

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR THE  
PROPOSED DEEPENING OF THE BEN SCHOEMAN BASIN AND  
ALTERATION OF BERTHS 601, 602, 603 AND 604, PORT OF  
CAPE TOWN.**

**SPECIALIST STUDY IN MARITIME ARCHAEOLOGY**

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## EXECUTIVE SUMMARY

This Maritime Archaeology specialist report was compiled as part of the Environmental Impact Assessment (EIA) phase of the proposed deepening of the Ben Schoeman Basin (BSB), also known as the Ben Schoeman Dock, and planned deepening and alterations to Berths 601, 602, 603 and 604 in that basin.

The development and management of this EIA, as well as the monitoring and guiding of related specialist studies, is being undertaken by SRK Consulting, Cape Town. The project is commissioned by Transnet, the legal entity representing the National Ports Authority of South Africa (NPA), Port of Cape Town.

The specialist study in Maritime Archaeology for this EIA was commissioned in September 2006. It is partly based on studies that were undertaken previously. These include the Strategic Environmental Assessment (SEA) for the Port of Cape Town and the Environmental Impact Assessment (EIA) for the extension of the container terminal in that port. In addition, various specialist studies and other relevant documentation that were made available by SRK during the course of October and November 2006 were consulted as well. The information contained therein has allowed for a partial assessment with regard to aspects of the underwater cultural resource that may be present in the study area. Unfortunately, the unavoidable incompleteness of the archival data and archaeological records was a constraining factor. Nevertheless, the brief for the specialist study: "... to conduct an initial review and confirm the approach and findings with SAHRA (South African Heritage Resources Agency)" was successfully achieved.<sup>1</sup>

The main conclusions of this study are as follows:

- 1- The consulted sources do not contain information that is sufficient or accurate enough to predict the exact location, nature, current state and extent of the underwater cultural resource that may be encountered during the planned further development of the BSB;
- 2- Although the underwater cultural resource is important and non-renewable, various pressing socio-economic needs exist to further develop the area of the BSB. The fact that the BSB has been subjected to extensive dredging and blasting in the past has already resulted in destruction of a substantial part of the underwater cultural resource in that place. For these reasons, further development of the BSB is preferable to development of other potential areas;
- 3- Nevertheless, mitigating activities are essential when further development is to be undertaken. These will mainly involve the monitoring of blasting and dredging activities from the surface. *Ad hoc* underwater fieldwork may be necessary on occasion. This will have to be done in the format of 'rescue archaeology' in specific small-scale locations that contain cultural material;

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<sup>1</sup> Correspondence Ms S.Jones, SRK Consulting – Dr B.Werz, *in dato* 21 September 2006: p.1; SRK Consulting, 2006. Proposed alterations to Berths 601, 602, 603 and 604 and associated deepening of the Ben Schoeman Dock at the Port of Cape Town. Plan of study for EIA. Report no.367079/1, August 2006: p.12.

The term 'underwater cultural resource' as used in the context of this report includes all archaeological material.

Requirements as indicated by SAHRA are integrated in this report. These mainly pertain to the need to monitor dredging activities.

- 4- Blasting and dredging operations should be planned and conducted in such a way as to minimize the negative impact on the cultural resource;
- 5- Deposition of dredged material will be done offshore and in deep water. It is therefore essential that this location will be accurately recorded, to allow for future exploration and artifact retrieval, even though dredging and deposition will inevitably cause the destruction of the context of archaeological sites;
- 6- An overview of the predicted Impact Assessment of the planned development, in the context of this specialist study, has been tabulated as follows:

Impact	Consequence	Probability	Significance	Status	Confidence
Without mitigation	High (7)	Probable	High	Negative	High
With essential mitigation	Low (5)	Probable	Low	Negative	High

## GLOSSARY

**Archaeology:** the scientific study of aspects of the human past, primarily through material evidence

**Artifact:** an object used or produced by people in the past

**BSB:** Ben Schoeman Basin

**Context:** the interrelationship between artifacts and finds

**Excavation:** the practice of documenting, uncovering and recovering of artifacts and finds, together with associated information

**Field work:** the tasks that are carried out in the field and that include both non-intrusive surveys and excavation

**Find:** an artifact or other physical trace that provides evidence for past human activities

**Geophysical techniques:** the various techniques that allow for the scanning and/or analysis of sediments and deposits

**HWC:** Heritage Western Cape

**Maritime archaeology:** the scientific study of people's past relations to the sea through surviving material evidence and all available additional evidence of whatever nature

**Material culture:** physical evidence of past human activity, mostly in the form of artifacts

**Intrusive survey:** a survey of an area or site whereby the context is disturbed and artifacts and finds contained therein removed

**NPA:** National Ports Authority of South Africa

**SAHRA:** South African Heritage Resources Agency

**Site:** a place where archaeological material is deposited

**Site information:** all data that can be gained from the study of a site. These may relate to spatial information pertaining to artifacts and finds, stratigraphy, sedimentology, etc.

**Stratigraphy:** the sequence of different layers of geological or cultural (i.e. man-made) material

**UNESCO:** United Nations Educational, Scientific and Cultural Organization

## 1. INTRODUCTION

Over the years, the Port of Cape Town has seen some substantial developments. These included land reclamations that caused a change in the original coastline, as well as the construction of a variety of harbour works and related infrastructural developments.<sup>2</sup>

During the 1990s, attention focused on further development of the container stacking area in the northeastern section of the harbour. Proposals were formulated to expand the stacking area by a distance of approximately 300 metres out to sea and northwards of the existing sea wall. This new section is to be reclaimed and backfilled with dredged material. The source of this material will probably be a section of sea bed deposits to the northeast of Robben Island.<sup>3</sup>

Parallel to the expansion of the container terminal, the need has been identified to deepen the greater part of the adjacent Ben Schoeman Basin (BSB) from its current maximum depth of -14m to -15.5m below chart datum. In addition, the adjacent north quay, alongside current berths 601, 602, 603 and 604, has to be expanded by 10m into the basin. These developments are deemed necessary to accommodate a new generation container vessels with deeper draft, as well as larger cranes to service such vessels.<sup>4</sup>

Originally, both the expansion of the container terminal stacking area and the deepening of the BSB were planned as one project due to their proximity. The two projects have subsequently been separated and are currently guided by separate Environmental Impact Assessments (EIAs) that include a variety of specialist studies on specific topics.

This specialist report was compiled as part of the EIA phase of the proposed deepening of the BSB, also known as the Ben Schoeman Dock, and planned deepening and alterations to Berths 601, 602, 603 and 604 in that basin. The development and management of this EIA is being undertaken by SRK Consulting, Cape Town. The project is commissioned by Transnet, the legal entity representing the National Ports Authority (NPA) of South Africa.

The specialist study in Maritime Archaeology for this EIA was commissioned in September 2006. It is partly based on studies that were undertaken previously, including:

- the Strategic Environmental Assessment (SEA) for the Port of Cape Town; and
- the Environmental Impact Assessment (EIA) for the extension of the container terminal in that port, completed in May 2003.

In addition, various specialist studies and other relevant documentation that were made available by SRK during the course of October and November 2006 were consulted as well. The information contained therein has allowed for a partial assessment with regard to aspects

<sup>2</sup> Durden, T.A.S., 1992. An assessment of the maritime archaeological potential of Table Bay, 1806 to 1900. Unpublished BA(Hons) thesis, Department of Archaeology, University of Cape Town; Soonike, H.E., 1974. The development of the harbour of Table Bay with special reference to the period 1825-1860. Unpublished MA thesis, Department of African Studies, University of Cape Town; South African Transport Services, 1985. Map showing the historical development of Table Bay Harbour, 1870-1985. South African Transport Services, Cape Town.

<sup>3</sup> See for example: CSIR-Environmentek, 1999. Draft scoping report. Proposed expansion of the container terminal stacking area at the Port of Cape Town. CSIR, Stellenbosch; Heather-Clark, S. & Liphoto, L., 2002b. Strategic Environmental Assessment for the Port of Cape Town phase one. Final scoping report. CSIR Report No. ENV-S-C 2002-100. CSIR, Stellenbosch; National Ports Authority of South Africa, 2002. NPA-Development Framework-Cape Town. NPA, Cape Town.

<sup>4</sup> See for example: Protekon Design, 2006. Port of Cape Town, container terminal expansion project. Geotechnical report. August 2006; Shangoni Management Services, 2006. Proposed alterations to Berths 601, 602, 603 and 604 and associated deepening of the Ben Schoeman Dock at the Port of Cape Town. March 2006; SRK Consulting, 2006. Proposed alterations to Berths 601, 602, 603 and 604 and associated deepening of the Ben Schoeman Dock at the Port of Cape Town. Plan of study for EIA. Report no.367079/1, August 2006.

of the underwater cultural resource that may be present in the study area. Unfortunately, the unavoidable incompleteness of the archival data, as well as the fact that many archaeological sites were never recorded, was a constraining factor. Nevertheless, the objectives of this specialist study were successfully achieved.

The structure of this report is as follows:

**Chapter 1:** the Introduction provides basic background information to the project and briefly indicates what alterations to the Ben Schoeman Basin (BSB) are envisaged. It also explains the role of the specialist study in maritime archaeology as part of the EIA.

**Chapter 2:** explains some objectives and principles underlying the maritime archaeology study for the BSB, provides guidelines and re-iterates the Terms of Reference for this specialist study.

**Chapter 3:** details the legal requirements for the protection of heritage resources and reports on the outcome of discussions held with the SA Heritage Resources Agency (SAHRA).

**Chapter 4:** describes the sources of information that were used for the study and explains the research methodology. Following this, it discusses the archaeological potential of the BSB and provides a brief description and background history of the site. This is followed by a description of the seabed before 1972, blasting and dredging operations during the 1970s and how this work altered the site. This discussion is also of value in order to assess the current archaeological potential of the basin. From then onwards, the emphasis is on the proposed deepening project and the envisaged disposal of dredged material. This includes some comments on the blasting, dredging and disposal methods that are envisaged, specifically from the archaeology perspective.

**Chapter 5:** provides an assessment of impacts that are envisaged when the project is executed, in accordance with the impact rating methodology provided in the specialist Terms of Reference, and discusses essential mitigation measures that should be implemented.

**Chapters 6:** presents the main conclusions of the study and provides specific recommendations.

Most of the sources of information that were used for the report are referenced in the form of footnotes and a full overview of sources of information is provided in the 'References' section at the end of the document.

## 2. STUDY OBJECTIVES, APPROACH AND TERMS OF REFERENCE

The general objectives of this study include the following:

- 1- To formulate principles and guidelines for the assessment and management of underwater cultural resources within the area of the Ben Schoeman Basin (BSB), Port of Cape Town;
- 2- To indicate the different types of underwater cultural resources that may be expected in the study area;
- 3- To indicate general requirements for the protection of these resources;
- 4- To provide practical advice for the protection of cultural material that may be uncovered by the proposed developments.<sup>5</sup>

General guidelines and principles for the assessment, study and management of cultural resources in the underwater environment, including archaeological material, have been formulated by the UNESCO's Convention on the Protection of the Underwater Cultural Heritage, and were adopted by the UNESCO's General Conference in 2001. The convention covers: "all traces of human existence having a cultural, historical or archaeological character which have been partially or totally underwater, periodically or continuously, for at least 100 years".<sup>6</sup> In this context it is also important to note that the South African National Heritage Resources Act *inter alia* protects wrecks and associated materials that are older than 60 years, or which SAHRA considers to be worthy of conservation.<sup>7</sup>

The UNESCO convention states in broad terms that it is essential to protect and preserve the underwater or maritime heritage for the benefit of mankind. Some important reasons for doing so include the following:

- 1- Maritime archaeological resources can provide information on aspects of the human past that cannot be gained from other sources, such as archival documents or museum collections;
- 2- The maritime archaeological heritage is a limited and non-renewable resource;
- 3- A substantial part of this resource is under constant threat from developments and the actions of salvors and treasure hunters.

The UNESCO Convention and indeed the prevailing philosophy of the discipline of archaeology dictate that whenever possible, archaeological sites must be protected from unwarranted interference. This can best be done by following the '*in situ*' preservation concept. Nevertheless, specific situations do occur that cannot prevent interference and thus call for

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<sup>5</sup> See also: Werz, B.E.J.S., 2003. Strategic Environmental Assessment (SEA) for the Port of Cape Town and Environmental Impact Assessment (EIA) for the expansion of the container terminal stacking area. Specialist study in Maritime Archaeology. Cape Town, May 2003: pp.7-9.

It should be mentioned here that no above-water cultural resources that may be important to archaeology or the cultural heritage in general have been identified in the BSB area. Although older wrecks and other cultural resources may still be present underneath the adjacent quays that were constructed on reclaimed land, these areas are currently sealed off and do not fall within the scope of this study..

<sup>6</sup> UNESCO, 2001. Convention on the Protection of the Underwater Cultural Heritage. Paris, November 2001; UNESCO, (2001). Information Kit UNESCO Convention on the Protection of the Underwater Cultural Heritage. Paris; Williams, 2001. Treasure hunters beware. Sources. Unesco Magazine 140: pp.4-5.

<sup>7</sup> National Heritage Resources Act: p.6.

mitigation. Examples of these are the proposed expansion of the container terminal stacking area and the deepening of the BSB at the Port of Cape Town.

Based on the above it will be clear that it is essential to formulate basic principles and guidelines for the assessment, study and management of underwater cultural resources within the BSB. Such guidelines and principles include but are not limited to the following:

- 1- Before any development takes place, a baseline study must be undertaken to assess the underwater cultural resources i.e. maritime archaeological potential of the area;<sup>8</sup>
- 2- The results of this study must be taken into consideration before construction starts;
- 3- Any work must take the possible presence, importance and sensitivity of maritime archaeological sites into consideration;
- 4- The involvement of a maritime archaeologist is essential for the compilation of the baseline i.e. desktop study but also for mitigating activities during upgrading of the BSB;
- 5- Any material recovered during such operations must be adequately stored and preserved and must remain accessible for further study. Excavation and recovery can only be done after a license from the Department of Customs and Excise has been issued and a permit from the SAHRA has been obtained;
- 6- Proper lines of communication between the developer, sub-contractors and the specialist for maritime archaeology must be maintained at all stages;
- 7- The various stages of potential archaeological surveys and retrieval of cultural material must be properly documented and made accessible.

The Specific Terms of Reference for the specialist study in Maritime Archaeology for the BSB are as follows:

- 1- Review existing studies at the Port of Cape Town, e.g. the Strategic Environmental Assessment of the Port of Cape Town and the Container Terminal Expansion, to identify maritime archaeological features in the vicinity of the proposed activities;
- 2- Review legal requirements in terms of heritage legislation relevant to this EIA;
- 3- Identify potential maritime archaeological issues related to the proposed project;
- 4- Consult with the South African Heritage Resources Agency (SAHRA) to confirm the approach and findings of the review as well as compliance with relevant heritage legislation;
- 5- Where required, identify the need for mitigation and suggest methods to achieve this;
- 6- Devise a practical monitoring programme that will, firstly, allow real time control of project activities to reduce environmental risks and, secondly, facilitate a qualitative determination of actual versus predicted project impacts;
- 7- Conform to any relevant guidelines for specialist studies issued by the Department of Environmental Affairs and Development Planning (DEADP).<sup>9</sup>

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<sup>8</sup> The baseline study for the BSB is represented by this report.

<sup>9</sup> Correspondence Ms S.Jones, SRK Consulting – Dr B.Werz, *in dato* 21 September 2006: pp.1-2.

### 3. LEGAL REQUIREMENTS IN TERMS OF HERITAGE LEGISLATION

The South African legislative system includes several acts which are relevant to the protection of archaeological sites, both on land and underwater. Although most of these acts were not formulated with this specific purpose in mind, they contain some clauses and conditions which regulate aspects of management and control. In addition to this, further regulations and conditions have been formulated by the government department which is involved in the management of sites with an archaeological or cultural importance, the South African Heritage Resources Agency (SAHRA).

Relevant legislation which touches on or incorporates submerged archaeological sites is described in the following acts:

- the Sea Shore Act, No.21 of 1935 (as amended);
- the Merchant Shipping Act, No.57 of 1951 (as amended);
- the Customs and Excise Act, No.91 of 1964;
- the Legal Succession to the South African Transport Services Act, No.9 of 1989;
- the National Heritage Resources Act, 1999.

Of these, the first four mainly deal with shipwrecks and their contents, either *in situ* or dispersed, or those areas where wrecks have been deposited without specific reference to the cultural and historical-archaeological values of such remains. On the other hand, the National Heritage Resources Act of 1999 specifically acknowledges these values and includes detailed regulations in this regard. As a result, certain provisions concerning wrecks and salvage activities remain in force side by side, creating a somewhat complicated situation.<sup>10</sup>

This section of the report will focus mainly on aspects of the National Heritage Resources Act of 1999, as well as some guidelines provided by the SAHRA.

The National Heritage Resources Act of 1999 defines 'wreck' as:

"... 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".<sup>11</sup>

The definition of 'heritage objects' is also important in this regard. Heritage objects include:

"An object or collection of objects, or a type of object or list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including (...) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, meteorites and rare geological specimens".<sup>12</sup>

<sup>10</sup> Van Meurs, L.H., 1985. Legal aspects of marine archaeological research. Institute of Marine Law, University of Cape Town: p.63; Werz, B.E.J.S., 1999. Diving up the human past. Perspectives of maritime archaeology, with specific reference to developments in South Africa until 1996. British Archaeological Report International Series 749, Oxford: pp.56-59; for a more detailed discussion of relevant legislation see: Werz, B.E.J.S., 2003. Strategic Environmental Assessment (SEA) for the Port of Cape Town and Environmental Impact Assessment (EIA) for the expansion of the container terminal stacking area. Specialist study in Maritime Archaeology. Cape Town, May 2003: pp.34-39.

<sup>11</sup> National Heritage Resources Act: p.6.

<sup>12</sup> National Heritage Resources Act: p.50.

The right to interfere with, to salvage, remove or manage and protect wrecks is vested in different authorities depending on their individual tasks, as well as the circumstances surrounding a specific wreck, such as position, condition and age. In this respect, relevant authorities can also transfer certain rights, tasks and duties to private companies and individuals. To indicate where different responsibilities lie, reference can be made to various acts. According to the Legal Succession to the South African Transport Services Act, a division of the company which took over responsibility from the South African Transport Services in 1989, Portnet, now the National Ports Authority of South Africa (NPA), holds jurisdiction over the harbours. The NPA is empowered to raise, remove or destroy any sunken, stranded or abandoned ship or wreck within the area of its jurisdiction which includes all port and harbour areas as defined by specified boundaries.<sup>13</sup> Furthermore, no one may break up any wreck, hulk or ship in a harbour without the permission of the port captain in charge.<sup>14</sup>

The NPA can order the owner or master of a wreck which proves a danger to navigation to remove or destroy such wreck. If the owner or master is not traceable or not in a position to follow such an order, the company can remove or destroy obstructions i.e. wrecks themselves or by using the services of salvage companies or other outside bodies. Sometimes the process is reversed and permission is sought by companies or individuals to salvage wrecks for commercial gain. All such activities, irrespective of the age of the wreck in question, fall under regulations contained in the Customs and Excise Act, No.91 of 1964. This Act states that anyone who has any wreck in his possession, including the owner or his representative, must inform the Controller of Customs and Excise. If such a person is not the owner of the wreck or his authorised agent, the wreck has to be delivered to the Controller. In addition, the removal or alteration of any wreck without the permission of the Controller of Customs and Excise is not allowed unless such an act is necessary for the preservation or safe-keeping. The Controller should, however, be informed without delay in case this happens and the wreck must be handed over.<sup>15</sup>

Under the Customs and Excise Act, it is compulsory to obtain permission to search for or salvage any wreck. As with the Merchant Shipping Act and the Legal Succession to the South African Transport Services Act, there is no time restriction involved and regulations cover both contemporary and older shipwrecks and other material remains. Permission to search, or search for, abandoned wrecks along the coast of the Republic is granted by the Controller of Customs and Excise, who is under the direction of the Department of Finance and who can issue a licence to that effect. This licence is valid for a period of one full calendar year. The fee for obtaining a licence is nil and the applicant does not have to show proof of competence in salvage proper or diving. The only requirements are to take out a security bond of R2000, to produce an annual report describing any salvage activities undertaken and plans for the following year, and the compilation of a register. The register, which must be open to inspection at all reasonable times by relevant authorities, should specify all articles recovered by the licensee, the date of recovery, the manner and the date of disposal of such articles, and to whom and for what sum or consideration the goods have been disposed of. Licence holders are liable to pay the Controller of Customs and Excise fifteen percent royalty on all items of value salvaged and declared and, in addition, import duties, surcharge and Value Added Tax (VAT) can be levied depending if recovered goods are to be sold and/or exported by the licence holder.<sup>16</sup>

<sup>13</sup> Legal Succession to the South African Transport Services Act, No.9 of 1989, Schedule 1, Section 11(d).

<sup>14</sup> Van Meurs, L.H., 1985. Legal aspects of marine archaeological research. Institute of Marine Law, University of Cape Town: p.63.

<sup>15</sup> Customs and Excise Act, No.91 of 1964, Section 112 sub-section 2; Van Meurs, L.H., 1985. Legal aspects of marine archaeological research. Institute of Marine Law, University of Cape Town: p.65-66.

<sup>16</sup> Werz, B.E.J.S., 1990. A preliminary step to protect South Africa's undersea heritage. The International Journal of Nautical Archaeology 19, p.337; Van Meurs, L.H., 1985. Legal aspects of marine archaeological research. Institute of Marine Law, University of Cape Town: p.66.

It should be noted that the licence issued by the Controller of Customs and Excise does not give exclusive rights to the holder to search for or salvage any particular wreck. The wording on the licence clearly indicates that permission is only given: "...subject to the rights of others, including any person to whom a licence similar to this licence may have been granted or may hereafter be granted...".<sup>17</sup> Furthermore, the Act does not suggest or indicate that special attention or significance should be attached to older wrecks which can be of historical-archaeological interest although, upon issuing a license, it is indicated by the Controller of Customs and Excise that the SAHRA should be approached for the necessary permit or authority when dealing with wrecks falling under the National Heritage Resources Act.

In the National Heritage Resources Act it is stated that:

"... the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority; provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA". And further: "... all archaeological objects (...) are the property of the State", whereas: "Any person who discovers archaeological or palaeontological objects or material (...) in the course of development (...) must immediately report the find to the responsible heritage resources authority ...".<sup>18</sup>

In this context, the following is also relevant.

"... any person who intends to undertake a development categorised as the construction of a (...) pipeline, canal or other similar form of linear development or barrier exceeding 33m in length; any development or other activity which will change the character of a site exceeding 5 000 square metres in extent; or (...) the re-zoning of a site exceeding 10 000 square metres in extent; or any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority ...".<sup>19</sup>

This regulation has been complied with as SAHRA was informed of the proposed BSB development on 23 October 2006 and during previous discussions.<sup>20</sup> Nevertheless, it has been indicated by SAHRA that it would welcome a more formal notification in the format of a letter from the NPA that briefly sets out the intended development activities.<sup>21</sup>

The National Heritage Resources Act of 1999 is the only act within the South African legal system which makes specific provisions for the historical-archaeological and cultural values which can be attributed to shipwrecks. This act has replaced the National Monuments Act, 1969 (Act No.28 of 1969) and its amendments. The objective of the Act is to establish a national system for the management of heritage resources which it applies throughout the Republic. It will be clear that the scope of this Act is quite extensive. The protection and management of submerged historical shipwrecks and other underwater archaeological sites is only one of its objectives.

The above clearly indicates that it is a legal requirement to obtain the necessary approval to undertake any disturbance, excavation or removal of archaeological sites and/or material contained therein. In practise, the first phase is to obtain a license to search or search for abandoned wreck from the Controller of Customs and Excise. This license is issued in the name of an individual and requires a surety of R2000. The time it will take to issue the license

<sup>17</sup> Department of Finance, Controller of Customs and Excise. License to search or search for abandoned wreck.

<sup>18</sup> National Heritage Resources Act: p.58.

<sup>19</sup> National Heritage Resources Act: p.62.

<sup>20</sup> E-mail correspondence Mr Jonathan Sharfman, SAHRA, to Mr Conrad Steenkamp, in dato 4 May 2006; E-mail correspondence Mr Conrad Steenkamp to Mr Billy Cilliers, NPA, in dato 6 May 2006.

<sup>21</sup> Telephone conversation Dr Bruno Werz with Mr Jonathan Sharfman, SAHRA, in dato 13-11-2006.

may range from a few weeks to a few months. After the license has been obtained, a permit is required from the SAHRA. Application for this is done by completing a form (Application Form 303). The information requested includes personal details of the applicant, details related to the envisaged project, site information and details of the project archaeologist. Under normal circumstances, a declaration is required from a collaborating institution, such as a museum or university that will assist in the project. Furthermore, the application has to be accompanied by a detailed project motivation and proposal. It will take several weeks to process this permit. In the case of the BSB project, however, SAHRA has indicated that as it concerns a development project, a permit can be issued to the project's maritime archaeologist virtually immediately to prevent unduly delays.<sup>22</sup>

Further feedback provided by SAHRA, as part of the brief for this study to confirm the approach and findings with that organization, includes the following comments:

SAHRA acknowledges that it is impossible to make definite statements on the current state of the underwater cultural resource in the BSB. This is due to the incompleteness of relevant sources of information, and the activities of a destructive nature that were undertaken during the 1970s. It is accepted that prehistoric material, such as stone implements, may have been present in the area previously. This type of artifact would have been deposited in deeper layers of sediment. Nevertheless, the fact that during construction the larger part of the eastern basin area seems to have been dredged clean of sediment would make it highly unlikely that much or any of this material remains *in situ*. The possibility remains, however, that such material may be encountered in the western section of the basin.

SAHRA also acknowledges that by far the majority shipwrecks in the area was originally deposited either on the beach or in very shallow water immediately adjacent to the old coast line. Some of these wrecks are thus currently covered by reclaimed land to the east and north-northeast of the BSB.<sup>23</sup> Some other wrecks may have ended up slightly further offshore, as evidenced by the material that was hauled up during the 1970s. Nevertheless, dredging of the seabed during the construction phase, whereby the depth was increased from in between -5 to -10m to >-10.7m (Berths 501, 502 and 600), >12.8m at Berth 601 and a standard depth of -14m in the rest of the area (Berths 602, 603 and 604) would have destroyed such wrecks either partly or entirely, together with most of their associated materials.<sup>24</sup> This applies to the greater part of the BSB, as can be judged from the bathymetry i.e. the water depth in the basin before construction took place.<sup>25</sup>

SAHRA concurs with the viewpoints that blasting should be undertaken in such a way as to minimize possible damage to archaeological features and dredging is to be done in such a way that it is possible to observe at least part of the dredged material on the surface.

As far as monitoring of these activities is concerned, as well as potential mitigation should any cultural material be found, SAHRA expects the following procedures to be implemented:<sup>26</sup>

- 1- That a suitably qualified maritime archaeologist (minimal qualification a Masters degree) be appointed as a Principal Investigator to monitor blasting and dredging activities on an *ad*

<sup>22</sup> Mr Jonathan Sharfman, SAHRA, pers.comm. 23 October 2006.

<sup>23</sup> South African Transport Services, 1985. Map showing the historical development of Table Bay Harbour, 1870-1985. South African Transport Services, Cape Town.

<sup>24</sup> National Ports Authority of South Africa (NPA), 2005. Expansion of CTCT to Increase Stack Capacity and Berth Depth. 2005/03/01: p.7.

The information provided here refers to the fact that berths 501, 502 and 600 are deep enough to accommodate ships with a draft of 10.7m and berth 601 is deep enough to accommodate vessels with a 12.8m draft. Therefore the actual water depth on these sites should be slightly greater.

<sup>25</sup> See: South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Soundings in basin; South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Profiles of test holes in basin.

<sup>26</sup> Mr Jonathan Sharfman, SAHRA, pers.comm. 23 October 2006.

*hoc* basis (i.e. spot-checks during one full day or two half-days per week for the duration of these activities);

- 2- That the archaeologist liaises closely with the client and specifically with the dredge operators;
- 3- That the archaeologist may appoint an assistant for the monitoring procedure should he/she not be in a position to visit the site;
- 4- That the archaeologist applies for a permit from SAHRA that will allow the recovery of cultural material;<sup>27</sup>
- 5- That an area of seabed be designated to store cultural material that may be recovered, as well as a storage space on land;
- 6- That the client makes provisions for financing the monitoring of activities by a maritime archaeologist and reserves some funding for potential underwater archaeological intrusive surveys and/or removal of material should the maritime archaeologist deem so necessary.

The above mentioned instructions are in accordance with a general document that was produced by the SAHRA and that was forwarded to the NPA previously. Some of the issues mentioned in this document need to be reiterated here.

“It is necessary for construction work to be discontinued until such time as an assessment of the site can be undertaken.<sup>28</sup> Should the site be deemed to be of historical or archaeological significance, it is necessary to lodge an application for an excavation permit with SAHRA. (...) This permit can only be issued on the name of the contracted maritime archaeologist (...) Should a permit be issued, it is subject to such conditions as SAHRA may deem appropriate”.

“The developer will be liable for certain financial burdens related to the acquiring of a permit and the subsequent recording of disturbed archaeological sites. (...) should the developer encounter an archaeological site, it is up to the developer to carry all of the costs of recording that site including the hiring of qualified personnel and equipment that may be required, as well as the cost incurred through the halting of construction activities in the area of the archaeological site”.<sup>29</sup>

In the context of this project, it is important to indicate that SAHRA fully understands the economic importance of the BSB development for the benefit of the Port of Cape Town, the economy of the Western Cape Province and the national economy.<sup>30</sup> SAHRA concurs that the suggestions that are made in this report are realistic, that they will not unduly delay the planned development, and that they are the best option given the circumstances.<sup>31</sup>

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<sup>27</sup> No other permits are required from SAHRA but the applicant must be a professional archaeologist. The archaeologist must, however, have a license from the Controller of Customs and Excise to search or search for abandoned wreck.

<sup>28</sup> In this context, ‘construction work’ relates to blasting and dredging in specific small-scale locations where cultural material may be found and not the whole area of the BSB.

<sup>29</sup> General Shipwreck Legislation document, forwarded by e-mail. E-mail correspondence Mr Jonathan Sharfman, SAHRA, to Mr Conrad Steenkamp, in dato 4 May 2006; E-mail correspondence Mr Conrad Steenkamp to Mr Billy Cilliers, NPA, in dato 6 May 2006.

<sup>30</sup> For more detailed background information on these aspects see also: National Ports Authority of South Africa (NPA), 2002. NPA-Development Framework-Cape Town. NPA, Cape Town.

<sup>31</sup> Mr Jonathan Sharfman, SAHRA, pers.comm. 23 October 2006.

## 4. PROJECT DESCRIPTION AND OVERVIEW OF ASSOCIATED IMPACTS

### 4.1. Sources

The desk top study is in part based on a survey of relevant literature, data bases and archival documents that were identified during the initial stages of the project. Information obtained in this way was analyzed for the specific purpose of this study. In addition, cartographic material was obtained and interpreted, whereas several discussions were held with oceanographers, geologists and archaeologists from the University of Cape Town and the South African Museum regarding wind and current patterns in the bay, beach morphology, prehistoric material onshore and historical sites within the harbour area.

A variety of material that is lodged with different institutions provided relevant information. These institutions include the Cape Archives Depot, where most of the relevant archival documents can be found, but also map and chart material pertaining to Table Bay that is currently housed in the *Nationaal Archief* in The Hague, the Netherlands. Modern charts were obtained from the Hydrographic Office, South African Navy. Relevant literature was traced in the South African Library, the University of Cape Town (UCT) library, the library of the African Studies Department, UCT, or is in the possession of the author. Most of the unpublished student theses and projects were undertaken by students in the Department of Archaeology, UCT, under the supervision of the author. Different shipwreck lists were either compiled by the author or by others. Some of these were published in the *South African Shipping News and Fishing Industry Review*, while an extensive shipwreck data base is maintained by the South African Library. The shipwreck data base at the SAHRA, previously the National Monuments Council, is for the greater part based on the data base from the South African Library.<sup>32</sup>

Feedback and advice regarding the modus operandi for the project from an archaeological and heritage perspective was obtained during discussions with the SAHRA maritime archaeologist, Mr J.Sharfman. Requirements as stipulated by SAHRA have been included in section 3. 'Legal requirements in terms of heritage legislation' and section 6. 'Conclusions and Recommendations'. These mainly pertain to the monitoring of dredge activities.

### 4.2. Research methodology and results

The primary objective of the baseline i.e. desk top study was to identify the different types of maritime archaeological sites that may occur in the area of the BSB. A study of relevant

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<sup>32</sup> National Monuments Council, 1996. Historical database for shipwrecks. Unpublished list, National Monuments Council, Cape Town; South African Heritage Resources Agency, 2006. List of shipwrecks along the South African coast. Unpublished list, SAHRA, Cape Town; South African Library, 1990. List of shipwrecks along the South African coast. South African Library, Cape Town; South African Shipping News and Fishing Industry Review, 1982. Marine casualties in southern African waters, 1552 to 1913. South African Shipping News and Fishing Industry Review, December 1982, 18-50; South African Shipping News and Fishing Industry Review, 1983. Marine casualties in southern African waters, 1914 to 1945. South African Shipping News and Fishing Industry Review, December 1983, 3-15; South African Shipping News and Fishing Industry Review, 1984. Marine casualties in southern African waters, 1946 to 1984. South African Shipping News and Fishing Industry Review, December 1984, 3-30; Werz, B.E.J.S., 1988. List of Dutch East India Company shipwrecks along the coast of South Africa. Unpublished list, Weert/Cape Town.

literature, unpublished research projects, discussions with other archaeologists and a primary assessment of archival sources indicated the possible presence of three general categories.<sup>33</sup> These are:

- 1- Prehistoric material;
- 2- Shipwrecks;
- 3- Anchorage debris.

#### *Prehistoric Material*

Prehistoric material which may occur in the BSB could include remains of hunter-gatherer camp sites, burials and loose finds that are currently under water. Indications for ephemeral occupation sites, remains of shell middens and burials have been found along the eastern shores of Table Bay.<sup>34</sup> Most of these finds date to the Later Stone Age (LSA) and are not very significant. More important is the discovery of Acheulean artefacts that date from the Early Stone Age (ESA). These consist of stone hand axes that have been dated to between 300,000 and 1.4 million years. These finds were made in 1995 and 1996, opposite the present-day Paarden Eiland area immediately to the north of Cape Town Harbour, and provide archaeological evidence for the occurrence of important prehistoric material, under water and *in situ* in Table Bay.<sup>35</sup>

#### *Shipwrecks and Anchorage Debris*

Shipwrecks and anchorage debris are indicators of the role that Table Bay has played during the last 500 years or so as a place of refuge for ships. In fact, the bay has been a focal point for intercontinental maritime traffic since the sixteenth century and still continues to do so. Evidence for this is reflected in the development of the Port of Cape Town since the nineteenth century, but also in the physical remains of historic ships and associated materials that are currently deposited in the bay. Some of this material is considered 'Anchorage debris' and consists of anchors that were lost and equipment and parts of cargoes that fell overboard or that were jettisoned on purpose. This material can be found in the old and current roadstead or anchoring ground. For the purpose of this study, however, mainly historical material is of relevance and the majority of this was deposited in the old roadstead. This

<sup>33</sup> E.g. Durden, T.A.S., 1992. An assessment of the maritime archaeological potential of Table Bay, 1806 to 1900. Unpublished BA(Hons) thesis, Department of Archaeology, University of Cape Town; Durden, T., Graf, O., Hall, G. et al., 1992. Ships and shipping disasters in Table Bay, 1806-1850. Unpublished student project, Department of Archaeology, University of Cape Town; Mavrodinov, N., 1999. An assessment of the maritime archaeological potential of the eastern coastline of Table Bay, between the old Salt River mouth and Blouberg. Unpublished MA thesis, Department of Archaeology, University of Cape Town; Soonike, H.E., 1974. The development of the harbour of Table Bay with special reference to the period 1825-1860. Unpublished MA thesis, Department of African Studies, University of Cape Town; Werz, B.E.J.S., 1999. Diving up the human past. Perspectives of maritime archaeology, with specific reference to developments in South Africa until 1996. British Archaeological Report International Series 749, Oxford; Werz, B.E.J.S., 2003. Strategic Environmental Assessment (SEA) for the Port of Cape Town and Environmental Impact Assessment (EIA) for the expansion of the container terminal stacking area. Specialist study in Maritime Archaeology. Cape Town, May 2003; Werz, B.E.J.S. & Flemming, N.C., 2001. Discovery in Table Bay of the oldest handaxes yet found underwater demonstrates preservation of hominid artifacts on the continental shelf. South African Journal of Science 97: pp.183-185; Werz, B.E.J.S. & Martin, C.G.C., 1994. Hydrographic surveys in aid of maritime archaeological research: the example of the Table Bay Project. The Hydrographic Journal 72: pp.3-15; Cape Archives Depot. Inventory 1/16, Archives of the Colonial Office; Cape Archives Depot. Inventory 1/20, Archives of the Collector of Customs and Excise, Cape Town; Cape Archives Depot. Inventory 1/42, Archives of the Port Captain, Table Bay; Cape Archives Depot. Inventory 4/1, Archives of the Secretary, Commercial Exchange; Cape Archives Depot. Inventory 4/2, Archives of the Harbour Boards.

<sup>34</sup> Mr Mike Wilson, South African Museum, pers. comm.; Dr Graham Avery, South African Museum, pers. comm.; Prof. John Parkington, University of Cape Town, pers. comm.; Werz, B.E.J.S., 1999. Diving up the human past. Perspectives of maritime archaeology, with specific reference to developments in South Africa until 1996. British Archaeological Report International Series 749, Oxford: p.70.

<sup>35</sup> Flemming, N.C., 1998. Archaeological evidence for vertical movement on the continental shelf during the Palaeolithic, Neolithic and Bronze Age periods. Stewart, I.S. & Vita-Finzi, C. (eds.) Coastal Tectonics. Geological Society, London, Special Publications 146: pp.135-136, 139; Werz, B.E.J.S., 1999. Diving up the human past. Perspectives of maritime archaeology, with specific reference to developments in South Africa until 1996. British Archaeological Report International Series 749, Oxford: p.70; Werz, B.E.J.S. & Flemming, N.C., 2001. Discovery in Table Bay of the oldest handaxes yet found underwater demonstrates preservation of hominid artifacts on the continental shelf. South African Journal of Science 97: p.183.

roadstead was situated opposite the Castle and is at present partly covered by the Foreshore development and parts of the modern harbour.<sup>36</sup> The significance of anchorage debris is, however, limited for archaeology, as materials in this category have very little if any contextual value.

The largest and most diverse category that was identified by the desk top study consists of shipwrecks. The study revealed that a minimum of some 360 vessels were lost in the bay.<sup>37</sup> Although basic archival information is available on most of these wrecks, a significant shortcoming is presented by the absence of exact positions for the majority of these cultural resources. Thus, only the approximate place where most vessels went down is known which presents problems for an accurate planning of development activities, in order to avoid disturbance of such sites. Nevertheless, general concentration areas could be identified. In addition, it is a fact that most historical shipping incidents occurred close to the coast and that these wrecks are therefore in relatively shallow waters.<sup>38</sup> In the case of Table Bay, a substantial percentage of shipping incidents were caused by natural conditions. In this respect especially the strong northwesterly winds that mainly occur during winter played a role of major importance. As a result, many vessels were pushed into the shallows, immediately adjacent to the beach, and some vessels even ended up on the beach. It thus seems likely that the majority of wrecks are located on or very close to the old shorelines.

#### *4.3. The archaeological potential of the Ben Schoeman Basin*

As a result of previous extensive blasting and dredging activities that took place in the BSB during the 1970s, it may be concluded that most shipwreck material will have disappeared. In this context, it must also be noted that the majority of material of this nature would have been deposited originally in what is nowadays the eastern section of the BSB, on or very close to the old shoreline.<sup>39</sup> Based on the available data, it can be concluded that most intrusive work during 1972-1976 was undertaken at exactly this location. Not only were surficial deposits dredged out, but the underlying bedrock was blasted to reach the required water depth of the basin. These circumstances make the probability of survival of any wrecks or substantial parts of wrecks very slim. This was also confirmed by various sources. In this context, the following quote is relevant.

“With the building of the Ben Schoeman dock in Cape Town harbour (...) dredgers hauled up much cultural material, obviously originating from historical shipwrecks which had previously foundered in the area. This material included complete case bottles, Chinese porcelain, coins and even substantial parts of ships structures. Before the work started, no impact assessment had been made which could have prevented this destruction. What was even more reprehensible was that during dredging no records were kept of the artifacts which were recovered and their approximate position, nor was the work stopped to allow for a site inspection while only very few artifacts were handed over to a museum”.<sup>40</sup>

<sup>36</sup> Leupe, P.A., 1867. Inventaris der verzameling van kaarten berustende in het Rijksarchief, eerste gedeelte. 's-Gravenhage nr. 180, 184-185.

<sup>37</sup> For an inventory of shipwrecks in Table Bay, together with basic information on nationality, type, date of sinking and approximate place of sinking see: Werz, B.E.J.S., 2003. Strategic Environmental Assessment (SEA) for the Port of Cape Town and Environmental Impact Assessment (EIA) for the expansion of the container terminal stacking area. Specialist study in Maritime Archaeology. Cape Town, May 2003.

<sup>38</sup> Gemeente Rotterdam, Rijkswaterstaat & Openbaar lichaam Rijnmond, 1986. Vooronderzoek archeologie. Rapport van de werkgroep archeologisch onderzoek in het kader van de voorbereiding/uitvoering van de aanleg van de Grootchalige Locatie voor de berging van baggerspecie uit het benedenrivierengebied. S.I.: p.5.

<sup>39</sup> South African Transport Services, 1985. Map showing the historical development of Table Bay Harbour, 1870-1985. South African Transport Services, Cape Town.

<sup>40</sup> Werz, B.E.J.S., 1999. Diving up the human past. Perspectives of maritime archaeology, with specific reference to developments in South Africa until 1996. British Archaeological Report International Series 749, Oxford: p.53; Dr Gabeba Abrahams, SA Cultural History Museum, Dr Graham Avery and Mr Mike Wilson, South African Museum, Mr Chris Scholtz, Mr Steven Valentine and others, pers.comm.

Nevertheless, there is still a chance that certain artifacts from shipwrecks can be found. Although most of these will have lost their contextual value, as they are no longer *in situ*, some items may have survived the process of blasting and dredging to be re-deposited on the bottom. Table 1 below provides details of the recorded shipwreck potential that may have been deposited in the BSB area in the past or very close by.

*Table 1: Recorded shipwrecks in the vicinity of the current BSB for the period 1610-2006 classified according to place of foundering<sup>41</sup>*

	Place of foundering	Quantity	Reference numbers in Appendix 1
1	Woodstock Beach	81	9-10-11-12-16-19-22-23-26-30-36-50-51-52-61-62-63-64-69-72-74-80-86-108-109-111-114-115-122-125-126-127-131-132-139-141-147-152-158-159-164-169-170-174-175-179-180-182-190-199-201-205-209-212-219-232-236-247-263-265-267-268-273-274-281-285-292-305-309-312-317-318-325-330-339-342-343-346-352-355-356
2	Salt River mouth Salt River mouth	42	3-6-48-65-66-81-90-96-102-103-116-124-133-140-143-156-162-165-171-172-183-187-189-197-200-208-213-225-240-243-244-248-251-280-294-296-311-319-344-345-349-350
3	Paarden Eiland	12	14-18-68-87-101-191-192-206-216-235-270-288
4	Near the Castle	9	13-57-203-233-234-301-323-359-360
5	Anchorage/Roadstead	2	167-320
	Total	146	

With regards to the current archaeological potential of the BSB, the following conclusions can be drawn. The eastern section was subjected to extensive blasting and dredging during the 1970s. As a result of these activities, most cultural material will have been removed. A relatively small area has been identified, around Berth 500, which could still contain archaeological material. This is further discussed in section 4.7. 'Previous blasting and dredging operations'. Nevertheless, this area will not be affected as no dredging is being planned here.

The western section of the basin seems to be the most promising area where underwater cultural material can possibly be found. This section may still contain parts of shipwrecks or related cultural material, as well as prehistoric material. Items in this last category would have been deposited in deeper layers originally, immediately overlying the clay and bedrock that

<sup>41</sup> Adapted from: Werz, B.E.J.S., 2003. Strategic Environmental Assessment (SEA) for the Port of Cape Town and Environmental Impact Assessment (EIA) for the expansion of the container terminal stacking area. Specialist study in Maritime Archaeology. Cape Town, May 2003: pp.21-22, Table 3.3. For more details on the individual ships that are indicated in the Table with a reference number, see Appendix 1 of the above-mentioned report: pp.48-120. It should be mentioned here that out of the total number of recorded shipwrecks in Table Bay, currently 360, the approximate place of foundering of 94 vessels was not recorded in the historical documentation. A certain percentage of these may have also ended up in or close to the current area of the BSB.

belongs to the Malmesbury Group.<sup>42</sup> Based on the available information, it seems that not all surficial material was removed from this location, which increases the chance of finding artifacts in this category. This is further discussed in section 4.7. 'Previous blasting and dredging operations'. In this context it is also important to note that one of the Acheulean hand axes that were recovered from the offshore area off Paarden Eiland in 1995 and 1996 were found in a reddish-brown layer that probably represents an old land surface. It is possible that this layer continues in the current harbour area, including the BSB, and that it has been recorded in the core samples taken previously.<sup>43</sup>

#### *4.4. Basic description of Ben Schoeman Basin*

The Ben Schoeman Basin (BSB) forms part of the Port of Cape Town. It is situated in the northern part of the harbour. The central axis is orientated east-west and the sea entrance, to the west, is protected by two sea walls. The BSB is bound by the quays of the Eastern Mole and the tanker and Elliott basins to the south, and the container terminal to the east and north.

The surface area of the BSB is approximately 112.7ha. or 1,127,000m<sup>2</sup>. The basin has twelve berths. These are situated as follows. Along the northern sea wall, from west to east, are berths 703-701. Berth 700 is situated in a north-south direction along the head of the container terminal quay. Berths 604-600 run from west to east alongside the southern side of the main container terminal quay. Berths 502 and 501 run from north to south alongside the eastern quay of the container terminal. Berth 500 is situated in a west-east direction, in the south-eastern corner of the BSB, and runs parallel to the quay that separates the BSB from the Elliott Basin. The total quay length for the deep sea berths is 1,700m, at a maximum draft of 14m, and there is a 300m long berth for coastal shipping, with a draft of 10.7m.<sup>44</sup>

#### *4.5. Basic history*

In 1967, the need for two new basins adjacent to Duncan Dock, to the south of the present-day BSB, was identified. In 1972, construction of the first basin, the BSB, started. Initially, the basin and its related above-water infrastructure was designed as a multi purpose terminal. With the introduction of the (then) relatively new container concept, design and usage of the BSB changed to its present appearance.

The construction of the BSB lasted until 1975, when the dredging of the basin and the reclamation of the adjacent quays came to an end. The fill for the reclaimed area (approximately 70ha in size) was taken from the Rietvlei and pumped via a pipeline to the Ben Schoeman Dock area. Some 5.4 million cubic metres of fill material was dredged from the Rietvlei to this purpose. During the period 1975-1978, further development of the above water

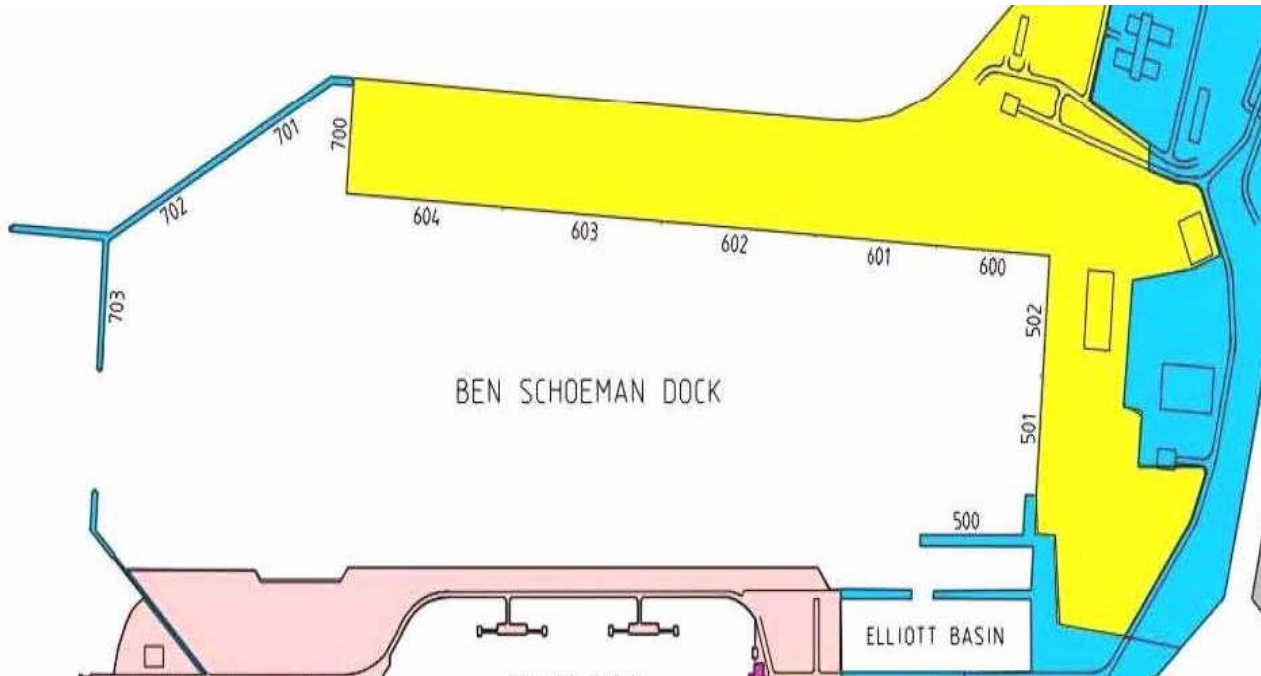
<sup>42</sup> Werz, B.E.J.S., 1999. Diving up the human past. Perspectives of maritime archaeology, with specific reference to developments in South Africa until 1996. British Archaeological Report International Series 749, Oxford: pp.67, 70; Werz, B.E.J.S. & Flemming, N.C., 2001. Discovery in Table Bay of the oldest handaxes yet found underwater demonstrates preservation of hominid artifacts on the continental shelf. South African Journal of Science 97: pp.183-185.

<sup>43</sup> Ibid.: South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Profiles of test holes in basin.

<sup>44</sup> CSIR, 1999. Proposed Expansion of the Container Terminal at the Port of Cape Town. Background Information Document. CSIR, Stellenbosch: p.7, as contained in: CSIR-Environmentek, 1999. Draft scoping report. Proposed expansion of the container terminal stacking area at the Port of Cape Town. CSIR, Stellenbosch; National Ports Authority of South Africa (NPA), 2002. NPA-Development Framework-Cape Town. NPA, Cape Town: D.2; National Ports Authority of South Africa (NPA), 2005. Expansion of CTCT to Increase Stack Capacity and Berth Depth. 2005/03/01: p.7.

infrastructure adjacent to the basin took place, including the construction of quays, cranes and the container stacking area.<sup>45</sup>

Figure 1: basic overview of the BSB.<sup>46</sup>



#### 4.6. Seabed deposits

Before the development of the BSB started, various surveys were undertaken of the area. In the context of this specialist study, the geophysical surveys that recorded the position of test holes and the profiles of test holes that were taken at the time are of importance. The profiles give an impression of the stratigraphy of the various deposits. The information that was provided by the profiles has allowed for a more accurate assessment of the probability of cultural material being present in the study area.

The test holes were positioned in what is now the BSB and in the surrounding area that is currently covered by the quay section adjacent to berths 602 to 604 (test holes 52-57).<sup>47</sup> From these profiles it is clear that the original 10m isobath or depth contour ran from in

<sup>45</sup> National Ports Authority of South Africa (NPA), 2002. NPA-Development Framework-Cape Town. NPA, Cape Town; National Ports Authority of South Africa (NPA), 2005. Expansion of CTCT to Increase Stack Capacity and Berth Depth. 2005/03/01: p.6.

<sup>46</sup> Figure adapted from National Ports Authority of South Africa (NPA), 2002. NPA-Development Framework-Cape Town. NPA, Cape Town: D.2.

<sup>47</sup> South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Actual position of test holes; South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Profiles of test holes in basin; South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Soundings in basin.

between the current berths 602 and 603 in a south-westerly direction towards the bend in the southern sea wall that currently indicates the approach to the BSB. This means that originally about two-thirds of the current basin area was shallower than -10m, with two minor exceptions. These consist of small-scale sea bed depressions along the central east-west axis that runs through the BSB, at the levels of current berths 600 and 603. The depth recorded at these two points was -10.7m and -12.8m respectively.<sup>48</sup>

The north-west section of the BSB (Berths 603, 604) was deeper than 10m, with average depths between >-10 and -12.5m. The deepest soundings were made in the entrance channel to the BSB, in between the sea walls, with depths of in between -13.7 and -14.3m.<sup>49</sup>

#### 4.7. Previous blasting and dredging operations

During the period 1972 to 1975, extensive work was undertaken to deepen the BSB. This consisted of dredging of surface sediments and blasting of underlying bedrock to the required depths, after which the debris resulting from blasting was removed. Table 2 below provides an indication of the scale of these activities at several of the berth sites.

Table 2: Overview of material removed at different berth sites<sup>50</sup>

BERTH	Depth pre 1972	Depth present	Thickness of material removed
500	-4.0 to -5.3m	≥ -10.7m	5.4m to 6.7m
501	-4.2 to -5.0m	≥ -10.7m	5.7m to 6.5m
502	-5.2 to -5.6m	≥ -10.7m	5.1m to 5.5m
600	-6.9 to -7.1m	≥ -10.7m	3.6m to 3.8m
601	-6.9 to -8.0m	≥ -12.8m	4.8m to 5.9m
602	-7.9 to -9.5m	≥ -14.0m	4.5m to 6.1m
603	-9.9 to -11.3m	≥ -14.0m	2.7m to 4.1m
604	-11.0 to -11.3m	≥ -14.0m	2.7m to 3.0m

From the above table, it becomes clear that by far most of the surficial deposits were removed from the eastern section of the BSB, including the areas of current berths 500 to 602. The composition of the deposits ranged from silt, sand, shale and clay in various particle sizes and different densities. Following removal of these deposits that covered the seabed surface, intrusion into the underlying clay and shale layers took place through blasting and further dredging. This resulted in the destruction and removal of most cultural material that may have originally been present in this area. In the western section of the BSB (westwards of the -10m contour between berth 603 and the entrance of the basin) most of the surficial deposits were removed to gain a water depth of -14m.<sup>51</sup>

Analysis of the profiles of the test holes that were taken from the BSB area before construction, indicate that the 1972-1975 development activities removed by far most of the surficial deposits in the areas of berths 500-602. At the location of Berth 500, an

<sup>48</sup> South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Soundings in basin.

<sup>49</sup> South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Soundings in basin.

<sup>50</sup> Figures extrapolated from: South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Actual position of test holes; South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Profiles of test holes in basin.

<sup>51</sup> South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Actual position of test holes; South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Profiles of test holes in basin.

approximately 4-5m thick lower layer, consisting of medium and fine sand, was left in place. Nevertheless, the top sandy layer of approximately 5.5 to 6.5m thick was removed. At berths 501 and 502, dredging activity reached down to a layer of very hard shale overlying bedrock. The area of Berth 600 was excavated until a layer ranging from soft to hard decomposed shale was reached. In Berth 601, only very firm clay to hard, sandy shale was left, after the covering layer of sand was removed. The area of Berth 602 was dredged down to clay and hard shale.

The profiles for berths 603 and 604 show a slightly different result. Although the surface deposits were taken off to a depth of -14m, some silt, sand and soft clay layers were left in place. These range in thickness from approximately 1.5 to 4m.<sup>52</sup> Based on these results, special attention must be taken when dredging in the western section of the BSB, from Berth 603 westwards. Potentially, the chances of finding cultural material in these specific areas are most likely.

#### *4.8. Proposed blasting and dredging operations*

The proposed upgrades to the Ben Schoeman Dock include the deepening of the greater part of the BSB to a standard depth of -15.5m to chart datum. This means that a layer of material approximately 4.8m thick has to be removed from the area of Berth 600, 2.7m near Berth 601 and 1.5m from the western section (berths 602-604). These planned activities include the area where the extension of the existing quay wall opposite berths 601-604 is planned. The methodology for this is briefly described in the available documentation.<sup>53</sup> The sensitivity of this area was already indicated in the previous section 4.7. 'Previous blasting and dredging operations'.

According to a geophysical survey that was undertaken to determine the sub-seabed conditions in the BSB, both sediments and (bed) rock will have to be extracted. It is estimated that 1,229,328m<sup>3</sup> of material will need to be removed, which consists of:

- soft material 949,428m<sup>3</sup>;
- soft rock 192,944m<sup>3</sup>; and
- hard rock 86,956m<sup>3</sup> or less than 10% of the total.<sup>54</sup>

Table 3 below provides an indication of the scale of the proposed blasting and dredging activities at several of the berth sites.

<sup>52</sup> South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Actual position of test holes; South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Profiles of test holes in basin.

<sup>53</sup> Shangoni Management Services, 2006. Proposed alterations to berths 601, 602, 603 & 604 and associated deepening of the Ben Schoeman Dock at the Port of Cape Town. Final scoping report for deepening of BSD. March 2006: p.7; SRK Consulting, 2006. Proposed alterations to Berths 601, 602, 603 and 604 and associated deepening of the Ben Schoeman Dock at the Port of Cape Town. Plan of study for EIA. Report no.367079/1, August 2006: p.17.

<sup>54</sup> Protekon Design, 2006. Port of Cape Town. Container Terminal Extension. Dredging. Dredge: site plan. Drawing BDC009V, sheet C1.

Table 3: Overview of material to be removed at different berth sites<sup>55</sup>

BERTH	Depth present	Depth planned	Thickness of material to be removed
500	≥ -10.7m	≥ -10.7m	0m
501	≥ -10.7m	≥ -10.7m	0m
502	≥ -10.7m	≥ -10.7m	0m
600	≥ -10.7m	-15.5m	4.8m
601	≥ -12.8m	-15.5m	2.7m
602	≥ -14.0m	-15.5m	1.5m
603	≥ -14.0m	-15.5m	1.5m
604	≥ -14.0m	-15.5m	1.5m

The nature of the material that is to be removed has been described in different reports.<sup>56</sup> From these reports, it is clear that the deeper geological levels in the BSB consist of solid shale and greywacke (fragments of mainly quartz and feldspar, embedded in clay-sized particles) rock of the Tygerberg Formation that forms part of the Malmesbury Group. This is overlain by hard layers of shale and greywacke. Nearer to the surface, layers of initially decomposed Malmesbury shale and greywacke can be found. The surficial sediments vary from place to place and consist of clay layers, layers that contain pebbles, gravel and shell, or sand with different particle size (ranging from coarse to fine). The consistency of the marine sediments in the upper layers are generally very soft or very loose. The top layer in many places consists of silt. Part of this silt may have been deposited by storm water outfalls that expel material in the basin.<sup>57</sup> In the BSB the thickness of this uppermost layer varies between 1 and 2m.<sup>58</sup>

Different methods have been indicated as to how the removal of deposits may be undertaken. Due to the fact that hard rock with an estimated volume of 86,956m<sup>3</sup> is present in the area, there is no alternative than to blast this material. On the basis of the various reports, it seems that the consensus among the experts is to do so by applying multiple small charges. This will minimize the negative impact blasting may have on existing structures, such as quay walls, but also on marine life.<sup>59</sup> This is in line with the requirements of the protection of the underwater cultural heritage. Although these activities may result in damaging archaeological material, the effects will be less than in the case of indiscriminate blasting. In fact, controlled blasting is sometimes also done on underwater archaeological sites, although on a much smaller scale as is envisaged for the BSB development.<sup>60</sup> Nevertheless, no definite decision has been made on the blasting procedure as yet.

<sup>55</sup> Extrapolated from: South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Actual position of test holes; South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Profiles of test holes in basin.

<sup>56</sup> Protekon Design, 2006. Port of Cape Town, container terminal expansion project. Geotechnical report. August 2006: pp.7,12,14,17; Protekon Design, 2006. Port of Cape Town. Container Terminal Extension. Dredging. Dredge: site plan. Drawing BDC009V, sheet C1.; Schoonees, J.S., 2006. Dredge disposal options for the deepening of the Port of Cape Town. Report no. EN/CO/205506. Entech Consultants, March 2006: p.4; South African Railways and Harbours, 1971. Table Bay Harbour. Harbour extension. Stage 2. Profiles of test holes in basin.

<sup>57</sup> Shangoni Management Services, 2006. Proposed alterations to berths 601, 602, 603 & 604 and associated deepening of the Ben Schoeman Dock at the Port of Cape Town. Final scoping report for deepening of BSD. March 2006: p.21.

<sup>58</sup> Protekon Design, 2006. Port of Cape Town, container terminal expansion project. Geotechnical report. August 2006: pp.7,12,14,17.

<sup>59</sup> Protekon Design, 2006. Port of Cape Town. Container Terminal Extension. Dredging. Dredge: site plan. Drawing BDC009V, sheet C1; Shangoni Management Services, 2006. Proposed alterations to berths 601, 602, 603 & 604 and associated deepening of the Ben Schoeman Dock at the Port of Cape Town. Final scoping report for deepening of BSD. March 2006: p.37; Szendrei, T., Ireland, K.S., Schoonees, J.S., Morant, P.D & Brink, Z., 2006. Removal of rock in the Port of Cape Town. Report no. EN/10/205414, February 2006..

<sup>60</sup> Werz, B.E.J.S., 1991. Book review. Green, J. 1990. Maritime Archaeology. A technical handbook. South African Archaeological Bulletin 46: p.51.

The same comment applies to the various options that exist with regard to dredging. Different dredgers are available for this phase and no final decision has been made in this regard. Nevertheless, from some reports it is clear that a possible option will be the use of a backhoe type dredger. Various reasons have been given for this preference. These concern such aspects as: limited space within the BSB; the need to minimize disruption to normal operations within the container terminal; the need for intermittent trench dredging; the need to minimize spillage of dredged up material; using a backhoe dredger will reduce the need for blasting; and it will reduce the cost factor.<sup>61</sup> Some of these aspects, such as the need to minimize disruption and to reduce the need for blasting, are also relevant to mitigation in respect of maritime archaeology.

From an archaeological point of view, preference is given to a dredger with relatively limited capacity. This will reduce the damage that may be caused to especially larger items, such as parts of a ship's hull. The dredger should preferably expel dredged material on the surface, whereby the option exists to visually monitor at least part of the removed deposits. This visual control, combined with the option to temporarily stop dredging activities to recover cultural material, represent the most important mitigating factors from an archaeological perspective for this specific project. A Trailer Suction Hopper Dredger (TSHD) does not seem to offer such opportunity but a backhoe dredger does. In addition, it will be easier to divert a backhoe dredger temporarily to another area should archaeological material be found. In this way, dredging can continue while there is an option to survey specific areas elsewhere for more archaeological material. Due to the fact that no decision has been made as yet which type(s) of dredger are going to be used, the maritime archaeology consultant should be involved in further discussions.

#### *4.9. Disposal of dredged material*

Several options for disposal of dredged material from the BSB were identified initially. These included:

- deposition on the beach or in the surf zone;
- deposition just beyond the surf zone;
- dumping in water with depths of in between -15 and -20m;
- dumping in water deeper than -40m.<sup>62</sup>

These options were later limited to two alternatives: disposal at depths of -40m or at -70m or deeper.<sup>63</sup>

From an archaeological point of view, preference would have to be given to dumping the dredge material on land or in shallow water. In this way, at least part of the deposits will be directly accessible. Blasting, dredging and transport of the material will inevitably result in the destruction of most of the site information and the context in which archaeological material was deposited initially. Nevertheless, by dumping dredged deposits on land or at depths of up to -20m, an option still exists to search for artifacts and finds. It is, however, acknowledged that these options may not be feasible due to environmental or other constraints.

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<sup>61</sup> Schoonees, J.S., 2006. Dredge disposal options for the deepening of the Port of Cape Town. Report no. EN/CO/205506. Entech Consultants, March 2006: pp.4-5; Shangoni Management Services, 2006. Proposed alterations to berths 601, 602, 603 & 604 and associated deepening of the Ben Schoeman Dock at the Port of Cape Town. Final scoping report for deepening of BSD. March 2006: p.7; Schoonees, J.S., 2006 (?). Summary of envisaged dredging methods. 18 October 2006.

<sup>62</sup> Schoonees, J.S., 2006. Dredge disposal options for the deepening of the Port of Cape Town. Report no. EN/CO/205506. Entech Consultants, March 2006: p.2.

<sup>63</sup> E-mail correspondence Ms Sue Reuther, SRK Consulting, to Dr Bruno Werz, *in dato* 7 September 2006.

Of the two alternative sites for deposition that have been decided on, deposition at a depth of -40m is considered more favourable than dumping at a depth of -70m. Although this is not an ideal option for dredge disposal from a maritime archaeology point of view, at least in this way there is still a limited chance of recovering objects and materials. Should the -70m option be taken, this would seriously hamper any efforts to the future recovery of such items. In that case, specialized diving equipment will have to be employed that would have serious infrastructural and financial implications. Whatever decision will be taken, the minimum requirement is that the exact location of the dump site and its extent are accurately recorded and that this information is lodged with the NPA and SAHRA.

## 5. ASSESSMENT OF IMPACTS ON MARITIME ARCHAEOLOGY

The nature of the impact that is assessed in this report can be described as the irrevocable disturbance of archaeological sites that may be present in the area of the BSB and the resulting damage to and dispersal of cultural material. This disturbance will be caused by blasting of bedrock and dredging of deposits to deepen the basin. Related to this is the disposal of dredge material in deep water.

Aspects of the Impact Rating for the proposed development of the BSB need some further explanation within the context of the specialist study in Maritime Archaeology.<sup>64</sup> This relates especially to the way the author of this report interpreted some of the general terms used in this section. A brief interpretation and some comments are provided below.

*Extent:* hereby it is assumed that the extent of the impact relates specifically to the physical remains of the underwater cultural heritage that may be present in the BSB. In this section, the non-tangible values that can be attributed to this heritage are not taken into consideration. If, for example, parts of a 19<sup>th</sup> century British shipwreck are uncovered, its attributed value to the history and culture of South Africa and Britain is not taken into consideration, but merely the fact that it is located in the BSB. For that reason, the area over which the impact will be experienced is classified as 'local'.

*Intensity:* in this context, the description 'natural and/or social functions and processes' is not quite satisfying. Preference would be given in this specific case to 'historical and cultural values that can be attributed to the underwater cultural material' and the impact the project may have on these.

Based on the above, the Consequence Rating has been determined as follows:

Development BSB	Extent	Intensity	Duration	Consequence
Without mitigation	Local (1)	High (3)	Long-term (3)	High
With essential mitigation	Local (1)	Low (1)	Long-term (3)	Low

The Probability Rating can be classified as 'probable' based on the presence of deposits in parts of the BSB that may still contain cultural material. Therefore, the Significance of the Impact can be described as 'high' if no mitigation is undertaken and 'low' if mitigation can be realized. Nevertheless, the Status of the Impact will be negative, as the planned activities will result in the loss of underwater cultural heritage and especially associated data, be it with or without mitigation.

The Impact Assessment Table has thus been completed as follows:

<sup>64</sup> See also: Correspondence Ms Sharon.Jones, SRK Consulting, to Dr Bruno Werz, in dato 21 September 2006: pp.4-6.

Impact	Consequence	Probability	Significance	Status	Confidence
Without mitigation	High (7)	Probable	High	Negative	High
With essential mitigation	Low (5)	Probable	Low	Negative	High

Essential mitigation measures that will reduce the significance of the impact of the proposed activities consist of monitoring and intervention.

Monitoring of proposed blasting and dredging operations will have to be done by a maritime archaeologist on an *ad hoc* basis. This will require a part-time on site presence. Furthermore, sub-contractors will have to be instructed to monitor dredging activities in case any cultural material is uncovered. This material should be secured and kept for inspection by the archaeologist, who must be notified accordingly. This also implies that during dredging, material that is brought to the surface must be open to visual inspection before being deposited in deep water. This is especially the case in the area that has been flagged as being sensitive (from Berth 603 westwards). This will have a bearing on the decision what type of dredger is going to be selected for work on this specific site. For this reason, it is advised to involve the archaeologist during discussions pertaining to this issue.

Potential intervention will have to depend on the discretion of the archaeologist. A decision to intervene will have to take both the significance of dredged cultural material, as well as the practical and financial implications for the client into account. The basic approach should be that activities must not be disrupted unnecessarily. Intervention can be done by recovering dredged cultural material on board during operations or redirecting the dredger temporarily until such time that an underwater survey of a specific (small) area has been completed. This last-mentioned option should only be done when there are sufficient indications that such a survey is warranted. These can relate to the specific nature of cultural material that is being dredged or the size of an artifact e.g. part of a ship's hull.

## 6. CONCLUSIONS AND RECOMMENDATIONS

The main conclusions of this study are as follows:

- 1- The available information of an historical and archaeological nature that was consulted for this study is not accurate enough to exactly predict the nature, current state and extent of the underwater cultural resource that may be encountered during the planned development of the Ben Schoeman Basin.
- 2- Although the underwater cultural resource is important and non-renewable, various socio-economic pressures exist to further develop the area of the BSB. These mainly relate to the important role the Port of Cape Town plays in maritime traffic. As a result, further development of the BSB is essential.
- 3- The fact that the BSB has been subjected to extensive dredging and blasting in the past has already resulted in destruction of a significant part of the underwater cultural resource in that place. For this reason, preference should be given to further development of this basin, as opposed to similar proposed developments elsewhere in the harbour or in places like Saldanha.
- 4- Even though the value of the underwater cultural i.e. archaeological resource in the BSB area has been reduced, mitigating activities are essential to save what is left. These will have to focus on monitoring blasting and dredging activities. These have been described in detail in the recommendations below.

It is therefore recommended that:

- 1- The planned development of the Ben Schoeman Basin is undertaken within the parameters as stipulated in this report.
- 2- The client formally informs the maritime archaeologist at SAHRA in writing of the planned development.
- 3- Blasting and dredging operations should be planned and conducted in such a way as to minimize the negative impact on the cultural resource.
- 4- Blasting operations are to be undertaken by means of multiple small parcel blasting or comparable methods that reduce damage to the potentially present cultural resource.
- 5- Where possible, dredging should be done by means of a system that will allow visual monitoring of dredged up deposits before these are carried off the site (i.e. backhoe dredger). This is especially relevant in the area that has been flagged as sensitive (Point 6 below). The maritime archaeologist should be involved in discussions on the most appropriate dredge to be used.
- 6- Special attention must be taken when dredging in the western section, from berths 603 towards the entrance channel. Potentially, the chance of finding cultural material in this specific area is most likely.
- 7- Dredged material should ideally be disposed of in an area that will allow future recovery of cultural material. As the deep water option has already been decided on, deposition at a maximum depth of 40m should be considered.

- 8- The location and dimensions of the deposition area must be accurately recorded and this information should be lodged with the NPA and SAHRA.
- 9- Mitigating activities may include: the securing of cultural material; diverting dredge operations temporarily; and/or underwater fieldwork in specific small-scale areas depending on the circumstances.
- 10- A qualified maritime archaeologist is to be appointed as a consultant for the duration of the dredging operations. This person will have to: liaise with SAHRA and the client / dredger operators; pay *ad hoc* site visits to monitor blasting and dredging activities; secure the necessary licenses and permits from the Controller of Customs and Excise and the SAHRA; and render assistance should any cultural material be dredged up. The archaeologist should be a Principal Investigator and therefore have a minimum qualification on a Masters level.
- 11- The client and any subcontractors should be made aware of the possibility that cultural material may be found. Specific instructions must be given that in such cases: this material is secured; the exact find location is recorded; and that where necessary, the dredger is diverted to avoid further damage but without disrupting dredging activities. Furthermore, the maritime archaeologist or his duly authorized representative needs to be notified immediately.
- 12- Should the maritime archaeologist deem it necessary to undertake an underwater survey and/or remove material, assistance will be provided by the client. This may include support from NPA divers and others.
- 13- The client should make provisions for essential mitigating activities related to underwater cultural material that may be recovered. This would include:
  - making funds available for monitoring activities to be undertaken by the project's maritime archaeologist;
  - funding for potential limited underwater fieldwork;
  - funding for the basic preservation and documentation of dredged up material; and
  - the allocation of a suitable area where recovered material may be temporarily stored and treated. This should include a designated sheltered area of seabed in the harbour area and a secured storage space on land.

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