Heritage Appendix I

Proposed 5 MW Biomass Fired Power Plant, Twofold Bay, near Eden NSW
Indigenous Cultural Heritage Assessment

A Report to Nick Graham-Higgs
nghenvironmental
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TABLE OF CONTENTS

1. SUMMARY 3

1.1 Introduction 3
1.2 The Archaeological Study 3
1.3 Previously Recorded Sites 3
1.4 Results 3
1.5 Conclusion and Recommendations 3

2. INTRODUCTION 5

3. PARTNERSHIP WITH THE ABORIGINAL COMMUNITY 6

4. THE PROPOSED IMPACTS 8

4.1 Proposed Impacts 8
4.2 Justification for Impacts 8
4.3 Prior Impacts 10
4.4 Potential for Impacts to Aboriginal Objects 14

5. STUDY METHODOLOGY 15

5.1 Literature Review 15
5.2 Field Survey and Methodology 15

6. LANDSCAPE CONTEXT 16

6.1 Topography, Geology and Geomorphology. 16

7. ARCHAEOLOGICAL CONTEXT 18

7.1 Social Geography and Occupation Models 18
7.2 Previously Recorded Aboriginal Objects 19
7.3 Archaeological Context 21
7.4 Archaeological Potential of the Study Area 24

8. SURVEY RESULTS 27

8.1 Survey Coverage Variables 27
8.2 Results 28

9. STATUTORY INFORMATION 29

10. CONCLUSIONS AND RECOMMENDATIONS 30

11. REFERENCES 31

1. SUMMARY

1.1 Introduction

New South Wales Archaeology Pty Ltd was commissioned in May 2009 by nghenvironmental to undertake an Indigenous cultural heritage assessment of a proposed 5 MW Base Load Biomass-fired Power Plant at the South East Fibre Exports Pty Ltd (SEFE) mill on Edrom Road, Twofold Bay (Eden) on the Far South Coast of New South Wales.

An application for the proposed development to be assessed as a Major Project under Part 3A of the *Environmental Planning and Assessment Act 1979* was submitted in January 2009 (Reference #: S08_01909). The Director General's Requirements for the Environmental Assessment (EA) were issued on 23rd March 2009 and, as a component of those requirements, it was stated that:

- the EA must include an assessment of the potential impact of the project components on Indigenous heritage values; and
- the EA must demonstrate effective consultation with Indigenous stakeholders during the assessment and in developing mitigation options.

This report addresses the Director Generals Requirements regarding Indigenous heritage and community consultation.

1.2 The Archaeological Study

An archaeological and cultural heritage assessment of the proposal area has been conducted by Julie Dibden, NSW Archaeology Pty Ltd, and Laurence Bamblett and Bobbie Maher, Eden Local Aboriginal Land Council. Field work was undertaken in June 2009.

This study has sought to identify and record any Aboriginal objects and Indigenous cultural values which may be present in the proposal area, to assess the archaeological potential of the landform elements present and to formulate management recommendations based on the results of background research, a field survey and site significance assessment.

The New South Wales National Parks and Wildlife Service (now incorporated in the Department of Environment and Climate Change) has prepared a draft document which provides a series of guidelines regarding the assessment and management of Aboriginal cultural heritage in New South Wales. This report has been prepared in accordance with those draft guidelines (NSW NPWS 1997). Additionally the study has been conducted with reference to the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (NSW DEC July 2005). These guidelines have been prepared specifically for development applications assessed under Part 3A of the *Environmental Planning and Assessment Act 1979*.

The assessment has been conducted in compliance with the *Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants* (DEC 2004).

1.3 Previously Recorded Sites

A search of the NSW Department of Environment and Climate Change (NSW DECC) Aboriginal Heritage Information Management System (AHIMS) has been undertaken (AHIMS Search # 25862). No previously recorded Aboriginal objects are present in the proposal area.

1.4 Results

No Aboriginal objects were recorded in the proposal area. Based on an assessment of previous land disturbance relating to the operation of the SEFE mill the entire area in which impacts are proposed is assessed to be of very low archaeological and cultural sensitivity.

1.5 Conclusion and Recommendations

The proposal area is assessed to be of low Indigenous archaeological and cultural potential and significance. Accordingly there are no constraints relating to Indigenous heritage and the proposed impacts.

2. INTRODUCTION

New South Wales Archaeology Pty Ltd was commissioned in May 2009 by nghenvironmental to undertake an Indigenous cultural heritage assessment of a proposed 5 MW Base Load Biomass-fired Power Plant at the South East Fibre Exports Pty Ltd (SEFE) mill on Edrom Road, Twofold Bay (Eden) on the Far South Coast of New South Wales (Figure 1).

The proposed Power Plant is defined as a Major Project under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Director General, Department of Planning has issued requirements for the preparation of an Environmental Assessment in which it is stated that an assessment of Indigenous heritage values is required.

In accordance with the NSW NPWS guidelines for archaeological reporting (NSW NPWS 1997) and the NSW DECC Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (NSW DEC 2005) this report aims to document:

- The Aboriginal consultation process undertaken for the proposal and the involvement in the proposal of the Aboriginal community (Section 3);
- A description of the proposal and whether or not it has the potential to result in impacts to Aboriginal cultural heritage (Section 4);
- A description of the impact history of the proposal area (Section 4);
- The methodology implemented during the study (Section 5);
- The landscape and natural resources of the proposal area in order to establish background parameters (Section 6);
- A review of archaeological and relevant literature and heritage listings on the NSW DECC Aboriginal Heritage Information Management System (Section 7);
- A synthesis of local and regional archaeology (Section 7);
- A predictive model of Aboriginal object type and location relevant to the proposal area (Section 7);
- The cultural and archaeological sensitivity of the landforms subject to proposed impacts (Section 7);
- The field survey results (Section 8);
- The legislative context (Section 9); and
- A series of recommendations based on the results of the investigation (Section 10).

The Indigenous heritage investigation has been conducted by Julie Dibden, New South Wales Archaeology Pty Ltd and Laurence Bamblett and Bobbie Maher, Eden Local Aboriginal Land Council. Fieldwork was conducted in June 2009.

3. PARTNERSHIP WITH THE ABORIGINAL COMMUNITY

The NSW Department of Conservation and Climate Change (NSW DECC) manages Aboriginal cultural heritage in NSW in accordance with the *National Parks and Wildlife Act 1974* (NPW Act). Part 6 of the Act provides protection for Aboriginal objects and Aboriginal Places. When an activity is likely to impact Aboriginal objects or declared Aboriginal Places approval of the Director-General of the NSW DECC under s90 or s87 of the NPW Act is usually required. The decision as to whether or not to issue s90 or s87 *or general approval* is based on the supply to the NSW DECC by a proponent of adequate information in regard to Aboriginal consultation to enable the Director-General to make an informed decision (NSW DEC 2004).

The NSW DECC requires proponents to undertake consultation with the Aboriginal community "…as an integral part of the impact assessment" process (NSW DEC 2004). While it is recognised that under Part 3A of the EP&A Act that Part 6 approvals under the NPW Act are not required, the consultation process as outlined in the DEC (2004) policy document relating to Aboriginal consultation has nevertheless been implemented for this project.

When administering its approval functions under the NPW Act the NSW DECC requires applicants to have consulted with the Aboriginal community about the Aboriginal cultural heritage values (cultural significance) of Aboriginal objects and places present in the area subject to development (NSW DEC 2004).

The NSW DECC requires consultation with the Aboriginal community because it recognises the following:

- That Aboriginal heritage has a cultural and archaeological significance and that both should be the subject of assessment to inform its decision process;
- That Aboriginal people are the primary determinants of the significance of their heritage;
- That Aboriginal community involvement *should occur early* in the assessment process to ensure that their values and concerns can be taken into account and so that their own decision making structures can function;
- That the information arising from consultation allows consideration of Aboriginal community views about significance and impact and allows for management and mitigation measures to be considered in an informed way (NSW DEC 2004).

The community consultation process as outlined in the NSW DEC (2004) document aims to improve the assessment by providing the Aboriginal community with an opportunity to:

- Influence the design of the assessment of cultural and scientific significance;
- Provide relevant information about cultural significance values of objects/places;
- Contribute to the development of cultural heritage management recommendations; and
- Provide comment on draft assessment reports (NSW DEC 2004).

The role of the Aboriginal Community is outlined by the NSW DECC (2004) as follows:

- The Aboriginal community is the primary determinant of the significance of their heritage;
- The Aboriginal community may participate in the process via comment on the assessment methodology and contribution of cultural knowledge; and
- The Aboriginal Community may comment on cultural significance of potential impacts and/or mitigation measures.

In order to fulfil the consultation requirements as outlined in the NSW DEC (2004) document, NSW Archaeology Pty Ltd on behalf of the proponent, has adopted the following procedure:

1. Notification and Registration of Interests

   The proponent has actively sought to identify stakeholder groups or people wishing to be consulted about the proposal and has invited them to register their interest.

   Written notification about the proposal dated 12th May 2009 has been supplied to the following bodies:

   - The Eden Local Aboriginal Land Council

- Native Title Services
- Bega Valley Shire Council
- NSW Department of Environment and Climate Change

In addition an advertisement has been placed in the Magnet newspaper (28th May 2009) providing notification of the cultural heritage study.

Eden Local Aboriginal Land Council registered an interest in this project.

2. Drafting, Review and Finalisation of the Cultural Heritage Assessment Report

The draft report will be provided to the Eden Local Aboriginal Land Council for review and comment.

The proposal area falls within the boundaries of the Eden Local Aboriginal Land Council (ELALC) as defined under the *Aboriginal Land Rights Act 1983* (NSW). Laurence Bamblett and Bobby Maher assisted in the field survey and assessment of the proposal area, concluding that the proposal had very low to negligible potential to cause impacts to Indigenous archaeological and cultural heritage values.

4. THE PROPOSED IMPACTS

The information contained in this section of the report is provided in accordance with the NSW NPWS (1997) guidelines for archaeological survey reporting. A full description of the proposal and its potential impact on the landscape and heritage resource is described below. This information includes a summary of the impact history of the study area.

4.1 Proposed Impacts

The proposal entails construction of a 5 MW Base Load Biomass-fired Power Plant in the area currently occupied by SEFE's mill waste burner (Figure 2). SEFE is a timber processing company that produces and exports both hardwood and softwood chips. During the production process SEFE generates around 40,250 tonnes of mill waste in the form of wood fines and bark. This waste is either sold as landscaping material or disposed of in the on-site mill waste burner. The Base Load Biomass-fired Power Station would turn this waste into electricity that can power the mill (estimated at ca. 20% of the electricity that would be produced), with the remainder sold into the national electricity grid.

The proposed power plant will include the following components:

- An uncovered area for fuel storage, weatherproof fuel storage shed with 600m^3 capacity; fuel reclaim bunker and fuel feed conveyor (reused from existing plant) and 90 tonne fuel storage dry bin (all of which will be in the area that screened fines and bark are currently stored);
- Boiler package including grate furnace, boiler make-up water treatment system, steam boiler incorporating a superheater, flue gas exhaust stack (around 35m high), 11KV electrical power generator and 15MW steam cooling/condensing system utilising sea water (all of which will be in the area currently occupied by the mill waste burner);
- Reverse osmosis make-up water treatment system (situated between the proposed power generator and existing ship loading wharf); and
- Seawater supply and disposal pipes for cooling water running from the ship loading wharf to the power station within SEFE's site boundary fence.

4.2 Justification for Impacts

The use of renewable biomass for fuel for SEFE'S power plant would deliver significantly lower GHG impacts compared with electricity generation from burning fossil fuels.

The project would:

- enhance the security of electricity supply to the Eden community; at present electricity supply to the local area is vulnerable to the effects of bushfires;
- potentially supply electricity for up to 2500 households;
- contribute to achieving the Federal Governments expanded NRET scheme;
- provide employment in the local area;
- establish a use for mill waste which is currently incinerated;
- establish a higher value use for waste.

Figure 1. Location of the proposal area (Eden 8823-1N 2nd ed 1:25000 topographic map GDA).

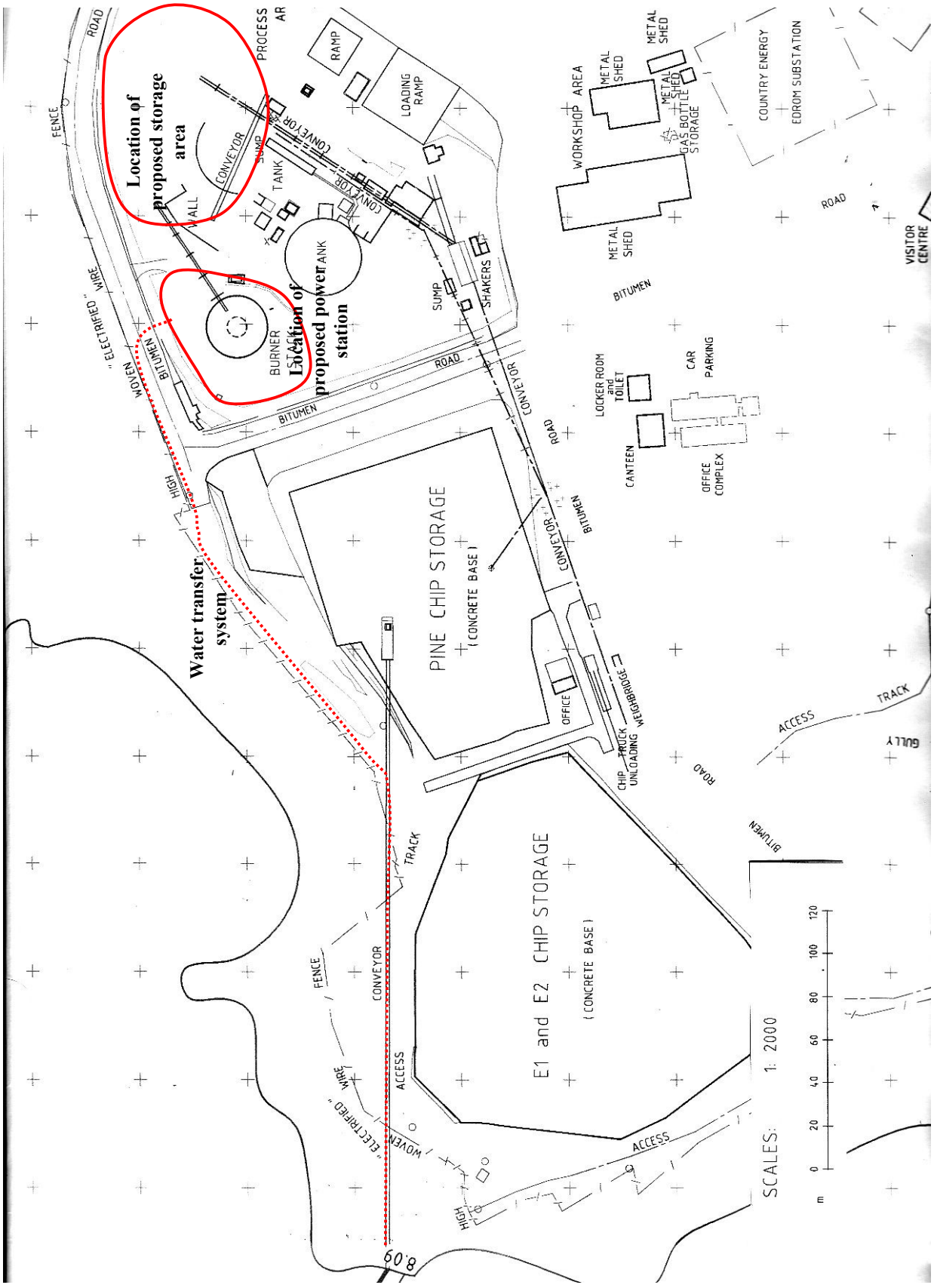

Figure 2. Existing SEFE mill layout and location of proposed impacts (base map supplied by proponent).

4.3 Prior Impacts

SEFE has occupied the mill site for approximately 40 years. It is understood that previously the land occupied by the SEFE mill was utilised as a goat farm. The potential impacts relating to the proposal are all located within the SEFE mill property. The power plant is proposed for the area currently occupied by the mill waste burner (Plate 1).

There have been significant prior impacts in this area including vegetation clearance, mechanical modification of the land surfaces, construction of the existing waste burner and associated storage areas, construction of access roads and installation of services such as electricity and water. These impacts have served to effectively remove and/or cause excessive disturbance to original land surfaces.

Plate 1. The mill waste burner site in which the proposed power plant will be situated.

The mill waste burner is situated on an area measuring approximately 80 x 80 metres. The area has been excavated to bedrock to provide a base for the burner; accordingly there is no original land surface in this area. All components of the proposal relating to power generation will be located in this area.

The existing storage area which will be utilised for ongoing storage relating to the power plant is a flat area, partly concrete paved and partly soil surface ; previous and current impacts are high (Plates 2 and 3).

Plate 2. Existing storage area located adjacent and to the northeast of the waste burner.

Plate 3. Looking from the storage area towards the waste burner site.

Water pipes will extend from the site of the power plant along an existing road to the extant conveyor belt which transfers chips to the wharf (Plates 4, 5, 6 and 7). Two pipes are proposed; one bringing seawater to the power plant and the other transferring water back to the ocean. The pipes will be installed on concrete blocks rather than laid underground and will lie side by side. The pipe network will extend from the power plant to the chip wharf a distance of approximately 400 metres. All land surfaces in this area are highly disturbed and/or eroded (see for example Plate 8).

In summary all impacts relating to the proposal are located in areas which have been subject to intensive and high levels of previous disturbance.

Plate 4. Route of proposed water transfer system from power plant to wharf. Photo taken adjacent to waste burner (to NNW) looking 240º. The two water pipelines will be installed on concrete blocks adjacent to the security fence.

Plate 5. Route of proposed water transfer system from power plant to wharf. Photo taken at north end of a minor track looking southwest.

Plate 6. Route of proposed water transfer system from power plant to wharf. Photo taken at south end of a minor track looking 30º.

Plate 7. Route of proposed water transfer system from power plant to chip wharf. In this area the pipework will be attached to the existing conveyor which extends to the wharf. Photo taken at point where pipework will be attached to conveyor; looking northwest.

Plate 8. Route of proposed water transfer system from power plant to chip wharf. Photo taken at south end of a minor track looking northeast; note high erosion to clay.

4.4 Potential for Impacts to Aboriginal Objects

The construction of the proposed power plant and associated infrastructure will entail ground disturbance and ordinarily would have the potential to cause disturbance to Aboriginal objects. However, given the nature and extent of prior impacts, the area is likely to be entirely devoid of any Aboriginal objects.

It is concluded that that the proposal is unlikely to cause impacts to any Aboriginal objects and certainly it has no potential to disturb any intact archaeological deposit.

5. STUDY METHODOLOGY

This Indigenous heritage assessment has included the following components:

- A NSW DECC Aboriginal Heritage Information Management System site search to determine whether or not previously recorded Aboriginal objects are present in the proposal area and to list the type of sites known to be present within the local area.
- A review of local and regional archaeological reports and other relevant documents in order to provide a contextual framework to the study and heritage management context.
- A review of impacts relating to the proposed Biomass-fired Power Plant aimed at determining the potential nature and extent of impacts to any Aboriginal objects that may be present.
- A field survey of the study area aimed at recording Aboriginal objects and/or cultural values, survey coverage data and assessing the archaeological potential of the various landform elements present.
- Documentation of survey results.
- An analysis of survey results.
- The formulation of a set of management recommendations ensuing from the above.

5.1 Literature Review

Background research has been conducted to determine if known Aboriginal objects are located in the vicinity of the proposal area and to facilitate site prediction on the basis of known regional and local site patterns in order to place the study area within an archaeological research and heritage management context.

The following information sources were accessed for this study:

- NSW DECC Aboriginal Heritage Information Management System;
- Relevant archaeological reports held in the NSW DECC archives;
- Eden 1:25,000 topographic map;
- A site plan of the SEFE mill site.

5.2 Field Survey and Methodology

Field survey was designed to encompass the entire proposal area. The field inspection was undertaken in June 2009. The assessment team was guided across the site by a member of SEFE staff who provided clarification in regard to the nature of the proposal and the areas of proposed impact. The survey was focused on inspecting ground surfaces for evidence of stone artefacts and midden material. It entailed a survey conducted on foot by three people and can be considered to have been comprehensive. Ground exposures inspected during the survey included roads, erosional features and bare earth exposures. Survey coverage is described in Section 8 of this report.

While the field survey was aimed at locating archaeological and cultural heritage material (Aboriginal objects as defined under the NSW NPWS Act 1974 *as amended*) an assessment was also made of prior land disturbance, survey coverage variables (ground exposure, archaeological visibility and so on) and the potential archaeological sensitivity of the land.

6. LANDSCAPE CONTEXT

A consideration of the landscape is necessary in archaeological work in order to characterise and predict the nature of Aboriginal occupation across the land (NPWS 1997). In Aboriginal society landscape could be both the embodiment of Ancestral Beings and the basis of a social geography and economic and technological endeavour. The various features and elements of the landscape are/were physical places that are known and understood within the context of social and cultural practice.

Given that the natural resources that Aboriginal people harvested and utilised were not evenly distributed across landscapes, Aboriginal occupation and the archaeological manifestations of that occupation will not be uniform across space. Therefore, the examination of the environmental context of a study area is valuable for predicting the type and nature of archaeological sites which might be expected to occur. Factors which typically inform the archaeological potential of a place include the presence or absence of water, animal and plant foods, stone and other resources and as well, the nature of the terrain.

Additionally, geomorphological and humanly activated processes need to be defined as these will influence the degree to which archaeological sites may be visible and/or conserved. For example land which is heavily grassed will prevent the detection of archaeological material while land which has suffered disturbance may no longer retain artefacts or stratified deposits.

The following sections provide information in regard to the landscape context of the study area.

6.1 Topography, Geology and Geomorphology.

The study area is located on Munganno Point, the western promontory of Jews Head on the southern side of Twofold Bay, on the Far South Coast of New South Wales. The existing waste burner is situated at an elevation of approximately 35 metres AHD on a broad crest, 200m south of the rocky shoreline (Figure 1). Several ephemeral first order creek lines drain off the headland into Twofold Bay.

Twofold Bay is a north east facing coastal bay divided by two rocky promontories to form outer and inner embayments. The coastal morphology of Twofold Bay is the result of the inundation of the steep continental margin of south eastern Australia during the postglacial marine transgression at ca. 18000 to 6000 years before present (BP).

Three main river systems drain into the bay: the Towamba and Nullica Rivers and Palestine Creek. The bay shoreline contains four main sand barriers which have acted to impound the local drainage and create a number of estuaries and small lagoons. The barriers are separated by rocky headlands (Hudson 1986). Munganno Point is located immediately north of East Boyd Bay through which Fisheries Creek flows. Another rocky headland, Brierly Point is located to the west of East Boyd Bay.

Munganno Point geology is varied and comprises Middle Devonian Eden Rhyolite (rhyolite, ignimbrite, felsite and agglomerate), the Late Devonian Twofold Bay Formation and the Merimbula Group (siltstones, mudstones, sandstone and conglomerates) (Mallacoota 1:250,000 Geological Series Map). Sandstone bedrock is present in the proposal area.

During the Pleistocene the area now occupied by Ben Boyd National Park and its immediate environs was situated at some distance from the sea. For most of the period after 100,000 years (BP) sea levels were lower than current levels; between 25,000 BP and 15,000 BP sea levels were 110 m -130 m below current levels. With the rising of the sea level and stabilisation at its current level at around 6000 BP, previous inland valleys became inundated by seawater. A subsequent process of embayment and various processes of tidal and fluvial deposition created the foredune ridge plain landforms which now occupy the river valleys to the west of the study area.

Prior to European settlement the area is likely to have been forested. All direct impact areas associated with the proposal are currently devoid of any vegetation. A number of flora species that would have been present in the study area prior to European settlement are known to have been utilised by Aboriginal people. Native cherry, pigface, cumbungi, lomandra and bracken are recognised food plants while eucalyptus species such as stringy bark are likely to have been exploited of their bark for shelter, canoes and implements.

Boot (1994) has undertaken a study based on original archival sources of ethno historical observations relating to the south coast region. Boot (1994) lists a large number of faunal and floral species which have been

recorded in the ethno historical literature as having been utilised by Aboriginal people; many of these are likely to have been readily available within the Munganno Point area. The animals listed include fish, shark, eel, whales, seals, marine worms, shellfish, possum, kangaroo, wombat, birds, goanna and grubs. Plants harvested and utilised include kangaroo apple, native cranberry, honeysuckle, pigface, macrozamia, cabbage tree, fruit and yams.

The study area is situated at the confluence of a variety of resource bases, including a supply of reliable fresh water (Fisheries Creek). Accordingly, the local area would have been targeted by Aboriginal land users for the exploitation of both coastal and terrestrial resources. Accordingly it is predicted that the area now occupied by the SEFE mill is likely to have sustained high levels of Aboriginal occupation.

7. ARCHAEOLOGICAL CONTEXT

7.1 Social Geography and Occupation Models

Aboriginal people have occupied Australia for at least 40,000 years and possibly as long as 60,000 years (Mulvaney and Kamminga 1999: 2). By 35,000 years all major environmental zones in Australia, including periglacial environments of Tasmania, were occupied (Mulvaney and Kamminga 1999: 114).

At the time of early occupation Australia experienced moderate temperatures. However, between 25,000 and 12,000 years (BP) (a period called the Last Glacial Maximum), dry and either intensely hot or cold temperatures prevailed over most of the continent (Mulvaney and Kamminga 1999: 114). At this time the mean monthly temperatures on land were 6 - 10ºC lower; in southern Australia coldness, drought and winds acted to change the vegetation structure from forests to grass and shrublands (Mulvaney and Kamminga 1999: 115-116).

With the cessation of glacial conditions, temperatures rose with a concomitant rise in sea levels. During the Late Pleistocene the sea was as much as 130 metres below the present level, and accordingly, the continent was correspondingly larger. By ca. 6000 years BP sea levels had more of less stabilised to their current position. With the changes in climate during the Holocene Aboriginal occupants had to deal with reduced landmass and changing vegetation and hydrological systems; forests again inhabited the grass and shrublands which had been present at the time of the Late Glacial Maximum. As Mulvaney and Kamminga (1999: 120) have remarked:

> *When humans arrived on Sahul's shores and dispersed across the continent, they faced a continual series of environmental challenges that persisted throughout the Pleistocene. The adaptability and endurance in colonising Sahul is one of humankinds' inspiring epics*.

Late Pleistocene occupation of south east Australia has been established by radio carbon dating of cultural material from a number of sites (Boot 1996; Lampert 1971, Ossa *et. al* 1995). It is therefore reasonable to assume that the study area was similarly occupied during this time. However the majority of recorded sites located in the south east date from the mid to late Holocene, at the time the sea more or less stabilized at its current level. Sites relating to Indigenous occupation include open artefact scatters or camp sites (some of which contain stratified subsurface deposit), rock shelters containing surface artefacts and/or occupation deposit and/or rock art, grinding groove sites, scarred and carved trees, quarry and procurement sites, burials, stone arrangements, and ceremonial places.

At the time of European occupation the study area is understood to have been occupied by the Thaua people (Tindale 1974). The Thaua people are described as occupying lands situated between Wallagoot Lake and Green Cape, and inland to the escarpment of the Great Divide. Tindale (1974) notes that there were two groups of Thaua, the Katungal, or 'sea coast people' and the Baianbal or Paienbara, the inland 'tomahawk people'. Both 'tribes' belonged to the Yuin 'cultural area' whose groups shared cultural characteristics such as a common initiation ceremony and closely related languages. Eades (1976) describes the Dyirringan language as being spoken in the area between Wallaga Lake and Twofold Bay with the Thawa language spoken south of Twofold Bay.

George Bass and his crew in the longboat 'Tom Thumb' were the first Europeans in 1797 to visit Twofold Bay (Toghill 1984). In the late 1820s the area was occupied by squatters and cattle were brought into the district in 1830 at which time conflict between Aboriginal people and the cattlemen (and their stockmen) is recorded to have occurred (Bayley 1942). By the early 1830s land on the Monaro and both to the south and north of Bega was occupied by squatters and their cattle. As elsewhere, the first squatters to arrive took up the best land in terms of its fertility and proximity to water. This land would also have been favoured land occupied by Aboriginal people. By 1834 Governor Bourke upon visiting the district reported that the use of the land was already contributing significantly to the wealth of the colony (Bayley 1942). During the 1830s and 1840s the Imlay brothers held properties which extended from Bittangabee, south of Eden, to the Murrah and Cobargo, both of which are situated north of Bega (Wellings (1966: 6). During the Imlay's occupation of the area cattle, sheep and fine horses were bred and exported to other Australian colonies, and as well, to New Zealand and England. Fruit and vegetables were also produced in abundance and shipped elsewhere.

According to Wellings (1966: 7) the Imlays were regarded as 'safe people' by the Aborigines. Aboriginal people were employed by the Imlays in both their agricultural and whaling ventures on the far south coast. It is likely that by the late 1830s to early 1840s Aboriginal people began to find both employment and other

advantages by forging close relationships with individual European men and women. Lambie (cited in Bayley 1942) reported in 1842 that 'a good many' Aboriginal people were employed on coastal properties, hoeing and reaping maize, and sheep washing. Referring to Aboriginal people employed by the Imlays in whaling, Lambie (cited in Bayley 1942) stated that after the season 'they all returned to their tribes in the bush'. In these early years of occupation Aboriginal people clearly alternated between farm/whaling work and 'bush' life. However while Aboriginal people had continued access to some lands and maintained many cultural and social traditions (Chittick & Fox 1997:191), nevertheless, initial European settlement caused immense disruption, devastation and change to personal lives, relationships to country, and the fabric of Aboriginal social and economic life.

Records made by commentators reveal a number of observations relating to Aboriginal people in the Eden area at the time of early European occupation (Heffernan and Boot 2000). Observations from the Bega/Eden region indicate that Aboriginal people relied heavily on coastal resources such as fish and shellfish and that camps were located on coastal dunes or in forests within close proximity to the coast (Sullivan 1982). In October 1798 people were seen in canoes in Twofold Bay (Bass 1799 cited in Heffernan and Boot 2000). In 1814 Flinders recorded people consuming the flesh of a beached whale in the bay (Heffernan and Boot 2000). By the 1820s commentators were remarking upon clashes between Aboriginal people and Europeans.

Ben Boyd commenced whaling on the southern side of Boydtown in 1842 and Boydtown was established in 1844. The arrival of Ben Boyd heralded a period of building and expansion in Twofold Bay (Pearson 1985). Aboriginal people continued to work in whaling ventures at Eden into the early 1900s (Mead 1977).

7.2 Previously Recorded Aboriginal Objects

A search of the NSW DECC Aboriginal Heritage Information Management System was conducted on the 14th May 2009 (AHIMS search #25862). The search was undertaken for an area of 4 kms² encompassed by Eastings: 760000-762000 and Northings: 5889000-5891000. The search results indicate that five previously recorded artefact scatters are situated to the south of the proposal area (Table 1; Figure 3); these sites are discussed further below. There are no Aboriginal objects previously recorded within the current proposal area itself.

Site ID	Site Name	Datum	Easting	Northing	Context	Recording
63-3-0203	East Boyd 7	AGD	760410	5889350	Open Site	Navin Officer Heritage Consultants Pty Ltd
63-3-0205	East Boyd 3	AGD	760240	5889150	Open Site	Navin
63-3-0206	East Boyd 5	AGD	760480	5889100	Open Site	Navin
63-3-0218	East Boyd 4	AGD	760250	5889340	Open Site	Navin Officer Heritage Consultants Pty Ltd
63-3-0219	East Boyd 8	AGD	760800	5889230	Open Site	Navin Officer Heritage Consultants Pty Ltd

Table 1. Aboriginal objects listed on AHIMS Search #25862.

The AHIMS register only includes sites which have been reported to NSW DECC. Accordingly, this search cannot be considered to be an actual or exhaustive inventory of Aboriginal objects situated within the local area. Generally, sites are only recorded during targeted surveys undertaken in either development or research contexts.

The following discussion in Sections 7.3 and 7.4 will present a review of previous archaeological work in the region for the purposes of producing a predictive model of site type and location for the study area.

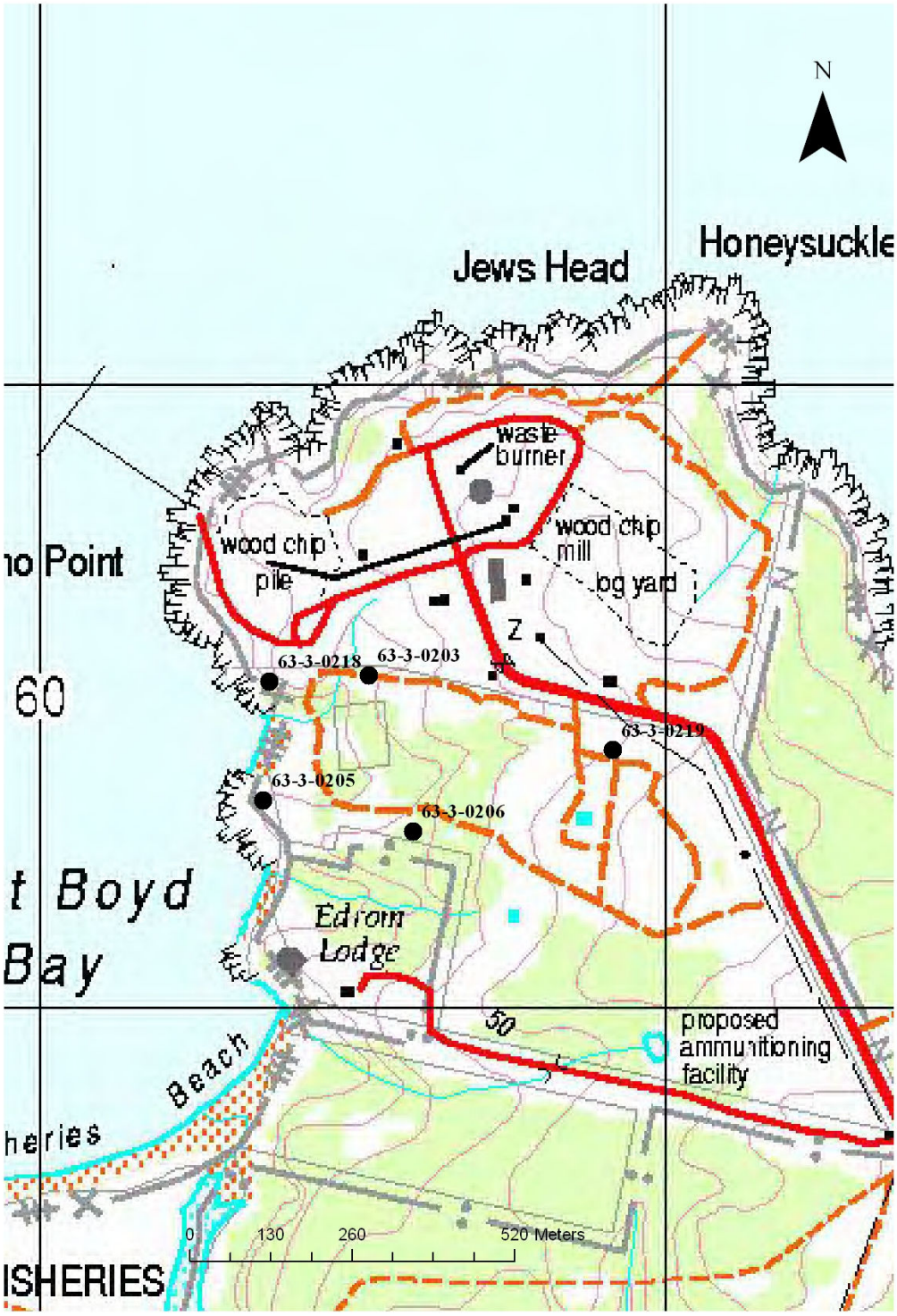

Figure 3. Location of previously recorded sites as listed on AHIMS Site Search.

7.3 Archaeological Context

Sullivan (1981; 1982) examined the middens of the south coast as the topic of her doctoral research. Sullivan recorded a number of middens at Pambula which were found to contain primarily estuarine species such as cockle, mud oyster, rock oyster, whelk and mussel with occasional rock platform species including abalone, warrener (*Cabestana splengleri*), nerite and *Austroclochlea*.

Test excavation was carried out by Sullivan (1982) at one mounded midden on the shore of Pambula Lake. The age of the base of the midden was determined by radiometric analysis to be about 3,000 years BP. The shell was broadly divided into an upper, middle and lower midden. The upper midden was found to be composed mainly of edible mussel with a low proportion of hairy mussel which has had accumulated between 1,200 years BP and the time of European contact. The middle midden contained mainly hairy mussel and mud oyster and had accumulated between 3,000 and 2,300 years BP. The lower midden was made up primarily of mud oyster and its accumulation was found to have commenced at 3,000 years BP (Sullivan 1982).

The excavated midden was found to contain fragmented bones of fish, bird, and land and sea mammals. The bones of small marsupials including wallaby, potoroo, possum and other medium sized animals were interpreted as indicating consistent exploitation throughout time while larger animals including sea mammals and kangaroos occurred sporadically indicating irregular exploitation. The bones from 12 different species of fish were found. Their differential distribution through the deposit allowed Sullivan to infer a diversification of fishing methods through time (Sullivan 1982). Both bone and stone artefacts were recovered. Flaked stone artefacts were made from silcrete, quartz and acid volcanic. Silcrete and backed artefacts are present in the earliest (lower) part of the deposit only and quartz (with low incidences of bipolar features) dominated the stone assemblage from 1,900 years BP. This pattern, argued Sullivan (1982), corresponds to the previously defined Bondaian and Post Bondaian periods.

Lourandos (1974) conducted surveys of a number of locations situated between Wallagoot Lake and Nadgee Nature Reserve. Three sites were recorded near the entrance of the Merrica River south of Wonboyn, including a midden on a headland and two small rock shelters containing deposit.

Bowdler (1982) conducted an emergency salvage excavation of an Aboriginal human burial at Wonboyn Beach, south of Boydtown, at the request of the NSW National Parks and Wildlife Service. The burial was situated in a 1.1m high sand cliff of an exposed hind dune at ca. 75 m north of Snake Creek at the south end of Wonboyn Beach. The skeleton was found to be almost complete and it appeared to be resting on a wood or bark support. The skeleton was determined to probably be a mature male dating to between 500 and 1000 years old.

Byrne and Smith (1987) conducted a survey for Aboriginal sites in selected locations within the state forests of the Eden area. Twenty-two sites were recorded during that study, nineteen of which were artefact scatters. The remainder included a midden, stone arrangement and quarry. Fifty percent of the open sites were situated in saddles, 25% on ridge summits and 25% on creek banks/flats. Artefact numbers and densities were found to be low, however it was suggested that this was largely a result of the poor visibility variables encountered.

Egloff (1987) undertook a study of Aboriginal sites of significance located within the southern portion of the Eden Woodchip Agreement Area. The main sources of information for that study were compiled from interviews with Aboriginal people from the Far South Coast. While no locations or names of places of significance were identified by that study it was noted that archaeological sites were regarded by the Aboriginal community as having "political, educational as well as economic significance" (Egloff 1987: 15), moreover, the importance of involving Aboriginal people in the management of cultural resources was emphasised.

Fuller (1988) conducted a survey at Quarantine Bay near Eden. An area measuring 4.5 hectares comprising a steep hilltop landform was surveyed. Despite apparently good visibility no sites were recorded. This result was explained to be a factor of the low sensitivity of the landform given the steep gradient, rocky substrate and absence of fresh water.

Byrne (1990) conducted a survey of various roads proposed by the NSW Forestry Commission of NSW in the Eden and Bombala areas. Seven artefact scatters and three isolated finds were recorded. All scatters were situated on flat locations on ridgelines and contained low artefact numbers. The artefacts were predominantly quartz.

Paton (1994) undertook a preliminary assessment of four areas within the Eden urban area where residential subdivisions were proposed. The areas in question were assessed to potentially be archaeologically sensitive

and it was recommended that full archaeological investigations be conducted before commencement of the proposed developments.

Williams (1995) conducted subsurface probing at Old Road Creek in response to a proposal by Optus to install a Fibre Optic Cable in an area previously identified to be an area of high archaeological potential. The landforms investigated comprised a flat floodplain with a low spur situated north of the creek and an elevated flat spur south of the creek. The creek itself is a permanent fresh water source. Artefacts were recovered from the low spur situated on the north side of the creek. The results indicated the presence of a shallow, moderate to high density subsurface artefact occurrence situated on the crest of the spur. The majority of the artefacts recovered were made of silcrete with quartz also found to be common.

The Greenglade rock shelter at Wonboyn Beach was excavated by Colley (1997). Occupation of the site was established by radio carbon dating to have extended from 600 years BP until the 19th century. The site was found to contain shell midden and glass artefacts. Colley (1997) also excavated an open midden at Baycliff. A date of 330±110 BP was obtained from charcoal retrieved from 55cm below the surface.

English (1997a) conducted a survey and subsurface augering program at Baycliff and Greenglade, near Wonboyn. The work was undertaken in response to a proposal by NSW NPWS to install new infrastructure facilities in the Nadgee Nature Reserve. The Baycliff survey area is situated at the north end of Wonboyn Beach and adjacent to the south side of Wonboyn Lake. The area is comprised of a hind dune system of low relief and an area adjacent to Wonboyn Lake comprised of a narrow beach backed by a steep sandy slope. The Greenglade survey area is situated at the south end of Wonboyn Beach and is comprised of level ground bordered to the south and southwest by steep sandstone slopes and cliffs and in the east by the beach. No previously unrecorded archaeological material was located during the investigations.

English (1997b) conducted a subsequent investigation in the Greenglade and Wonboyn areas. The survey was focused on a proposed walking track extending from Greenglade to Merrica River. The track traversed moderate to steep gradient spurlines west of the coastline. No sites were recorded. A vehicle track network from Wonboyn to Greenglade and Baycliff and an access track to the centre of the beach was also surveyed (some auguring was also conducted) in areas both west and within the Wonboyn Beach hind dune system. No sites were recorded.

A preliminary desktop study was undertaken by Navin Officer Heritage Consultants (1998) for the proposed Multi Purpose Wharf development area at Munganno Point. One Aboriginal site and one area of archaeological potential were identified within areas potentially impacted by the proposal.

Navin Officer Heritage Consultants (1999) subsequently conducted a cultural heritage assessment of the proposed wharf, commercial facility and Naval Munitions Storage Facility for inclusion within an Environmental Impact Study. That study encompassed survey of four separate areas: Munganno Point, directly south of the SEFE mill site; Brierly Point, situated ca. 1.5km to the southwest; Saltwater Creek, ca. 5km south of the mill, and Hut Forest Road, ca. 12km to the southwest. The roads linking these locations were also included in the survey. A total of fourteen sites were identified during the surveys at East Boyd. Sites recorded included two middens, ten artefact scatters, two isolated finds and five areas assessed to have the potential to contain subsurface archaeological material.

Of most relevance to the current proposal are the results from the Munganno Point study area. A total of 44 hectares were investigated at Munganno Point (Navin Officer Heritage Consultants 1999). The landforms surveyed included the shoreline, rocky headlands and sandy embayments of East Boyd Bay and the crests, upper, middle and lower slopes of ridges and spurs to the east. Six sites and two areas of archaeological potential were recorded within this area:

- East Boyd 3 (EB3) - Medium to high density scatter of at least 50-100 artefacts with discontinuous scatters of midden material. Situated on the crest/slopes of headland.
- East Boyd 4 (EB4) - Scatter of over 25 artefacts on a headland crest.
- East Boyd 5 (EB5) - Low to moderate density scatter of over 20 artefacts on a gently sloping spur crest.
- East Boyd 6 (EB6) - Small (3 artefacts) low density scatter on a spur crest.
- East Boyd 7 (EB7) - Small (3 artefacts) low density scatter on the basal slope of a spur.
- East Boyd 8 (EB8) - Isolated find on the upper slope of a ridge.
- PAD1 - Area of archaeological potential on a dunal sand barrier to the north of Edrom Lodge.
- PAD2 - Area of archaeological potential within dunes and creek flats in a small cove adjacent Harris Daishowa cottage (immediately north of EB3).

It is noted that the larger and higher density sites and the identified areas of archaeological potential are all situated on the crests and dunal formations leading down to the west towards the bay.

The Aboriginal site East Boyd 3 and PAD2 were subsequently subject to a program of subsurface excavation (Navin Officer Heritage Consultants 2000). A total of 485 stone artefacts were retrieved from twenty-seven hand excavated pits. Raw materials present included quartz, chert, silcrete, quartzite, tuff, fossil wood, rhyolitic tuff and ochre. Chert, quartz and silcrete were the most common materials. The excavation results indicated that midden and stone artefacts were concentrated on the coastal margin of the headland crest at Munganno Point. Given the nature of the evidence the site was considered to be representative of occasional activity over a long period of time rather than sustained occupation.

Heffernan and Boot (2000) document the results of the SEFRAC Archaeology Project conducted within the Eden Management Area (EMA). Over 1100 Aboriginal sites are recorded in the EMA. Based on the known population and density of sites a predictive study has indicated that over 11 million sites may remain undiscovered within the EMA. Based on survey data the most likely locations of Aboriginal sites are identified to be: ridges and flats with slopes of 10º or less; all elevations below 1300m above sea level; areas of granite and sedimentary geology; areas which once contained lowland and mid altitude forests and in areas presently vegetated with dry forest and woodland.

Boot (2000) surveyed a proposed walking track at Green Cape, Ben Boyd National Park. The study area traversed an area situated close to the cliff top of the Green Cape headland. Poor visibility was encountered. No sites were recorded however the area was assessed to potentially contain middens.

Boot (2001a) surveyed a proposed beach access track at Jewfish Beach on the southwestern shore of Wonboyn Lake. The areas surveyed included forest and wetland contexts. One site containing eighteen stone artefacts and two pieces of midden shell was recorded on level dry ground adjacent to the wetland.

Barber (2001) conducted a survey of the Bittangabee Campground, Ben Boyd National Park. The survey was undertaken in response to a NSW NPWS proposal to upgrade the camping area. The area is situated on the end of a long wide spur which extends north east from Skeleton Hill, situated ca. 3km to the south west. The area forms a headland situated immediately to the south of Bittangabee Bay inlet. Two occurrences of midden material and ninety-one stone artefacts were recorded by Barber (2001). Stone artefacts were found to be distributed across the entire study area. Artefactual materials recorded included fine grained siliceous stone, chert, quartz, quartzite, rhyolite, silcrete and volcanics with quartz and rhyolite dominating the raw material count. The recording of four hammerstones was interpreted to indicate the manufacture of implements at the site.

Barber (2002) subsequently conducted subsurface test excavation at the Bittangabee Bay site. Twenty-six test probes were undertaken in three areas of the site. The site was found to contain relatively intact subsurface archaeological deposits. The excavated material was assessed to be representative of flaking and quartz was found to be the most common raw material.

Navin Officer Heritage Consultants (2002) undertook salvage excavation at the site East Boyd 3 on Munganno Point. The excavation entailed nine 1 x 1 metre units situated within various locations inside the development footprint. A total of 259 artefacts were recovered from eight of the nine excavation pits. Artefact density varied from 14/m^2 to 97/m^2. The assemblage was dominated by chert, silcrete and quartz; the most common aretfact types were lithic fragments, flakes and flake portions. Lower numbers of cores, microblades, backed items and utilised flakes were also recovered. Just over three kilograms of shell were also recovered from the excavation pit located on the sandy flats adjacent the headland. The shell material was interpreted as highly disturbed midden. The results of the excavation confirmed that the headland had been utilised for repeated short-term occupation with some exploitation of the adjacent marine resources.

Barber (2003) documents the heritage assessment of a proposed walking track along Myanba Creek within Coolangubra National Park. A 20km long survey was conducted by Bobby Maher, Eden Local Aboriginal Land Council. The area consisted of low gradient slopes situated above the creekline. A single sparse density artefact scatter was recorded on the crest, shoulder and side slopes of a spur.

Navin Officer Heritage Consultants (2003) conducted a survey of an alternative commercial facility location at East Boyd Bay, one kilometre south of the current proposal area. The area is situated at ca. 375m inland from Fisheries Beach and south east of Munganno Point and comprises upper and mid west facing slopes of the Jews Head ridgeline and the crest and upper slopes of two minor spurs. Three artefact scatters and two isolated finds were recorded. The recorded artefact scatters comprised two small, low-density scatters situated on a spur crest

EB9) and the side slope of a broad ridge (EB11). One larger artefact scatter (EB10), containing over 30 artefacts, was recorded at the interface of a gentle upper slope and a ridge crest; artefact density at this site appeared to be low. Both the isolated finds were recorded on gentle gradient northwest facing slopes.

Navin Officer Heritage Consultants (2004) surveyed one of the locations at Eden previously investigated by Paton (1994). The area in question comprised 93 hectares situated to the northeast of the township where the Eden Cove Estate was proposed. A total of ten sites comprising nine artefact scatters and one previously recorded midden were identified. Three areas of archaeological potential were also recorded.

Dibden (2004) conducted an assessment of the Boydtown site in relation to a proposed development of the township as a holiday destination. The study area, situated approximately five kilometres west of the SEFE mill, measured a total of 60 hectares, of which 54 hectares were subject to archaeological survey. A total of nine artefact scatters and one possible shell midden were recorded during that survey. The artefact scatters were recorded on creek flats, side and basal slopes and on a knoll crest, while the shell deposit was identified within a foredune context. The creek flats, basal slopes and dune systems were all identified as being archaeologically sensitive.

Kuskie and Clarke (2007) undertook an archaeological assessment of an area of some 8.5 hectares proposed for a tourist and residential development at Cattle Bay in Eden. One Aboriginal site, artefact scatter Cattle Bay 1, was recorded within the proposal area. The recording comprised six artefacts exposed on tracks over a spur crest overlooking Cattle Bay. While the potential for associated subsurface artefacts was predicted to be high, the extent of disturbance from prior impacts was such that the overall archaeological sensitivity was assessed to be low.

At the Davidson Whaling Station Historic Site there have been a series of archaeological investigations that have dealt with aspects of indigenous Archaeology (Feary 1990, 1997; Davies 2003; Dibden 2006).

Feary (1990) inspected a section of midden exposed by the walking track works between Loch Garra and the tryworks (Site # 63-3-0046). A series of 5 auger holes were dug to a maximum depth of 97 cm to test the limits, contents and stratigraphy of the midden. The midden was found to consist of thin and dispersed layer of shell dominated by *Mytilus plannatus* in a black sandy loam with a small amount of bone remains and stone artefacts.

Davies (2003) was contracted to prepare a Conservation Management and Cultural Tourism Plan for DWSHS. While no additional Aboriginal sites were recorded during that study the foreshore area and the foreshore track were assessed to have a high archaeological potential.

Dibden (2006) conducted an assessment of proposed works relating to an upgrade of visitor facilities at the Davidson Whaling Station. Eight Aboriginal artefact locales were recorded in or adjacent to the proposed impact zones. The field survey encompassed the entire area of the proposal site and was therefore comprehensive. However, effective survey coverage was generally low due to the presence of a vegetation ground cover and a general lack of breaching of the soil profile. Based on the relevant predictive model of site type and location the proposal area was assessed to be of high archaeological potential, however within the proposed impact areas that potential was significantly reduced by the significant levels of prior ground disturbance.

In summary, middens, artefact scatters and burials are well documented site types found on the New South Wales Far South Coast. Midden deposits can be found on headlands, in shelters, and adjacent to estuaries and wetlands. Artefact scatters are found across the full range of environmental zones, and their size and nature can be expected to reflect different landuse patterns of exploitation. Large and complex artefact scatters are most likely to be found in areas where a number of different resource zones and a source of reliable fresh water are present. Human burials are typically found in sandy deposits.

7.4 Archaeological Potential of the Study Area

The literature review presented above indicates that in coastal environments on the far south coast middens and stone artefact scatters are commonly recorded sites. Human burials and scarred trees are also recorded, albeit in low numbers.

Given the location of the study area on a headland within a relatively short distance of various resource zones it is possible that the area may have been utilised on a repeated and/or semi regular basis. Archaeological investigations within neighbouring sections of Munganno Point (Navin Officer Heritage Consultants 1999,

2000, 2002) indicate that artefacts are present at low to moderate densities and that some areas immediately adjacent the shoreline contain evidence of marine exploitation in the form of midden deposits. The evidence from sites such as East Boyd 3, situated 500m south of the study area, has been interpreted as being representative of repeated short-term occupation. It is expected that the proposal area would have seen similar levels of use.

However, European landuse including the construction and operation of the existing SEFE mill have resulted in extremely high levels of ground disturbance. This disturbance is likely to have either removed or significantly reduced the integrity of the archaeological resource in the proposal area.

Based on a consideration of the review of prior research conducted in the Eden area the following site predictions are made:

Stone Artefacts

Stone artefacts are located either on the ground surface and/or in subsurface contexts. Typically stone artefacts recorded in open sites are representative of debris which results from flaking stone and will include unmodified flakes, cores and flaked pieces. Actual stone tools such as deliberately formed artefacts (such as scrapers, backed blades or adzes) or pieces which possess evidence of use are generally present in low frequencies. The raw materials used for artefact manufacture in the Eden area typically include volcanics, quartz and silcrete.

The detection of artefact scatters depends on ground surface factors and whether or not the potential archaeological bearing soil profile is visible. Prior ground disturbance, vegetation cover and sediment/gravel deposition can act to obscure artefact scatter presence.

Stone artefacts are likely to be present within the proposal area, although the potential for *in situ* artefacts is predicted to be low.

Grinding Grooves

Grinding grooves are always located on sandstone exposures and are the result of the manufacture and maintenance of ground edge tools. Such tools were generally made of stone, however bone and shell were also ground to fine points.

The location of sites with grinding grooves is dependent on the presence of a suitable rock surface, usually fine grained homogeneous sandstone, and a water source. Grinding groove sites may consist of a single groove, or a large number which are sometimes arranged in groups. They commonly occur as an open site, however, are sometimes found in shelter contexts. Usually grinding grooves are located on horizontal sandstone exposures, however, they can occasionally be found on vertical surfaces.

Given the absence of suitable sandstone exposures within the current proposal area this site type is unlikely to be recorded

Middens

Middens consist of deposits of shell and sometimes contain stone artefacts, bone and human burials. Middens situated in the area will vary in their species composition which is generally a factor of environmental location. Three midden sites have previously been recorded to the northwest of the proposal area.

Given the location of the proposal area, within 200m of the shoreline of a rocky headland, there is a moderate to high potential for midden material to occur. However, as is the case with the potential for stone artefacts, it is unlikely that *in situ* midden deposits will be present.

Burials

Several Aboriginal burial sites are known to have been present within the wider region. Burials are generally only visible in areas where the deposit has been disturbed either by natural erosion or human activity. This site type is not usually found during field survey.

Given the topographic context of the proposal area and the nature of sediment deposits burials are unlikely to be present.

Rock Shelter Sites

Rock shelters consist of any form of rock overhang which contains artefacts and/or art. Common archaeological features of rock shelter sites are: surface artefacts, occupation deposits such as stone artefacts, shell, bone and charcoal, rock drawings, paintings and stencils, engraved imagery, potential archaeological deposit and grinding grooves. Given the absence of large vertical stone exposures in the proposal area this site type is unlikely to be recorded.

Scarred and Carved Trees

Scarred and carved trees result from the removal of bark from trees by Aboriginal people for either domestic or ceremonial purposes. These site types can occur anywhere that trees of sufficient age are present, however, in an Aboriginal land use context would most likely have been situated on flat or low gradient landform units in areas suitable for either habitation and/or ceremonial purposes.

Bark removal by European people through the entire historic period and by natural processes such as fire blistering and branch fall, make the identification of scarring from a causal point of view very difficult. Accordingly, given the propensity for trees to bear scarring from natural causes their positive identification is impossible unless culturally specific variables such as stone hatchet cut marks or incised designs are evident and rigorous criteria in regard to tree species/age/size and it specific characteristics in regard to regrowth is adopted.

Nevertheless, the likelihood of trees bearing cultural scarring remaining extant and *in situ* in the proposal area is low given events such as land clearance and bushfires. Generally scarred trees will only survive if they have been carefully protected such as the trees associated with Yuranigh's grave at Molong where successive generations of European landholders have actively cared for them.

Given the absence of mature trees in the proposal area the potential for scarred trees to occur is negligible.

Stone Quarry and Procurement Sites

A lithic quarry is the location of an exploited stone source (Hiscock & Mitchell 1993:32). Sites will only be located where exposures of a stone type suitable for use in artefact manufacture occurs. These sites will commonly have evidence of exploitation including extraction and preliminary flaking preparation. The presence of these site types is dependent on the surface exposure of suitable stone. Quarries are a rare site type in this region. Given the absence of suitable stone in local outcrops in the proposal area this site type is unlikely to be recorded during the study.

8. SURVEY RESULTS

8.1 Survey Coverage Variables

Survey Coverage Variables are a measure of ground surveyed during the study and the archaeological visibility present within that surveyed area. Survey coverage variables provide a measure with which to assess the effectiveness of the survey so as to provide an informed basis for the formulation of management strategies.

Specifically, an analysis of survey coverage is necessary in order to determine whether or not the opportunity to observe stone artefacts in or on the ground was achieved during the survey. In the event that it is determined that ground exposures provided a minimal opportunity to record artefacts it may be necessary to undertake archaeological excavation for determining whether or not artefacts are present. Conversely, if ground exposures encountered provided an ideal opportunity to record the presence of artefacts, the survey results may be considered to be adequate and accordingly no further archaeological work may be required.

Two variables have been recorded during this study to measure ground surface visibility: The area of ground exposure encountered and the quality and type of ground visibility (archaeological visibility) within those exposures. The two variables of ground surface visibility which have been estimated during the survey are defined as follows:

- Average Ground Exposure – an estimate of the total area of bare ground exposure; and
- Average Archaeology Visibility – an estimate of the potential archaeological visibility within those exposures of bare ground.

Based on the two ground surface visibility variables as defined above, a net estimate (Net Effective Exposure) of the archaeological potential of exposure area within a survey unit or set of units has been calculated. The Effective Survey Coverage (ESC) calculation is defined and required by the NPWS. The ESC provides an estimate of the proportion of the total study area which provided a net 100% level of the potential archaeological visibility. The ESC achieved in the present study is generally low.

The study area was subdivided into a total of two survey units each of which were subject to a comprehensive survey (Table 2; Figure 4). The total survey area measured ca. 1.25 hectares. Approximately 0.75 hectares of this area was systematically surveyed on foot. Effective survey coverage is calculated to have been ca. 8% taking into consideration ground exposure and archaeological visibility variables (Table 3).

Survey Unit 1 contained ground exposures within the area occupied by the mill burner however based on prior removal of the land surface (excavation for the burner construction), archaeological visibility was nil (Plate 9). The area within SU1 encompassed by the existing storage area contained no ground exposure given the presence of soil, wood debris and bitumen. Survey Unit 2 contained areas of exposures within the minor track located between the bitumen surfaced road and the conveyor belt. It is estimated that in this area archaeological visibility was 100% due to high erosion to clay.

Plate 9. The area in which the mill waste burner is situated; note excavation.

Survey Unit	Landform element	Aspect	Gradient	Landuse impacts	Proposed impacts	Archaeological sensitivity
SU1	Crest	north-northwest	0-2°	Original clearance and original farming; construction of the mill waste burner and storage areas including excavation	Storage; power generator and associated components	Originally the landform would have been archaeologically sensitive; however due to extensive prior impacts the archaeological potential and sensitivity is assessed to be negligible/low
SU2	Simple slope	southwest	4°	Original clearance and original farming; construction of road, fencing and installation of conveyor belt	Water transfer network	Originally the landform would have been sensitive; however dur to extensive prior impacts the archaeological potential and sensitivity is assessed to be negligible/low

Table 2. Survey Unit descriptions.

Survey Unit	Survey Unit Area	Area surveyed	Ground exposure	Ave. archaeological visibility %	Net Effective Exposure	ESC
SU1	1 ha	0.5 ha	0.1 ha	0	0	0
SU2	0.25 ha	0.25 ha	0.1 ha	100	0.1 ha	40%
total	1.25 ha	0.75 ha	0.2 ha		0.1 ha	8%

Table 3. Survey Coverage Data.

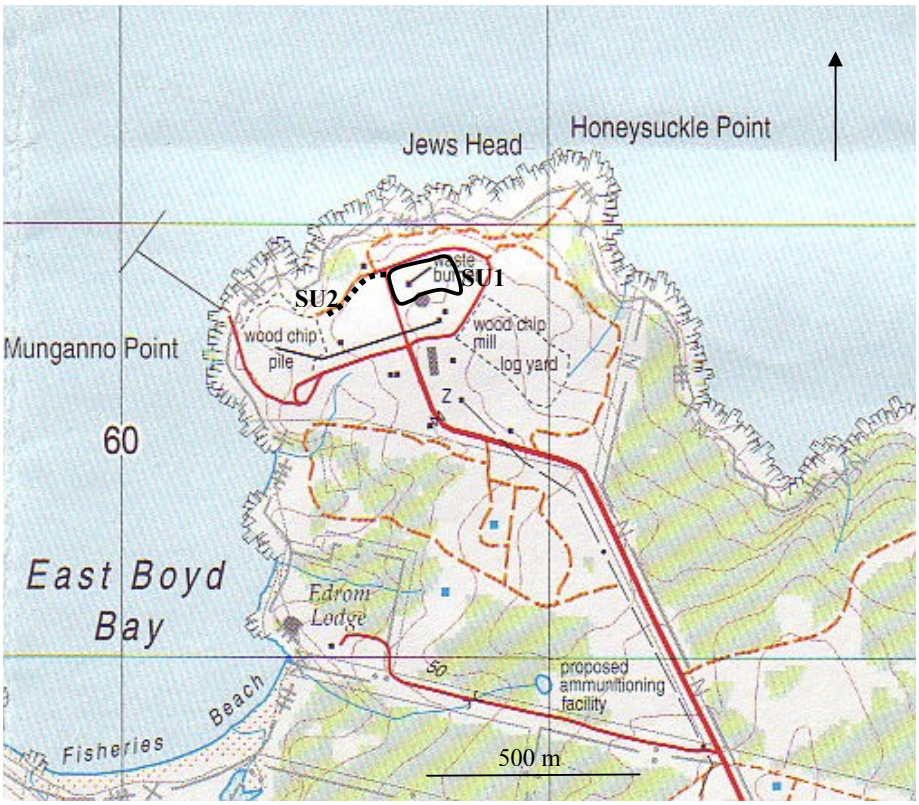

Figure 4. Location of Survey Units (Eden 8823-1N 2nd ed 1:25000 topographic map GDA).

8.2 Results

No Aboriginal objects were recorded during the survey. The proposed impact area is assessed to be of low to negligible archaeological sensitivity based on the extent and nature of previous disturbance. The site is assessed to possess negligible potential to contain subsurface archaeological deposit.

9. STATUTORY INFORMATION

The Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act), its regulations, schedules and guidelines provides the context for the requirement for environmental impact assessments to be undertaken during land use planning (NPWS 1997).

Part 3A of the Environmental Planning and Assessment Act 1979

On 9 June 2005 the NSW Parliament passed the Environmental Planning and Assessment Amendment (Infrastructure and Other Planning Reform) Bill. The Act was assented to on 16 June 2005 and commenced on 1 August 2005. This amendment contains key elements of the NSW Government's planning system reforms and makes major changes to both plan-making and major development assessment.

Fully operational in August 2005, the major projects assessment system includes:

- a new part of the (EP&A Act) — known as Part 3A — which defines the way a project should be assessed.
- State Environmental Planning Policy (Major Projects) 2005 — which defines what projects are subject to Part 3A and require ministerial approval.

A key component of the amendments is the insertion of a new Part 3A (Major Projects) into the EP&A Act. The new Part 3A consolidates the assessment and approval regime for all major developments which previously were addressed under Part 4 (Development Assessment) or Part 5 (Environmental Assessment).

Part 3A applies to all major State government infrastructure projects, developments previously classified as State significant and other projects, plans or programs of works declared by the Minister. The amendments aim to provide a streamlined assessment and approvals regime and also to improve the mechanisms available under the EP&A Act to enforce compliance with approval conditions of the Act.

Under 75U of the Act, Part 3A applications do not require certain permits/approvals required under other legislation. These matters are assessed as part of the Part 3A process, For example, a permit under section 87 or a consent under section 90 of the *National Parks and Wildlife Act 1974* or, an approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977* are not required for Part 3A applications. Section 75U applies from the date of issue of the Director General's Requirements.

Notwithstanding, the Department of Planning still requires an equivalent level of information within the Environmental Assessment as would ordinarily be required for any such permit/approval to enable an assessment of relevant works.

The proposed 5 Biomass-fired Power Station has been declared a major project under Part 3A of the Act.

10. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations in relation to Indigenous heritage are made on the basis of:

- The results of the investigation as documented in this report.
- An analysis of the survey results.
- Consideration of the nature and limited extent of proposed impacts.
- Consideration of the high levels of prior disturbance in the proposed impact areas.
- Consultation with Eden Local Aboriginal Land Council.

Conclusions and recommendations:

1. No Aboriginal objects or Indigenous heritage values have been identified in the proposal area.
2. The proposed impact areas have been subject to extensive and high levels of previous disturbance. Accordingly the archaeological and cultural sensitivity of the proposal area is assessed to be very low.
3. The proposal area has very low to negligible potential to contain subsurface archaeological deposits. Accordingly no further archaeological investigations are warranted.
4. There are no Indigenous heritage constraints relating to the proposed construction of the Biomass-fired Power Plant.

11. REFERENCES

Barber, M. 2001 *An archaeological survey of Bittangabee Campground Ben Boyd National Park, NSW*. Report to NSW National Parks and Wildlife Service.

Barber, M. 2002 *A subsurface archaeological investigation of a section of Bittangabee Campground Ben Boyd National Park, NSW*. Report to NSW National Parks and Wildlife Service.

Barber, M. 2003 *Archaeological condition report Coolangubra Walking Track*. Report to NGH Environmental.

Bickford, A., Blair, S. and Freeman, P. 1988 *Ben Boyd National Park Bicentennial Project: Davidson Whaling Station, Boyd's Tower, Bittangabee Ruins*, NSW National Parks and Wildlife Service.

Boot, P. 1994 Recent Research into the Prehistory of the Hinterland of the South Coast of New South Wales. In Sullivan, M., Brockwell, S. and Webb, A. (eds) *Archaeology in the North: Proceedings of the 1993 Australian Archaeological Association Conference.* NARU: Darwin.

Boot, P. 2000 *Green Cape, Ben Boyd National Park, inspection of proposed walking track route for Aboriginal sites*. Memorandum to Craig Dickman, Ranger Far South Coast Region NSW NPWS.

Boot, P. 2001 *Aboriginal Heritage Assessment Jewfish Beach Access Track, Wonboyn Lake, Nadgee Nature Reserve*. Memorandum to Lynette Evans, Ranger Far South Coast Region NSW NPWS.

Bowdler, S. 1982 *An emergency excavation of an Aboriginal human burial at Wonboyn Beach on the Far South Coast of New South Wales*. A report to the National Parks and Wildlife Service of New South Wales.

Byrne, D. 1990 *Archaeological survey of proposed forest roads in Eden and Bombala Districts, NSW*. Report to the Forestry Commission of NSW.

Byrne, D. and L. Smith 1987 *Survey for Aboriginal Archaeological Sites in the State Forests of the Eden area*. Report to the Forestry Commission of NSW.

Chittick, L. and Fox, T. 1997 *Traveling With Percy: A South Coast Journey*. Aboriginal Studies Press: Canberra.

Colley, S. 1997 A Pre and Post Contact Aboriginal Shell Midden at Disaster Bay, NSW South Coast. *Australian Archaeology*. 45: 1-19.

Davies, P. 2003 *Davidson Whaling Station Historic Site Conservation Management and Cultural Tourism Plan*, Report to NSW National Parks and Wildlife Service.

Dibden, J. 2004 *Proposed Subdivision at Boydtown. Aboriginal Archaeological Assessment*. Report to nghenvironmental.

Dibden, J. 2006 *Davidson Whaling Station, Twofold Bay, NSW Proposed New Visitor Access Cultural Heritage Assessment*. A report to nghenvironmental.

Eades, D.K. 1976 The Dharawal and Dhurga languages of the New South Wales South Coast. In *Australian Aboriginal Studies Research and Regional Studies No. 8.* AIAS: Canberra.

Egloff, B. 1987 *A Report on an Investigation of Places of Cultural Significance to Aboriginal People in the Southern Portion of the Eden Woodchip Agreement Area*, A report to the NPWS, NSW.

English, A. 1996 *Preliminary assessment of bone material found on Wonboyn Beach, Wonboyn, NSW. As appendix to English*, A. 1997a Archaeological investigation of proposed infrastructure in Nadgee Nature Reserve, Wonboyn, NSW. Internal NSW NPWS report.

English. A. 1997a *Archaeological investigation of proposed infrastructure in Nadgee Nature Reserve, Wonboyn*, NSW. Internal NSW NPWS report.

English. A. 1997b *Stage two archaeological investigation of proposed infrastructure in Nadgee Nature Reserve, Wonboyn*, NSW. Internal NSW NPWS report.

Feary, S. 1988b. *Archaeological Survey of Proposed Walking Track and Carpark, Davidson Whaling Station Historic Site, Eden District*. Unpublished report to New South Wales National Parks and Wildlife Service.

Feary, S. 1990. *Report on Inspection of Midden, Davidson Whaling Station Historic Site*. Unpublished report to New South Wales National Parks and Wildlife Service.

Flood, J. 1980 *The Moth Hunters: Aboriginal Prehistory of the Australian Alps.* AIAS: Canberra.

Fuller, N. 1988 *An archaeological survey at Quarantine Bay, Far South Coast, NSW*.

Heffernan, K. and P. Boot 2000 *Draft Report of the SEFRAC Archaeology Project: Aboriginal Archaeological Surveys, Conservation and Management of Aboriginal Sites and Cultural Landscapes in the SFNSW Eden Management Area, South Eastern New South Wales*. Internal report: NSW NPWS Cultural Heritage Division Southern Aboriginal Heritage Unit.

Hiscock, P. & Mitchell, S. 1993 *Stone Artefact Quarries and Reduction Sites in Australia: Towards a Type Profile.* AGPS: Canberra.

Hudson, J. 1986 *Guide notes for the 12th International Sedimentological Congress*: Canberra August 1986.

Keith, D. and M. Bedward 1999 Native Vegetation of the South East Forests region, Eden. *Cunninghamia*. Vol. 6: No. 1.

Kuskie, P. and Clarke, E. 2007 *An Aboriginal Heritage Impact Assessment of a Proposed Mixed Use Tourist and Residential Development at Cattle Bay, Eden, Far South Coast of New South Wales* A report to Brewster Murray Pty Ltd.

Lampert, R. 1971 *Burrill Lake and Currarong*. Department of Prehistory. Research School of Pacific Studies: Australian National University.

Lourandos, H. 1974 *Field report on an archaeological survey on the Far South Coast of NSW*. Unpublished report: Sydney University.

Mead, T. 1977 *Killers of Eden The story of the killer whales of Twofold Bay*. Angus and Robertson: Sydney.

Mulvaney, J. and J. Kamminga 1999 *Prehistory of Australia*. Allen and Unwin: St Leonards.

Navin Officer Heritage Consultants 1998 *Cultural Heritage Desktop Overview Proposed East Coast Ammunition Complex Twofold Bay, NSW*. A Report to GHD.

Navin Officer Heritage Consultants 1999 *Proposed Multi Purpose Wharf, Commercial Facility and Navy Ammunitioning Facility, Twofold Bay, NSW. Cultural Heritage Assessment*. Unpublished report to Woodward-Clyde Pty Ltd.

Navin Officer Heritage Consultants 2000 *Proposed Multi Purpose Wharf, Commercial Facility and Navy Ammunitioning Facility, Twofold Bay, NSW. Further Cultural Heritage Assessment at East Boyd including Aboriginal, Historic and Maritime Components*. Report to URSCorp.

Navin Officer Heritage Consultants 2002 *Proposed Multi Purpose Wharf, Commercial Facility and Navy Ammunitioning Fcility, Twofold Bay, NSW: Archaeological Salvage of Aboriginal Sites*. A report to URSCorp.

Navin Officer Heritage Consultants 2003 *Cultural Heritage Assessment of Proposed Commercial Facility Area at East Boyd Bay, NSW. Cultural Heritage Component of Statement of Environmental Effects*. A report to URS Australia Pty Ltd.

Navin Officer Heritage Consultants 2004 *Eden Cove Estate SEPP71 Master Plan – Cultural Heritage Components*. A report to LFA (Pacific) Pty Ltd.

New South Wales National Parks and Wildlife Service. 1997 (Working draft) Guidelines for Archaeological Survey Reporting in NSW NPWS Aboriginal Cultural Heritage Standards and Guidelines Kit.

New South Wales Department of Environment and Conservation 2004 Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants.

Ossa, P., Marshall, B. & Webb, C. 1995 New Guinea 2 cave: A Pleistocene site on the Snowy River, Victoria. *Archaeology in Oceania* 30(1):22-35.

Paton, R. 1994 *The Archaeological Sensitivity of Four Urban Investigation Areas Near Eden, Far South Coast, New South Wales*. A report to Bega Valley Council.

Pearson, M. 1985 Shore-based whaling at Twofold Bay: One hundred years of enterprise. *Journal of the Royal Australian Historical Society*. Vol. 71 (1): 3-27.

Peterson, N. 1976 *Tribes and Boundaries in Australia*. AIAS: Canberra.

Rose, D. 1990 *Gulaga. A report on the cultural significance of Mt Dromedary to Aboriginal people*. Present to the Forestry Commission of NSW and the NSW National Parks and Wildlife Service.

Sullivan, M.E. 1982 *Aboriginal Shell Middens in the Coastal Landscape of New South Wales*. Unpublished PhD Thesis, Australian National University, Canberra.

Toghill, J. 1984 *Ghost Ports of Australia*. Macmillan Australia: South Melbourne.

Tindale, N.B. 1974 *Aboriginal Tribes of Australia.* ANU: Canberra.

Williams, D. 1995 *Subsurface probing at Old Road Creek, South of Eden, NSW for an Optus Communication Fibre Optic Cable*. Report to Purdon Associates Pty Ltd.