involving foragers (hunter-gatherers), pastoralists and colonists is given by Henshilwood & Yates (2001) and is not repeated here. While both pastoralists and colonists had a devastating impact on foraging societies (including government authorised and permitted genocide up to 1927), it is thought that smallpox was responsible for killing up to 90% of the KhoeKhoe population in 1713, thus opening the land for easier colonial settlement (Henshilwood & Yates 2001).

The built environment – colonial period structures, homesteads, outbuildings, features and transport infrastructure - is the most common evidence for the presence of colonists in the area from roughly the early to mid 18thC. While colonial period structures are common in Mossel Bay and smaller villages in the surrounding area, not many structures were recorded in previous heritage-related studies consulted for this project. Exceptions include the protected historic water furrow in Great Brak River (Kaplan 2008) and the Not Conservation Worthy colonial period ruins between the Hartenbos and Klein Brak rivers (Nilssen 2005a).

Although cemeteries and burials are known to occur in the wider area, only one study makes reference to a “Bushman” burial that was excavated from the sands close to the mouth of the Great Brak River (Kaplan 1996). No other burials or graves are reported in the literature consulted for this project.

Three investigations reported that no archaeological resources were identified and that the affected areas were not archaeologically sensitive (Kaplan 2003, 2019 and Nilssen 2007a).

Based on the above findings, and particularly studies conducted in close proximity and with similar spatial and sedimentary contexts as that of Erf 3122, it is anticipated that the most likely archaeological resources to occur on Erf 3122 are isolated Stone Age implements of mainly MSA and ESA origin with the occasional LSA piece, or at best, low to medium density scatters of the same materials (Hart 2005, Kaplan 2007, Nilssen 2005b and Pelser 2021). Due to their low densities, often disturbed contexts and the complete absence of associated cultural and organic remains, such finds are considered to be of low to no archaeological value and hence given Grade IIIC or Not Conservation Worthy status.

None of the above-mentioned Provincial Heritage Sites or any other known significant heritage sites will be impacted by the proposed development on Erf 3122.

6.2. Field Survey

This section documents the identification and assessment of the significance of archaeological resources as set out in Sections 3 (2), 3 (3) and/or prescribed under Sections 6 (2) and 7 of the NHRA as per the heritage assessment criteria. Identified archaeological resources are also mapped and tabulated (Figures 13 and 25, Table 2, and Appendix A).

On 19 and 20 July 2010 a distance of 24.7 km was walked, covering an area of about 25 ha, of which an average of at least 80% provided good archaeological visibility (Figures 6 through 9). The vast bulk of the study area comprises disturbed sediments and the most common disturbance results from ploughing for cultivation (see section 4.2 above).

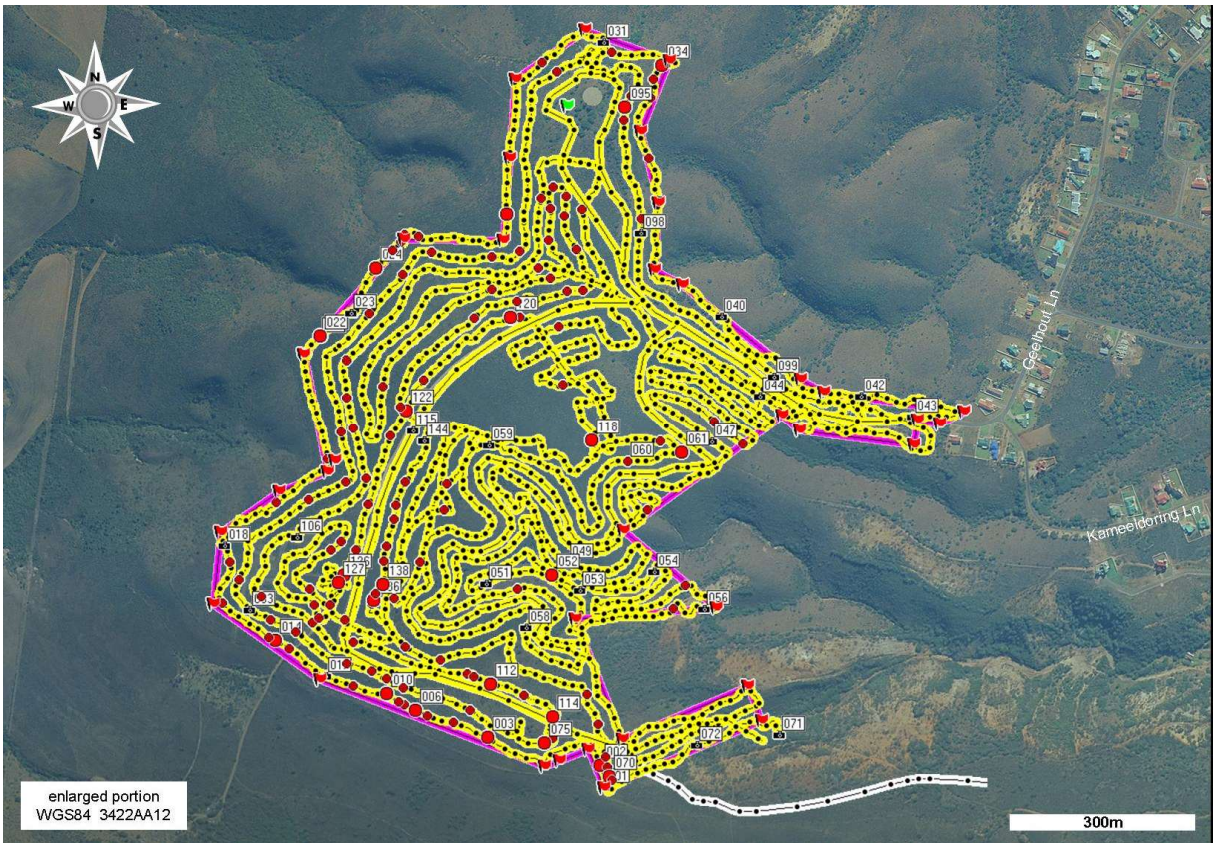

Figure 13. Google Earth aerial image showing Erf 3122 (purple polygon), vehicle access track (white line), survey walk tracks (yellow lines), archaeological finds (red dots) and photo localities (camera icons). (A4 version on page 53)

All of the 136 identified archaeological occurrences originate in the Stone Age and these include isolated stone artefacts as well as low density scatters of stone artefacts (Appendix A). The materials are dominated by Middle Stone Age (MSA) specimens, followed by those of the Early Stone Age (ESA) and Later Stone Age (LSA) artefacts are rare. The contexts of these finds are mostly disturbed as a result of one or more of the above-mentioned activities (section 4.2).

Stone artefacts at **waypoints 6, 61, 95 and 112** may be of either MSA or LSA origin while those at **waypoints 2, 3, 10, 14, 22, 24, 29, 52, 70, 122, 126 and138** are of MSA age and include;

- hammer stones,
- a variety of single and multi platform cores including “tortoise” and disc cores,
- flaked quartzite and flaked quartzite cobbles,
- flakes & chunks and
- a large scraper

All but one of these specimens are in quartzite. Examples of the above are shown in Figures 14 through 17 (also see Figure 13, Table 2 and Appendix A).

Figure 14. Archaeological finds and contexts. Numbers denote waypoint names – see Figure 13, Table 2 and Appendix A for further information. GPS unit is 10 cm long.

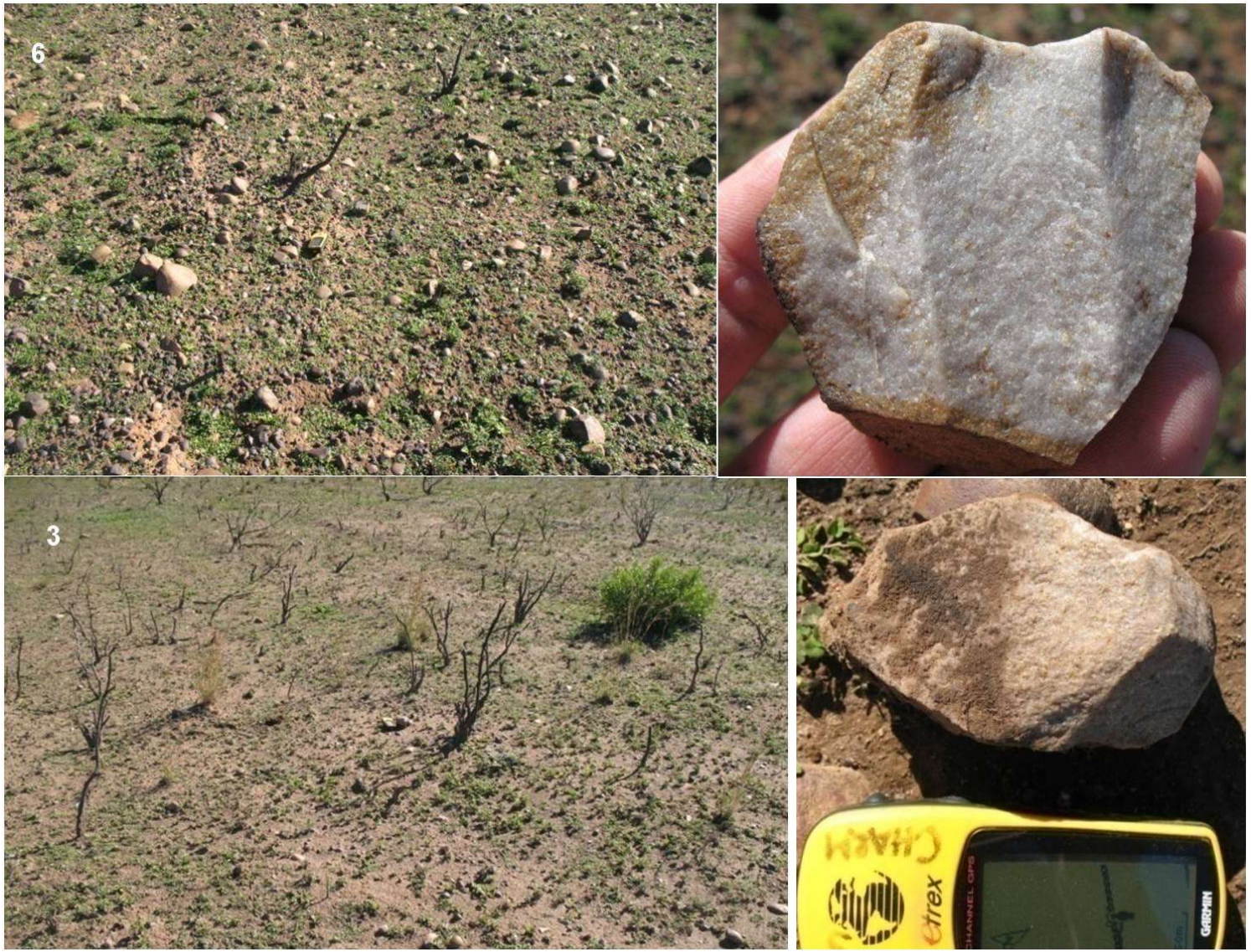

Figure 15. Archaeological finds and contexts. Numbers denote waypoint names – see Figure 13, Table 2 and Appendix A for further information. GPS unit is 10 cm long.

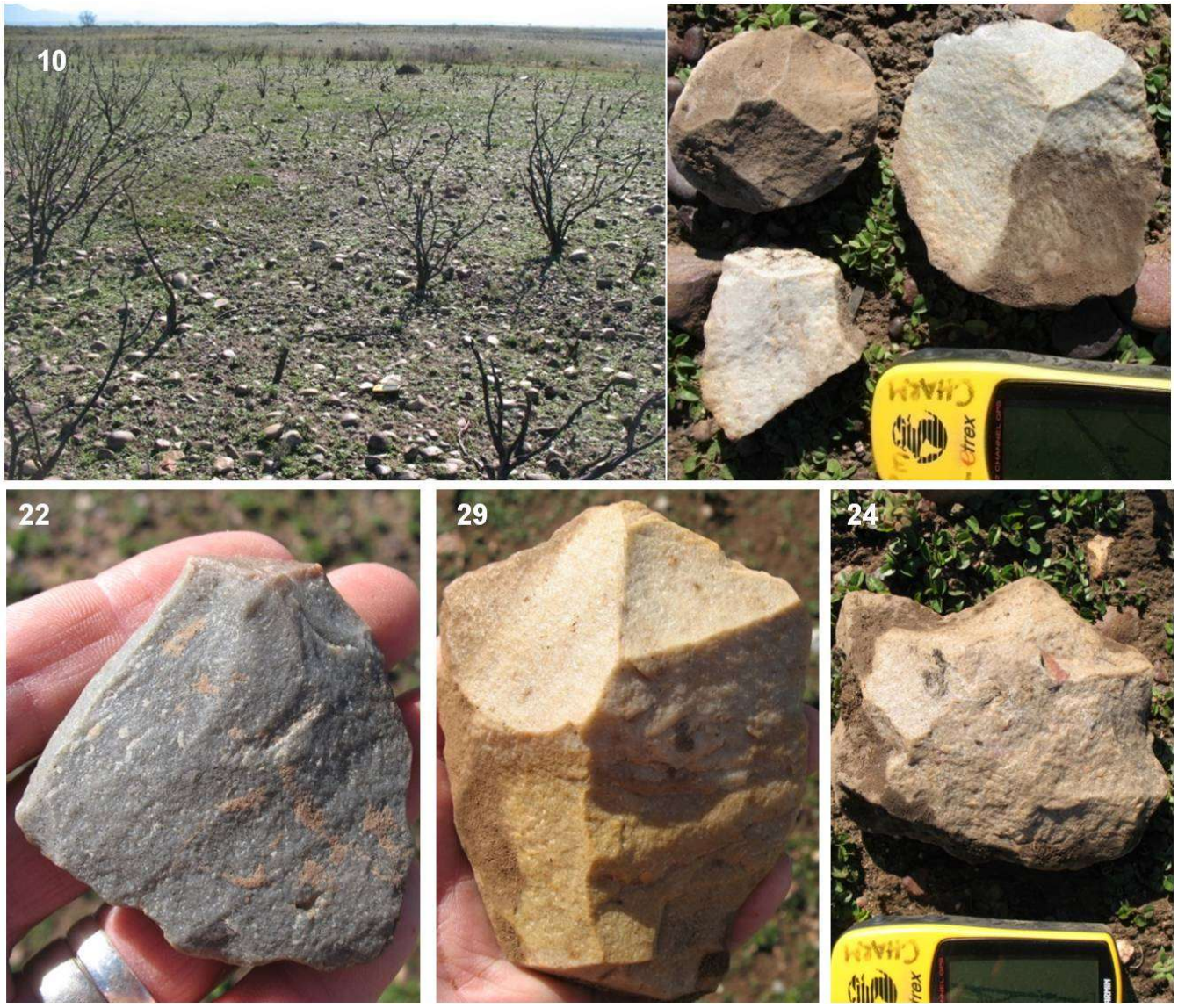

Figure 16. Archaeological finds and contexts. Numbers denote waypoint names – see Figure 13, Table 2 and Appendix A for further information. GPS unit is 10 cm long.

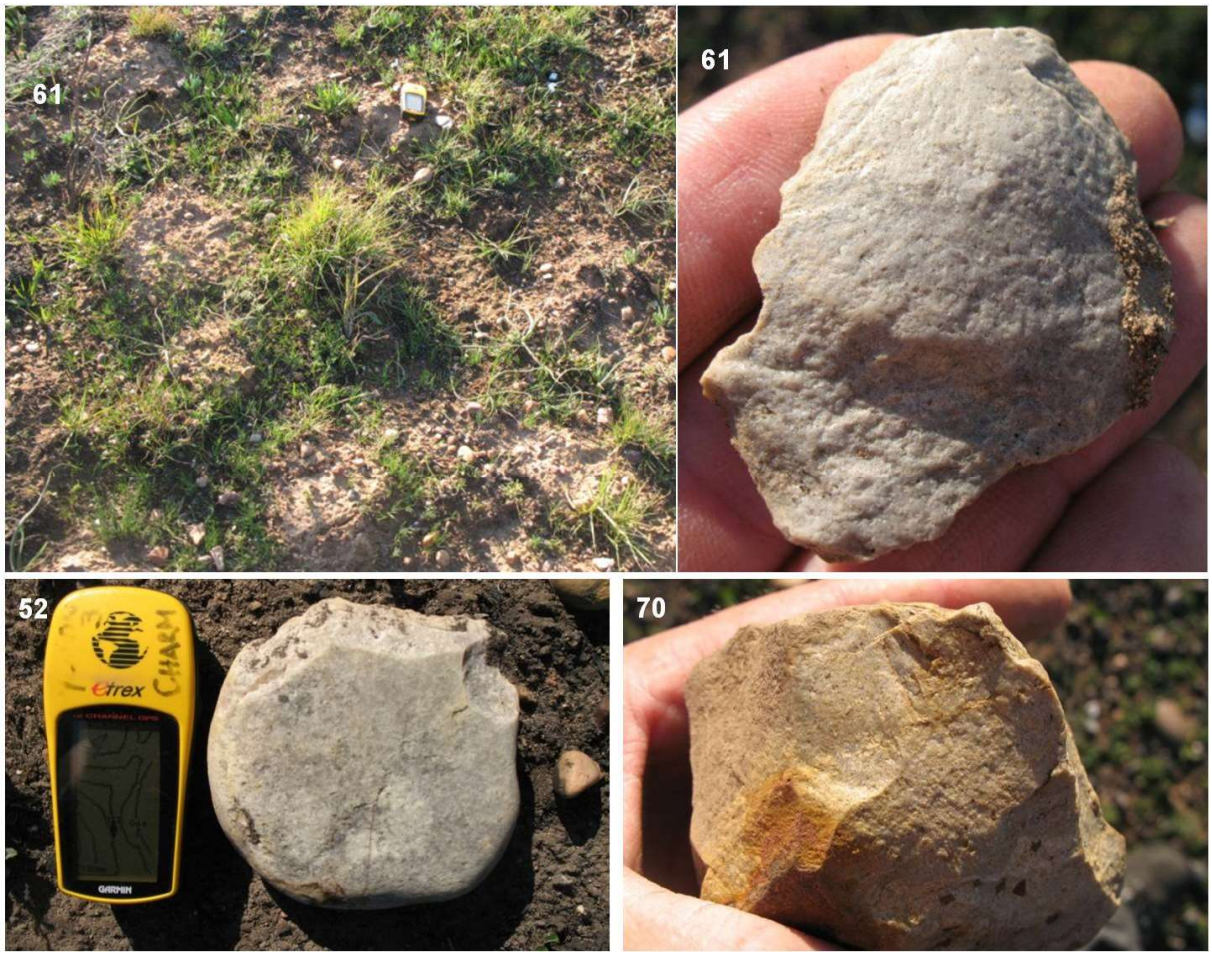

Figure 17. Archaeological finds and contexts. Numbers denote waypoint names – see Figure 13, Table 2 and Appendix A for further information. GPS unit is 10 cm long.

Waypoints 75, 114, 118 and 120 represent localities where ESA stone artefacts were identified including;

- large cores,
- bifacial hand axes and
- large flakes

All ESA pieces are in quartzite and examples are shown in Figures 18 and 19 (also see Figure 13, Table 2 and Appendix A).

The only definitively LSA stone artefact was identified at **waypoint 136** and is a multi platform core in chalcedony (Figure 20, Figure 13 and Table 2). While this is the only piece of chalcedony seen in this area, geologist and palaeontologist, John Pether, says that the chalcedony occurs in the Kirkwood Formation on which Erf 3122 is situated.

Significance and recommendations:

Due to the fact that the context of all the above finds is compromised and because materials occur in isolation or in low densities and without any associated cultural or organic remains, the above materials are considered to be of low significance at the local level and Not Conservation Worthy (Grade IIIC and NCW). It is recommended that no further archaeological mitigation or management of these occurrences is required.

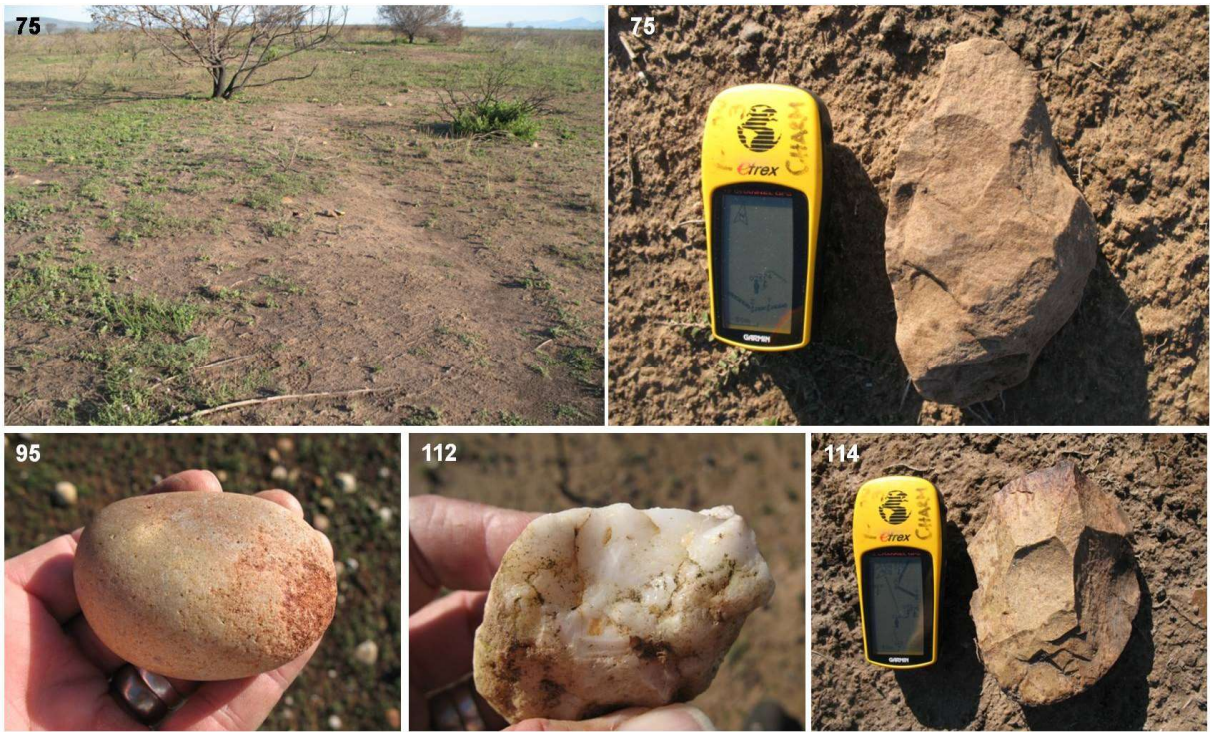

Figure 18. Archaeological finds and contexts. Numbers denote waypoint names – see Figure 13, Table 2 and Appendix A for further information. GPS unit is 10 cm long.

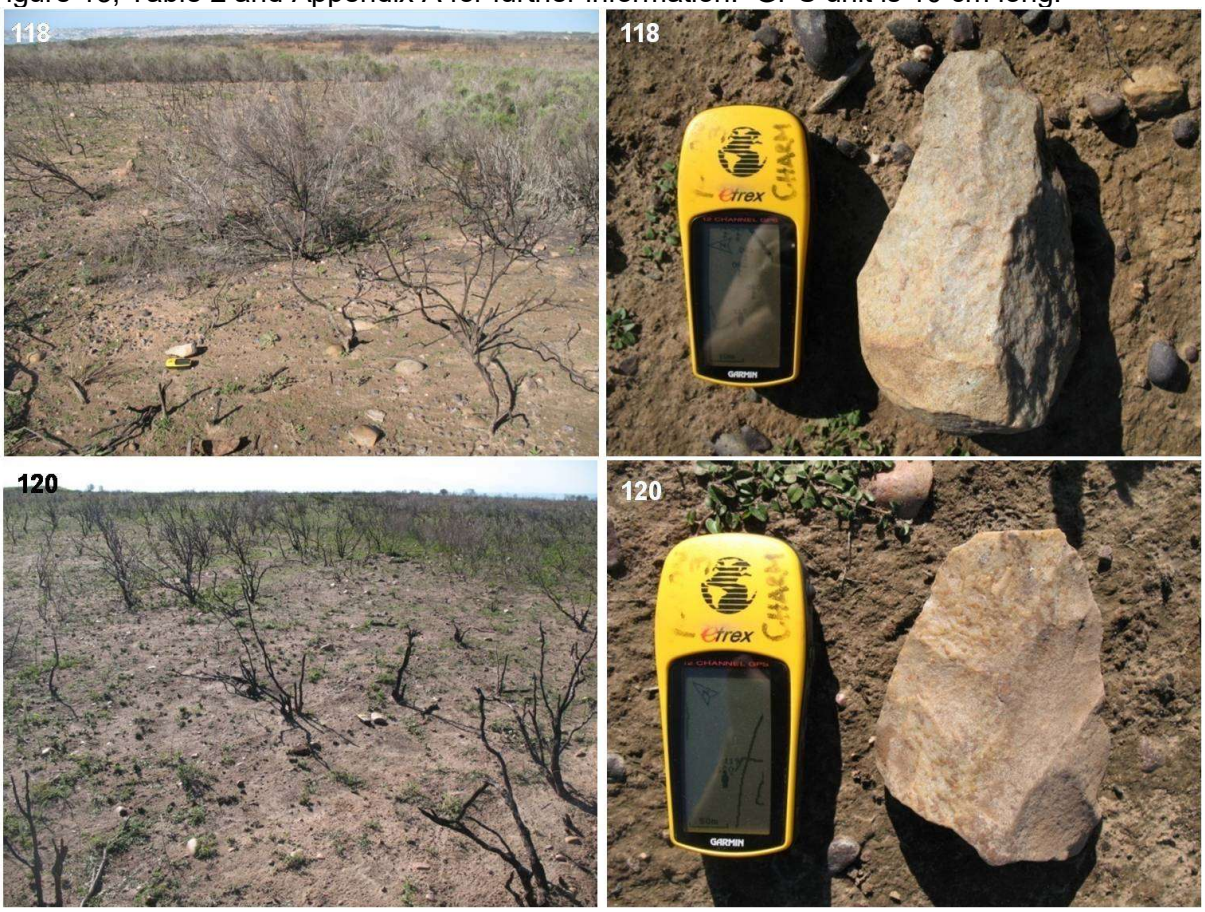

Figure 19. Archaeological finds and contexts. Numbers denote waypoint names – see Figure 13, Table 2 and Appendix A for further information. GPS unit is 10 cm long.

Figure 20. Later Stone Age core in chalcedony identified at waypoint 136 showing context (white ellipse) and detail (inset). See Figure 13, Table 2 and Appendix A for further information. GPS unit is 10 cm long.

A MSA scatter of stone artefacts was recorded at **waypoint 34**, which is in close proximity to an existing reservoir and at one of the highest points on the property (Figures 21, 13 and Table 2). While densities were not calculated, the scatter contains higher densities of stone artefacts than seen elsewhere on the property. On average, there is less than one artefact per square meter. This is a low to medium density scatter of materials roughly 250m^2 in extent and some artefacts are still imbedded in sediment. Specimens include hammer stones, a hammer stone/grind stone, various cores, blades, flakes, convergent flakes or points and chunks, and all these are in medium to fine grained quartzites of differing colour. Retouched pieces occur, but are rare and no formal tools were identified.

Significance and recommendations:

The context of this occurrence is disturbed, but due to the higher density and wider variety of stone artefacts than seen at other occurrences, it is considered to be of medium significance at the local level (Grade IIIB). Although the site does not warrant sampling via archaeological excavation or the collection of specimens under a work plan or permit from HWC, the extent was mapped via GPS which includes a buffer of about 5 m around the scatter (Figure 22). Due to the presence of an endangered species of butterfly, this northern part of Erf 3122 is a conservation area and will not be developed, but the installation of a perimeter fence and construction of a service road should be monitored to minimize unnecessary damage or disturbance of artefacts.

Figure 21. Middle Stone Age artefact scatter at waypoint 34 with blades, convergent flakes (points), blade core and hammer stone (note reservoir and trig beacon). See Figure 13 and Table 2 A for further information. GPS unit is 10 cm long. (A4 version on page 54)

Figure 22. Mapped extent of the MSA scatter at waypoint 34 (red polygon), which includes a 5 m buffer around the artefact scatter. Note circular reservoir.

At **waypoint 127**, a medium to low density stone artefact scatter of ESA implements was identified and is situated on a high point of the property and near the miniature airfield (Figures 23, 13 and Table 2). While the density of artefacts was not calculated, densities are higher than at other occurrences. On average, artefacts occur at less than one artefact per square meter. The occurrence is about 300m^2 in extent and is situated in formerly ploughed and cultivated fields. Artefacts include large cores, crude and finer bifacial hand axes, "chopper" tools (probably worn out hammer stones and/or cores) and flakes. All specimens are in quartzite that is variably patinated and coloured. The site was revisited in 2017 and 2022 and despite thicker vegetation cover and a few dumps of garden refuse, the locality of the photographed artefacts was easily found.

Significance and recommendations:

Although these artefacts are in a disturbed context, they occur in higher frequencies than seen elsewhere in the study area and are almost exclusively of ESA origin. A variety of artefacts were identified, representing a range of ESA tools that are indicative of the stone tool technology used at that time. As such, the site is considered to be of medium significance at the local level (Grade IIIB) and as described above for waypoint 34, the extent of the occurrence was mapped via GPS which includes a buffer of roughly 5 m around the scatter (Figure 24). After recommendations made in the initial AIA and subsequent mapping (Nilssen 2010 and 2017), this locality has been incorporated into the design of the development and will be conserved in perpetuity (Figure 25). A temporary fence should be erected around the scatter to ensure that this No-Go zone is protected during the construction phase of development. The erection of the temporary fence prior to construction should be supervised by a suitably qualified and informed archaeologist.

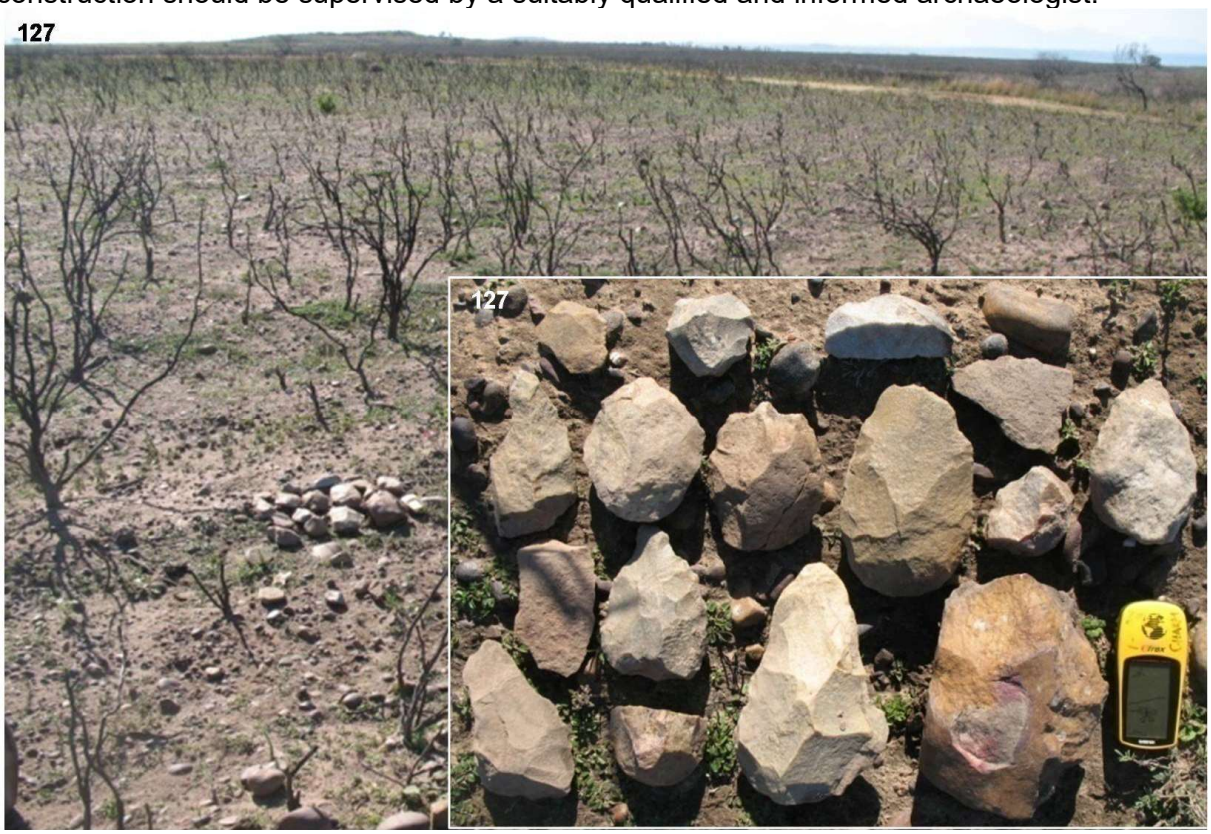

Figure 23. Early Stone Age scatter of stone artefacts at waypoint 127. Included are cores, flakes and bifacial hand axes. See Figure 13 and Table 2 for further information. GPS unit is 10 cm long. (A4 version on page 55)

Figure 24. Mapped extent of the ESA scatter at waypoint 127 (red polygon), which includes a 5 m buffer around the artefact scatter. Note miniature airfield west of 127.

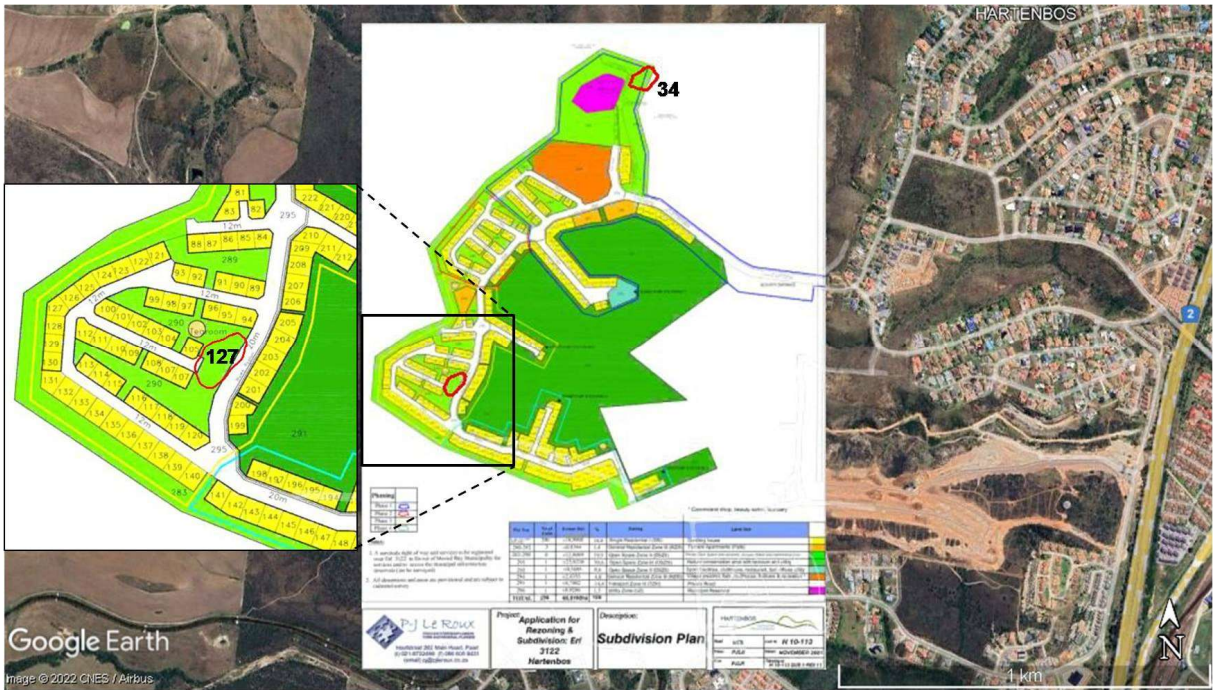

Figure 25. Location of heritage resources (34 & 127) relative to the Site Development Plan showing incorporation and protection of 127; and 34 falls in the northern conservation area and straddles the property boundary. (A4 version on page 56)

Table 2. Selection of heritage resources including 34 and 127. A complete list is presented in Appendix A.

Name	Description img=image snd=sound	Datum: WGS 84 Lat/Lon dec.degrees	Datum: WGS 84 Grid: SA National	Elevation masl
2	MSA img8164-6 snd8166	S34.13324 E22.08624	23 Y0084287 X3778818	123 m
3	MSA img8167-9 snd8169	S34.13284 E22.08425	23 Y0084471 X3778775	125 m
6	MSA/LSA img8170-2 snd8172	S34.13245 E22.08300	23 Y0084587 X3778733	127 m
10	MSA img8173-6 snd8176	S34.13221 E22.08249	23 Y0084634 X3778706	126 m
14	MSA img8178-80 snd8180	S34.13144 E22.08054	23 Y0084815 X3778623	129 m
22	MSA img8190-1 snd8191	S34.12701 E22.08133	23 Y0084746 X3778132	131 m
24	MSA img8194-6 snd8196	S34.12604 E22.08231	23 Y0084657 X3778023	129 m
29	MSA img8198-8200 snd8200	S34.12526 E22.08460	23 Y0084446 X3777934	134 m
34	MSA img8202-5 snd8205	S34.12311 E22.08733	23 Y0084197 X3777693	123 m
52	MSA img8215-20 snd8220	S34.13049 E22.08538	23 Y0084369 X3778513	106 m
61	MSA/LSA img8227-30 snd8230	S34.12871 E22.08767	23 Y0084160 X3778314	122 m
70	MSA img8231-4 snd8234	S34.13340 E22.08640	23 Y0084272 X3778835	123 m
75	ESA img8240-4 snd8244	S34.13292 E22.08524	23 Y0084379 X3778783	120 m
95	MSA/LSA img8246-50 snd8250	S34.12371 E22.08667	23 Y0084256 X3777761	132 m
112	MSA/LSA img8257-62 snd8262	S34.13207 E22.08430	23 Y0084467 X3778690	123 m
114	ESA img8263-7 snd8267	S34.13254 E22.08539	23 Y0084366 X3778741	122 m
118	ESA img8274-80 snd8280	S34.12854 E22.08608	23 Y0084306 X3778297	121 m
120	ESA img8281-6 snd8286	S34.12675 E22.08466	23 Y0084439 X3778100	126 m
122	MSA img8287-92 snd8292	S34.12810 E22.08283	23 Y0084606 X3778251	127 m
126	MSA img8293-5 snd8295	S34.13049 E22.08173	23 Y0084705 X3778517	127 m
127	ESA img8296-8301 snd8301	S34.13060 E22.08164	23 Y0084713 X3778529	126 m
136	LSA img8302-8 snd8308	S34.13085 E22.08226	23 Y0084656 X3778556	125 m
138	MSA img8309-12 snd8312	S34.13063 E22.08241	23 Y0084642 X3778532	122 m

No other archaeological resources of colonial or pre-colonial origin were identified in the study area. Due to the geological sequence and depth of disturbances – particularly that of ploughing – it is not expected that *in situ* and significant archaeological materials will be encountered during earthmoving activities associated with the proposed development.

6.3. Graves

No colonial period graves or burials were identified during the foot survey. Given the absence of significant archaeological sites and the fact that no graves or unmarked human burials are documented in the immediate surroundings, the chance discovery of human remains is considered to be low.

7. Statement of Significance and Provisional Grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all identified heritage resources. In terms of Section 2(vi), ‘‘cultural significance’’ means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA (see Section 3 above).

Due to their disturbed context, isolated occurrence, temporal mixing and absence of any associated cultural or organic remains, **all Stone Age artefacts other than those recorded at waypoints 34 and 127** are considered to be of very low archaeological research value or significance, and are given a field rating of Grade IIIC and Not Conservation Worthy (NCW). These finds require no further investigation, management or

mitigation, and due to their NCW status and compromised context, a work plan or permit from the heritage authorities is not needed for their further disturbance.

The low to medium density scatter of mainly **MSA stone artefacts at waypoint 34** is only considered to be of medium significance at the local level (Grade IIIB) because of the somewhat higher densities of artefacts than seen in other parts of Erf 3122. Like elsewhere on the property, these finds are in a disturbed context, are temporally mixed and associated cultural or organic remains are entirely absent. Apart from fencing and a service road, this locality will not be developed.

The low to medium density scatter of mainly **ESA stone artefacts at waypoint 127** is only considered to be of medium significance at the local level (Grade IIIB) because of the somewhat higher densities of artefacts than seen in other parts of Erf 3122. Like elsewhere on the property, these finds are in a disturbed context, are temporally mixed and associated cultural or organic remains are entirely absent. This locality has been incorporated into the development layout and will be protected and conserved in perpetuity.

In the unlikely event of the chance discovery of human remains, these will be considered to be of high significance at the local level (Grade IIIA).

Since there are no significant archaeological components of the cultural landscape on the affected property, there is no statement of significance or provisional grading with respect to cultural landscapes.

7.1. Summary of Archaeological Indicators

Identified archaeological remains at waypoints other than 34 and 127 are of low significance and NCW.

- Indicator: Identified NCW archaeological remains may be damaged or destroyed without a work plan or permit from Heritage Western Cape.

The low to medium scatter of mainly **MSA stone artefacts at waypoint 34** is considered to be of medium significance at the local level (Grade IIIB)

- Indicator: Identified archaeological remains will be conserved, but the area requires archaeological monitoring during the installation of perimeter fence and construction of service road. These archaeological remains may NOT be damaged or destroyed without a work plan or permit from Heritage Western Cape.

The low to medium scatter of mainly **ESA stone artefacts at waypoint 127** is considered to be of medium significance at the local level (Grade IIIB)

- Indicator: Identified archaeological remains will be conserved in perpetuity, but a temporary fence should be installed to protect this No-Go area during the construction phase of development. The fence should be erected under the supervision of a suitably informed and qualified archaeologist. These archaeological remains may NOT be damaged or destroyed without a work plan or permit from Heritage Western Cape.

The significance of potentially buried archaeological resources is unknown, but indications are that they should be treated as of low significance.

- Indicator: Significant archaeological resources may not be damaged or destroyed without a work plan or permit from Heritage Western Cape.

If unmarked human burials or human remains lie buried beneath surface sediments, then they are regarded to be of high local significance.

- Indicator: Human remains may not be disturbed without a work plan or permit from Heritage Western Cape.

8. Assessment of Impacts

The impacts to archaeological resources will occur during the construction phase of development, will be restricted to the property and will be permanent.

8.1. Impacts to Archaeological Resources

Because they are a non-renewable resource, impacts to archaeological resources will be permanent and will occur during the construction phase of development. It is not anticipated that significant archaeological resources will be uncovered during construction, but the nature and content of sub-surface sediments are unknown.

Because the Grade IIIB archaeological resources are avoided by the development, these resources will not be impacted during the construction or operational phases of development. There are no fatal flaws regarding impacts to identified archaeological resources provided that the recommended management measures are implemented.

For the isolated & low density Stone Age artefacts the cultural significance is considered to be low (Grade IIIC and NCW), an intensity rating of low is given. The overall impact significance without mitigation is considered to be medium negative, but given the NCW status of the resource this significance rating is not really meaningful (Table 3).

Table 3. Assessment of Impacts on Archaeological Resources – Isolated & low density Stone Age artefacts

Nature of Impact: loss of Isolated & low density Stone Age artefacts from excavations and construction							
	Extent	**Duration**	**Intensity**	**Status**	**Probability**	**Significance**	**Confidence**
Without mitigation	Local 1	Permanent 5	Low 4	Negative	Definite 5	MEDIUM 50	High
Mitigation & Notes: • Mitigation is not feasible • due to their Grade IIIC and NCW status, the loss of these resources will have a negligible negative impact on the archaeological value of the area							
With mitigation	NA	NA	NA	NA	NA	NA	High

For the MSA scatter of stone artefacts at waypoint 34 the cultural significance is considered to be medium at the local level (Grade IIIB), an intensity rating of medium is given. The overall impact significance without mitigation is considered to be medium negative while the overall impact significance with mitigation is considered to be low positive (Table 4). Given that waypoint 34 falls within a conservation area and outside the development footprint, the impact of the development is positive in providing an opportunity to conserve an archaeological resource. Provided that the recommended management measures are implemented there are no further concerns.

Table 4. Assessment of Impacts on Archaeological Resources – MSA scatter of stone artefacts at waypoint 34

Nature of Impact: loss of Isolated & low density Stone Age artefacts from excavations and construction							
	Extent	**Duration**	**Intensity**	**Status**	**Probability**	**Significance**	**Confidence**
Without mitigation	Study area 2	Permanent 5	Medium 6	Negative	Highly probable 4	MEDIUM 52	High
Mitigation & Notes: • Because this resource is given Grade IIIB status, it is recommended that it be conserved – it falls in a conservation area and outside the development footprint but may be impacted by installation of the perimeter fence and construction of the service road • Installation of perimeter fence and construction of service road should be monitored by a suitably qualified and informed archaeologist to avoid or minimize damage or disturbance to artefacts							
With mitigation	Local 1	Permanent 5	Medium 6	Positive	Improbable 2	LOW 24	High

For the ESA scatter of stone artefacts at waypoint 127 the cultural significance is considered to be medium at the local level (Grade IIIB), an intensity rating of medium is given. The overall impact significance without mitigation is considered to be high negative while the overall impact significance with mitigation is considered to be low positive (Table 5). In accordance with recommendations made in the initial AIA and subsequent mapping of this resource (Nilssen 2010 and 2017), the extent of waypoint 127 was incorporated into the layout of the development and hence the impact of the development is positive in providing an opportunity to conserve an archaeological resource. Provided that the recommended management measures are implemented there are no further concerns.

Table 5. Assessment of Impacts on Archaeological Resources – ESA scatter of stone artefacts at waypoint 127

Nature of Impact: loss of Isolated & low density Stone Age artefacts from excavations and construction							
	Extent	**Duration**	**Intensity**	**Status**	**Probability**	**Significance**	**Confidence**
Without mitigation	Study area 2	Permanent 5	Medium 6	Negative	Definite 6	HIGH 78	High
Mitigation & Notes: • Because this resource is given Grade IIIB status, it is recommended that it be conserved – in accordance with recommendations made in the initial AIA (Nilssen 2010), this locality has been incorporated into the development layout and will be protected and conserved in perpetuity. • A temporary fence should be installed to protect this No-Go area during the construction phase of development. The fence should be erected under the supervision of a suitably informed and qualified archaeologist.							
With mitigation	Local 1	Permanent 5	Medium 6	Positive	Improbable 2	LOW 24	High

8.2. Evaluation of Impacts Relative to Sustainable Social and Economic Benefits

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development.

Because the vast bulk of the archaeological finds identified on Erf 3122 are given NCW status and because the Grade IIIB resources will be protected and conserved as a result of the development, the impact to the archaeological value of the area is considered to be negligible and positive. As a result, the negative impacts of the proposed development on archaeological resources will be less than the positive contribution the development will make to the local community and economy during the construction and operational phases of the project. Being a fairly large development with potential for a considerable positive contribution to the local economy, the benefits of the proposed development to sustainable social and economic development outweigh its impacts on archaeological resources.

8.3. Existing Impacts to Archaeological Resources

The archaeological context of Erf 3122 and much of surroundings is already significantly altered by past agricultural activities and a variety of residential and infrastructural developments. As is evident from the above desktop study and literature review, no significant archaeological sites were recorded in the immediate surroundings, and given the overall scarcity and low quality of archaeological resources in the area, these impacts to the archaeological record were low to negligible.

8.4. The No-Go Alternative

If the development does not proceed, then the site will remain as is with continued impacts of human and natural processes. The No-Go option will have neither positive nor negative impact on archaeological resources and is therefore considered to be neutral. As outlined above, however, the development provides opportunities for positive impacts on archaeological resources. Furthermore, considering that the socio-economic benefits from the proposed development outweigh its negative impacts on archaeological resources, it seems reasonable to argue that the proposed development is preferable to the No-Go option.

8.5. Cumulative Impacts

We know that infrastructural and residential developments in the surrounding area have impacted negatively on heritage resources, but because the bulk of the heritage resources in the area are considered to be of low significance, this negative and cumulative impact is negligible. Some of the existing developments in the immediate surroundings did not undergo heritage impact assessments, and hence it is possible that some anthropogenic materials were lost to development. As mentioned before, however, the archaeology of the immediate surroundings, like that of Erf 3122, is predominantly of low quality and in compromised context, and therefore, the cumulative impact in this instance is considered to be low.

Because the overall archaeological sensitivity of the affected property is considered to be low, there are no further direct, indirect or cumulative impacts that require amendments to the development layout. Given the disturbed context, and the absence of significant archaeological resources on site and in the immediate surroundings, the proposed development will have negligible additional cumulative impact on the archaeological resources of the area.

8.6. Levels of Acceptable Change

No negative impacts to archaeological resources should occur until such resources are evaluated and then studied, sampled or conserved as deemed necessary in accordance with their cultural significance.

There is no anticipated change to the archaeological value of the area since no significant archaeological resources were identified and since two archaeological occurrences will be protected add conserved as a result of the proposed development. It follows that the level of change to the archaeological record of the area is negligible and therefore acceptable. Furthermore, the proposed development is in keeping with existing and planned residential developments within the urban edge and in the surroundings of Erf 3122.

8.7. Consideration of Alternatives and Plans for Mitigation

Development proposals for Erf 3122 were in an iterative process since at least 2010 and hence many alternatives were tabled, considered and eliminated/adapted up to the latest version shown in Figure 4. Consequently, at the time of this writing no alternatives are presented, but see the HIA for a more complete consideration and discussion. Apart from the No-Go option, alternative development options will not affect this investigation, assessment or recommendations made here.

While any development option - involving construction - will have a negative impact on archaeological resources in the development footprint, the vast bulk of the mainly isolated Stone Age artefacts occur in disturbed contexts and are of low heritage value. Their disturbance or destruction will have a negligible negative impact on the heritage value of the area (Nilssen 2010).

It was recommended in the constraints analysis phase that locality 127 shown in Figures 23 24 and 25 should be incorporated into the development layout as this archaeological occurrence of Stone Age artefacts will add value and a potential point of interest to the development (Nilssen 2017). The development layout was subsequently adapted to incorporate this locality and as previously mentioned; locality 34 is also outside the development footprint (Figure 25). The latter is due to the identification of an endangered species of butterfly in the northern portion of the property that is now a conservation area and apart from a perimeter fence and service road; no other development will take place in this area.

While no plans for mitigation are needed, management measures include the erection of a temporary fence around locality 127 and archaeological monitoring during the installation of the perimeter fence and service road in the surroundings of locality 34.

9. Input to the Environmental Management Program

If an Environmental Management Program (EMPr) is applicable to the project, then it should make provision for the following:

1. Because the Early and Middle Stone Age artefact scatters at waypoints 127 and 34 are considered to be of medium significance at the local level (Grade IIIB), their extents - including 5 m buffers - were mapped (via GPS) and these are No-Go areas that are already incorporated into the revised development layout.
2. Waypoint 127 should be enclosed with a temporary boundary fence prior to the construction phase and under an archaeologist's supervision to ensure that this No-Go area is avoided during the construction phase of development.
3. Waypoint 34 falls within a conservation area and outside the development footprint, but the installation of a perimeter fence and construction of the service road should be monitored by a suitably qualified and informed archaeologist to avoid or minimize the disturbance or destruction of artefacts.
4. If any human remains or significant archaeological materials are exposed during development activities, then the find should be protected from further disturbance and work in the immediate area should be halted and Heritage Western Cape must be notified immediately. These heritage resources are protected by Section 36(3)(a) and Section 35(4) of the NHRA (Act 25 of 1999) respectively and may not be damaged or disturbed in any way without a work plan and permit from the heritage authorities. Any work in mitigation, if deemed appropriate, should be commissioned and completed before construction continues in the affected area and will be at the expense of the developer.
5. If an EMPr is not developed for the project, then the above recommendations must be implemented by the applicant or developer.

10. Conclusions

An Archaeological Impact Assessment (AIA) was conducted for the proposed development of Erf 3122 on 19 and 20 July 2010 (Nilssen 2010). The study area was previously cultivated and several disturbances were noted. Evidence for the dumping of building rubble and general waste occurs in certain areas. A fire left most of the property denuded of vegetation. As a result, adequate ground surfaces were visible for a comprehensive archaeological inspection and assessment. Further disturbances by recent human activities include a reservoir and associated pipeline(s), vehicle tracks, what appears to be a miniature airfield, geological test holes and an overhead power line at the eastern extent of the property.

All of the 136 identified archaeological occurrences originate in the Stone Age. These are dominated by Middle Stone Age specimens, followed by those of the Early Stone Age and Later Stone Age artefacts are rare. The contexts of these finds are mostly disturbed as a result of one or more of the above-mentioned activities. Two archaeological occurrences, one of mainly Middle Stone Age implements (waypoint 34) and another of mainly Early Stone Age specimens (waypoint 127) are considered of medium significance (field rating: Grade IIIB) and recommendations for their protection and conservation were made. Subsequent mapping of these localities were incorporated into the revised development layout ensuring that these resources will be protected and conserved in perpetuity (Nilssen 2017 and 2021).

Due to the geological sequence and depth of disturbances – particularly that of ploughing – it is not expected that significant *in situ* archaeological materials will be encountered during earthmoving activities associated with the proposed development. The significance of potentially buried archaeological resources is unknown, but indications are that they should be treated as of low significance. No tangible heritage resources of the colonial period were identified.

If unmarked human burials or human remains lie buried beneath surface sediments, then they are regarded to be of high local significance. Human remains may not be disturbed without a permit from Heritage Western Cape.

10.1. Reasoned Opinion of the Specialist

Based on results from this study, there are no fatal flaws and provided that the recommendations made here are implemented, then there is no indication that development activities will have a negative impact on the archaeological value of the area. Consequently, it is this author's opinion that the proposed development on Erf 3122, Mossel Bay, should be authorized in full.

11. Recommendations

1. There are no fatal flaws or objections to the full authorisation of the proposed development provided that the below recommendations are implemented.
2. Because the Early and Middle Stone Age artefact scatters at waypoints 127 and 34 are considered to be of medium significance at the local level (Grade IIIB), their extents - including 5 m buffers - were mapped via GPS and these are No-Go areas that are already incorporated into the revised development layout.
3. Waypoint 127 should be enclosed with a temporary boundary fence prior to the construction phase and under an archaeologist's supervision to ensure that this No-Go area is avoided during the construction phase of development.
4. Waypoint 34 falls within a conservation area and outside the development footprint, but the installation of a perimeter fence and construction of a service road should be monitored by a suitably qualified and informed archaeologist to avoid or minimize the disturbance or destruction of artefacts.
5. Due to their low densities, temporally mixed and disturbed nature, the remainder of identified Stone Age artefacts are Not Conservation Worthy and therefore their disturbance / destruction does not require a work plan or permit from Heritage Western Cape. No further archaeological studies or mitigation / management measures are necessary for these archaeological resources.
6. If any human remains or significant archaeological materials are exposed during development activities, then the find should be protected from further disturbance and work in the immediate area should be halted and Heritage Western Cape must be notified immediately. These heritage resources are protected by Section 36(3)(a) and Section 35(4) of the NHRA (Act 25 of 1999) respectively and may not be damaged or disturbed in any way without a work plan and permit from Heritage Western Cape. Any work in mitigation, if deemed appropriate, should be commissioned and completed before construction continues in the affected area and will be at the expense of the developer.
7. Points 2, 3, 4 and 6 of the above recommendations should be included in the Environmental Management Program (EMPr) for the proposed residential development.
8. If an EMPr is not developed for the project, then the above recommendations must be implemented by the applicant or developer.

12. References

Brown, K.S., C.W. Marean, A.I.R. Herries, Z. Jacobs, C. Tribolo, D. Braun, D.L. Roberts, Mi.C. Meyer and J. Bernatchez. 2009. Fire As an Engineering Tool of Early Modern Humans. *Science* 325, 859.

DEA&DP, 2005. Guidelines for Involving Specialists in EIA Processes.

De Kock, S. 2021. Background Information Document to Notice of Intent to Develop (NID) in Terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 Of 1999). Proposed Residential Development of Erf 3122 (Hartenbos), Mossel Bay District and Municipality.

Goodwin, A.J.H. & Van Riet Lowe, C. 1929. The Stone Age cultures of South Africa. *Annals of the University of Stellenbosch*. Vol. 11:

Goodwin, A.J.H. & Malan, B.D. 1935. Archaeology of the Cape St. Blaize Cave and raised beach, Mossel Bay. *Annals of the South African Museum* 24, 111-140.

Hart, T. 2005. Initial Heritage Statement: Proposed Open Cycle Gas Turbine Site and Transmission Lines at Mossel Bay, South Western Cape. Prepared for Ninham Shand Consulting by Archaeology Contracts Office, Department of Archaeology, University of Cape Town

Henshilwood, C and Yates, R. 2001. Report on the Archaeological Survey of the Skulpiesbaai Nature Reserve, Still Bay District: Phases 1a & 1b. (SAHRIS MAPID 00192)

Heritage Western Cape (HWC). 2016. Grading: purpose and management implications. Document produced by Heritage Western Cape, 16 March 2016.

Heritage Western Cape (HWC), 2021a. Notification of Intent to Develop, Heritage Impact Assessment, (Pre-Application) Basic Assessment Reports, Scoping Reports and Environmental Impact Assessments, Guidelines for Submission to Heritage Western Cape.

Heritage Western Cape (HWC), 2021b. Guide for Minimum Standards for Archaeology and Palaeontology Reports Submitted to Heritage Western Cape.

Kaplan, J. 1993. The state of archaeological information in the coastal zone from the Orange river to Ponta do Oura. Department of Environmental Affairs and Tourism. (report not available on SAHRIS)

Kaplan, J.M. 1997. Archaeological Study: Proposed Pinnacle Point Development. An unpublished report by the Agency for Cultural Resources Management on file at SAHRA as: 1997-SAHRA-0020.

Kaplan, J. 1996. Archaeological Study: Erf 1491 and a Portion of the Farm Searles No. 252, Great Brak River, Southern Cape. (SAHRIS MAPID 01818).

Kaplan, J. 2003. Phase 1 Archaeological Impact Assessment, Proposed Development Remainder of Portion 16 of Farm Rensburg Estate No. 137, Great Brak River. (SAHRIS MAPID 02792)

Kaplan, J. 2005. Phase 1 Archaeological Impact Assessment, Proposed Development Lagoon Bay Lifestyle Estate, George, Southern Cape. (SAHRIS MAPID 00047).

Kaplan, J. 2007. Phase 1 Archaeological Impact Assessment, Proposed Development Outeniquasbosch Safari Park, Farms Outeniquasbosch 149 and Hartenbos 217, Mossel Bay (SAHRIS MAPID 02940).

Kaplan, J. 2008. Phase 1 Archaeological Impact Assessment - Proposed Development Heritage Creek Estate (Erf 3933), Great Brak River, Southern Cape. (SAHRIS MAPID 02709)

Kaplan, J. 2019. Heritage Impact Assessment - Proposed Residential Housing Development, Erf 2839, Great Brak River, Western Cape.

Leith, G. 1898. On the caves, shell-mounds and stone implements of South Africa. *Journal of the Royal Anthropological Institute* 28, 258-274.

Marean, C.W. & P. Nilssen. 2002. The Mossel Bay Archaeology Project (MAP) Background and Results from Test Excavations of Middle Stone Age Sites at Pinnacle Point, Mossel Bay. Final report for the South African Heritage Resources Agency (SAHRA) and the National Research Foundation (NRF).

Marean, C. W., Thompson, E., Williams, H., Bernatchez J. Nilssen, P. J *et al*. 2007. Early Human use of Marine resources and pigments in South Africa during the Middle Pleistocene. *Nature* 449, 905.

Marean, C. W., Nilssen, P. J., Brown, K., Jerardino, A., and D. Stynder. 2004. Paleoanthropological Investigations of Middle Stone Age Sites at Pinnacle Point, Mossel Bay (South Africa): Archaeology and Hominid Remains from the 2000 Field Season. *PaleoAnthropology*, 2004.05.02, 14-83.

McGrath, J.R., Cleghorn, N., Gennari, B., Henderson, S., Kyriacou, K., Nelson-Viljoen, C., Nilssen, P., Richardson, L., Shelton, C., Wilkins, J., & Maeran, C.W. 2015. The Pinnacle Point Shell Midden Complex: a Mid to Late Holocene Record of Later Stone Age Coastal Foraging Along the Southern Cape Coast of South Africa. *South African Archaeological Bulletin* 70 (202): 209–219.

Nilssen, P. 2005a. Archaeological Heritage Impact Assessment - Proposed Rezoning and Subdivision of a Portion of Vaalevalley 219, Mossel Bay, Western Cape Province. (SAHRIS MAPID 01941)

Nilssen, P.J. 2005b. Archaeological Heritage Impact Assessment: Proposed rezoning and development of Remainder Portion Vyf Brakkefontein 220, Hartenbos Heuwels, Mossel Bay. (SAHRIS MAPID 01917)

Nilssen, P. 2005c. Nilssen, P.J. 2005c. Development at Pinnacle Point, Mossel Bay, Archaeological Monitoring of Vegetation Clearing & All Earthmoving Activities. Report on file at SAHRA as: 2005-SAHRA-0190.

Nilssen, P. J. 2006. Archaeological Heritage Scoping Survey: Proposed Cemetery, Portion 8, Erf 225, Mossel Bay Farms, Mossel Bay Municipal District, Western Cape Province. CARM cc, Great Brak River. (2006-SAHRA-0238)

Nilssen, P. 2007a. Archaeological Heritage Impact Assessment - The Farm Dawn Dunes 136 Portion 33 and The Farm Rensburg Estate 137 Portion 1, District Mossel Bay, Western Cape Province: Proposed Residential Development. (SAHRIS MAPID 01912)

Nilssen, P. 2007b. Archaeological Heritage Scoping Survey - Remainder Portion 7 of the Farm Eigendomsgrond 251, Pienaarstrand, George, Western Cape Province: Proposed Residential Development. (SAHRIS MAPID 01892)

Nilssen P.J. 2009a. Archaeological Impact Assessment with comment on Paleontology: Construction of Sewer Pipelines for Mossdustria and Erf 6422, District Mossel Bay, Western Cape Province.

Nilssen, P.J. 2009b. Archaeological Impact Assessment: Asazani Zinyoka Bulk Water Pipeline Route, Mossel Bay Municipality, Mossel Bay, Western Cape Province.

Nilssen, P. 2009c. Archaeological Heritage Impact Assessment: Remainder Portion 54 of the Farm Hooge Kraal 238, Magisterial District George, Western Cape Province. (SAHRIS MAPID 01897)

Nilssen, P. 2010. Archaeological Impact Assessment: Proposed rezoning, subdivision and residential development: Erf 3122, Hartenbos, Mossel Bay, Western Cape Province

Nilssen, P. 2017. Constraints Analysis - Archaeological Resources: Proposed rezoning, subdivision and residential development: Erf 3122, Hartenbos Heuwels, Mossel Bay, Western Cape Province

Nilssen, P. 2021. Scoping Report - Archaeological Resources - Proposed rezoning, subdivision and residential development: Erf 3122, Hartenbos Garden Estate / Hartenbos Natuur-Landgoed, Mossel Bay, Western Cape Province

Orton, J. 2021. Heritage Impact Assessment: Proposed Sand Mine on Portion 33 of the Farm Klipheuvel 143, Mossel Bay (Klein Brak River), Western Cape.

Pelser, A.J. 2021. Report on a Phase 1 Heritage Assessment for Proposed Residential Development on Portion 175 (a Portion of Portion 168) of the Farm Vyf Brakke Fonteinen 220 (Erf 21244) in Mossel Bay, Western Cape Province. (SAHRIS 13434)

SAHRA APM, 2018. Compliance to SAHRA Minimum Standards, SAHRIS Requirements and Section 38 of the NHRA.

Thompson, Erin. 2006. Artifact Accumulation Formation Processes and their Affect on Studies of Early Hominin Land Use as Reflected in an Acheulean Assemblage near Mossel Bay, South Africa. Unpublished Masters Dissertation.

UNESCO, 2008. Operational guidelines for the implementation of the World Heritage Convention, 2008.

Van Zyl, L-M. 2021. Screening Report for an Environmental Authorization as Required by the 2014 EIA Regulations – Proposed Site Environmental Sensitivity

13. A4 Sized Graphics (on following pages)

Figure 1. General location of Erf 3121, Mossel Bay, Western Cape Province (red rectangle). Enlarged portion of 1:50 000 topographic map 3422AA MOSSELBAAI (1999). Courtesy of the Chief Directorate: Surveys and Mapping, Mowbray.

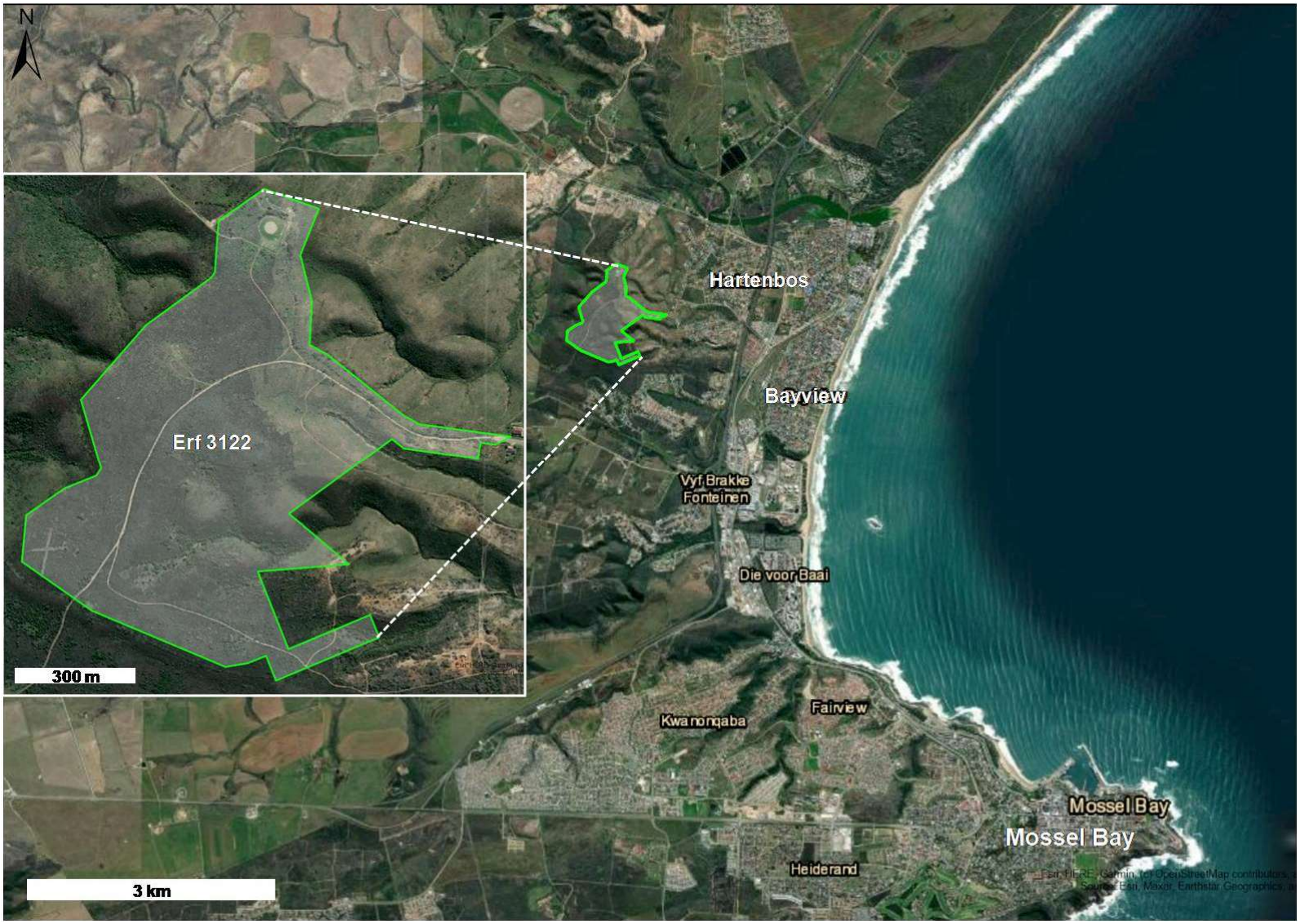

Figure 2. Aerial image showing the general location of Erf 3121 (green polygon), Mossel Bay, Western Cape Province (https://gis.elsenburg.com/apps/cfm/).

Figure 6. Examples of the environment and surrounds (see Figure 13 for locality information). Note evidence for ploughing (1 & 21) and result of veld fire.

Figure 7. Site and surrounds – note disturbances and burnt vegetation (see Figure 13 for locality information).

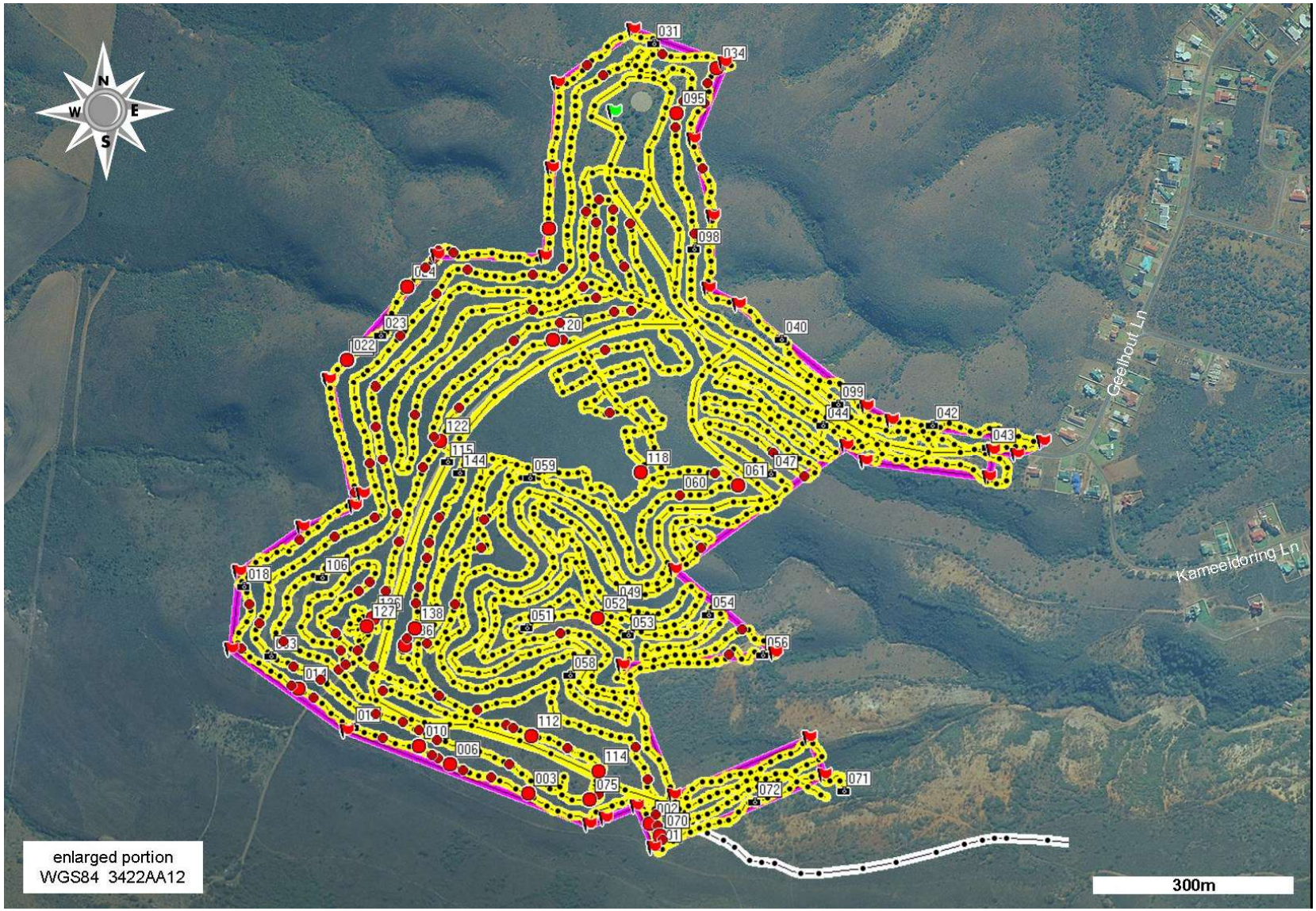

Figure 13. Google Earth aerial image showing Erf 3122 (purple polygon), vehicle access track (white line), survey walk tracks (yellow lines), archaeological finds (red dots) and photo localities (camera icons).

Figure 21. Middle Stone Age scatter of artefacts at waypoint 34 with blades, convergent flakes (points), flakes, blade core and hammer stone (note reservoir and trig beacon). See Figure 13 and Table 2 A for further information. GPS unit is 10 cm long.

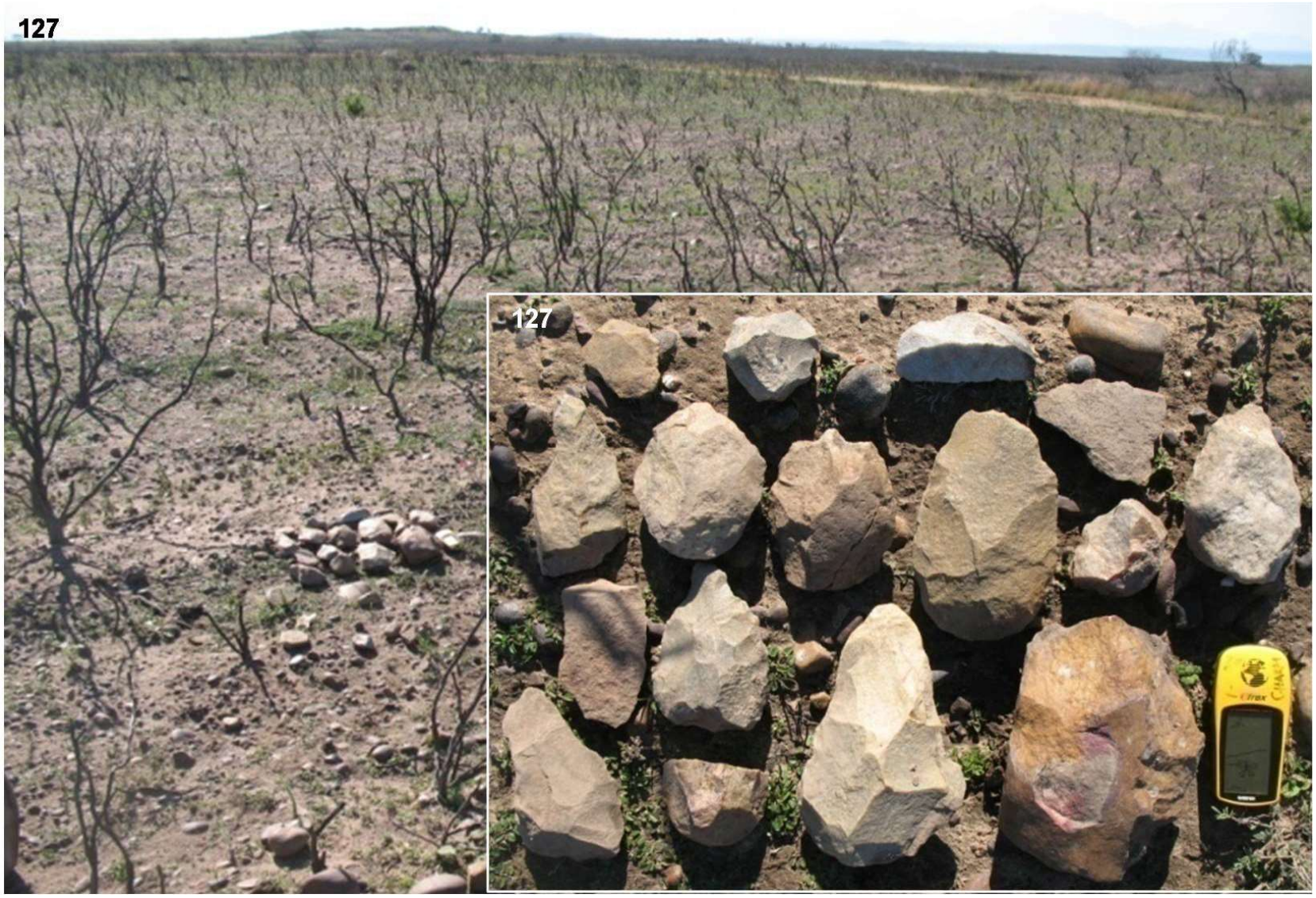

Figure 23. Early Stone Age scatter of stone artefacts at waypoint 127. Included are cores, flakes and bifacial hand axes. See Figure 13 and Table 2 for further information. GPS unit is 10 cm long.

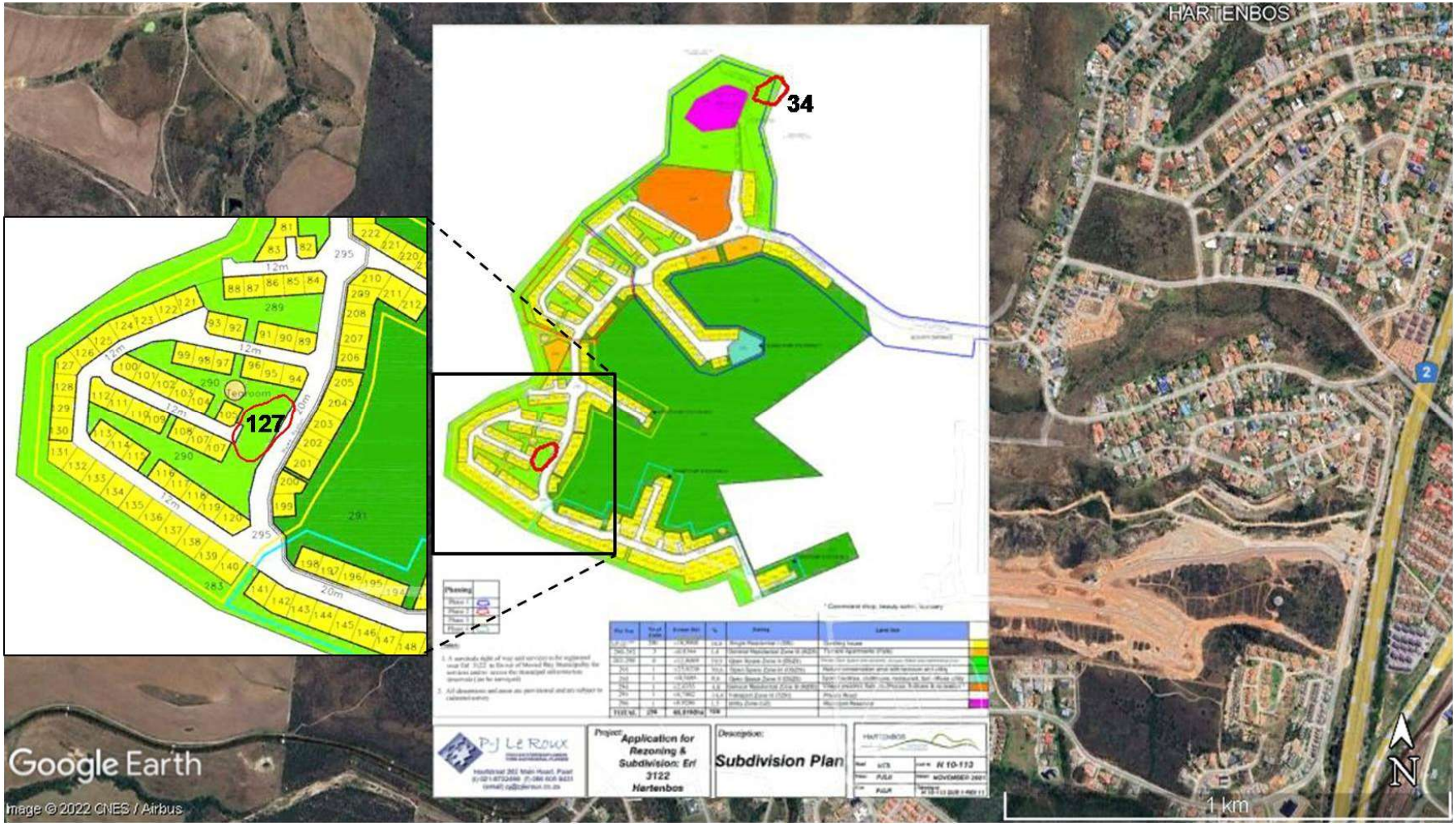

Figure 25. Location of heritage resources (34 & 127) relative to the Site Development Plan showing incorporation and protection of 127; and 34 falls in the northern conservation area and straddles the property boundary. Courtesy of the Applicant.

14. Appendices

Appendix A: Coordinate & Descriptive data for all observations and photographs

Name	Description img=image snd=sound	Datum: WGS 84 Lat/Lon dec.degrees	Datum: WGS 84 Grid: SA National	Elevation masl
1	img8160-3 snd8163	S34.13355 E22.08631	23 Y0084280 X3778853	122 m
2	MSA img8164-6 snd8166	S34.13324 E22.08624	23 Y0084287 X3778818	123 m
3	MSA img8167-9 snd8169	S34.13284 E22.08425	23 Y0084471 X3778775	125 m
4	stone artefact	S34.13261 E22.08366	23 Y0084526 X3778751	125 m
5	stone artefact	S34.13252 E22.08320	23 Y0084568 X3778741	127 m
6	MSA/LSA img8170-2 snd8172	S34.13245 E22.08300	23 Y0084587 X3778733	127 m
7	stone artefact	S34.13236 E22.08280	23 Y0084605 X3778724	128 m
8	stone artefact	S34.13232 E22.08269	23 Y0084615 X3778719	127 m
9	stone artefact	S34.13225 E22.08249	23 Y0084633 X3778711	127 m
10	MSA img8173-6 snd8176	S34.13221 E22.08249	23 Y0084634 X3778706	126 m
11	stone artefact	S34.13209 E22.08190	23 Y0084689 X3778694	125 m
12	img8177 snd8177	S34.13194 E22.08142	23 Y0084733 X3778678	127 m
13	stone artefact	S34.13155 E22.08078	23 Y0084792 X3778636	128 m
14	MSA img8178-80 snd8180	S34.13144 E22.08054	23 Y0084815 X3778623	129 m
15	stone artefact	S34.13140 E22.08043	23 Y0084825 X3778618	127 m
16	stone artefact	S34.13089 E22.07960	23 Y0084901 X3778563	129 m
17	stone artefact	S34.13030 E22.07974	23 Y0084890 X3778498	129 m
18	img8181-5 snd8185	S34.13006 E22.07965	23 Y0084898 X3778471	129 m
19	stone artefact	S34.12943 E22.08055	23 Y0084816 X3778401	127 m
20	stone artefact	S34.12881 E22.08145	23 Y0084733 X3778330	129 m
21	img8186-9 snd8189	S34.12702 E22.08132	23 Y0084747 X3778132	130 m
22	MSA img8190-1 snd8191	S34.12701 E22.08133	23 Y0084746 X3778132	131 m
23	GEO test hole img8192-3 snd8193	S34.12669 E22.08188	23 Y0084696 X3778095	127 m
24	MSA img8194-6 snd8196	S34.12604 E22.08231	23 Y0084657 X3778023	129 m
25	stone artefact	S34.12579 E22.08260	23 Y0084630 X3777994	130 m
26	stone artefact	S34.12566 E22.08275	23 Y0084616 X3777981	130 m
27	stone artefact	S34.12555 E22.08281	23 Y0084611 X3777968	131 m
28	stone artefact	S34.12559 E22.08305	23 Y0084589 X3777972	132 m
29	MSA img8198-8200 snd8200	S34.12526 E22.08460	23 Y0084446 X3777934	134 m
30	stone artefact	S34.12306 E22.08521	23 Y0084391 X3777690	124 m
31	img8201 snd8201	S34.12276 E22.08631	23 Y0084291 X3777656	126 m
32	stone artefact	S34.12291 E22.08643	23 Y0084279 X3777672	124 m
33	stone artefact	S34.12311 E22.08738	23 Y0084192 X3777693	124 m
34	MSA img8202-5 snd8205	S34.12311 E22.08733	23 Y0084197 X3777693	123 m
35	stone artefact	S34.12331 E22.08717	23 Y0084210 X3777716	128 m
36	stone artefact	S34.12357 E22.08713	23 Y0084214 X3777745	129 m
37	stone artefact	S34.12445 E22.08710	23 Y0084216 X3777842	117 m
38	stone artefact	S34.12507 E22.08728	23 Y0084199 X3777911	124 m
39	stone artefact	S34.12534 E22.08722	23 Y0084204 X3777941	128 m
40	img8206-7 snd8207	S34.12674 E22.08838	23 Y0084096 X3778095	121 m
41	stone artefact	S34.12748 E22.08946	23 Y0083996 X3778177	107 m
42	img8208 snd8208	S34.12788 E22.09082	23 Y0083870 X3778220	104 m
43	img8209 snd8209	S34.12819 E22.09174	23 Y0083785 X3778253	104 m
44	img8210 snd8210	S34.12789 E22.08905	23 Y0084033 X3778223	113 m
45	stone artefact	S34.12858 E22.08874	23 Y0084061 X3778300	110 m
46	stone artefact	S34.12827 E22.08823	23 Y0084108 X3778265	113 m
47	img8211 snd8211	S34.12855 E22.08820	23 Y0084110 X3778296	117 m
48	stone artefact	S34.12955 E22.08705	23 Y0084215 X3778408	110 m
49	img8212-3 snd8213	S34.13031 E22.08567	23 Y0084342 X3778493	111 m
50	stone artefact	S34.13069 E22.08479	23 Y0084424 X3778536	115 m
51	img8214 snd8214	S34.13062 E22.08424	23 Y0084474 X3778529	112 m
52	MSA img8215-20 snd8220	S34.13049 E22.08538	23 Y0084369 X3778513	106 m
53	GEO profile img8221-2 snd8222	S34.13070 E22.08589	23 Y0084322 X3778537	101 m
54	GEO profile img8223 snd8223	S34.13044 E22.08719	23 Y0084202 X3778507	96 m
55	stone artefact	S34.13063 E22.08773	23 Y0084152 X3778528	108 m
56	img8224 snd8224	S34.13098 E22.08807	23 Y0084120 X3778565	113 m
57	stone artefact	S34.13097 E22.08751	23 Y0084172 X3778566	116 m
58	img8225 snd8225	S34.13124 E22.08495	23 Y0084408 X3778598	120 m
59	img8226 snd8226	S34.12860 E22.08429	23 Y0084472 X3778305	121 m
60	stone artefact	S34.12884 E22.08672	23 Y0084247 X3778330	123 m
61	MSA/LSA img8227-30 snd8230	S34.12871 E22.08767	23 Y0084160 X3778314	122 m

Name	Description img=image snd=sound	Datum: WGS 84 Lat/Lon dec.degrees	Datum: WGS 84 Grid: SA National	Elevation masl
62	stone artefact	S34.12855 E22.08728	23 Y0084195 X3778297	123 m
63	stone artefact	S34.12955 E22.08349	23 Y0084544 X3778411	125 m
64	stone artefact	S34.13152 E22.08281	23 Y0084605 X3778630	123 m
65	stone artefact	S34.13171 E22.08344	23 Y0084547 X3778651	125 m
66	stone artefact	S34.13221 E22.08600	23 Y0084310 X3778704	123 m
67	stone artefact	S34.13265 E22.08620	23 Y0084292 X3778753	123 m
68	stone artefact	S34.13312 E22.08633	23 Y0084278 X3778804	124 m
69	stone artefact	S34.13326 E22.08636	23 Y0084276 X3778820	123 m
70	MSA img8231-4 snd8234	S34.13340 E22.08640	23 Y0084272 X3778835	123 m
71	img8235-7 snd8237	S34.13279 E22.08939	23 Y0083996 X3778765	97 m
72	img8238-9 snd8239	S34.13295 E22.08794	23 Y0084131 X3778784	114 m
73	stone artefact	S34.13345 E22.08644	23 Y0084268 X3778842	120 m
74	stone artefact	S34.13284 E22.08539	23 Y0084365 X3778775	123 m
75	ESA img8240-4 snd8244	S34.13292 E22.08524	23 Y0084379 X3778783	120 m
76	stone artefact	S34.13244 E22.08394	23 Y0084500 X3778732	123 m
77	stone artefact	S34.13212 E22.08278	23 Y0084607 X3778697	125 m
78	stone artefact	S34.13199 E22.08249	23 Y0084634 X3778683	125 m
79	stone artefact	S34.13188 E22.08222	23 Y0084659 X3778670	126 m
80	stone artefact	S34.13176 E22.08179	23 Y0084699 X3778658	126 m
81	stone artefact	S34.13131 E22.08088	23 Y0084783 X3778608	127 m
82	stone artefact	S34.13113 E22.08045	23 Y0084823 X3778589	128 m
83	img8245 snd8245	S34.13099 E22.08009	23 Y0084856 X3778574	128 m
84	stone artefact	S34.13056 E22.07990	23 Y0084874 X3778526	129 m
85	stone artefact	S34.12940 E22.08112	23 Y0084762 X3778397	128 m
86	stone artefact	S34.12914 E22.08178	23 Y0084703 X3778367	127 m
87	stone artefact	S34.12842 E22.08168	23 Y0084712 X3778287	129 m
88	stone artefact	S34.12670 E22.08220	23 Y0084666 X3778096	130 m
89	stone artefact	S34.12613 E22.08277	23 Y0084614 X3778032	131 m
90	stone artefact	S34.12581 E22.08329	23 Y0084567 X3777996	131 m
91	stone artefact	S34.12587 E22.08434	23 Y0084470 X3778002	130 m
92	stone artefact	S34.12580 E22.08482	23 Y0084425 X3777994	129 m
93	stone artefact	S34.12320 E22.08548	23 Y0084367 X3777705	130 m
94	stone artefact	S34.12355 E22.08678	23 Y0084246 X3777743	132 m
95	MSA/LSA img8246-50 snd8250	S34.12371 E22.08667	23 Y0084256 X3777761	132 m
96	stone artefact	S34.12390 E22.08666	23 Y0084258 X3777781	129 m
97	stone artefact	S34.12532 E22.08696	23 Y0084228 X3777939	127 m
98	img8251-3 snd8253	S34.12552 E22.08696	23 Y0084228 X3777961	127 m
99	img8254-5 snd8255	S34.12760 E22.08929	23 Y0084011 X3778190	111 m
100	stone artefact	S34.12519 E22.08592	23 Y0084324 X3777925	132 m
101	stone artefact	S34.12503 E22.08521	23 Y0084390 X3777908	134 m
102	stone artefact	S34.12737 E22.08179	23 Y0084703 X3778171	128 m
103	stone artefact	S34.12791 E22.08179	23 Y0084702 X3778231	128 m
104	stone artefact	S34.12836 E22.08190	23 Y0084692 X3778280	127 m
105	stone artefact	S34.12909 E22.08212	23 Y0084671 X3778361	127 m
106	img8256 snd8256	S34.12994 E22.08093	23 Y0084780 X3778457	128 m
107	stone artefact	S34.13080 E22.08029	23 Y0084838 X3778552	128 m
108	stone artefact	S34.13118 E22.08118	23 Y0084756 X3778594	127 m
109	stone artefact	S34.13147 E22.08190	23 Y0084689 X3778625	126 m
110	stone artefact	S34.13191 E22.08390	23 Y0084504 X3778673	123 m
111	stone artefact	S34.13196 E22.08401	23 Y0084493 X3778678	123 m
112	MSA/LSA img8257-62 snd8262	S34.13207 E22.08430	23 Y0084467 X3778690	123 m
113	stone artefact	S34.13223 E22.08489	23 Y0084412 X3778707	121 m
114	ESA img8263-7 snd8267	S34.13254 E22.08539	23 Y0084366 X3778741	122 m
115	img8268-73 snd8273	S34.12838 E22.08296	23 Y0084594 X3778282	126 m
116	stone artefact	S34.12689 E22.08552	23 Y0084360 X3778114	123 m
117	stone artefact	S34.12772 E22.08558	23 Y0084353 X3778207	122 m
118	ESA img8274-80 snd8280	S34.12854 E22.08608	23 Y0084306 X3778297	121 m
119	stone artefact	S34.12675 E22.08483	23 Y0084423 X3778100	126 m
120	ESA img8281-6 snd8286	S34.12675 E22.08466	23 Y0084439 X3778100	126 m
121	stone artefact	S34.12766 E22.08314	23 Y0084578 X3778202	126 m
122	MSA img8287-92 snd8292	S34.12810 E22.08283	23 Y0084606 X3778251	127 m

Name	Description img=image snd=sound	Datum: WGS 84 Lat/Lon dec.degrees	Datum: WGS 84 Grid: SA National	Elevation masl
123	stone artefact	S34.12846 E22.08256	23 Y0084631 X3778291	127 m
124	stone artefact	S34.12947 E22.08217	23 Y0084666 X3778403	126 m
125	stone artefact	S34.13012 E22.08194	23 Y0084686 X3778476	127 m
126	MSA img8293-5 snd8295	S34.13049 E22.08173	23 Y0084705 X3778517	127 m
127	ESA img8296-8301 snd8301	S34.13060 E22.08164	23 Y0084713 X3778529	126 m
128	stone artefact	S34.13092 E22.08150	23 Y0084727 X3778564	128 m
129	stone artefact	S34.13111 E22.08130	23 Y0084744 X3778585	128 m
130	stone artefact	S34.13092 E22.08121	23 Y0084753 X3778564	129 m
131	stone artefact	S34.13000 E22.08169	23 Y0084710 X3778463	129 m
132	stone artefact	S34.13013 E22.08151	23 Y0084726 X3778477	129 m
133	stone artefact	S34.13069 E22.08113	23 Y0084761 X3778539	130 m
134	stone artefact	S34.13114 E22.08175	23 Y0084703 X3778589	128 m
135	stone artefact	S34.13091 E22.08222	23 Y0084660 X3778563	125 m
136	LSA img8302-8 snd8308	S34.13085 E22.08226	23 Y0084656 X3778556	125 m
137	stone artefact	S34.13077 E22.08229	23 Y0084653 X3778547	124 m
138	MSA img8309-12 snd8312	S34.13063 E22.08241	23 Y0084642 X3778532	122 m
139	stone artefact	S34.13029 E22.08244	23 Y0084640 X3778494	124 m
140	stone artefact	S34.13008 E22.08249	23 Y0084636 X3778470	123 m
141	stone artefact	S34.12968 E22.08261	23 Y0084625 X3778426	122 m
142	stone artefact	S34.12948 E22.08265	23 Y0084621 X3778404	123 m
143	stone artefact	S34.12914 E22.08281	23 Y0084607 X3778366	123 m
144	img8313-5 snd8315	S34.12854 E22.08316	23 Y0084576 X3778299	121 m
145	stone artefact	S34.13082 E22.08262	23 Y0084623 X3778553	123 m
146	stone artefact	S34.13030 E22.08307	23 Y0084582 X3778494	122 m
147	stone artefact	S34.12917 E22.08354	23 Y0084540 X3778369	123 m
148	stone artefact	S34.12805 E22.08272	23 Y0084617 X3778245	126 m
149	stone artefact	S34.12677 E22.08403	23 Y0084497 X3778102	128 m
150	stone artefact	S34.12652 E22.08477	23 Y0084429 X3778074	126 m
151	stone artefact	S34.12637 E22.08567	23 Y0084346 X3778057	126 m
152	stone artefact	S34.12636 E22.08594	23 Y0084322 X3778055	126 m
153	stone artefact	S34.12576 E22.08582	23 Y0084333 X3777989	129 m
154	stone artefact	S34.12529 E22.08561	23 Y0084353 X3777936	131 m
155	stone artefact	S34.12500 E22.08564	23 Y0084350 X3777904	130 m
156	stone artefact	S34.12487 E22.08542	23 Y0084370 X3777890	132 m
157	stone artefact	S34.12517 E22.08536	23 Y0084376 X3777924	131 m
158	stone artefact	S34.12563 E22.08534	23 Y0084378 X3777975	129 m
159	stone artefact	S34.12618 E22.08536	23 Y0084375 X3778036	127 m
160	stone artefact	S34.12635 E22.08434	23 Y0084469 X3778055	128 m
161	stone artefact	S34.12775 E22.08242	23 Y0084645 X3778212	126 m
162	stone artefact	S34.12603 E22.08515	23 Y0084394 X3778019	127 m
257 Mos 33	trig beacon 257 Mos 33	S34.12369 E22.08566	23 Y0084350 X3777759	
A	Erf 3122 boundary point	S34.12258 E22.08597	23 Y0084322 X3777636	
A1	Erf 3122 boundary point	S34.13200 E22.08132	23 Y0084742 X3778684	
B	Erf 3122 boundary point	S34.12303 E22.08744	23 Y0084186 X3777684	
B1	Erf 3122 boundary point	S34.13091 E22.07945	23 Y0084916 X3778565	
C	Erf 3122 boundary point	S34.12406 E22.08694	23 Y0084231 X3777799	
C1	Erf 3122 boundary point	S34.12987 E22.07957	23 Y0084906 X3778450	
D	Erf 3122 boundary point	S34.12509 E22.08726	23 Y0084201 X3777913	
D1	Erf 3122 boundary point	S34.12928 E22.08060	23 Y0084811 X3778383	
E	Erf 3122 boundary point	S34.12606 E22.08719	23 Y0084206 X3778021	
E1	Erf 3122 boundary point	S34.12900 E22.08145	23 Y0084733 X3778351	
F	Erf 3122 boundary point	S34.12628 E22.08768	23 Y0084161 X3778045	
F1	Erf 3122 boundary point	S34.12884 E22.08158	23 Y0084721 X3778333	
G	Erf 3122 boundary point	S34.12765 E22.08975	23 Y0083969 X3778195	
G1	Erf 3122 boundary point	S34.12729 E22.08103	23 Y0084773 X3778162	
H	Erf 3122 boundary point	S34.12784 E22.09015	23 Y0083932 X3778215	
H1	Erf 3122 boundary point	S34.12563 E22.08279	23 Y0084613 X3777976	
J	Erf 3122 boundary point	S34.12811 E22.09260	23 Y0083705 X3778244	
J1	Erf 3122 boundary point	S34.12564 E22.08454	23 Y0084451 X3777976	
K	Erf 3122 boundary point	S34.12829 E22.09219	23 Y0083743 X3778264	
K1	Erf 3122 boundary point	S34.12444 E22.08464	23 Y0084443 X3777843	

Name	Description img=image snd=sound	Datum: WGS 84 Lat/Lon dec.degrees	Datum: WGS 84 Grid: SA National	Elevation masl
L	Erf 3122 boundary point	S34.12824 E22.09179	23 Y0083780 X3778259	
L1	Erf 3122 boundary point	S34.12330 E22.08474	23 Y0084435 X3777716	
M	Erf 3122 boundary point	S34.12860 E22.09173	23 Y0083785 X3778299	
N	Erf 3122 boundary point	S34.12838 E22.08973	23 Y0083970 X3778276	
P	Erf 3122 boundary point	S34.12817 E22.08942	23 Y0083999 X3778253	
Q	Erf 3122 boundary point	S34.12985 E22.08664	23 Y0084253 X3778441	
R	Erf 3122 boundary point	S34.13097 E22.08826	23 Y0084103 X3778564	
S	Erf 3122 boundary point	S34.13113 E22.08580	23 Y0084330 X3778584	
T	Erf 3122 boundary point	S34.13286 E22.08662	23 Y0084252 X3778775	
U	Erf 3122 boundary point	S34.13210 E22.08882	23 Y0084050 X3778689	
V	Erf 3122 boundary point	S34.13260 E22.08906	23 Y0084027 X3778744	
W	Erf 3122 boundary point	S34.13356 E22.08629	23 Y0084282 X3778853	
X	Erf 3122 boundary point	S34.13301 E22.08602	23 Y0084307 X3778792	
Y	Erf 3122 boundary point	S34.13317 E22.08551	23 Y0084354 X3778811	
Z	Erf 3122 boundary point	S34.13325 E22.08525	23 Y0084378 X3778820	

Appendix B: Methodology for Assessing the Significance of Impacts

EFFECT	**Extents/Spatial Scale**		**E**
	Localized	At localized scale and a few hectares in extent.	1
	Study area	The proposed site and its immediate environs.	2
	Regional	District and Provincial level.	3
	National	Country.	4
	International	Internationally.	5
	Duration/Temporal Scale		**D**
	Very short	Less than 1 year.	1
	Short term	Between 2 to 5 years.	2
	Medium term	Between 5 and 15 years.	3
	Long term	Exceeding 15 years and from a human perspective almost permanent.	4
	Permanent	Resulting in a permanent and lasting change.	5
	Magnitude/Intensity (Archaeological Sensitivity / Significance)		**M**
	No potential	Locations or sediments entirely lacking archaeological remains or context suitable for scientific value.	0
	Marginal	Limited probability for producing archaeological resources from certain contexts and localities.	2
	Low	Archaeological resources present but of Not Conservation Worthy status – requiring no further archaeological investigation or mitigation.	4
	Medium	Archaeological resources present and rated as Grade III – local significance – requiring some archaeological investigation or mitigation.	6
	High	Archaeological resources present and rated as Grade II – regional significance – requiring archaeological investigation or mitigation, possible complete protection as No-Go area.	8
	Very high	Archaeological resources present and rated as Grade I – national or international significance – requiring complete protection as No-Go area.	10
	Probability/Likelihood		**P**
	Very improbable	Probably will not happen.	1
	Improbable	Some possibility, but low likelihood.	2
	Probable	Distinct possibility of these impacts occurring.	3
	Highly probable	The impact is most likely to occur.	4
	Definite	The impact will definitely occur regardless of prevention measures.	5

SIGNIFICANCE = (E+D+M) x P		
< 30	LOW	The impact would not have a direct influence on the decision to develop in the area
30-60	MEDIUM	The impact could influence the decision to develop in the area unless it is effectively mitigated
>60	HIGH	The impact must have an influence on the decision process to develop in the area

Appendix C: *Curriculum vitae*

Biographics:

Names & Surname:	Peter John Nilssen
Address:	41, 21st Avenue Mossel Bay 6500, South Africa
Postal Address:	P.O. Box 2635, Mossel Bay, 6500, South Africa
Telephone/Contact:	Cellular phone: (27) 082 783 5896, E-mail: peter@carm.co.za
Identity Number:	641214 5081 080
Nationality:	South African
Family Status:	Married with two children
Drivers Licence:	Code 02, 11/02/1987, Code 08, 15/12/1982
Health:	Excellent
Languages:	English, Afrikaans

Education:

School & Certificate:	Rondebosch Boys High School, 1978 – 1982, Cape Senior Certificate, Full Matriculation Exemption
University & Degrees:	University of Cape Town (UCT), South Africa - Ph.D. in archaeology (2000), BA HONS in archaeology (1989), and BA major in archaeology (1988)

Professional Accreditation & Affiliation

Professional member of the Association of Southern African Professional Archaeologists (ASAPA) since 1989, including the Cultural Resource Management section of the same association (ASAPA professional member # 097).

Accreditation:

- Principal Investigator for archaeozoology (specialist analysis), coastal & shell midden archaeology and Stone Age archaeology;
- Field Director for Colonial Period;
- Field Supervisor for Iron Age and Rock Art.

Affiliation:

- Honorary Research Associate of Iziko – South African Museum, Cape Town

Professional Employment

Date	Employer	Description
1989 - 1994	Prof. J.E. Parkington, UCT	Research Assistant
1990 – 1992	Prof. J.E. Parkington, UCT	Tutor for excavations
1991 & 1992	Dept. Archaeology, UCT	Tutor - Archaeology
1995 & 1996	Prof. A. Sillen, UCT	Research Assistant
1993 - 1999	Various scientists	Faunal analysis
1991 - 1999	Archaeology Contracts Office (UCT)	Cultural Resource Management
1991 - 1999	Agency for CRM (J Kaplan)	Cultural Resource Management
1999 - 2004	Prof. C.W. Marean, State University of New York, Stony Brook, USA	Contracted researcher and faunal analyst
2000 - 2001	Dr. C.S. Henshilwood, IZIKO	Faunal analysis, Blombos Cave
2003	Prof. Judith C. Sealy, UCT	Faunal analysis
2004 - 2006	Institute of Human Origins (IHO) Arizona State University, Tempe, USA	Co- Director & researcher, Pinnacle Point Site Complex, Mossel Bay
2007 to present	self employed	Archaeological & Heritage Consultant
2013 to present	Point of Human Origins	Founder and owner – anchor site for

		the Cradle of Human Culture tourism route - Pinnacle Point Site Complex, Mossel Bay

Experience:

Considerable fieldwork (survey, recording, mapping & excavation) and project experience in both archaeological research (Western Cape Province) and cultural resource management (CRM - Western, Eastern and Northern Cape Provinces of South Africa as well as Lesotho) spanning much of the Southern African prehistoric (Stone Age and Pastoralist) and historic (Colonial) periods.

CRM Project types include:

- Notification of Intent to Develop & accompanying Heritage Statements
- Archaeological specialist studies
- Heritage Impact Assessments
- Research & CRM archaeological excavations in Historic and Prehistoric sites

Development types:

- Single and complex residential & industrial
- Golf course
- Nature reserve / game farm
- Solar and wind facilities
- Roads, walkways, pipelines, cables, powerlines
- Dams
- Mines

Publications & Reports

Book:

- Nilssen, Peter. 2011. Hunting or Scavenging in the Early and Middle Stone Ages of Africa – Experimental archaeology and reconstructing hominid strategies of carcass acquisition and butchery in the Upper Pleistocene and Plio-Pleistocene. VDM Verlag Dr. Muller GmbH & Co. KG (ISBN 978-3-639-37474-2)

Peer Review Publications:

- Nilssen, Peter and Craig Foster. 2017. The key to our future is buried in the past – philosophical thoughts on saving us from ourselves. The Digging Stick Vol 34, 1
- Antonieta Jerardino, Jonathan Kaplan, Rene Navarro and Peter Nilssen. 2016. Filling in the gaps and testing past scenarios on the Central West Coast: Hunter-gatherer subsistence and mobility at 'Deurspring 16' Shell Midden, Lamberts Bay, South Africa. *The South African Archaeological Bulletin* June 2016.
- McGrath, J.R., Cleghorn, N., Gennari, B., Henderson, S., Kyriacou, K., Nelson-Viljoen, C., Nilssen, P., Richardson, L., Shelton, C., Wilkins, J., & Maeran, C.W. 2015. The Pinnacle Point Shell Midden Complex: a Mid to Late Holocene Record of Later Stone Age Coastal Foraging Along the Southern Cape Coast of South Africa. South African Archaeological Bulletin 70 (202): 209–219.
- Abe, Y., C.W. Marean, P.J. Nilssen & D.J. Allen. 2014. Taphonomy–Edged, Incised, Hacking, and Impaling Traumas. International Journal of Osteoarchaeology 12(2):142 - 143 · January 2014
- Marean, C.W., Bar-Matthews, M., Fisher, E., Goldberg, P., Herries, A., Karkanas, P., Nilssen, P.J., Thomson, E. 2010. The stratigraphy of the Middle Stone Age sediments at Pinnacle Point Cave 13B (Mossel Bay, Western Cape Province, South Africa). Journal of Human Evolution, 59(3-4):234-55.
- Thalassa Matthews, Curtis Marean & Peter Nilssen 2009. Micromammals from the Middle Stone Age (92–167 ka) at Cave PP13B, Pinnacle Point, south coast, South Africa. Palaeontologia Africana (December 2009) 44: 112–120
- Miryam Bar-Matthews, Curtis Marean , Zenobia Jacobs , Panagiotis Karkanas , Erich Fisher , Andy Herries , Kyle Brown , Hope Williams , Jocelyn Bernatchez , Avner Ayalon , Peter Nilssen. 2010. A high resolution and continuous isotopic speleothem record of paleoclimate and paleoenvironment from 90 to 53 ka from Pinnacle Point on the south coast of South Africa. Quaternary Science Reviews 29(17–18):2131-2145.
- Marean, C. W., Thompson, E., Williams, H., Bernatchez J. Nilssen, P. J *et al* (2007) "Early Human use of Marine resources and pigments in South Africa during the Middle Pleistocene" *Nature*
- Marean, C. W., Nilssen, P. J., Brown, K., Jerardino, A., and D. Stynder (2004) "Paleoanthropological Investigations of Middle Stone Age Sites at Pinnacle Point, Mossel Bay (South Africa): Archaeology and Hominid Remains from the 2000 Field Season." *PaleoAnthropology*

- Marean, C.W., Bar-Matthews, M., Nilssen, P.J., Fisher, E., Herries, A., and Karkanas, P. 2006. Paleoclimatic context of the origins of modern humans in South Africa: Based on speleothems isotopic record. *Geochmica et Cosmochimica Acta* 70(18) DOI: 10.1016/j.gca.2006.06.788
- Yoshiko Abe, Curtis W. Marean, Peter J. Nilssen, Zelalem Assefa, and Elizabeth Stone 2002. "The analysis of cut marks on archaeofauna: a review and critique of quantification procedures, and a new image-analysis GIS approach." *American Antiquity* 67:
- C.W. Marean, Y. Abe, P.J. Nilssen, and E. Stone 2001. "Estimating the minimum number of skeletal elements (MNE) in zooarchaeology: a review and a new image-analysis GIS approach." *American Antiquity* 66:333-348.
- Jerardino, R. Navarro, and P. Nilssen, 2001. An approach to the study of Cape rock lobster (*Jasus lalandii*) exploitation in the past: morphometric equations for estimating carapace length from mandible sizes. *South African Journal of Science* 97:59-62.
- D'Errico, F, C. Henshilwood and P. Nilssen 2001. An engraved bone fragment from c. 70,000-year-old Middle Stone Age levels at Blombos Cave, South Africa: implications for the origin of symbolism and language. *Antiquity* 75 (288): 309-318.
- Nilssen, Peter John. 2000. An actualistic butchery study in South Africa and its implications for reconstructing hominid strategies of carcass acquisition and butchery in the upper pleistocene and plio-pleistocene. Unpublished PhD dissertation, University of Cape Town, South Africa.
- Nilssen, Peter. 1994. Framing the present to capture the past: An example of videography in actualistic research. The *South African Archaeological Bulletin* Vol. XLIX (160): 100-102.
- Henshilwood, C., Nilssen, P. and Parkington, J. 1994. Mussel drying and food storage in the late Holocene, SW Cape, South Africa. *Journal of Field Archaeology*. 21: 103 - 109.
- Parkington, J., Nilssen, P., Reeler, C. and Henshilwood, C. 1992. Making sense of space at Dunefield Midden campsite, western Cape, South Africa. *Southern African Field Archaeology*. 1 (2): 63-71.

Heritage-related Reports & Impact Assessments:

More than 240 reports completed to date as Principal Investigator

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Appendix D: Declaration of Independence

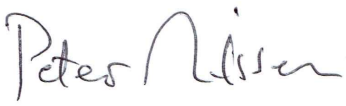
Archaeological Impact Assessment: (HWC Case No. 20190809SB0909E) Proposed Residential Development on Erf 3927 (Still Bay West), Riversdale District and Hessequa Municipality

Terms of Reference: This assessment forms part of the Heritage Impact Assessment and assesses the overall archaeological sensitivities of the project area.

Declaration:

I, **Peter Nilssen**, as the appointed independent specialist hereby declare that I:

- acted as the independent specialist in the compilation of the above report;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have any vested interest in the proposed activity proceeding;
- have disclosed to the EAP any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management act;
- have provided the EAP with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.



Signature of the specialist

Date: 30 May 2022

Appendix E: Glossary & Abbreviations

Historic: period comprising the last few hundred years in South Africa (from around the year 1488) of colonial (mostly western European people) occupation

Hominin: Any member of the tribe Hominini, the evolutionary group that includes modern humans and now-extinct bipedal relatives

Midden: refuse from human occupation that may contain cultural and food remains

Shell midden: refuse from human occupation that may contain cultural and faunal remains, but that is dominated by the remains of shellfish

Stone Age: period of hominin occupation with stone implements being the dominant and often only surviving technology, spanning the period between approximately 3 million years ago and 2 thousand years ago

Abbreviations

ASAPA: Association of Southern African Professional Archaeologists	**MSA**: Middle Stone Age
BA: Basic Assessment	**NCW**: Not Conservation Worthy
CRM: Cultural Resources Management	**NEMA**: National Environmental Management Act (Act No. 107 of 1998)
EMPr: Environmental Management Program	**NHRA**: National Heritage Resources Act (Act No. 25 of 1999)
ESA: Early Stone Age	**NID**: Notification of Intent to Develop
GPS: global positioning system	**PPP**: Public Participation Process which includes Community Consultation
HIA: Heritage Impact Assessment	**SAHRA**: South African Heritage Resources Agency
HWC: Heritage Western Cape	**SAHRIS**: South African Heritage Resources Information System
LSA: Later Stone Age	