

# ARCHAEOLOGICAL IMPACT ASSESSMENT PROPOSED DESALINATION PLANT PORT NOLLOTH NORTHERN CAPE

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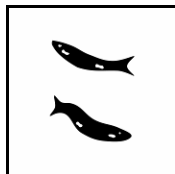
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## Executive summary

The Agency for Cultural Resource Management (ACRM) was commissioned by Bvi Consulting Engineers to conduct an Archaeological Impact Assessment (AIA) for the proposed construction and operation of a desalination plant in Port Nolloth in the Northern Cape.

The proposed project entails the installation of a 1.5 m<sup>3</sup>/p/day seawater desalination plant to supplement the potable water supply of Port Nolloth. Seawater will be abstracted through a collector well system at Stillbaai, and a submersible pump and underground pipeline will convey the seawater to the proposed desalination plant which will be located inside the Port Nolloth Mari Culture Park, about 3 kms north of the town. Purified seawater will be piped to the existing bulk water supply pipeline that is situated alongside the R382 at the entrance to the Park. Brine (seawater that contains high concentrations of salts and other impurities) will be returned to the sea, via a pipeline at North Bay.

In terms of Section 38 (1) (c) of the National Heritage Resources Act (NHRA) 1999 (Act 25 of 1999), an Archaeological Impact Assessment (AIA) of the proposed project is required if the footprint area of the proposed development is more than 5000 m<sup>2</sup>.

In addition, Section 38 (1) (a) of the NHRA also indicates that any person constructing a powerline, pipeline or road, or similar linear development or barrier exceeding 300m in length is required to notify the responsible heritage resources authority, who will in turn advise whether an impact assessment report is needed before development can take place.

The aim of the archaeological study is to locate and map heritage sites or remains that may potentially be impacted by the proposed development, to assess the significance of the potential impacts and to propose measures to mitigate any impacts.

A field study took place in which the following observations were made:

With regard to the proposed desalination plant: Dispersed scatters of shellfish (mainly limpets), and a few pieces of stone were documented in the proposed footprint area which comprises a series of low, partially vegetated and undulating sand dunes. No natural stratigraphy or preserved shell midden deposits were noted. No organic remains such as pottery, bone or ostrich eggshell were found. As a result the remains have all been rated as having low archaeological significance.

Shell middens were also documented in the surrounding area (outside the proposed development footprint), several of which were previously recorded by David Morris of the McGregor Museum in Kimberley, during an AIA of the proposed Mari Culture Park.

With regard to the proposed seawater intake and outlet pipelines: Shell middens are prolific in the beach and dune area alongside the Port Nolloth Abalone Farm, but have been extensively damaged (and some destroyed) by unrehabilitated diamond mining activities, construction of roads, 4 x 4 activity and quad bikes. Some in-situ deposits were, however, documented on some of the remaining sand dunes that occur in the area.

No archaeological remains were documented in the proposed route for the underground purified water pipeline that connects to the bulk water supply pipeline to the town.

The following potential risk sources have been identified.

- Unmarked human burials/remains may be exposed or uncovered during bulk earthworks.
- Buried shell middens may also be exposed or uncovered during bulk earthworks and excavations.

The archaeological study has shown that the proposed project (i.e. the construction of a desalination plant including associated activities) is viable, but that measures must be put in place to protect the surrounding archaeological heritage during both the construction and operational phase of the proposed development.

With regard to the proposed construction of a seawater desalination plant at Port Nolloth, the following recommendations are therefore made:

1. The project is deemed to be viable.
2. No archaeological mitigation is required.
3. The proposed seawater intake and outlet pipelines must not damage or cross over any of the remaining sand dunes in the beach area alongside the Port Nolloth Abalone Farm where important shell middens have been recorded.
4. Shell middens that have been documented in the surrounding area must be demarcated with danger tape prior to construction activities commencing. Ideally, the archaeologist should be instructed to undertake this management intervention.
5. Signage should be erected in the Mari Culture Park, and near the entrance to the beach area, indicating the presence of vulnerable archaeological sites and their importance.
6. A very visible shell midden that includes the remains of a large seal in the road cutting alongside the western boundary of the Mari Culture Park/desalination plant should possibly be excavated and rescued. Alternatively the site can be covered (and therefore protected) with sand and re-vegetated. The latter is supported as excavation of the shell midden will be more expensive.
7. Should any unmarked human remains, or buried shell middens be exposed or uncovered during excavations these must immediately be reported to the South African Heritage Resources Agency (Ms Mariagrazia Galimberti 021 4624502). Burials must not be removed until inspected by the archaeologist and will have to be removed by an archaeologist under a permit issued by SAHRA.

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## 1. INTRODUCTION

Bvi Consulting Engineers, on behalf of the Richtersveld Municipality, commissioned the Agency for Cultural Resource Management (ACRM) to conduct an Archaeological Impact Assessment (AIA) for the proposed construction and operation of a desalination plant in Port Nolloth in the Northern Cape (Figure 1).

The proposed project entails the installation of a reverse osmosis 1.5 m<sup>3</sup>/day seawater desalination plant to supplement the potable water supply of Port Nolloth. The proposed desalination plant will comprise a control room, various storage tanks, pumps and filters. Seawater will be abstracted through a collector well system at Stillbaai, and a submersible pump and pipeline will convey the seawater to the proposed desalination plant which will be located inside the Port Nolloth Mari Culture Park. Desalinated (or purified) water will be piped to the existing bulk water supply pipeline that is situated alongside the R382 (Port Nolloth/Alexander Bay road), Brine (seawater that contains high concentrations of salts and other impurities) will be returned to the sea, via a pipeline at North Bay.

The proposed desalination plant is to be located on Erf 3359.

The underground beach well points and seawater intake pipeline is to be located on Erf 516, which is vacant commonage.

The brine outlet pipeline is to be located on Erf 3287 (the existing Port Nolloth Abalone Farm) and Erf 516.

- The footprint area for the proposed desalination plant is 7 875 m<sup>2</sup>.
- The underground seawater intake pipeline will be ± 400 m long.
- Brine water outlet pipeline will be ± 1 000 m long, and the
- Underground purified water pipeline connecting to the existing bulk water supply pipeline will be about ± 1 020 m long.

In terms of Section 38 (1) (c) of the National Heritage Resources Act (NHRA) 1999 (Act 25 of 1999), an AIA of the proposed development is required if the development footprint area is more than 5000 m<sup>2</sup>. This is to determine if the area contains heritage sites and to take the necessary steps to ensure that they are not damaged or destroyed during development.

In addition, Section 38 (1) (a) of the NHRA also indicates that any person constructing a powerline, pipeline or road, or linear development or barrier exceeding 300m in length is required to notify the responsible heritage resources authority, who will in turn advise whether an impact assessment report is needed before development can take place.

ACRM has been instructed to undertake a baseline study in order to locate and map archaeological sites or remains that may potentially be impacted by the proposed development, to assess the significance of the potential impacts and to propose measures to mitigate any impacts.

The AIA forms part of the Environmental Basic Assessment process that is being undertaken by independent environmental consultants, Enviro-Logic cc.



Figure 1. Locality map

## 2. TERMS OF REFERENCE

The terms of reference for the archaeological study were to:

- Determine whether there are likely to be any archaeological resources that may be impacted by the proposed construction and operation of the desalination plant, including associated infrastructure;
- To identify and map archaeological resources that may be impacted by the proposed development;
- To assess the sensitivity and conservation significance of archaeological resources affected by the proposed development;
- To assess the significance of any impacts resulting from the proposed development, and
- To identify measures to protect and maintain any valuable archaeological sites that may be impacted by the proposed development

### **3. DESCRIPTION OF THE AFFECTED ENVIRONMENT**

A proposed site layout for the Port Nolloth desalination plant is illustrated in Figure 2.

#### **3.1. The proposed desalination plant**

The proposed desalination plant will be situated inside the fenced off Mari Culture Park which is located about 3 kms north of Port Nolloth, alongside the R382 to Alexander Bay. The proposed site is located immediately inland of Stillbaai, an area of beach and dune alongside the Port Nolloth Abalone Farm.

The proposed footprint area for the desalination plant comprises a stable, partially vegetated dune area, where the higher back dunes slope gently toward the flatter undulating frontal dunes alongside western boundary of the Mari Culture Park (Figures 3 & 4). There is a fairly wide sand track that cuts through the site and an Eskom powerline which crosses a portion of the property nearer to its southern boundary.

#### **3.2 The proposed underground seawater intake pipeline**

The proposed underground seawater intake pipeline will be about 400 m long and excavated to a depth of about 1 m. Seawater will be abstracted through an underground collector well system at Stilbaai and submersible pumps will convey the seawater in the intake pipeline to the proposed desalination plant.

The shoreline area including the beach and dunes have been extensively damaged by unrehabilitated diamond mining activities, including the construction of roads, 4 x 4 activity and use of recreational quad bikes, that have also destroyed and damaged extensive shell middens in the area (Figures 5 & 6).

#### **3.3 The proposed brine water outlet pipeline**

The proposed brine water pipeline will be about 1000 m long and excavated to a depth of about 1 m. Brine (seawater that contains high concentrations of salts and other impurities) will be returned to the sea at North Bay through an above and underground pipeline.

While a short section of the pipeline will be laid in the soft sands alongside the western boundary of the Mari Culture Park, the bulk of the brine water outlet pipeline will be located in an already severely disturbed area near the entrance to the Port Nolloth Abalone Farm, as well as inside the farm where it will eventually discharge into the sea at North Bay (refer to Figure 2 and Figure 16 in the Appendix).

#### **3.4 The proposed underground purified water pipeline**

The proposed underground purified water pipeline will be about 1000 m long and will be excavated to a depth of about 1 m. The proposed pipeline will be aligned alongside the existing gravel entrance road inside the Mari Culture Park, where it will connect with the existing Port Nolloth bulk water supply pipeline alongside the R382 (refer to Figure 2).

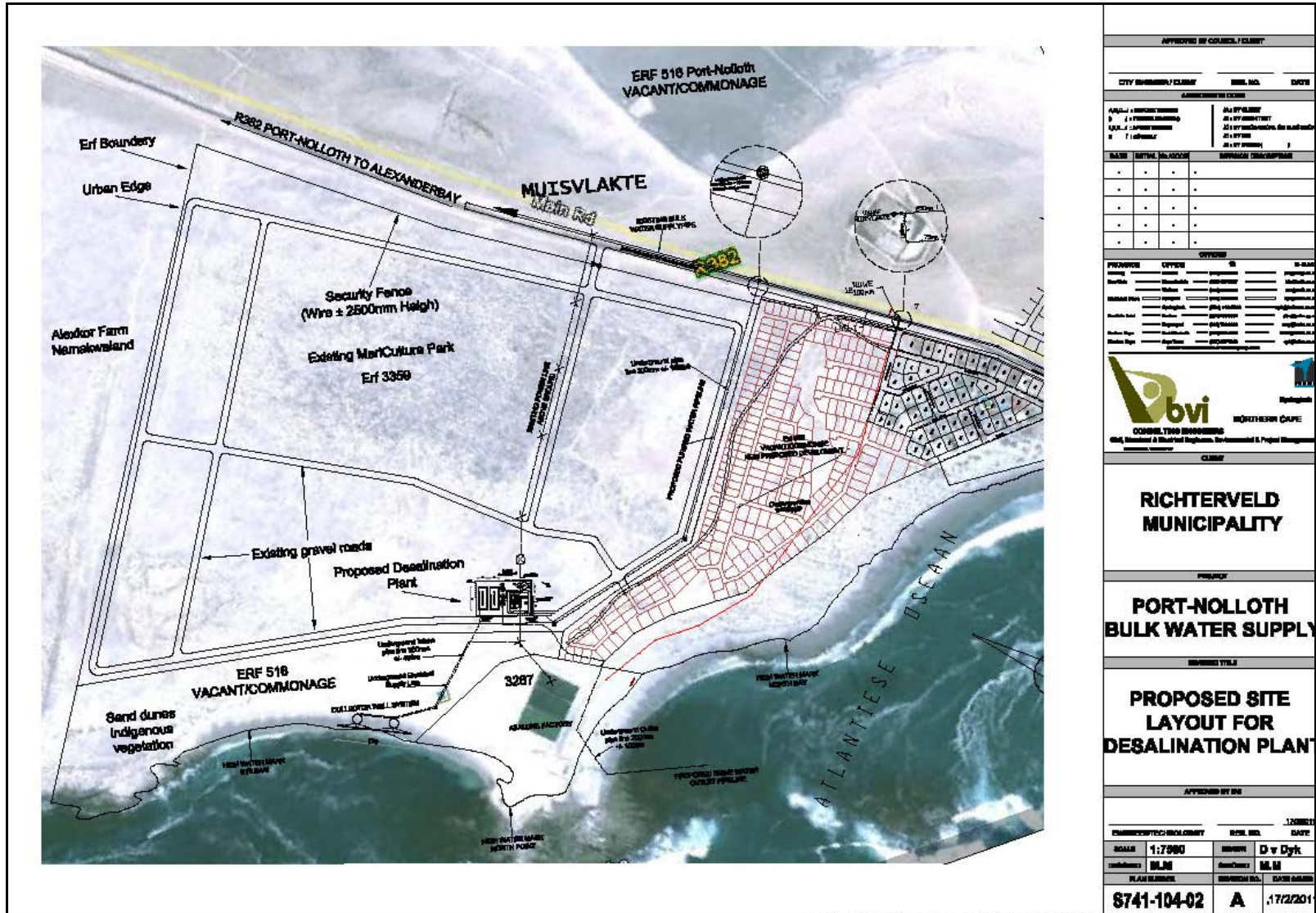


Figure 2. Proposed site layout for the Port Nolloth Desalination Plant





Figure 3. The proposed desalination plant. View of the site facing west



Figure 4. The proposed desalination plant. View of the site facing west. Note the road that cuts through a portion of the site. Crushed shell midden deposits occur along sections of the road



Figure 5. The route for the proposed intake pipeline. Extensive damage such as unrehabilitated mining, construction of road and tracks (4 x 4's and quad bikes) has taken place in the shoreline area. Note the large diggings to the left of the plate. Such activities have caused large scale damage to shell middens. Arrow indicates destroyed and damaged shell middens.



Figure 6. The proposed intake pipeline to the proposed desalination plant. The fence marks the western boundary of the Mari Culture Park

## **4. STUDY APPROACH**

### **4.1 Method of survey**

A half-day, field survey of the proposed development site including the associated infrastructure was undertaken by the archaeologist.

The site visit and assessment took place on the 2<sup>nd</sup> August, 2011 and a number of archaeological observations were made.

A desk top study was also done.

All archaeological remains documented during the study have been mapped using a hand-held Garmin Oregon 300 GPS unit set on the map datum WGS 84 (refer to Figure 23 in the Appendix).

### **4.2 Constraints and limitations**

There were no constraints or limitations associated with the study.

### **4.3 Identification of potential risks**

Unmarked pre-colonial human remains, and buried shell middens may be uncovered or exposed during bulk earthworks and excavations, for both the proposed desalination plant and the proposed underground sea water intake pipeline. The archaeologist is aware of at least two 'Bushman' burials that have been 'excavated' from dunes around Port Nolloth. The remains of one of these skeletons are in storage at the Port Nolloth Museum. The museum also has a substantial collection of archaeological material made from the surrounding area.

### **4.4 Results of the desk top study**

An AIA of the proposed Port Nolloth Mari Culture Park was undertaken by David Morris of the McGregor Museum in 2006. According to Morris (2006) shell middens were documented inside the Park, nearer to the coast. Morris (2006:5) concluded that the development of the Mari Culture Park would have 'no significant impact' on the archaeological resources, although it was recommended that at least one of the middens that were recorded is sampled.

Rudner (1968) also reported that there are extensive shell middens near North Point. North Point is the site of the existing Port Nolloth Abalone Farm and is also within the current study area. According to Rudner, Laidler collected much material from middens north and south of Port Nolloth in 1913. He reports: "The shell deposits were hundreds of feet in length and breadth and the implement assemblages homogenous, being of a Wilton type accompanied by ostrich eggshell plaques and pendants, eggshell water bottles, ornamented and plain. Pottery of a 'Hottentot' type occurred mainly on the mounds on which stone implements were scarcest".

Further south at McDougall's Bay there are shell middens capping the dunes along the northern half of the bay (Wadley 2009), and Rudner (1968) reports on at least 52 clay pots from this area. According to Colson (1905) a complete pot was found in a midden in

1899 south of the Port Nolloth jetty. This pot was half-filled with specularite (an iron powder used as decoration), as well as a bone awl and some ostrich eggshell beads.

Kaplan (1993) listed 297 open station shell midden sites from the 1:50 000 map sheet for Port Nolloth (2916 BD Port Nolloth). The sites occur at White Point, Wedge Point and Twee Pad.

More recently, a housing development in McDougall's Bay (named KaiKai) resulted in disturbance to numerous middens overlooking the Bay. These have been recorded as part of an AIA by David Morris of the McGregor Museum (Wadley 2009).

Wadley (2009) also documented several important shell middens and scatters of stone tools and ostrich eggshell on the edge of the large salt pan to the north of the town, about 1 km inland from the coast.

Kaplan (2011a, b in prep) has recently documented shell middens, stone tools and ostrich eggshell near the towns existing oxidation dam, as well as further inland at the municipal waste refuse dump.

Early and Middle Stone Age quarry (stone knapping) sites were recorded by Küsel (2009) during an AIA for a proposed wind farm situated about 15 kms east of Port Nolloth.

The Archaeology Contracts Office (ACO) at the University of Cape Town has also been involved in archaeological mitigation work in the diamond fields of the Namaqualand coast since 1991. They have conducted extensive surveys of the land owned by De Beers resulting in a database of nearly 1 400 sites and undertaken extensive mitigation of shell middens. Dewar (2007) later compiled a regional synthesis of the archaeology of the Namaqualand coast based on the excavations of nine of these sites.

The ACO was also involved in the rescue excavations of a small shelter named Boegoeberg 2, about 60km north of Port Nolloth, on the coast (Parkington et al. 2004). It had been blanketed by sand some time after it was occupied by Middle Stone Age shellfish gatherers. It remained blocked until the early 1990s when diamond miners excavated the shelter in search of diamondiferous deposits. Archaeologists were alerted after most of the deposit had been removed. These deposits are extremely informative for our understanding of the spread of the Middle Stone Age in Namaqualand and further open sites are not impossible (Parkington et al. 2004).

From the above it is clear that while archaeologists are becoming increasingly aware of the richness and importance of the Port Nolloth area, no professional archaeological research has yet been undertaken there. Sadly, it is in places like Port Nolloth, which are so far from established universities and research institutions such as the McGregor Museum in Kimberly, that there is very little oversight with regard to the protection of these valuable heritage resources.

## 5. RESULTS OF THE SURVEY

### 5.1 The proposed desalination plant

A Google aerial photograph indicating the waypoints of archaeological occurrences documented during the study is illustrated in Figure 23 in the Appendix.

**093** (S 29 14.263 E 16 51.565): Thin patches of fragmented shellfish, including some whole shell occurs on soft loose sands behind the high dunes south east of the proposed footprint area (Figure 7). No natural stratigraphy is present on the proposed site and the remains are confined to the surface. The shellfish is dominated by limpets (Scutellastra argenvillei and Cymbula granatina), with smaller amounts of Black Mussel (Choromytilus meridionalis) occurring. No cultural remains such as stone tools, ostrich eggshell or pottery were found. Some bird bone was noted however.

The site has been rated as having low archaeological significance.

**094** (S 29 14.274 E 16 51.528): The remains of a large seal and some shellfish occur on a degraded sandy slope alongside the road near the western boundary of the Mari Culture Park (Figure 8). A very thin layer of stratigraphy is present against the dune. The shellfish is dominated by S argenvillei, C granatina and C. oculus. While no skull was found, large limb bones, pelvis, toe and rib bones are visible on the sandy slope. No cultural remains were found.

The site has been rated as having medium-low archaeological significance.

**095** (S 29 14.269 E 16 51 535): Comprises a thin surface patch of fragmented shell, and small whole shells dominated by C. granatina and S. argenvillei that occurs on soft loose sands outside the footprint area. No natural stratigraphy is present. No cultural remains were found.

The site has been rated as having low archaeological significance.

**096** (S29 14.247 E16 51.552): Comprises a few fragments of shellfish on soft loose sands. No natural stratigraphy is present. No cultural remains were found.

The site has been rated as having low archaeological significance.

**097** (S29 14.243 E16 51.548): Comprises about 20-30 pieces of fragmented shell and about 10 whole shells (mainly S. argenvillei) on soft, loose sands. No natural stratigraphy is present. No cultural remains were found.

The site has been rated as having low archaeological significance.

**098** (S29 14.245 E16 51.535): Comprises a few fragments of shellfish on soft loose sands. No natural stratigraphy is present. No cultural remains were found

The site has been rated as having low archaeological significance.

**099** (S29 14.250 E16 51.523): Comprises a small, thin surface scatter of fragmented shell and some small whole shellfish in a small sandy basin about 5 m from the Eskom powerline. The shellfish is dominated by S. granatina. No natural stratigraphy is present. No cultural remains were found.

The site has been rated as having low archaeological significance.

**100** (S29 14.249 E16 51.515): Comprises crushed and fragmented adiaagnostic limpet shell in the sandy track that cuts through the footprint area. Some whole shells and shell fragments occur on the soft shoulder alongside the track (Figure 9). The shellfish is dominated by limpets (C. oculus and C. granatina), with small amounts of Black Mussel occurring. No natural stratigraphy is present. One or two small whelks also occur. One quartzite chunk was found.

The site has been rated as having low archaeological significance.

**101** (S29 14.236 E16 51.547): A larger patch of crushed and fragmented adiaagnostic limpets occurs in the above sandy track. A few small whelks were also counted (Figure 10). Some whole S. argenvillei and C. granatina was noted, including small amounts of Black Mussel. No natural stratigraphy is present. No cultural remains were found.

The site has been rated as having low archaeological significance.

**102** (S29 14.198 E16 51.514): The site comprises a larger scatter of whole and fragmented shellfish on a flat patch of compacted sand below the dune slope (Figure 11). The site is located outside the footprint area of the proposed desalination plant. The shellfish is dominated by the limpet S. argenvillei, with some C. granatina and Black Mussel also occurring. Many small round water worn pebbles were noted lying about. It is likely that the shellfish is lying on an older dune deposit that has eroded away. No natural stratigraphy is present. A few pieces of quartzite and one quartz flake and one lump of red hematite were counted.

The site has been rated as having low archaeological significance.

**103** (S29 14.191 E16 51.549): Comprises relatively large amounts of fragmented shellfish, and round (water worn) pebbles on soft sands on a wider flat dune top overlooking **102** (Figure 12). No natural stratigraphy is present. One large quartzite chunk was found.

The site has been rated as having low archaeological significance.

**104** (S29 14.191 E16 51.549): This site was documented by Morris (2006) during an AIA for the proposed Mari Culture Park. It comprises a mound of relatively well preserved shellfish on a low sand dune directly alongside a secondary road (Figure 13). Large numbers of large, whole shellfish occurs which are dominated by S. argenvillei and C. granatina. A few ostrich eggshell fragments were also found, including some weathered (adiaagnostic) bone and bits of soft calcrete. No other cultural remains were found.

The site has been rated as having medium archaeological significance.

**105** (S29 14.190 E16 51.568): This site was documented by Morris (2006), and comprises several patches of fragmented and whole shellfish on soft sands on the south-east facing slopes of the back dunes alongside the above secondary road (Figure 14). Whole shell is dominated by S. argenvillei and C. granatina, with some Black Mussel also occurring. One quartz chunk, several small quartzite cobbles, and water work pebbles were counted. Some diggings have also taken place. There are chunks and pieces of calcrete in the road.

The site has been rated as having low-medium archaeological significance.

**106** (S29 14.194 E16 51.557): Comprises a very thin scatter of surface shellfish on wind blown sands, about 10 m from **105**. No natural stratigraphy is present. Shellfish is dominated by S. argenvillei and C. granatina. No cultural remains were found.

The site has been rated as having low archaeological significance.

**107** (S29 14.223 E16 51.577): Crushed and fragmented shellfish, including large whole limpets (S. argenvillei and C. granatina) and relatively large amounts of fragmented Black Mussel occurs behind the large back dunes in the sandy track that cuts through the proposed footprint area of the desalination plant (Figures 15 & 16). The remains are situated outside the footprint area, however, but possibly in the alignment of the proposed purified water pipeline. The archaeological site has been exposed when the track was first made. No natural stratigraphy is present in the cuttings. No cultural remains were found. The site is severely degraded.

The site has been rated as having low archaeological significance.

**108** (S29 14.209 E16 51.591): The site was documented by Morris (2006) and comprises some in-situ shell midden deposits that are exposed on the low dunes alongside the secondary access road, and in the low cutting alongside the road (Figures 17 & 18). Fragmented and crushed shellfish also occurs in the road, including some whole shell that is dominated by S. argenvillei and C. granatina. Some Black Mussel also occurs. Several quartz chunks and flakes were counted.

The site has been rated as having low-medium archaeological significance.



Figure 7. Site 093



Figure 10. Site 100



Figure 8. Site 094



Figure 11. Site 102



Figure 9. Site 101



Figure 12. Site 103





Figure 13. Site 104



Figure 14. Site 105



Figure 15. Site 107



Figure 17. Site 108



Figure 16. Site 107



Figure 18. Site 108

## 5.2 The proposed underground sea water intake pipeline

**109-115** S29 14.251 E16 51.470      S29 14.204 E16 51.404  
          S29 14.244 E16 51.462      S29 14.211 E16 51.382  
          S29 14.233 E16 51.444      S29 14.216 E16 51.433

**109-111** Comprises a series of relatively well preserved shell midden remains on the degraded sand dunes alongside the Port Nolloth Abalone Farm. The remains comprise some fairly thick patches of shellfish on the soft, partially vegetated dune tops, and in the exposed road cuttings (Figures 19 & 20). The shellfish is dominated by the limpets S. argenvillei, C. granatina and C. oculus, while smaller amounts of Black Mussel also occur. A few quartz flakes and chunks, one silcrete flake, one silcrete chunk and a large quartzite chunk was counted. These are some of the sites that were most likely recorded by Ruder (1968) more than 40 years ago.

The remains have been rated as having potentially high significance.

Activities such as unrehabilitated mining, construction of access roads, 4 x 4 tracks, and recreational quad bikes have caused significant damage to shell middens (**112-115**) in the beach and dune area (Figures 21 & 22, and refer to Figure 5).



Figure 19. Site 109



Figure 21: Site 112



Figure 20: Site 111



Figure 22: Site 114

### **5.3 The proposed brine water outlet pipeline**

No archaeological remains were found in the alignment of the proposed brine water outlet pipeline. Most of the route crosses the property administered by the Port Nolloth Abalone Farm.

### **5.4 The proposed underground purified water pipeline**

No important archaeological remains were found in the alignment of the proposed purified water pipeline. Most of the route will be aligned alongside the main road at the entrance to the Mari Culture Park that leads to the sandy track near the entrance to the proposed desalination plant. Site **107** was documented in the sandy track but the remains have been rated as having low archaeological significance.

## **6. PREDICTED IMPACTS**

### **6.1 The proposed desalination plant**

Sites **(098-101)** will likely be directly impacted by the proposed construction of the desalination plant. However, the remains have been rated as having low archaeological significance as they comprise mostly thin, dispersed traces of surface shell with no natural stratigraphy or cultural remains present.

Sites **093, 095-097, 102-103 & 106** all fall outside the footprint area of the proposed desalination plant, and the remains have been rated as having low archaeological significance as they comprise mainly surface traces of shellfish, with no natural stratigraphy and at most just a few stone flakes present.

Site **094** has been rated as having medium significance. Construction of the road alongside the western boundary of the Mari Culture Park has damaged most of the site, but a thin layer of natural stratigraphy still occurs against the sandy slope, while the remains of a large seal are also visible. The archaeological site will not be directly impacted by the proposed activities, but measures must be put in place in order to protect what remains of this potentially important feature.

Sites **104, 105, & 108** are shell middens that have been recorded by Morris (2006), and may potentially be vulnerable to the proposed development.

### **6.2 The proposed underground sea water intake pipeline**

Large numbers of shell middens have already been damaged and destroyed in the dune and beach area alongside the abalone farm, as a result of diamond mining and associated activities. 4 x 4 vehicles and quad bikes have added to the general degradation of the area. A ribbon of relatively well preserved shell middens have been recorded on the surviving dunes, which will not be directly impacted by the proposed sea water intake pipeline. Measures must, however, be put in place that protects these vulnerable sites during both the construction and operational phase of the proposed project.

### **6.3 The proposed brine outlet pipeline**

No visible archaeological traces will be impacted by the proposed brine outlet pipeline.

### **6.4 The proposed underground purified water pipeline**

Site **107** may be impacted by the proposed underground purified water pipeline, but as indicated, these remains (in the sandy track) have been rated as having low archaeological significance.

The following potential risk sources have also been identified.

- Unmarked human burials may be exposed or uncovered during bulk earthworks and excavations for the proposed desalination plant, and intake and outlet pipelines.
- Buried shell midden deposits may also be exposed or uncovered during proposed activities.

## **7. CONCLUSION**

Indications are that in terms of the archaeological heritage, the proposed construction and operation of the Port Nolloth seawater desalination plant including associated infrastructure is viable. The direct impact on important archaeological resources is expected to be limited.

Management actions must, however be implemented in order to protect vulnerable and threatened archaeological deposits that are located in the surrounding area.

## **8. RECOMMENDATIONS**

With regard to the proposed construction and operation of a seawater desalination plant at Port Nolloth in the Northern Cape, the following recommendations are made:

1. The project is deemed to be viable.
2. No archaeological mitigation is required.
3. The proposed seawater intake and outlet pipelines must not damage or cross any of the remaining sand dunes in the beach area where potentially important shell middens still occur.
4. Shell middens that have been documented must be demarcated with danger tape prior to construction activities commencing. Ideally, the archaeologist should be instructed to undertake this intervention.

5. Signage should be erected in the Mari Culture Park and near the entrance to the beach area, indicating the presence of the archaeological sites and their importance.
6. The very visible shell midden (**094**) that includes the remains of a large seal could potentially be excavated and rescued. Alternatively the site must be covered (and therefore protected) with sand. The latter is supported as excavation of the archaeological remains will be more expensive.
7. Should any unmarked human remains, or buried shell middens be exposed or uncovered during excavations these must immediately be reported to South African Heritage Resources Agency (Ms Mariagrazia Galimberti 021 4624502). Burials should not be removed until inspected by the archaeologist and will have to be removed under a permit issued by SAHRA.

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Figure 23. Google aerial photograph illustrating the waypoints of archaeological occurrences

