ARCHAEOLOGICAL IMPACT ASSESSMENT
PROPOSED EXPANSION OF DIAMOND COAST AQUACULTURE FARM ON PORTION 1 OF FARM KLEINZEE 654 KLEINZEE NORTHERN CAPE

SAHRA CASE Id: 11907

Report prepared for

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On behalf of

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Executive summary

1. Introduction

ACRM was appointed to conduct an Archaeological Impact Assessment (AIA) for the proposed expansion of the Diamond Coast Aquaculture farm at Kleinzee in the Northern Cape Province. Kleinzee is located about 60kms north of Hondeklipbaai at the mouth of the Buffels River. Currently, Diamond Coast Aquaculture operates a land-based marine aquaculture farm on Portion 1 of the Farm Kleinzee 654, a little north of the town, on land previously owned and mined by De Beers Consolidated Mining.

The AIA forms part of a wider Heritage Impact Assessment (or HIA) requested by the South African Heritage Resources Agency (*SAHRA Case Id: 11907*), which includes a Maritime Archaeological Impact Assessment and a Palaeontological Impact Assessment (PIA).

Anchor Environmental is the appointed independent Environmental Assessment Practitioner (EAP) responsible for facilitating the Basic Assessment process for Environmental Authorization.

2. The development proposal

Diamond Coast Aquaculture (DCA) is proposing to increase production of aquaculture products by expanding their existing facilities. The proposed expansion includes the construction of new hatcheries, finfish production ponds, expansion of the abalone growing tanks, and the construction of buildings to accommodate staff facilities. A new pump house will be built adjacent to the existing one near the beach. Additional brine intake pipes will be installed at the existing pump house, while the new pump house will be fitted with new brine intake pipes. A new outfall pipeline will be constructed on the northern side of the aquaculture farm to ensure that effluent is released below the low tide mark on the shore.

DCA are also proposing to construct a small wind energy facility (a maximum of 28 turbines), in an area of mostly overburden mine dumps and tailings in the currently restricted decommissioned area east of the abalone farm.

3. Aim

The overall purpose of the AIA is to assess the sensitivity of archaeological resources in the proposed development footprint area(s), to determine the potential impacts on such resources, and to avoid and/or minimise such impacts by means of management and/or mitigation measures.

The significance of archaeological resources was assessed in terms of their content and context. Attributes considered in determining significance include artefact and/or ecofact types, rarity of finds, exceptional items, organic preservation, potential for future research, density of finds and the context in which archaeological traces occur.

4. Results

A field assessment of the proposed activities (i.e. the aquaculture farm & wind energy facility), was undertaken by ACRM in January 2018 in which the following findings were made

4.1 Proposed aquaculture farm

Traces of archaeological resources were recorded on the slightly consolidated sands close to the existing pump station, where additional pipelines will traverse the seaside dune area. These comprise mostly dispersed scatters of marine shellfish, dominated by limpets (*Scutellastra argenvillei* & *Cymbula granatina*). One or two more dense patches of shellfish were also noted, that included several quartzite flakes and unworked beach cobbles on the flat, degraded sandy plain alongside the gravel road. No pottery, ostrich eggshell or any other organic remains were found despite a detailed search of the surrounding near shore area.

A displaced scatter of marine shellfish and a few round beach cobbles and quartzite flakes were recorded on a berm adjacent the proposed supply line, alongside the gravel road between the DCA site office and the Kleinzee Oyster farm.

Several isolated patches of weathered marine shellfish and non-artefactual stone was recorded in the mined out and degraded footprint area of the proposed fish farm south east of the DCA site office.

Apart from one or two ephemeral scatters of displaced shellfish on large tailings adjacent the effluent channel, and some isolated shell, stone flakes and chunks in the footprint of the proposed abalone farming area, no other archaeological traces were found, where almost the entire area has been heavily mined for diamonds.

The archaeological remains have been rated as having *low* (Grade 3C) significance.

4.2 Proposed wind energy facility

A few isolated stone flakes, a miscellaneous grindstone, and several dispersed and eroded scatters of shellfish, were located in the northern portion of the proposed footprint area, east of the existing aquaculture farm. The entire area has been, heavily mined for diamonds, comprising an irrevocably transformed landscape of un-rehabiliated and rehabilited mine dumps. A few quartzite flakes and chunks, and isolated fragments of limpet shell were also found on degraded tailings alongside the gravel road in the southern portion of the proposed footprint area.

An ephemeral scatter of marine shellfish (limpets), imported stone cobbles, and limited numbers of quartz, silcrete and quartzite flakes were recorded on a high, degraded dune overlooking the Buffels River in the south western portion of the proposed footprint area. A few fragments of Cape Coastal pottery were also found. A nearby patch of surface quartz may have been targeted as a source of raw material by Later Stone Age hunter-gatherers.

The archaeological remains have been rated as having *low* (Grade 3C) significance.

5. *Impact Statement*

Potentially significant impacts are likely to be limited, and where they do occur, will be confined to the shore near the existing pump station, where additional pipelines will traverse the seaside dune area.

However, the overall results of the study indicate that the proposed activities (i.e. expansion of the existing DCA aquaculture farm & a wind energy facility), will not have a significant impact on any important archaeological heritage.

The impact significance of the proposed development on archaeological heritage is therefore assessed as LOW.

6. Conclusion

Traces of archaeological deposits were recorded in both the proposed footprint area of the aquaculture farm, and the proposed wind energy facility, but indications are that, in terms of archaeological heritage, the affected environment is not a threatened landscape. Almost the entire area has been heavily mined for diamonds, and archaeological resources have either been destroyed, or are degraded as a result.

Fortunately, many of the archaeological sites in the areas previously owned and mined by De Beers, have been mitigated by archaeologists from the Archaeology Contracts Office (ACO), and therefore much is known about the precolonial history of this dry and arid landscape.

7. Recommendations

1. No archaeological mitigation is required prior to construction activities commencing.

2. Excavations for any underground pipelines in the area around the pump station (i. e. the aquaculture farm) must be carefully monitored by the Environmetnal Control Officer (ECO). The ECO must be briefed by the archaeologist prior to any excavations commencing.

3. Should any unmarked human burials/remains or ostrich eggshell water flask caches for example, be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (Ms Natasha Higgit 021 462 4502). Burials, etc. must not be removed or disturbed until inspected by the archaeologist.

4. The archaeologist must be consulted on the final placement of wind turbines in the southern portion of the proposed development site.

5. The above recommendations must be included in the Environmental Management Plan (EMP) for the proposed aquaculture and wind energy farm development

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1. INTRODUCTION

ACRM was appointed by Diamond Coast Aquaculture (DCA) to conduct an Archaeological Impact Assessment (AIA) for the proposed expansion of the Diamond Coast Aquaculture farm at Kleinzee in the Northern Cape Province. Kleinzee is located about 60kms north of Hondeklipbaai at the mouth of the Buffels River (Figures 1 & 2).

Currently, Diamond Coast Aquaculture operates a land-based marine aquaculture farm on Portion 1 of the Farm Kleinzee 654 a little north of the town, on land previously owned and heavily mined by De Beers Consolidated Mining.

The AIA forms part of a wider Heritage Impact Assessment (or HIA) requested by the South African Heritage Resources Agency (*SAHRA Case Id: 11907*), which includes a desktop Maritime Archaeological Impact Assessment (Gribble 2018) and a desktop Palaeontological Impact Assessment (Pether 2018).

Anchor Environmental is the appointed independent Environmental Assessment Practitioner (EAP) responsible for facilitating the Basic Assessment process for Environmental Authorization.

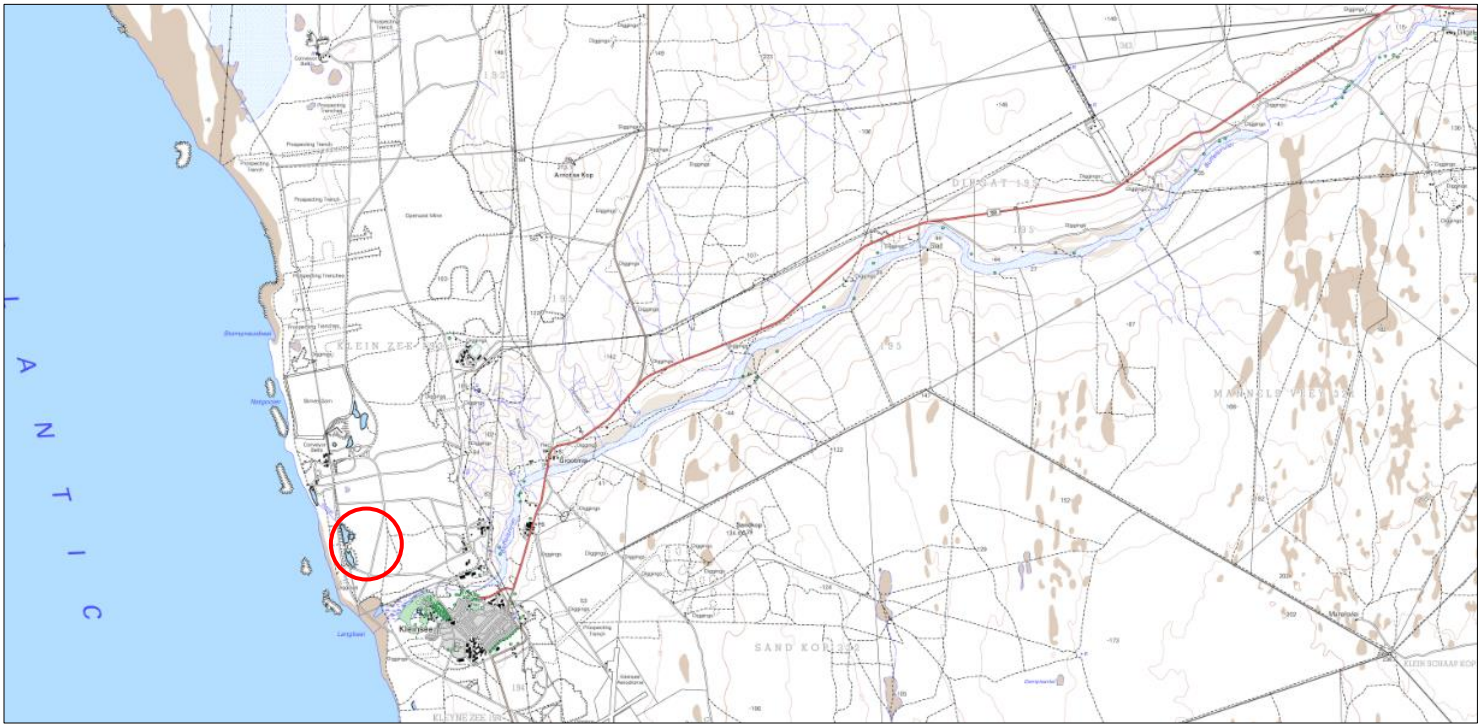

Figure 1. Locality map. 1:50 000 topo-cadastral sheet 2916DB & 2917CA Kleinsee. The red polygon is the study area

Figure 2. Google satellite map indicating the location of the existing DCA aquaculture farm and the study area (red polygon) in Kleinzee

2. THE DEVELOPMENT PROPOSAL

Diamond Coast Aquaculture (DCA) currently produces approximately 100 tons of abalone and 200 tons of seaweed per annum. The proposal is to expand the existing facilities in order to both diversify production and significantly increase production volumes (Figure 3).

DCA thus propose to increase production capacity of up to 1000 tons of abalone, 2000 tons of finfish, 5000 tons of seaweed, 300 tons of oysters, sea urchins and/or sea cucumbers. The proposed expansion includes the construction of three new hatcheries, finfish production ponds, the expansion of the existing abalone growing tanks and the construction of buildings to accommodate staff facilities. A second pump house will be built adjacent to the existing one near the beach. Five additional brine intake pipes will be installed at the existing pump house while the new pump house will be fitted with three brine intake pipes. A new outfall pipeline will be constructed on the northern side of the aquaculture farm to ensure that effluent is released below the low tide mark on the shore.

DCA are also proposing to construct a small wind energy facility (a maximum of 28 wind turbines, but most likely not exceeding 15 turbines), in an area of mostly overburden mine dumps, in the decommissioned mine area east of the existing aquaculture farm.

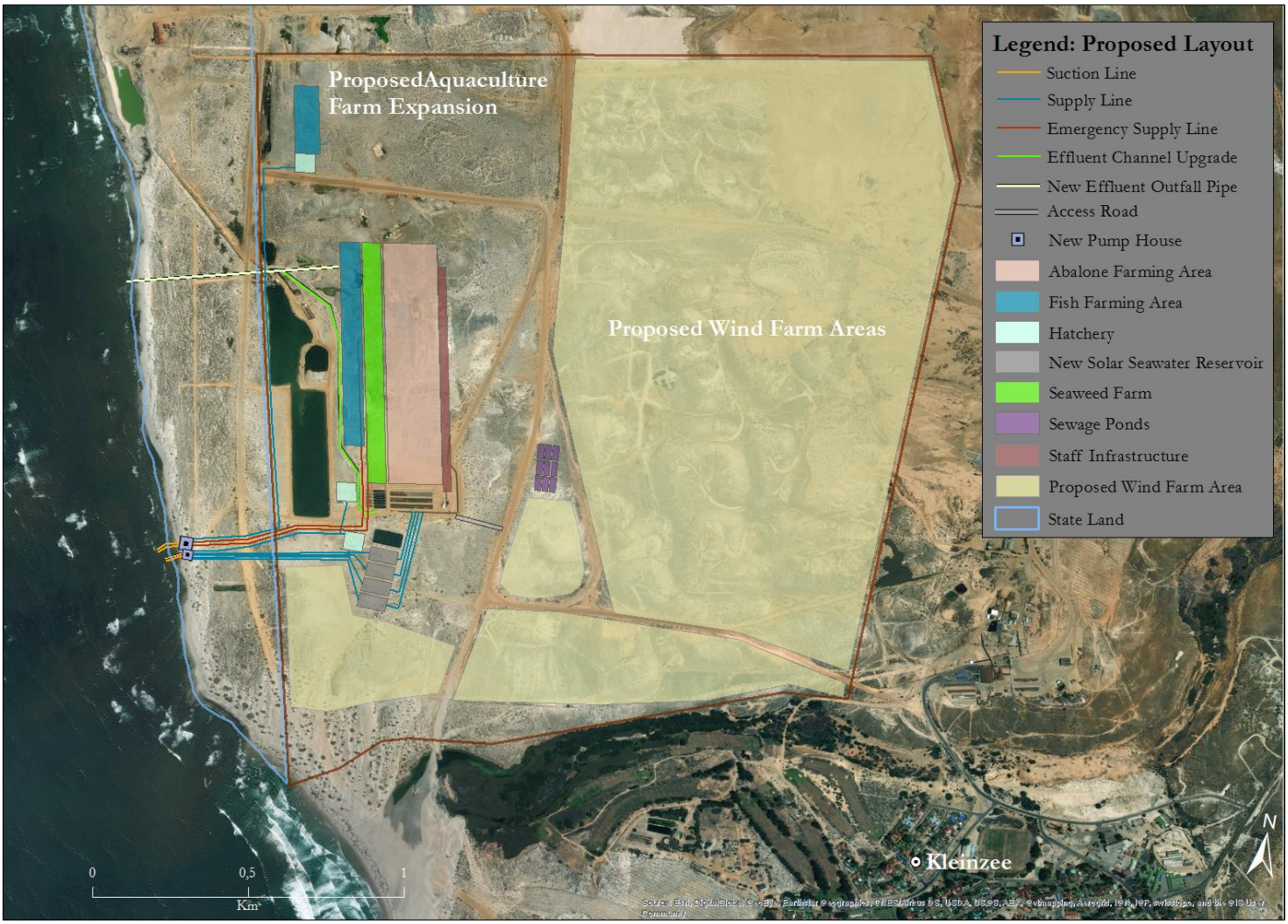

Figure 3. Proposed site development plan (Anchor Environmental Consultants Nov. 2017).

3. HERITAGE LEGISLATION

The National Heritage Resources Act (NHRA No. 25 of 1999) protects archaeological and palaeontological sites and materials, as well as graves/cemeteries, shipwrecks, battlefield sites and buildings, structures and features over 60 years old. The South African Heritage Resources Agency (SAHRA) administers this legislation nationally, with Heritage Resources Agencies acting at provincial level.

According to the Act (Sect. 35), it is an offence to destroy, damage, excavate, alter of remove from its original place, or collect, any archaeological, palaeontological and historical material or object, without a permit issued by the SAHRA or applicable Provincial Heritage Resources Agency.

SAHRA was duly notified of the proposed expansion of the aquaculture farm, and development of a small wind energy facility. In a letter to Diamond Coast Aquaculture (*Case Id: 11907*), SAHRA requested that a Heritage Impact Assessment (or HIA),

comprising an archaeological, maritime archaeology and palaeontological impact assessment, must be undertaken, as part of the environmental application process.

4. TERMS OF REFERENCE

The terms of reference for the archaeological study were to:

- Determine whether there are likely to be any important archaeological remains that may be impacted by the proposed development;

- Indicate any archaeological constraints that would need to be taken into account in considering the development proposal;

- Identify possible `No-Go` areas, and

- Recommend mitigation action

5. DESCRIPTION OF THE RECEIVING ENVIRONMENT

Kleinzee is located about 60kms north of Hondeklipbaai on the Namaqualand coastal plain, in the Northern Cape Province of South Africa. The existing Diamond Coast Aquaculture farm, on Farm 654/1 is located just north of the Buffels River. The entire area of Farm 654 has been mined for diamonds and constitutes and irrevocably transformed landscape.

The flatter, western coastal portion of the farm comprises mainly low frontal sand dunes of younger windblown or aeolian sands, which are partially degraded by historical mining activities. The eastern portion of the farm has been heavily mined for alluvial diamonds, with exposed bedrock granites covering much of the area north of the existing abalone farm. The southern portion of the study site, i. e. the proposed new solar seawater reservoir (refer to Figure 3), comprises currently rehabilitated lands in progress (Figures 4-27).

The proposed wind energy facility on Farm 654/1 will be located in an area of large rehabilitated and un-rehabilitated mine dumps in the currently restricted, decommissioned mine area east of the DCA aquaculture farm (Figures 28-33). The proposed footprint area has been, heavily mined for diamonds and comprises a radically transformed landscape.

Currently, there is no formal layout plan for the proposed wind farm, including associated activities (e.g. internal access roads, underground cables, powerline routes, sub-station & construction work camp). ACRM was requested to assess the proposed footprint area and provide a statement of archaeological sensitivity.

Figure 4. Proposed abalone farming area

Figure 5. Proposed abalone farming area

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Figure 33. Northern portion of the proposed wind energy farm. View facing north west

6. STUDY APPROACH

6.1 Method

The purpose of the AIA is to assess the sensitivity of archaeological resources in the study area, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures.

The significance of archaeological resources was assessed in terms of their content and context. Attributes considered in determining significance include artefact and/or ecofact types, rarity of finds, exceptional items, organic preservation, potential for future research, density of finds and the context in which archaeological traces occur.

A 3-day field assessment was undertaken by ACRM on 8-10 January, 2018. The position of identified archaeological resources, were plotted using a hand held GPS unit set on the map datum wgs 84.

A track path of the survey was also captured (refer to Figure 34).

A literature survey was carried out to assess the heritage context surrounding the proposed development site.

Heritage resources are graded following the system established by Winter & Baumann (2005) in the guidelines for involving heritage practitioners in EIAs.

6.2 Constraints and limitations

There were no constraints or limitations associated with the study. Archaeological visibility was overall very good. Access to the decommissioned mining area (i. e. the proposed wind energy facility) is restricted and had to be undertaken under strict security supervision, but this did not hinder the study in any way.

6.3 Identification of potential risks

6.3.1 Proposed aquaculture Farm

A new pump station will be constructed at the shore, and additional pipelines will traverse the dune-covered area (refer to Figure 3). Here, the concern is the possible occurrence of fossil bones in the sub surface beach deposits (Pether 2018), and in the overlying dunes where buried archaeological material (i. e. shell midden deposits) may occur.

Unmarked Khoisan burials may also be intersected during sub surface excavations.

6.3.2 Proposed wind energy farm

The receiving environment has been heavily mined, but shell midden deposits, stone flakes and pottery were recorded in the south western of the study area overlooking the Buffelsrivier.

7. HERITAGE CONTEXT

The Namaqualand coast is an arid, unforgiving landscape, receiving less than 150mm of rain a year. Its rocky coastline, however, is extremely productive, teeming with shellfish, crayfish, marine birds and mammals. The shoreline area attracted pre-colonial Stone Age hunter-gatherer-foragers, as it offered opportunities for the exploitation of marine foods, particularly shellfish. The environment also supports a variety of terrestrial animals that are available for human subsistence.

More than 1500 archaeological sites have been recorded on the Namaqualand coast (Kaplan 1993). A large amount of this work has been done by the Archaeology Contract Office (ACO), who has shown that there is an almost continuous distribution of shell middens along the rocky shoreline, adjacent to dune ridges and sandy beaches. The majority of sites have been identified while conducting AIAs ahead of mining operations on land owned by De Beers, and Namakwa Sands/Exxaro (Halkett 1998, 2001, 2002, 2003, 2006; Halkett & Hart 1987; Hart & Halkett 1993, 1994a, 1994b 1999; Hart & Lanham 1997; Parkington & Hart 1993; Parkington & Poggenpoel 1990; Orton 2005, 2007a; Orton & Halkett 2005; Orton & Halkett 2006).

With the discovery of economically viable offshore gas deposits, and strategic mineral sands in the vicinity of the mouth of the Groenrivier, a large number of coastal shell middens and interior campsites have been added to the Namaqualand data base (Kaplan 2014, 2007; Orton & Hart 2011).

Numerous Later Stone Age (LSA) sites were also recorded during an AIA for one of the proposed nuclear power station near Kleinzee (Parkington & Hart 1991a, 1991b), while shell middens, stone flakes and pottery were recently documented at Rooiklippe, south of Kleinzee (Kaplan 2018 in prep).

Well preserved LSA sites have been recorded at the Kleinzee Golf Course (Hart & Halkett 1997) and a collection of Early Stone Age (ESA) tools were also made by Halkett (2002) from the Sandkop mining area in Kleinzee[1]. The ACO has also conducted numerous surveys and mitigation work in and around Kleinzee, on behalf of De Beers Consolidated Mining, while Halket (2006) has documented both ESA and Middle Stone Age (MSA) scatters several kilometres inland of the town.

Ephemeral scatters of LSA sites containing stone tools, marine shellfish, ostrich eggshell and pottery have also been documented on the coastal plains south of Groenrivier (Orton 2007, & pers. com. 2014). Rocky outcrops and boulders were also targeted by Stone Age people and several such rock shelters with archaeological deposits, shellfish, stone tools, pottery, ostrich eggshell and even rock art have been recorded near Kotzesrus (Orton & Hart 2011). Webley & Halkett (2010) also encountered a LSA site with stone tools, pottery, ostrich eggshell fragments and some 19th Century British refined earthenware on the banks of the Swartdoring River, as well as large scatters of Middle Stone Age (MSA) LSA and ESA lithics, about 30kms south of Garies, more than 40kms inland of the coast..

Research by Dewar (2006, 2007) has revealed that parts of Namaqualand were occupied by ESA people more than a million years ago, but the greatest number of archaeological sites (i. e. coastal shell middens), are those which relate to the ancestors of modern San (hunter gatherers) and Khoekhoen (Herders) which date to the last 4-5000 years (Webley 1992), although recent work suggests there is much variety in age, with some sites being only a few hundred years old (Orton 2007b).

Archaeological sites with pottery post-dating 2000 years are also reported from a number of sites in Namaqualand. These ceramic LSA sites are believed to be associated with the introduction of pastoralism to the region about 2000 years ago, and Webley (2001) has obtained some of the earliest dates for sheep from Spoegrivier Cave, about 1900 years ago.

Excavations at several locations between Brandsebaai and the Orange River mouth have shown that MSA people have also been exploiting coastal resources since the Last interglacial period about 120 000 years ago (Hart 2006; Parkington 2006), and scatters of ESA handaxes more than 500 000 years old have also been found amongst sand dunes on the coastal plains and around pans in a survey of the Namaqua National Park (Morris & Webley 2004).

Historically, the interior of Namaqualand was occupied by the Little Namaqua, a Khoekhoen pastoralist group, who herded sheep and cattle and lived in temporary encampments of mat houses. They are known to have moved seasonally with their livestock and historical reports indicate that they may have followed a transhumance cycle between the Kamiesberg in the summer months and the Sandveld in the winter months (Webley 1992). Early traveller reports relating to Little Namaqua settlement in the area is summarized in Webley (1992). For example, the Governor Simon van der Stel who travelled to Namaqualand in 1685,

[1] These tools are currently on display at the Kleinzee Museum.

found the first Namaqua kraals north of the Doornboschrivier, which it is believed, is a reference to the Groenrivier (Webley & Halkett 2010). Since the Little Namaqua had no clearly defined territorial boundaries, it was easy for the colonial Trekboers to settle in the area. The earliest loan farms were granted after 1750 and the Little Namaqua eventually retreated to so-called "reserves" such as Leliefontein, Steinkopf, Kommaggas, Concordia and the Richtersveld (Webley & Halkett 2010).

7.1 Graves & unmarked burials

Historical graves are usually well marked and mostly occur in small farm graveyards. Pre-colonial graves, on the other hand, can occur at any location where sand suitable for excavation and burial exists. This is particularly the case in the coastal area where dunes abound. Pre-colonial graves are unmarked, and have been found at various locations throughout the western coastal region of South Africa (Morris 1982), including several on the Namaqualand coast. For example, a human burial was found at the mouth of the Groenrivier (Jerardino *et al* 1992), while several Khoisan skeletons were exposed in a large excavation alongside the road near the mouth of the river (Petrus Schreuder Namanqua National Park, pers. comm. 2014). The Archaeology Contracts Office also excavated a burial near Noup south of Kleinzee (Hart & Halkett 2001), while a number of burials are listed as having come from the area at the mouth of the Buffelsrivier (Morris 1992).

The location of pre-colonial graves cannot be predicted and no plans can be made to avoid intersecting burials during construction activities.

8. FINDINGS

A spreadsheet of waypoints and description of archaeological finds is presented in Table 1 (Appendix A).

Track paths and waypoints are illustrated in Figure 34.

8.1 Proposed aquaculture farm

Traces of archaeological remains were encountered at the coast, on loose slightly consolidated sands near the pump station, where additional pipelines will traverse the seaside dune area (refer to Figure 3). These comprise thin, dispersed scatters of marine shellfish (Site 802), dominated by limpets, including a few whole shell (*Scutellastra argenvillei* & *Cymbula granatina*) alongside the gravel road to the pump station. One or two more dense patches of shellfish were also noted, that included several quartzite flakes and unworked beach cobbles in the flat, degraded sandy plain between the pump station and the gravel road (Figures 35-37). No pottery or ostrich eggshell were found despite a detailed search of the surrounding area. Bird bone on the surface sands is most likely a modern occurrence. It is possible that sub-surface archaeological deposits may occur across this near shore area.

No fossil bones were found on the compact palaeo-surfaces within the aeolian deposits, but these are known to be more abundant in the vicinity of buried fossil pans, sometimes with associated archaeological material (Pether 2018).

Some displaced marine shellfish and a few round beach cobbles and quartzite flakes (Site 796) were recorded adjacent the proposed supply line, on a berm alongside the gravel road between the DCA site office and the Kleinzee Oyster Farm (Figure 38). A miscellaneous grindstone and fragments of weathered, adiagnostic shellfish (Site 795) were noted on a large patch of gravel alongside the gravel road.

Isolated patches of weathered shellfish (*S. argenvillei*) and non-artefactual stone (Sites 791 & 793) were recorded in the mined-out and degraded footprint area of the proposed fish farm south east of the DCA site office (Figures 39 & 40). Fragments of limpet (*S. argenvillei*), and some isolated whole shells were also noted, but these were not recorded with a GPS.

Dispersed scatters of limpet shell (Sites 8001 & 8011), and a few quartzite stone flakes were recorded on the top, and side of large tailings alongside the effluent channel/proposed fish farming and seaweed farm (refer to Figure 3), but these remains occur in severely degraded context (Figures 41 & 42).

A small patch of fragmented shellfish and some whole limpets (*S. argenvillei*) was found among extensive tailings in the degraded north eastern portion of the proposed abalone farming area (Site 799). A single Middle Stone Age quartzite flake (Site 798) was also found. Apart from the occasional, isolated fragment of shellfish, no other archaeological traces were found in the proposed abalone farming area, where almost the entire area has been heavily mined to granite bedrock.

No other archaeological traces were encountered over the remainder of the proposed development site including the proposed sewage ponds east of the abalone farm (refer to Figures 3 & 27).

8.1.2 Grading of the archaeological remains

The very small numbers and highly disturbed and compromised context in which they were found means that the archaeological remains have been rated as having *low* (Grade 3C) significance.

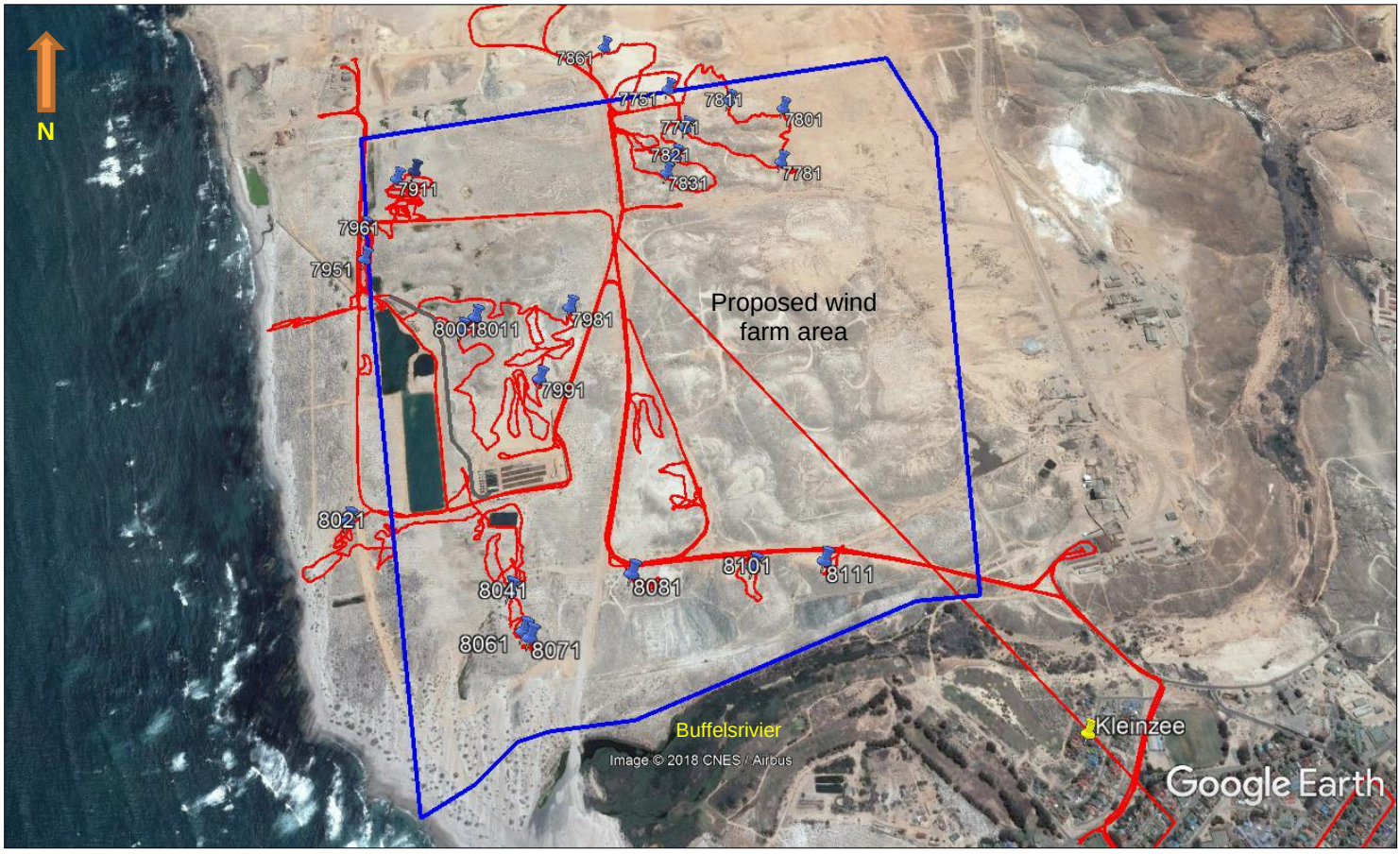

Figure 34. Track path (in red) and waypoints of archaeological finds. The blue polygon is the farm boundary

Figure 35. Site 802. View facing west to the pump station

Figure 36. Site 802. View facing west

Figure 37. Site 802. View facing west

Figure 38. Site 796. View facing south

Figure 39. Site 793. View facing west

Figure 40. Site 791. View facing west

Figure 41. Site 8001. View facing west

Figure 42. Site 8011. View facing west

8.2 Proposed wind energy facility

The northern portion of the footprint area of the proposed wind energy facility is located among a large area of overburden dumps in the decommissioned mine area, east of the existing aquaculture farm (refer to Figure 3). The whole area has been, heavily mined for diamonds and comprises an irrevocably transformed landscape of rehabiliated and un-rehabilited mine dumps (refer to Figures 32-34).

Isolated lithics, including a chalcedony flake (Site 775), a broken quartzite cobble (Site 780) and a miscellaneous upper grindstone (Site 781) was recorded (Figure 43). A dispersed and wind-eroded scatter of weathered limpets including a few larger whole shells (Site 778), quartz chunks/flakes including a large chunk of worked quartz, and several quartzite flakes were recorded on a large west facing mine dump in the proposed footprint area (Figure 44). Two small patches of fragmented shellfish (Sites 782 & 783) were also recorded on steep, south east facing slopes of large tailings, while a scatter of shellfish (Site 7861) including a few large whole limpets (*S. argenvillei*), and several quartzite flakes and chunks were recorded on mine tailings outside the boundary of study area (Figure 45).

A dispersed and ephemeral scatter of limpet shell (Site 8071), imported stone cobbles and limited numbers of quartz, silcrete and quartzite flakes were recorded on a high, degraded dune overlooking the Buffels River in the south western portion of the proposed footprint area (Figure 46). A few fragments of Cape Coastal pottery was also found (Figure 47), indicating the site is dated to after 2000 years ago. A nearby patch of surface quartz (Site 8061) may have been targeted as a source of raw material by Later Stone Age hunter-gatherer-foragers, where several chunks and flaked and smashed pieces of stone were found.

A scatter of fragmented and displaced shellfish (Site 8041), a few quartzite and quartz stone flakes, and imported beach cobbles was also recorded on the north east facing slopes of the same high dune overlooking the proposed new solar seawater reservoirs (Figure 48).

8.2.1 Grading of the archaeological remains

The very small numbers and highly disturbed and eroded context in which they were found means that the archaeological remains have been rated as having *low* (Grade 3C), significance.

Figure 43. Site 781. The lighter is for scale

Figure 44. Site 778. View facing west.

Figure 45. Site 786. View facing west

Figure 46. Site 8071

Figure 47. Pottery from Site 8071. The battery is for scale

Figure 48. Site 8041. View facing west

9. IMPACT ASSESSMENT

Potentially significant impacts are likely to be limited, and where they do occur, will be confined to the shore near the existing pump station, where additional pipelines will traverse the seaside dune area (Table 1). However, the overall results of the study indicate that the proposed activities (i.e. expansion of the existing DCA aquaculture farm & a wind energy facility), will not have a significant impact on any important archaeological heritage.

The impact significance of the proposed development on archaeological heritage is therefore assessed as LOW.

Potential impact on terrestrial archaeology	
Nature of impact	Damage to, or destruction of archaeological resources
Extent and duration of impact	Localized and short term
Intensity of impact	Potentially high. Location of proposed intake pipes near pump station may impacts on potentially significant archaeological deposts
Probability of occurrence	Medium
Degree to which impact can be reversed	Irreversible
Irreplaceability of resources	High – archaeological resources are non-renewable and cannot be replaced
Cumulative impact prior to mitigation	Medium-High
Significance of impact pre-mitigation	Medium-High
Degree of mitigation possible	High
Proposed mitigation	Test excavations to determine significance of sub surface archaeological deposits
Cumulative impact post mitigation	Low
Significance after mitigation	Insignificant

Table 1. Assessment of archaeological impacts

10. CONCLUSION

Traces of archaeological deposits were recorded in both the proposed footprint area of the aquaculture farm, and the proposed wind energy facility, but indications are that, in terms of archaeological heritage, the affected environment is not a threatened landscape. Almost the entire area has been heavily mined for diamonds, and archaeological resources have either been destroyed, or are severely degraded as a result.

Fortunately, many of the archaeological sites in areas previously owned and mined by De Beers Consolidated Mining have been mitigated by archaeologists from the Archaeology Contracts Office (ACO), and therefore much is known about the precolonial history of this dry and arid landscape.

11. RECOMMENDATIONS

With regard to the proposed expansion of the Diamond Coast Aquaculture Farm including the development of a small wind energy facility, on Farm 654/1 Kleinzee, the following recommendations are made.

1. No archaeological mitigation is required prior to construction activities commencing.

2. Excavations for any underground pipelines in the area around the pump station (i. e. the aquaculture farm) must be carefully monitored by the Environmetnal Control Officer (ECO). The ECO must be briefed by the archaeologist prior to any excavations commencing.

3. Should any unmarked human burials/remains or ostrich eggshell water flask caches for example, be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or the South African Heritage Resources Agency (Ms Natasha Higgit 021 462 4502). Burials, etc. must not be removed or disturbed until inspected by the archaeologist.

4. The archaeologist must be consulted on the siting and placement of wind turbines in the southern portion of the proposed development site.

5. The above recommendations must be included in the Environmental Management Plan (EMP) for the proposed aquaculture and wind energy farm development.

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Appendix A

Spreadsheet of waypoints and description of archaeological finds

Site	Name of farm	Late/long	Description of finds	Grading	Suggested mitigation
	Farm 654/1				
Proposed Wind farm					
7751		S29° 39.203' E17° 03.313'	Chalcedony flake	Low (Grade 3C)	None required
7771		S29° 39.302' E17° 03.351'	Broken quartzite chunk	Low (Grade 3C)	None required
7781		S29° 39.388' E17° 03.553'	Dispersed wind-eroded scatter of weathered limpets incl. a few large whole shells, quartz chunks/flakes including a large chunk of worked quartz, several quartzite flakes on a large west facing tailings dump	Low (Grade 3C)	None required
7801		S29° 39.255' E17° 03.565'	Broken quartz chunk/cobble	Low (Grade 3C)	None required
7811		S29° 39.233' E17° 03.446'	Quartzite grindstone	Low (Grade 3C)	None required
7821		S29° 39.371' E17° 03.329'	Fragments of weathered limpet shell on steep south east facing tailings slope		
7831		S29° 39.413' E17° 03.311'	Fragments of weathered limpet shell on steep south east facing tailings slope	Low (Grade 3C)	None required
7861		S29° 39.089' E17° 03.169'	Scatter of shellfish incl. a few large whole limpets (*S. argenvillei*), 1-2 quartzite flakes and chunks on large tailings outside the boundary of Farm 654/	Low (Grade 3C)	None required
8041		S29° 40.228' E17° 03.043'	Scatter of fragmented and displaced shellfish, a few quartzite and quartz stone flakes, and imported beach cobbles on north facing slopes of high dune overlooking the proposed solar seawater reservoirs.	Low (Grade 3C)	Archaeologist to supervise and instruct on placement of any wind turbines
8061		S29° 40.291' E17° 03.071'	Patch of surface quartz, possible target for raw material. Several chunks and flaked pieces of stone found among pile of smashed and broken quartz.	Low (Grade 3C)	Archaeologist to supervise and instruct on placement of any wind turbines
8071		S29° 40.301' E17° 03.083'	Highly dispersed scatter of shellfish, imported stone cobbles and limited numbers of quartz, silcrete and quartzite flakes, some Cape Coastal clay pottery on a high, degraded dune overlooking the Buffels River in the south western	Low (Grade 3C)	Archaeologist to supervise and instruct on placement of any wind turbines

			portion of the proposed footprint area		
8081		S29° 40.201' E17° 03.253'	Several quartzite flakes, quartzite chunk, ?quartzite core, a few limpet fragments, 1-2 large whole shell, on quartz & gravel tailings/mine dump above and alongside the gravel road. Area severely degraded	Low (Grade 3C)	Non required
8101		S29° 40.192' E17° 03.464'	X 2 quartzite flakes on large, degraded, tailings/gravels above and alongside gravel road	Low (Grade 3C)	None required
8111		S29° 40.183' E17° 03.589'	Indurated shale flake & a few large whole limpet (*S. argenvillei*), on flat mine dump/tailings	Low (Grade 3C)	None required
Proposed aquaculture farm				Low (Grade 3C)	None required
7911		S29° 39.421' E17° 02.744'	Isolated patches of weathered shellfish (*S. argenvillei*) and non-artefactual stone	Low (Grade 3C)	None required
7931		S29° 39.403' E17° 02.778'	Isolated patches of weathered shellfish (*S. argenvillei*) and non-artefactual stone	Low (Grade 3C)	None required
7951		S29° 39.603' E17° 02.702'	Miscellaneous grindstone and a thin scatter of fragments of weathered, adiagnostic shellfish on gravel patch alongside road	Low (Grade 3C)	None required
7961		S29° 39.536' E17° 02.692'	Some displaced marine shellfish & a few round beach cobbles & quartzite flakes adjacent the proposed supply line on a berm alongside the gravel road between the DCA site office and the Kleinzee Oyster Farm		
7981		S29° 39.711' E17° 03.121'	MSA quartzite flake	Low (Grade 3C)	None required
7991		S29° 39.854' E17° 03.071'	Small patch of fragmented marine shellfish and some whole limpets (*S. argenvillei*) on extensive tailings in the heavily mined out north eastern portion of the proposed new abalone farming area	Low (Grade 3C)	None required
8001		S29° 39.756' E17° 02.912'	Dispersed scatter of limpet shell, and a few quartzite flakes on top of large gravel tailings and dumps alongside the	Low (Grade 3C)	

			effluent channel - proposed fish farming and seaweed farm		
8011		S29° 39.729' E17° 02.937'	Dispersed scatter of limpet shell and a few quartzite flakes on the side of large gravel tailings and dumps alongside the effluent channel	Low (Grade 3C)	
8021		S29° 40.109' E17° 02.746'	Dispersed scatter of marine shellfish including a few large whole shells (*Scutellastra argenvillei* & *Cymbula granatina*) alongside the gravel road leading to the pump station. One or two more dense patches of shellfish noted, including several quartzite flakes and unworked beach cobbles in the flat, degraded sandy plain. No pottery or ostrich eggshell were found. Some modern bird bone	Low (Grade 3C)	Construction activities must be monitored by the ECO

Spreadsheet of waypoints and description of archaeological finds