Merimbula Sewage Treatment Plant Upgrade and Ocean Outfall

Appendix I

Aboriginal Cultural Heritage Assessment Report

Aboriginal Cultural Heritage Assessment Report

Merimbula STP Upgrade and Ocean Outfall Project

Client: Bega Valley Shire Council

ABN: 26 987 935 332

Prepared by

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Executive Summary

AECOM Australia Pty Ltd (AECOM) was commissioned by Bega Valley Shire Council (BVSC) to undertake an Aboriginal cultural heritage assessment for the proposed Merimbula Sewage Treatment Plant (STP) Upgrade and Ocean Outfall Project (the Project), near Merimbula, on the far south coast of NSW. BVSC is seeking approval for the Project under Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The current assessment forms part of the Environmental Impact Statement (EIS) being prepared for the Project, which has been declared State Significant Infrastructure (SSI) pursuant to section 115U (2) of the EP&A Act.

This Aboriginal Cultural Heritage Assessment Report (ACHAR) documents the results of AECOM's assessment and has been compiled in accordance with Heritage NSW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a), *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b) and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011).

The Project area for this Aboriginal cultural heritage assessment comprises the terrestrial component of the broader Merimbula STP and Ocean Outfall Project site (i.e., the 'Project area' shown on Figure 1 in this report). Thus defined, the Project area encompasses the existing Merimbula STP and its associated exfiltration ponds, located to the east and west of Arthur Kaine Drive respectively, as well as parts of the Pambula-Merimbula Golf Course and broader Merimbula Bay Barrier, including a c.2.7 km long section of Merimbula Main Beach. More broadly, the Merimbula STP is located between the townships of Merimbula and Pambula, approximately 3.5 km to the south of Merimbula's CBD and 2.5 km north of Pambula's CBD. The STP is bounded to the north and west by Merimbula Lake, to the south by the Pambula-Merimbula Golf Course and to the east by Arthur Kaine Drive. Merimbula Airport is located approximately 1 km to the north of the STP.

Searches of the AHIMS database on 2 August 2021 for a 15 x 15 km area centred on the Project area (AHIMS search area) returned 176 non-restricted site entries. Excluding new sites identified as part of the current assessment, consideration of the location of previously recorded sites, including associated site cards and reports, indicates that two registered sites - open artefact site 62-6-0133 and burial site 62-6-0173 - are located either wholly (62-6-0133) or partially (62-6-0173) within the Project area. An additional two sites - scarred tree 62-6-0475 and artefact scatter 62-6-0788 - are located within 50 metres of the Project area. All four sites are listed on the AHIMS database as 'Valid'. However, it is noted that a review of the site card for open artefact site 62-6-0133 indicates that this site should, in fact, be listed as 'Destroyed', with the two flaked stone artefacts comprising this site collected in 1979.

Archaeological survey of the Project area was undertaken in October 2018 by a combined field team of two AECOM archaeologists, three Registered Aboriginal Party (RAP) field representatives and a representative from BVSC. Areas of cleared land to the east of Arthur Kaine Drive were targeted for survey. However, transects were also completed to the west of Arthur Kaine Drive, within and adjacent to the fenced Merimbula STP complex. All survey was conducted on foot, with a total of 15 transects completed over the course of the survey. Recorded transect data indicate that a total survey coverage of approximately 8 ha, representing around 16.6% of the Project area (as defined in October 2018), was achieved.

A total of three new Aboriginal archaeological sites, consisting of two shell midden sites and one isolated artefact, were identified during survey. All are located on vehicle tracks within the Merimbula Barrier sand mass. Previously recorded scarred tree 62-6-0475 was also re-located during survey. While the scar on this tree has been reassessed as a probable European survey mark, on the basis of RAP feedback, it will be managed as an Aboriginal site. The recorded location of burial site 62-6-0173 was also inspected during survey. However, no definite or potential human remains were observed at or immediately surrounding this location. Newly identified shell midden sites have been designated as 'Merimbula STP SM1' (62-6-0812) and 'Merimbula STP SM2' (62-6-0811), while the isolated artefact has been designated as 'Merimbula STP IA1' (62-6-0810). Merimbula STP SM1 contains only shell. However, Merimbula STP SM2 contains both flaked stone artefacts and midden shell.

A targeted program of archaeological test excavation was also undertaken as part of the current assessment. Test pits were excavated at seven of nine proposed geotechnical borehole locations within the Project area (as defined in October 2018). Aboriginal objects, consisting exclusively of flaked stone artefacts, were recovered from three of these pits, all of which were located on east-west trending spur or 'finger' dunes overlooking an area of freshwater wetland within the Merimbula Barrier's backbarrier sand flat.

Taking into account the results of the archaeological field investigations undertaken for this assessment, as well as a critical review of existing AHIMS data, a total of six Aboriginal archaeological sites are recognised within and immediately surrounding the Project area, including two shell midden sites, two open artefact sites, registered burial site 62-6-0173 and previously recorded scarred tree 62-6-0475. Of the six sites identified, three - burial site 62-6-0173, shell midden Merimbula STP SM2 (62-6-0811) and subsurface artefact scatter Merimbula STP OAS1 (62-6-0809) - are located partially within the Project area. The remaining three sites are located wholly outside of the Project area.

An assessment of the scientific significance of the six Aboriginal sites recognised within and immediately surrounding the Project area has attributed moderate scientific significance to two sites (Merimbula STP OAS1 and burial site 62-6-0173) and low scientific significance to the remaining four sites. No sites of high scientific significance have been identified within or immediately adjacent to the Project area. However, it is recognised that such sites may exist in subsurface contexts.

Primary ground disturbance within the Project area, defined here as bulk earthworks within the existing fenced STP complex and the installation of the underground section of the ocean outfall pipeline, are not anticipated to result in any physical impacts to the three Aboriginal sites identified within this area.

Several potential options for construction access have been considered for the Project. Initially, access routes off Arthur Kaine Drive, east of the STP, were considered. However, these were not chosen due to the risk of impacting known Aboriginal sites and ecological values. Access routes at various points at the northern end of Merimbula Beach were also considered but were likewise chosen due to inadequate access for construction vehicles expected, or impacts to public facilities and vegetation. Temporary construction beach access from Pambula Beach to the laydown area on Merimbula Beach has been selected to avoid these issues, primarily potential impacts to Aboriginal sites within the foredune and backbarrier flat components of the Merimbula Barrier sand mass, as well as potential ecological impacts. Construction access from Pambula Beach to the laydown area on Merimbula Beach is assessed as carrying a negligible Aboriginal heritage impact risk.

Ancillary ground disturbance activities outside of Meirmbula Main beach are assessed as carrying a low to moderate impact risk for identified Aboriginal sites both within and adjacent to the Project area, with inadvertent impacts from light and/or heavy vehicle movements deemed most likely.

Together with the results of the archaeological survey and test excavation works undertaken for this assessment, local and regional archaeological datasets suggest that dune ridges and areas of backbarrier sand flat within the eastern portion of the Project area are of high Aboriginal archaeological sensitivity. This assessment notwithstanding, installation of the underground section of the ocean outfall pipeline using trenchless construction techniques is considered to carry a negligible Aboriginal heritage impact risk. This assessment is made on the basis of drilling depths, which greatly exceed the probable depth of subsurface archaeological deposits in both contexts.

To manage potential impacts to the known and potential Aboriginal cultural heritage values of the Project area and its immediate environs, it is recommended that a Aboriginal Cultural Heritage Management Plan (ACHMP) be prepared for the Project. The ACHMP should be prepared in consultation with RAPs, Heritage NSW and the Department of Planning, Industry and Environment (DPIE). The commitment for the development of this ACHMP should be addressed in the EIS.

Key components of the proposed ACHMP for the Project are as follows:

- erection of protective fencing around newly identified surface sites Merimbula STP SM1 (62-6-0812), Merimbula STP SM2 (62-6-0811) and Merimbula STP IA1 (62-6-0810), as well as previously recorded burial site 62-6-0173 and scarred tree 62-6-0475;
- creation of a 'no-go zone' for a former vehicle track to the south of the STP's existing dunal exfiltration ponds, identified by RAP Mr Graham Moore as the location of unregistered human skeletal remains of Aboriginal origin.

- identification of provisions regarding appropriate management action(s) for any previously unrecorded Aboriginal archaeological sites identified within the Project area throughout the life of the Project;
- preparation of a procedure for the management of the discovery of any definite or potential human skeletal remains;
- identification of provisions regarding appropriate consultation protocols with RAPs; and
- preparation of an Aboriginal cultural heritage awareness training package.

1.0 Introduction & Background

1.1 Introduction

AECOM Australia Pty Ltd (AECOM) was commissioned by Bega Valley Shire Council (BVSC) to undertake an Aboriginal cultural heritage assessment for the proposed Merimbula Sewage Treatment Plant (STP) Upgrade and Ocean Outfall Project (the Project), near Merimbula, on the far south coast of NSW (Figure 1). BVSC is seeking approval for the Project under Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The current assessment forms part of the Environmental Impact Statement (EIS) being prepared for the Project, which has been declared State Significant Infrastructure (SSI) pursuant to section 115U (2) of the EP&A Act.

This Aboriginal Cultural Heritage Assessment Report (ACHAR) documents the results of AECOM's assessment and has been compiled in accordance with Heritage NSW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a), *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b) and *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011).

1.2 The Project

The Project would involve an upgrade of sewage treatment at the Merimbula STP and replacement of the existing beach face outfall and dunal exfiltration ponds with an ocean outfall in Merimbula Bay. Upgrades at the STP and provision of the ocean outfall system is aimed at reduced the environmental and health impacts of current operations, by providing a higher level of treatment and a superior mode of discharge/ dispersion of the treated effluent via an ocean outfall in Merimbula Bay.

The Project would involve:

- upgrade of the existing STP to improve the quality of treated effluent and facilitate efficient pumping through the ocean outfall pipeline to the proposed diffuser location;
- installation of a 3.5 km ocean outfall pipeline to convey treated effluent offshore to a submerged effluent diffuser at the end of the outfall pipeline; and
- decommissioning of the existing beach-face outfall pipeline and effluent storage pond (within the STP site), and cessation of use of the existing exfiltration ponds.

A summary of the proposed Project elements is provided in Table 1.

Table 1 Project Summary

Project element	Summary
STP upgrade	• Additional treatment processes incorporated into the existing STP site, which include: - Poly Aluminium Chloride (PAC) dosing for phosphorous removal - Ultraviolet (UV) treatment to achieve improved wastewater quality (through additional removal of protozoa, bacteria) - A change to the existing chlorine dosing treatment as follows: ▪ Chlorine dosing, using liquified chlorine gas, would continue to be applied to wastewater to be re-used. Wastewater to be discharged via the ocean outfall would no longer be subject to chlorine dosing, creating two wastewater streams: one for reuse (with chlorine) and one for offshore disposal (without chlorine). ▪ The two wastewater streams would be separated to allow for the chlorine dosing of the re-use stream. This would involve installation of two 920 kg capacity drums, a new chlorine dosing unit and a new pump system. ▪ The chemicals/substances required for chlorine dosing would be stored at a dedicated storage facility, within the STP. Either the existing chlorine storage shed would be upgraded to house the increased volume of chlorine required for the Project, or a new shed would be built on or near to the site of the existing shed. - The Project may also include tertiary filtration, if deemed required to meet water quality objectives through additional log removal of protozoa, bacteria, total suspended solids (TSS) and biological oxygen demand (BOD). • Additional pump stations and ancillary infrastructure within the existing STP site (including above-ground storage tanks, pipes, pits, power supply and additional low voltage (LV) connection (including transformer, cabling and distribution board), control kiosks, a retaining wall and access roads). • Utilities relocation and upgrade. • Decommissioning of the existing 17 ML effluent storage pond within the STP site, including dewatering and sediment/sludge removal. • Cessation of use of the existing exfiltration ponds within the adjacent sand dunes.
Ocean outfall pipeline and wastewater diffuser, and associated pump station	Construction and installation of a 3.5 km outfall pipeline. The pipeline would travel from the STP in an east-south-easterly direction to a location approximately 2.7 km offshore in Merimbula Bay (refer to Figure 4). A multi-port wastewater diffuser would be located at the end of the pipeline at a depth of approximately 30 metres. The diffuser would be approximately 80 m in horizontal length. The pipeline would be up to 450mm in outer diameter (366mm internal diameter) and consist of pipeline lengths welded together.

Project element	Summary
	The pipeline would involve two construction methods for different sections of the pipeline as follows: • "Section one" - STP to a location beyond surf zone: underground trenchless drilling method. • "Section two" - Location beyond surf zone to offshore pipeline termination point: laying of pipeline on seabed floor and covering with rock or concrete mattresses. • A transition riser may be required to connect the underground pipeline with the seabed pipeline. If required, the riser would be located beyond the surf zone. The pipeline would contain up to two valves along its length for relieving the air entrapment, should it occur.

1.3 The Project area

The Project area for this assessment, shown on Figure 5, comprises the terrestrial component of the broader Merimbula STP and Ocean Outfall Project site (see Figure 1). Thus defined, the Project area encompasses the existing Merimbula STP and its associated exfiltration ponds, located to the east and west of Arthur Kaine Drive respectively, as well as parts of the Pambula-Merimbula Golf Course and broader Merimbula Bay Barrier, including a c.2.7 km long section of Merimbula Main Beach.

The Merimbula STP is located between the townships of Merimbula and Pambula, approximately 3.5 km to the south of Merimbula's CBD and 2.5 km north of Pambula's CBD. The STP is bounded to the north and west by Merimbula Lake, to the south by the Pambula-Merimbula Golf Course and to the east by Arthur Kaine Drive. Merimbula Airport runway is located approximately 400 m north of the STP, with the airport terminal located approximately 1 km to the north of the STP.

Land within the Project area, which falls wholly within the Bega Valley Shire Local Government Area (Bega Valley LGA), has been registered as per Table 2.

Table 2 Project area land description

Project area component	Land Description
Merimbula STP (including existing exfiltration ponds)	The Project area within the existing Merimbula STP site falls within the following parcels of land: • Lot 101 on DP1201186 • Lot 1 on DP853245 • Lot 2 on DP853245 • Lot 1 on DP861737 • Lot 2 on DP861737.
Outfall pipeline	**Section one** Section one of the outfall pipeline comprises primarily the onshore portion of the proposed pipeline. The pipeline would be located underground, and travel from the existing STP site to a point below the mean high water mark (MHWM) in Merimbula Bay, beyond the surf zone. Section one would traverse below the surface of the following parcels of land: • Lot 355 on DP 41837 • Lot 7308 on DP 1167035 • Lot 320 on DP 750227 • Lot 7307 on DP 1167035 • Road Reserve (Arthur Kaine Drive) • Crown Land (i.e. land below the MHWM). **Section two** Section two of the outfall pipeline comprises the majority of the offshore portion of the proposed outfall pipeline. The pipeline would be laid on the sea bed, from where it emerges from underground at a point below the MHWM to the diffuser location, approximately 2.7 kilometres offshore. Sections of the pipeline would be located on Crown Land.
Construction areas (including golf course construction laydown, beach access and areas not already described in land parcels above)	Beach access area (above MHWM) and site of decommissioning existing beach-face outfall pipeline: • Lot 102 on DP 1201186 • Lot 356 on DP 41837 • Lot 7307 on DP1167035 • Lot 7917 on DP1187854 • Lot 7318 on DP1167151 • Lot 7019 on DP1122193. Beach access area (below MHWM): • Crown Land (i.e. land below the MHWM).

1.4 Secretary's Environmental Assessment Requirements (SEARs)

The Secretary of the Director General of the NSW Department of Planning, Industry and Environment (DPIE) issued revised Secretary's Environmental Assessment Requirements (SEARs) for the Project on 4 February 2019. Requirements relevant to Aboriginal heritage are reproduced below:

1. *The Proponent must identify and assess any direct and/or indirect impacts (including cumulative impacts) to the heritage significance of: (a) Aboriginal places and objects, as defined under the National Parks and Wildlife Act 1974 and in accordance with the principles and methods of assessment identified in the current guidelines; (b) Aboriginal places of heritage significance, as defined in the Standard Instrument – Principal Local Environmental Plan;*

3. *The EIS must identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the proposal and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test*

excavation. The investigation, assessment and reporting of Aboriginal cultural heritage values must be conducted in accordance with the current Code of Practice and Guide. Impacts on Aboriginal cultural heritage values are to be assessed and documented in the ACHAR. The ACHAR must demonstrate attempts to avoid impact on cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the ACHAR must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH.

4. *Consultation with Aboriginal people must be undertaken and documented in accordance with the current consultation requirements for proponents. The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the ACHAR.*

This ACHAR, which documents the results of AECOM's Aboriginal cultural heritage assessment for the Project, fulfils these requirements.

1.5 Assessment Objectives

The overarching objectives of this Aboriginal cultural heritage assessment were as follows:

- to identify the Aboriginal cultural heritage values of the Project area by way of background research, an archaeological field investigation and consultation with Registered Aboriginal Parties (RAPs);
- to assess the potential impact of the Project on the identified Aboriginal cultural heritage values of the Project area;
- to provide an appropriate management strategy to avoid or minimise potential harm to the identified Aboriginal cultural heritage values of the Project area; and
- to compile an ACHAR that will assist DPIE in their assessment of BVSC's SSI application.

1.6 Scope of Current Assessment

This assessment has been undertaken in accordance with Heritage NSW's *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011), *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a) and *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b). As such, its key requirements have been:

- to conduct a search of the Aboriginal Heritage Information Management System (AHIMS);
- to review the landscape context of the Project area, with specific consideration to its implications for past Aboriginal land use (and by extension, its Aboriginal archaeological record);
- to review relevant archaeological and ethnohistoric information for the Project area and environs;
- to prepare a predictive model for the Aboriginal archaeological record of the Project area;
- to undertake an archaeological field investigation;
- to identify, notify and register Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places in the Project area;
- to provide RAPs with information about the scope of the proposed works and Aboriginal heritage assessment process;
- to facilitate a process whereby RAPs can:
    - contribute culturally appropriate information to the proposed assessment methodology;
    - provide information that will enable the cultural significance of Aboriginal objects and/or places within the Project area to be determined; and
    - have input into the development of cultural heritage management options.

- to prepare and finalise an ACHAR with input from RAPs.

1.7 Project Team

Dr Andrew McLaren (Senior Heritage Specialist, AECOM) managed all aspects of the current assessment and authored this report. The archaeological field investigation detailed in Section 7.0 was undertaken by a combined field team of two AECOM archaeologists (Andrew McLaren and Luke Atkinson), one BVSC representative and three RAP field representatives, with RAP field personnel listed in Table 5 in Section 3.0. Technical and QA review of this report was undertaken by Geordie Oakes (Principal Heritage Specialist, AECOM) and Catherine Brady (Technical Director, AECOM) respectively.

Aboriginal community consultation for this assessment was undertaken in accordance with Heritage NSW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a). Full details of the consultation process undertaken are provided in Section 3.0. Aboriginal persons and organisations consulted as part of this assessment are listed in Table 3.

Table 3 Registered Aboriginal Parties for the current assessment

Organisation	Date of registration	Primary Contact Person
Cullendulla	6 April 2018	Corey Smith
Biamanga	6 April 2018	Seli Storer
Murramarang	6 April 2018	Roxanne Smith
Goobah	6 April 2018	Basil Smith
Bega Local Aboriginal Land Council	22 March 2018	Glenn Willcox
Eden Local Aboriginal Land Council	26 February 2018	BJ Cruse
Graham Moore (Individual)	22 March 2018	Graham Moore

1.8 Report Structure

This report contains eleven sections. This section - **Section 1.0** - has provided background information on the Project and assessment undertaken. The remainder of the report is structured as follows:

- **Section 2.0** outlines the statutory framework within which this assessment has been undertaken;
- **Section 3.0** details the Aboriginal community consultation program undertaken for this assessment;
- **Section 4.0** describes the existing environment of the Project area and its associated archaeological implications;
- **Section 5.0** describes the archaeological context of the Project area on a regional and local scale. Predictions regarding the nature of the Project area's Aboriginal archaeological record are also provided;
- **Section 6.0** summarises relevant ethnohistoric information for the Project area;
- **Section 7.0** describes the visual inspection component of the assessment;
- **Section 8.0** assess the archaeological (scientific) and cultural significance of land within the Project area;
- **Section 9.0** provides an assessment of the potential impacts of the Project on identified Aboriginal heritage values;
- **Section 10.0** details an appropriate management strategy for the identified Aboriginal heritage values of the Project area; and
- **Section 11.0** lists the references cited in-text.

FIGURE 1: PROJECT AREA

Legend

- Project area
- Project area (temporary construction area)

N

0 500 1,000 m

AECOM

Source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FIGURE 2: PROPOSED STP LAYOUT (INDICATIVE)

N 0 50 100 m

AECOM

Legend

- Project area
- Project area (temporary construction area)

Proposed Project Upgrades

- PAC dosing, UV disinfection, tertiary treatment
- Pump stations, storage, chlorine disinfection
- PAC dosing (second unit)
- Effluent storage pond to be decommissioned

Source: Nearmap, 2019

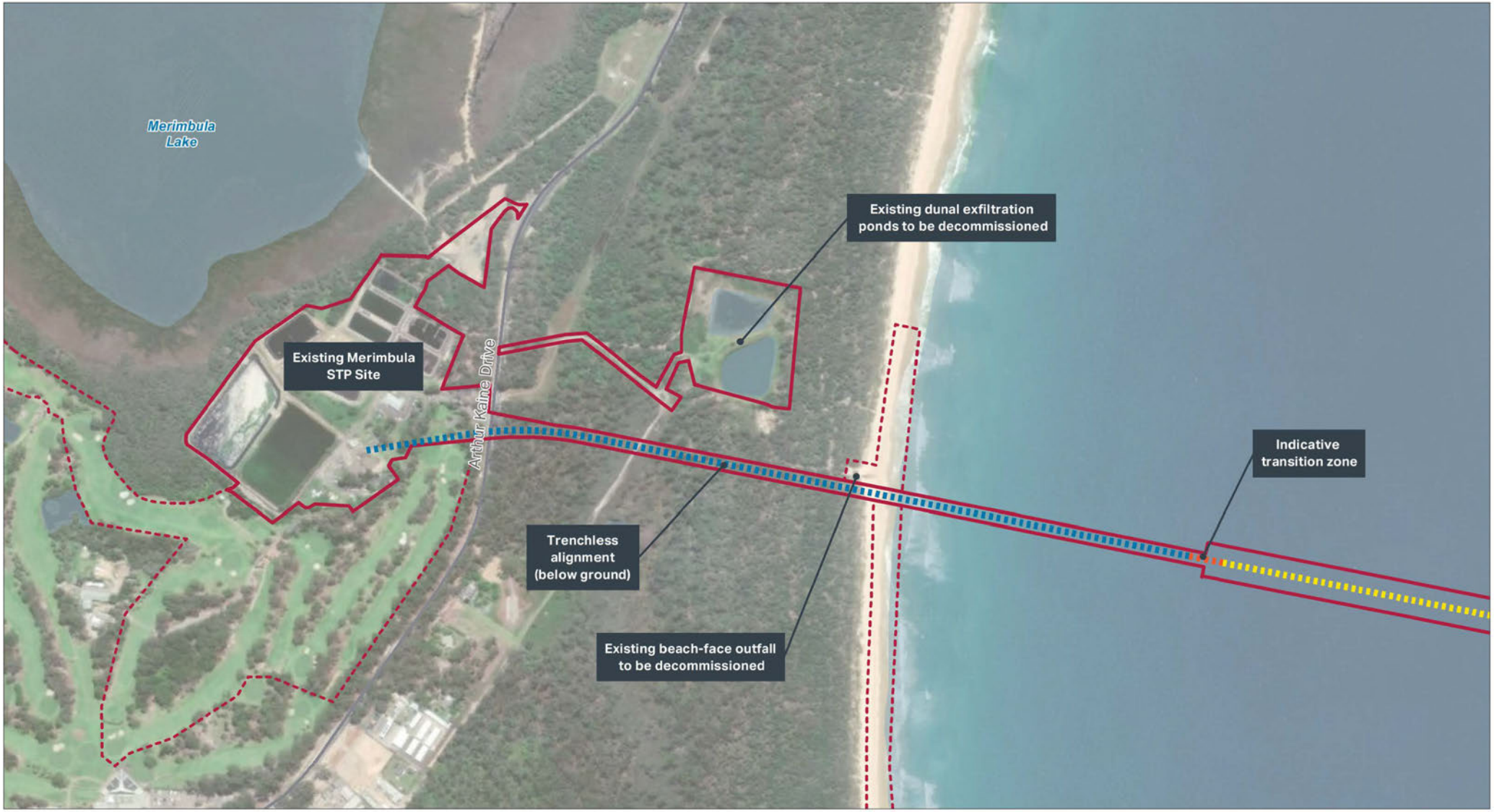

FIGURE 3: OCEAN OUTFALL PIPELINE - SECTION 1 (BELOW GROUND)

N

0 100 200 m

AECOM

Legend

- Project area
- Project area (temporary construction area)
- Outfall pipeline – Section 1 (below ground)
- Transition Zone
- Outfall pipeline – Section 2 (above seafloor)

FIGURE 4: OCEAN OUTFALL PIPELINE – SECTION 2 (ABOVE SEAFLOOR)

Legend

- Project area
- Project area (temporary construction area)
- Outfall pipeline – Section 1 (below ground)
- Transition Zone
- Outfall pipeline – Section 2 (above seafloor)
- Diffuser (above seafloor)

N

0 200 400 m

AECOM

Source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FIGURE 5: PROJECT AREA FOR THIS ABORIGINAL CULTURAL HERITAGE ASSESSMENT

N 0 250 500 m

AECOM

Source: Department of Customer Service, 2020; Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

Project Area

2.0 Applicable Policy and Legislation

2.1 Commonwealth Legislation

2.1.1 Aboriginal and Torres Strait Islander Protection Act 1984

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (the ATSIHP Act) provides for the preservation and protection of places, areas and objects of particular significance to Indigenous Australians. The stated purpose of the ATSIHP Act is the "preservation and protection from injury or desecration of areas and objects in Australia and in Australian waters, being areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition" (Part I, Section 4).

Under the Act, 'Aboriginal tradition' is defined as "*the body of traditions, observances, customs and beliefs of Aboriginals generally or of a particular community or group of Aboriginals, and includes any such traditions, observances, customs or beliefs relating to particular persons, areas, objects or relationships*" (Part I, Section 3). A 'significant Aboriginal area' is an area of land or water in Australia that is of "*particular significance to Aboriginals in accordance with Aboriginal tradition*" (Part I, Section 3). A 'significant Aboriginal object', meanwhile, refers to an object (including Aboriginal remains) of like significance.

For the purposes of the Act, an area or object is considered to have been be injured or desecrated if:

a. In the case of an area:
    i. it is used or treated in a manner inconsistent with Aboriginal tradition;
    ii. the use or significance of the area in accordance with Aboriginal tradition is adversely affected; and
    iii. passage through, or over, or entry upon, the area by any person occurs in a manner inconsistent with Aboriginal tradition

b. in the case of an object:
    i. it is used or treated in a manner inconsistent with Aboriginal tradition.

The ATSIHP Act can override state and territory laws in situations where a state or territory has approved an activity, but the Commonwealth Minister prevents the activity from occurring by making a declaration to protect an area or object. However, the Minister can only make a decision after receiving a legally valid application under the ATSIHP Act and, in the case of long term protection, after considering a report on the matter. Before making a declaration to protect an area or object in a state or territory, the Commonwealth Minister must consult the appropriate minister of that state or territory (Part 2, Section 13).

No declarations relevant to the proposal area have been made under the ATSIHP Act.

2.1.2 Native Title Act 1993

The *Native Title Act 1993* (NTA) provides for the recognition and protection of native title for Aboriginal peoples and Torres Strait Islanders. The NTA recognises native title for land over which native title has not been extinguished and where persons able to establish native title are able to prove continuous use, occupation or other classes of behaviour and actions consistent with a traditional cultural possession of those lands. It also makes provision for Indigenous Land Use Agreements (ILUA) to be formed as well as a framework for notification of Native Title Stakeholders for certain future acts on land where Native Title has not been extinguished.

Searches of the *National Native Title Register*, *Register of Native Title Claims* and *Register of Indigenous Land Use Agreements* were undertaken in January 2018 for the Bega Valley LGA. These searches returned no registered native title determinations but did identify one active registered Native Title claim: NC2017/003 - South Coast People. Reference to the accompanying map for this claim, provided in Appendix A, indicates that the Project area is situated wholly within the NC2017/003 claim area. The claim's associated register extract identifies NTSCORP Limited as the relevant contact entity for the claim group. NC2017/003 was registered on 31 January 2018.

As indicated in Section 3.3.1, formal notification of the Project and the current assessment was forwarded to NTSCORP on 26 February 2018. No response was received to this initial notification. A follow up notification, including a request for a formal response, was forwarded to NTSCORP on 29 May 2018. However, once again, no response was received.

2.1.3 Environment Protection and Biodiversity Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) took effect on 16 July 2000. Under Part 9 of the EPBC Act, any action that is likely to have a significant impact on a Matter of National Environmental Significance may only progress with approval of the Commonwealth Minister for the Environment. An action is defined as a project, development, undertaking, activity, series of activities, or alteration. An action will also require approval if:

- it is undertaken on Commonwealth land and will have or is likely to have a significant impact;
- it is undertaken outside Commonwealth land and will have or is likely to have a significant impact on the environment on Commonwealth land; and
- it is undertaken by the Commonwealth and will have or is likely to have a significant impact.

The EPBC Act defines 'environment' as incorporating both natural and cultural environments and therefore includes Aboriginal heritage. Under the Act, protected heritage items are listed on the National Heritage List (items of significance to the nation) or the Commonwealth Heritage List (items belonging to the Commonwealth or its agencies). These two lists replaced the Register of the National Estate (RNE), which was closed in 2007 and is no longer a statutory list. Statutory references to the RNE in the EPBC Act were removed on 19 February 2012. However, the RNE remains an archive of over 13,000 heritage places throughout Australia.

Searches of the National Heritage List, Commonwealth Heritage List and RNE were undertaken in September 2020, with no relevant Aboriginal heritage listings identified.

2.2 State Legislation

2.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act), administered by DPIE, requires that consideration be given to environmental impacts as part of the land use planning process in NSW. In NSW, environmental impacts are interpreted as including impacts to Aboriginal and non-Aboriginal (i.e., European) cultural heritage.

BVSC is seeking approval for the Project under Division 5.2 of the EP&A Act. The Project has been declared to be State Significant Infrastructure (SSI). Pursuant to Section 5.23 of the EP&A Act, Aboriginal Heritage Impact Permits (AHIPs) are not required for projects approved under Division 5.2 of Part 5 of the EP&A Act. Impacts to Aboriginal heritage values associated with approved SSI projects are typically managed under Aboriginal Cultural Heritage Management Plans (ACHMPs). ACHMPs are statutorily binding once approved by DPIE.

2.2.2 Aboriginal Land Rights Act 1983

The *Aboriginal Land Rights Act 1983* (ALR Act) was established to return land in NSW to Aboriginal peoples through a process of lodging claims for certain Crown lands. The Act, administrated by the NSW Department of Aboriginal Affairs, is a compensatory regime which recognises that land is of spiritual, social, cultural and economic importance to Aboriginal people.

The ALR Act establishes the NSW Aboriginal Land Council (NSWALC) and a network of over 120 autonomous Local Aboriginal Land Councils (LALCs) and requires these bodies to:

a. take action to protect the culture and heritage of Aboriginal persons in the LALC's area, subject to any other law; and

b. to promote awareness in the community of the culture and heritage of Aboriginal persons in the LALC's area.

LALCs constituted under the ALR Act can make claims. The Registrar of the ALR Act has responsibility for maintaining the Register of Aboriginal Land Claims under section 166 of the Act. All land claims that have been made since the Act came into force in 1983 have been recorded in the Register.

Consultation with the Registrar of the ALR Act in February 2018, undertaken as part of Stage 1 of the Aboriginal community consultation program for the current assessment, has indicated that the Project area does not have any Registered Aboriginal Owners pursuant to Division 3 of the ALR Act.

2.2.3 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act), administered by Heritage NSW, is the primary legislation for the protection of Aboriginal cultural heritage in NSW. The NPW Act gives the Secretary of the Department of the Premier and Cabinet (DPC) responsibility for the proper care, preservation and protection of 'Aboriginal objects' and 'Aboriginal places', defined under the Act as follows:

- an *Aboriginal object* is any deposit, object or material evidence (that is not a handicraft made for sale) relating to Aboriginal habitation of NSW, before or during the occupation of that area by persons of non-Aboriginal extraction (and includes Aboriginal remains); and
- an *Aboriginal place* is a place declared so by the Minister administering the NPW Act because the place is or was of special significance to Aboriginal culture. It may or may not contain Aboriginal objects.

Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm them and includes a 'strict liability offence' for such harm. A 'strict liability offence' does not require someone to know that it is an Aboriginal object or place they are causing harm to in order to be prosecuted. Defences against the 'strict liability offence' in the NPW Act include the carrying out of certain 'Low Impact Activities', prescribed in Clause 58 of the *National Parks and Wildlife Regulation 2019* (NPW Regulation), and the demonstration of due diligence.

An Aboriginal Heritage Impact Permit (AHIP) issued under Section 90 of the NPW Act is required if impacts to Aboriginal objects and/or places cannot be avoided. An AHIP is a defence to a prosecution for harming Aboriginal objects and places if the harm was authorised by the AHIP and the conditions of that AHIP were not contravened. Applications for AHIPs must be supported by an ACHAR compiled in accordance with Section 3 of Heritage NSW's *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and an Aboriginal Archaeological Report (AAR) compiled in accordance with Section 2.3 of Heritage NSW's *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b). A process of Aboriginal community consultation carried out accordance with Heritage NSW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a) must also be demonstrated. AHIPs may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons.

As indicated in Section 2.2.1, pursuant to Section 5.23 of the EP&A Act, AHIPs are not required for projects approved under Division 5.2 of Part 5 of the EP&A Act. Impacts to Aboriginal heritage values associated with approved SSI projects are typically managed under ACHMPs. ACHMPs are statutorily binding once approved by DPIE.

Section 89A of the NPW Act requires notification of the location of Aboriginal sites within a reasonable time, with penalties for non-notification. Section 89A is binding in all instances, including SSI projects.

2.3 Local Government

Clause 5.10 of the *Bega Valley Local Environmental Plan 2013* (Bega Valley LEP 2013) provides specific provisions for the protection of heritage items, heritage conservation areas, archaeological sites, Aboriginal objects and Aboriginal places of heritage significance within the Bega Valley LGA, defined in the LEP as follows:

- a *heritage item* means a building, work, place, relic, tree, object or archaeological site, the location and nature of which is described in Schedule 5 of the LEP;
- a *heritage conservation area* means an area of land of heritage significance:
  - shown on the Heritage Map as a heritage conservation area; and
  - the location and nature of which is described in Schedule 5 of the LEP; and
  - includes any heritage items situated on or within that area.
- an *Aboriginal object* means any deposit, object or other material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of an area of New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.
- an *Aboriginal place of heritage significance* means an area of land, the general location of which is identified in an Aboriginal heritage study adopted by the Council after public exhibition and that may be shown on the Heritage Map, that is:
  - the site of one or more Aboriginal objects or a place that has the physical remains of pre-European occupation by, or is of contemporary significance to, the Aboriginal people. It may (but need not) include items and remnants of the occupation of the land by Aboriginal people, such as burial places, engraving sites, rock art, midden deposits, scarred and sacred trees and sharpening grooves; or
  - a natural Aboriginal sacred site or other sacred feature. It includes natural features such as creeks or mountains of long-standing cultural significance, as well as initiation, ceremonial or story places or areas of more contemporary cultural significance.
- archaeological site means a place that contains one or more relics.

Under Section 2 of Clause 5.10 of the Bega Valley LEP 2013, development consent is required for any of the following:

a. demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):
   (i) a heritage item;
   (ii) an Aboriginal object;
   (iii) a building, work, relic or tree within a heritage conservation area;
b. altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item;
c. disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed;
d. disturbing or excavating an Aboriginal place of heritage significance;
e. erecting a building on land:

(i) on which a heritage item is located or that is within a heritage conservation area; or

(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance;

subdividing land:

(i) on which a heritage item is located or that is within a heritage conservation area; or

(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.

Schedule 5 of the Bega Valley LEP 2013 provides a list of heritage items, heritage conservation areas, archaeological sites and places of Aboriginal heritage significance within the Bega Valley LGA. There are no Aboriginal objects or places of Aboriginal heritage significance listed in this schedule that fall within the Project area.

As the Project is subject to the development consent provisions for SSI in accordance with Division 5.2 of Part 5 of the EP&A Act, the planning controls required by the Bega Valley LEP 2013 will not apply to the current Project.

3.0 Aboriginal Community Consultation

Aboriginal community consultation acknowledges the right of Aboriginal people to be involved, through direct participation, on matters that directly affect their heritage. Involving Aboriginal people in all facets of the assessment process ensures that they are given adequate opportunity to share information about cultural values, and to actively participate in the development of appropriate management and/or mitigations measures. The successful identification, assessment and management of Aboriginal cultural heritage values are dependent on an inclusive and transparent consultation process.

Aboriginal community consultation for the current assessment was undertaken in accordance with Heritage NSW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (the Consultation Requirements). The results of the consultation process undertaken are detailed below. A consultation log is provided as Appendix B.

3.1 Stage 1 - Notification and Registration

The aim of Stage 1 of the Consultation Requirements is to identify, notify and register Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places in the Project area.

3.1.1 Consultation with Regulatory Agencies

Section 4.1.2 of the Consultation Requirements stipulates that proponents are responsible for ascertaining, from reasonable sources of information, the names of Aboriginal people who may hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places. Proponents are required to compile a list of Aboriginal people who may have an interest for the proposed Project area and hold knowledge relevant to determining the cultural significance of Aboriginal objects and/or places by writing to:

a. the relevant regional office of the OEH;

b. the relevant LALC(s);

c. the Registrar, Aboriginal Land Rights Act 1983 for a list of Aboriginal owners;

d. the National Native Title Tribunal for a list of registered native title claimants, native title holders and registered Indigenous Land Use Agreements;

e. NTSCORP Limited;

f. The relevant local council(s); and

g. The relevant catchment management authorities for contact details of any established Aboriginal reference group.

In accordance with this requirement, the following agencies were contacted via letter or email on 26 February 2018 requesting information on relevant Aboriginal persons and organisations:

- OEH (former, now Heritage NSW);
- Eden LALC;
- Office of the Registrar, *Aboriginal Land Rights Act 1983* (NSW);
- The National Native Title Tribunal (NNTT);
- NTSCORP Limited;
- Bega Valley Shire Council; and
- South East Local Land Services (South East LLS).

Responses were received from three agencies and are attached as Appendix C:

- The NNTT responded on 26 February 2018 advising the results of searches of the *Schedule of Applications (unregistered claimant applications*), *Register of Native Title Claims*, *National Native Title Register*, *Register of Indigenous Land Use Agreements* and *Notified Indigenous Land Use Agreements*;
- OEH responded on 9 March 2018 providing a list of Aboriginal parties for the Bega Valley LGA; and
- The Office of the Registrar responded on 14 March 2018 advising the results of a search of the *Register of Aboriginal Owners.*

3.1.2 Public Notification

Section 4.1.3 of the Consultation Requirements requires that, in addition to writing to the Aboriginal people identified by the agencies listed in Section 3.1.1, the proponent must also place a notice in the local newspaper circulating in the general location of the proposed project. The notification must outline the project and identify its location.

In accordance with this requirement, a public notice was placed in the Merimbula News Weekly on 28 February 2018 (Appendix D). The closing date for registration via this notice was 15 March 2018, which provided the necessary minimum 14-day period for EOI.

3.1.3 Invitations for Expressions of Interest

Section 4.1.3 of the Consultation Requirements requires that proponents must write to the Aboriginal people whose names were obtained through the regulatory agencies and the relevant LALC(s) to notify them of the proposed project and invite them to register an interest in participating in a process of community consultation.

In accordance with this requirement, on 14 March 2018, a letter inviting expressions of interest and containing summary information on the Project was sent to all Aboriginal persons and organisations identified by the regulatory agencies. A draft of AECOM's assessment methodology was also included with this letter. A total of 28 Aboriginal individuals and organisations were invited to register an interest in being consulted. Eden LALC had already registered its interest in the Project but was sent a copy of the EOI letter and draft methodology regardless. The closing date for EOIs was 12 April 2018, which provided the necessary minimum 14-day period for registering interest.

By the closing date for EOI, seven organisations had registered an interest in the assessment. Summary information on all RAPs, including registration dates, is provided in Table 4.

Table 4 Registered Aboriginal Parties (RAPs) for the current assessment

Organisation	Date of registration	Primary Contact Person
Cullendulla	6 April 2018	Corey Smith
Biamanga	6 April 2018	Seli Storer
Murramarang	6 April 2018	Roxanne Smith
Goobah	6 April 2018	Basil Smith
Bega LALC	22 March 2018	Glenn Willcox
Eden LALC	26 February 2018	BJ Cruse
Graham Moore (Individual)	22 March 2018	Graham Moore

3.1.4 Notification of Registered Aboriginal Parties (RAPs)

Section 4.1.6 of the Consultation Requirements requires that the proponent make a record of the names of each Aboriginal person who registered an interest and provide a copy of that record, along with a copy of the EOI letter forwarded to the Aboriginal parties, to the relevant Heritage NSW regional office and LALC. Section 4.1.5 of the Consultation Requirements provides the opportunity for Aboriginal persons to withhold their details from being forwarded to these parties.

In accordance with these requirements, on 20 April 2018, a list of RAPs for the current assessment was forwarded to the relevant Heritage NSW regional office (South Branch, Queanbeyan) and the Eden LALC. A copy of the EOI letter sent out on 14 March 2018 was included in this correspondence. No parties requested that their contact details be withheld from OEH or Eden LALC.

3.2 Stage 2 - Presentation of Information about Project

The aim of Stage 2 of the Consultation Requirements is to provide RAPs with information about the scope of the proposed project and the proposed cultural heritage assessment process.

For the current assessment, presentation of information about the Project area and proposed development was provided to RAPs as part of the registration of interest process detailed in Section 3.1.3. Basic information on the proponent and Project was included in the EOI letter sent out on 14 March 2018, with more detailed information provided in the draft assessment methodology.

3.3 Stage 3 – Gathering Information about Cultural Significance

The aim of Stage 3 of the Consultation Requirements is to facilitate a process whereby RAPs can:

a. contribute to culturally appropriate information gathering and the assessment methodology;

b. provide information that will enable the cultural significance of Aboriginal objects and/or places on the proposed Project area to be determined; and

c. to have input into the development of any cultural heritage management measures.

For current assessment, consultation with RAPs regarding the cultural heritage values of the Project area included:

- a request with the EOI letter for any initial comments regarding the Aboriginal cultural heritage values of the Project area;
- discussion of cultural heritage values during fieldwork; and
- the provision of a draft report to all RAPs for comment prior to finalisation.

3.3.1 Registration of Interest

Information on the cultural values of the Project area and its environs was provided by one RAP as part of their registration of interest in the Project. In a telephone conversation with AECOM Principal Aboriginal Heritage Specialist Dr Andrew McLaren on 22 March 2018, Mr Graham Moore noted the following:

- the Merimbula Bay barrier / dune system contains numerous Aboriginal archaeological sites, many of which are unregistered and thus do not appear on the AHIMS database;
- the Project area contains previously recorded burials and scarred trees;
- one previously identified burial was located on a vehicle track and consisted of the top end or “head” of a humerus; and
- there are good historical records available for Aboriginal occupation of the far South Coast region, including the greater Merimbula-Pambula district.

3.3.2 Draft Survey Methodology

Sections 4.3.1 and 4.3.2 of the Consultation Requirements require that the proponent present and/or provide the proposed methodology for the cultural heritage assessment to RAPs and that RAPs be given a minimum of 28 days to review and provide feedback on this methodology.

All RAPs for the current assessment were provided with a draft of AECOM’s proposed assessment methodology (Appendix E) as part of the EOI package sent out 14 March 2018. The specified closing date for comments on the draft methodology was 14 April 2018, which provided the necessary minimum 28-day period for comment.

Written responses to the draft methodology were provided by four RAPs and are attached as Appendix F. All four RAPs indicated that they supported the draft methodology.

3.3.3 Archaeological Survey and Test Excavation Program

Two RAPs - Bega LALC and Eden LALC - were invited to participate in the archaeological field investigation detailed in Section 7.0. Both RAPs were notified, in writing, on 13 August 2018 (Appendix G). Ultimately, Bega LALC provided a single site officer for the works while Eden LALC provided two site officers. Site officers for both RAPs are listed in Table 5.

RAP field representatives involved in fieldwork identified the following social or cultural values for the Project area in conversations with AECOM field staff:

- newly identified shell midden sites Merimbula STP SM1 and Merimbula STP SM2 indicate visits to Merimbula Lake for shellfish collection;
- the landscape position of Merimbula STP SM1 and Merimbula STP SM2 suggest that people would have been seeking shelter from westerly winds blowing across Merimbula Lake;
- dunes within the Project area retain high potential for additional Aboriginal burial sites;
- areas of freshwater wetland within the Merimbula Barrier, including those within the Project area, would have been focal resource zones for Aboriginal people camping within the sand mass;
- elevated dune ridges providing ready access to the above would have been favoured camping locations;
- the concentration of flaked stone artefacts in TP6 (BH002C) indicates the presence of a large 'workshop' in this area;
- stones used for flaked stone artefact manufacture in the Project area are typical of the local area; and
- parts of the Merimbula Barrier sand mass were occupied by Aboriginal people into the early 20th century. This may have included portions the current Project area.

Table 5 RAP personnel involved in archaeological field investigation

RAP	Representative	Position
Bega LALC	Ron Thomas	Site officer
Eden LALC	BJ Cruse	Eden LALC Chairman
	Serina Maher	Site officer

3.4 Stage 4 - Review of Draft Assessment Report

The aim of Stage 4 of the Consultation Requirements is to prepare and finalise an ACHAR with input from RAPs.

In accordance with Section 4 of the Consultation Requirements, on 21 October 2020, a draft of this ACHAR was issued to RAPs for their review. The closing date for comments was 19 November 2020, which provided the required minimum 28 day period for review. .

Ultimately, two RAPs provided responses on the draft ACHAR. RAP responses are summarised in Table 6, with written responses provided in Appendix H.

Table 6 RAP responses to draft ACHAR

RAP	Representative	Date and type of response	Summary of response	AECOM response
Eden LALC	BJ Cruse	01/12/20 (verbal)	Eden LALC are satisfied with the report and the thoroughness of AECOM's assessment.	None required
Graham Moore	N/A (Individual)	2/12/20 (verbal & written)	Graham has advised that around 15 years ago highly fragmented human skeletal remains, representing an unknown number of Aboriginal burials, was identified on and directly adjacent to a former east-west trending vehicle track to the south of the dunal exfiltration ponds. Now disused and overgrown, public access to this track has been blocked, at its western end, by a large felled tree, which Graham advises was placed across the track as a protective measure for the remains. Graham has advised that, provided the access track containing the human remains is not impacted by any machinery, he is happy for the Project to proceed. Graham has also advised that previously recorded scarred tree 62-6-0475 is an Aboriginal scarred tree that has been subsequently modified by Europeans.	AECOM notes that no potential or definite human skeletal remains were identified on the track in question during the archaeological survey undertaken for this assessment. In addition, it is noted that the burial, or burials, has not been entered onto the AHIMS database. The above notwithstanding, AECOM notes that physical impacts to any human skeletal remains that may still exist on or immediately adjacent to the referenced vehicle track will be avoided through the creation of a dedicated 'no-go' zone (see Section 10.1.2). Regarding previously recorded scarred tree 62-6-0475, AECOM notes that, in view of RAP wishes, this tree is to be managed as an Aboriginal site. Protective fencing is proposed for this site.

4.0 Landscape Context

4.1 Physical Setting

As indicated in Section 1.3, the Project area for this assessment comprises the terrestrial component of the broader Merimbula STP and Ocean Outfall Site. Thus defined, the Project area encompasses the existing Merimbula STP and its associated exfiltration ponds, located to the east and west of Arthur Kaine Drive respectively, as well as parts of the Pambula-Merimbula Golf Course and broader Merimbula Bay Barrier, including a c.2.7 km long section of Merimbula Main Beach

The Project area, as shown on Figure 5, is located between the townships of Merimbula and Pambula, approximately 3.5 km to the south of Merimbula's CBD and 2.5 km north of Pambula's CBD. The Merimbula STP is bounded to the north and west by Merimbula Lake, to the south by the Pambula-Merimbula Golf Course and to the east by Arthur Kaine Drive. Merimbula Airport is located approximately 1 km to the north of the STP.

4.2 Geomorphology and Topography

The Project area cross cuts the central portion of the Merimbula Bay Barrier, a "stationary" or foredune ridge barrier (after Thom, 1983) of Holocene antiquity. The barrier, which extends over 6 km from the entrance to Lake Merimbula in the north to the entrance of the Pambula River in the south, is made up of three distinct geomorphic units, all of which are represented within the Project area. From east to west, these comprise a sandy beach unit (i.e., Merimbula Beach), a relatively narrow (<300 m) foredune unit and a backbarrier flat unit up to ~450 m wide. Stratigraphically, the barrier has been described as consisting of a thin wedge of near-shore shelly sand overlain by leached, well-sorted quartzose beach and dune sand (beach ridge facies) (Polach et al., 1979: 335). A single radiocarbon date of 5,530±85 BP (ANU-1404), obtained on a sample of shell hash recovered from the uppermost portion of the regressive near-shore shelly sand facies at a depth of 7 m below MSL, provides a *terminus post quem* for the accumulation of the overlying beach ridge facies (Figure 6).

In common with other stationary bay barriers along the NSW south coast, two major depositional phases have been inferred for Merimbula barrier complex. The first of these was associated with the Postglacial Marine Transgression (PMT) (*c.*10,000 to 6,000 years BP) and characterised by the vertical accumulation of transgressive beach facies, their gradual landward movement and the deposition of a relatively thick (~20 m) backbarrier sand facies through behind beach wash over processes. The second phase of barrier development commenced upon cessation of the PMT around 6,000 years BP. Thom (in Polach et al., 1979: 335) posits a reduction in backbarrier deposition during this phase and the vertical accumulation of the beach ridge facies. Progradation, if it occurred at all, has been placed at around 5,500 years BP, with the present shoreline position of the barrier dating from *c.*5,000 years BP (Thom in Polach et al., 1979: 353).

Several distinct topographic units can be distinguished within the Project area, with remnant (i.e., non-disturbed) components mapped on Figure 7. Landward of Merimbula Beach itself (Unit 1), the foredune component of the Merimbula Bay Barrier (Unit 2) incorporates a series of north-easterly to south-westerly trending parallel dune ridges with a maximum elevation of 10 m AHD, as well as lower-lying, roughly east-west oriented 'spur' or 'finger' dune ridges along its western edge. The foredune unit is bordered to the west by a backbarrier sand flat (Unit 3) with an elevation of around 4m AHD and maximum width of around 200 m. This flat gives way, in turn, to the eastern flank of a locally significant north-south trending ridgeline underlain by alluvial sands, grits and lacustrine clays of Tertiary antiquity (Unit 4). A major east-west trending spur associated with this ridgeline is occupied by the Merimbula STP, which itself abuts the south eastern fringe of Merimbula Lake, an intermediate, wave-dominated barrier estuary incorporating estuarine-plain deposits of Holocene antiquity (Unit 5). Gently inclined footslopes associated with another locally prominent ridgeline complex border Merimbula Lake to the south (Unit 6), with small section of alluvial plain (Unit 7) also represented.

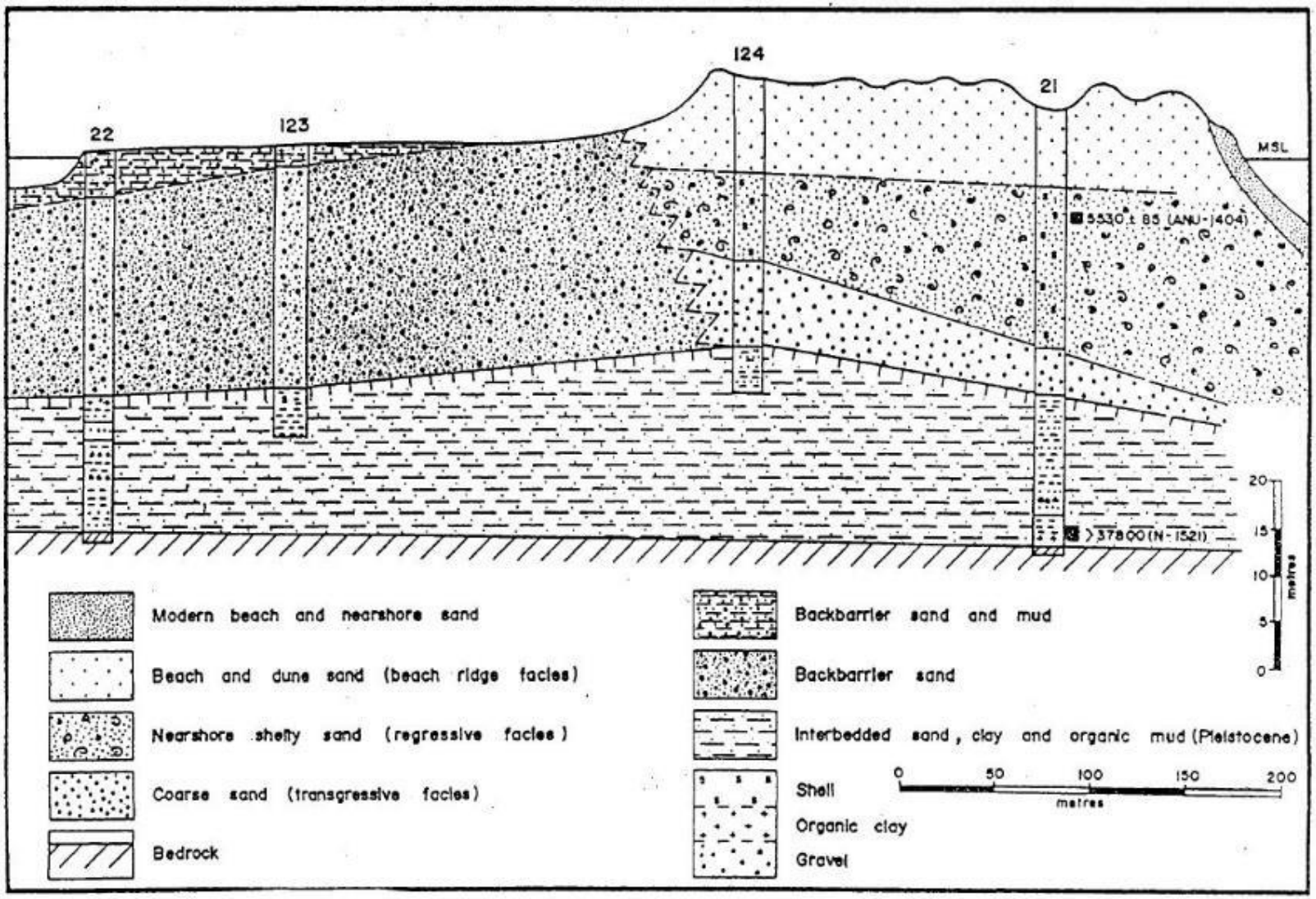

Figure 6 Sectional view of Merimbula Bay Barrier showing constituent geomorphic / sedimentary units (Source: Thom et al., 1978).

FIGURE 7: LANDFORMS

N 0 250 500 m

AECOM

Legend

- Project area
- Backbarrier flat
- Beach
- Disturbed
- Foredunes
- Tertiary ridgeline

4.3 Hydrology

Owing to highly permeable soils, there are no permanent or ephemeral freshwater creeks present within the Merimbula Bay Barrier sand mass. However, freshwater is available in low-lying, poorly-drained landform elements (e.g., flats, swales) therein. Consistent with available soil and vegetation datasets, as well as examined historical aerials, field observations indicate that such features are present within the current Project area, with the most significant occurring in the south central portion of the site within the backbarrier flat landform unit. Further inland, potable water would have been available from the freshwater reaches of watercourses such as the Pambula River, Millingandi Creek, Boggy Creek, Merimbula Creek and Bald Hills Creek.

The Project area, as noted above, is bordered to the west by Merimbula Lake, an intermediate, wave-dominated barrier estuary (after Roy et al., 2001) (Figure 8). The lake, whose entrance is permanently open to the ocean, has a total waterway area of around 450 ha and an average water level of *c*.0.2 m AHD. The Merimbula Lake catchment, which encompasses parts of several named watercourses, as well as parts of Yurammie State Forest and the South East Forests National Park, is approximately 4,300 ha in size. In 2009, around 60% of the lake's catchment was estimated to consist of largely-unmodified forested terrain, with rural and urban areas accounting for the remaining 40% at *c*.35% and *c*.5% respectively (Haines & Rollason, 2009: 6). Lake waters have been characterised as "generally similar" to ocean waters and are known, in combination with the lake's fringing mangrove, saltmarsh and seagrass communities, to support a diverse range of fish and shellfish species. Water quality is generally good, facilitating an active oyster-growing industry (Haines & Rollason, 2009: 11, 22-23).

Other locally significant water bodies include Pambula Lake and Back Lagoon, with the latter located on the northern fringe of Merimbula, approximately 4 km north-northeast of the Project area (Figure 9). Pambula Lake, like Merimbula Lake, comprises a wave-dominated barrier estuary with an open entrance. Back Lagoon, in contrast, has been classified as a semi-mature, intermittently-closed saline coastal lagoon (after Roy et al., 2001). Fed by Merimbula Creek, which flows into the western portion of the lagoon, Back Lagoon has a total waterway area of approximately 38 ha and is periodically connected to the open ocean, with the entrance either artificially or naturally opened approximately every six months and remaining so for up to one week (Borrell, 2013: 24).

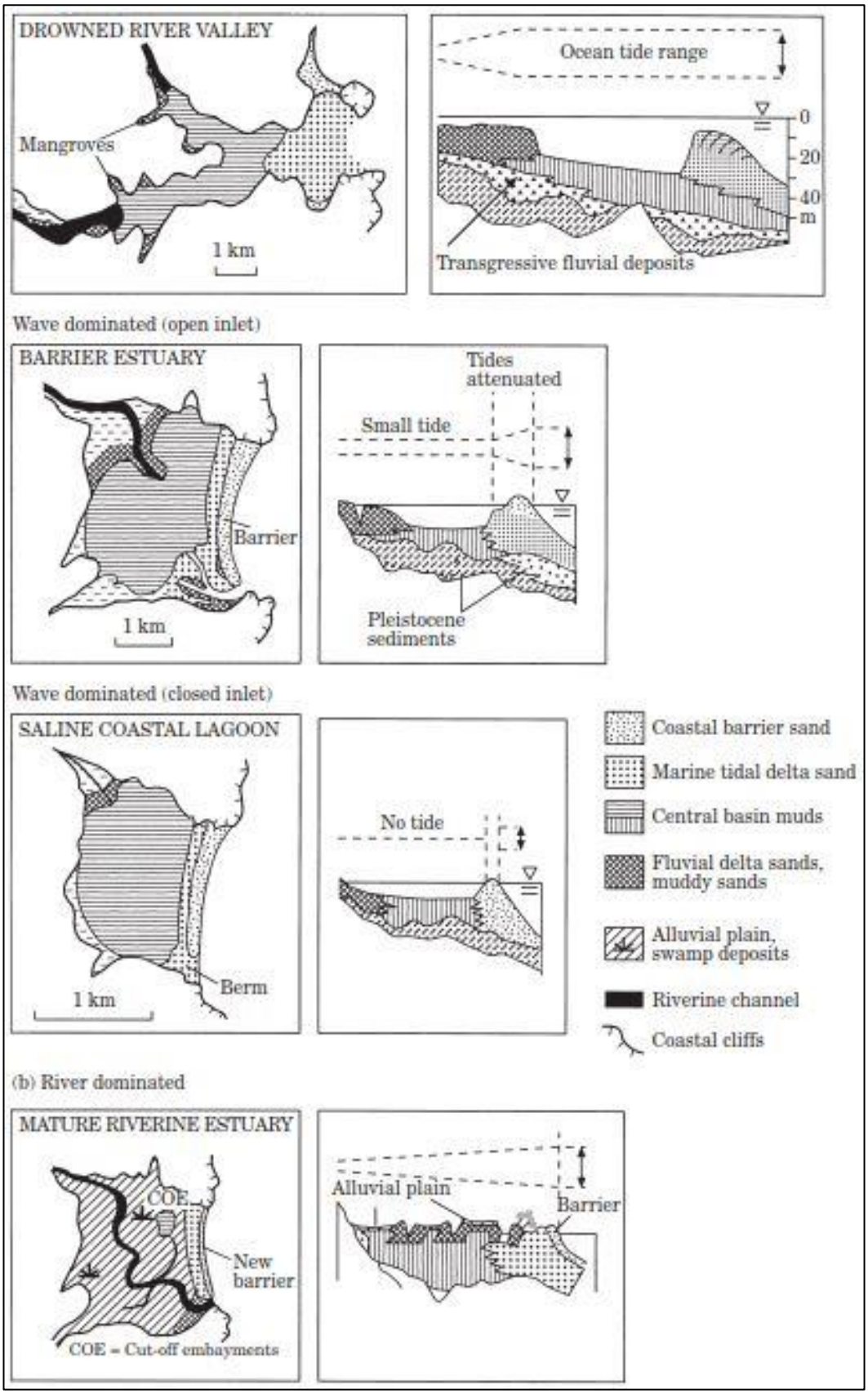

Figure 8 Three main estuary types in New South Wales showing idealised sediment distributions in plan and cross-section. Merimbula and Pambula Lakes, as indicated in-text, comprise intermediate, wave-dominated barrier estuaries, while Back Lagoon comprises a semi-mature, intermittently-closed saline coastal lagoon.

FIGURE 9: HYDROLOGY

N 0 1 2 km

AECOM

Legend

- Project area
- Water Body

4.4 Surface Geology

Available geological reference materials indicate that the surface geology of the Project area consists principally of marine barrier deposits of Holocene antiquity. Mapped coastal barrier units, shown on Figure 10, correspond to the extant barrier landforms of the Project area (i.e., beach, dune and backbarrier flat) and include Qhbb (marine sand, shell and gravel - beach), Qhbd (marine sand - dune) and Qhbf (marine sand, silt, clay, gravel and shell - backbarrier flat). Tertiary sediments belonging to the Tertiary Quandolo and/or Long Beach Formations described by Nott et al. (1991) are also represented within the Project area, occurring in association with the locally prominent ridgeline system in the western portion of the site, as are saline swamp deposits of Holocene antiquity (Qhes/Qheb). The latter, which are restricted to the westernmost portion of the site, adjacent to Merimbula Lake, include organic muds, peats, clays, silts, marine sands and fluvial sands.

Nott et al. (1991) describe the Quandolo Formation as being "composed of medium to coarse well indurated pink (5YR 8/3) sand, with numerous angular to subangular quartz clasts up to 10 cm long" and "[l]ayers well rounded poorly sorted boulders of Devonian sandstone, up to 1.5 m across their *b*-axis". The Long Beach Formation, in contrast, is described as being "significantly less indurated", with "a great deal of textural variation" (Nott et al., 1991: 362). The formation, Nott et al. (1991: 362) report, contains "clay and sand clay layers, 10-50 cm thick, interbedded with layers of fine to coarse sand which contain scattered angular to well-rounded quartz clasts up to 5 cm across their *b*-axis, and rare black quartzite clasts"

Existing archaeological data for the greater Merimbula-Pambula-Twofold Bay district indicate that Aboriginal people occupying this part of the far South Coast region utilised a diverse range of rock types for flaked and edge-ground stone tool manufacture. Nonetheless, quartz, silcrete and acid volcanics appear to have been the most commonly exploited materials. Reference to available geological reference materials, including the 1:250,000 Bega-Mallacoota and 1:25,000 Merimbula-Pambula geological map sheets, suggests that these and other rocks suitable for flaked stone artefact manufacture (e.g., basalt, quartzite, chert, petrified wood) could have been sourced within the district, occurring variously in primary (i.e., outcrop) and secondary (i.e., gravel bank) geological contexts. For quartz, mapped occurrences of the Tertiary Quandolo and Long Beach Formations can be identified as potentially significant sources of this raw material, as well as quartzite. Alongside Quaternary gravel deposits, knappable volcanic rocks such as basalt, rhyolite and porphyry, could potentially have been sourced from surface outcrops associated with the Boyd Volcanic Complex (Db), as could cherts associated with the undifferentiated Adaminaby Group (Oa).

In contrast to the Monaro Province to its west (see Lewis et al., 1994: 108), and other portions of the NSW south coast (e.g., the Bendalong-Ulladulla area, see Hughes et al., 1973), surface and/or subsurface outcrops of silcrete have not been reported within the Merimbula-Pambula-Twofold Bay district (see, for example, Lewis et al., 1994; Nott et al., 1991; Troedson & Hashimoto, 2008). Nonetheless, the presence of unmapped deposits remains a possibility, particularly in areas of "contact" between the volcanics of the Boyd Volcanic Complex (Db), the sandstones of the Late Devonian Merimbula Group (Dm) and Tertiary sediments (Ts). Alongside a range of other knappable rock types, the potential presence of silcrete clasts in the Quaternary gravel deposits of the district's major river, creek and lake systems is also noted[1].

[1] Sullivan's (1984: 10) reference to the availability of silcrete within 4 km of the Severs Beach midden is notable in this respect.

FIGURE 10: GEOLOGY

N 0 250 500 m

AECOM

Legend

- Project area
- Qav
- Qhas/Qhemd
- Qhbb
- Qhbd
- Qhbf
- Qhefw
- Qhemw
- Qhes/Qhbf
- Qhes/Qheb
- Qhs/Qhbf
- Ts (Tertiary Sediments)

Source: Department of Customer Service, 2020; Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

4.5 Soils

Soils within the Project area have been mapped by Tulau (1997) as belonging to Wallagoot Foredune (wf), Tathra variant c (tac), Pambula (pa), Kalaru (ka), Nelson Lagoon (nl) soil landscapes (Figure 11), with the wf and tac landscapes corresponding broadly to the mapped distribution of marine barrier deposits within the site, the pa and ka landscapes to that of the Tertiary Quandolo and/or Long Beach Formations and the nl landscape to that of the saline swamp of deposits of Merimbula Lake.

Soils of the wf soil landscape are associated with the foredunes of Merimbula Beach and comprise very deep (>3 m), well-drained Siliceous Sands. Topsoils comprise loose, speckled brownish grey sands and are typically very thin (≤5 cm). These overlie several metres of yellowish brown sands (C horizon). In areas of foredune retreat, buried A soil horizons can occur (Tulau, 1997:161). Locally, soils of the tac landscape occur in association with poorly drained flats and swales within the Merimbula Bay Barrier and comprise deep (>150 cm), imperfectly drained to poorly drained groundwater Podzols. Topsoils include loamy sands and sands and extend up to 15 cm below ground level (b.g.l). Seasonally high water tables are a defining characteristic of this landscape (Tulau, 1997:166).

Soils of the pa soil landscape mantle locally occurring rises and hills underlain by Tertiary fluvial sediments. Topsoils in crest, summit and slope contexts consist of loamy sands of variable colour (e.g., brownish black, brownish grey, yellow brown) extending up to 25 cm b.g.l. In drainage lines, a silty clay AB horizon is present from the surface and has a thickness of at least 80 cm (Tulau, 1997:46). Soils of the ka landscape, like those of the Pambula landscape, are associated with Tertiary fluvial sediments representing prior courses of the palaeo-Bega, Pambula and Yowaka Rivers (Tulau, 1997: 32). Topsoils include a black sandy loam (A_1), a yellow brown sand (A_{2e}) and a greyish yellowish brown silty loam (A_{2e}).

Soils of nl soil landscape occur on intertidal and supratidal flats adjacent to Merimbula Lake and comprise deep (>150 cm), very poorly drained Alluvial Soils and acid sulphate soils. Topsoils include fibric peats, light clays and sandy loams. Stratigraphic profiles are typically extremely complex. Described topsoil and subsoil units are underlain by layered gritty, shelly sands to clays (Tulau, 1997:150).

4.6 Flora and Fauna

Existing native vegetation mapping for the Project area and its environs indicates the presence of a variety of vegetation communities, with Tozer et al.'s (2010) Coastal Foredune Scrub (MU e61) and Coastal Sand Forest (MU p64) units particularly well represented. Other locally significant vegetation communities, in terms of areal extent or past Aboriginal land use, include the Coastal Freshwater Lagoon (MU p313), Eden Dry Shrub Forest (MU e47), Southeast Lowland Grassy Woodland (MU e20p229) and Estuarine Saltmarsh (MU p509) communities, with units p313 and p509 occurring in association with the Merimbula Bay Barrier's backbarrier sand flat and Merimbula Lake respectively.

Although available historical records provide only limited insight into Aboriginal exploitation of plants along the Far South Coast region (see, in particular, Attenbrow, 1976:58-60), it can be confidently asserted that the original vegetation communities of the project area and its environs will have supplied Aboriginal people camping within, or passing through this area with an extensive array of edible and otherwise useful plant species (Table 7). Extant native vegetation communities and locally occurring water bodies would likewise have supported a large and diverse range of economic terrestrial, aquatic and avian fauna. Historical evidence for Aboriginal peoples' use of the floral and faunal resources of the Far South Coast region is discussed in further detail in Section 6.4.

FIGURE 11: SOIL LANDSCAPE

N 0 250 500 m

AECOM

Legend

- Project area
- Jellat Jellat Flat
- Kalaru
- Kangarutha Point
- Milligandi
- Nelson Lagood
- Pambula
- Penooka Swamp
- Tathra - variant c
- Wallagoot Foredune
- Yellow Pinch
- Water Body

Source: Department of Customer Service, 2020; Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Table 7 Selection of economic plant species known to occur within the mapped native vegetation units of the Project area and its environs

Botanical name	Common name	Known / Potential Use(s)	Reference(s)
Acacia spp.	Acacia	Seeds & gum edible; wood suitable for making range of implements; bark & gum have medicinal properties	Stewart & Percival, 1997
Eucalypt spp.	Eucalypts	Bark has multiple uses (e.g., shelter, shields, baskets, fish nets); wood suitable for making range of implements (e.g., spears, clubs); leaves, gum & bark have medicinal properties	Stewart & Percival, 1997; Isaacs, 2002
Banksia spp.	Banksia	Nectar can be sucked from flowers or flowers soaked in water to make sweet liquid	Stewart & Percival 1997; Isaacs, 2002: 218
Leucopogon parviflorus	Coast beard-heath	Fruit edible	Coppin, 2008
Triglochin procera	Water ribbon	Small tubers on roots can be eaten raw or cooked	Isaacs, 2002: 229
Eleocharis sphacelata	Tall Spike-rush	Onion-shaped tubers edible fresh (young) or roasted (older)	Stewart & Percival, 1997
Rhagodia candolleana	Seaberry Saltbush	Small, dark red berries edible. Leaves can also be eaten.	Coppin 2008
Bursaria spinosa	Blackthorn	Nectar can be sucked from flowers	Isaacs, 2002: 219
Lomandra longifolia	Spiny-headed Matrush	Leaf bases and flowers edible; leaves can be used to make baskets	Stewart & Percival, 1997
Duboisia myoporoides	Corkwood	Alkaloid-rich sap can be drunk to produce stupor and can also be used as fish poison	Isaacs, 2002: 235
Dianella caerulea	Blue Flax Lily	Berries are edible	Stewart & Percival, 1997
Melaleuca ericifolia	Swamp paperbark	Nectar-filled flowers can be soaked in water to sweeten it; bark has multiple uses; (e.g., shelter, dressing for wounds, wrapping)	Stewart & Percival, 1997

Botanical name	Common name	Known / Potential Use(s)	Reference(s)
Pteridium esculentum	Bracken Fern	Rhizomes and fronds edible; rhizomes must be baked or roasted to destroy toxins; young stems can be rubbed on insect bites to relieve stinging/itching	Stewart & Percival, 1997
Typha orientalis	Cumbungi	Rhizomes edible after roasting; fibres can be used to make string; young shoots can be eaten raw; flower spikes can be steamed and eaten	Stewart & Percival, 1997
Phragmites australis	Common Reed	Roots edible; Straight flowering stems can be used as spear shafts; leaves can be twisted into rope	Zola & Gott, 1992: 12
Macrozamia communis	Burrawang	Nut edible after leaching and cooking	Isaacs, 2002: 225
Triglochin procerum	Water Ribbon	Tubers edible	Zola & Gott, 1992: 12
Themeda australis	Kangaroo Grass	Seeds edible (ground and baked as cakes); leaves and stems contain fibre that can be used to produce string	Zola & Gott, 1992: 58
Persoonia linearis	Narrow-leaved Geebung	Fruits edible	Stewart & Percival, 1997
Gahnia radula	Thatch Saw-sedge	Seeds can be pounded to produce flour; leaf bases are edible	Stewart & Percival, 1997
Panicum effusum	Hairy panic grass	Seeds edible (ground and baked)	Issacs, 2002: 226
Poa labillardierei	Tussock grass	Fibre from grass can be used to make string nets for nets, baskets and mats.	Zola & Gott, 1992: 58

4.7 European Land Use History

In 1797, Surgeon George Bass became the first European to formally explore the Far South Coast of NSW, voyaging along the region's coastline as part of his epic exploratory journey from Port Jackson to Westernport Bay in Victoria. It was during this initial voyage, on the 18th of December 1797, that Bass and his crew took shelter in the mouth of the Pambula River and subsequently explored its lower reaches, as well as Pambula Lake. Bass was clearly impressed by the natural beauty of the Pambula River, which he named Barmouth Creek, describing the lower part of the river in his journal as "one of the prettiest little harbours as to form that was perhaps ever seen" (Bass, 18 December 1797 in Bladen, 1895). Bass was similarly impressed by Twofold Bay, to the south of the Merimbula-Pambula district, venturing ashore here on his return journey and remarking in his journal that "…[t]he nautical advantages of this bay, notwithstanding the anchorage is but small, seem to be superior to any we

have been in" (Bass,16 February 1798 in Bladen, 1895). Accompanied by Lieutenant Matthew Flinders, Bass was to return to the Far South Coast the following year, voyaging once again along the region's coastline as part of an exploratory journey that would see the duo circumnavigate Tasmania. Notably, both men are reported to have shared a particular interest in the flora and fauna of Twofold Bay and its environs (Swinbourne & Morris, 2012: 2).

Bass and Flinders' early exploratory efforts aside, formal European settlement of the greater Merimbula-Pambula-Twofold Bay district can be traced to early 1800s, with Captain Thomas Raine establishing a shore-based whaling station at Twofold Bay in 1828. Raine was soon followed by brothers Peter, George and Alexander Imlay, who by 1835, had established whaling stations at two sites in Twofold Bay, as well as "Pamboola Station", close to present day Pambula. The Imlay brothers rapidly become the district's largest landholders, taking up multiple grazing runs that would ultimately encompass "most of the land from Broulee south, to, and beyond Twofold Bay, and west to the mountain escarpment" (Ferguson, 1971: 4). Utilising Twofold Bay as their port, the Imlays shipped cattle and sheep from their runs to various locations including Hobart, the penal settlement at Port Arthur and New Zealand (Higgins, 1982: 4). Pure-bred cattle and pedigreed horses were also imported. In 1839, then Commissioner of Crown Lands, John Lambie, described Pamboola Station as covering an area of seventeen square miles, with four slab huts, a stockyard and one hundred and fifty hectares of wheat and barley under cultivation (Higgins, 1982: 6).

Despite their initial successes, by the early 1840s, the Imlays' economic fortunes had greatly soured, with natural disasters, a downturn in the cattle market and a succession of poor seasons combining to put them deeply in debt. The Imlay's pastoral and agricultural interests were subsequently taken over by their financial backers, brothers James and William Walker, who in 1842 erected a homestead ("Oaklands") on what was formerly Pamboola Station. Alongside cattle rearing and grazing, the Walker brothers grew potatoes, wheat, maize, barley and oats and were also responsible for the establishment of boiling down works at Pambula, Merimbula and Eden (Ferguson, 1971: 6; Higgins, 1982: 9). Captain John Lloyd, a veteran of the Battle of Trafalgar, was another prominent local landholder around this time. In 1844, Lloyd received a grant of 300 acres on the southern side of Pambula River in lieu of retirement pay and had his homestead, "The Grange", built at the northern end of South Pambula Hill, overlooking the river's floodplain. In 1845, a road connecting Eden to the Monaro Plains was built and passed through the village of Pambula, which had been planned by Government Surveyor Thomas Townsend only two years earlier. At this time, the village, was located on flat, low-lying terrain (i.e., floodplain) closer to the Pambula River. However, a major flood in 1851 devastated then fledging village, which included a school (opened in 1849), and resulted in its re-establishment on higher ground to the north / northeast of its original position. Like the Imlays before them, the economic fortunes of the Walker brothers in the district were short-lived , with the duo selling their leases in 1852 to the newly established Twofold Bay Pastoral Association (Swinbourne & Morris, 2012: 3).

By the mid-1850s, the Twofold Bay Pastoral Association, which was made up of James, William and Eyde Manning, Thomas Mort, Edwin and Robert Lucas-Tooth and John Croft, owned vast acreage between Moruya and Eden and were producing wool, beef cattle and horses for multiple Australian and overseas markets (Swinbourne & Morris, 2012: 5). The present day township of Merimbula commenced its life around 1853 as a private village owned and operated by the Association. Members of the Association were responsible for the commissioning and construction, in 1855, of a wharf, stores and other facilities near the entrance to Merimbula Lake, as well as that of a substantial flour mill at Merimbula in 1858, which went on become to part of Munn's Maizena Works (from 1867) and later still, the Merimbula Co-operative Bacon Company's factory (from 1922) (Higgins, 1982: 13; Swinbourne & Morris, 2012: 7, 17, 29). The establishment of the Illawarra Steam Navigation Company, later renamed the Illawarra and South Coast Steam Company, can likewise be attributed to members of the Association (Swinbourne & Morris, 2012: 9). The cargo service operated by this company, Swinbourne and Morris (2012: 9) note, "provided essential access to Sydney markets for wool, building timber and railway sleepers, kegs of butter, rounds of cheese, sides of home-cured bacon, wattle bark, corn, beef cattle, livestock and passengers". Passenger accommodation, at least initially, was basic at best, with the Bega Gazette in 1880 describing it as "wretched" and reporting passengers as "complaining of the horrors of insects attracted by the livestock and loss of sleep for the incessant squealing of pigs" (Swinbourne & Morris (2012: 9).

The passing of the Crown Lands Acts in 1861 brought an end to the Twofold Bay Pastoral Association, which disbanded as a result, but also attracted new settlers to the Pambula and Merimbula areas. Around the same time, the Kiandra Gold Rush of 1859-1861 provided a boost to the economies of both villages, with large numbers of miners arriving by ship at Merimbula, stocking up on provisions and travelling inland to the goldfields (Swinbourne & Morris (2012: 7). In 1867, Munn's Maizena Works in Merimbula was producing approximately three tonnes of corn flour ("Munn's Maizena") per week, with the works soon becoming the village's primary employer and remaining so for approximately half a century (Swinbourne & Morris (2012:18). Merimbula's first dedicated schoolhouse was built five years later, in 1872. In 1875, the school had an enrolment of 39 children under the tutelage of John Morrison (Ferguson, 1971: 14). Morrison's tenure as Merimbula's school teacher was a somewhat rocky one, with the teacher experiencing interference and poor relationships with leading citizens, due largely to intermittent district-wide labour shortages which resulted in older pupils absenting themselves from classes or abandoning their education altogether to work full-time at Munn's Maizena Works (Swinbourne & Morris (2012:23-24).

Further development of the townships of Merimbula and Pambula followed the 1888 discovery of gold on ridges along the Yowaka River, which led to the establishment of the Mount Gahan goldfield and Mount Gahan Gold Mining Company. While most miners camped in tents on the goldfield, their need for food and equipment served the economies of both towns well (Higgins, 1982: 26). The establishment of the goldfield also resulted in the launching, in 1892, of the district's first newspaper. Known colloquially as "The Pambula Voice", the full title of the paper was "The Pambula Voice and Eden, Wyndham, Wolumla, Rocky Hall, Towamba and Merimbula Advocate" (Higgins, 1982: 27). Further social and/or economic developments in the closing decades of the 19th century included the formation of the Pambula Progress Association (1884), which lobbied intensively for the construction and maintenance of local transport infrastructure, the opening of a six-bed cottage hospital in Pambula in 1897, the emergence, from 1891, of a local oyster farming industry focused on the Pambula River and the formation of the Pambula Co-operative Creamery and Dairy Company in 1897.

Reference to earliest parish map available for the Merimbula area, prepared in 1885, indicates that land within the Project area comprised part of two Temporary Commons (R.23456 and R.15468), with the northern common (R.23456), demarcated in green on Figure 12, extending westward from Merimbula Beach to the eastern edge of Merimbula Lake, around the southern edge of the lake and northward, toward Boggy Creek, for around 2.5 km. Two north-south trending tracks are visible in the north-central portion of the Project area at this time, as is an isolated section of "reserved road". From c.1920, this reserved road formed part of the then Princes Highway (now Arthur Kaine Drive). The "Old Cemetery" mapped to the north of the Project area is also of note here. This cemetery is visible on all available parish maps up to 1942. However, consultation with the Merimbula-Imlay Historical Society in July 2018 has indicated that this cemetery was never gazetted and was likely never used. Local histories compiled by Ferguson (1971), Higgins (1982) and Swinbourne and Morris (2012) provide no further information on the cemetery.

The opening decades of the twentieth century saw the prosperity and populations of Pambula and Merimbula decline as a result of difficulties in the gold mining, dairying, maize and wattlebark industries. In Merimbula, the Merimbula Co-Operative Bacon Company, formed in 1922, replaced Munn's Maizena Works as the town's primary employer, with the fishing and oyster growing industries also important (Swinbourne & Morris (2012:27-38). Moving forward in time, to the 1960s, tourism emerged as one of Merimbula's key industries, assisted by the opening of the Merimbula Airport in 1959. Today, tourism remains one of the greater Merimbula and Pambula district's most important industries.

FIGURE 12: 1885 PARISH MAP

N 0 250 500 m

AECOM

Source: Department of Customer Service, 2020

Legend

Project area

4.8 Land Disturbance

Alongside field observations, historical aerial photographs provide an avenue for assessing the nature and extent of post-European settlement land use activities and ground disturbance across the Project area. Aerials from 1962 (Figure 13), 1971 (Figure 14), 1979 (Figure 15), 1989 (Figure 16) and 1994 (Figure 17), for example, indicate a range of activities and associated ground surface impacts. Those of particular note include:

- Native vegetation clearance;
- The construction pre-1962 of a *c.*30 m wide electricity easement parallel to Merimbula Beach;
- Sand mining activities (pre-1980);
- The construction and evolution of the Merimbula STP (including associated infrastructure items);
- Road construction;
- The construction of the Pambula-Merimbula Golf Course; and
- Light vehicle track construction / use.

To varying degrees, all of the above-cited land use activities and associated ground impacts are relevant to the survival, integrity and identification of Aboriginal archaeological evidence within the Project area. Key implications for the current archaeological investigation include:

- The probable destruction, in severely disturbed areas, of any pre-existing archaeological deposits;
- The disturbance of pre-existing archaeological deposits through both direct (eg, earthworks) and indirect (eg, erosion) means, resulting in a loss of archaeological integrity;
- A significantly reduced likelihood for the presence of culturally scarred trees;
- An increase, in areas affected by erosion, of archaeological site visibility.

Figure 18 comprises a land disturbance map for the Project area. Three levels of disturbance are recognised: low, moderate and high. Areas of highly disturbed terrain within the Project area are unlikely to retain evidence of past Aboriginal occupation in surface and subsurface contexts owing to the severity of past ground surface disturbances that have occurred within them. Areas of moderately disturbed terrain, in contrast, may retain such evidence. However, it is likely to have been disturbed to varying degrees. Any Aboriginal archaeological deposits present within areas of low disturbance are likely to exhibit a high degree of archaeological integrity.

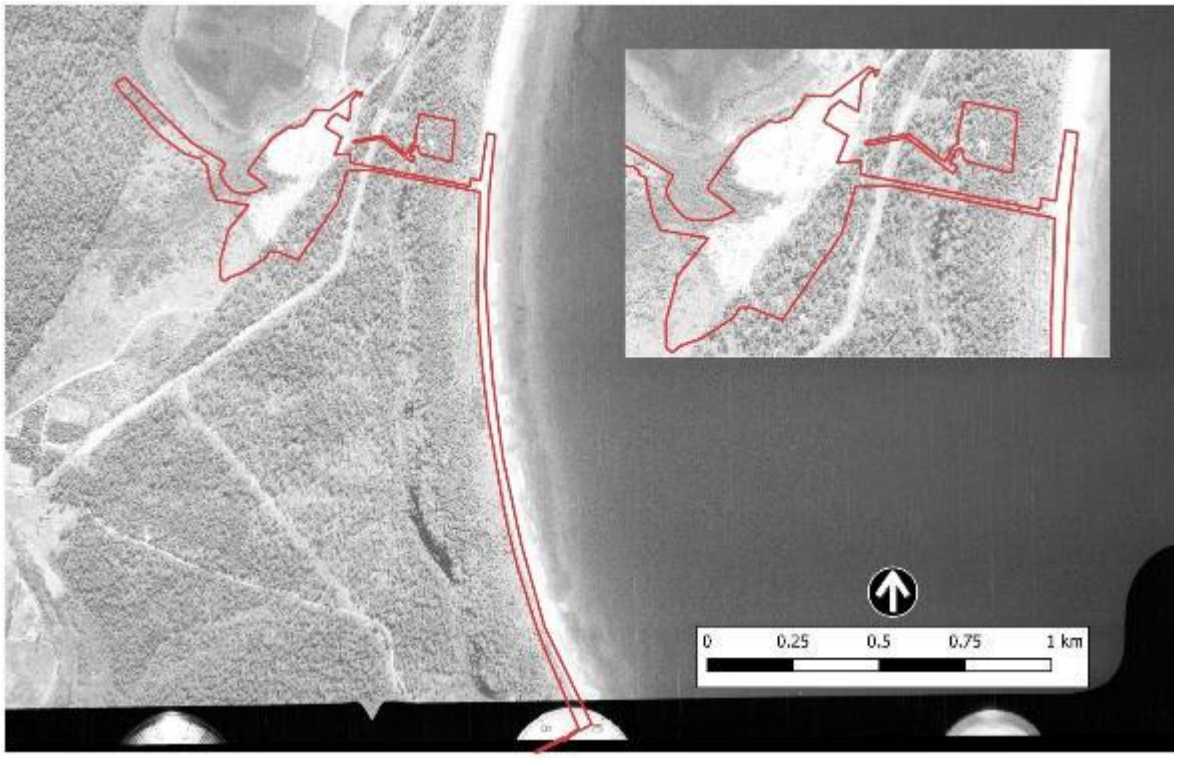

Figure 13 1962 aerial photograph of Project area (Source: NSW Spatial Services)

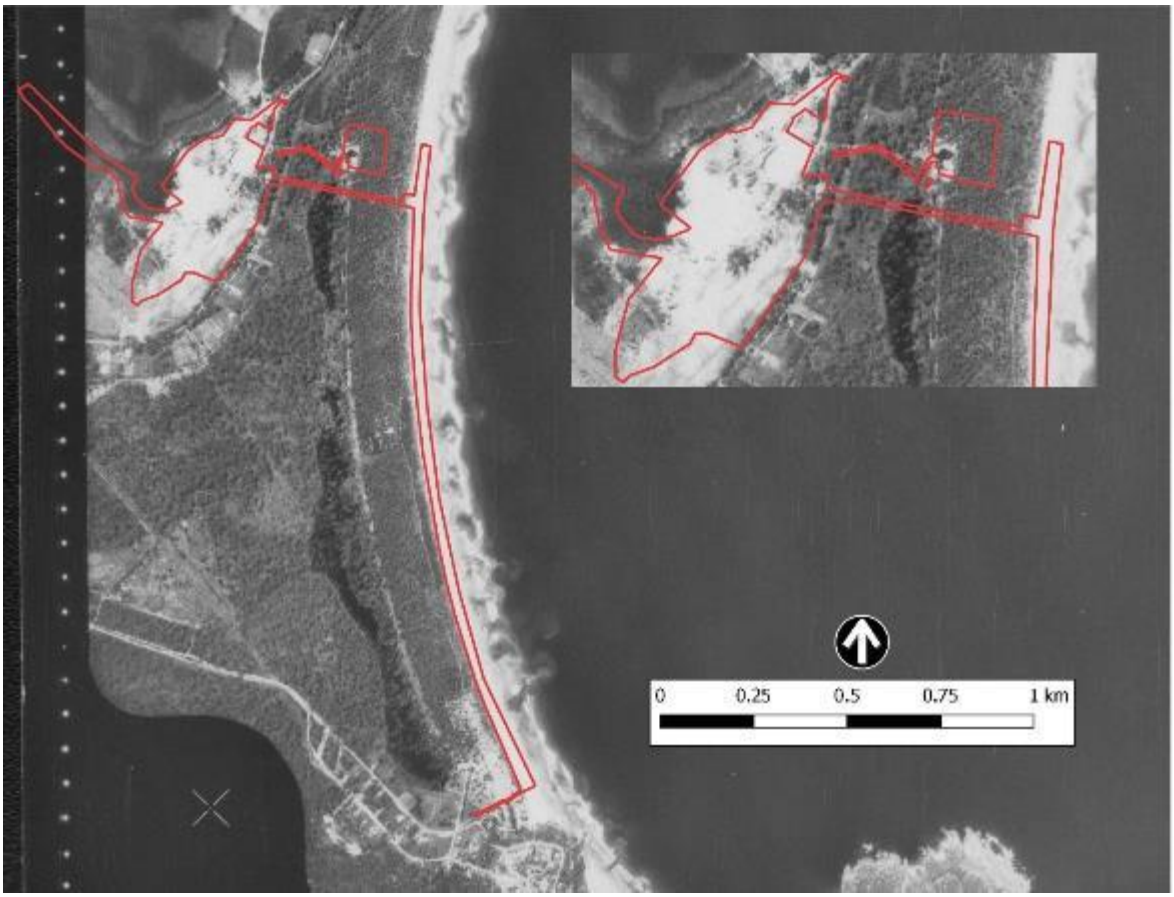

Figure 14 1971 aerial photograph of Project area (Source: NSW Spatial Services)

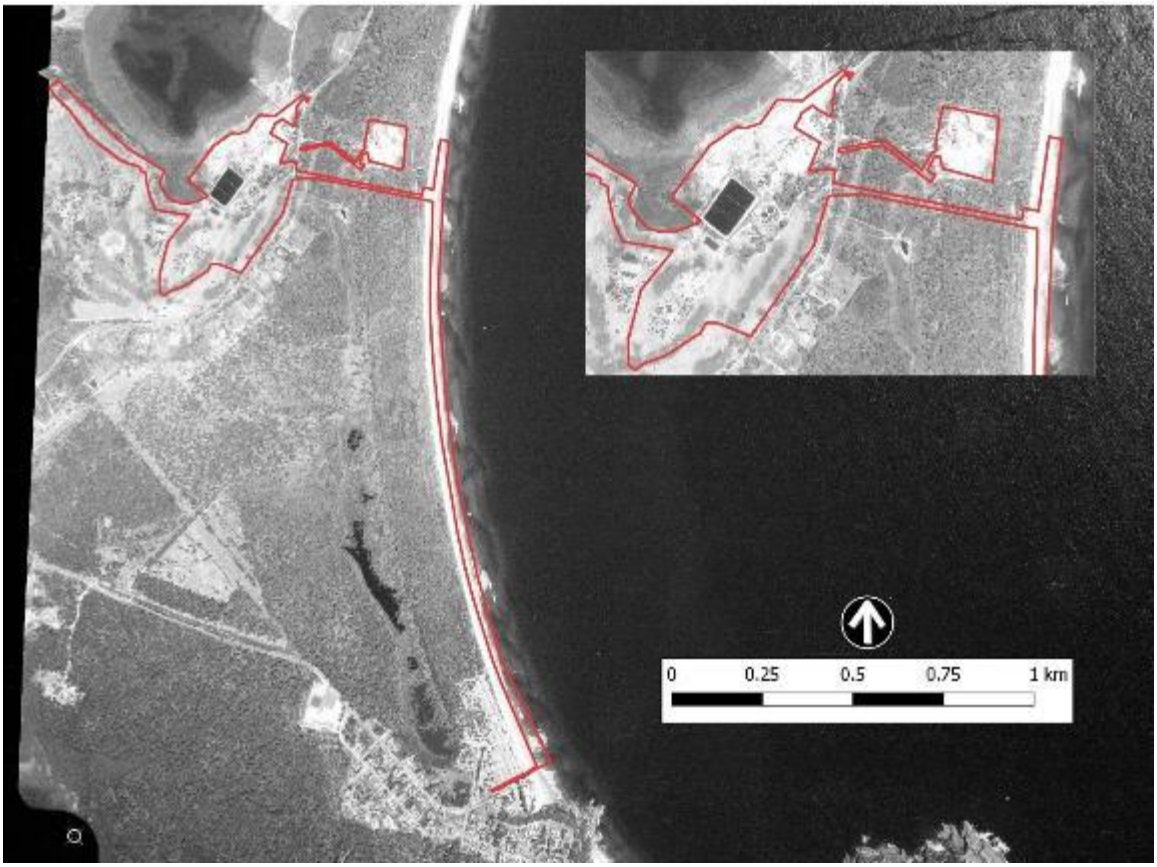

Figure 15 1979 aerial photograph of Project area (Source: NSW Spatial Services)

Figure 16 1989 aerial photograph of Project area (Source: NSW Spatial Services)

Figure 17 1994 aerial photograph of Project area (Source: NSW Spatial Services)

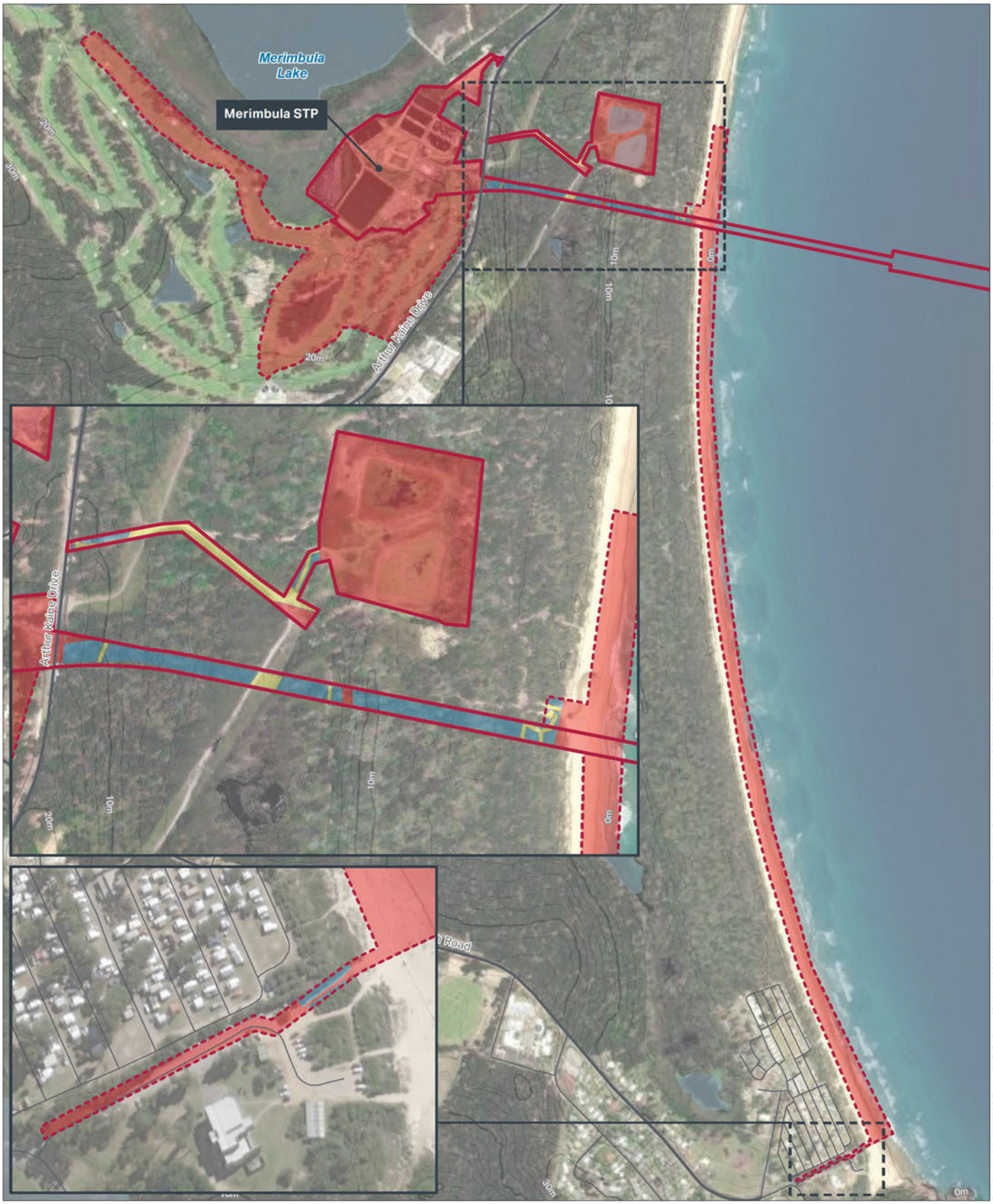

FIGURE 18: EXISTING AND HISTORICAL LAND DISTURBANCE WITHIN THE PROJECT AREA

N 0 250 500 m

AECOM

Legend

- Project area
- Project area (temporary construction area)

Land Disturbance

- High
- Moderate
- Low

Source: Department of Customer Service, 2020; Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

4.9 Key Observations

Key observations to be drawn from a review of the existing environment of the Project area are as follows:

- The Project area cross-cuts the central portion of the Merimbula Bay Barrier, a “stationary” or foredune ridge barrier of Holocene antiquity. The barrier, which extends over 6 km from the entrance to Lake Merimbula in the north to the Pambula River mouth in the south, is made up of three distinct geomorphic units, all of which are represented within the Project area. From east to west, these comprise a sandy beach unit (i.e., Merimbula Beach), a relatively narrow (<300 m) foredune unit and a backbarrier flat unit up to ~450 m wide.
- Stratigraphically, the barrier consists of a thin wedge of near-shore shelly sand overlain by leached, well-sorted quartzose beach and dune sand (beach ridge facies) (Polach et al., 1979: 335). A single radiocarbon date of 5,530±85 BP (ANU-1404), obtained on a sample of shell hash recovered from the uppermost portion of the regressive near-shore shelly sand facies at a depth of 7 m below MSL, provides a *terminus post quem* for the accumulation of the overlying beach ridge facies. Any Aboriginal archaeological materials present within this facies will thus be of mid-to-late Holocene antiquity.
- Owing to highly permeable soils, there are no permanent or ephemeral freshwater creeks present within the Merimbula Bay Barrier sand mass. However, freshwater is available in low-lying, poorly drained swales and flats therein. In keeping with available soil landscape and vegetation datasets, as well as examined historical aerials, field observations indicate that such features are present within the Project area, with the most significant occurring within the south-central portion of the site within the backbarrier flat landform unit.
- Available geological reference materials indicate that rocks suitable for flaked and/or ground stone artefact manufacture are available within the greater Merimbula-Pambula-Twofold Bay district, with Quaternary gravel deposits along major watercourses and the shorelines of Merimbula and Pambula Lakes comprising potentially significant sources.
- Prior to European settlement, the floral and faunal resources of the Project area and its environs would have been sufficient to facilitate intensive and/or repeated occupation by Aboriginal people.
- Areas of freshwater wetland within the Project area are likely to have been focal resource zones for Aboriginal people camping within, or travelling through, the Project area.
- Surface soil materials within the Project area are exclusively sandy in texture, with those associated with the Merimbula Bay Barrier’s foredune and backbarrier sand flat components particularly suitable for burials.
- Examination of historical aerial imagery for the Project area indicates a range of historical land use activities and associated ground surface impacts. While parts of the Project area have been severely disturbed through activities such as sand mining and the construction the Merimbula STP, a significant portion of the land within this area is assessed as retaining a high degree of ground integrity.

5.0 Archaeological Context

5.1 Introduction

This section describes the archaeological context of the Project area on a local and regional scale. Archaeological data of relevance to this area, including the results of previous surface and subsurface investigations within and surrounding the Project area, are reviewed for the purposes of developing a series of predictions regarding the nature of its associated Aboriginal archaeological record and contextualising the results of the survey and test excavation program detailed in Section 7.0

5.2 Regional Context - The NSW South Coast

Scientific interest in the Aboriginal archaeological record of the NSW South Coast can be traced to the late 19th century, with Anderson's (1890) investigation of coastal shell middens at Wagonga Inlet, near Narooma, and Pambula Lake, near Pambula, comprising one of the earliest studies of its kind in the state (Attenbrow, 1999). Academic and compliance-based archaeological investigations since this time have secured the South Coast's place as one of the most intensively investigated archaeological regions in Australia, with hundreds of Aboriginal archaeological investigations involving survey and/or excavation having now been undertaken across the region. Collectively, these studies have revealed a rich and diverse record of past Aboriginal occupation, with thousands of sites now registered on the AHIMS database. Published and unpublished studies to date have investigated numerous aspects of the Aboriginal prehistory of the region, with notable research themes including:

- prehistoric resource exploitation and mobility regimes (including dietary changes) (e.g., Attenbrow, 1976; Boot, 2002; Bowdler, 1970, 1976; Byrne, 1983; Colley, 1997; Lampert, 1966, 1971; Lampert & Steele, 1993; Mackay & White, 1987; Poiner, 1976; Sullivan, 1982, 1984, 1987);
- mid-to-late Holocene[2] socio-economic intensification and population change (e.g., Attenbrow, 2006; Boot, 1996, 2002; Hughes, 1977; Hughes & Lampert, 1982; Lampert & Hughes, 1974; Lourandos, 1997);
- offshore island use (e.g., Blackwell, 1982; Sullivan, 1982b);
- archaeological site location (e.g., Byrne, 1983; Boot, 2002; Sullivan, 1976); and
- flaked stone artefact technologies and raw material use (e.g., Boot, 2002; Hiscock, 1982; Hughes et al., 1973; McCarthy, 1943).

Available archaeological data indicate that Aboriginal people have occupied the South Coast region since the late Pleistocene (Boot, 1996b). However, few 'early' (i.e., late Pleistocene/early Holocene) sites are known. Documented examples include the Bass Point midden (Bowdler, 1970, 1976), near Wollongong, Murramarang Point (Hughes, 1977; Hughes & Lampert, 1982) and the rock shelter sites of Burrill Lake (Lampert, 1971), Bulee Brook 2 (Boot, 2002) and Bob's Cave (Boot, 2002). Compared with the late Pleistocene/early Holocene, archaeological evidence for mid-to-late Holocene Aboriginal occupation of the region abounds, with numerous excavated sites containing occupational evidence of this antiquity (e.g., Boot, 1996a, 2002; Bowdler, 1970; Hughes et al., 1984; Lampert, n.d., 1966, 1971; Lampert & Steele, 1993; Sullivan, 1984; Webb & Cane, 1986). In keeping with broader Australian developments (Lourandos, 1997; Ulm, 2013), the social and economic systems of Aboriginal groups occupying the South Coast region during the mid-to-late Holocene appear to have become increasingly complex, with researchers pointing to various structural changes in the archaeological record as evidence of this 'complexity'. Well documented examples include:

- increases in 'intensity of site occupation', as evidenced by increases in implement and sediment accumulation rates;

[2] Differing perspectives on the chronology and periodization of the Holocene amongst Australian archaeologists necessitate a note on our use of the term "mid-to-late Holocene". Here, we follow Hiscock's (2008: 162) chronological framework, which subdivides the Holocene as follows: 'early-' (6,000-10,000 BP), 'mid-' (3,000-6,000 BP) and 'late-' (0-3,000 BP).

- the emergence and/or proliferation of complex fishing and stone working technologies (e.g., hook and line fishing, backed artefacts); and
- offshore island use (e.g., Blackwell, 1982; Bowdler, 1976; Hughes & Lampert, 1982; Lampert & Hughes, 1974; Sullivan, 1982b, 1987).

For the South Coast, dramatic mid-to-late Holocene increases in implement and sediment accumulation rates at several sites have been linked by some researchers to population increase (e.g., Hughes & Lampert, 1982; Lampert & Hughes, 1974). However, the probable influence of other factors, such as changes in stone artefact technologies, has also been noted (e.g., Hiscock, 1981; see also Attenbrow, 2006; Hiscock, 2008)).

Shell middens dominate the Aboriginal archaeological record of the region's coastal zone, while open artefact sites (i.e., artefact scatters and isolated artefacts) dominate that of its hinterland zone. Other site types, such as scarred trees, quarries, fish traps, grinding grooves and burials are comparatively rare across the board. Located in both 'open' and 'closed' (i.e., rock shelter) contexts, excavated coastal shell midden deposits have varied significantly in size and composition, with the largest and most archaeologically complex examples to date occurring in environmentally-strategic locations adjacent to lakes, coastal rock platforms and estuaries. Associated archaeofaunal assemblages, meanwhile, attest to the exploitation, for food and tool manufacture, of a large and diverse suite of aquatic, avian and terrestrial fauna, with site-based assemblages indicating an emphasis on locally available resources. Together with those recovered from archaeological sites further inland (see Boot, 2002), these assemblages have been used to infer the existence of a generalised economy involving the exploitation of broad range of resources from multiple ecological zones (ANUTECH, 1986; Boot, 2002: 329-334; Sullivan, 1982, 1984).

Existing analyses of archaeological site distribution across the South Coast's coastal and hinterland zones (e.g., Boot, 2002; Sullivan, 1976, 1982a) have provided a range of insights into Aboriginal peoples' differential use of these zones. Along the coast, shell midden deposits have been identified in a variety of topographic contexts (e.g., headlands, river/creek banks, dunes, sand flats) with availability of food and accessibility of drinking water identified as key influences on the selection of campsites (Sullivan, 1976: 59). Foredunes behind sandy beaches adjacent to rock platforms appear have been favoured site locations, particularly those on the northern side of associated headlands. Sullivan (1976: 66) has characterised such areas as "a logical compromise between readily available shellfish, access to water which is often derived from drainage off the headland, sand to sit on and shelter from the prevailing winds". Further inland, Boot's (2002) analysis of archaeological site distribution across the region's hinterland zone has shown that, while all hinterland environments were utilised by Aboriginal people, high biodiversity woodlands and dry open forests in major river valleys were more intensively exploited than other ecological zones (Boot, 2002: 119). At the same time, areas of flat terrain therein, as well as on low altitude, broad, forested ridges, appear to have been favoured for sustained and/or repeated occupation.

Alongside associated radiometric dates, technological and typological data for the majority of excavated flaked stone artefact assemblages from the South Coast region suggest that these belong to the 'Australian small-tool tradition', a term coined by Gould (1969) to describe what was then thought to be the first appearance, in the mid-Holocene[3], of a new suite of flaked stone tool forms in the Aboriginal archaeological record of Australia, including backed artefacts, adzes and points. Complex, hierarchically-organised reduction sequences associated with the production of these tools contrast markedly with the simple sequences of earlier periods (Moore, 2011). Tools of the Australian small-tool tradition, it has been suggested, formed part of a portable, standardised and multifunctional tool kit aimed specifically at risk reduction (Hiscock, 1994, 2002, 2006). Stone artefact assemblages from late Pleistocene and early Holocene contexts, in contrast, are described by archaeologists as belonging to the 'Australian core tool and scraper tradition', a term first used by Bowler et al. (1970) to describe the Pleistocene assemblages recovered from Lake Mungo in western New South Wales. Bowler et al. (1970) saw the main components of these assemblages - core tools, steep-edged

[3] More recent research into the chronology of backed artefacts and points in Australia (e.g., Hiscock & Attenbrow 1998, 2004; Hiscock 1993b) has demonstrated a long history of production and use for these implement types, with backed artefacts, for example, now known to have been produced in the early Holocene and late Pleistocene as well (albeit in small numbers).

scrapers and flat scrapers - as characteristic of early Australian Aboriginal assemblages and as being of a distinctly different character to those associated with the proceeding small-tool tradition.

In south-eastern Australia, including the South Coast region, the Australian 'small-tool' and 'core tool and scraper' traditions are most commonly described in terms of McCarthy's (1967) Eastern Regional Sequence (ERS) of stone artefact assemblages. Based on appreciable changes in the composition of chipped stone artefact assemblages over time, the ERS hypothesises a three phase sequence of 'Capertian' (earliest), 'Bondaian' and 'Eloueran' (most recent) assemblages and was developed on the basis of McCarthy's (1948, 1964) pioneering analyses of stratified flaked stone assemblages from Lapstone Creek rock shelter, on the lower slopes of the Blue Mountains eastern escarpment, and Capertee 3 rock shelter in the Capertee Valley north of Lithgow. At present, the most widely cited characterisation of the ERS in south-eastern Australia is that of a four-phase sequence beginning with the Pre-Bondaian (McCarthy's 'Capertian') and moving successively through the Early, Middle and Late phases of the Bondaian, the last of which equates to McCarthy's (1967) Eloueran phase (Table 8). The tripartite division of the Bondaian is based principally on the presence/absence and relative abundance of backed artefacts (Attenbrow, 2010: 101). However, other factors, such as changes in the abundance of bipolar artefacts and different stone materials, as well as the presence/absence of edge-ground hatchet-heads are also relevant. While providing a useful chronological framework for archaeologists working in south-eastern Australia, it should be noted that, based as they are on archaeological datasets from different regions, published and unpublished versions of the sequence do differ with respect to the dating of individual phases, as well the relative frequencies of various diagnostic traits.

As in other regions of south-eastern Australia (e.g., Attenbrow, 2006, 2010; McDonald, 2008), various excavated assemblages from the NSW south coast attest to a shift, over time, in the relative significance of particular raw materials for flaked stone artefact manufacture, as well as the relative importance of both backed artefact manufacture and bipolar flaking (see, for example, Boot, 2002; Lampert, 1971; ANUTECH, 1986; Sullivan, 1984). Excavated flaked stone artefact assemblages from middens in the Pambula-Merimbula district (e.g., ANUTECH, 1986; Sullivan, 1984), for example, document a change, around 2000 years BP, from 'early' silcrete or rhyolite -dominated assemblages containing backed artefacts to 'later' quartz-dominated assemblages without these implements.

Table 8 McCarthy's (1967) Eastern Regional Sequence (ESR) of stone artefact assemblages, as proposed by McDonald (2008) for the adjoining Sydney region

Current phasing	McCarthy's (1967) Phasing	Approximate date range	Backed artefact frequency	Bipolar artefacts	Edge-ground hatchet heads	Silicified tuff predom.	Silcrete and/or quartz predom.
Pre-Bondaian	Capertian	30,000-8,000 BP	Absent	Rare	Absent	Yes	No
Early Bondaian	Bondaian	8,000-4,000 BP	Very low	Rare	Absent	No	Yes
Middle Bondaian		4,000-1,000 BP	Very high	Increasingly common	Present	No	Yes
Late Bondaian	Eloueran	1,000 BP to European contact	Low	Very common	Present	No	Yes

5.3 Local Context

5.3.1 AHIMS Database

The AHIMS database, administered by Heritage NSW, contains records of all Aboriginal objects reported to the Director General of the Department of Premier and Cabinet in accordance with Section 89A of the National Parks and Wildlife (NPW) Act. It also contains information about Aboriginal places, which have been declared by the Minister to have special significance with respect to Aboriginal culture. Previously recorded Aboriginal objects and declared Aboriginal places are known as 'Aboriginal sites'.

Searches of the AHIMS database on 2 August 2021 for a 15 x 15 km area centred on the Project area (AHIMS search area) returned 176 non-restricted site entries[4] (Appendix I). As indicated in Table 9, shell middens are the dominant site type within the AHIMS search area, accounting for 55.7% of registered sites (n = 98). However, open artefact sites (i.e., artefact scatters and isolated finds) are also well represented (n = 61, 34.7%). Other, less common site types include five scarred trees, five burials, three areas of Potential Archaeological Deposit (PAD), two rockshelters, one fish trap and a single grinding groove site.

Excluding new sites identified as part of the current assessment (n = 4, see Table 24 in Section 7.5), consideration of the location of previously recorded sites, including associated site cards and reports, indicates that two registered sites - open artefact site 62-6-0133 and burial site 62-6-0173 - are located either wholly (62-6-0133) or partially (62-6-0173) within the Project area (refer to Figure 19and Figure 31). An additional two sites - scarred tree 62-6-0475 and artefact scatter 62-6-0788 - are located within 50 metres of the Project area. Summary information on these four sites is provided in Table 10, with site locations shown on Figure 19and Figure 31. Associated site cards, meanwhile, are provided in Appendix J. All four sites are listed on the AHIMS database as 'Valid'. However, it is noted that a review of the site card for open artefact site 62-6-0133 indicates that this site should, in fact, be listed as 'Destroyed', with the two flaked stone artefacts comprising this site collected in 1979. Registration of the site was completed in 1983, four years after this collection.

Attention is also drawn to the fact that the AHIMS registered coordinates for burial site 62-6-0173 and scarred tree 62-6-0475 are incorrect, with field observations and a review of associated site cards placing these sites at the coordinates provided in Table 10 and locations shown on Figure 19and Figure 31 .

Table 9 AHIMS search results

Site type	Number	%
Shell midden	98	55.7
Open artefact site	61	34.7
Scarred tree	5	2.8
Burial	5	2.8
PAD	3	1.7
Rockshelter	2	1.1
Fish trap	1	0.6
Grinding groove(s)	1	0.6
Total	**176**	**100**

[4] Consultation with the AHIMS Registrar in December 2018 confirmed that the four 'Restricted' sites present within the AHIMS search area are not located within or directly adjacent to the Project area.

Table 10 AHIMS registered Aboriginal sites within and directly adjacent to the Project area

AHIMS #	AHIMS Site Name	AHIMS centroid coordinates		Correct centroid coordinates (AECOM, 2021)		Site type	AHIMS Status	Correct status (as at 2021)	Site Description[3]	Location relative to Project area
		MGAE	MGAN	MGAE	MGAN					
62-6-0173	Merimbula Treatment Works	758455	5910289	758509	5910192	Burials	Valid	Valid	Three clusters of highly decayed and fragmented bone, potentially representing three individual internments, identified on the south-eastern edge of extant sand pit (Plate 1). The clusters were noted to "lie some 2 to 3 m below the presumed original surface of the quarry" and were found over a distance of approximately 11 metres (ANUTECH, 1988: 7). The remains, which were believed to have eroded out of the wall of the quarry, were described as "barely recognizable due to their advanced state of decay" (ANUTECH, 1988" 6) (Plate 2). However, one fragment was identified as a portion of the frontal bone from the supra-orbital region, possibly from a fully mature female or adolescent. A scatter of flaked stone artefacts, consisting of a quartz cores and flakes of chalcedony and quartz, was identified in the vicinity, occurring on the upper margins of the south-eastern rim of the sand pit. Additional stone artefacts were observed along the northern and eastern margins of the pit. Isolated fragments of Anadara and Mud Whelk shell were likewise noted during survey. However, no midden deposits were observed.	Partially within

AHIMS #	AHIMS Site Name	AHIMS centroid coordinates		Correct centroid coordinates (AECOM, 2021)		Site type	AHIMS Status	Correct status (as at 2021)	Site Description[3]	Location relative to Project area
		MGAE	MGAN	MGAE	MGAN					
62-6-0133	Merimbula Bay	758405	5910289	-	-	Artefact scatter	Valid	Destroyed	In 1979, two backed artefacts, including one described as a “trimmed Bondi point”, were collected from the existing sand quarry in this area. This collection was undertaken by Kay Margus of the NSW NPWS, with the site subsequently registered by archaeologist Marjorie Sullivan in 1983.	Wholly within
62-6-0475	Merimbula Crown Lands Sand Pit	758305	5910389	758288	5910304	Scarred tree	Valid	Valid	This modified tree was recorded in July 2000 by representatives from the NSW NPWS and Eden LALC. At the time, the tree was interpreted as having a scar caused by Aboriginal cultural modification, with a European survey mark later added to it. Some uncertainty was attached to the site, however, as it was noted that there were two more trees in the surrounding area with similar scars, both of which were identified as potential European survey marks.	Outside
62-6-0788	Arthur Kaine Scatter	223651	5909895	223651	5909895	Artefact scatter	Valid	Valid	Large artefact scatter including cores, flakes, blades, flaked pieces and grinding stones. Artefacts observed eroding out of the eastern side of Arthur Kaine Drive, opposite the Merimbula STP. Site extent listed on site card as 100 m (L) by 10 m (W).	Outside

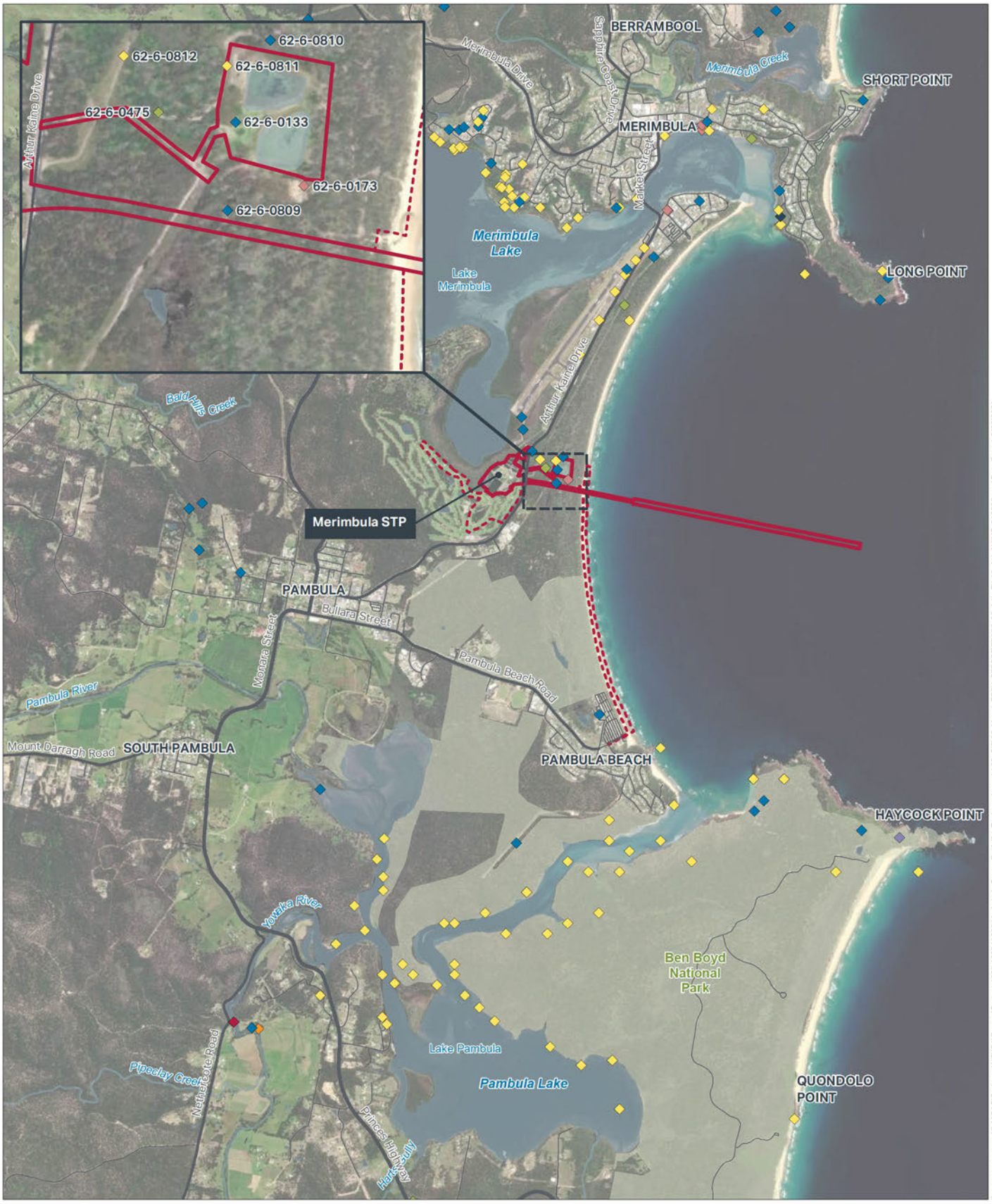

FIGURE 19: ABORIGINAL HERITAGE INFORMATION MANAGEMENT SYSTEM REGISTERED SITES

N 0 1 2 km

AECOM

Legend

- Project area
- Project area (temporary construction area)

Aboriginal Heritage Information Management System (AHIMS)

- Burial
- Fish trap
- Grinding groove(s)
- Midden
- Open artefact site
- Potential Archealogical Deposit (PAD)
- Rockshelter
- Scarred tree

Source: Department of Customer Service, 2020; Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Plate 1 Sand quarry viewed towards the southeast with location of burials indicated by "x" (from ANUTECH, 1988)

Plate 2 Close up of the most intact bone cluster identified during survey (from ANUTECH, 1988)

5.3.2 Previous Aboriginal Archaeological Investigations

Available archaeological data, including the results of the AHIMS database search detailed in Section 5.3.1, indicate that numerous Aboriginal archaeological investigations have been carried out in the greater Merimbula-Pambula district over the past four decades. Investigations to date, the majority of which have been undertaken as part of larger environmental assessments linked to residential and commercial development projects, have included both surveys and subsurface investigations, with notable examples of the latter including those carried out by ANUTECH (1986), Dibden (2006, 2007), Kuskie (1995, 2004, 2005), Kuskie & Webster (2001), Oakley (2004), Sullivan (1982, 1984), Wheeler et al. (2003) and Wilcox & Barber (2014).

As for the Project area itself, to date, physical investigation of the Aboriginal archaeological record of this area has been limited to survey, with land surrounding the exfiltration ponds in the eastern portion of the Project area surveyed as part of compliance-based Aboriginal heritage assessments linked to historical sand mining activities and STP upgrades (ANUTECH, 1988; Byrne & Brayshaw, 1983). For contextual purposes, the results of these investigations, as well as several others undertaken in the greater Merimbula-Pambula area, are summarised in Table 11.

Viewed collectively, the results of previous surface and subsurface investigations within the greater Merimbula-Pambula district indicate a pattern of past Aboriginal occupation and land use generally consistent with that of the coastal portion of the South Coast region as a whole. Shell middens are the dominant site type in this area, with recorded examples varying significantly in size and contents and occurring in a variety of topographic contexts. Excavated examples indicate a generalised or mixed subsistence economy, albeit one with a strong economic focus on the rich estuarine resources of Merimbula and Pambula Lakes, as well as the Pambula River (see, in particular, ANUTECH, 1986; Sullivan, 1984). Associated flaked stone artefact assemblages, meanwhile, attest to an emphasis on the procurement, reduction and use of locally available quartz, silcrete and rhyolite, as well as change over time in the stone artefact technologies employed by Aboriginal people occupying this area.

Table 11 Previous Aboriginal archaeological investigations

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
M.Sullivan	1978	PhD research project	Test excavation	c.3km, south	Test excavation of shell midden at Severs Beach, Pambula River estuary. Single trench, measuring 1 x 0.5 m, excavated in area of mounded shell midden > 1m deep. Trench excavated to bedrock at 1.2 m. Single 25cm^2 column sample collected for detailed laboratory analysis. Deposit divided in 'upper', 'middle' and 'lower' midden on basis of observed shell content. Upper midden (Spit 1-8), which accumulated between 1200 years BP and European contact, dominated by shells of the *Mytilus planulatus* (edible mussel), with a very low proportion of *Trichomya hirsutus* (hairy mussel) also present. Middle midden (spits 9-14), which accumulated between 2300 and 1200 years BP, made of shells of *Trichomya hirsutus* and *Ostrea angasi* (mud oyster). Lower midden, which accumulated between 300 and 2300 years BP, dominated by *Ostrea angasi.* Fragmented bones of various fish, land mammals birds and sea mammals also present throughout the deposit. Four bone tools, including a ground and polished spatulate point made on a wallaby tibia, recovered during excavation. Flaked stone artefact assemblage from lowest spits (spit-16-18), which included six backed artefacts, argued to be "typical of the Bondaian tradition" (Sullivan, 1984: 11). Bondaian 'industry' based on silcrete and other fine-grained siliceous rocks, including acid volcanics. A "less distinctive technology" based principally on quartz evident from around 1900 years BP (Sullivan, 1984: 11). Changes in stone artefact technology at this time not accompanied by changes in the main species of shell fish collected, which occurred at about 2300 years BP. At this time, there was a change from the exploitation of mainly mud oyster to increased exploitation of hairy mussel. From c.1200 years BP, there was another change, to the predominant exploitation of edible mussel. This change also coincided with the taking of a wider range of fish. Changes in shellfish exploitation at site linked to the introduction of shell fish hooks and a change in	Sullivan, 1982a, 1984

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					women's food collection strategies; specifically, an increased emphasis on line fishing (Sullivan, 1984:12).	
M.Sullivan	1980	PhD research project	Survey	c.3km, south	Pedestrian survey of the banks of the Pambula river estuary, the primary aim of which was to re-investigate a series of middens initially identified in 1890 by Geological Surveyor William Anderson, who carried out intensive site surveys and excavations at Wagonga Inlet, near Narooma, and Pambula Lake (Anderson, 1890). Anderson recorded midden concentrations in 17 locations along the Pambula river estuary, all of which were revisited during survey. Four new middens were also identified. Estimated midden volumes in 1980 ranged between 5 and 20,000 m^3, with Sullivan (1981: 83) estimating the survival of more than 95% of the midden resource identified by Anderson in 1890. Mud oyster particularly well represented across the identified sites, with other observed species including cockle, rock oyster, mud whelk, edible mussel and hairy mussel. Chipped stone noted at one site. Recorded shell midden evidence at Pambula Lake assessed "as one of the few almost intact complexes of mounded middens remaining in New South Wales" (Sullivan, 1981: 85).	Anderson, 1890; Sullivan, 1981
P.J. Hughes	1982	Waterslide Development, Merimbula	Survey	3.6 km, north-northwest	Pedestrian surveys of two flat top ridge areas were carried out along north-south transect lines, spaced between 10m and 20m, depending on surface visibility. Recent fires resulted in high visibility across the sites. Vehicle tracks in areas of steeper slopes were also surveyed and surface visibility and exposure contrasted sharply with the low visibility of the forest floor adjacent. One Aboriginal archaeological site was located on a bulldozed pile of sand, on the western edge of the main access vehicle track. The site contained four pieces of quartz: three small flakes and one unmodified piece. An additional three artefacts were recorded within 30m from these, including two unmodified pieces of quartz and a 3cm flake of acid volcanic rock. While the volcanic rock was of a material foreign to the local area, the quartz pieces were	Hughes, 1982b

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					assessed as potentially natural in origin, as a locally occurring quartz vein was observed in the immediate area.	
P.Hughes	1982; 1983	Merimbula Heights Estate (Stages 1 and 2)	Survey	c.2.5 km, north-northwest	Following the disturbance of Aboriginal shell middens during Stage 1 of the project, comprehensive pedestrian surveys were carried out along the sewerage line route to assess potential impacts of the proposed works. Six relatively intact shell midden sites/site complexes were recorded within the Stage 1 subdivision area, with varying degrees of complexity and size. All middens were "concentrated along the cliff line at the junction of the hillslopes and the rock platforms and estuarine sand flats" (ANUTECH, 1982: 10). Site 4 demonstrated evidence of once covering the entire (100m x 60m) sloping surface of the headland; however, only a 40m wide strip along the clifftop remained. The remaining deposit included 20-60cm of stratified deposit of densely compact shells, with clear 'mounds' observed. One of these included a mound c.1m high and possibly 160cm wide. Shell material across all sites consisted largely of mud oyster, followed by cockle and rock oyster, with rare instances of mud whelk and edible mussel present in the upper deposits. Charcoal in large quantities, in addition to fishbones and scales, and volcanic and quartz flakes were also observed. Additional surveys were carried out on the slopes above the lake and the proposed route of the Stage 2 works. Shell middens were observed in the reconnaissance of the Stage 2 area (referred to as localities A-F). Localities B, D and E were similar in character to Site 4, though smaller; The Stage 2 area of the proposed works was surveyed on foot in order to determine the nature of sites within the Project area (including the 'localities' located along the lake foreshore in the above survey). While continuous material was present along parts of the cliff line and on sand flats fronting the lake, six topographically discrete shell midden sites were recorded (MHE7 to	Hughes, 1982, 1983

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					12). In addition, three further sites were recorded on the hillslopes above: a stone artefact scatter on a vehicle track (MHE13) and two shell scatters on the ridge crests (MHE14 and 15). Materials within the sites varied between disturbed and in situ and largely consisted of estuarine shells (mud oyster, rock oyster, edible mussel, striped shell, mud whelk and cockles), with additions of fish and terrestrial mammal bone, as well as stone artefacts. Raw materials of stone artefacts consisted of acid volcanic rock, quartz and silcrete. Salvage was recommended for sites MHE9 and 10 as these were likely impacted by the proposed works. The assemblages of the Sites along the foreshore and cliff tops were evaluated as highly significant archaeologically, as the stability of the Merimbula barrier would have resulted in a consistency of estuarine resources over the last 5000 years. Thus, variances in materials represented at the Sites were more a factor of cultural changes, than environmental factors.	
D.Byrne & H.Brayshaw	1983	Extension to existing sand mine	Survey	Partially within	Pedestrian survey of two rectangular parcels of land to the immediate north and south of existing sand quarry, each measuring approximately 3 hectares in size. Ground surface visibility within the northern block assessed at 0-10% due to moderate to heavy cover of leaf litter. Four transects, each “roughly 20 m apart”, walked the length of the block, with extant vehicle tracks also inspected. One isolated artefact, consisting of a retouched crystal quartz flake (1.7 x 2.4 x 0.4 cm), identified. No shells observed in association or elsewhere. Southern block likewise assessed via four transects, with vehicle tracks also inspected. Visibility conditions in southern block significantly higher (20-80%) due to recent fire. Shell midden material, consisting of “two large and eroded whelk shells”, identified in one location. No other materials found.	Byrne & Brayshaw, 1983
E. Webb, S. Cane,	1986	Merimbula Heights Estate	Excavation	c.2.5 km, north-northwest	Archaeological excavations at two Aboriginal shell midden sites (MHE8 and MHE10) initially identified and recorded by Hughes (1982, 1983). Excavations at MHE8, which encompassed the	ANUTECH, 1986

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
G.Aiken, A. Lance					entire, gently sloping surface of a rocky headland adjacent to Merimbula Lake, included eight 1 m^2 test pits, with test pits "placed to provide a cross section of the site" (ANUTECH, 1986: 13). Excavations at MHE10, located at the western end of a cliff line on the eastern bank of an intermittent stream, comprised one 25 cm^2 and three 1 m^2 test pits. Column samples from two pits within MHE8 and one from MHE10 selected for detailed analysis. Sydney cockle was the dominant shellfish species at both sites. At MHE8, cockle accounted for over 60% of the minimum number of individuals in the upper 40-45 cm of the midden. The excavators also note a general pattern of increasing amounts of mud oyster shell at lower levels, one most clearly expressed in Square 8F where oyster comprised 40-60% of the shells in the lower layer but was absent in the upper layers (ANUTECH, 1986: 16). At MHE8, mud whelk (*Pyrazus ebeninus*) was "consistently present in low numbers", with other, minor species including edible mussel (*Mytilus planulatus*), Triton (*Cabestana spengleri*) and Pipi (*Donax deltoides*). A similar pattern of species dominance was noted for site MHE10, albeit with slight differences in the proportions of some shellfish species. Shellfish aside, few other faunal remains were recovered from either site, with excavated materials largely fragmentary or lacking diagnostic attributes that would assist in their identification. Paucity of such materials interpreted as a product of the "minimal contribution of terrestrial fauna in the subsistence diet" as opposed to preservation bias (ANUTECH, 1986: 18). Flaked stone artefacts were recovered from both sites. However, only those from MHE10 (n = 90) were subject to detailed analysis. Rhyolite was the dominant raw material (n = 64, 71%) at MHE10, followed by quartz (n = 20, 22%) and 'other' materials (n = 6, 7%) including silcrete, chalcedony and a "red volcanic raw material", possibly also rhyolite (ANUTECH, 1986: 19). Flakes were the most common artefact type (n = 67, 74%), with formed objects	

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					including two cores and four backed artefacts. Regarding the vertical distribution of artefacts and raw materials, the excavators note that quartz was dominant in the upper layers of the site and that backed artefacts were restricted to the lower layers, a similar pattern that observed by Sullivan (1984) in the Severs Beach midden. Radiometric dates for MHE8 and MHE10 (n = 10) indicate initial occupation around 3700 to 3200 years ago, with the change from the MHE10's lower Bondaian assemblage and upper quartz-dominant assemblage occurring at about 2000 BP. Patterns of species dominance at MHE8 and MHE10 attributed to a shift in the subsistence economies of the sites' inhabitants as opposed to changing environmental conditions, with the excavators noting that the estuarine environment of Merimbula Lake appears to have been relatively stable since the formation of the Merimbula barrier approximately 5000 years ago. General absence of mussel at sites MHE8 and MHE10 attributed to local environmental factors (i.e., the paucity of rock platforms).	
G. Aiken; A. Lance	1986 1987	Upper Berrambool Housing Development	Survey; Survey and test excavation	3.6 km, north-northeast	Pedestrian surveys were undertaken of a c.2 square kilometre Project area. Surface visibility was calculated at 0-5% in the majority of locations, with a thick ground cover of leaf litter, grasses and scrub. A single archaeological site was observed on a drainage line/track above the lagoon: a stone artefact scatter of 14 small artefacts (13 flakes and one core, with raw materials of silcrete, acid volcanic rock and indurated mudstone). The Project area was divided into zones of archaeological sensitivity, with Zone 1 (medium to high) located on the "gently sloping to flat areas above Back Lagoon, the higher areas of ground above the junction of the creeks with the lagoon at the north-eastern edge of the development area, and the foredunes of Shore Point Beach." (Aiken, 1986: 5);	Aiken, 1986; Lance, 1987

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					Pedestrian surveys and manual test excavation were undertaken on the sand dunes, flats and shorelines between Short Point Beach and Back Lagoon to combat the limited visibility experienced within the initial survey. The Project area was divided into four distinct environmental zones for assessment. The beach barrier contained a dispersed scatter of marine shell. The Back Lagoon foreshore contained two stone artefacts on the surface: a quartz porphyry pebble with irregular flake scars and a quartzite flake. The previously recorded Site 1 was re-recorded and consisted of a stone artefact scatter of 12 artefacts (flakes, flaked pieces and cores of quartz porphyry, acid volcanic rock and quartz). Disturbance was recorded as high and test excavation failed to reveal further archaeological material, with the exception of fragments of marine shell. No archaeological material was observed from survey and test excavation of the lagoon behind Short Point Beach. The major ridge above Back Lagoon was raked with a garden rake to remove leaf litter and three artefacts were observed: flakes and flaked pieces of quartz porphyry. No archaeological material was revealed from the excavation.	
B.Egloff & N.Fuller	1988	Merimbula Effluent Disposal Works	Survey	Partially within	Pedestrian survey of abandoned sand quarry, as well as land to the north associated with a proposed effluent pipeline and linear array of dispersal bores. Egloff and Fuller (1988: 5) report" favourable" survey conditions for the abandoned sand pit but very poor conditions in areas to the north due to thick vegetation. Three clusters of "highly decayed and fragmented bone", potentially representing three individual internments, identified on the south-eastern edge of extant sand pit. The clusters were noted to "lie some 2 to 3 m below the presumed original surface of the quarry" and were found over a distance of approximately 11 metres (ANUTECH, 1988: 7). The remains, which were believed to have eroded out of the wall of the quarry, were described as "barely recognizable due to their advanced state of decay" (ANUTECH,	ANUTECH, 1988

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					1988: 6). However, one fragment was identified as a portion of the frontal bone from the supra-orbital region, possibly from a fully mature female or adolescent. A scatter of flaked stone artefacts, consisting of a quartz cores and flakes of chalcedony and quartz, was identified in the vicinity, occurring on the upper margins of the south-eastern rim of the sand pit. Additional stone artefacts were observed along the northern and eastern margins of the pit. Isolated fragments of Anadara and Mud Whelk shell were likewise noted during survey. However, no midden deposits were observed.	
N. Fuller	1988	Mandeni Cabins Resort Development	Survey	7 km, north	Pedestrian surveys were undertaken of a 2.75 square kilometre parcel of land prior to its development. Surface visibility was limited to exposures on vehicle tracks and areas of low leaf litter. Survey was carried out in zig-zags spaced 30m apart in areas of cleared land and forested areas were examined from vehicle tracks. Two isolated stone artefacts were recorded: a weathered silcrete core and a small silcrete flake in a disturbed context. Subsurface testing of the area was recommended due to limited surface visibility and high sensitivity for artefacts.	Fuller, 1988
P. Cope	1992	Asphalt production plant, Lot 3 DP 620570	Survey	4.2 km, northwest	Pedestrian survey of 19 hectare project area proposed as the location of an asphalt production plant. Particular attention was paid to areas of level ground, watercourses and exposures as participants walked in a zig zag pattern across the site. A single site, consisting of an artefact scatter in area of disturbed ground, was identified. Identified artefacts (n = 3) comprised two acid volcanic flakes and a flake made out of a banded coarse grey sedimentary rock.	Cope, 1992
D. Crew	1993	Extension to Pambula-Merimbula Golf Club	Survey	0.5 km, southwest	Pedestrian survey was carried out over the proposed extension area of the Pambula-Merimbula Golf Club (36.1 hectares). Survey was focused on areas of exposure from vehicle tracks and clearing, as the majority of the site was constrained by low visibility. Extensive disturbance was observed across the site, including	Crew, 1993

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					timber removal, historic quarrying and general disturbance from the construction of the golf course and Princes Highway. A single isolated artefact was observed in an erosion scar: a broken river pebble hammerstone/anvil. The area was assessed as having low archaeological sensitivity.	
P.J. Kuskie	1995	Proposed tourism-related facility	Survey & test excavation	c.900m, north	Archaeological investigation of ten hectare parcel of land to the east of Merimbula airport. Investigation incorporated both survey and test excavation. Project area situated at mid-point of the Merimbula Bay Barrier. Initial survey resulted in the identification of a scarred tree (Merimbula Beach 2), consisting of two tree stumps with evidence of felling by a stone hatchet, and a shell midden (Merimbula Beach 1), consisting of a concentration of pipi shell on a vehicle track. Test excavation program subsequently initiated in response to very poor ground visibility conditions. Subsurface investigation involved the mechanical excavation of 23 trenches, each measuring c.1.3 m (l) x 0.7 (w) x 0.65 m (d), along a north-oriented oriented transect east of the powerline easement (Transect 1, 660 m), as well as the manual excavation of sixteen shovel test pits along three smaller east-west oriented transects (Transects 2, 3 and 4, 20-90 m in length). 4.55 cubic metres of deposit was sieved from levels up to 0.75 m below the ground surface. However, no Aboriginal archaeological materials were identified as the result of the test excavation program. This negative result was thought to be a product of one, or a combination, of factors including sample size, past Aboriginal land use preferences and historical land disturbance. Regarding past Aboriginal land use, Kuskie (1995: 15) concluded that "…Aboriginal occupation may have been more intensive adjacent to the lake or beach", with "[t]he absence of freshwater (apart from minor run-off accumulation in dune swales during rain)" potentially also significant.	Kuskie, 1995

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
D. Williams	1998	Health Retreat near Merimbula	Survey	3.7km, north-northeast	Pedestrian survey was undertaken over an area of 7.2 hectares with the purpose of identifying archaeological remains and assessing the significance of the site. The entirety of the site was traversed, although particular emphasis was placed on the foreshores to identify midden material and also to the crests and secondary spurs to the north. Visibility was calculated as very poor across most areas, with the exception of areas of erosion and animal tracks. Effective survey coverage ranged from 3.27% to 20%. One Aboriginal archaeological site was identified on a minor spur crest and consisted of a scatter of three rhyolite flakes.	Williams, 1998
P.J. Kuskie & V.Webster	2001	Yellow Pinch to Millingandi deviation of Princes Highway	Test excavation	c.6km, northwest	Test excavation program undertaken at AHIMS registered shell midden site #62-6-189, initially identified by Gaffey (1990) as part of an archaeological survey of the 7.5 km long Yellow Pinch to Millingandi deviation of the Princes Highway. Site located on the mid and upper slopes of a ridge crest side overlooking Merimbula Creek. Testing program involved the manual excavation of 22 test pits, each measuring 0.25m^2, at three metre intervals on two transects places across the site. Total of 31 shell items, consisting of 27 fragments of rock oyster (*Saccostrea commercialis*) and four fragments of mussel (*Mytilus spp.*), recovered from test pits. No flaked stone artefacts recovered. Largest scatter of shell material on surface of site comprised of rock oyster, mussel and a single fragment of mud whelk. Sydney cockle shell (*Anadara trapezia*) also noted in separate, smaller surface scatter. Reduction in extent of surface materials associated with site, as well as maximum shell density, attributed to “processes of erosion, bioturbation and recent human impact” (Kuskie& Webster, 2001: 16). Excavated and surface evidence interpreted as a product of transitory movement or hunting/gathering without camping (Kuskie & Webster, 2001: 16). Associated shellfish likely procured from Merimbula Lake, c.2.5 km distant.	Kuskie & Webster, 2001

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
J. Wheeler, R. Wright, P. Douglas, G.Wilson, D. Tuck & D.Steele	2003	Proposed re-development of Merimbula Public School	Test excavation	c.3km, north-northeast	Archaeological test excavation program at Merimbula Public School. Program divided into two phases, with Phase 1 involving archaeological monitoring in areas of disturbed topsoil (designated as areas of "low PAD"), and Phase 2, manual test excavations in areas of moderate to high PAD (i.e., those containing intact or partially intact topsoils). Ultimately, three areas were subject to investigation as part of Phase 2 of the program (Areas A, B and C), with a total of twelve hand-excavated test pits, each measuring 1 m^2, and a single machine trench completed across these areas. Excavations in Area A, located on the school's western margin, included three test pits and the program's single machine trench. Those in Area B, located on the southern margin of the school, included six test pits, while those in Area C, located on the eastern margin of the school, included three test pits. Excavations in Area A revealed a substantial amount of fill from the surface, with fill materials extending up to 1.7 m b.g.l. However, remnant intact A-horizon soils containing flaked stone artefacts were found immediately below these fills. Remnant intact A-horizon soils were similarly identified in Area B, again underlying modern fill materials. These yielded flaked stone artefacts, pieces of ochre and a small amount of cockle and triton shell. Excavations at Area C revealed a partially intact soil profile without overlying fill. Remnant intact A-horizon soils here yielded flaked stone artefacts, shell (cockle, oyster, mud whelk, venus shell) and charcoal "probably derived from Aboriginal hearth fires" (Wheeler et al., 2003: 33). Wright (in Wheeler et al., 2003: 93) reports a total of 851 flaked stone artefacts for the Phase 2 testing, with rhyolite the dominant raw material (n = 526, 62%), followed by quartz (n = 214, 25%) and silcrete (n = 111, 13%). Formed objects included nineteen complete/broken cores, one of which comprised a bipolar core, 27 backed artefacts and two scrapers. No radiometric dates were obtained as part of the testing program. However, together with the	Wheeler et al., 2003

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					strong representation of backed artefacts in the assemblage, the absence of 'upper' quartz-dominated industry at the site was used to suggest occupation from c. 4000 BP to 1000 BP (Wheeler et al., 2003: 51).	
P.J. Kuskie	2004	Merimbula Cove Residential Development	Salvage program incorporating excavation and surface collection	c.3km, north-northwest	Archaeological salvage program undertaken for three Aboriginal archaeological sites identified within Stage 4 of the Merimbula Cove residential development. These comprised a shell midden and artefact scatter site (MC7/A), a shell midden (MC6/A) and isolated artefact (MC6/B). Salvage involved site recording, collection of samples for dating excavation of the MC6/A midden and partial excavation of a spatially-discrete midden locus (Midden Locus C) within MC7/A. Salvage excavation at site MC6/A involved the establishment of 1 x1 m grid across the exposed midden, with each 1m^2 unit further subdivided in 0.5 x 0.5 m excavation units. Ultimately, eighteen 0.5 x 0.5 m units, covering a total area of 4.5 m^2, were excavated. Cockle (*Anadara trapezia*) was the dominant shellfish species, with mud oyster (*Ostrea angasi*) also "modestly represented" (Kuskie, 2004: 20) in the midden. Other species included edible mussel (*Mytilus planulatus*) and turban (*Phasianella ventricosa*), with the latter represented by only two whole items. Flaked stone artefacts recovered from MC6/A were limited to two rhyolite flakes. Four unidentifiable fragments of bone were also recovered. Single cockle shell recovered from the *in situ* midden deposit in excavation unit 2B returned an age of 1192±30 years BP (910-620 cal BP). MC6/A midden interpreted as a product of a "small, focalised activity event (i.e. single meal event) that probably involved very low numbers of people for a very short duration (Kuskie, 2004: 21). At site MC7/A, shell and flaked stone artefacts were observed across an area of approximately 180 x 20 metres, occurring on a gently inclined ridge crest around 250 m from Merimbula Lake. Four 'loci' of shell midden evidence were identified within this area, with shell samples retrieved from each loci	Kuskie, 2004

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					returning dates of 509±30 years BP (266-0 cal BP), 503±35 years BP (265-0 cal BP), 807±30 years BP (540-290 cal BP) and 561±37 years BP (332-0 cal BP). Flaked stone artefacts recovered from the *in situ* midden deposit partially-excavated at Midden locus C, dated to 807±30 years BP (540-290 cal BP), included a geometric microlith and a flake, both manufactured out of silcrete. Including these artefacts, a total of 46 flaked stone artefacts were recovered from site MC7/A, with the majority (53.7%) manufactured out of rhyolite. Silcrete was the second most common material (28%), followed by quartz (11%) and chert (6%).	
B.Oakley	2004	Residential development	Test excavation	c.1.9 km, north	Test excavations at the Merimbula Lake Midden (#62-6-542) site, located on the Carrington development site, 1 Elizabeth Street, Merimbula. Eastern half of development site situated on sand dune complex capping the highest part of the Merimbula Barrier. Remainder of property, on its western side, described as “an almost flat surface…very gently inclined towards Merimbula Lake” (Sullivan & Hughes, 2004: 2). Merimbula Lake Midden (MLM) initially identified by representatives of the Eden LALC during archaeological monitoring of earth stripping works across the site. At this time, the midden comprised “a small compact concentration of relatively undisturbed midden shell exposed within an area measuring approximately four metres by four metres in the southwestern corner of the development site” (Oakley, 2004: 15). Scattered midden shells were also observed across “a large section” of the recently graded development site. Oakley (2004) assessed the compact midden deposit, designated as ‘locus Y’, as likely being *in situ* and that additional *in situ* deposit could be present beneath the disturbed surface. A test excavation program was recommended. Ultimately, this program incorporated both mechanical and manual excavations, with the latter conducted at ‘locus Y’ and another small remnant compact midden deposit designated as ‘locus Z’. More broadly, the site was divided into two	Oakley, 2004

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					areas (A and B) for the purposes of testing, with Area A bordering Fishpen Road and Area B bordering Marine Parade. Nine out of 15 machine cut trenches in Area A contained midden deposit, with seven containing “clear midden lenses”. Nine trenches contained stone artefacts. All manual excavations conducted in Area A intercepted *in situ* midden deposit. However, only one contained stone artefacts. Of the ten machine cut trenches in Area B, four contained midden deposit. Levels of disturbance in this area were high and only one trench had a clearly defined midden lens. Only one trench yielded a stone artefact. Oakley (2004: 30) reports that cockle was the dominant shell species found at the site, accounting for 70% of shell retrieved from machine cut trenches and 66.5% of shell retrieved from manual trenches. Mud oyster was the second most common material in both machine cut (16%) and manual (19.4%) trenches, followed by mud whelk (machine = 10%, manual = 7.6%) and triton (machine = 4%, manual = 6.4%). Combined subsurface stone artefact assemblage from site (n = 17) made up of flakes, broken flakes and flaked pieces, with all but two pieces manufactured out of rhyolite. Remaining two items made out of quartz. Additional four artefacts, consisting of two hammerstones and two rhyolite flakes, collected from surface of site.	
R.V.S. Wright	2004	Carrington development site	Burial excavation and analysis	c.1.9 km, north	Human skeletal remains were investigated subsequent to their discovery during excavation activities for the proposed Carrington construction. In the initial report, the bones were assessed, and the discovery site was observed to determine the nature of the site and the proposed impacts of the works. Assessments concluded that the partial remains were Aboriginal in origin and likely came from an in situ burial. A Section 87 permit was issued and the current report details the findings. The burial site was manually excavated in the impact area, revealing an incomplete in situ burial of a single individual. A line of white sewer pipe extended over the top of the burial and was a likely cause of previous disturbance. Excavated	Wright, 2004

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					sand was sieved and spoil heaps to the east, and north of the burial contained skull fragments. Wright concluded that the individual was an elderly female, buried flat on her back, which had possibly undergone periods of exposure and reburial by wave action. The grave was assessed as younger than 5,000 years, following the deposition of the coastal dunes and likely as young as 500 years as the skeletal remains were not largely impacted by the slightly acidic soils. Following the assessment, the remains were reburied in the same location at a depth where they would not be impacted by the proposed works.	
ERM	2005	Bega Valley Sewerage Program, Merimbula	Survey	Immediately adjacent	Pedestrian and vehicular surveys were carried out over two distinct areas affected by the proposed pipeline and reclaimed water storage works. Participants systematically inspected all areas of exposure and surface visibility. Overall, the corridor of the proposed transfer pipeline exhibited low visibility and was largely surveyed by vehicle, whereas the site of the proposed storage pond was located on an area of thick grass cover, which was briefly traversed on foot. No archaeological material or areas of potential archaeological deposit were recorded.	(Environmental Resources Management Australia Pty Ltd (ERM), 2005b)
J.Dibden	2007	Rezoning application for Lot 222 on DP1090501	Test excavation	c.1.7 km, south	Program of subsurface test excavation across Lot 222 on DP1090501, Pambula Beach Road, Pambula Beach. Property previously subject to survey by Dibden (2006), resulting in the identification of single stone artefact and a recommendation for a subsurface testing program. This program, undertaken in May 2007, involved the excavation, via hydraulic flight auger, of fifteen 0.6 m diameter auger holes along three transects oriented in an east-west direction across the property. Auger holes along each transect were excavated at approximately 25 m intervals, with augering completed in 20 cm ‘spits’. Auger holes were excavated to a maximum depth of 120 cm below ground level. Highly fragmented shell, potentially all of recent, non-Aboriginal origin, recovered from four auger holes. All identifiable shell comprised	Dibden, 2007

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
					Sydney rock oyster. Non-Aboriginal or European objects were recovered from the majority (n = 11, 73.3%) of auger holes at depth ranging from 20 cm to 80 cm. Flaked stone artefacts were recovered from all but one of the auger holes excavated, with a total of 246 artefacts retrieved. Formed objects included three cores, two core fragments and seven retouched artefacts (including four backed artefacts). Quartz was the dominant raw material (n = 85, 34.6%), followed by rhyolite (n = 75, 30.5%), silcrete (n = 72, 29.3%), chert (n = 13, 5.3%) and quartzite (n = 1, 0.4%).	
Godden Mackay Logan Pty Ltd	2008	Robyn's nest, Merimbula	Survey	3 km, northwest	Pedestrian surveys of the proposed development area were conducted in order to assess the impacts to potential Aboriginal archaeological material. An estimated 40% survey coverage was achieved, with greater emphasis placed on areas of good surface visibility. Six spatially discrete sites (RN1-6) were recorded, containing 19 flaked stone artefacts (mainly flakes or flaked pieces (n=16), but also including a core, a hammerstone and a manuport) and a total of five shell middens (two of which were large, with associated lithic material and varying species of shell). Sites RN3 and RN4 consisted of an artefact scatter and two isolated artefacts, and were located on a raised hill crest, suggesting temporary use of hilltop crests overlooking the lake. Raw materials included pink and grey banded quartzite, with fewer instances of white silcrete and grey chert. Large quantities of shellfish suggest that "shellfish procurement and consumption was a primary activity" along the lake foreshore (Godden Mackay Logan, 2008: 1). Shells consisted of edible estuarine species (Sydney rock oyster, mud oyster and cockle) and number of different species correlated with the size of the midden, suggesting smaller middens were single meal events, while larger middens represented repeated or longer use of the site. Potential for further surface and subsurface archaeological material was identified along the extent of the lake foreshore and on the central hill crest.	GML, 2008

Consultant / Researcher	Year	Project	Investigation type	Location relative to the Project area	Summary of investigation & results	Reference
G.Willcox & M.Barber	2014	Construction of theatre building and associated infrastructure	Test excavation	c.2.6 km, north	Test excavations at Twyford Hall site, located at the corner of Market and Beach Streets, central Merimbula. Previous archaeological assessment on property adjoining Twyford Hall site to the east (i.e., Merimbula Plaza) had recorded and investigated *in situ* shell midden deposits below historic and recent construction deposits (i.e., Merimbula Beach Street Site 1, #62-6-0654, Dibden *in prep*). Six 50 x 50 cm test pits hand excavated to investigate presence/absence of comparable midden deposits. Observed subsurface deposits divided, following Dibden (in prep), in three broad stratigraphic groups: Group A - Historic and Recent Construction Deposits; Group B - Midden Deposits; and Group C: Sub-Midden Soils and Beach Sands. Group A deposits were identified from the surface to a depth ranging between c.30 and 50 cm below the present ground surface. These deposits overlay *in situ* midden deposits (Group B) varying in thickness from c.20 to 40 cm. The interface between the lower group B and upper Group C horizons ranged from 10 to 20 cm in thickness and featured mottled patterning, with sand colour lightening with increased depth into Group C sands. Three test pits contained shell, with mud oyster (Ostrea) and cockle (Anadara sp) co-dominant overall. Other species represented in the shell assemblage included Triton (Cabestana), Turban (Turbo sp), Mussel (Mytilus sp) and Pipi. Five out of six test pits yielded stone artefacts, with a total of 59 artefacts recovered, the majority (n = 55, 93.2%) coming from two pits (TPs 0-4C and 18-16A). Flakes (n = 20) and angular fragments (n = 28) were the dominant artefacts types, collectively accounting for 81.4% of the assemblage. Formed objects limited to two cores and single backed artefact. Quartz was the dominant raw material (n = 41, 69%), followed by silcrete (n = 14, 24%), 'igneous' (n = 3, 5%) and chert (n = 1, 2%).	Willcox & Barber, 2014

5.4 Key Observations

Key observations to be drawn from a review of the local and regional archaeological context of the Project area are as follows:

- available radiometric dates indicate that Aboriginal people have occupied the South Coast region since the late Pleistocene. However, few 'early' (i.e., late Pleistocene / early Holocene) sites are known. Most Aboriginal archaeological sites within the region are of mid-to-late Holocene antiquity (0-6,000 years BP);
- shell middens dominate the Aboriginal archaeological record of the region's coastal zone. Further inland, open artefact sites (i.e., artefact scatters and isolated artefacts) predominate;
- existing archaeological survey data for the region's coastal zone indicate a strong trend for the presence of Aboriginal archaeological sites in the littoral zones of lakes and inlets, as well as dunal areas (particularly those adjacent to rock platforms);
- available archaeological data for the South Coast region, including the Far South Coast, indicate that Aboriginal people occupying this region over the course of the mid-to-late Holocene had a subsistence economy that was generalised or diversified in nature (i.e. involved the exploitation of a wide range of resources from many different ecological zones);
- excavated archaeofaunal assemblages from both coastal and hinterland sites attest to the exploitation, for food and other purposes (e.g., skins for clothing, bone tool manufacture), of a diverse range of aquatic, avian and terrestrial fauna, with individual site-based assemblages indicating an emphasis on locally available resources;
- as in other regions of south-eastern Australia, various excavated assemblages from the South Coast region attest to a shift, over time, in the relative significance of particular raw materials for flaked stone artefact manufacture, as well as the relative importance of both backed artefact manufacture and bipolar flaking;
- available archaeological data, including the results of a search of the AHIMS database, indicate that numerous Aboriginal archaeological investigations have been carried out in the greater Merimbula-Pambula district over the past four decades. Investigations to date, the majority of which have been undertaken as part of larger environmental assessments linked to residential and commercial development projects, have included both surveys and subsurface investigations;
- Aboriginal people are known to have occupied the greater Merimbula-Pambula area for *at least* 3,500 years (e.g., ANUTECH, 1986);
- any Aboriginal archaeological sites located on or within the beach ridge facies of the Merimbula Bar Barrier will be of mid-to-late Holocene antiquity;
- in keeping with the regional dataset, excavated shell midden sites in the greater Merimbula-Pambula area attest to a generalised economy, albeit one with a strong economic focus on the rich estuarine resources of Merimbula and Pambula Lakes;
- previously recorded midden sites in the greater Merimbula-Pambula area are clustered along the littoral zones of Merimbula and Pambula Lakes. Fewer sites are known within the Merimbula Bay Barrier sand mass. However, comparatively few Aboriginal archaeological investigations have been undertaken in this area, which remains largely undeveloped;
- excavated and surface recorded flaked stone artefact assemblages from the greater Merimbula-Pambula area attest to an emphasis on the use of quartz, silcrete and rhyolite;
- backed artefacts (i.e. Bondi points, geometric microliths) dominate the retouched components of excavated and surface recorded assemblages;

- consideration of the location of previously recorded sites in the vicinity of the Project area indicates that two AHIMS registered sites - open artefact site 62-6-0133 and burial site 62-6-0173 - are located either wholly (62-6-0133) or partially (62-6-0173) within the Project area. An additional AHIMS registered site - scarred tree 62-6-0475 - is located within 50 metres of the Project area;
- all three registered sites are listed on the AHIMS database as 'Valid' sites. However, a review of associated site cards and reports indicates that artefact scatter 62-6-0133 should, in fact, be listed as 'Destroyed', with the two artefacts comprising this site collected in 1979;
- burial site 62-6-0173 was identified in 1988. At this time, the site comprised three clusters of highly decayed and fragmented bone on the south-eastern edge of the disused sand quarry in this location. The clusters, potentially representing three individual internments, were noted to "lie some 2 to 3 m below the presumed original surface of the quarry" and were found over a distance of approximately 11 metres (ANUTECH, 1988: 7); and
- scarred tree 62-6-0475 was recorded in July 2000 by representatives from the NSW NPWS and Eden LALC. At the time, the tree was interpreted as having a scar caused by Aboriginal cultural modification, with a European survey mark later added to it. Some uncertainty was attached to the site, however, as it was noted that there were two more trees in the surrounding area with similar scars, both of which were identified as potential European survey marks.

5.5 Archaeological Predictions

Taking into account the landscape context of the Project area (Section 3.0), as well as the archaeological data reviewed in this chapter, the following predictions are made regarding the Aboriginal archaeological record of the Project area:

1. site types with high to very high potential to occur include shell middens and burials;
2. site types with moderate to high potential to occur include open artefact sites and scarred trees;
3. surface and subsurface shell midden sites within the Project area will be dominated by estuarine species (i.e., cockle, mud whelk, mud oyster)
4. given the Project area's proximity to Merimbula and Pambula townships, there exists moderate potential for one or more Aboriginal sites within this area to contain 'post-contact' materials (i.e., flaked bottle glass and/or ceramics);
5. landforms with the highest Aboriginal archaeological potential within the Project area include the foredune and backbarrier sand flat components of the Merimbula Bay Barrier;
6. elevated dune surfaces adjacent to mapped areas of freshwater lagoon will contain the largest and most complex archaeological sites;
7. most, if not all, of the Aboriginal archaeological materials present within the Project area will be of mid-to-late Holocene antiquity;
8. burial sites, if present, will occur within the foredune or backbarrier sand flat landform units;
9. flaked stone artefact assemblages will be dominated by artefacts manufactured out of one of three raw materials: quartz, silcrete or rhyolite;
10. flaked stone assemblages will be dominated by flake debitage items (*sensu* Andrefsky 2005), with formed objects (i.e., cores and retouched flakes) comparatively poorly represented;
11. complete and/or fragmentary backed artefacts will dominate the retouched components of recorded flaked stone artefact assemblages; and
12. tool types of demonstrated temporal significance, if present, will be limited to edge-ground hatchet heads and backed artefacts.

6.0 Ethnohistoric Context

6.1 Introduction

Information regarding the ways in which Aboriginal people likely used pre-contact landscapes is available to archaeologists through two primary sources: archaeological (i.e., survey and excavation) data and historical records. **Section 5.0** summarised the Aboriginal archaeological context of the Project area on both a regional and local scale. This section builds on this foundation by summarising relevant ethnohistoric information for the Project area and environs.

Key sources, both primary and secondary, for the post-contact languages and lifeways of Aboriginal people occupying the Far South Coast region of NSW around the time of European colonisation include: Attenbrow (1976), Besold (2012), Boot (2002), Brierly (1843a, 1843b, 1844b, 1844a), Eades (1976), Fraser (1882), Goulding & Waters (2005), Howitt (1904), Imlay (1839, 1841), Organ (1993), Matthews (1896; 1901, 1902b, 1902a, 1904), Matthews & Everitt (1900), Robinson (1844) , Sullivan (1982), Warner (n.d.), Wesson (2000, 2002) and White (2010, 2015). While a detailed review of these sources is beyond the scope of this report, information of particular relevance to the current assessment is summarised below.

6.2 Social Organisation: Language Groups, Named Groups and Territories

As in other parts of NSW and Australia more broadly, reconstructing the social organisation of Aboriginal groups occupying the Far South Coast region at contact is extremely difficult given the enormous social upheaval that accompanied European colonisation of the region and which preceded any substantiative anthropological investigations into their languages and lifeways (e.g., Howitt, 1904; Matthews, 1901, 1902a, 1902b, 1904). Nonetheless, available ethnohistoric records for the region do offer a range of insights into the social organisation of the region's Aboriginal population at contact.

According to Tindale's (1974) oft-cited tribal map (Figure 20), the Far South Coast region encompasses the traditional lands of the *Thaua*, *Djiringanj* and *Bidawal* "tribes" (Figure 20). However, Tindale's map fails to draw a distinction between language groups and named groups and masks what available linguistic and ethnohistoric evidence for this region indicates was a complex system of social organisation structured around numerous exogamous intermarrying 'country groups' (White, 2015: 271). Horton's (1996) *Map of Indigenous Australia* is similarly broad-brush, with several of Tindale's South Coast "tribes" collapsed into a single group, the "*Yuin*" (after Howitt, 1904) (Figure 21).

Wesson (2000), building on the linguistic research of Eades (1976), has identified six language variants for the South Coast region, with the current project area falling within the territory of *Thauaira*-speaking peoples (i.e., Tindale's (1974) *Thaua* "tribe"). Wesson's language map, which utilises the same language names identified by Eades (1976) and was prepared on the basis of a comparative analysis between available vocabulary lists and territory descriptions, highlights the percentage commonality between vocabularies by district (Figure 22). *Thauaira* and *Jeringan*, Wesson (2000: 156) has proposed, were separate languages, while *Jeringan* and *Thoorga* were "closely related", comprising "variants of a single language". *Thurumba* or *Mudthung*, the language spoken between Batemans Bay and Conjola Creek, meanwhile, is suggested to have shared aspects of both *Tharawal* and *Thoorga* (Wesson, 2000: 156). Specific to the *Thauaira* or *Thawa* language, as reported by Wesson (2000:156), Robinson (1844) makes no mention of these names, which were provided by Howitt's and Matthews' informants. However, Robinson does report his informant 'Rodney' as indicating that Twofold Bay, Cape Howe, Genoa, Wongrabel and Pambula people all spoke the same language and that this language was different to that spoken north of the Bega river.

Howitt (1904), a key ethnographer for the South Coast region, reports that the 'Yuin tribes' "claimed the country from Cape Howe to the Shoalhaven River" and describes two major internal social subdivisions. According to Howitt (1904:81-82), the first of these was between the *Kurial* in the north ('*kuru*', north) and the *Guyangal* in the south ('guya', south), with both comprising "sub-tribes" that were further subdivided into a total of six smaller 'clans' (three apiece). In addition to this north/south differentiation, Howitt (1904: 82), following Robinson (1844), notes that the Yuin drew a distinction between those living on the coast and those living in 'inland' areas, with the former comprising the *Katungal* (*Katung*, "the sea,") and the latter, the *Paiendra* (*Paien*, "a tomahawk"). A third group, the *Bemeringal* (Bemering, "a mountain"), are reported to have occupied "the high mountains still further back" (Howitt, 1904: 82).

More recently, Wesson (2000: 151) has characterised Howitt's (1904) north/south and east/west differentiations for the Yuin in terms of 'functional names', with identified functional groupings linked strongly to both topography and the dominant economic focus of each group. Wesson recognises five functional groups for the broader South Coast region (Figure 23), with the current Project area located within the territory of the 'Kunnerkwell' or 'Kudingal' (after Robinson, 1844), whose economy was marine-focused. Wesson's map shows Kunnerkwell/ Kudingal Country as extending between the Bega River in the north to a point just south of Mallacoota Inlet in the south, and westward from the ocean some 10-20 km.

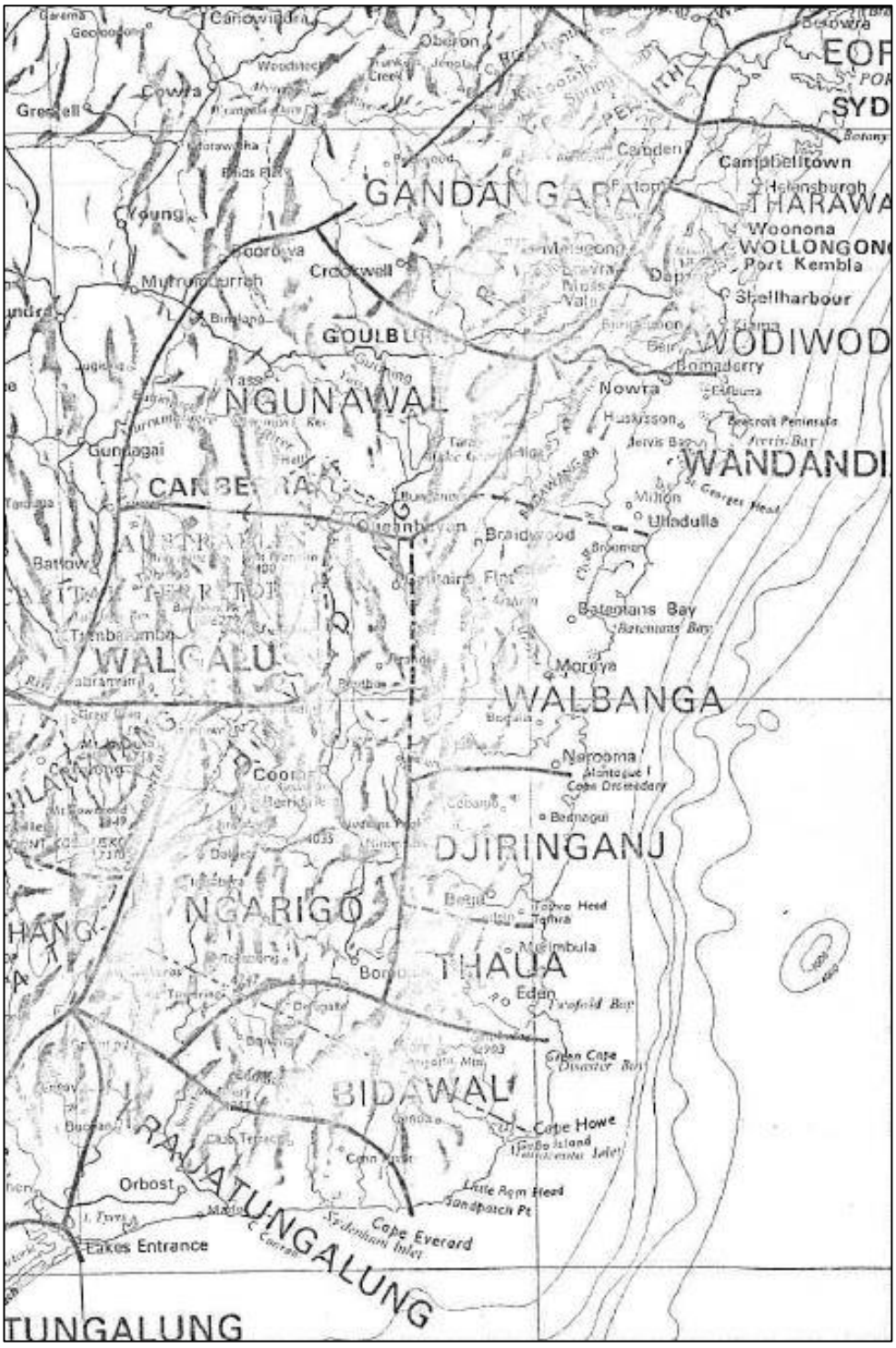

Figure 20 Tindale's (1974) "tribal" groups and boundaries for the South Coast region (from Attenbrow, 1976: 36, Map 2)

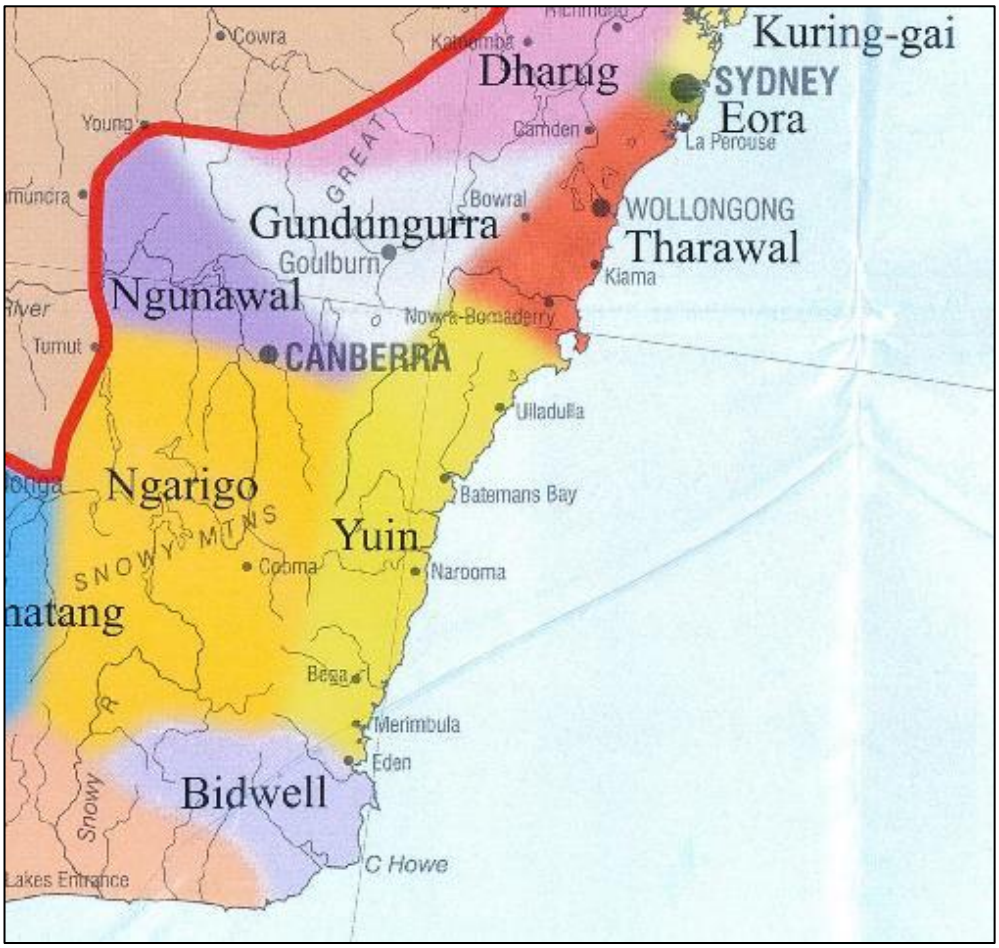

Figure 21 Excerpt from Horton's (1996) Aboriginal Language Map

White (2015), drawing on various lines of evidence, has proposed that the "…Yuin (as an identity) existed as a conglomerate of intermarrying country groups sharing a coastal/escarpment orientation, mutually intelligible language and who participated in common ceremonial activities". White's "country groups", which are also referred to as "socio-territorial political ensembles" (after Correy et al., 2008), held a range of use-rights to particular 'estates'. However, the territorial boundaries of each group were permeable or elastic in the sense of complex kinship ties facilitating inter-group movements of people and the reciprocal use and/or exchange of resources. Yuin kinship, as highlighted by Howitt and Matthews, was not moiety or section-based but rather "involved extensive networks of relatedness within and between exogamous intermarrying country groups". Patrifilial totemic affiliations served to both distinguish particular localities in the landscape and also to create connections (White, 2015: 275, after Keen, 2004).

As highlighted by Attenbrow (1976: 41), the existence of land-owing units amongst the Yuin of the NSW South Coast is mentioned by both by Howitt (1885: 799-800) and Fraser (1892: 36), with the former summarising the social organisation of the Yuin as follows:

> "the tribe as whole occupied a certain tract of hunting and food-gathering ground; it was invariably divided into well-defined local groups, each having its own portion of the common community. These are again divided into smaller groups, until the smallest unit consists of a few people of the same blood, under the direction and guidance of the older or most able of the elder men" (Howitt, 1885: 799-800).

Associations between particular groups and locations is likewise suggested by Robinson's (1844) journals, with listed Aboriginal individuals assigned both a tribal name and locality name.

Boot's (2002: 70) analysis of historical group size data for the Yuin indicates a tripartite social structure, with small family groups of eight to ten individuals, consisting of a man, his wives and children, larger groups of related families numbering around 30 to 40 individuals (i.e., local descent groups / Howitt's (1904) 'tribes') and large "alliance groups" consisting of at least 100 individuals. Alliance groups congregated only for particular purposes (e.g., initiation ceremonies, feasts).

Each Yuin 'tribe', Howitt (1904: 314) reports, was controlled by a headman or 'Gommera' (also 'Biamban'). These individuals were 'aged', had healing, fighting and magical skills and could speak several dialects languages or dialects. Alongside their central role in male initiation ceremonies, Gommeras, who gained their power from Daramulan, were also responsible for maintenance of social order (i.e., adherence to the "old laws", Howitt, 1904: 315). Individual Gommera had the power to admonish and punish people within their local group and also arranged and managed ritual fights. Gommeras, alongside other initiated men, were also responsible for arranging marriages and developing alliances (Howitt, 1904: 263).

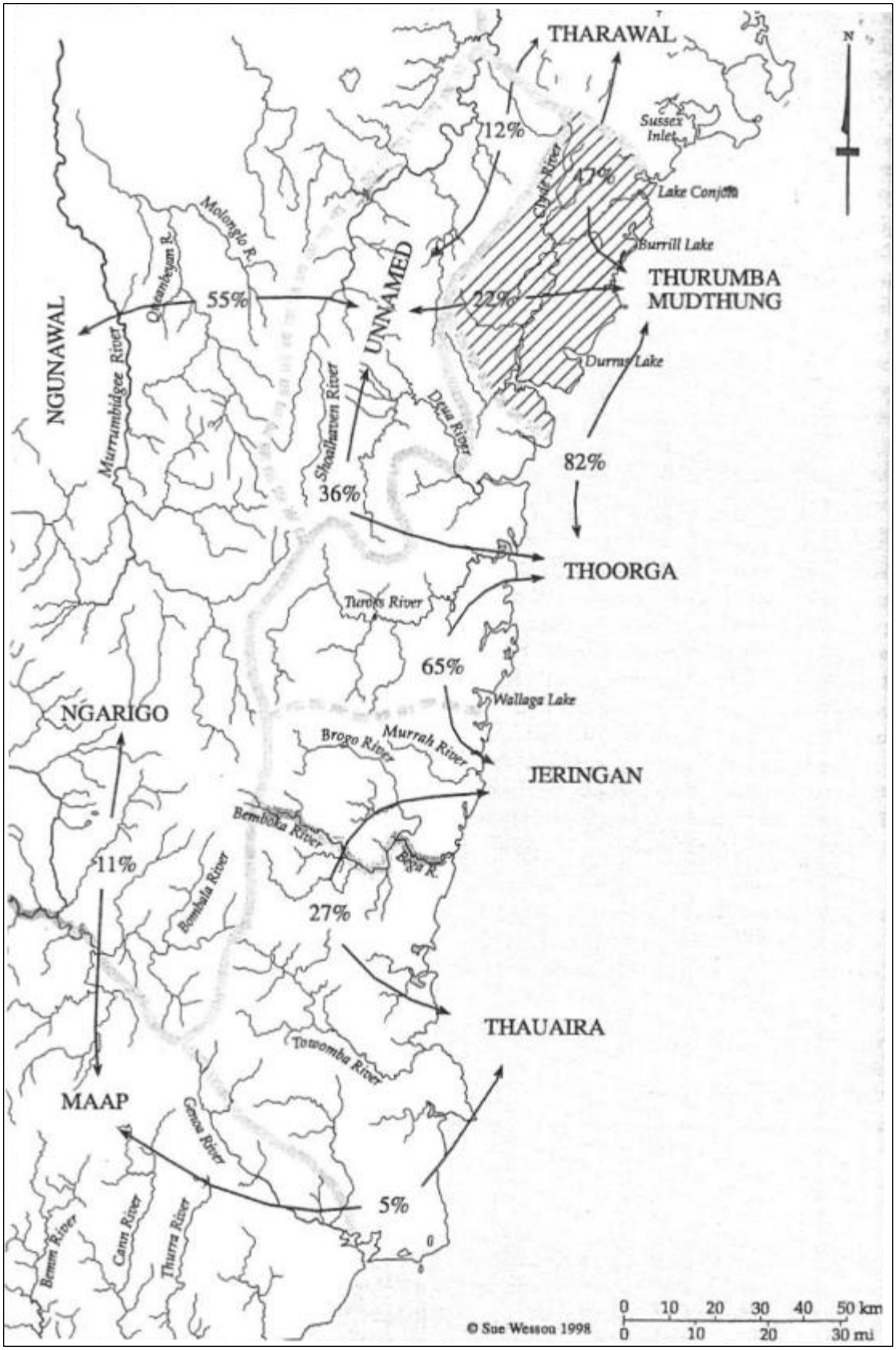

Figure 22 Wesson's (2000) language map for the South Coast region of NSW showing percentage commonalities between identified languages

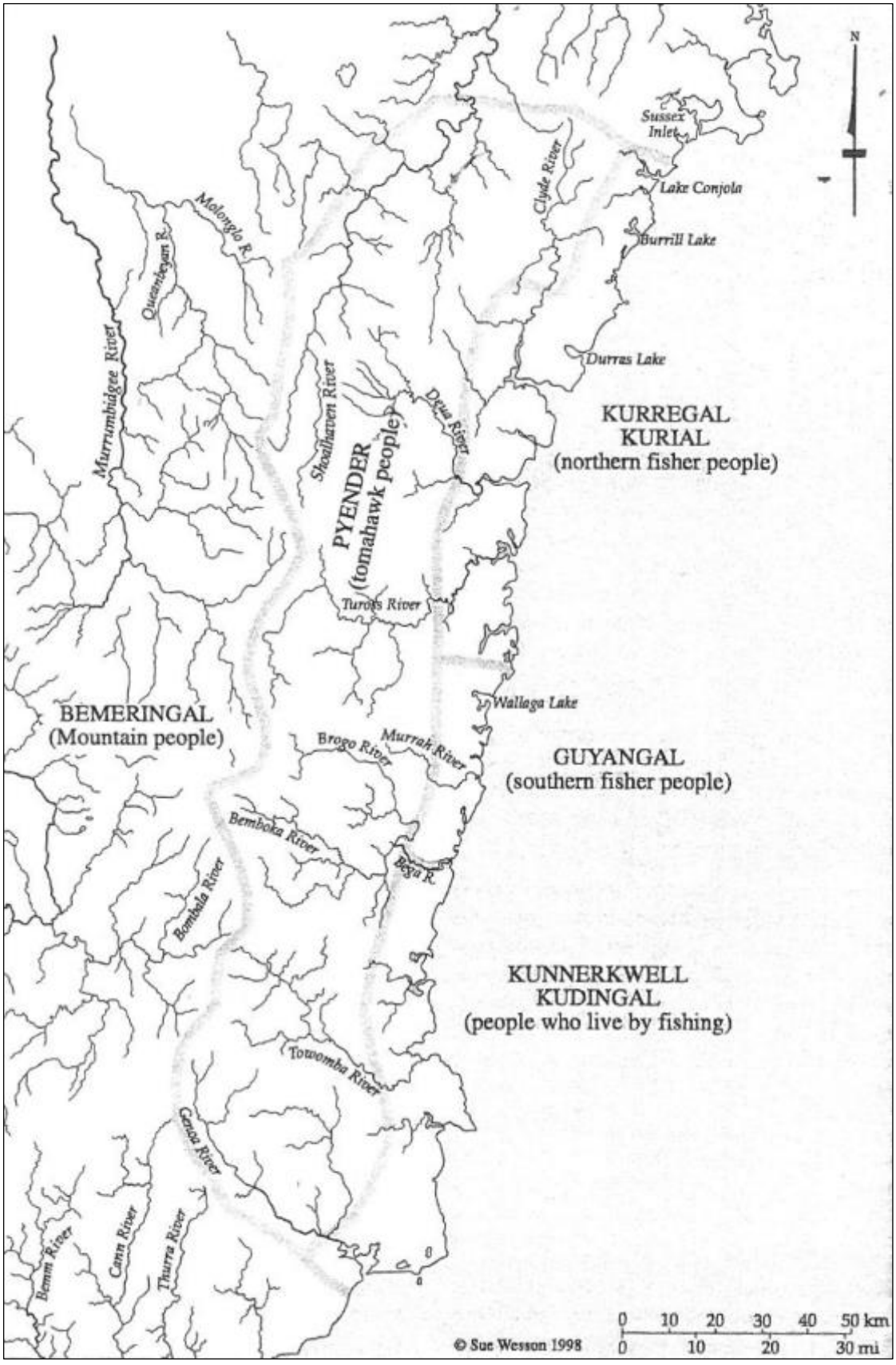

Figure 23 Wesson's (2000) functional groups for the South Coast region of NSW

6.3 Group Size, Mobility & Seasonality

Aboriginal people occupying the Far South Coast region around the time of European colonisation were most frequently observed in 'coastal' contexts. However, as Attenbrow (1976: 45) has pointed out, this coastal bias is at least partly attributable to the coastal orientation of early European exploration and settlement, with Twofold Bay, for example, a focal point for early European settlement and the location of most historical sightings. Numbers of people observed on the coast range from individuals to "several hundreds", with the largest parties seen at Twofold Bay in autumn, winter and spring (see Attenbrow, 1976: Table 1). That Twofold Bay was the location of the largest sighted gatherings of people, however, is unsurprising given the establishment, in 1828, of a shore-based whaling station here, which likely attracted Aboriginal people for work and/or food (Attenbrow, 1976: 46). Further inland, available ethnohistorical observations for the region's hinterland zone present contrasting pictures of population sizes and intensity of use more broadly, with some accounts suggestive of sparse populations and low-intensity use and others quite the opposite (see Attenbrow, 1976: 46 & Table 1). Available ethnohistorical data, Attenbrow (1976: 47) notes, provide no evidence to suggest seasonal fluctuations in the numbers of Aboriginal people in this zone.

Census data for the Maneroo District, which at that time included the coastal zone from Twofold Bay north to Moruya, are available for the years 1841 to 1848 (see Attenbrow, 1976: Table 2). These data, which come from John Lambie's Annual Reports to Governor Gipps, indicate a total population of between 277 and 560 individuals. Figures for 'Pampulla' (Pambula), located in closest proximity to the current Project area are the lowest for the district, ranging from only 14 to 17 individuals. Those for 'Twofold Bay' and 'Biggah' (Bega), in contrast, are considerably higher, ranging from148 to 165 and 69 to 86 individuals respectively. While noting the various limitations such data, Attenbrow (1976:49), working from the assumption that the earliest census figures available for the region represent a population that had already declined as a result of introduced diseases and other factors, proposed a pre-European settlement population density of "not less than 1 person per 6.7 square miles", with densities along the coast potentially reaching to 1 person per square mile in "some seasons". At the same time, it was suggested that the population density of the Bega Valley was likely higher than that of the Towamba Valley (Attenbrow, 1976: 49).

Taken at face value, existing ethnohistorical observations for the region suggest that levels of residential mobility amongst the Aboriginal groups of the Far South Coast were reasonably high. Nonetheless, as Attenbrow (1976: 50) has suggested, the extent to which available accounts accurately reflect traditional settlement patterns is difficult to assess on the basis of available data. Flood (1973), for her part, identified three accounts of coastal-based peoples visiting the Monaro Tablelands and interpreted these as evidence of their participation in Bogong Moth feasts. However, Attenbrow (1976) reports "no mention of people leaving the South Coast for the Monaro" in the accounts examined as part of her own research. While Aboriginal peoples of the Monaro Tablelands are known to have visited the coast (Twofold Bay) for corrobborees and whale feasts, direct ethnohistorical observations of reciprocal visits by people based in coastal zone of the Far South Coast are lacking. More generally, Attenbrow (1967: 53) has proposed that movements of large numbers of people as part of traditional subsistence strategies would only have occurred in the context of largely unpredictable subsistence events (e.g., whale strandings and the capture of large quantities of fish).

Attenbrow's (1976) settlement and subsistence model for the Far South Coast, developed out of a detailed review of existing ethnographic and ethnohistorical accounts for this region, as well as an assessment of the physical environment of this area[5], proposes differing subsistence patterns for the Aboriginal populations of the Bega and Towamba Valleys (including their adjacent coastlines). For the Bega Valley and its adjacent coastline, Attenbrow's model holds that, while the coastline and hinterland would have been occupied all year, population densities and group sizes along the coastline would have been higher in summer, spring and autumn. In coastal areas, groups would have practised a largely marine-based economy but would also have exploited various land mammals and vegetable foods (Attenbrow, 1976: 121-122). In inland areas, larger groups would have formed along the lower reaches of the Bega River, where fish traps were constructed, with small groups occurring elsewhere. Fishing, birding and eeling were important inland subsistence activities, as were the hunting of land

[5] I.e., in terms of topography, climate, vegetation and the availability of economic plant and animal resources

mammals and emu and the collection of vegetable foods. In both zones, summer and spring camps would have been occupied for longer periods than in winter. However, available resources would not have facilitated their use for a whole season. In winter, groups would have been smaller and more evenly distributed across the landscape, with land mammals and vegetable foods emphasised in diets.

Further south, the smaller and less resource-rich character of the Towamba Valley would have supported a smaller Aboriginal population. The valley's adjoining coastal strip, meanwhile, would have had a comparable density to that of the Bega Valley. As in the Bega Valley to its north, the coastline and hinterland would have been occupied all year. In summer, spring and autumn, people would have been spread more evenly over the landscape. However, summer would have seen larger groups form on the coast. The diets of people on the coast would have been similar to those of people occupying or visiting the Bega coastline though seals may have been more important further south. Inland diets and subsistence activities would likewise have been comparable to those of the Bega Valley. Trips to the higher, more mountainous parts of the valley would have been made. In winter, people would occupied the lower portions of the valley, around Towamba, as well the adjacent coastline, with small groups hunting and foraging in both zones.

6.4 Subsistence Regimes

Available ethnohistorical records indicate that Aboriginal peoples occupying the Far South Coast around the time of European colonisation exploited a range of terrestrial, avian and aquatic fauna for food and other resources (e.g., skins for clothing).

Along the coast, fish appear to have been a particularly important food resource, with offshore fishing the most commonly observed subsistence activity (e.g., Lt Col. Munday, 1851 in Wellings, 1931; Robsinson in Mackaness 1941: 19; Robinson, 1844: 173; Brough Smyth, 1878). The importance of fishing is also evident in Brough Smyth's (1878) and Robsinson's (1844 in Mackaness 1941: 334) use of the terms "ichthyagous" and "piscatory" when describing the 'Twofold Bay Aborigines'. Whales and dolphins were also consumed, albeit opportunistically as a result of beaching (Fraser, 1892: 52; Robinson, 1844: 186). Seals are also known to have been hunted (Robinson, 1844: 91-92). References to freshwater fishing are limited to those of Robinson (1844: 233-235, 249) who reports being shown an "old weir for taking fish" near the mouth of the Bega River, the use of poison for catching fish and eels at this location and further inland, near Tantawangalo, the construction and use of fishing platforms. Despite their strong representation in the Aboriginal archaeological record of the Far South Coast region, shellfish feature poorly in the region's ethnohistorical literature, with Attenbrow (1976: Table 1) noting only two indirect references to their exploitation (i.e., Aboriginal people providing survivors of the "Sydney Cove" with shellfish).

Like shellfish, references to the exploitation of freshwater animal foods on the Far South Coast are very limited. Nonetheless, possums, wombats, kangaroos, emus and wild dogs (dingoes) are variously reported as having been hunted and/or eaten, with King Phillip Parker (1826: 6, in Attenbrow, 1976: Table 1) reporting the use of fire for "hunting kangaroo" (Bega Gazette 30/3/1889 in Bayley, 1946: 11; Brierly, 1843; HR.NSW Vol III: 764 in Sharp, 1963; Robinson 1844 in Mackaness, 1941: 336). Possums appear to have been favoured food, with Brierly (1842/43) reporting that the "natives here…[at Twofold Bay]…live principally upon them". That possums were an important economic resource for the Aboriginal population of the Far South Coast is also suggested by Robinson's (1844: 239-240) observation that the term *Pyender* (also *Paiendra*), from *Pyen* (also *Paien*), "a tomahawk", was "applied to all blacks living in the woods and who live by climbing trees", a reference to the hunting of possums. Alongside land-based mammals and birds, plant-dwelling grubs are also known to have been eaten, with Brierly (1842/43: 10) noting that a white grub called "Burdie", found in decaying Xanthorrhoea, was a "much esteemed and appreciated" foodstuff.

Various plant food resources are also reported in the ethnohistorical literature of the region. Robinson (1844), with reference to the "Biggah" (Bega) 'tribes', notes the processing and consumption of large quantities of Zamia nuts (*Macrozamia riedlei*), with the fruits of the Kangaroo apple (*Solanum laciniatum*), Pigface (*Carpobrotus glaucescens*) and Native Cranberry (*Astroloma humifusum*) also cited as commonly eaten plant foods. Aboriginal exploitation of the Cabbage tree palm (*Livistona australis*) is likewise noted by Robinson (1844: 235), as is the consumption of "roots" (Robinson, 1844: 247), with the latter observed in an inland, riverside context (i.e., Buckajo, Bega Valley). Maiden

(1904:79-80) reports that "[y]oung roots and shoots of Kurrajong were much sought after" by Aboriginal people living in the Bega/Candelo region.

6.5 Material Culture

Aboriginal material culture is explicitly linked to the natural environment and resource availability. For the Far South Coast region, available historical records identify a diverse range of hunting and gathering 'gear'. Domestic structures also are well-represented in the literature and were often the subject of illustration. Huts were of timber, bark and sometimes grass construction, with relevant descriptions, drawn from Attenbrow's (1976) and Sullivan's (1982) reviews of the literature, provided in Table 12. Attenbrow's (1976) sketches of Far South Coast huts, based variously on sketches and/or descriptions by Robinson, Brierly and Stanley, are shown in Figure 24.

Table 12 Ethnohistorical descriptions of hut construction and/or form

Location	Description	Reference
Twofold Bay	A young sapling was (?) secured (?) to young trees as a sort of ridge pole some four feet from the ground, against this Toby [Brierly's guide] cunningly arranged sheets of bark and so formed a sloping roof sort of tent, with a few armfuls of soft grass for bedding; nothing could be more grateful and comfortable for a night's rest"	Brierly, n.d., a:47 in Sullivan, 1982: Table 6
Twofold Bay and Nadgee coastline	"..small bark huts…sheets of bark bent in two about 2 to 3 ft high in the centre"	Robinson, 1844: 85 in Attenbrow, 1976: 56
Twofold Bay	"Their huts like the others natives of the coast are simple and rude being sheets of bark in a trigonal shape with barely sufficient room to sit under"	Robinson in Mackaness, 1941: 335 (reported by Sullivan, 1982: Table 6)
Bega Valley	"Passed several recently formed camps but differently constituted to those of Twofold Bay - probably because no trees were large enough to afford large sheets of bark or severed when it would not strip. 3 sticks or more covered with strips of bark, sometimes with grass"	Robsinson 1844 in Mackaness 194: 1
Bega Valley	"some of the huts in the locality resembled a beehive and others, the half od a cupola"	Robinson 1844 in Mackaness, 1941: 335 (reported by Sullivan, 1982: Table 6)

Howitt (1904), for his part, lists the following items of material cultural for the Yuin people: boomerangs, grass-tree spears, shields, clubs (i.e., waddys), spear-throwers (i.e., womeras), possum skin rugs, possum fur belts, string bark 'dresses', bone nose-pegs, baskets, bags and digging sticks. Items excluded from Howitt's account but identified as part of Attenbrow (1976) and Sullivan's (1982) reviews include canoes, tomahawks (i.e., hatchets), bark buckets, kangaroo cloaks, rope, paddles, shell drinking vessels[6], barbed spears and fishing nets (Figure 25 and Figure 26). Ethnohistorical sources indicate that canoes, a commonly sighted item, were manufactured out of tree bark, with the ends of selected sheets of bark variously reported as having been "folded", "crimped" or puckered up". Methods of fastening are not specifically mentioned. However, based on observations from other parts of the South Coast, as well as Brierly's sketch (Figure 26), the use of bark cord and/or wooden "rivets" seem likely. Ribs and cross beams are also noted by Robinson (1844: 99 in Sullivan, 1982: 55).

Although particularly well represented in the Aboriginal archaeological record of the Far South Coast region, available ethnohistorical sources for the Far South Coast contain no references to the production and/or use of flaked stone artefacts. As in other regional contexts (e.g., Brayshaw, 1987), this absence of evidence may reflect the fact that such artefacts were no longer being used around the

[6] Specifically, use of abalone (*Haliotis gigantean*) shells as drinking vessels

time of European colonisation, presumably replaced with other materials (e.g. metal, glass). However, it is also possible that their use simply escaped the notice or interest of early observers.

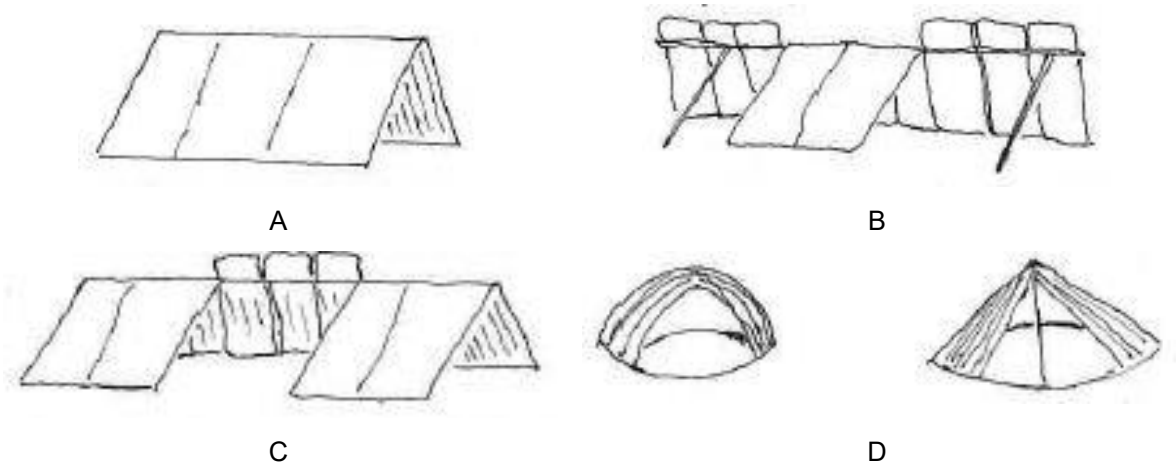

Figure 24 Sketches of Aboriginal huts observed on the Far South Coast, drawn by Attenbrow (1976) on the basis of descriptions or sketches by Brierly, Robinson and Owen Stanley. Dome and half cupola structures, 'D' observed by Robinson (1844) near the mouth of Bega River.

Figure 25 'Aborigine of Twofold Bay with artefacts' by Brierly, 1842-44 (from Attenbrow, 1976: Illustration 2)

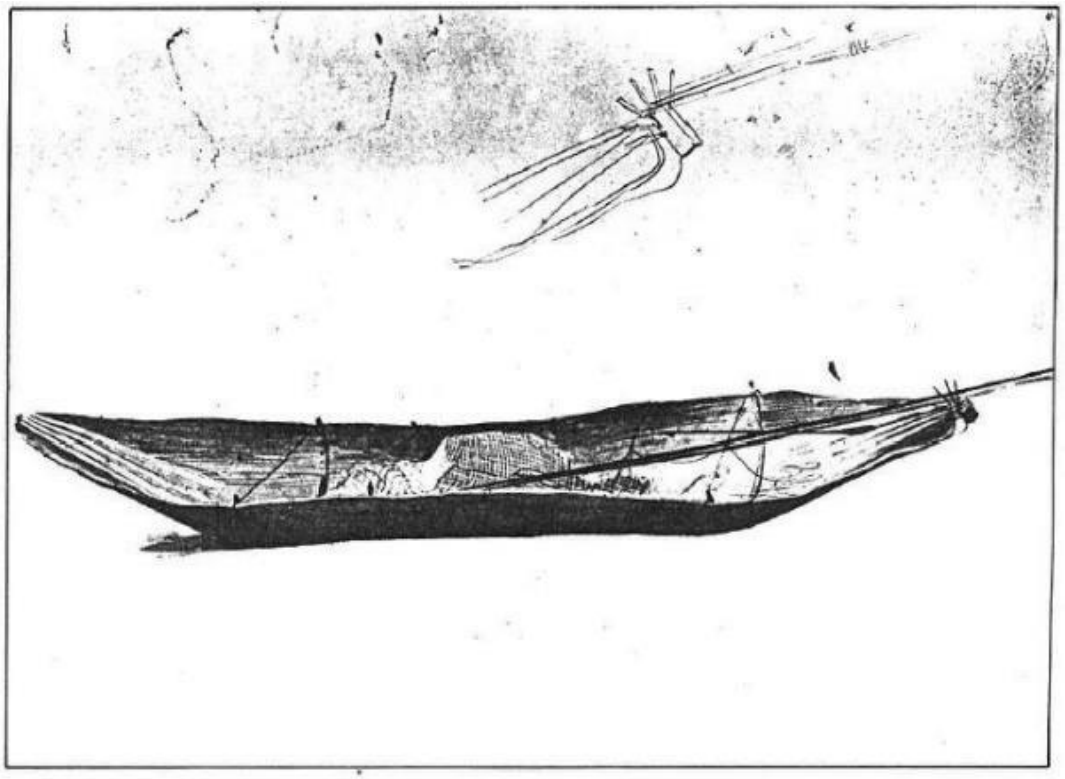

Figure 26 Twofold Bay canoe with fishing gear by Brierly, 1842-1844 (from Attenbrow, 1976: Illustration 1)

6.6 Ceremony and Ritual

Evidence for ceremonial or ritual behaviour amongst the Yuin peoples of the NSW South Coast, including the Far South Coast region, can be found in the accounts of a number of early observers (e.g., Howitt, 1904; Matthews, 1896, 1904; Matthews and Everitt, 1900; Robinson, 1844a, 1844b; Brierly, 1844a, 1844b; Warner, n.d.), with documented 'ceremonial' activities including corroborees, male initiation ceremonies, marriages, ritual combat, and various burial, body adornment and modification practices. Information regarding the spiritual beliefs of Yuin peoples, while limited, is also available, with the most detailed insights coming from Howitt (1904).

Boot (2002: 82), citing Howitt (1904: 439-440), notes the existence amongst south-eastern Australian Aboriginal groups, including the Yuin, of a common belief in a sky world to which the spirits of the deceased ascended after death. While similar to earth, Howitt (1904: 440) notes that this sky world was perceived by the Yuin as being "more fertile, bettered watered and plentifully supplied with game" (Howitt, 1904: 440). The sky world was the domain of Daramulum, the sky god, as well as the ghosts or spirits of the dead, which were known as *Tulugal* (Howitt, 1904: 462-463). In Yuin cosmology, communication with the Tulugul was made through the agency of trees, whose up reaching branches and subsurface root systems comprised pathways to the sky world and underworld respectively (Boot, 2002: 84). In addition to human ghosts, Howitt (1904: 462-463) reports that the word *Tulugal* was also applied to malevolent supernatural beings who lived in trees, rocks and caves in the mountains and were believed to steal and eat children. These entities could be lured out of their hiding places and destroyed via fire (Howitt, 1904: 463).

Male initiation ceremonies amongst the Yuin, called *Kuringal*, are described by Howitt (1904), Matthews (1896), Brierly (1843a: 14 in Boot, 2002: 85; 1844a:39 in Boot, 2002: 85), with Brierly's accounts relating to ceremonies witnessed by him in the Twofold Bay area at East Kiah in 1843 and Boyd town in 1844. Howitt (1904: 513) notes differing terminology for *Kuringal* with and without associated earthen mounds, the former called *Bunan* and the latter, *Kadja-wallung*. Initiation grounds were elaborately prepared, with Howitt (1904: 540), Matthews (1986: 3330, 344), Townsend (1848: 101-105), for example, noting the presence of carved trees at initiation sites (see also Howitt, 1904: 519). Kuringal are known to have attracted people from a vast geographic area, with Howitt (1904:718), for example, noting the attendance of people "from a district included by the Shoalhaven

River, Braidwood, the southern part of the Manero, and Twofold Bay" (see also Matthews (1904) and Fraser (1883). Such events also served as an important venue for the exchange of goods (Howitt, 1904: 718-719).

Robinson (1844b: 182-184, in Sullivan, 1982: 78) and Brierly (n.d., b:59-60, in Sullivan, 1982: 78) describe burial ceremonies at Twofold Bay, with both men noting the use of bark shrouds and the placement of heavy logs and boughs over the grave. Robinson (1844 in Mackaness, 1941: 333) also reports the location of the burial as being in "a sequestered part of the forest".

6.7 Post Contact History

As in other parts of NSW and Australia more generally, the post-contact history of the Aboriginal population of the Far South Coast region is primarily one of dispossession and loss, with traditional hunting and camping grounds rapidly claimed and settled by Europeans, populations decimated by a variety of introduced diseases and surviving groups subject to various colonial initiatives aimed at assimilating them into an ostensibly superior European way of life. Nonetheless, armed resistance and friendly relations are also attested in the region's ethnohistorical record. The participation of Aboriginal people in European economic activities is similarly documented, with available records, for example, documenting Aboriginal peoples' involvement in a range of European pastoral and agricultural activities, as well as the whaling industry (for a detailed review see Goulding & Waters, 2005).

Today, modern Yuin people retain strong cultural connections to the South Coast region as a whole and are actively involved in the protection and promotion of their culture for future generations.

7.0 Archaeological Survey & Test Excavation Program

7.1 Archaeological Survey

7.1.1 Aims and Objectives

The overarching aim of the archaeological survey undertaken for this assessment was to identify and record any existing surface evidence of past Aboriginal occupation within the Project area. Specific, 'nested' objectives, meanwhile, were as follows:

- To re-locate and reassess previously recorded sites 62-6-0173 and 62-6-0475;
- To sample all landform elements within the Project area, with a particular emphasis on landforms of demonstrated archaeological potential;
- To ground-truth levels of past land disturbance across the Project area; and
- To identify areas of subsurface Aboriginal archaeological sensitivity.

7.1.2 Survey Strategy

In developing an appropriate survey methodology for the current assessment, three key factors were taken into consideration. These included:

1. Very poor Ground Surface Visibility (GSV) conditions in areas of remnant / regenerating native vegetation to the east and west of Arthur Kaine Drive;
2. Generally poor survey conditions in these same areas, with dense undergrowth impeding pedestrian survey and posing a significant Work Health and Safety (WH&S) risk; and
3. The presence of areas of severely disturbed terrain within the Project area, with the majority of land to the west of Arthur Kaine Drive, for example, assessed pre-survey as retaining negligible Aboriginal archaeological potential.

In view of the above, it was decided that the survey would focus on areas of cleared land to the east of Arthur Kaine Drive[7], as well as Merimbula Main Beach. Examination of historical aerial photographs prior to survey suggested that, compared with that to west of Arthur Kaine Drive, land within this portion of the Project area *generally* retained higher levels of integrity and, by extension, Aboriginal archaeological potential.

7.1.3 Field Team and Methods

Archaeological survey of the Project area, as it was defined in October 2018 (see Figure 27), was undertaken on Tuesday 2 October 2018 by a combined field team of two AECOM archaeologists, three RAP field representatives and a representative from BVSC. Survey participants are listed by organisation in Table 13. As per the survey strategy developed prior to survey, areas of cleared land to the east of Arthur Kaine Drive were targeted for survey. However, transects were also completed to the west of Arthur Kaine Drive, within and adjacent to the fenced Merimbula STP complex.

All survey was conducted on foot, with a total of 15 transects completed over the course of the survey. The location of each transect completed during survey, including start and end points, was recorded using a handheld differential GPS unit, with associated transect data (e.g., levels of visibility and exposure) entered directly into the same unit upon the completion of each transect.

All Aboriginal archaeological materials identified during survey were recorded to the standard required by the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*, with individual artefact locations captured by differential GPS. Attribute data for all identified Aboriginal objects were entered directly into the same unit using AECOM's standard digital open site recording form. All sites were comprehensively photographed following artefact recording.

[7] Specifically, vehicle tracks, cleared utility easements and land surrounding the exfiltration ponds / former sand quarry

Table 13 Survey team by organisation

Organisation	Representative	Position
AECOM Australia Pty Ltd	Dr Andrew McLaren	Archaeologist
	Luke Atkinson	Archaeologist
BVSC	Bernie Maher	STP Operator
Bega LALC	Ron Thomas	Site officer
Eden LALC	BJ Cruse	Site officer
	Serina Maher	Site officer

7.1.4 Survey Results

7.1.5 Survey Coverage and Effective Coverage

As indicated in Section 7.1.3, a total of 15 pedestrian transects were completed over the course of the survey. Transect locations are shown on Figure 27. Recorded transect data indicate that a total survey coverage of approximately 8 ha, representing around 16.6% of the 2018 Project area, was achieved. A breakdown of survey coverage by landform is provided in Table 14.

Effective coverage is an estimate of the area in which archaeological materials are 'detectable'. Calculation of the total effective coverage obtained for the current survey indicates that approximately 4.3 ha of the Project area was effectively surveyed for Aboriginal archaeological materials. This equates to around 8.9% of the Project area and 54.3% of the total area surveyed (Table 15). Tabulated estimates of the effective coverage achieved for each of the 15 transects completed during survey are provided in Table 16. Estimates range from 2 to 100%, with higher values linked principally to enhanced ground surface visibility conditions along vehicle tracks, as well as excellent visibility on Merimbula Main Beach.

Unsurprisingly, calculation of levels of effective survey coverage by landform (Table 15) shows that effective coverage was highest within the beach landform unit (2.6 ha, 60.2%). Values for the remaining landform units are significantly lower, with the backbarrier sand flat (0.5 ha, 11.7%) and foredune (0.7 ha, 16.6%) units exhibiting similar values. Landform-based artefact counts, provided in Table 15, do not accord with these data, with the majority (n = 73, 85.9%) of Aboriginal objects identified during survey occurring within the backbarrier sand flat unit.

Table 14 Survey coverage by landform

Landform unit	Area (ha)	%
Backbarrier flat	0.92	11.7
Beach	2.73	34.5
Disturbed	2.44	30.9
Estuarine plain	0.03	0.4
Foredunes	0.96	12.1
Tertiary ridgeline	0.83	10.4
Total	**7.92**	**100**

Table 15 Effective coverage data by landform with surface artefact counts

Landform unit	Effective coverage (ha)	% of total effective coverage	Number of Aboriginal objects[1]	% of total artefacts
Backbarrier flat	0.5	11.73	73	85.9
Beach	2.58	60.22	-	
Disturbed	0.29	6.86	11	12.9
Estuarine plain	0.0013	0.03	-	
Foredunes	0.71	16.62	1	1.2
Tertiary ridgeline	0.19	4.55	-	-
Total	4.28	100	85	100

[1]Individual stone artefacts and shells/shell fragments

Table 16 Survey coverage data by transect

Transect Id	Landform unit(s)	Length (m)	Survey unit area (m²)	Visibility (%)	Exposure (%)	Effective coverage area (m²)	Effective coverage (%)
01	3,4	912	9056.7	10	40	362.3	4
02	3	474	4720.1	10	30	141.6	3
03	3	166	1739	10	30	52.2	3
04	3	354	3508	20	50	350.8	10
05	3	52	594.7	10	20	11.9	2
06	1,3,6	837	8229.3	40	90	2962.5	36
07	1,6	378	3811.5	10	90	343.0	9
08	1,3,5	254	2340.3	80	90	1685.0	72
09	1,3	408	3896.9	70	90	2455.1	63
10	1,2,5	1985	19792.1	90	100	17812.9	90
11	3,5	259	2520.4	60	60	1058.6	42
12	1,3,5	477	4707.9	40	90	1694.8	36
13	5	74	465.6	90	100	419.0	90
14	1	91	787	70	80	440.7	56
15	2,5	1318	13055.9	100	100	13055.9	100

1 Landform units: 1 = Backbarrier flat; 2 = Beach; 3 = Disturbed; 4 = Estuarine plain; 5 = Foredunes; 6 = Tertiary ridgeline

FIGURE 27: SURVEY TRANSECTS UNDERTAKEN DURING THE 2018 SURVEY

Legend

- Project Area
- 2018 Project Area
- Survey Transect

N

0 200 400 m

AECOM

Source: Nearmap, 2019

7.1.6 Surface Sites

A total of three new Aboriginal archaeological sites, consisting of two shell midden sites and one isolated artefact, were identified during survey. All are located on vehicle tracks within the Merimbula Barrier sand mass. Previously recorded scarred tree 62-6-0475 was also re-located during survey. However, the scar on this tree has been reassessed as a European survey mark. The recorded location of burial site 62-6-0173 was also inspected during survey. However, no definite or potential human remains were observed at or immediately surrounding this location.

Newly identified shell midden sites have been designated as 'Merimbula STP SM1' and 'Merimbula STP SM2', while the isolated artefact has been designated as 'Merimbula STP IA1'. Reference to Figure 28 indicates that one of these sites - Merimbula STP SM2 - is located partially within the Project area, with the remaining two sites located wholly outside of it.

Merimbula STP SM1 contains only shell. However, Merimbula STP SM2 contains both flaked stone artefacts and midden shell. Descriptions of each site are provided below.

7.1.7 Merimbula STP SM1

Site Type: Shell midden **GPS Coordinates:** *Redacted for cultural reasons*

Date Recorded: 2 October 2018 **1:25,000 Topographic Map:** Pambula 8824-2S

Recorder(s): A.McLaren & L. Atkinson **Visible site area:** 28 x 4 m (112 m^2)

Landform Unit: Backbarrier sand flat **Vegetation:** Derived shrubland

Slope: Very gently inclined (1-3%) **Ground Integrity:** Low **Average GSV:** 60%

Disturbance Factors: Native vegetation clearance, light vehicle track construction / use

Distance to Ocean: c.500 m **Distance to Merimbula Lake:** c.250 m

Site Description:

Merimbula STP SM1 consists of a low density scatter of midden shell on and immediately adjacent to a north-south trending light vehicle track located within a cleared powerline easement to the east of Arthur Kaine Drive (Plate 3 and Plate 4). The site is located at the interface between the Merimbula Barrier's backbarrier sand flat and the Tertiary ridgeline that abuts this flat to west. Land to the immediate north of the site, outside of the cleared easement, supports a dense cover of estuarine scrub vegetation (Plate 5). Shell material was observed across an area of c.28 x 4 m, with majority occurring on the vehicle track. Fifty-five individual pieces of shell were noted during survey, with almost all comprising small fragments. Cockle (Anadara trapezia) is the dominant species, accounting for 78.2% of the site's total observed shell assemblage (n = 43). Other species represented include mud whelk (Pyrazus ebeninus) (n = 7, 12.7%) and oyster (Ostrea angasi or Saccostrea glomerata) (n = 5, 9.1%)

Plate 3 View across Merimbula STP SM1, facing south (Photograph: AECOM, 2018)

Plate 4 Close up of exposed midden shell within Merimbula STP SM1 (Photograph: AECOM, 2018)

Plate 5 **View north from northernmost extent of Merimbula STP SM1. Note low-lying swampy terrain and dense estuarine scrub vegetation either side of cleated powerline easement (Source: AECOM, 2018)**

7.1.8 Merimbula STP SM2

Site Type: Shell midden
GPS Coordinates: *Redacted for cultural reasons*
Date Recorded: 2 October 2018
1:25,000 Topographic Map: Pambula 8824-2S
Recorder(s): A.McLaren & L. Atkinson
Visible site area: 45 x 3 m (135 m^2)
Landform Unit: Backbarrier sand flat
Vegetation: Cleared / Sand Forest
Slope: Level (≤1 %)
Ground Integrity: Low
GSV: 80%
Disturbance Factors: Native vegetation clearance, light vehicle track construction / use
Distance to Ocean: c.340 m
Distance to Merimbula Lake: c.360 m

Site Description:

Merimbula STP SM2 consists of a low density scatter of midden shell and flaked stone artefacts on a north-south trending light vehicle track to the immediate west of the exfiltration ponds on Lot 1 DP853245 (Plate 6). The landscape context of the site is that of the Merimbula Barrier's backbarrier sand flat. Shell and stone artefacts were observed along a c.45 m stretch of the track, with 11 individual shell pieces and 22 flaked stone artefacts recorded during survey. Shell species include cockle (*Anadara trapezia*) (n = 6, 54.5%), mud whelk (*Pyrazus ebeninus*) (n = 4, 36.4%) and oyster (*Ostrea angasi* or *Saccostrea glomerata*) (n = 1, 9.1%). Flaked stone artefacts, all of which are manufactured out of quartz, include two flakes, eight flake shatter fragments, nine angular shatter fragments and two cores (one multidirectional, one bipolar) (Plate 7).

Plate 6 View across Merimbula STP SM2, facing north (Source: AECOM, 2018)

Plate 7 Multidirectional quartz core identified within Merimbula STP SM2 (Source: AECOM, 2018)

7.1.9 Merimbula STP IA1

Site Type: Isolated artefact

GPS Coordinates: *Redacted for cultural reasons*

Date Recorded: 2 October 2018

1:25,000 Topographic Map: Pambula 8824-2S

Recorder(s): A.McLaren & L. Atkinson

Visible site area: 1 x 1 m

Landform Unit: Foredunes

Vegetation: Cleared / Sand Forest

Slope: Moderate (3-10%)

Ground Integrity: Low

GSV: 100%

Disturbance Factors: Native vegetation clearance, light vehicle track construction / use

Distance to Ocean: c.280 m

Distance to Merimbula Lake: c.400 m

Site Description:

Merimbula STP IA1 consists of isolated flaked stone artefact on a deeply incised east-west trending section of vehicle track to the north of the exfiltration ponds on Lot 1 DP853245 (Plate 8). The artefact, which has been exposed by 4WD activity and is not *in situ*, consists of a quartz angular shatter fragment with a maximum linear dimension of 29 mm (Plate 9). No other artefacts were observed in the vicinity.

Plate 8 **View across Merimbula STP IA1, facing east. Note 'incision' of vehicle track into dune. Artefact identified next to GPS, centre mid-ground (Source: AECOM, 2018)**

Plate 9 Merimbula STP IA1: isolated quartz angular shatter fragment (Source: AECOM, 2018)

7.1.10 Burial Site 62-6-0173

Burial site 62-6-0173, as indicated in Section 5.3.1, was identified in 1988 as part of an archaeological survey for a proposed upgrade to the Merimbula STP. The site, as originally identified, consisted of three clusters of highly decayed and fragmented bone on a “somewhat stable sloping surface” located on the south-eastern edge of what was then a disused sand quarry (ANUTECH, 1986: 7). This surface was interpreted as having formed through the slumping of the quarry’s formerly near vertical walls. Described as being “barely recognizable due to their advanced state of decay”, the identified remains were noted to “lie some 2 to 3 m below the presumed original surface of the quarry” and were found over a distance of approximately 11 metres (ANUTECH, 1988: 7). A scatter of flaked stone artefacts, consisting of a quartz core and flakes of chalcedony and quartz, was also identified in the vicinity of the remains.

The registered location of burial site 62-6-0173 was inspected during survey and found to consist of an area of sparsely vegetated foredune to the immediate southeast of the STP’s southern exfiltration pond (Plate 10). GSV across this area, which was assessed in the field as being in a relatively stable condition, was generally excellent. However, no definite or potential human remains, nor any other form of Aboriginal archaeological evidence (e.g., midden shell, flaked stone artefacts), was observed during survey. Given their advanced state of decay in 1988, it is considered likely that the skeletal remains identified in this area have been completely destroyed through natural weathering processes. Stone artefacts observed in the vicinity, in contrast, are likely still present. However, none were observed during survey, likely a product of aeolian sand movement. Intact and predominantly intact dune ridges within the Project area, including those immediately surrounding the registered location of burial site 62-6-0173, are considered to retain high potential for additional Aboriginal burials.

Plate 10 View across registered location of burial site 62-6-0173, facing east (Source: AECOM, 2018)

7.1.11 Scarred Tree 62-6-0475

Previously recorded scarred tree Merimbula Crown Lands Sandpit (62-6-0475) was relocated at [*coordinates redacted for cultural reasons*], approximately 87 m south of its AHIMS registered location. The tree, a mature living E. pilularis, is located approximately 8 m to the north of east-west trending light vehicle track on Lot 7307 on DP1167035 and exhibits a single scar consistent with a European survey mark (Long, 2003: 15-17). The scar, the dimensions of which are provided in Table 17, exhibits a series of steel metal axe marks across its base, as well as a carved cross with a steel nail hammered into its centre (Plate 11 and Plate 12). No letters or numbers are visible. The scar is in good condition.

Based on field observations, an Aboriginal origin for the scar on this tree is considered unlikely. Nonethless, in view of RAP feedback, 62-6-0475 will be managed as an Aboriginal site.

Table 17 Size data for scar on previously recorded scarred tree 62-6-0475

Scar length (cm)	Scar Width (Lower) (cm)	Scar Width (Mid) (cm)	Scar Width (Upper) (cm)	Depth (cm)	Height of scar above ground (cm)
92	22	26	20	9	93

Plate 11 **Previously recorded scarred tree 62-6-0475. Note steel axe marks at base of scar and carved cross with nail (Source: AECOM, 2018).**

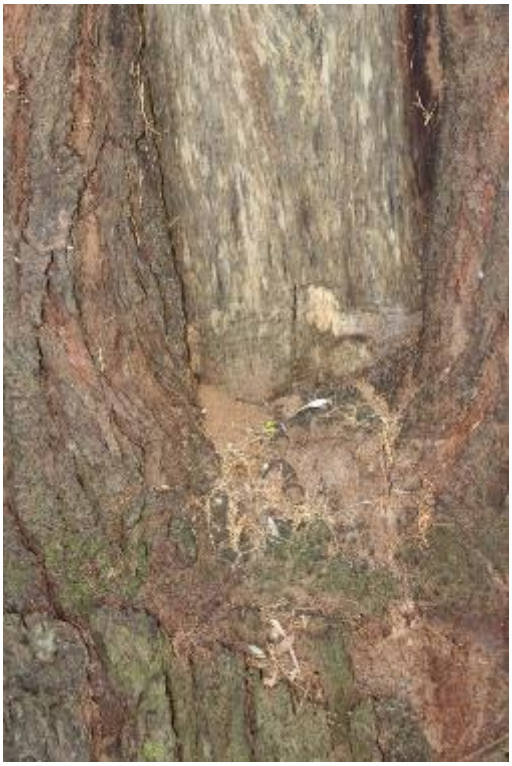

Plate 12 **Close up of steel axe marks at base of scar on 62-6-0475 (Source: AECOM, 2018).**

7.1.12 Additional Features of Interest

In addition to previously recorded scarred tree 62-6-0475, a further five modified trees were identified during survey. Summary information on these trees, all of which were assessed in the field as definite or probable European survey reference trees, is provided in Table 18. Four scars exhibit steel axe marks in combination with carved letters or nails. All are located in the immediate vicinity of light vehicle tracks. The scar on Modified tree 5 is in very poor condition precluding a more definite assessment of its origin. On the basis of available evidence, however, a European origin seems likely.

Table 18 **Summary information on definite/probable European survey reference trees identified during survey**

Site Id	Location		Tree species	Living / Dead	Number of scars	Steel axe / chainsaw marks (Y/N)	Carved numbers / letters (Y/N)	Steel nail(s) (Y/N)	Plate
	MGAE	MGAN							
Survey reference tree #1	758384	5910161	Eucalyptus sp.	Dead	1	Y	Y	N	Plate 13
Survey reference tree #2	758144	5910278	E. pilularis or E. botryoides	Living	1	Y	Y	N	Plate 14 Plate 15
Survey reference tree #3	758380	5910314	Eucalyptus sp.	Dead	2	Y	N	N	Plate 16 Plate 17

Site Id	Location		Tree species	Living / Dead	Number of scars	Steel axe / chainsaw marks (Y/N)	Carved numbers / letters (Y/N)	Steel nail(s) (Y/N)	Plate
	MGAE	MGAN							
Survey reference tree #4	758385	5910277	Eucalyptus sp	Dead	1	N	N	N	Plate 18
Survey reference tree #5	758541	5910116	B. integrifolia	Living	2	Y	N	Y	Plate 20 Plate 21 Plate 22

Figure removed for cultural reasons

Figure 28 Survey Results

Plate 13 **Survey reference tree 1. Note carved lettering (Source: AECOM, 2018).**

Plate 14 **Survey reference tree 2 (Source: AECOM, 2018).**

Plate 15 **Close up of scar on Survey reference tree 2. Note steel axe marks at base and carved lettering (Source: AECOM, 2018).**

Plate 16 **Survey reference tree 3, Scar #1. Note steel axe marks at base (Source: AECOM, 2018).**

Plate 17 **Survey reference tree 3, Scar #2. Note steel axe marks at base (Source: AECOM, 2018).**

Plate 18 **Survey reference tree 4, facing north-northwest (Source: AECOM, 2018).**

Plate 19 **Close up of scar on Survey reference tree 4. Note poor condition (Source: AECOM, 2018).**

Plate 20 **Survey reference tree 5, facing east (Source: AECOM, 2018).**

Plate 21 **Survey reference tree 5, Scar #1. Note nail in centre (AECOM, 2018).**

Plate 22 **Survey reference tree 5 on Modified tree 2. Note steel axe marks at base Source: AECOM, 2018).**

7.2 Test Excavation Program

7.2.1 Background & Rationale

BVSC have undertaken a number of fieldwork investigations to inform the final concept design for the Project. These investigations have included both terrestrial and marine investigations, with the former comprising geophysical and biodiversity surveys, as well as a geotechnical drilling program.

In mid-2017, AECOM completed a standalone Aboriginal archaeological due diligence assessment for proposed geophysical survey works within the then Project area (AECOM, 2017). This assessment determined that the proposed works constituted a low impact activity under the NPW Regulation and carried a negligible impact risk for Aboriginal heritage. Nonetheless, a series of recommendations were made to avoid any inadvertent impacts to Aboriginal objects.

Subsequent to the above, in October 2018, AECOM's heritage team was tasked with 'clearing' nine potential geotechnical borehole locations within the then Project area (Figure 29 and Table 19). All nine locations were physically inspected as part of the archaeological survey detailed in Section 7.1, with no surface Aboriginal objects identified. Nonetheless, all but two were assessed in the field as retaining potential for subsurface archaeological deposits (albeit of variable character and/or integrity). BH004, located on a bitumen hardstand adjacent to the entrance to the Merimbula STP, was assessed in the field as retaining no subsurface archaeological potential. BH005, located on a heavily eroded vehicle track on the eastern flank the site's Tertiary ridgeline, was likewise assessed as retaining no subsurface archaeological potential due to complete topsoil loss through erosion.

In order to avoid impacts to any subsurface Aboriginal objects present at borehole locations BH002A, BH002B, BH002C, BH003, BH006, BH007 and BH008, a program of archaeological test excavation focussing on these seven locations was deemed warranted for the Project. While recognising the subsurface archaeological potential of other portions of the Project area, including the Merimbula Barrier's foredune and backbarrier sand flat units more broadly, a larger-scale subsurface testing program was not undertaken for the current assessment in view of:

a. the location and/or nature of Project's proposed ground disturbance activities, which generally carry a negligible impact risk; and

b. Requirement 14 of the of Code of Practice, which excludes from the legal definition of harm any subsurface investigations carried out in areas known or likely to contain Aboriginal burials.

In compliance with Requirement 15c of the Code of Practice, notification of AECOM's intention to undertake the program of test excavation detailed in this report was provided, in writing, to OEH on 3 September 2018. Subsequent written and verbal correspondence with OEH and DPE regarding the permissibility of the proposed test excavation program, which continued up to 3 October 2018 (the day prior to testing), confirmed that the excavations could proceed subject to AECOM's adherence to the following mitigation measures:

- No test excavations would be undertaken within 50 meters of registered burial site 62-6-0173
- Test excavations would be limited to locations proposed for intrusive geotechnical works
- Should any suspected human remains be encountered during testing, Requirement 25 of the Code of Practice would be followed
- Should any test pit intercept intact shell midden deposit, the extent of excavation in that location would be limited to 50cm x 50cm to minimise impact to the deposit. In addition, an alternative location would be found; and
- That representatives from the Eden and Bega LALCs were present during the test excavations.

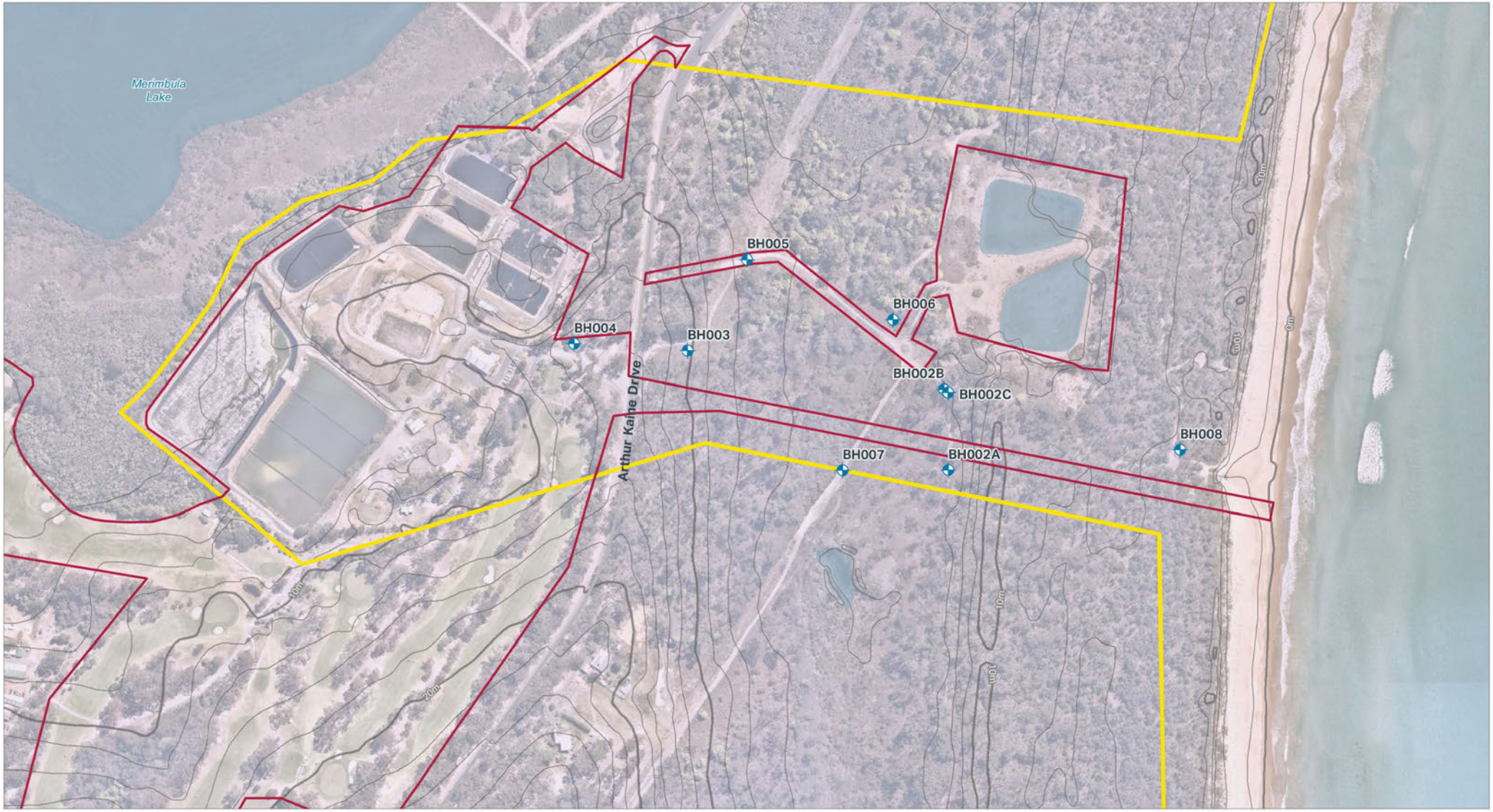

FIGURE 29: BOREHOLE LOCATIONS

Legend

- Study area
- 2018 Project area
- Borehole Location

N

0 100 200 m

AECOM

Source: Nearmap, 2019

Table 19 Potential geotechnical borehole locations within the Project area

BH ID	MGAE	MGAN
BH002A	758390	5910104
BH002B	758385	5910184
BH002C	758390	5910179
BH003	758148	5910218
BH004	758053	5910228
BH005	758207	5910301
BH006	758343	5910241
BH007	758295	5910109
BH008	758601	5910122

7.2.2 Sampling Strategy & Methods

Test pit locations, shown on Figure 30, were dictated by the geotechnical works program, with test pits centred on geotechnical boreholes BH002A, BH002B, BH002C, BH003, BH006, BH007 and BH008. In accordance with the Code of Practice, all test pits were hand excavated as 50 x 50 cm units, with 5 cm spits employed during the excavation of the first test pit (TP1) and 10 cm spits thereafter. Excavation in all artefact-containing pits proceeded a minimum of two additional spits (20 cm) below the lowest artefact-bearing spit.

All excavated sediment was dry-sieved on-site through 5mm wire-mesh sieves. All definite and potential Aboriginal objects were collected at the sieves and bagged by square and spit. Representative profiles in test pits were drawn and photographed, with test pit stratigraphy recorded on pro forma test pit recording sheets using standard sedimentological terms and criteria (after McDonald & Isbell 2009). All pits were backfilled after excavation

7.2.3 Results

A total of 84 Aboriginal objects, consisting exclusively of flaked stone artefacts, were recovered from three of the seven test pits excavated as part of the current investigation. Artefact-bearing test pits comprised TPs 3, 4 and 6, centred on boreholes BH002A, BH002B and BH002C respectively, with TP6 containing the largest number of artefacts (n = 63), followed by TP4 (n = 12) and TP3 (n = 9). All three pits were located on east-west trending spur or ‘finger’ dunes overlooking an area of freshwater wetland within the backbarrier sand flat unit. Descriptions of all test pits are provided in Table 20.

Vertical distribution data for recovered artefacts indicate that the majority (n = 62, 73.8%) occurred between 20 cm and 30 cm below ground level (b.g.l). with the deepest artefacts occurring between 50 cm and 60 cm b.g.l in TP4. In TPs 3 and 6, no artefacts were recovered below 40 cm b.g.l. Data for TP4 indicate a bimodal distribution, with peaks between 10 and 20 cm b.g.l (n = 5, 41.6%) and 40 cm and 50 cm b.g.l (n = 4, 33.3%).

Observed soils and soil profiles were, in general, consistent with those described by Tulau (1997) for the Wallagoot Foredune (wf), Pambula (pa) and Tathra (tac) soil landscapes. Profiles in test pits on the western edge of the barrier’s foredune unit (TPs 3,4 and 6), classified in-field as well-drained Podzol profiles, showed significantly greater pedogenic development than that in the TP8, located in a high foredune context. Distinct A1 and A2 soil horizons overlying C horizon sands were evident in these contexts. Profiles in the two pits excavated within the backbarrier sand flat unit (TPs 2 and 5) were likewise classified in-field as Podzol profiles. However, both appeared comparatively poorly drained. Extant soil profiles in these contexts were sampled to a depth of 50 cm, revealing distinct A1 soil horizons overlying A2 horizon sands (inferred subsoil, after Tulau, 1997: 161). Soils within TP1, located in a Tertiary ridge-flank context, were consistent with those described for the Pambula soil landscape (pa), with sandy A1 and A2 soil horizons overlying Tertiary parent materials.

Evidence for anthropogenic disturbance to extant soil profiles was restricted to the presence of imported volcanic rocks in the upper 30 cm of TP8.

Table 20 Test pit results: summary information

Borehole ID	Test Pit ID	Location		Landform unit	Landform element (observed)	Soil landscape	Mapped vegetation community	Stratigraphy	Aboriginal objects? (Y/N)	Plate
		MGAE	MGAN							
BH002A	4	758390	5910104	Foredunes	Dune crest	Wallagoot Foredune	Coastal sand forest	**0-29 cm:** Grey (10YR 5/1) speckled black (10YR 2/1) sand with high organic content (A Horizon) **29-45 cm:** Grey (10YR 6/1) sand (A2 Horizon) **45-80 cm:** Light brownish grey (10YR 6/2) sand (C horizon) **80 cm +:** Light brownish grey (10YR 6/2) sand (C horizon)	Y	Plate 23
BH002B	3	758385	5910184	Foredunes	Dune crest	Wallagoot Foredune	Coastal sand forest	**0-28 cm**: Dark grey (10YR 4/1) sand with high organic content (A1 Horizon) **28-47 cm:** Grey (10YR 6/1) sand (A2 Horizon) **47-50 cm:** Yellowish brown 10YR 5/4 (C horizon) **50 cm +:** Yellowish brown 10YR 5/4 (C horizon)	Y	Plate 24
BH002C	6	758390	5910179	Foredunes	Dune crest	Wallagoot Foredune	Coastal sand Forest	**0-23 cm:** Dark grey (10YR 4/1) sand with high organic content (A1 Horizon) **23-45 cm:** Grey (10YR 6/1) sand (A2 Horizon) **45-60 cm:** Yellowish brown 10YR 5/4 (C horizon) **60 cm +:** Yellowish brown 10YR 5/4 (C horizon)	Y	Plate 25

Borehole ID	Test Pit ID	Location		Landform unit	Landform element (observed)	Soil landscape	Mapped vegetation community	Stratigraphy	Aboriginal objects? (Y/N)	Plate
		MGAE	MGAN							
BH003	1	758148	5910218	Tertiary ridgeline	Upper slope	Pambula	Derived shrubland	**0-13 cm:** Very dark grey(10YR 3/1) loamy sand with high organic content **13-42 cm:** Dark grey (10YR 4/1) fine silty sand **42 cm +:** Yellowish brown (10YR 5/4) sandy clay loam (C horizon -*In situ* Tertiary)	N	Plate 26
BH006	2	758343	5910241	Backbarrier flat	Flat	Tathra (Variant C)	Derived shrubland	**0-20 cm:** Grey (10YR 5/1) speckled black (10YR 2/1) sand with high organic content (A1 Horizon) **20-50 cm:** Grey (10YR 6/1) sand (A2 Horizon) **50 cm +:** Grey (10YR 6/1) sand (A2 Horizon)	N	Plate 27
BH007	5	758295	5910109	Backbarrier flat	Flat	Tathra (Variant C)	Derived sedgeland	**0-24 cm:** Grey (10YR 5/1) speckled black (10YR 2/1) sand with high organic content (A Horizon) **24-50 cm:** Grey (10YR 6/1) sand (A2 Horizon) **50 cm +:** Grey (10YR 6/1) sand (A2 Horizon)	N	Plate 28
BH008	7	758601	5910122	Foredunes	Dune crest	Wallagoot Foredune	Coastal scrub	**0-9 cm:** Dark grey (10YR 4/1) speckled black (10YR 2/1) sand with high organic content (A Horizon). Common imported volcanic rocks. **9-50 cm:** Brown (10YR 5/3) sand (C horizon). Common imported volcanic rocks to *c*.30 cm. **50 cm +:** Brown (10YR 5/3) sand (C horizon)	N	Plate 29

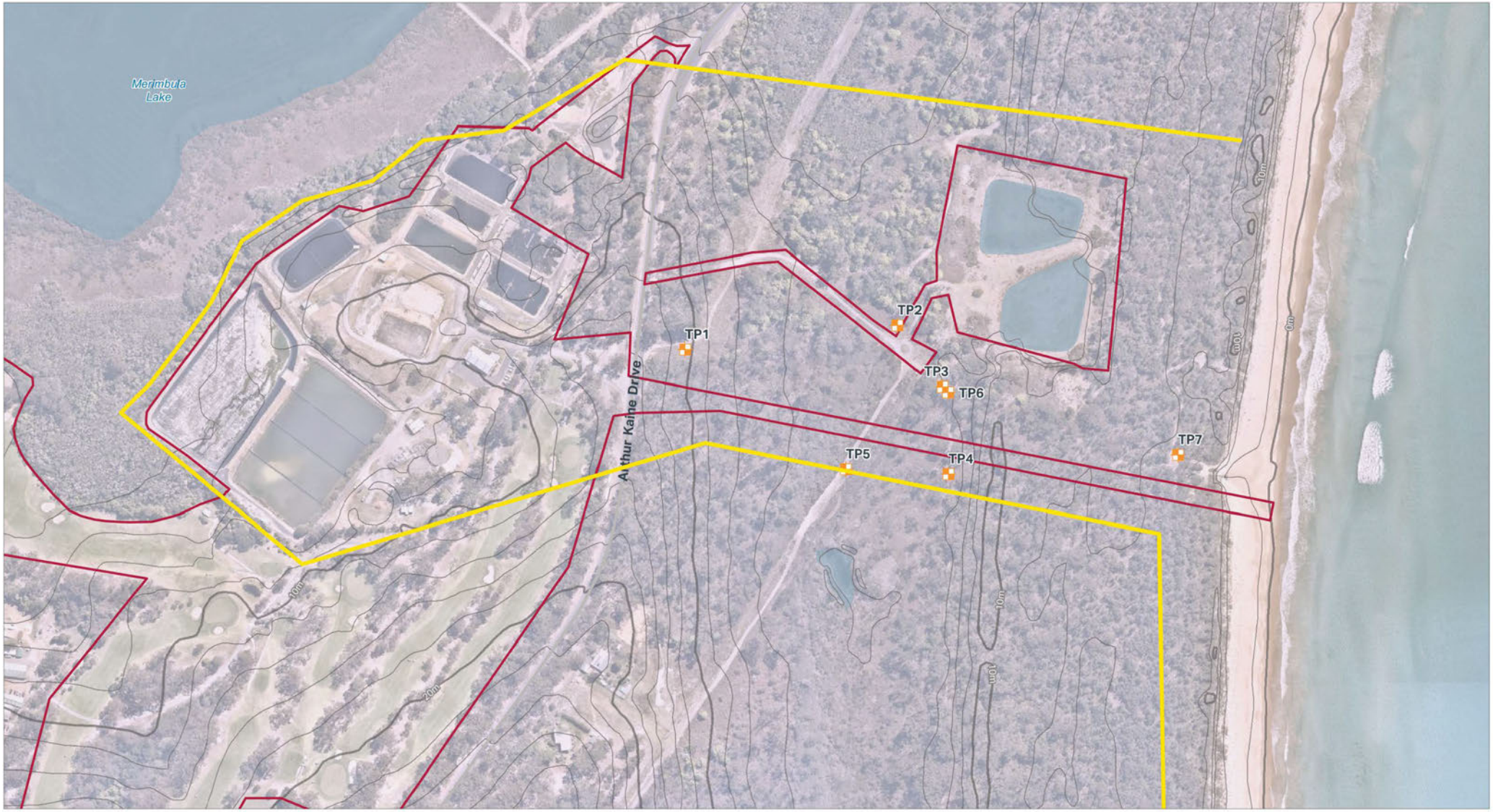

FIGURE 30: TEST PIT LOCATIONS

Legend

- Study area
- 2018 Project area
- Test Pit Location

N

0 100 200 m

AECOM

Source: Nearmap, 2019

Plate 23 BH002A / TP4, end excavation (Source: AECOM, 2018)

Plate 24 BH002B / TP3, end excavation (Source: AECOM, 2018)

Plate 25 BH002C / TP6, end excavation (Source: AECOM, 2018)

Plate 26 BH003 / TP1, end excavation (Source: AECOM, 2018)

Plate 27 BH006 / TP2, end excavation (Source: AECOM, 2018)

Plate 28 BH007 / TP5, end excavation (Source: AECOM, 2018)

Plate 29 BH008 / TP7, end excavation. Note stockpiled volcanic rocks (imported) on left (Source: AECOM, 2018)

7.2.4 Flaked Stone Artefact Assemblage

As indicated, a total of 84 flaked stone artefacts were recovered as result of the test excavation program. A typological breakdown of the recovered assemblage, provided in Table 22, shows that it is dominated by flake debitage items, which account for 63.1% of the assemblage by count. Non flake-debitage is comparatively poorly represented (n = 23, 27.4%). Recovered flake debitage items (n = 53) include 13 complete flakes, 13 proximal flakes, two split flakes, a single redirecting flake and 24 flake shatter fragments. Formed objects, meanwhile, include four cores and four backed artefacts.

Silcrete is the dominant raw material, accounting for 75% of the assemblage by count (n = 63) and 61.2% by weight (89.3 g). Lustrous red and pink artefacts - probable products of the flaking of heated silcrete blanks - are strongly represented (n = 56, 88.9%). Quartz is the second most common raw material, with a total of 14 quartz artefacts weighing 18.2 grams recovered. Seven acid volcanic artefacts, weighing 38.4 grams, complete the assemblage. Cortex is not represented.

Recovered artefacts are, in general, relatively small and light, exhibiting an average maximum linear dimension of 20.2±8.7 mm (range: 9.5-43.2 mm) and average weight of 1.7±4.4 g (range: 0.01-33 g).

Three complete cores and one core fragment were recovered. Complete specimens include two multidirectional cores (one silcrete, one acid volcanic) and a quartz bipolar core.

Retouched implements or tools consist exclusively of backed artefacts. Two are near complete Bondi points, while two are medial fragments of indeterminate form. In keeping with the assemblage as a whole, all but one were manufactured out of silcrete.

Table 21 Typological breakdown of flaked stone artefact assemblage by test pit

TP ID	BH ID	Technological Type										
-		Complete Flake	Proximal Flake	Redirecting Flake	Split Flake	Flake Shatter	Angular Shatter	Multi-directional Core	Bipolar core	Core Fragment	Backed artefact	-
3	BH002B	2	3			4						9
4	BH002A	2	1		2	3	4					12
6	BH002C	9	9	1		17	19	2	1	1	4	63
Total (n)	**-**	**13**	**13**	**1**	**2**	**24**	**23**	**2**	**1**	**1**	**4**	**84**
Total (%)		**15.5**	**15.5**	**1.2**	**2.4**	**28.6**	**27.4**	**2.4**	**1.2**	**1.2**	**4.8**	**100**

Table 22 Raw material breakdown of flaked stone artefact assemblage by test pit

TP ID	BH ID	Raw material			Total
		Silcrete	Quartz	Acid volcanic	
3	BH002B	8	1	-	9
4	BH002A	5	3	4	12
6	BH002C	50	10	3	63
Total (n)	**-**	**63**	**14**	**7**	**84**
Total (%)	**-**	**75**	**16.7**	**8.3**	**100**

7.3 Summary of Survey & Test Excavation Results

A summary of the key findings of the archaeological field investigation undertaken for this assessment is provided below:

- Archaeological survey of the Project area, as defined in late 2018, resulted in the identification of two new shell midden sites (Merimbula STP SM1 and Merimbula STP SM2) and one isolated stone artefact (Merimbula STP IA1). Merimbula STP SM1 contains only shell while Merimbula STP SM2 contains both shell and stone artefacts.
- Observed shell species in Merimbula STP SM1 and Merimbula STP SM2 indicate an economic emphasis on the estuarine resources of Merimbula Lake. Cockle (*Anadara trapezia*) is the dominant species in both middens, with other, less common species represented including mud whelk (*Pyrazus ebeninus*) and oyster (*Ostrea angasi* or *Saccostrea glomerata*).
- The registered location of burial site 62-6-0173 was inspected as part of the archaeological survey undertaken for this assessment and found to consist of an area of sparsely vegetated foredune to the immediate southeast of the STP's southern exfiltration pond. GSV across this area, which was assessed in the field as being in a relatively stable condition, was generally excellent. However, no definite or potential human remains, nor any other form of Aboriginal archaeological evidence (e.g., midden shell, flaked stone artefacts), was observed during survey.
- Given their advanced state of decay in 1988, it is considered likely that the skeletal remains identified in this area have been completely destroyed through natural weathering processes. Stone artefacts observed in the vicinity, in contrast, are likely still present. However, none were observed during survey, likely a product of aeolian sand movement.
- Intact and predominantly intact dune ridges within and adjacent to the Project area, including those immediately surrounding the registered location of burial site 62-6-0173, are considered to retain high potential for additional Aboriginal burials.
- Previously recorded scarred tree 62-6-0475 was reassessed during survey. The tree, a mature living *E. pilularis* located in close proximity to a vehicle track, exhibits a single scar consistent with a European survey mark. The scar exhibits a series of steel metal axe marks across its base, as well as a carved cross with a steel nail hammered into its centre. No letters or numbers are visible. The scar is in good condition.
- Observed soils and soil profiles within the seven test pits excavated were, in general, consistent with those described for their associated soil landscapes. Profiles in test pits on the western edge of the Merimbula Barrier's foredune unit (TPs 3,4 and 6), classified in-field as well-drained Podzol profiles, showed significantly greater pedogenic development than that in TP8, located in a high foredune context. Distinct A1 and A2 soil horizons overlying C horizon sands were evident in these contexts.
- Densities for artefact-bearing test pits (n = 3) ranged from low to high, with a maximum density of 63 artefacts per 0.25 m^2 occurring in TP6 centred on BH002C.
- Excavations at BH002B and BH002C, located on an east-west trending spur or 'finger' dune overlooking an area of freshwater wetland, appear to have intercepted part of a larger moderate-to-high density reduction foci.
- The primary purpose of the reduction foci intercepted at BH002B and BH002C appears to have been the production of small flakes suitable for on-site backed artefact manufacture.
- A total of 84 flaked stone artefacts were recovered as a result of subsurface testing, with the majority (n = 63, 75%) coming from TP6 (BH002C). Flake debitage items dominate the assemblage (n = 53, 63.1%), with non-flake debitage items (n = 23, 27.4%) and formed objects (n = 8, 9.5%) comparatively poorly represented.
- Formed objects include three complete cores, one core fragment and four backed artefacts.

- Raw material data attest to an emphasis on the procurement and reduction of silcrete, with 75% of artefacts (n = 63) manufactured of this material. Other, less commonly exploited raw materials include quartz (n = 14, 16.7%) and acid volcanic (n = 7, 8.3%).
- Cortex is not represented in the combined subsurface assemblage suggesting that raw material packages imported into the Project area had, in general, been extensively flaked prior to entry, presumably at locally exploited stone sources.

7.4 Reassessment of Archaeological Predictions

In Section 5.5, a series of predictions were made regarding the Aboriginal archaeological record of the Project area. In Table 23, the validity of these predictions is assessed against the results of the current archaeological field investigation.

Table 23 Evaluation of archaeological predictions

Prediction	Evaluation
Site types with high to very high potential to occur include shell middens and burials	The results of the current archaeological investigation provide partial support for this prediction. Two new shell midden sites, one of which also contains stone artefacts, were identified during survey. No burials were identified during survey or the subsurface testing program. However, intact to relatively intact dunes and areas of backbarrier sand flat within the Project area are assessed as retaining high potential for the presence of burials.
Site types with moderate to high potential to occur include open artefact sites and scarred trees	The results of the current archaeological investigation provide partial support this prediction. No definite or potential Aboriginal scarred trees were identified during survey. Scars on all six modified trees identified during survey, including AHIMS registered scarred tree 62-6-0475, are assessed as European survey marks. Subsurface testing has identified a large subsurface artefact scatter site within the Project area (Merimbula STP OAS1)
Surface and subsurface shell midden sites within the Project area will be dominated by estuarine species (i.e., cockle, mud whelk, mud oyster)	The results of the current archaeological investigation support this prediction. Cockle (Anadara trapezia) is the dominant species in both newly identified middens, with other, less common species represented including mud whelk (Pyrazus ebeninus) and oyster (Ostrea angasi or Saccostrea glomerata).
Given the Project area's proximity to Merimbula and Pambula townships, there exists moderate potential for one or more Aboriginal sites within this area to contain 'post-contact' materials (i.e., flaked bottle glass and/or ceramics)	No definite or potential post-contact materials were identified in association with any of Aboriginal archaeological sites identified as a result of the current investigation. However, there remains moderate potential for the presence of such materials.
Landforms with the highest Aboriginal archaeological potential within the Project area include the foredune and backbarrier sand flat components of the Merimbula Bay Barrier	The results of the current archaeological investigation support this prediction
Elevated dune surfaces adjacent to mapped areas of freshwater lagoon will contain the largest and most complex archaeological sites	The results of the current archaeological investigation provide some support for this prediction

Prediction	Evaluation
Most, if not all, of the Aboriginal archaeological materials present within the Project area will be of mid-to-late Holocene antiquity	Consideration of the geomorphic context of identified sites, as well as the technological/typological characteristics of associated flaked stone artefact assemblages and local archaeological datasets, suggests that identified sites/objects are of mid-to-late Holocene antiquity.
Burial sites, if present, will occur within the foredune or backbarrier sand flat landform units	No burial sites were identified as a result of the current archaeological investigation. However, AHIMS registered burial site 623-6-0173 was located in such a context. Intact to relatively intact dunes and areas of backbarrier sand flat within and adjacent to the Project area are assessed as retaining high potential for the presence of additional burials.
Flaked stone artefact assemblages will be dominated by artefacts manufactured out of one of three raw materials: quartz, silcrete or rhyolite	The results of the current archaeological investigation support this prediction.
Flaked stone assemblages will be dominated by flake debitage items (sensu Andrefsky 2005), with formed objects (i.e., cores and retouched flakes) comparatively poorly represented	The results of the current archaeological investigation support this prediction.
Complete and/or fragmentary backed artefacts will dominate the retouched components of recorded flaked stone artefact assemblages	The results of the current archaeological investigation support this prediction.
Tool types of demonstrated temporal significance, if present, will be limited to edge-ground hatchet heads and backed artefacts	The results of the current archaeological investigation support this prediction.

7.5 Aboriginal Sites

Taking into account the results of the archaeological field investigations undertaken for this assessment, as well as a critical review of existing AHIMS data, a total of six Aboriginal sites are recognised within and immediately surrounding the Project area, including two shell midden sites, two open artefact sites, registered burial site 62-6-0173 and previously recorded scarred tree 62-6-0475. Of these, three sites - burial site 62-6-0173, shell midden Merimbula STP SM2 (TBC) and subsurface artefact scatter Merimbula STP OAS1- are located partially within the Project area. The remaining three sites are located wholly outside of the Project area.

Site locations are shown on Figure 31.

Table 24 Aboriginal sites

Site Name	Centroid Coordinates*		New or existing site?	AHIMS Id(s)	Type	AHIMS Site Feature(s)	Landform unit(s)	Size (Area m^2)
	MGAE	MGAN						
Merimbula Treatment Works			Existing	62-6-0173	Burial	BUR; PAD	Foredunes	2053
Merimbula STP SM1			New	62-6-0812	Shell midden	SHL	Backbarrier flat	112
Merimbula STP SM2			New	62-6-0811	Shell midden	SHL	Backbarrier flat	135
Merimbula STP IA1			New	62-6-0810	Open artefact site (isolated artefact)	AFT	Foredunes	1
Merimbula STP OAS1			New	62-6-0809	Open artefact site (artefact scatter)	AFT; PAD	Foredunes	3524
Scarred tree			Existing	62-6-0475	Scarred tree	TRE	Backbarrier flat	N/A

**Coordinates redacted for cultural reasons*

Figure removed for cultural reasons

Figure 31 Aboriginal Sites

8.0 Significance Assessment

8.1 Principles of Assessment

Heritage sites hold value for different communities in a variety of different ways. All sites are not equally significant and thus not equally worthy of conservation and management (Pearson & Sullivan, 1995: 17). One of the primary responsibilities of cultural heritage practitioners, therefore, is to determine which sites are worthy of preservation and management (and why) and, conversely, which are not (and why) (Smith & Burke, 2007: 227). This process is known as *the assessment of cultural significance* and, as highlighted by Pearson and Sullivan (1995: 127), incorporates two interrelated and interdependent components. The first involves identifying, through documentary, physical or oral evidence, the elements that make a heritage site significant, as well as the type(s) of significance it manifests. The second involves determining the degree of value that the site holds for society (i.e., its cultural significance) (Pearson & Sullivan, 1995: 126) (Table 22).

In Australia, the primary guide to the assessment of cultural significance is the Australian ICOMOS Charter for Places of Cultural Significance (1999), informally known as The Burra Charter, which defines cultural significance as the "aesthetic, historic, scientific, social or spiritual value for past, present or future generations" of a site or place (ICOMOS, 1999: 2). Under the Burra Charter model, the cultural significance of a heritage site or place is assessed in terms of its aesthetic, historic, scientific and social values, none of which are mutually exclusive. Establishing cultural significance under the Burra Charter model involves assessing all information relevant to an understanding of the site and its fabric (i.e., its physical make-up) (ICOMOS, 1999: 12). The assessment of cultural significance and the preparation of a statement of cultural significance are critical prerequisites to making decisions about the management of any heritage site or place (ICOMOS, 1999: 11).

With respect to Aboriginal heritage, it is possible to identify two major streams in the overall significance assessment process: the assessment of scientific value(s) by archaeologists and the assessment of social (or cultural) value(s) by Aboriginal people. Each is considered separately below.

Table 25 Values relevant to determining cultural significance, as defined by The Burra Charter

Value	Definition
Aesthetic	"Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture and material of the fabric; the smells and sounds associated with the place and its use" (ICOMOS, 1999: 12).
Historic	"Historic value encompasses the history of aesthetics, science and society...[a] place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may have historic value as the site of an important event" (ICOMOS, 1999: 12).
Scientific	"The scientific or research value of a place will depend on the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute further substantial information" (ICOMOS, 1999:12).
Social	"Social value embraces the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group" (ICOMOS, 1999: 12).

8.2 Scientific Value

Scientific value refers to the importance of a place in terms of its rarity, representativeness and the extent to which it may contribute further information (i.e., its research potential) (OEH, 2011: 9).

8.2.1 Rarity and representativeness

Rarity and representativeness are related concepts. Rarity refers to the relative uniqueness of a site within its local and regional context. The scientific significance of a site is assessed as higher if it is unique or rare within either context. Conversely, it is considered to be of lower significance if it is common in one or both. The concept of representativeness, meanwhile, refers to the question of whether or not a site is "a good example of its type, illustrating clearly the attributes of its significance" (Burke & Smith 2004: 247). Representativeness is an important criterion as one of the primary goals of cultural heritage management is to preserve for future generations a representative sample of all archaeological site types in their full range of environmental contexts.

In common with rarity, assessments of representativeness within a region are dependent on the state of current knowledge concerning the number and type of archaeological sites present within that region[8]. This is a critical point, for as suggested by Kuskie (2000) and others (e.g., Bowdler, 1981; Godwin, 2011; Pearson & Sullivan, 1995), the absence across most of Australia of regional-scale quantitative data for Aboriginal sites and places represents a major constraint in assessments of representativeness and rarity. As stressed by Bowdler (1981) almost 40 years ago, detailed regional-scale assessments are required to address this issue.

8.2.2 Research potential

Research potential can be defined as the potential of an archaeological site to address what Bowdler (1981: 129) has referred to as "timely and specific research questions". These questions may relate to any number of issues concerning past human lifeways and environments and, as suggested by Bowdler's quote, will inevitably reflect current trends or problems in academic research (Burke & Smith, 2004: 249). For their part, Bowdler and Bickford (1984: 23-4) suggest that the research potential of an archaeological site can be determined by answering the following series of questions:

1. Can the site contribute knowledge which no other resource can?
2. Can the site contribute knowledge which no other such site can?
3. Is this knowledge relevant to general questions about human history or other substantiative subjects?

Several criteria can be used to assess the research potential of an archaeological site. Particularly important in the context of Aboriginal archaeology are the intactness or integrity of the site in question, its complexity and its potential for archaeological deposit (NPWS, 1997: 7). The connectedness of the site to other sites or natural landscape features may also be relevant, as may its educational potential and aesthetic qualities.

Integrity refers to the extent to which a site has been disturbed by natural and/or anthropogenic phenomena and includes both the state of preservation of particular remains (eg, animal bones, plant remains) and, where applicable, stratigraphic integrity. Assessments of archaeological integrity are predicated on the notion that undisturbed or minimally disturbed sites are likely to yield higher quality archaeological and/or environmental data than those whose integrity has been significantly compromised by natural and/or anthropogenic phenomena. Establishing levels of preservation or integrity in the context of a surface survey is difficult. Nonetheless, useful rating schemes are available for open artefact sites (Coutts & Witter, 1977: 34) and scarred trees (Long, 2003).

The *complexity* of a site refers primarily to the nature or character of the artefactual materials or features that constitute it but also includes site structure (eg, the physical size of the site, spatial patterning in observed cultural materials). In the case of open artefact sites, for example, the principal criteria used to assess complexity are the site's size (i.e., number of artefacts and/or spatial extent), the presence, range and frequency of artefact and raw material types, and the presence of features such as hearths.

[8] There is, of course, a temporal fluidity to this criterion (i.e., as knowledge of the Aboriginal archaeology of a region increases, assessed levels of representativeness may change, a point of equal relevance to rarity).

Potential for archaeological deposit refers to the potential of a site to contain subsurface archaeological evidence which may, through controlled excavation and analysis, assist in answering questions that are of contemporary archaeological interest. Assessing subsurface potential in the absence of subsurface investigation is difficult. Nonetheless, consideration of a range of factors, including the integrity of the site, the complexity of extant surface evidence, local geomorphic conditions (as established through surface observations and documentary research) and the results of previous archaeological excavations in the area, will help inform assessment of this criterion.

Connectedness concerns the relationship between archaeological sites within a given area and may be expressed through a combination of factors such as site location, type and contents. It may, for example, be possible to establish a connection between a stone quarry and discarded hatchet found nearby. Demonstrating connectedness archaeologically, however, is far from straightforward, especially when dealing with surface evidence alone. Ultimately, this difficulty rests with the need to demonstrate contemporaneity between sites that may have been created hundreds, if not thousands, of years apart. As Shiner (2008: 13) has observed, “much of the surface archaeological record documents the accumulation of materials from multiple behavioural episodes occurring over long periods of discontinuous time”. Contemporaneity, then, needs to be demonstrated not assumed.

8.3 Assessment of Scientific Significance

An assessment of the scientific significance of the five Aboriginal archaeological sites recognised within and immediately surrounding the Project area is presented in Table 26. Previously recorded scarred tree 62-6-0475, which has been reassessed as a European survey tree, is not included here nor is previously recorded open artefact site 62-6-0133, the AHIMS site card for which indicates that the artefacts associated with this site (n = 2) were salvaged in 1979. Registered burial site 62-6-0173 is included, with the current assessment based on observations made during the survey component of the current assessment, as well as information provided in its site card and associated report (ANUTECH, 1988).

Following AMBS (2009b, 2009c), a scored ranking system has been employed for the current assessment, with overall significance ratings based on a cumulative ‘score’ derived from a ranked assessment of the research potential, rarity and representativeness of each site on a local and regional scale. Rankings for each of the criteria discussed above are associated with one of three potentials scores: low (score = 1), moderate (score = 2) and high (score = 3). Overall significance ratings are defined as follows:

- Low significance: score 10-15
- Moderate significance: score 16-25
- High significance: score 26-30

As indicated in Table 23, newly identified midden sites Merimbula STP SM1 and Merimbula STP SM2 have been assessed as being of low scientific significance, as has newly identified isolated artefact Merimbula STP IA1 and previously recorded scarred tree 62-6-0475. Newly identified subsurface artefact scatter site Merimbula STP OAS1 and previously recorded burial site 62-6-0173 have been assessed as being of moderate scientific significance. No sites of high archaeological significance have been identified within the Project area. However, it is recognised that such sites may exist in subsurface contexts.

Table 26 Scientific significance assessment

Site	Site type	Rarity		Represen-tativeness		Integrity		Complexity		PAD		Overall score	Overall significance
		L	R	L	R	L	R	L	R	L	R		
Merimbula STP SM1	SM	1	1	1	1	1	1	1	1	2	1	12	Low
Merimbula STP SM2	SM	1	1	2	1	1	1	2	1	2	1	13	Low
Merimbula STP OAS1	OAS	2	2	3	2	3	2	2	2	3	2	23	Moderate
Merimbula STP IA1	OAS	1	1	1	1	1	1	1	1	1	1	10	Low
62-6-0173	BUR	3	3	1	1	2	2	1	1	3	3	20	Moderate
Scarred tree 62-6-0475	ST	1	1	1	1	1	1	1	1	1	1	10	Low

8.4 Cultural values

Cultural values refer to the spiritual, traditional, historical and contemporary associations and attachments a place or area has for Aboriginal people. Accordingly, these values and their significance can only be identified through consultation with Aboriginal people.

Verbal and written advice received from the RAPs involved in this assessment has identified a range of social or cultural values for the Project area and Merimbula Barrier complex more broadly:

- The Merimbula Bay barrier / dune system contains numerous Aboriginal archaeological sites, many of which are unregistered and thus do not appear on the AHIMS database;
- The Project area contains scarred trees and burials. One previously identified burial was located on a vehicle track and consisted of the top end or “head” of a humerus;
- Newly identified shell midden sites Merimbula STP SM1 and Merimbula STP SM2 indicate visits to Merimbula Lake for shellfish collection;
- The landscape position of Merimbula STP SM1 and Merimbula STP SM2 suggest that people would have been seeking shelter from westerly winds blowing across Merimbula Lake;
- Dunes within the Project area retain high potential for additional Aboriginal burial sites;
- Areas of freshwater wetland within the Merimbula Barrier, including those within the Project area, would have been focal resource zones for Aboriginal people camping within the sand mass;
- Elevated dune ridges providing ready access to the above would have been favoured camping locations;
- The concentration of flaked stone artefacts in TP6 (BH002C) indicates the presence of large ‘workshop’ in this area;
- Stones used for flaked stone artefact manufacture in the Project area are typical of the local area;
- Parts of the Merimbula Barrier sand mass were occupied by Aboriginal people into the early 20th century. This may have included portions of the current Project area.

8.5 Consolidated Statement of Significance

The Project area forms part of a larger cultural landscape of high cultural and spiritual significance to modern Yuin people. The Project area contains evidence of the Yuin peoples’ long physical and spiritual association with the land and natural resources of the Merimbula Barrier sand mass and its surrounding landforms and water bodies. Known Indigenous sites within and immediately surrounding

this area hold cultural significance to contemporary Yuin people, attesting to traditional habitation, subsistence and land use patterns, including stone procurement and tool manufacturing systems, as well as burial practises.

Existing archaeological datasets for the Project area and environs, including the results of the current assessment, suggest that parts of the Merimbula Barrier sand mass were intensively occupied by the ancestors of contemporary Yuin people, with elevated, low gradient spur or 'finger' dunes overlooking areas of freshwater wetland, in particular, attracting sustained and/or repeated occupation, likely over millenia. Subsurface testing within newly identified artefact scatter site Merimbula STP OAS1 has revealed the presence of high subsurface artefact densities. Further subsurface investigations in this and other comparable barrier contexts are expected to yield large cultural lithic and/or faunal assemblages, the analysis of which could be used to address a range of research questions concerning past Aboriginal settlement and subsistence patterns on a local and regional scale. At the same time, existing datasets indicate that parts of the Merimbula Barrier sand mass were used for non-domestic activities; specifically, burial of the dead. Aboriginal burials are a regionally rare site type and it is noted that that such sites offer opportunities for addressing a variety of issues pertaining to paleodemography and paleopathology, as well as pre-contact mortuary practises and ideologies.

While parts of the Merimbula Barrier sand mass have been severely disturbed through historical land use activities, intact and relatively intact sections of backbarrier flat and foredune within the Project area retain high potential for the presence of subsurface archaeological deposits, including burials.

No physical or documentary evidence for post-contact Aboriginal occupation of the Project area has been identified by the current assessment. However, verbal advice provided by RAPs indicates that parts of the Merimbula Barrier sand mass, potentially including the Project area, were occupied by Aboriginal people into the early 20th century.

With regards to its aesthetic qualities, while the majority of the Project area has been severely disturbed through historical land use activities, sections remain undeveloped and are considered to hold moderate aesthetic significance on the basis of a natural, pre-contact ambience.

9.0 Impact Assessment

9.1 Proposed Construction Activities

The construction footprint for the Project, shown on Figure 32, includes compound areas, laydown areas, construction parking areas and access tracks.

Construction of the STP upgrade would include:

- establishment of site construction areas, including compound areas, laydown areas, parking areas and access tracks;
- daily arrival and departure of construction workers to and from site in light vehicles;
- delivery of machinery, materials, equipment, and process units to site;
- bulk earthworks, importing of fill and decommissioning of existing effluent pond and dunal exfiltration ponds;
- relocation and upgrade of utilities;
- construction of STP infrastructure, including buildings, dosing facilities, filtration units, and a new pumping station. This would involve laying foundations/concrete slabs, installation of process units, placement and joining of pumping station equipment, erection of buildings and pumping station building. Installation of pipes, switches, valves and connections throughout plant; and
- installation of electrical and control infrastructure.

Construction of ocean outfall pipeline would include:

- establishment of site construction areas, including compound areas, laydown areas, parking areas and access tracks;
- daily arrival and departure of construction workers to and from site in light vehicles;
- transport pipeline lengths and construction materials to site and laydown;
- pipeline stringing and welding;
- establishment of drill rig pad and entry point (including potential for an intermediate site on Merimbula Beach front and excavation to connect pipeline lengths), and tank to collect drilling fluids (where soil cuttings are separated from the fluid for removal of soil offsite to a licensed facility, and reuse of the fluid for drilling; excess fluid at the conclusion of drilling would also be removed offsite);
- installation of underground section (Section one) via trenchless method (e.g. horizontal direction drilling or direct drive tunnelling), following by pipeline insertion via pulling or pushing;
- installation of above ground section (Section two) via direct placement on sea bed in 600-800 metre lengths. This would also involve progressive covering, protection and stabilisation works for the pipeline (e.g. potentially using concrete mattresses) held together with ropes or slings;
- installation of fittings including access points and intermediate air valves; and
- Installation of multi-port diffuser (approximately 80 metres in length) and risers (up to three) at the ocean end of the pipeline, including rock mound or concrete protection. If required, a riser would be installed via micro-piling.

9.2 Impacts to Known Aboriginal Sites

9.2.1 Primary Ground Disturbance Activities

Primary ground disturbance works within the Project area, defined here as bulk earthworks within the existing fenced STP complex and the installation of the underground section of the ocean outfall pipeline (Section 1), are not anticipated to result in any physical impacts to the three Aboriginal sites identified within the Project area. Regarding potential subsidence impacts to these sites, and the Merimbula Barrier sand mass more broadly, it is noted that the water quality, groundwater and groundwater dependent ecosystem assessments undertaken for the Project (AECOM, 2021; Eco Logical Australia Pty Ltd, 2021; Elgin Associates, 2021) have all concluded that it is unlikely that the proposed underground trenchless drilling for the ocean outfall pipeline would result in any subsidence.

9.2.2 Temporary Construction Access

Several potential options for construction access have been considered for the Project. Initially, access routes off Arthur Kaine Drive, east of the STP, were considered. However, these were not chosen due to the risk of impacting known Aboriginal sites and ecological values. Access routes at various points at the northern end of Merimbula Beach were also considered but were likewise chosen due to inadequate access for construction vehicles expected, or impacts to public facilities and vegetation.

Temporary construction beach access from Pambula Beach to the laydown area on Merimbula Beach has been selected to avoid these issues, primarily potential impacts to Aboriginal sites within the foredune and backbarrier flat components of the Merimbula Barrier sand mass, as well as potential ecological impacts.

Construction access from Pambula Beach to the laydown area on Merimbula Beach is assessed as carrying a negligible Aboriginal heritage impact risk.

9.2.3 Ancillary Ground Disturbance Activities (Outside of Merimbula Main Beach)

Ancillary ground disturbance activities outside of Merimbula Main Beach, such as light and/or heavy vehicle movements, are assessed as carrying a low to moderate impact risk for identified Aboriginal sites within and immediately the Project area.

9.3 Impacts to Previously Unrecorded Sites within the Merimbula Barrier Sand Mass

Together with the results of the archaeological survey and test excavation investigations undertaken for this assessment, local and regional archaeological datasets indicate that dune ridges and areas of backbarrier sand flat within the eastern portion of the Project area are of high Aboriginal archaeological sensitivity. This assessment notwithstanding, installation of the underground section of the ocean outfall pipeline, which traverses both landform units, is considered to carry a negligible Aboriginal heritage impact risk. This assessment is made on the basis of upper limit drilling depths for these landforms (*c.*-2 to -7.5 m AHD), which greatly exceed the probable maximum depth of subsurface archaeological deposits (<1m b.g.l) in both contexts.

Figure removed for cultural reasons

Figure 32 Impact Assessment

10.0 Management Strategy

A management strategy to address the potential impacts of the Project on the known and potential Aboriginal heritage resource of the Project area has been developed on the basis of:

- the results of the archaeological investigation described in Section 7.0;
- the results of previous archaeological investigations within and surrounding the Project area;
- the significance and impact assessments detailed in Sections 8.0 and 9.0;
- consultation with RAPs; and
- BVSC's legal responsibilities under Part 6 of the NPW Act 1974.

It is recommended that this strategy be detailed in an Aboriginal Cultural Heritage Management Plan (ACHMP) for the Project, which should be prepared in consultation with RAPs, Heritage NSW and DPIE. Subject to Division 5.2 Development Consent and ACHMP approval by DPIE, this document will guide the management of Aboriginal cultural heritage within the Project area throughout the life of the Project. Key components of the ACHMP are detailed below.

10.1.1 Fencing of Surface Sites

Newly identified surface sites Merimbula STP SM1, Merimbula STP SM2 and Merimbula STP IA1 should be protected throughout the life of the Project via permanent stock-proof fencing and appropriate associated signage. Previously recorded burial site 62-6-0173 and scarred tree 62-6-0475 should likewise be fenced as a precautionary measure. All relevant staff and contractors should be made aware of the nature and locations of these sites as well as BVSC's legal obligations with respect to them. Protected sites should be identified on all relevant site plans and designated as 'no-go' zones.

Should BVSC and/or its contractors require use of the vehicle tracks upon which Merimbula STP SM1, Merimbula STP SM2 and Merimbula STP IA1 are located, alternative access arrangements should be investigated and detailed in the ACHMP.

10.1.2 No-Go Zone – Former Vehicle Track to South of Exfiltration Ponds

Fragmented human skeletal remains, representing an unknown number of Aboriginal burials, have been reported by RAP Mr Graham Moore as having been identified (*c.*15 years ago) on the now disused east-west trending vehicle track to the south of the STP's existing dunal exfiltration ponds. Public access to this track has been blocked at its western end by a large felled tree, which Mr Moore has advised was placed across the track as a protective measure for the remains. While no potential or definite human skeletal remains were identified on the track in question during the archaeological survey undertaken for the current assessment, as a precautionary measure, it is recommended this track be identified in the Project's CEMP and all relevant site plans as an environmental 'no-go zone'. Fencing with appropriate signage should be installed at the eastern and western ends of the track to ensure that it is not used by any Project-related machinery.

10.1.3 Surface impacts to Merimbula Barrier sand mass (subsidence-induced)

In view of its demonstrated archaeological and cultural sensitivity, should installation of Section 1 of the ocean outfall pipeline result in any surface impacts to the Merimbula Barrier sand mass, BVSC should consult with RAPs regarding the appropriate management of these impacts.

10.1.4 Previously Unrecorded Aboriginal Archaeological Sites

Provisions regarding appropriate management action(s) for any previously unrecorded Aboriginal archaeological sites identified within the Project area throughout the life of the Project should be incorporated into the ACHMP. Management action(s) will vary according to the type of evidence identified, its significance (both scientific and cultural) and the nature of potential impacts.

10.1.5 Human Skeletal Remains

In the event that potential human skeletal remains are identified within the Project area at any point during the life of the Project, the following standard procedure, to be detailed in the ACHMP, should be followed:

1. all work in the vicinity of the remains should cease immediately;
2. the location should be cordoned off - work can continue outside of this area as long as there is no risk of interference to the remains or the assessment of the remains;
3. where it is instantly obvious from the remains that they are human, the Project Manager (or a delegate) should inform the NSW Police by telephone (prior to seeking specialist advice);
4. where uncertainty over the origin of the remains exists, a physical or forensic anthropologist should be commissioned to inspect the exposed remains *in situ* and make a determination of origin, ancestry (Aboriginal or non-Aboriginal) and antiquity (pre-contact, historic or modern):
    - if the remains are identified as modern and human, notify NSW Police;
    - if the remains are identified as pre-contact or historic Aboriginal, notify Heritage NSW; and
    - if the remains are identified as historic (non-Aboriginal), notify Heritage NSW.

An Aboriginal community representative must be present where it is reasonably suspected burials or human remains may be encountered. If human remains are unexpectedly encountered and they are thought to be Aboriginal, the Aboriginal community must be notified immediately;

Recording of Aboriginal ancestral remains must be undertaken by, or be conducted under the direct supervision of, a specialist physical anthropologist or other suitably qualified person; and

Archaeological reporting of Aboriginal ancestral remains must be undertaken by, or reviewed by, a specialist physical anthropologist or other suitably qualified person, with the intent of using respectful and appropriate language and treating the ancestral remains as the remains of Aboriginal people rather than as scientific specimens.

10.1.6 Consultation Protocols

Provisions regarding appropriate consultation protocols with RAPs should be incorporated into the ACHMP. Contact details and preferred contact methods for each RAP, as well other relevant stakeholders, should be specified.

10.1.7 Aboriginal Cultural Heritage Awareness Training

An Aboriginal cultural heritage awareness training package should be developed for the Project. This package should be developed in consultation with RAPs and completed prior to the commencement of any ground disturbance works within the Project area. A register of all persons having completed the training package should be maintained throughout the life of the Project.

Aboriginal cultural awareness training should be mandatory for all staff and contractors whose roles may reasonably bring them into contact with Aboriginal sites and/or involve consultation with local Aboriginal community members.

BVSC should ensure that the Project's standard environmental site induction includes an Aboriginal heritage component. At a minimum, this should outline current protocols and responsibilities with respect to the management of Aboriginal cultural heritage within the Project area, provide an overview of the diagnostic features of potential Aboriginal site types and procedures for reporting the identification of Aboriginal archaeological sites.

10.1.8 Reporting under the ACHMP

Any Aboriginal heritage management or mitigation works carried out under the ACHMP for the Project should be documented to a standard comparable to that required by the *Code of Practice for Archaeological Investigation of Aboriginal Objects*. Printed and/or digital copies of any associated reports should be made available to RAPs upon request.

10.1.9 Periodic Review of ACHMP

The ACHMP for the Project should be subject to periodic review to ensure that all management policies are being adhered to and are working effectively. Periodic reviews will also provide an opportunity to make modifications to existing policies and to add, where appropriate, new policies.

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Appendix A

Register of Native Title Claims - Extract and Maps

National Native Title Tribunal

Extract from the Register of Native Title Claims

Application Information

Application Reference:	**Federal Court number:** NSD1331/2017
	NNTT number: NC2017/003
Application name:	The Applicant on behalf of the South Coast People v Attorney General of New South Wales (South Coast People)
Registration History:	Registered from 31/01/2018

Register Extract (pursuant to s. 186 of the *Native Title Act 1993*)

Application filed with:	Federal Court of Australia
Date application filed:	03/08/2017
Date claim entered on Register:	31/01/2018
Applicants:	Marilyn Pickalla Campbell, Aileen Blackburn (nee Mongta), William Campbell, Wally Stewart, John Brierley, Mark Tinelt Parsons, Dean Kelly, Cathy Thomas, Leslie Simon, Taressa Mongta, Gwenda Jarrett, Paul McLeod

Address for service: NTSCORP Limited
Unit 1a Suite 2.02
44-70 Rosehill Street
REDFERN NSW 2016
Phone: (02) 9310 3188
Fax: (02) 9310 4177

Additional Information:

Not Applicable

DESCRIPTION OF THE AREA COVERED BY THE CLAIM:

(A) Area covered by application

The area covered by the application ('the Application Area') comprises all the land and waters within the external boundaries described in Attachment B and depicted in the map at Attachment C.

The Application Area description and map have been prepared with the assistance of the Geo-Spatial Unit of the National Native Title Tribunal. The area covered by this application does not include the areas described at point B below.

(B) Areas within the external boundaries not covered by the application

1. The area covered by the application excludes any land and waters covered by past or present freehold title or by previous valid exclusive possession acts as defined by section 23B of the Native Title Act 1993 (Cth). That is, the area covered by the application excludes any land and waters which are:
a) a Scheduled interest;
b) a freehold estate;
c) a commercial lease that is neither an agricultural lease nor a pastoral lease;
d) an exclusive agricultural lease or an exclusive pastoral lease;
e) a residential lease;
f) a community purpose lease;
g) a lease dissected from a mining lease and referred to in s 23B(2)(c)(vii) of the Native Title Act (1993) (Cth); and
h) any lease (other than a mining lease) that confers a right of exclusive possession over particular land or waters.

2. Subject to paragraphs 4 and 5, the area covered by the application excludes any land or waters covered by the valid construction or establishment of any public work, where the construction or establishment of the public work commenced on or before 23 December 1996.

3. Subject to paragraphs 4 and 5, exclusive possession is not claimed over areas which are subject to valid previous non-exclusive possession acts done by the Commonwealth, State or Territory.

4. Subject to paragraph 6 below, where the act specified in paragraphs l, 2 and 3 falls within the provisions of:
a) s 23B(9) - Exclusion of acts benefiting Aboriginal Peoples or Torres Strait Islanders;
b) s 23B(9A) - Establishment of a national park or state park;
c) s 23B(9B) - Acts where legislation provides for non-extinguishment;
d) s 23B(9C) - Exclusion of Crown to Crown grants; and
e) s 23B(10) - Exclusion by regulation;
the area covered by the act is not excluded from the application.

5. Where an act specified in paragraphs 1, 2 and 3 affects or affected land or waters referred to in:
a) s 47 - Pastoral leases etc covered by claimant application;
b) s 47A - Reserves covered by claimant application;
c) s 47B - Vacant Crown land covered by claimant application; the area covered by the act is not excluded from the application.

6. The area covered by the application excludes land or waters where the native title rights and interests claimed have been otherwise extinguished.

PERSONS CLAIMING TO HOLD NATIVE TITLE:

The South Coast People are the native title claim group on whose behalf the Applicant makes this application.

The South Coast People native title claim group comprises all the descendants of the following apical ancestors:
Mary Ann, mother of Emily and Joseph Johnson
Charles ADGERY
Robert ANDY
Maria BILLYBOY (aka Coommee Nullanga)
Arthur BLOXSOME
Richard BOLLOWAY
Alick BOND
Charlotte BOND
Oswald BRIERLEY
William BROUGHTON
Jane BROWN
Thomas Golden BROWN
James BUNDLE
Jerry BUNGIL
Louisa BURROWS
William CAMPBELL
John CARPENTER
Johnny CARTER
Henry CHAPMAN
Henry COOLEY
Tom COOLEY
Bob CURRAN
Henry DAVIS
Ellen DEMESTRE
Julia DIXON

William DIXON
Jimmy Coombala FRIDAY
Biddy GILES
James GOLDING
Patrick HADDIGADDI
Jessie JENKINS
Donald JOHNSON
Annie JOHNSTON
Judy KENNY
John KERRY
Lucy LYONS
Mary Ann LYONS
Richard MARSHALL
Caroline MATHEWS
Elizabeth MATTHEWS
Annie MCGRATH
Edward MOORE
MUMBLER
Jenny NIMEBUR
George NIPPLE
Margaret Ann NIXON
Harry PICKALLA
John PITTMAN
Mary Ann ROSE
Minnie ROWLEY
John SIMS
Sally of Wandandian, spouse of Dan Parsons
Governor STEWART
Mary Ann STEWART
Peter THOMAS
George TIMBERY
Mary TURNER
Edward WALKER
William WALKER
and persons adopted and incorporated into the families of those persons in accodance with the South Coast People's traditional laws and customs (and the biological descendants of any such persons).

REGISTERED NATIVE TITLE RIGHTS AND INTERESTS:

The following Native Title Rights & Interests were entered on the Register on 31/01/2018

The South Coast People claim the following native title rights and interests in relation to the claim area, subject to the valid laws of the State of New South Wales and the Commonwealth (including the right to conduct activities necessary to give effect to them):

1. Where exclusive native title can be recognised, the South Coast People, as defined in Schedule A of this application, claim the right to possession, occupation, use and enjoyment of the lands and waters of the application area to the exclusion of all others subject to the valid laws of the Commonwealth and State of New South Wales.

2. Where exclusive native title cannot be recognised, the South Coast People as defined in Schedule A of this application, claim the following non-exclusive rights and interests including the right to conduct activities necessary to give effect to them:
i. the right to access, to remain in and to use the land and waters for any purpose;
ii. the right to access and to take resources from the land and waters for any purpose;
iii. the right to maintain and protect places and objects of significance;
iv. the right to be accompanied onto those areas by persons who, though not native title holders, are:
a) spouses, partners or parents of native title holders, together with their children, grandchildren, great-grandchildren and their descendants;
b) people required under traditional laws and customs for the performance of cultural activities, practices or ceremonies; and
c) people requested by the native title holders to assist in, observe or record cultural activities, practices or ceremonies.

The native title rights and interests are subject to and exercisable in accordance with:

a) the valid laws of the State of New South Wales and the Commonwealth;
b) the rights (past of present) conferred upon persons pursuant to the laws of the Commonwealth and the laws of the State of New South Wales; and
c) the traditional laws acknowledged and traditional customs observed by the South Coast People.

REGISTER ATTACHMENTS:

1. Attachment B Description of the area covered by the application, 6 pages - A4, 03/08/2017

2. Attachment C Map of the area covered by the application, 2 pages - A4, 03/08/2017

3. NNTT Map of the application area, 1 page - A4, 31/01/2018

Note: The Register of Native Title Claims may, in accordance with s. 188 of the Native Title Act 1993, contain confidential information that will not appear on the Extract.

RNTC Extract Attachment NSD1331/2017 (NC2017/003)
NNTT Map of the claim area.
Please note: This map does not form part of the Form 1 application and is provided for information only.

Commencement Point

NSD19/2010
NSD164/2012
NSD1839/2008

NSD1272/2005

NSD1631/2004

NSD240/2010

NSD1826/2005

Buffer 3nm east of the MHWM

Montague Island

NSD1200/2009

NSD1766/2005

NSD1246/2007

NSD1199/2009

National Native Title Tribunal

Native Title Determination Application

South Coast

Legend

South Coast Claim Area

0 25 50
Kilometres

Geocentric Datum of Australia 1994

Prepared by:
Geospatial Services, National Native Title Tribunal
13/06/2017

Data Sources:
South Coast Claim boundary compiled by National Native Title Tribunal based on information or instructions provided by the applicants.

149°30'E 150°0'E 150°30'E 151°0'E 151°30'E
34°0'S 34°30'S 35°0'S 35°30'S 36°0'S 36°30'S 37°0'S

Filepath: P:\GEO_INFO\Products\NSW\NTDA\Proposed\South_Coast\Mapping\GT2017_0862_Map\20170613_Proposed_South_Coast_Topo_A3P.mxd

Geotrack Number: GT2017/0862

Appendix B

Consultation Log

Table B1: Aboriginal Community Consultation Log

Date	To/From AECOM	Organisation	Contact person(s)	Method of contact	AECOM representative	Summary
26.02.18	From AECOM	OEH	-	Letter	A.McLaren	Letter to request information regarding Aboriginal individuals and/or organisations who may hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects/places in the area of the Project.
26.02.18	From AECOM	Officer of the Registrar	-	Letter	A.McLaren	As above
26.02.18	From AECOM	Eden LALC	-	Letter	A.McLaren	As above
26.02.18	From AECOM	Bega Valley Shire Council	-	Letter	A.McLaren	As above
26.02.18	From AECOM	NTSCORP Limited	-	Letter	A.McLaren	As above
26.02.18	From AECOM	Local Land Services - South East	-	Letter	A.McLaren	As above
26.02.18	From AECOM	National Native Title Tribunal	-	Email	A.McLaren	Search request form
26.02.18	TO AECOM	National Native Title Tribunal	-	Email	A.McLaren	Response to AECOM's search request. See **Appendix B**.
13.03.18	To AECOM	OEH	Sarah Robertson	Email with letter attachment	A.McLaren	Response to AECOM's information request. See **Appendix B**.
14.03.18	From AECOM	Various potential RAPs (n = 28)	Various	Letters and emails	A.McLaren	EOI letter and draft methodology
15.03.18	TO AECOM	Officer of the Registrar	Jodie Rikiti	Email with letter attachment	A.McLaren	Response to AECOM's information request. See **Appendix B**.
21.03.18	To AECOM	Bega Valley Shire Council (Aboriginal Liaison Officer - BVSC)	Graham Moore	Phone	J.Dunford	Request to speak with heritage staff member involved with Project
22.03.18	From AECOM	BVSC (Aboriginal Liaison Officer)	Graham Moore	Phone	A.McLaren	Returning Graham's earlier phone call. No answer. Message left on mobile and office voicemails.
22.03.18	To AECOM	BVSC (Aboriginal Liaison Officer)	Graham Moore	Phone	A.McLaren	Telephone discussion re assessment and cultural values of the study area / Merimbula Bay Barrier/ dune system more broadly. See **Section 3.3.**1 for identified values.
22.03.18	To AECOM	Bega LALC	Glenn Willcox	Email	A.McLaren	Response to EOI letter package. Bega LALC wishes to register for consultation.

Date	To/From AECOM	Organisation	Contact person(s)	Method of contact	AECOM representative	Summary
23.03.18	From AECOM	BVSC (Aboriginal Liaison Officer)	Graham Moore	Email	A.McLaren	Follow-up email to phone call on 22.03.18. Have provided draft methodology and requested confirmation of values identified by Graham; specifically: -The Merimbula Bay barrier / dune system contains numerous sites, many of which are unregistered and thus do not appear on the AHIMS database; -Our Project area contains nine burials and two scarred trees; -One previously identified burial was located on a vehicle track and consisted of the top end or "head" of a humerus; and -There are good historical records available (e.g., Flinders / Bass) for the far south coast / greater Merimbula area.
29.05.18	From AECOM	NTSCORP Limited	-	Email with letter attached	A.McLaren	Follow-up to stakeholder information letter posted on 26.02.18 as no response has been received (as of today). I have noted that the study area falls wholly within the claim area for registered Native Title claim NC2017/003 - South Coast People and that the claim's associated register extract identifies NTSCORP Limited as the relevant contact entity for the claim group. Original RFI letter attached.
08.08.18	From AECOM	BVSC Aboriginal Liaison Officer	Graham Moore	Email	A.McLaren	Brief email to flag probable fieldwork dates (27-29 August)
08.08.18	From AECOM	Bega LALC	Glenn Willcox	Email	A.McLaren	Brief email to flag probable fieldwork dates (27-29 August)
08.08.18	From AECOM	Eden LALC	BJ Cruse	Email	A.McLaren	Brief email to flag probable fieldwork dates (27-29 August)
09.08.18	To AECOM	BVSC Aboriginal Liaison Officer	Graham Moore	Email	A.McLaren	Response to previous e-mail re probable fieldwork dates. Graham has indicated that he appreciates us keeping him in the loop and has asked whether it looks as though there are any issues forthcoming.
08.08.18	From AECOM	BVSC Aboriginal Liaison Officer	Graham Moore	Email	A.McLaren	Response to Graham's earlier email. Have asked whether he will be available to participate in the field program and whether he was happy with the draft methodology sent out on 14th March. Re Graham's question, I have advised that the "next steps" in terms of proposed management / mitigation actions will depend on the results of the survey and test excavation program, as well as discussions with all RAPs during and post-fieldwork.
13.08.18	From AECOM	Bega LALC	Glenn Willcox	Email	A.McLaren	Fieldwork notification letter

Date	To/From AECOM	Organisation	Contact person(s)	Method of contact	AECOM representative	Summary
13.08.18	From AECOM	Eden LALC	BJ Cruse / Penny Stewart	Email	A.McLaren	Fieldwork notification letter
13.08.18	From AECOM	Eden LALC	BJ Cruse	Phone (mobile)	A.McLaren	Phone call to discuss upcoming fieldwork / confirm availability of Eden LALC site officer. No answer. Voicemail left.
13.08.18	From AECOM	Bega LALC	Glenn Willcox	Email	A.McLaren	Response to fieldwork letter. Glenn has indicated that Ronnie Thomas will attend the fieldwork on behalf of the Bega LALC.
14.08.18	From AECOM	Eden LALC	BJ Cruse	Phone (Mobile)	A.McLaren	Phone call to discuss upcoming fieldwork / confirm availability of Eden LALC site officer. No answer, went to messagebank.
14.08.18	From AECOM	Eden LALC	BJ Cruse / Penny Stewart	Phone (LALC office)	A.McLaren	Phone call to discuss upcoming fieldwork / confirm availability of Eden LALC site officer. No answer. Voicemail left.
16.08.18	From AECOM	Eden LALC	BJ Cruse	Phone (Mobile)	A.McLaren	Phone call to discuss upcoming fieldwork / confirm availability of Eden LALC site officer. No answer. Voicemail left.
16.08.18	From AECOM	Eden LALC	BJ Cruse / Penny Stewart	Phone (LALC office)	A.McLaren	Phone call to discuss upcoming fieldwork / confirm availability of Eden LALC site officer. No answer. Voicemail left.
16.08.18	To AECOM	Eden LALC	BJ Cruse	Phone	A.McLaren	BJ returning my earlier calls. BJ has indicated that Eden LALC will not be able to provide a site officer for the survey/test excavation program given an existing fieldwork commitment. In addition, BJ has advised that no works should occur without their approval / involvement.
17.08.18	From AECOM	Eden LALC	BJ Cruse	Phone	A.McLaren	Phone call to double-check availability. BJ has confirmed that Eden LALC is not available.
17.08.18	From AECOM	Officer of the Registrar	N/A	Phone	A.Mclaren	Land claim register search submitted for Crown Land parcels with Study area
24.08.18	To AECOM	Officer of the Registrar	Tysan Towney	Email with letter attachment	A.McLaren	Land claim register search results.
05.09.18	From AECOM	Eden LALC	BJ Cruse	Phone	A.McLaren	Phone call to advise BJ of new fieldwork dates. BJ has indicated that he will be available.
17.09.18	From AECOM	Bega LALC	Glenn Willcox	Email	A.McLaren	Notifying Glenn of rescheduled fieldwork dates
17.09.18	From AECOM	Eden LALC	BJ Cruse	Phone	A.McLaren	Follow up phone call to confirm new fieldwork dates with BJ.
19.09.18	From AECOM	BVSC Aboriginal Liaison Officer	Graham Moore	Email	A.McLaren	Notifying Graham of rescheduled fieldwork dates. Have requested confirmation of whether he would like to be involved.

Date	To/From AECOM	Organisation	Contact person(s)	Method of contact	AECOM representative	Summary
19.09.18	To AECOM	Bega LALC	Glenn Willcox	Email	A.McLaren	Glenn has confirmed new fieldwork dates are fine
21.10.20	From AECOM	All RAPs	Various	Email & mail	A.McLaren	Draft ACHAR for RAP Review
01.12.20	From AECOM	Eden LALC	Glenn Willcox	Phone & email	A.McLaren	Phone call and follow-up email re comment on draft ACHAR. Glenn not in, will pass message on.
01.12.20	From AECOM	Eden LALC	BJ Cruse	Phone	A.McLaren	Phone call to follow up re comment on draft ACHAR. Response to draft ACHAR provided. See Table 6 in Section 3.4.
01.12.20	From AECOM	Cullendulla Biamanga Murramarang Goobah	Corey Smith Seli Storer Roxanne Smith Basil Smith	E-mail	A.McLaren	Follow up email re comment on draft ACHAR.
02.12.20	From AECOM	Graham Moore	Graham Moore	Phone & e-mail	A.McLaren	Phone call to follow up re comment on draft ACHAR. Response to draft ACHAR provided. See Table 6 in Section 3.4 and Appendix H.

Appendix C

Agency Responses

NSW GOVERNMENT | Office of Environment & Heritage

Your reference: Merimbula STP upgrade
Our reference: DOC18/123455
Contact: Rose O'Sullivan 4224 4177

Andrew McLaren
AECOM P/L
PO Box Q410
QVB Post Office NSW 1230
via email: andrew.mclaren@aecom.com

Dear Andrew,

WRITTEN NOTIFICATION OF PROPOSAL AS REQUIRED UNDER DECCW ABORIGINAL CULTURAL HERITAGE CONSULTATION REQUIREMENTS FOR PROPONENTS 2010
RE: Proposed Merimbula Sewage Treatment Plant Upgrade and Deep Ocean Outfall Project

I refer to your emailed letter received by the Office of Environment and Heritage (OEH) on 1 March 2018 regarding the above matter.

Attached is a list of known Aboriginal parties for the Bega local government area that OEH feels is likely to have an interest in the development. Please note this list is not necessarily an exhaustive list of all interested Aboriginal parties and receipt of this list does not remove the requirement of a proponent/ consultant to advertise in local print media and contact other bodies seeking interested Aboriginal parties, in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (April 2010).

Under Section 4.1.6. of the *Consultation Requirements* you must also provide a copy of the names of each Aboriginal person who registered an interest to the relevant OEH regional office and Local Aboriginal Land Council (LALC) within 28 days from the closing date for registering an interest.

Note: the contact details in the list provided by OEH may be out of date as it relies on Aboriginal parties advising OEH when their details need changing. If individuals/ companies undertaking consultation are aware that any groups contact details are out of date, or letters are returned unopened, please contact either the relevant stakeholder group (if you know their more current details) and/ or OEH. AHIP applicants should make a note of any group they are unable to contact as part of their consultation record.

If you wish to discuss any of the above matters further please feel free to contact me on 4224 4177.

Yours sincerely

9 March 2018

Rose O'Sullivan
A/Team Leader, Aboriginal Heritage - South East
Regional Operations Division

Enclosure: Attachment 1 – Bega LGA

PO Box 733 Queanbeyan NSW 2620
11 Farrer Place Queanbeyan NSW
Tel: (02) 6229 7188 Fax: (02) 6229 7001
ABN 30 841 387 271
www.environment.nsw.gov.au

ATTACHMENT 1:

Bega local government area

Organisation/Individual Name	Address	Contact Details
Bega Local Aboriginal Land Council	Auckland Plaza, 17 Bunyara Dr, PO Box 11, Bega NSW 2550	Ph: (02) 6492 3950 email: ceo_begalalc@commander.net.au
Eden Local Aboriginal Land Council	PO Box 199, Eden NSW 2551	Ph: (02) 6495 7177 0427 961 922 Fax: (02) 6495 7433
Merrimans Local Aboriginal Land Council	13 Umbarra Rd, Wallaga Lake NSW 2546	Ph: (02) 44737288 Mob: 0408 118798 Fax: (02) 44737478 Email: ceo@merrimanslalc.org.au
Wagonga Local Aboriginal Land Council	16 Canty Street, Narooma NSW 2546	Ph: 02 4476 1144 email: wagongalandscouncil@gmail.com
Colleen Dixon	Unit 2 49 East Street BEGA NSW 2550	Ph: 02 6492 4740
Twofold Aboriginal Corporation	PO Box 184, Eden NSW 2551	Ph: (02) 6945 6343 Fax:(02) 6945 7441
Ngarigo Elders: Iris White	No address supplied	Email: irisj.white@gmail.com
Yukkumbruk	14 Chipperfield Circuit Gordon ACT 2906	Mob: 0401 247 589 Email: canberra.knockout@yahoo.com.au
Thomas Brown	Unit 5, 65/67 Cam Street, Cambridge Park NSW 2747	Mob: 0404 942 564 Ph: (02) 4722 5937
Guunamaa Dreaming Contact: Richard Cambpell	2 Minda Cres, Oak Flats NSW 2529	mob: 0499688663 email: richardcambpell123@outlook.com
Nundagurri Aboriginal Corporation. Contact: Newton Carriage (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	email: Nundagurri@gmail.com
Walbunja. Contact: Hika Te Kowhai (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	15 Renee Crescent, Moruya Heads NSW 2537	Mob: 0402 730 612 email: Walbunja@gmail.com
Goobah Development Pty Ltd. Contact: Basil Smith Chief Cultural Heritage Officer (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	mob: 0405 995 725 Email: bunjil.smith@gmail.com
Gunyuu Contact: Kylie Ann Bell (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	Email: gunyuuchts@gmail.com
Wullung: Contact Person Lee-Roy Boota - Chairperson (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	54 Blackwood Street, Gerringong NSW 2534	Mob: 0403703942 Email: wullunglb@gmail.com
Badu: Contact person Karia Lea Bond - Chairperson (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	11 Jeffrey Place, Moruya NSW 2537	Mob: 0476381207 Email: baduchts@gmail.com

Organisation/Individual Name	Address	Contact Details
Yerramurra: Contact Person - Robert Parsons (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	Email: yerramurra@gmail.com
Jerringong: Contact Person - Jodie Stewart - Chairperson (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	2/10 Burnett Avenue, Gerringong NSW 2534	Mob: 0422800184 Email: jerringong@gmail.com
Murrumbul: Contact Person - Mark Henry (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	Email: murrumbul@gmail.com
Wingikara: Contact Person - Hayley Bell (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	Email: wingikarachts@gmail.com
Bilinga: Contact Person - Simalene Carriage (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	Email: bilingachts@gmail.com
Munyunga: Contact Person - Kaya Dawn Bell (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	Email: munyungachts@gmail.com
Pemulwuy: Contact Person - Pemulwuy Johnson (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	Email: pemulwuyd@gmail.com
Karrial: Contact Person - Karrial Johnson (Murrin Clan: This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	Email: karrialchts@gmail.com
THAUAIRA - Contact Person: Shane Carriage (Murrin Stakeholder This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	Email: thauairachts@gmail.com
WALGALU - Contact Person: Ronald Stewart (Murrin Stakeholder This group's states that their boundaries extend from the Hawkesbury River to the Snowy River)	No address supplied	Email: walgaluchts@gmail.com
Gadhu Dreaming. Contact person: Gordon Campbell	No address supplied	Mobile: 0401342364 Email: gordy2540@hotmail.com
Steven Holmes	35 Mitchell St, Eden NSW 2551	email: thawathaua2017@gmail.com

McLaren, Andrew

From: Enquiries <Enquiries@nntt.gov.au>
Sent: Monday, 26 February 2018 6:13 PM
To: McLaren, Andrew
Subject: RE: SR3826 - Register Search Form - SR3826

UNCLASSIFIED

Native title search – *NSW Parcels – Multiple*
Your ref: *Merimbula EIS & CD* - Our ref: *SR3826*

Dear Dr Andrew McLaren,

Thank you for your search request received on 26 February 2018 in relation to the above area, please find your results below.

Search Results
The results provided are based on the information you supplied and are derived from a search of the following Tribunal databases:

- Schedule of Native Title Determination Applications
- Register of Native Title Claims
- Native Title Determinations
- Register of Indigenous Land Use Agreements
- Notified Indigenous Land Use Agreements

For more information about the Tribunal's registers or to search the registers yourself and obtain copies of relevant register extracts, please visit our website.

Parcel ID	Feature Area SqKm	NNTT file number	Name	Category	Overlap Area SqKm	P
320//D750227	0.1736	NC2017/003	South Coast People	Applications (RNTC)	0.1736	
320//D750227	0.1736	NC2017/003	South Coast People	Applications (Schedule)	0.1736	
7307//D1167035	0.6613	NC2017/003	South Coast People	Applications (RNTC)	0.6613	
7307//D1167035	0.6613	NC2017/003	South Coast People	Applications (Schedule)	0.6613	
7308//D1167035	0.0483	NC2017/003	South Coast People	Applications (RNTC)	0.0483	
7308//D1167035	0.0483	NC2017/003	South Coast People	Applications (Schedule)	0.0483	

Please note: Records held by the National Native Title Tribunal as at 26 February 2018 indicate that the identified parcel listed below appears to be freehold, and freehold tenure extinguishes native title. The National Native Title Tribunal does not hold data sets for freehold tenure; consequently, we cannot conduct searches over freehold . For

confirmation of freehold data, please contact the NSW Land and Property Information office or seek independent legal advice.

These items not found in NNTT non freehold data:

Parcel ID
100//D1201186

Please note: There may be a delay between a native title determination application being lodged in the Federal Court and its transfer to the Tribunal. As a result, some native title determination applications recently filed with the Federal Court may not appear on the Tribunal's databases.

The search results are based on analysis against external boundaries of applications only. Native title applications commonly contain exclusions clauses which remove areas from within the external boundary. To determine whether the areas described are in fact subject to claim, you need to refer to the "Area covered by claim" section of the relevant Register Extract or Schedule Extract and any maps attached.

Search results and the existence of native title
Please note that the enclosed information from the Register of Native Title Claims and/or the Schedule of Applications is not confirmation of the existence of native title in this area. This cannot be confirmed until the Federal Court makes a determination that native title does or does not exist in relation to the area. Such determinations are registered on the National Native Title Register.

The Tribunal accepts no liability for reliance placed on enclosed information
The enclosed information has been provided in good faith. Use of this information is at your sole risk. The National Native Title Tribunal makes no representation, either express or implied, as to the accuracy or suitability of the information enclosed for any particular purpose and accepts no liability for use of the information or reliance placed on it.

If you have any further queries, please do not hesitate to contact us on the free call number 1800 640 501.

Regards,

Enquiries
Public enquiry hours are 8.30am to 4.30pm
National Native Title Tribunal | Perth
Facsimile (08) 9425 1193 | Email enquiries@nntt.gov.au
Freecall 1800 640 501 | www.nntt.gov.au
Shared Country Shared Future

From: McLaren, Andrew [mailto:]
Sent: Monday, 26 February 2018 3:21 PM
To: Enquiries <Enquiries@nntt.gov.au>
Subject: SR3826 - Register Search Form

Hi,

Please find attached a register search form for processing.

Cheers

Andrew McLaren

Dr Andrew McLaren

Senior Heritage Specialist
D +61 2 8934 0547
Andrew.McLaren@aecom.com

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OFFICE OF THE REGISTRAR
ABORIGINAL LAND RIGHTS ACT 1983 (NSW)

14 March 2018

Dr Andrew P McLaren
AECOM Australia Pty Ltd
Level 21,420 George Street
SYDNEY NSW 2000

Dear Dr McLaren

Re: Request - Search for Registered Aboriginal Owners

I refer to your letter dated 26 February 2018 regarding an Aboriginal Cultural Heritage Assessment of the proposed Merimbula Sewage Treatment Plant Upgrade and the Deep Ocean Outfall project located near Merimbula, NSW.

I have searched the Register of Aboriginal Owners and the project area described does not have Registered Aboriginal Owners pursuant to Division 3 of the *Aboriginal Land Rights Act 1983*.

I suggest that you contact Bega Local Aboriginal Land Council on 02 6492 3950, and the Eden Local Aboriginal Land Council on 02 6495 7177. They may be able to assist you in identifying other Aboriginal stakeholders for this project.

Yours sincerely

Jodie Rikiti
Administration Officer
Office of the Registrar, ALRA

Address: Level 3, 2 – 10 Wentworth Street, PARRAMATTA NSW 2150
Post: P.O Box 5068, PARRAMATTA NSW 2124
Phone: 02 8633 1266

McLaren, Andrew

From: Glenn Willcox <ceo_begalalc@commander.net.au>
Sent: Thursday, 22 March 2018 9:56 AM
To: McLaren, Andrew
Subject: Merimbula Sewage Treatment Upgrade Project

Dear Dr McLaren
Thank you for contacting the Bega LALC via your letter dated 14th March 2018, regarding consultation for the Merimbula Sewage Treatment Upgrade Project.
Please ensure that the Bega LALC is included as a registered party for project consultation.
We await further information re this project.
Yours sincerely

Glenn Willcox
CEO
Bega Local Aboriginal Land Council
Ph 02 6492 3950
PO Box 11
Bega
NSW 2550

Office - Level 1, 187 Carp St, Bega
(Enter from Church St)

Appendix D

Newspaper Advertisement – Merimbula News Weekly

Call for Registrations

Aboriginal Cultural Heritage Assessment

Merimbula Sewage Treatment Plant Upgrade (STP) and Deep Ocean Outfall Project, Merimbula, NSW

Bega Valley Shire Council, PO Box 492, Bega NSW 2550

AECOM Australia Pty Ltd (AECOM), on behalf of Bega Valley Shire Council (Council), is seeking to identify Aboriginal persons or organisations who wish to be consulted in relation to an Aboriginal cultural heritage assessment for the Merimbula Sewage Treatment Plant Upgrade (STP) and Deep Ocean Outfall Project (the Project), near Merimbula, NSW.

Council proposes to undertake a number of fieldwork investigations to inform the concept design, modelling and preparation of the Environmental Impact Statement (EIS) for the project. The fieldwork includes geotechnical drilling works and investigations to enable an understanding of the existing environment and inform the design and constructability methodology for the deep ocean outfall component of the project and the preparation of the EIS.

The Aboriginal cultural heritage assessment will form part of the EIS being prepared to support a development application for Development Consent under Part 5.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act) for the project, which has declared State Significant Infrastructure (SSI). The EIS will be prepared to meet the Secretary's Environmental Assessment Requirements (SEARs) for the project.

Interested Aboriginal persons and/or organisations are invited to register their interest in writing to:

Dr Andrew McLaren
AECOM Australia Pty Ltd
PO Box Q410, QVB PO
Sydney NSW 1230
Phone: 02 8934 0547
Fax: 02 8934 0001
Email: andrew.mclaren@aecom.com

Expressions of interest should include current contact details. The closing date for registration is **15 March 2018.**

Further Information regarding the project, including a draft assessment methodology, will be provided upon registration.

Appendix E

Draft Assessment Methodology

AECOM Imagine it. Delivered.

Merimbula CD & EIS
Bega Valley Shire Council
14-Mar-2018

Merimbula Sewage Treatment Plant Upgrade (STP) and Deep Ocean Outfall Project

Aboriginal Cultural Heritage Assessment - Draft Methodology

Merimbula Sewage Treatment Plant Upgrade (STP) and Deep Ocean Outfall Project

Aboriginal Cultural Heritage Assessment - Draft Methodology

Client: Bega Valley Shire Council

ABN: 56 458 309 541

Prepared by

AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
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ABN 20 093 846 925

14-Mar-2018

Job No.: 60541653

Quality Information

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Date	14-Mar-2018
Prepared by	A. McLaren
Reviewed by	A. Frolich

Revision History

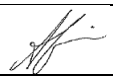
Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	14-Mar-2018	Draft	A.Frolich/Principal Scientist	

Table of Contents

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) has been commissioned by Bega Valley Shire Council (BVSC) to undertake an Aboriginal cultural heritage assessment for the proposed Merimbula Sewage Treatment Plant (STP) Upgrade and Deep Ocean Outfall Project, near Merimbula, on the far south coast of NSW (Figure 1). BVSC is seeking approval for the Project under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The current assessment forms part of the Environmental Impact Statement (EIS) being prepared for the Project, which has been declared State Significant Infrastructure (SSI) pursuant to section 115U (2) of the EP&A Act. The EIS for the Project will be prepared to meet the Secretary's Environmental Assessment Requirements (SEARs) for the project, which were issued on 14 June 2016.

This draft assessment methodology details AECOM's proposed approach to the current assessment and is being provided to all Registered Aboriginal Parties (RAPs) in accordance with Sections 4.3.1 and 4.3.2 of the NSW Office of Environment and Heritage's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a). A brief review of existing environmental and archaeological data for the Study area is also provided to give context to AECOM's proposed assessment methodology.

1.1 Assessment Objectives

The overarching objectives of this assessment are as follows:

- to identify the Aboriginal cultural heritage values of the Study area by way of background research, an archaeological field investigation and consultation with RAPs;
- to assess the potential impact of the Project on the identified Aboriginal cultural heritage values of the Study area;
- to provide an appropriate management strategy to avoid or minimise potential harm to the identified Aboriginal cultural heritage values of the Study area; and
- to compile an Aboriginal Cultural Heritage Report (ACHAR) that will assist the Minister for Planning in his/her assessment and determination of the Project.

1.2 Project Background & Overview

The Merimbula Sewage Treatment Plant Upgrade and Deep Ocean Outfall Project (hereafter 'the Project') is the result of an effluent management strategy undertaken by AECOM for BVSC from 2009 and adopted a meeting of the elected members of Council on 25 June 2014. The strategy considered a number of effluent disposal and reuse options for Merimbula and the district. The Project was developed in consultation with community representatives including representatives from the Merimbula Lake Shellfish Quality Assurance Program, Pambula Lake Shellfish Quality Assurance Program, NSW Environment Protection Authority, NSW Office of Water, and the Southern Rivers Catchment Management Authority.

The Project comprises the concept design and environmental assessment of two components:

1. Upgrade of the existing Merimbula STP; and
2. Construction of a deep ocean outfall.

The existing Merimbula STP will be upgraded so as to ensure that effluent discharge to the ocean will not cause water quality at the boundary of a defined mixing zone to exceed the marine quality trigger values for south-east Australia stipulated in the ANZECC Guidelines for *Fresh and Marine Waters, 2000*. The nature and extent of modifications to the STP will be determined as part of the concept design phase. Modifications and potential options to be considered include:

- A pump station for the deep ocean outfall with a building structure for the switchboard;
- Modification of the existing STP effluent ponds to provide flow balancing to:
    - Cater for peak wet weather flows;
    - Optimise size of pumps and pipeline;

  - Improve disinfection; and
  - Split effluent flows for disposal and reuse locations.
- A UV disinfection system for effluent disposal and reuse;
- Modification of chlorine disinfection
- Potential for de-chlorination equipment for effluent disposed to ocean;
- Potential for a phosphorous removal chemical dosing system with a shelter for equipment and chemical storage;
- Potential for biologically active filters and de-nitrifying filters to reduce concentration of nitrogen in effluent.

The ocean outfall component of the Project involves the construction of a transfer pipe from the existing STP to a deep water discharge point up to 6 km southeast of the Mean High Water Mark (MHWM) of Merimbula. The transfer pipeline may be constructed and laid in the following two sections:

- Section 1 will be located underground from the STP to a point beyond the wave zone; and
- Section 2 will be located in a trench on the sea bed from the end of Section 1 to the outfall discharge point.

The construction methodology for the entire length of the transfer pipeline will be developed commensurate with the concept design, which is to occur in the initial stages of the EIS process. Subject to a construction methodolgy, Section 1 of the pipeline from the STP is likely to be installed by underground horizontal directional drilling. There may be two drilling rig stations, one within the existing STP and the other within a cleared area adjacent to the exfiltration ponds east of Arthur Kaine Drive. However, a key objective of the design is to eliminate the requirement for the intermediate drill rig staging location if possible.

BVSC will be undertaking a number of fieldwork investigations to inform the final concept design and the preparation of the EIS for the Project. These investigations comprise both terrestrial and marine investigations. The terrestrial investigations include geophysical and biodiversity surveys, while the marine investigations include dye dispersion experiments, geophysical and geotechnical surveys, and marine sediment and infauna sampling activities. These investigations are required in order to understand the existing environment and to inform the concept design and constructability for the ocean outfall component of the Project.

Geotechnical investigations for the Project will involve the drilling up to 8 boreholes across the terrestrial component of the Study area. Borehole drilling would be carried out as follows:

- Working area would be identified and delimited with signage, tape and bollard;
- Boreholes would be drilled using a rig and where required, the drilling rig would use bog matts to allow suitable access and minimise potential impacts;
- Boreholes would have a diameter of about 150 mm;
- Various drilling techniques (including hand augers) would be used where appropriate to obtain soil and rock core samples;
- If rock is reached, the rock will be cored to retrieve samples;
- Once samples have been obtained, boreholes would be backfilled (using bentonite and cement grout to top of rock as a minimum) and returned to as near to pre-existing conditions as possible
- Backfilling of boreholes would involve allowing the hole to collapse and backfill with clean sand (generally 2 mm quartz sand with neutral pH) if required; and
- Any excess cutting unable to be backfilled would be disposed of at an appropriately licenced facility.

Existing access tracks will be used to undertake the works. The site would be accessed from Arthur Kaine Drive and Ocean Drive. Parking of vehicles or plant/equipment during the work shift would occur within existing disturbed areas only and away from environmentally sensitive areas including outside the dripline of trees.

Each borehole would require a direct disturbance area of around 150 millimetres in diameter. Other activities would also result in general ground disturbance, such as the movement of vehicles and

machinery, placement of the drill rig and in gaining access to borehole locations. Limited vegetation impact is proposed with all measures taken to avoid disturbance to trees and shrubs. However, some grasses may be impacted by drilling.

1.3 Environmental Context

The Study area for the current ACHIA, shown on **Figure 1**, comprises the terrestrial component (*c.*44 ha) of the broader Merimbula STP and Ocean Outfall SSI Declaration Area, which covers an area of approximately 1,400 ha. Thus defined, the Study area encompasses the existing Merimbula STP and its associated exfiltration ponds, located to the east and west of Arthur Kaine Drive respectively, as well as largely unmodified sections of the broader Merimbula Bay Barrier Complex including a *c.*1.5 km long section of Merimbula Main Beach and *c.*360 m wide (N-S) section of adjoining foredunes.

As shown on Figure 1, the Merimbula STP is located between the townships of Merimbula and Pambula, approximately 3.5 km to the south of Merimbula's CBD and 2.5 km north of Pambula's CBD. The STP is bounded to the north and west by Merimbula Lake, to the south by the Pambula-Merimbula Golf Course and to the east by Arthur Kaine Drive. Merimbula Airport is located approximately 1 km to the north of the STP. Land within the Study area, which falls wholly within the Bega Valley Shire LGA, has been registered as Lot 2 on DP861737, Lot 101 on DP1201186, Lot 7308 on DP1167035, Lot 100 on DP1201186, Lot 7307 on DP1167035, Lot 1 on DP853245, Lot 320 on DP750227, Lot 355 on DP41837 and Lot 2 on DP853245.

The Study area, as alluded to above, cross cuts the central portion of the Merimbula Bay Barrier, a "stationary" or foredune ridge barrier (after Thom, 1983) of Holocene antiquity. The barrier, which extends over 6 km from the entrance to Boggy Creek in the north to the entrance of the Pambula River in the south, is made up of three distinct geomorphic units, all of which are represented within the Study area. From east to west, these comprise a sandy beach unit (i.e., Merimbula Beach), a relatively narrow (<300 m) foredune unit and a backbarrier flat unit up to ~450 m wide. Stratigraphically, the barrier has been described as consisting of a thin wedge of near-shore shelly sand overlain by leached, well-sorted quartzose beach and dune sand (beach ridge facies) (Polach et al., 1979: 335). A single radiocarbon date of 5,530±85 BP (ANU-1404), obtained on a sample of shell hash recovered from the uppermost portion of the regressive near-shore shelly sand facies at a depth of 7 m below MSL (see Figure 2), provides a *terminus post quem* for the deposition of the overlying beach ridge facies.

In common with other stationary bay barriers along the NSW south coast, two major depositional phases have been inferred for Merimbula barrier complex; the first associated with Postglacial Marine Transgression (PMT) (*c.*10,000 to 6,000 years BP) and characterised by the vertical accumulation of a transgressive beach facies, the gradual landward movement of this facies and the deposition of a relatively thick (~20 m) backbarrier sand facies through behind beach wash over processes. The second phase of barrier development commenced upon cessation of the PMT around 6,000 years BP. Thom (in Polach et al., 1979: 335) posits a reduction in backbarrier deposition during this phase and the vertical accumulation of the beach ridge facies. Progradation, if it occurred at all, has been placed at around 5,500 years BP, with the present shoreline position of the barrier dating from *c.*5,000 years BP (Thom in Polach et al., 1979: 353).

Topographically, the Study area can be divided into four distinct zones on the basis of surface geology. Landward of Merimbula Beach itself, the foredune component of the Merimbula Bay Barrier, which consists of Holocene marine sand (Qhbd), incorporates three to four north-easterly to south-westerly trending parallel dune ridges with a maximum elevation of 10 m AHD. These dunes are abutted to the west by a backbarrier sand flat (Qhbf) with an elevation of around 4m AHD and maximum width of around 200 m. This flat gives way, in turn, to the eastern flank of a locally significant north-south trending ridgeline associated with alluvial sands, grits and lacustrine clays of Tertiary antiquity (Ts). A major east-west trending spur associated with this ridgeline is occupied by the Merimbula STP, which itself abuts the southeastern fringe of Merimbula Lake, an intermediate, wave-dominated barrier estuary associated with estuarine-plain deposits of Holocene antiquity.

Owing to highly permeable soil materials, there are no permanent or ephemeral freshwater creeks present within the Merimbula Bay Barrier sand mass. However, freshwater can be found in low-lying, poorly-drained swales and depressions. Further inland potable water would have been available from

the freshwater reaches of watercourses such as the Pambula River, Boggy Creek, Merimbula Creek and Bald Hills Creek.

1.4 Archaeological Context

1.4.1 AHIMS Database

The AHIMS database, administered by OEH, contains records of all Aboriginal objects reported to the Director General of the Department of Premier and Cabinet in accordance with Section 89A of the National Parks and Wildlife (NPW) Act. It also contains information about Aboriginal places, which have been declared by the Minister to have special significance with respect to Aboriginal culture. Previously recorded Aboriginal objects and declared Aboriginal places are known as 'Aboriginal sites'.

Searches of the AHIMS database on 1 March 2018 for a 15 x 15 km area centred on the Study area (AHIMS search area) returned 157 site entries (**Table 1**). As is typical for the NSW south coast region, shell middens are the dominant site type represented within the AHIMS search area, accounting for 56.7% of registered sites (n = 89), with open artefact sites (i.e., artefact scatters and isolated finds) also well represented (n = 51, 32.5%). Other, less common site types include five scarred trees, five burials, three areas of PAD, two rockshelters, one fish trap and one grinding groove site.

Consideration of the location of previously recorded sites indicates that three are located within the Study area. Summary information on these sites, the locations of which are shown on **Figure 1** below, is provided in **Table 2**.

Table 1 AHIMS search results

Site type	Number	%
Shell midden	89	56.7
Open artefact site	51	32.5
Scarred tree	5	3.2
Burial	5	3.2
PAD	3	1.9
Rockshelter	2	1.3
Fish trap	1	0.6
Grinding groove(s)	1	0.6
Total	**157**	**100**

Figure1: Study area for current Aboriginal cultural heritage assessment, showing known Aboriginal sites

Table 2 AHIMS registered sites within Study area

AHIMS Site	Site Type	Description
Merimbula Bay (#62-6-0133)	Artefact scatter	In 1979 two artefacts were located in the beach ridge sequence between Merimbula Lake and the coast line. The artefacts consisted of two backed artefacts. They were uncovered due to sand quarrying and both artefacts were collected by K. Margus. In 1983 National Parks and Wildlife Service (NPWS) employee M. Sullivan created the site card and registration for this site based on information from the 1979 collection. The site coordinate was an approximation. This site is incorrectly listed as valid in the AHIMS register; it in fact consists of a disturbed area where two artefacts were previously removed in a 1979 surface collection (four years before the site was registered).
Merimbula Treatment Works (#62-6-0173)	Burial	In 1988 Brian Egloff from ANUTECH recorded three clusters of highly fragmented bones in an advanced state of decay in the south east corner of a sand quarry. They were described as "barely recognisable" with "one fragment identifiable as a portion of the frontal bone from the supra-orbital region. Possibly mature female or adolescent". Artefacts were also identified on the upper margins of the sand quarry rim, including a quartz core with quartz and chalcedony flakes. Photographs included in the site card show the area as a sandy dune with very little vegetation. It was noted on the site card for modified tree site #62-6-0475 that the burial was inspected again in 2000 by representatives from NPWS and Eden Local Aboriginal Land Council (ELALC). It was noted at that time that vegetation had grown across and stabilised the site and no bones were visible.
Merimbula Crown Lands Sandpit (#62-6-0475)	Modified tree	This modified tree was recorded in 2000 by representatives from NPWS and ELALC. At the time the tree was interpreted as having a scar caused by Aboriginal cultural modification, with a European survey mark later added to it. Some uncertainty was attached to the site however, as it was noted that there were at least two other trees in the surrounding area with similar scars and they may all have been the result of European modification for survey marks. The site card photograph shows marks consistent with a European axe having been used to form the scar (straight edged cut marks), suggesting that both the scar and survey mark are historical in origin, rather than Aboriginal. Marks like this were made by surveyors from the 1800s onwards, with the scar referred to as the blaze. These so-called Reference Trees were used to denote boundaries and locate survey marks; as with Aboriginal culturally modified trees, land clearance across NSW has increased their rarity and historical value (Doherty Smith & Associates, 2014). It was noted on the site card that as of June 2000, ELALC planned to inspect and discuss the modified tree, stating: "in [the] next month", but no further details resulting from that discussion were appended to this site card.

1.4.2 Due Diligence Assessment 2017

In mid-2017, AECOM undertook an Aboriginal archaeological due diligence assessment of the Study area in advance of a non-invasive gravity survey required to inform the concept design and constructability of the ocean outfall component of the Project. Consultation was undertaken with ELALC for this work, who were identified in the AHIMS site cards as having recorded and inspected the burial and modified tree registered in this vicinity. A visual inspection of the Study area was undertaken on 22 June 2017 by AECOM senior archaeologist Dr Darran Jordan. The purpose of this inspection was to help establish whether the proposed seismic refraction survey would, or was likely to, harm any Aboriginal objects.

One new Aboriginal site was identified during the inspection and provisionally designated as 'Merimbula STP Shell Scatter 1'. On the track under the transmission line easement at Zone 55 GDA94 758248E 5910382N some fragmented shell was noted which could potentially indicate associated subsurface deposits. No finds other than shell (e.g., flaked stone artefacts, mammal bone) were identified, nor were any compact, *in-situ* lenses of shell observed. Merimbula STP Shell Scatter 1 is interpreted as a disturbed surface manifestation of a former subsurface shell midden deposit.

Burial site 62-6-0173 was revisited and noted to be vegetated which has kept the area stabilised. A wombat hole with an associated spoil pile was present at the burial site, providing visibility of disturbed subsurface deposits. No artefacts or bone were observed within the hole or in the spoil pile.

Modified tree site 62-6-0475 could not be relocated, as the AHIMS coordinate proved to be inaccurate and the general area was thick with scrub, reducing both access and visibility. Three other historically modified trees were identified in the surrounding area however, increasing the likelihood that the origins of 62-6-0475 are as a surveyor's reference tree with blaze and metal cross mark.

Disturbance was noted throughout the area, most heavily within the bounds of the Merimbula STP and within the road corridor of Arthur Kaine Drive. In the dune area, past disturbances were evident in the form of vegetation clearance (with felled trees and stumps present), vehicle and pedestrian access tracks (which had been cleared of vegetation, cut into the dunes and churned by vehicles), and the disused sand quarry, currently forming two ponds with an associated outflow pipe.

Other impacts included the transmission line easement with associated vehicle tracks (in places heavily churned by vehicle movement, subsurface optical fibre cables, campfires and rubbish dumping (including a camp area within dense scrub, with two tents, a mattress and bottle dump. The subsurface sewer main was a major linear impact running through the dune area, with one outflow pipe at the beach and another at the two ponds formed by the former sand quarry. Other evidence of it across the area included surface vents and maintenance holes located at regular intervals.

1.5 Proposed Assessment Approach

The approach that AECOM intends to adopt for undertaking the current assessment includes the following components:

- background research;
- an archaeological field investigation incorporating survey and test excavation for the identified borehole locations;
- consultation with RAPs; and
- Preparation of an Aboriginal Cultural Heritage Assessment Report for the Project (ACHAR).

The proposed methodology for each of these tasks is set as follows:

1.5.1 Background Research

The following tasks will be undertaken for the background research component of the assessment:

- Review of searches of OEH's AHIMS and associated site cards and reports to clarify site contents, extents and statuses (undertaken as part of due diligence);
- A review of the landscape context of the Study area, with a particular emphasis on its implications for the nature and distribution of Aboriginal archaeological materials;
- A review of relevant archaeological and ethnohistoric information for the Study area and environs; and
- Preparation of a predictive model for the Aboriginal archaeological record of the Study area.

1.5.2 Archaeological Field Investigation

The archaeological field investigation will involve a pedestrian survey of the Study area as well as a targeted program of test excavation. Both will be undertaken by a combined field team of two AECOM archaeologists and an appropriate number of RAP field representatives, as determined by BVSC and AECOM prior to fieldwork.

In view of the archaeologically and culturally sensitive nature of the Merimbula Bay Barrier, as well as the nature of proposed Project-related ground disturbance activities, a program of archaeological test excavation focusing on proposed geotechnical drilling locations (up to 8) will be undertaken following survey. If required on engineering grounds, any intermediate drill pit between Arthur Kaine Drive and the water would also be targeted for subsurface testing. Test excavation units at each proposed drilling location will be centred on the borehole itself to reduce the risk any of any inadvertent impacts.

Archaeological test excavations for the Project will be undertaken in accordance with OEH's *Code of Practice for Archaeological Investigation of Aboriginal Objects*. All test pits will be hand excavated as 50 x 50 cm units (0.25 m²), with 5 cm spits employed during the excavation of the first test pit and 10 cm spits thereafter. Should the nature of the deposit require it, test pits may be expanded to a maximum of 1m^2. All test pits will be excavated to a minimum depth of 50 cm b.g.l. Excavated sediment will be dry-sieved through 5mm wire-mesh sieves. Any Aboriginal objects recovered during sieving will be bagged by square and spit. Representative profiles in each excavation unit will be drawn and photographed. Test pit stratigraphy will be recorded on pro forma test pit recording sheets using standard sedimentological terms and criteria (after McDonald & Isbell, 2009). All pits will be backfilled after excavation.

Should any suspected human remains be intercepted during the test excavation program, the protocol outlined in Section 3.6 of the *Code of Practice* will be followed.

1.5.3 Social/Cultural Values Assessment

Aboriginal community consultation for the assessment will be undertaken in accordance with OEH's Aboriginal *Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a). RAP representatives are in the best position to provide information on the Aboriginal social/cultural heritage values of the Study area. During the assessment process, AECOM will consult with RAPs regarding the cultural heritage values of the Study area. This will include as a minimum:

- A request for any initial comments regarding the Aboriginal cultural heritage values of the Study area in the letter accompanying this draft methodology;
- Discussion of cultural heritage values during fieldwork; and
- provision of a draft AACHAR to all RAPs for their review and comment. The draft AACHAR will assess the potential impact of the proposed development on the identified Aboriginal cultural heritage values of Study area and outline an appropriate management strategy for avoiding or minimising potential harm to such values. AECOM will incorporate any comments made within the submission period into the final AACHAR.

1.5.4 Aboriginal Cultural Heritage Assessment Report

An Aboriginal Cultural Heritage Assessment Report (ACHAR) will be prepared for inclusion in the project EIS. The ACHAR will be prepared with reference to the following statutory guidelines:

- OEH's *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (Office of Environment & Heritage, 2011);
- OEH's *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b); and
- OEH's *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a).

1.6 References Cited

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Appendix F

RAP Responses to Draft Methodology

From: Cullendulla [mailto:cullendullachts@gmail.com]
Sent: Friday, 6 April 2018 12:02 PM
To: Jordan, Darran
Subject: Aboriginal Cultural Heritage Assessment - Merimbula Sewage Treatment Plant Upgrade (STP) and Deep Ocean Outfall Project - Invitation to Register Interest & Draft Assessment Methodology

Hi Darran,

This is Goobahs registration of intrest in the above project.

We support the draft Methodology and wish to be kept informed of any further developments. All correspondence should be sent to this email address. Thankyou.

--
Kind Regards
Corey Smith
Cultural Heritage Officer
Cullendulla

From: Biamanga [mailto:biamangachts@gmail.com]
Sent: Friday, 6 April 2018 12:03 PM
To: Jordan, Darran
Subject: Aboriginal Cultural Heritage Assessment - Merimbula Sewage Treatment Plant Upgrade (STP) and Deep Ocean Outfall Project - Invitation to Register Interest & Draft Assessment Methodology

Hi Darran,

This is Biamangas registration of intrest in the above project.

We support the draft Methodology and wish to be kept informed of any further developments. All correspondence should be sent to this email address. Thankyou.

--
Kind Regards
Seli Storer
Chief Executive Officer
Biamanga

From: Murramarang [mailto:murramarangchts@gmail.com]
Sent: Friday, 6 April 2018 12:03 PM
To: Jordan, Darran
Subject: Aboriginal Cultural Heritage Assessment - Merimbula Sewage Treatment Plant Upgrade (STP) and Deep Ocean Outfall Project - Invitation to Register Interest & Draft Assessment Methodology

Hi Darran,

This is Murramarangs registration of intrest in the above project.

We support the draft Methodology and wish to be kept informed of any further developments. All correspondence should be sent to this email address. Thankyou.

--
Kind Regards
Roxanne Smith
Cultural Heritage Officer
Murramarang

From: Goobah [mailto:goobahchts@gmail.com]
Sent: Friday, 6 April 2018 12:31 PM
To: Jordan, Darran
Subject: Aboriginal Cultural Heritage Assessment - Merimbula Sewage Treatment Plant Upgrade (STP) and Deep Ocean Outfall Project - Invitation to Register Interest & Draft Assessment Methodology

Hi Darran,

This is Goobahs registration of intrest in the above project.

We support the draft Methodology and wish to be kept informed of any further developments. All correspondence should be sent to this email address. Thankyou.

--
Regards Basil Smith
Chief Executive Officer
Goobah PH 0405995725

Appendix G

Fieldwork Notification

AECOM Imagine it. Delivered.

AECOM Australia Pty Ltd
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Sydney NSW 2000
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QVB Post Office NSW 1230
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www.aecom.com

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+61 2 8934 0001 fax
ABN 20 093 846 925

EXAMPLE

13 August 2018

Glenn Willcox
Bega Local Aboriginal Land Council
PO Box 11
Bega, NSW, 2550

Dear Glenn,

Re: Fieldwork Notification - Merimbula Sewage Treatment Plant (STP) Upgrade and Deep Ocean Outfall Project

AECOM is requesting one field representative from your organisation to participate in the fieldwork component of the Aboriginal heritage assessment being undertaken for the Merimbula Sewage Treatment Plant (STP) Upgrade and Deep Ocean Outfall Project, near Merimbula.

A Bega LALC site officer is requested for three days of fieldwork, being **Tuesday 28th**, **Wednesday 29th** and **Thursday 30th August 2018**.

Field Representative Information

Fieldwork Description: Archaeological survey and test excavation

Meeting Place: Entrance to Merimbula Sewage Treatment Plant, off Arthur Kaine Drive, Merimbula (see map below)

Meeting Time: Please be at the meeting place at 8:00am ready to sign in. A brief safety induction will be conducted on arrival prior to commencement of works. Work hours will be 8:00am to 4:00pm.

AECOM Contact: Andrew McLaren (02) 8934 0547 or 0403 753 165

What to Bring: Water, morning tea and lunch

PPE (High-visibly vest or high-visibility long-sleeved shirt, long pants, boots, safety/sun glasses, hat, gloves)

Chair to sit on at lunchtime

Invoicing:

Rate: $700 flat-rate per day (ex-GST). Rate is inclusive of travel expenses.

Please note that the proponent - Bega Valley Shire Council - require all invoicing parties to have completed and returned the attached creditor request application. Failure to supply a completed application will prevent/delay payment of fieldwork invoices.

Please also note that if your organisation is not registered for GST this should not be included on your invoice.

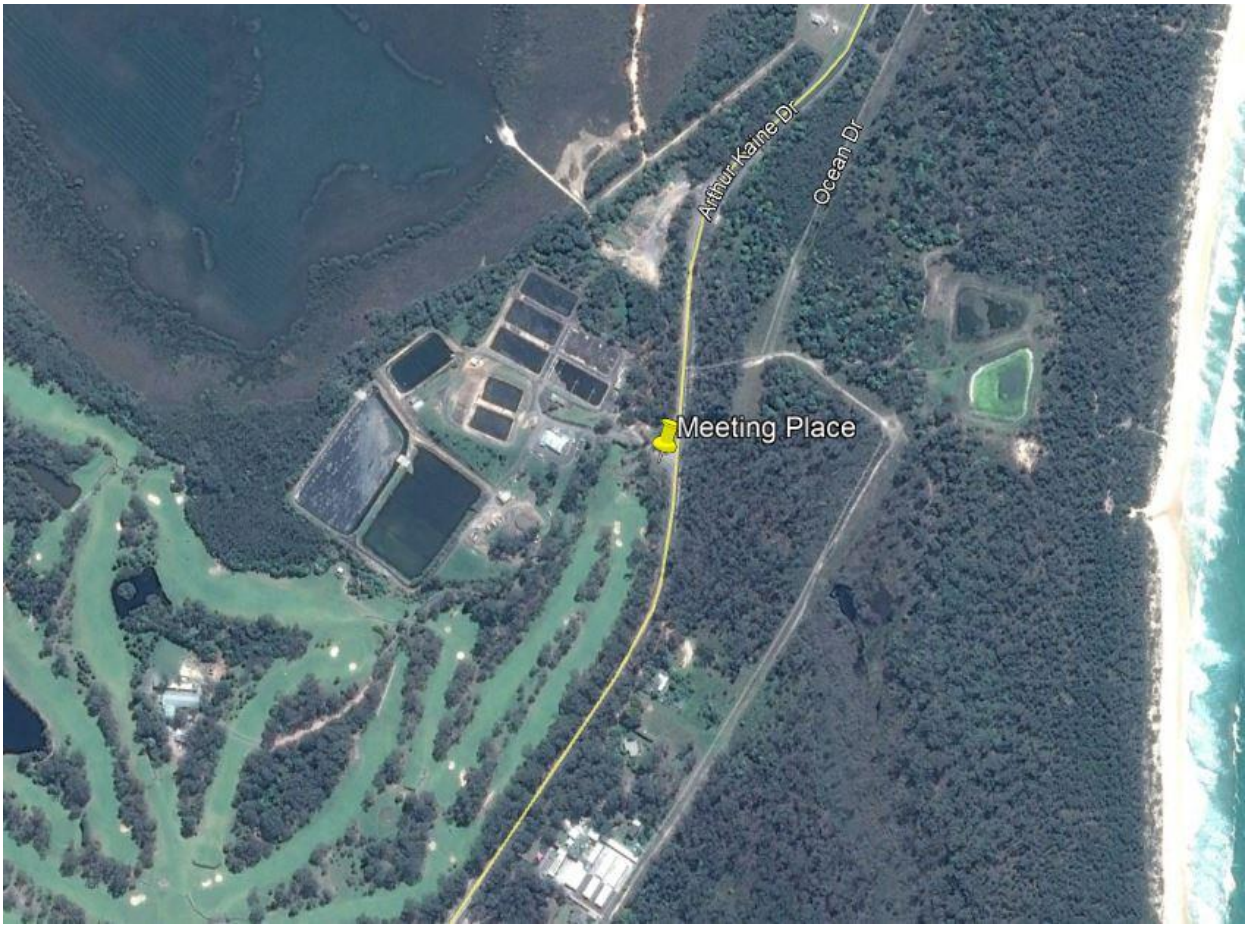
Please address invoices to: Andrew T Stewart
Project Manager
Bega Valley Shire Council
BVSC, Zingel Place, Bega, NSW 2550
c/o AECOM Australia Pty Ltd

Please send invoices to: andrew.mclaren@aecom.com

Yours faithfully,

Dr Andrew P McLaren
Archaeologist
andrew.mclaren@aecom.com

Mobile: 0403 753 165
Direct Dial: +61 2 8934 0547
Direct Fax: +61 2 8934 0001



Meeting Place: Entrance to Merimbula Sewage Treat Plant (STP), off Arthur Kaine Drive, Merimbula

CREDITOR DETAILS REQUEST

To assist, please print clearly in BLACK pen and provide as much information as possible so we can ensure prompt payment.
If the form has not been completed we may send it back to you or ask you for more information before we can process your request.

Please complete and return to:

Creditors Clerk
Bega Valley Shire Council
PO Box 492
BEGA NSW 2550

Council contact person / order placed by:

Company details

	Company name		
Registration	ABN		GST registered ☐ Yes ☐ No
Payee name	Contact name / Position		
Postal address ✉	Street or PO		
	Town/Locality		Postcode
Daytime contact details	Phone		Fax
	Email		

Ordering details

Method of receiving orders and details:

☐ Email ☐ Facsimile ☐ Phone

Accounts receivable contact details	Phone		Fax
	Email		

Payment details

I give BVSC permission to make payment direct to the account detailed below.

Bank details	BSB no		Account no.
	Account name		

Remittances

Please send remittance notices for automatic bank payments by.

☐ Email ☐ Post

Authorisation

Please add/update my company's details in the BVSC creditor system.

Signature

Date / /

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REGISTRATION STAMP

Form unable to be processed / incomplete ☐
Awaiting further information / returned to sender ☐

Activated by

Date

creditor request details.docx

Appendix H

RAP Submissions on Draft Report

McLaren, Andrew

From: Graham Moore <graham.moore@lls.nsw.gov.au>
Sent: Wednesday, 2 December 2020 1:56 PM
To: McLaren, Andrew
Subject: [EXTERNAL] RE: Review of draft ACHAR - Merimbula STP Upgrade & Deep Ocean Outfall Project

Hi Andy, seems that the footprint is all good mate and as long as the machinery is not impacting on that track closest to the existing water ponds all should be good.
Gtraham

From: McLaren, Andrew <Andrew.McLaren@aecom.com>
Sent: Wednesday, 2 December 2020 1:05 PM
To: Graham Moore <graham.moore@lls.nsw.gov.au>
Subject: Fwd: Review of draft ACHAR - Merimbula STP Upgrade & Deep Ocean Outfall Project

Dr Andrew McLaren
Senior Heritage Specialist
D (02) 8934 0547
M 0403 753 165
andrew.mclaren@aecom.com

From: McLaren, Andrew

Sent: Wednesday, October 21, 2020 10:42:34 AM

To: gmoore@begavalley.nsw.gov.au <gmoore@begavalley.nsw.gov.au>

Subject: Review of draft ACHAR - Merimbula STP Upgrade & Deep Ocean Outfall Project

Hi Graham,

Hope all's well at your end.

In accordance with Section 4.4.2 of Heritage NSW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents*, please find attached for your review a draft of AECOM's Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Merimbula STP Upgrade & Deep Ocean Outfall Project, between Merimbula and Pambula, NSW. If you'd like me to pop a physical copy in the mail, that's no problem, I'll just need to grab a postal address.

Please note that the closing date for comments is Thursday 19 November 2020. Comments can be provided by mail, fax, e-mail or phone using the contact details below.

Kind regards,

Andy McLaren

Dr Andrew McLaren
Principal Aboriginal Heritage Specialist
D +61 2 8934 0547 M 0403 753 165
Andrew.McLaren@aecom.com

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Appendix I

AHIMS Search Results

AHIMS Web Services (AWS)

Note: This Excel report shows the sites found in AHIMS on the 02/08/2021. If this date is not the sa
letter.

Site ID	Site name	Datum	Zone	Easting	Northing	Context
62-6-0540	Bar Beach 1	GDA	55	760571	5912673	Open site
62-6-0756	Pambula Beach 1	GDA	55	759536	5907033	Open site
62-6-0684	No. 2 Marine Parade	AGD	55	759677	5912708	Open site
62-6-0567	Mirador Site 1	AGD	55	760419	5914556	Open site
62-6-0656	Barmouth Carpark 2	AGD	55	760210	5906790	Open site
62-6-0787	Merimbula SP SAL16	GDA	55	761368	5913879	Open site
62-6-0476	Culture Camp Hammer	AGD	55	761250	5906600	Open site
62-6-0677	Merimbula Headland 1	GDA	55	761557	5912222	Open site
62-6-0463	PRMS	AGD	55	758800	5906500	Open site
62-6-0192	Merimbulla Beach 1;ME	AGD	55	759000	5911550	Open site
62-6-0078	Pambula Lake 12;	AGD	55	758900	5906200	Open site
62-6-0800	LAKE STREET - ARTE	GDA	55	760561	5912998	Open site
62-6-0755	Bar Beach PAD	GDA	55	760570	5912748	Open site
62-6-0654	Merimbula Beach Stree	GDA	55	759443	5913535	Open site
62-6-0076	Severs Beach;Pambula	AGD	55	759600	5906300	Open site
62-6-0017	Merimbula Point;	AGD	55	760700	5912000	Open site
62-6-0038	Pambula Lake;Quonda	AGD	55	760600	5903800	Open site
62-6-0087	Haycock Point;Toalla P	GDA	55	761722	5906720	Closed sit
62-6-0100	Merimbula Lake 3	AGD	55	758500	5912550	Open site
62-6-0832	Merimbula Airport Midd	GDA	55	758620	5911412	Open site
62-6-0817	Merimbula Airport Midd	GDA	55	758961	5912021	Open site
62-6-0797	Merimbula Airport Midd	GDA	55	759061	5912188	Open site
62-6-0686	Main Street 1	AGD	55	759745	5913450	Open site
62-6-0515	Merimbula Public Scho	AGD	55	759800	5913600	Open site
62-6-0130	Haycock Point;	AGD	55	760200	5907100	Open site
62-6-0541	Tura Beach 1 (TB 1)	AGD	55	761046	5915828	Open site
62-6-0002	The Pinnacles Haycock	AGD	55	761800	5906200	Open site
62-6-0667	Lot 222/Locale 1	AGD	55	758704	5907726	Open site
62-6-0796	Merimbula Airport Midd	GDA	55	759165	5912326	Open site
62-6-0496	Bar Beach Rd	AGD	55	760460	5912479	Open site
62-6-0037	Pambula Lake;	AGD	55	758900	5903900	Open site
62-6-0012	Severs Beach;Pambula	AGD	55	759300	5906500	Open site
62-6-0040	Back Lagoon;Short Poi	AGD	55	760300	5913600	Open site
62-6-0003	Pambula Beach;Jiguma	AGD	55	760500	5907100	Closed sit
62-6-0492	Yowaka - Bridge (13)	AGD	55	758530	5904320	Open site
62-6-0097	Merimbula Lake 1;	AGD	55	758900	5912650	Open site
62-6-0786	Bar Beach 2	GDA	55	760549	5912812	Open site
62-6-0655	Barmouth Carpark 1	AGD	55	760300	5906890	Open site
62-6-0544	Burial, Merimbula	AGD	55	759373	5912617	Open site
62-6-0183	Pambula Beach;	AGD	55	759300	5907400	Open site
62-2-0014	Merimbula Creek;Merin	AGD	55	759700	5913400	Open site
62-6-0098	Merimbula Lake 2;	AGD	55	760200	5907100	Open site
62-6-0004	Pambula Beach;Jiguma	AGD	55	760500	5907100	Open site
62-6-0676	Merimbula Point 2	GDA	55	761612	5912155	Open site
62-6-0099	Merimbula Lake 4;	AGD	55	758390	5912450	Open site
62-6-0080	Pambula Lake 14;	AGD	55	758400	5905700	Open site
62-6-0816	Merimbula Airport Midd	GDA	55	758810	5911743	Open site
62-6-0056	Pambula River;Severs	AGD	55	758600	5906200	Open site
62-6-0789	Bimbimbie IF 1	GDA	55	758974	5912832	Open site
62-6-0079	Pambula Lake 13;	AGD	55	758700	5905800	Open site
62-6-0193	Merimbulla Beach 2;ME	AGD	55	758950	5911700	Open site
62-6-0075	Pambula Lake 9;	AGD	55	758800	5906700	Open site
62-6-0794	Merimbula Airport Midd	GDA	55	759078	5912240	Open site
62-6-0783	Merimbula Boardwalk 1	GDA	55	759174	5912917	Open site

62-6-0522	Main Street Aboriginal I	AGD	55	759770	5913390	Open site
62-6-0039	Short Point;Back Lagoc	AGD	55	760300	5913600	Open site
62-6-0041	Merimbula Point;	AGD	55	760700	5912000	Open site
62-5-0008	The Pinnacles Haycock	AGD	55	761000	5906200	Open site
62-6-0074	Pambula Lake;Pambul	AGD	55	758400	5906300	Open site
62-6-0689	Dry Cleaners	GDA	55	759094	5913622	Open site
62-6-0493	Yowaka - Bridge (14)	AGD	55	758830	5904370	Open site
62-6-0795	Merimbula Airport Midd	GDA	55	759245	5912444	Open site
62-6-0462	GA 1	AGD	55	760550	5914400	Open site
56-6-0333	GA1	AGD	55	760550	5914400	Open site
62-6-0077	Pambula Lake 11;	AGD	55	759000	5906400	Open site
62-6-0808	NGH TB AFT 1	GDA	56	224678	5915883	Open site
62-6-0301	Lot 15/4	AGD	55	759750	5913480	Open site
62-6-0500	Rotary Park	GDA	55	760290	5913504	Open site
62-6-0678	Merimbula Headland 3	AGD	55	761430	5911754	Open site
62-6-0815	TH20-01	GDA	55	762537	5917199	Open site
62-6-0834	AKD locale 1	GDA	55	759341	5912357	Open site
62-6-0542	Merimbula Lake Midde	AGD	55	759366	5912622	Open site
62-6-0001	Merimbula Lake Main S	AGD	55	759700	5913450	Open site
62-6-0312	Lot 15/4	AGD	55	759750	5913480	Open site
62-6-0302	Back Lagoon 1	AGD	55	760250	5914350	Open site

ame as the original date of the Search Results letter obtained during the Basic Search, then the search results might

Site status	Primary contact	Site features	Site types	Recorders
Valid		Shell : -		Veronica Webster,Onsit
Valid		Shell : 1		Ms.Sarah Robertson
Valid	Searle	Artefact : 7		Doctor.Julie Dibden
Valid	Searle	Artefact : 4		Doctor.Julie Dibden
Valid	T Russell	Artefact : 10		Phil Purcell
Valid		Artefact : 1		Bega Local Aboriginal L
Valid		Artefact : -		Miss.Sharon Davey,Joh
Valid	T Russell	Shell : 99		Mr.Graham Moore
Valid		Shell : -		Bobbie Oakley
Valid		Shell : -, Artefact : -	Midden	Mr.Peter Kuskie
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : 1		Doctor.Rebecca Parkes
Not a Site		Potential Archaeological Deposit (PAD) : 1		Onsite Cultural Heritage
Valid	Searle	Artefact : 7, Shell : -, Potential Archaeological De		Doctor.Julie Dibden,Iron
Valid		Shell : -, Artefact : -	Midden	Miss.Marjorie Sullivan
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Shell : -, Artefact : -	Midden	Miss.Marjorie Sullivan
Valid		Shell : -, Artefact : -, Art	Shelter with Art,Shelter	Bill Thornhill
Valid		Shell : -, Artefact : -	Midden	Miss.Marjorie Sullivan
Partially Destroyed		Artefact : -, Shell : -		Mr.Matthew Barber,Mr.M
Partially Destroyed		Artefact : -, Shell : -		Mr.Matthew Barber,Mr.M
Valid		Artefact : -, Shell : -		Mr.Matthew Barber,Mr.M
Valid		Shell : -, Artefact : -		Cultural Heritage Conne
Valid		Shell : -, Artefact : -		Jim Wheeler
Valid		Shell : -, Artefact : -	Midden	Australian National Univ
Valid		Artefact : 4		ERM - Thornton
Valid		Shell : -, Artefact : -	Midden	Harry Lourandos
Valid	Searle	Artefact : 246		Doctor.Julie Dibden
Valid		Artefact : -, Shell : -		Mr.Matthew Barber,NGH
Valid		Shell : -		Mr.Graham Moore
Valid		Shell : -, Artefact : -	Midden	Unknown Author
Valid		Shell : -, Artefact : -	Midden	Miss.Marjorie Sullivan
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Shell : -, Artefact : -	Shelter with Midden	ASRSYS
Valid		Shell : -		Mr.Graham Moore
Valid		Shell : -, Artefact : -	Midden	Miss.Marjorie Sullivan
Valid		Shell : -		Doctor.Julie Dibden,NSW
Valid	T Russell	Artefact : 10		Phil Purcell
Valid		Burial : 1		Richard Wright
Valid		Artefact : -, Shell : -	Midden	I Kirby,W Mongta
Valid		Burial : -, Shell : -, Artefa	Burial/s,Midden	Mr.Keith Thompson
Valid		Shell : -, Artefact : -	Midden	Miss.Marjorie Sullivan
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid	T Russell	Artefact : 1		Mr.Graham Moore
Valid		Shell : -, Artefact : -	Midden	Miss.Marjorie Sullivan
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : -, Shell : -, Non-Human Bone and Orga		Mr.Matthew Barber,Mr.M
Valid		Shell : -, Artefact : -	Midden	Unknown Author
Valid		Artefact : -		Mr.Matthew Barber,NGH
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Modified Tree (Carved c	Scarred Tree	Mr.Peter Kuskie
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : -		Mr.Matthew Barber,Mr.M
Valid		Shell : -		Doctor.Julie Dibden,NSW

Valid		Shell : -		Bobbie Oakley
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Shell : -, Artefact : -	Midden	Unknown Author
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : 4		Mr.Graham Moore
Valid		Shell : -		Mr.Graham Moore
Partially Destroyed		Artefact : -, Shell : -		Mr.Matthew Barber,Mr.M
Valid		Artefact : -	Open Camp Site	G Aiken
Valid	T Russell	Artefact : 14		ANUTECH
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : -		Mr.Matthew Barber,NGH
Valid		Artefact : -	Open Camp Site	Miss.Jackie Taylor
Valid		Modified Tree (Carved or Scarred) : -, Artefact :		Mr.Peter Kuskie,Mr.Gra
Valid	T Russell	Artefact : 1		Mr.Graham Moore
Valid		Aboriginal Resource and Gathering : -, Artefact :		Lantern Heritage Pty Ltd
Valid		Artefact : -		Doctor.Julie Dibden,NSW
Valid		Burial : 1, Shell : 1000		Eden LALC
Valid		Shell : -, Burial : 2	Burial/s	Ms.Kerry Thompson
Valid		Artefact : -	Open Camp Site	Miss.Jackie Taylor
Valid		Artefact : -	Open Camp Site	Mr.Douglas Williams

: be different. The PDF version of this report will always coincide with the Basic Search Results

Reports	Permits	Longitude GDA94	Latitude GDA94
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		149.91	-36.95
100643	2866	149.92	-36.89
	2400	149.92	-36.88
100192,100193	2572	149.92	-36.95
and Council,Mr.Glenn Willcox		149.93	-36.88
n Cruse,George Malolakis		149.94	-36.95
		149.94	-36.90
	1484	149.91	-36.95
		149.91	-36.90
		149.91	-36.95
,Lantern Heritage Pty Ltd - Tathra		149.92	-36.89
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99859,103055,103129	2435,2436,3665,3740,3	149.91	-36.89
		149.92	-36.95
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		149.93	-36.97
		149.94	-36.95
193	4187	149.90	-36.90
Matthew Barber,NGH Heritage - Fyshwick,NGH H		149.90	-36.91
Matthew Barber,Mr.Matthew Barber,NGH Heritag		149.91	-36.90
Matthew Barber,NGH Heritage - Fyshwick,NGH H		149.91	-36.90
100634		149.92	-36.89
98395,98820	2,1628,1723,1724,2108,	149.92	-36.89
ersity		149.92	-36.94
98952	1968,1969	149.93	-36.87
193	3835	149.94	-36.95
100242,100708	2679,2680	149.91	-36.94
H Heritage - Fyshwick		149.91	-36.90
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	2671	149.91	-36.95
1250	4187	149.92	-36.89
		149.93	-36.94
		149.91	-36.97
		149.91	-36.89
N Archaeology Pty Ltd	4187	149.92	-36.89
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99142,99851	2055	149.91	-36.90
		149.91	-36.94
		149.92	-36.89
		149.92	-36.94
		149.93	-36.94
		149.94	-36.90
	4187	149.90	-36.90
		149.90	-36.96
Matthew Barber,NGH Heritage - Fyshwick,NGH H		149.90	-36.90
100363	2623	149.91	-36.95
H Heritage - Fyshwick		149.91	-36.89
		149.91	-36.96
		149.91	-36.90
		149.91	-36.95
Matthew Barber,NGH Heritage - Fyshwick,NGH H		149.91	-36.90
N Archaeology Pty Ltd	4187	149.91	-36.89

	1676,2793,2794,2803	149.92	-36.89
1250	4187	149.92	-36.89
		149.93	-36.90
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		149.90	-36.95
		149.91	-36.89
		149.91	-36.97
Matthew Barber,Mr.Matth	4727	149.91	-36.90
		149.92	-36.88
1250		149.92	-36.88
		149.91	-36.95
d Heritage - Fyshwick		149.91	-36.86
	1418	149.92	-36.89
99700,100465	2463,2464	149.92	-36.89
		149.94	-36.90
l - Tathra,Ms.Cassandra	4748	149.94	-36.85
N Archaeology Pty Ltd		149.91	-36.90
99158,99366	2040,2041,2059	149.91	-36.90
193		149.92	-36.89
	1418	149.92	-36.89
		149.92	-36.88

AHIMS Web Services (AWS)

Note: This Excel report shows the sites found in AHIMS on the 02/08/2021. If this date is not the sa
letter.

Site ID	Site name	Datum	Zone	Easting	Northing	Context
62-6-0488	Yowaka - Bridge (9)	AGD	55	756720	5905120	Open site
62-6-0068	Pambula Lake;Tee Tre	AGD	55	756900	5905200	Open site
62-6-0691	Robyns Nest 2 (RN2) P	GDA	55	757264	5913471	Open site
62-6-0693	Robyns Nest 4 (RN4) P	GDA	55	757449	5913590	Open site
62-6-0632	Merimbula Cove 6/C	GDA	55	757500	5913618	Open site
62-6-0784	Merimbula Boardwalk 2	GDA	55	757898	5912841	Closed sit
62-6-0082	Pambula Lake 16;	AGD	55	757800	5905600	Open site
62-6-0133	Merimbula Bay;	AGD	55	758300	5910100	Open site
62-6-0173	Merimbula treatment w	AGD	55	758350	5910100	Open site
62-6-0580	Yowaka 3.	AGD	55	755400	5904675	Open site
62-6-0178	Milligandi 2;	AGD	55	755900	5914220	Open site
62-6-0175	Milligandi 5;	AGD	55	755930	5913530	Open site
62-6-0483	Yowaka - Bridge (4)	AGD	55	756330	5905870	Open site
62-6-0494	Broadwater	AGD	55	756645	5904718	Open site
62-6-0067	Pambula Lake;Tee Tre	AGD	55	757130	5905100	Open site
62-6-0135	Merimbula Heights Est	AGD	55	757880	5912650	Open site
62-6-0490	Yowaka - Bridge (11)	AGD	55	757690	5904750	Open site
62-6-0134	Merimbula Heights Est	AGD	55	758130	5912650	Open site
62-6-0475	Merimbula Crown Land	AGD	55	758200	5910200	Open site
62-6-0809	Merimbula STP OAS1	GDA	55	758393	5910155	Open site
62-6-0810	Merimbula STP IA1	GDA	55	758458	5910413	Open site
62-6-0578	Yawaka 1	AGD	55	755333	5904685	Open site
62-6-0179	Milligandi 1;	AGD	55	756200	5914320	Open site
62-6-0570	Driftwood Survey Unit 1	AGD	55	756206	5911512	Open site
62-6-0069	Shark Hole;Pambula La	AGD	55	756800	5905300	Open site
62-6-0191	PAMBULA 8824-2-5;	AGD	55	757200	5914600	Open site
62-6-0184	Hart Creek;Princes Hig	AGD	55	756900	5903000	Open site
62-6-0692	Robyns Nest 3 (RN3) P	GDA	55	757353	5913594	Open site
62-6-0470	Merimbula Cove 10/B,	GDA	55	757407	5913390	Closed sit
62-6-0070	Pambula Lake A;	AGD	55	757200	5905700	Open site
62-6-0471	Merimbula Cove 12/A	AGD	55	757533	5913434	Open site
62-6-0534	Merimbula Cove 6/B	AGD	55	757570	5913520	Open site
62-6-0535	Merimbula Cove 7/A	AGD	55	757580	5913590	Open site
62-6-0472	Merimbula Cove 3	AGD	55	757740	5912850	Open site
62-6-0137	Merimbula Heights Est	AGD	55	757830	5912830	Open site
62-6-0814	Merimbula Airport acce	GDA	55	758070	5910676	Open site
62-6-0754	PAM-ISO1	GDA	55	755329	5909289	Open site
62-6-0576	Driftwood Survey Unit 3	AGD	55	756378	5911404	Open site
62-6-0652	Driftwood Survey Unit 5	AGD	55	756610	5911570	Open site
62-6-0237	OFC 1;	AGD	55	751800	5905190	Open site
62-6-0485	Yowaka - Bridge (6)	AGD	55	756620	5906520	Open site
62-6-0486	Yowaka - Bridge (7)	AGD	55	756610	5906150	Open site
62-6-0487	Yowaka - Bridge (8)	AGD	55	756610	5906020	Open site
62-6-0066	Pembula Lake	AGD	55	756600	5904790	Open site
62-6-0138	Merimbula Heights Est	AGD	55	757760	5912840	Open site
62-6-0139	Merimbula Heights Est	AGD	55	757780	5912700	Open site
62-6-0474	Merimbula Cove 1	AGD	55	757800	5912970	Open site
62-6-0705	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site
62-6-0704	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site
62-6-0812	Merimbula STP SM1	GDA	55	758236	5910389	Open site
62-6-0189	Merimbula Ck	AGD	55	755320	5915800	Open site
62-6-0579	Yowaka 2.	AGD	55	755157	5904742	Open site
62-6-0180	Milligandi 7;	AGD	55	755600	5913540	Open site
62-6-0177	Milligandi 3;	AGD	55	755880	5914470	Open site

62-6-0174	Milligandi 6;	AGD		55	755910	5913480	Open site
62-6-0572	Driftwood Survey Unit 1	AGD		55	756262	5911694	Open site
62-6-0651	Driftwood Survey Unit 1	AGD		55	756315	5911600	Open site
62-6-0573	Driftwood Survey Unit 1	AGD		55	756404	5911521	Open site
62-6-0159	Pambula Beach 4;Pam	AGD		55	756600	5905200	Open site
62-6-0690	Robyns Nest 1 (RN1) P	GDA		55	757208	5913518	Open site
62-6-0071	Pambula Lake 5;	AGD		55	757300	5905700	Open site
62-6-0473	Merimbula Cove 2	AGD		55	757790	5912940	Open site
62-6-0142	Merimbula Heights Est	AGD		55	757960	5913070	Open site
62-6-0160	Thantawanglo 1;	AGD		55	757900	5906480	Open site
62-6-0154	Merimbula;Site 1;	AGD		55	758200	5915100	Open site
62-6-0752	PAM-AS2	GDA		55	754830	5909913	Open site
62-6-0751	PAM-AS1	GDA		55	754959	5909966	Open site
62-6-0176	Milligandi 4;	AGD		55	755860	5913670	Open site
62-6-0577	Driftwood - Possible Sc	AGD		55	756167	5911625	Open site
62-6-0481	Yowaka - Bridge	AGD		55	756150	5905500	Open site
62-6-0093	Merimbula Lake;	AGD		55	756400	5912300	Open site
62-6-0575	Driftwood Survey Unit 1	AGD		55	756378	5911404	Open site
62-6-0653	Driftwood Survey Unit 6	AGD		55	756525	5911550	Open site
62-6-0484	Yowaka - Bridge (5)	AGD		55	756550	5906320	Open site
62-6-0660	Restriction applied. Please contact	ahims@environment.nsw.gov.au.					Open site
62-6-0469	Merimbula Cove 11/A	GDA		55	757490	5913420	Open site
62-6-0533	Merimbula Cove 6/A	AGD		55	757530	5913480	Open site
62-6-0785	Merimbula Boardwalk 3	GDA		55	757706	5913173	Open site
62-6-0085	Honeysuckle Point;Pam	AGD		55	757400	5905000	Open site
62-6-0489	Yowaka - Bridge (10)	AGD		55	757540	5904880	Open site
62-6-0136	Merimbula Heights Est	AGD		55	757860	5912760	Open site
62-6-0141	Merimbula Heights Est	AGD		55	757980	5912750	Open site
62-6-0753	PAM-AS3	GDA		55	754928	5909508	Open site
62-6-0157	Pambula Beach 2;Pam	AGD		55	756000	5907000	Open site
62-6-0083	Peach Tree Point;Pamb	AGD		55	757300	5905300	Open site
62-6-0140	Merimbula Heights Est	AGD		55	757930	5912700	Open site
62-6-0811	Merimbula STP SM2	GDA		55	758392	5910374	Open site
62-6-0659	Restriction applied. Please contact	ahims@environment.nsw.gov.au.					Open site
62-6-0482	Yowaka - Bridge (3)	AGD		55	756430	5905630	Open site
62-6-0167	Nethercote Falls	AGD		55	751110	5903090	Open site
62-6-0464	RFA4	AGD		55	756900	5915800	Open site
62-6-0694	Robyns Nest 5 (RN5) P	GDA		55	757396	5913411	Open site
62-6-0695	Robyns Nest 6 (RN6) P	GDA		55	757459	5913425	Open site
62-6-0084	Pambula Lake 17;	AGD		55	757300	5905200	Open site
62-6-0782	Merimbula boardwalk 4	GDA		55	757761	5913267	Open site
62-6-0072	Pambula Lake 6;	AGD		55	757600	5905800	Open site
62-6-0813	Merimbula Airport runw	GDA		55	758057	5910799	Open site
62-6-0788	Arthur Kaine Scatter	GDA		56	223651	5909895	Open site
62-6-0158	Pambula Beach 3;Pam	AGD		55	758000	5906000	Open site
62-6-0073	Pambula Lake 7;	AGD		55	758000	5906000	Open site
62-6-0081	Pambula Lake 15;	AGD		55	758200	5905600	Open site
62-6-0491	Yowaka - Bridge (12)	AGD		55	758230	5904500	Open site
62-6-0156	Pambula Bch 1;Pambu	AGD		55	756000	5905000	Open site
62-6-0571	Driftwood Survey Unit 1	AGD		55	756216	5911548	Open site
62-6-0574	Driftwood Survey Unit 1	AGD		55	756414	5911562	Open site

ame as the original date of the Search Results letter obtained during the Basic Search, then the search results might

Site status	Primary contact	Site features	Site types	Recorders
Valid		Shell : -		Mr.Graham Moore
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid	John Dixon	Potential Archaeological Deposit (PAD) : -, Artef		Mr.Peter Kuskie,South E
Valid	John Dixon	Artefact : -, Potential Archaeological Deposit (PA		Mr.Peter Kuskie,South E
Valid	T Russell	Artefact : 1		Mr.Peter Kuskie,South E
Valid		Shell : -		Doctor.Julie Dibden,NSV
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : -	Open Camp Site	ASRSYS
Valid		Burial : -	Burial/s	Brian Egloff
Valid	T Russell	Grinding Groove : 1		Mr.Graham Moore
Valid		Artefact : -	Open Camp Site	Kerry Navin
Valid		Artefact : -	Open Camp Site	Kerry Navin
Valid		Shell : -		Mr.Graham Moore
Valid		Hearth : -, Artefact : -, Shell : -		Mr.Graham Moore
Valid		Shell : -, Artefact : -	Midden	Miss.Marjorie Sullivan
Valid		Shell : -, Artefact : -	Midden	Phil Hughes
Valid		Shell : -		Mr.Graham Moore
Valid		Shell : -, Artefact : -	Midden	Phil Hughes
Valid		Modified Tree (Carved or Scarred) : -		John Cruse,George Mal
Valid		Artefact : -, Potential Archaeological Deposit (PA		AECOM Australia Pty Lt
Valid		Artefact : -		AECOM Australia Pty Lt
Valid	Mr.Graham Moore	Artefact : 1		Mr.Graham Moore
Valid		Artefact : -	Open Camp Site	Kerry Navin
Valid	Searle	Artefact : 3		Doctor.Julie Dibden
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : -	Open Camp Site	P.D Cope
Valid		Modified Tree (Carved c	Scarred Tree	I Kirby,W Mongta,H Terr
Valid	John Dixon	Potential Archaeological Deposit (PAD) : -, Artef		Mr.Peter Kuskie,South E
Valid		Artefact : 12, Shell : -		Mr.Peter Kuskie,Mr.Pete
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : 1		Mr.Peter Kuskie,Mr.Pete
Valid		Artefact : 1		Mr.Peter Kuskie
Valid		Shell : -, Artefact : 16		Mr.Peter Kuskie
Valid		Shell : -, Art (Pigment or Engraved) : -		Mr.Peter Kuskie,V Gutti
Valid		Shell : -, Artefact : -	Midden	Phil Hughes
Valid		Artefact : 9		Miss.Jackie Taylor,Mr.M
Valid		Artefact : -		Mr.Shaun Adams
Valid	Searle	Artefact : 1		Doctor.Julie Dibden
Valid	Searle	Potential Archaeological Deposit (PAD) : 1		Doctor.Julie Dibden
Valid		Artefact : -	Open Camp Site	Doctor.Tim Stone
Valid		Shell : -		Mr.Graham Moore
Valid		Shell : -		Mr.Graham Moore
Valid		Shell : -		Mr.Graham Moore
Valid		Shell : -, Artefact : -	Midden	Miss.Marjorie Sullivan
Valid		Shell : -, Artefact : -	Midden	Phil Hughes
Valid		Shell : -, Artefact : -	Midden	Phil Hughes
Valid		Shell : -, Artefact : -		Mr.Peter Kuskie,V Gutti
Valid				Mr.Graham Moore
Valid				Mr.Graham Moore
Valid		Shell : -		AECOM Australia Pty Lt
Valid		Shell : -, Artefact : -	Midden	Prue Gaffey
Valid	T Russell	Fish Trap : -		Mr.Graham Moore
Valid		Artefact : -	Open Camp Site	Kerry Navin
Valid		Artefact : -	Open Camp Site	Kerry Navin

Valid		Artefact : -	Open Camp Site	Kerry Navin
Valid	Searle	Artefact : 1		Doctor.Julie Dibden
Valid		Artefact : 6, Potential Archaeological Deposit (P/		Doctor.Julie Dibden
Valid	Searle	Artefact : 1		Doctor.Julie Dibden
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Partially Destroyed	John Dixon	Potential Archaeological Deposit (PAD) : -, Shell		Mr.Peter Kuskie,South E
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : -, Shell : -		Mr.Peter Kuskie,V Gutti
Valid		Shell : -, Artefact : -	Midden	Phil Hughes
Valid		Artefact : -	Open Camp Site	Doctor.Sue Feary,Mr.Dc
Valid		Artefact : -	Open Camp Site	ASRSYS
Valid		Artefact : -		Mr.Shaun Adams
Valid		Artefact : -		Mr.Shaun Adams
Valid		Artefact : -	Open Camp Site	Kerry Navin
Valid	Searle	Modified Tree (Carved or Scarred) : 1		Doctor.Julie Dibden
Valid		Shell : -, Artefact : -		Mr.Graham Moore
Valid		Shell : -, Artefact : -	Midden	K Margus
Valid	Searle	Artefact : 1		Doctor.Julie Dibden
Valid		Potential Archaeological Deposit (PAD) : 1		Doctor.Julie Dibden
Valid		Shell : -		Mr.Graham Moore
Valid	T Russell			Mr.Graham Moore
Valid		Artefact : 9, Shell : -		Mr.Peter Kuskie,Mr.Pete
Valid		Shell : 1		Mr.Peter Kuskie
Valid		Shell : -		Doctor.Julie Dibden,NSV
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : -, Shell : -		Mr.Graham Moore
Valid		Shell : -, Artefact : -	Midden	Phil Hughes
Valid		Shell : -, Artefact : -	Midden	Phil Hughes
Valid		Artefact : -		Mr.Shaun Adams
Valid		Artefact : -	Open Camp Site	ASRSYS
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : -	Open Camp Site	Phil Hughes
Valid		Artefact : -, Shell : -		AECOM Australia Pty Lt
Valid	T Russell			Mr.Graham Moore
Valid		Shell : -		Mr.Graham Moore
Valid		Artefact : -	Open Camp Site	Laura-Jane Smith
Valid		Artefact : 2		Mr.Graham Moore
Valid	John Dixon	Shell : 2		Mr.Peter Kuskie,South E
Valid	John Dixon	Shell : -		Mr.Peter Kuskie,South E
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : -		Doctor.Julie Dibden,NSV
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Artefact : 3		Miss.Jackie Taylor
Valid		Artefact : -		Biosis Pty Ltd - Wollong
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid		Shell : -		Mr.Graham Moore
Valid		Shell : -, Artefact : -	Midden	ASRSYS
Valid	Searle	Artefact : 2		Doctor.Julie Dibden
Valid	Searle	Artefact : 5		Doctor.Julie Dibden

: be different. The PDF version of this report will always coincide with the Basic Search Results

Reports	Permits	Longitude GDA94	Latitude GDA94
		149.88	-36.96
1465		149.89	-36.96
101238	3551	149.89	-36.89
101238	3551	149.89	-36.89
East Archaeology,South	3551	149.89	-36.89
N Archaeology Pty Ltd	4187	149.89	-36.90
		149.90	-36.96
1418		149.90	-36.92
1418		149.90	-36.92
		149.87	-36.97
1760		149.87	-36.88
1760		149.87	-36.89
		149.88	-36.96
		149.88	-36.97
1465		149.89	-36.96
1291,98245,98485	4187	149.90	-36.90
		149.90	-36.97
444,445,98245		149.90	-36.90
olakis		149.90	-36.92
d - Sydney,Doctor.Andrew Peter Mclaren		149.90	-36.92
d - Sydney,Doctor.Andrew Peter Mclaren		149.90	-36.92
		149.87	-36.97
1760		149.88	-36.88
99500	2578	149.88	-36.91
		149.89	-36.96
		149.89	-36.88
rick,Mr.David Crew		149.89	-36.98
101238	3551	149.89	-36.89
98614		149.89	-36.89
		149.89	-36.96
98614		149.89	-36.89
98906	1796,1798	149.89	-36.89
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latthew Barber,NGH Heritage - Fyshwick		149.90	-36.91
		149.87	-36.93
99500	2578	149.88	-36.91
99500	2402,2403,2578	149.88	-36.91
		149.83	-36.96
		149.88	-36.95
		149.88	-36.95
		149.88	-36.96
1465		149.88	-36.97
444,445,98245	4187	149.89	-36.89
444,445,98245	4187	149.89	-36.89
98614,99589	2032,2033,3719	149.89	-36.89
d - Sydney,Doctor.Andrew Peter Mclaren		149.90	-36.92
2051,99066	310,763,1530,1531,153	149.87	-36.87
		149.87	-36.97
1760		149.87	-36.89
1760	193	149.87	-36.88

1760		149.87	-36.89
99500	2578	149.88	-36.90
99500	2402,2403,2578	149.88	-36.91
99500	2578	149.88	-36.91
		149.88	-36.96
101238	3551	149.89	-36.89
		149.89	-36.96
98614,99589	2032,2033,3719	149.89	-36.89
444,445,98245		149.90	-36.89
ɔuglas Williams		149.90	-36.95
434		149.90	-36.87
		149.86	-36.92
		149.86	-36.92
1760		149.87	-36.89
		149.88	-36.90
		149.88	-36.96
		149.88	-36.90
99500	2578	149.88	-36.91
99500	2402,2403,2578	149.88	-36.91
		149.88	-36.95
98614	3551	149.89	-36.89
98906	1796,1798	149.89	-36.89
N Archaeology Pty Ltd	4187	149.89	-36.89
		149.89	-36.96
		149.89	-36.97
444,445,98245		149.90	-36.89
444,445,98245		149.90	-36.89
		149.86	-36.93
		149.88	-36.95
		149.89	-36.96
444,445,98245		149.90	-36.89
d - Sydney,Doctor.Andrew Peter Mclaren		149.90	-36.92
		149.88	-36.96
618		149.82	-36.98
		149.88	-36.87
101238		149.89	-36.89
101238		149.89	-36.89
		149.89	-36.96
N Archaeology Pty Ltd	4187	149.89	-36.89
		149.89	-36.96
		149.90	-36.91
ong,Mrs.Samantha Keats		149.90	-36.92
		149.90	-36.96
		149.90	-36.96
		149.90	-36.96
		149.90	-36.97
		149.88	-36.96
99500	2578	149.88	-36.91
99500	2578	149.88	-36.91

Appendix J

AHIMS Site Cards

1. Map Name BEGA ..... Pambula ..... 5. Site No. 62-6-133
2. Scale 1:250,000 ..... 1:25,000 ..... 6. Site type OPEN
3. Grid ref ~~7583920~~ 7583.9101 ..... 583101 ..... COMPOSITE
4. Site name(s) Merimbula Bay ..... 7. Classification .....

8. Air photo ref .....
9. Cadastral County Auckland, Parish Pambula Adj. to 368
10. Land Status Crown lease ..... 11. .....

62-6-0133

12. Directions for site relocation

1979 sand quarry

13. Owner Crown Land ..... 14. Tenant/Manager ....
Address C/- Land Board ..... Address .....
..... Nowra ....
Attitude ..... Attitude .....

15. Site Description

Within the beachridge sequence between Merimbula Lake and open coast, K. Margus collected a "trimmed bondi point" and a "backed blade" from an existing sand quarry in 1979

16. Reasons for investigation Noted as part of application
17. Condition ..... to extend sand quarry .....
.....
18. Interpretation Requires further survey etc.
19. Visitation .....
20. Recommendations .....
.....

21. **Environmental description of site locality**

See B. Thom descriptions of Merimbula Bar

---

22. **Relation to other sites in locality**

Numerous sites, mainly shell middens to north, northeast and east

---

23. **Details of artifact collections**

2 backed blades

---

24. Is plan or diagram of site attached? **Yes/No** (No)

25. Are annotated photographs attached? **Yes/No** (No) **How many?**

26. Other additions

---

27. Importance of site to Aborigines — Not known

28. Source of this information

---

29. Oral sources of information

30. Written references — EA 2/1 on F/1851 SER

---

31. Recorded by M. Sullivan — **Filed by**

from K. Margus information

Address NPWS

Date 20-10-83 — **Date**

additional information for 62-6-133

National Parks and Wildlife Service

BOX N189, GROSVENOR STREET POST OFFICE, SYDNEY, NSW 2000. TEL (02) 237 6500

Standard Site Recording Form Revised 5/88

62-6-0173

NPWS Code

1:250,000 map sheet: Mallacoota

AMG Grid reference (Full reference - please include leading digits)

250K 7 5 8 3 5 0 mE (25K) — 250K 5 9 1 0 1 0 0 mN (5/6 25K)

Scale of map used for grid reference (Please use largest scale available): [ ] 1:25K [/] 50K (preferred) [ ] 100K [ ] 250K

1:25K, 50K, 100K map name: Pambula 8824-11-S First ed.

HEAD OFFICE USE ONLY:

NPWS Site no: ~~62-6-133~~ 62-6-173

Site types: Burials

Accessioned by: RDH Date: 31-1-89

Data entered by: [signature] Date: 14/2/89

Owner/Manager: Public Works Dept

Address: South Coast Region, NSW

Site name: —

Locality/property name: Merimbula Effluent Disposal Works

NPWS District: Eden

Region: South East

Reason for investigation (give R.O. instruction no. where applicable):
- additions to Merimbula sewage treatment plant.

Portion no: —

Parish: Pambula

Other land category:

County: Auckland

Air photo refs. (for stereo pair)

Photos taken? (Yes)/No

How many attached? — see report

How to get to the site (refer to permanent features, give best approach to site eg. from above, below, along cliff. (Draw diagram on separate sheet.)
Take the Princes Highway south from Merimbula. Turn left onto a dirt track with gate where you see Merimula Aerodrome buildings on your right. Take car as far up track as poss. then walk around sand-pit to get to burials.

Other sites in locality? (Yes)/No.

Are sites in NPWS Register? Yes/(No).

Site Types include: shell middens, stone artefact scatters

Have artefacts been removed from site? Yes/(No)/don't know. When?

By whom?

Deposited where?

Is site important to local Aborigines? (Yes)/No/don't know.

Give contact(s) name(s) + address(es)

Ben Cruse
Eden Local Aboriginal Land Council
11 Chandos St, EDEN / PO BOX 199, EDEN
(064) 961922

Contacted for this recording? (Yes)/No.

(Attach additional information separately) If not, why not?

Verbal/written reference sources (including full title of accompanying report).

"Merimbula Effluent Disposal Works Archaeological Investigations" for Public Works Department, N.S.W. by Brian J. Egloff

NPWS Report Catalogue # C-1418

Checklist: surface visibility, damage/disturbance/ threat to site

Condition of site:
- burials eroding out of wall of quarry (3) in advanced state of disintegration. Surface where burials now located is product of slumping & slope movement. Some stone artefacts on margin of quarry

Recommendations for management & protection (attach separate sheet if necessary):
- consultation between Eden LALC, Public Works Dept. & Soil Conservation Service being carried out.

Site recorded by: Brian J. Egloff

Date: Sept. 1988

Address/institution: ANUTECH
GPO Box 4
Canberra 2601

SITE POSITION & ENVIRONMENT

OFFICE USE ONLY: NPWS site no: 626-173

1. Land form a. beach/hill slope/ridge top, etc: 150m west Merimbula Beach b. site aspect: -flat c. slope: 0° (original)

d. mark on diagram provided *or* on your own sketch the position of the site:

e. Describe briefly: Burials have been revealed by slumping of sand quarry pit edges.

f. Local rock type: sand on .... g. Land use/effect: Abandoned sand quarry to be used as effluent pond.

2. Distance from drinking water: 0·55 km Source: Merimbula Lake

3. Resource Zone associated with site (estuarine, riverine, forest etc): Forest

4. Vegetation: Eucalypts, banksia, bracken

5. Edible plants noted: —

6. Faunal resources (include shellfish):

7. Other exploitable resources (river pebbles, ochre, etc):

Site type:
- Burials (3)
- Stone artefact scatter/s

CHECKLIST TO HELP:
length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock.

DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types.

ART: area of surface decorated, motifs, colours, wet, dry pigment, technique of engraving, no. of figures, sizes, patination.

BURIALS: number & condition of bone, position, age, sex, associated artefacts.

TREES: number, alive, dead, likely age, scar shape, position, size, patterns, axe marks, regrowth.

QUARRIES: rock type, debris, recognisable artefacts, percentage quarried.

OTHER SITES EG. structures (fish traps, stone arrangements, bora rings, mia mias), mythological sites, rock holes, engraved groove channels, contact sites (missions massacres cemeteries) as appropriate

DESCRIPTION OF SITE & CONTENTS.

Note state of preservation of site & contents. Do NOT dig, disturb, damage site or contents.

- The 3 burials are located in the south east corner of the edges of the sand quarry (30-40m north of south boundary and 43.10 m west of the east boundary — wire fence surrounding pit is being used to define boundaries) These are barely recognizable due to their advanced state of decay. Appear to be 3 clusters highly fragmented bone. Not burned; white and crumbly. One fragment identifiable as a portion of the frontal bone from the supra-orbital region. Poss. mature female or adolescent.

- Stone artefacts: A quartz core, flakes of a fine grained siliceous stone (prob. chalcedony) as few small quartz flakes were found on the upper margins of the south-eastern rim of the sand pit. All fairly fine & approx. 1 cm in length. On the northern and eastern margins of the pit very coarse grained beige coloured flakes measuring 1.5 to 5.0 cm in length were located as were white quartz flakes.

Attach sketches etc, eg. plan & section of shelter, show relation between site contents, indicate north, show scale.
Attach annotated photos (stereo where useful) showing scale, particularly for art sites.

62-6-175

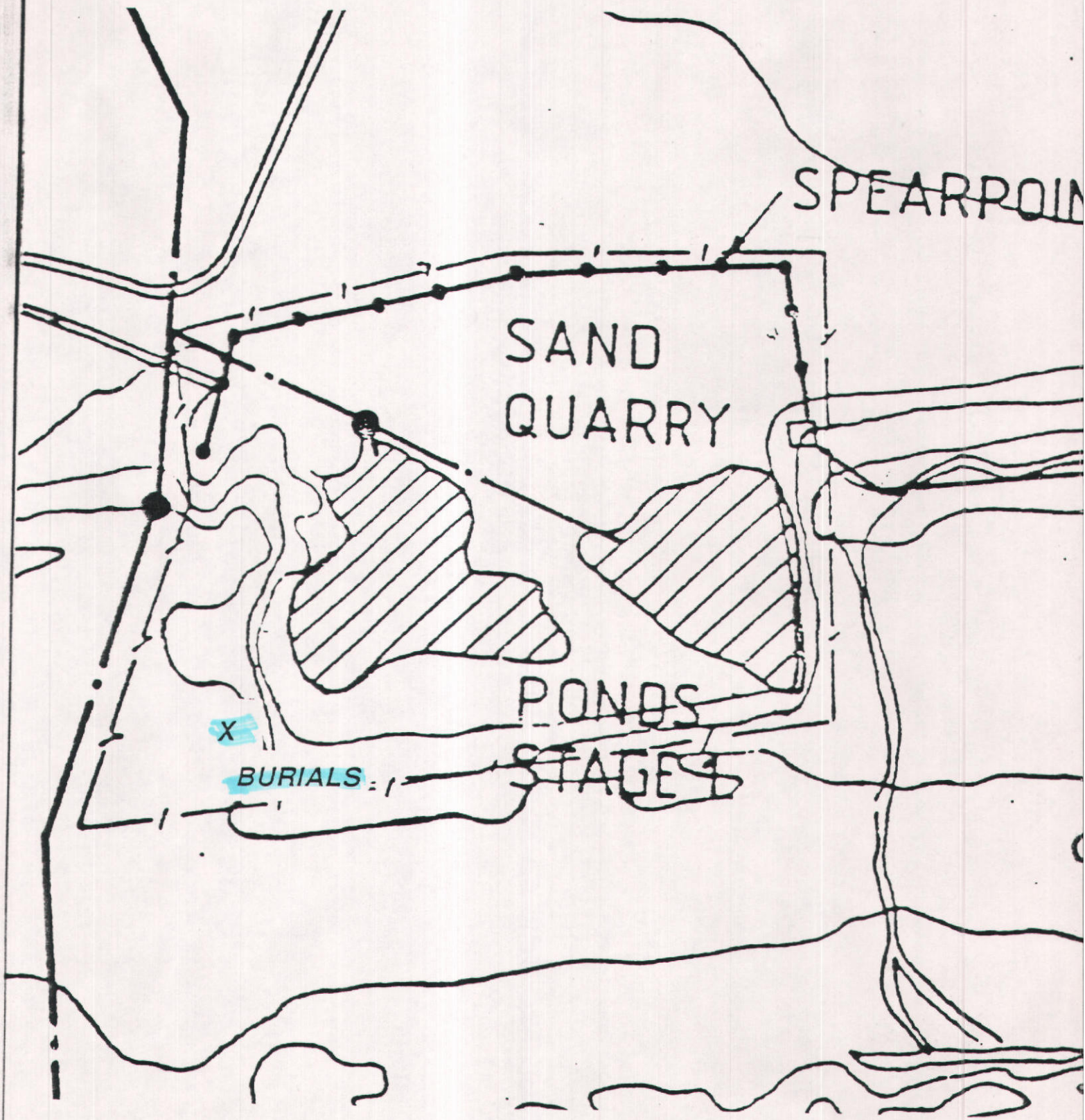

Figure 2 Location of the burials within the project area

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Plate 1 The sand quarry viewed towards the south-east showing the location of the burials (indicated with an "x")

Plate 2 Close up of the eastern most, the more intact, cluster of bone material.

62-6-173

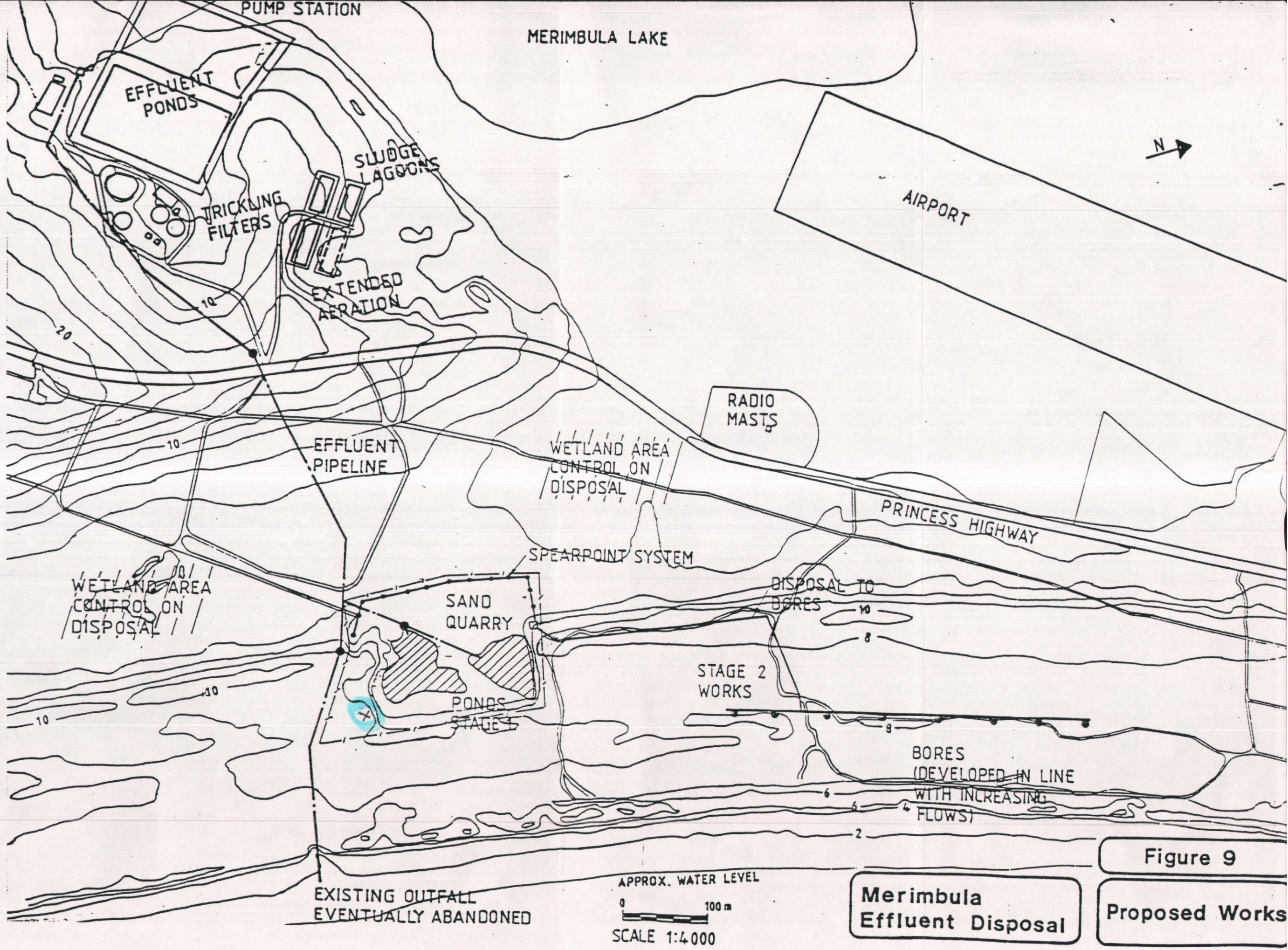


Figure 1 Merimbula Effluent Disposal Works

62-6-173

56

National Parks and Wildlife Service

Standard Site Recording Form

62 – 6 – 0475

MAP NAME	EDITION	SCALE	REFERENCE
PAMBULA 8824-2-S	1974	1:25000	758200 10200

HEAD OFFICE USE ONLY:

NWPS site no: 62-6-0475

Site types:

File nos:

Report filed with site no:

Classification: Site status:

Filed by:

Date:

Site name: MERIMBULA CROWN LANDS SANDPIT

Local post office: MERIMBULA

Locality/property name: CROWN LAND SOUTH OF MERIMBULA

NPWS District: FAR SOUTH COAST REGION Region: SOUTHERN

Reason for investigation (give H.O. instruction no. or full title of accompanying report where applicable): SITE WAS RECENTLY FOUND BY RANGERS. IT HAS NOT BEEN PREVIOUSLY RECORDED

Portion no: Other land category: CROWN LAND

Parish: PAMBULA County: AUCKLAND

Plan/sketch/section of site attached? (Yes) No. How many?

Air photo refs. (for stereo pair)

Annotated photos attached? Yes/No How many?

Condition of site: GOOD

Causes of damage/disturbance/threat to site: (Fill in separate management/protection recommendations sheet if necessary)

How to get to the site (refer to permanent features, give best approach to site eg. from above, below, along cliff. Draw diagram on separate sheet if necessary). * adjacent to powerline easement off sandpit/settling ponds track.

SEE ATTACHED MAP

Other sites in locality? (Yes) No. Site Types include: MIDDENS, BURIAL, SPIRITUAL

Are sites in NPWS Register? (Yes)/No. BUT NOT ALL Unregistered sites-plans for future recording? (Yes)/No.

Have artefacts been removed from site? Yes/No/(don't know.) When?

By whom? Deposited where?

Is site important to local Aborigines? (Yes) No/don't know.

Give contact(s) name(s) + address(es) JOHN CRUSE & EDEN LAND COUNCIL

Contacted for this recording? (Yes) No. J.C. recorded. E.LALC. will inspect & discuss in next month!

(Attach additional information separately) If not, why not?

Verbal/written reference sources: *John Cruse NPWS *Claude McDermott CHU NPWS *Rod Wellington CHU NPWS *Christian Thompson. CHU NPWS *Bobbie Mor & Daren Mongta

Site recorded by: John Cruse, George Malolakis & Sharon Davey (NPWS) ~~& Georgie Lee (work Exp.)~~ E.L.A.L.C.

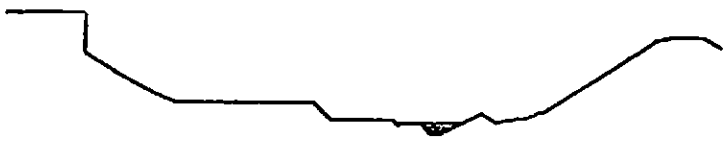
Address/institution:

Date: 23.6.2000

SITE POSITION & ENVIRONMENT open forest | OFFICE USE ONLY: NPWS site no:

1. Land form e.g. beach/hill slope/ridge top, etc: 1/Swamp/sandflat at rear of hindune

2. Describe briefly & mark on diagram provided *or* on your own sketch the position of the site: see map.



3a Local rock type: sand | b rock type at site: | c site aspect: southerly | d slope: flat

4. Distance from drinking water: 100-200m | Source: Swamp | Perm/temp.? semi permanent

5. Vegetation: coastal woodland - banksia, pittosporum, blackbutt? (casuarina)

6. Edible plants noted: wombat berry, bracken fronds, banksia, wattle, medicine plant

7. Faunal resources (include shellfish) wallabys, goannas, echidnas, wombat, ocean fish + shellfish etc

DESCRIPTION OF SITE & CONTENTS. Site type(es):

Note state of preservation of site & contents. Do NOT dig, disturb, damage site or contents.

Attach sketches etc, eg. plan & section of shelter, show relation between site contents, indicate scale.

Attach annotated photos (stereo where useful) showing scale, particularly for art sites.

see attached.

* Aboriginal scarred tree (blackbutt??) with whitefella survey mark (European) in centre (cross).

* Potential spiritual significance

CHECKLIST TO HELP:
length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock.

DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types.

ART: area of surface decorated, motifs, colours, wet, dry pigment, technique of engraving, no. of figures, sizes, patination.

BURIALS: number & condition of bone, position, age, sex, associated artefacts.

TREES: number, alive, dead, likely age, scar shape, position, size, patterns, axe marks, regrowth.

QUARRIES: rock type, debris, recognisable artefacts, percentage quarried.

OTHER SITES EG. structures (fish traps, stone arrangements, bora rings, mia mias), mythological sites, rock holes, engraved groove channels, contact sites (missions massacres cemeteries) as appropriate

Recommendation for management of scarred tree.

- Eden Land Council to be informed; (done ✓ 21.7.2000)
- Undertake site inspection with Land Council representatives; (done ✓ 21.7.2000)
- Record site; done ✓ 21.7.2000
- Leave site as is and don't draw attention to it; LALC agree
- In the event of the tree dying putting the carving at risk consultation be undertaken with local Aboriginal community to determine best and most appropriate method of site management.

NB: - 2 more potential scarred trees (might be whitefella surveyors ???)
to clarify with ELALC & CHU
- see below.

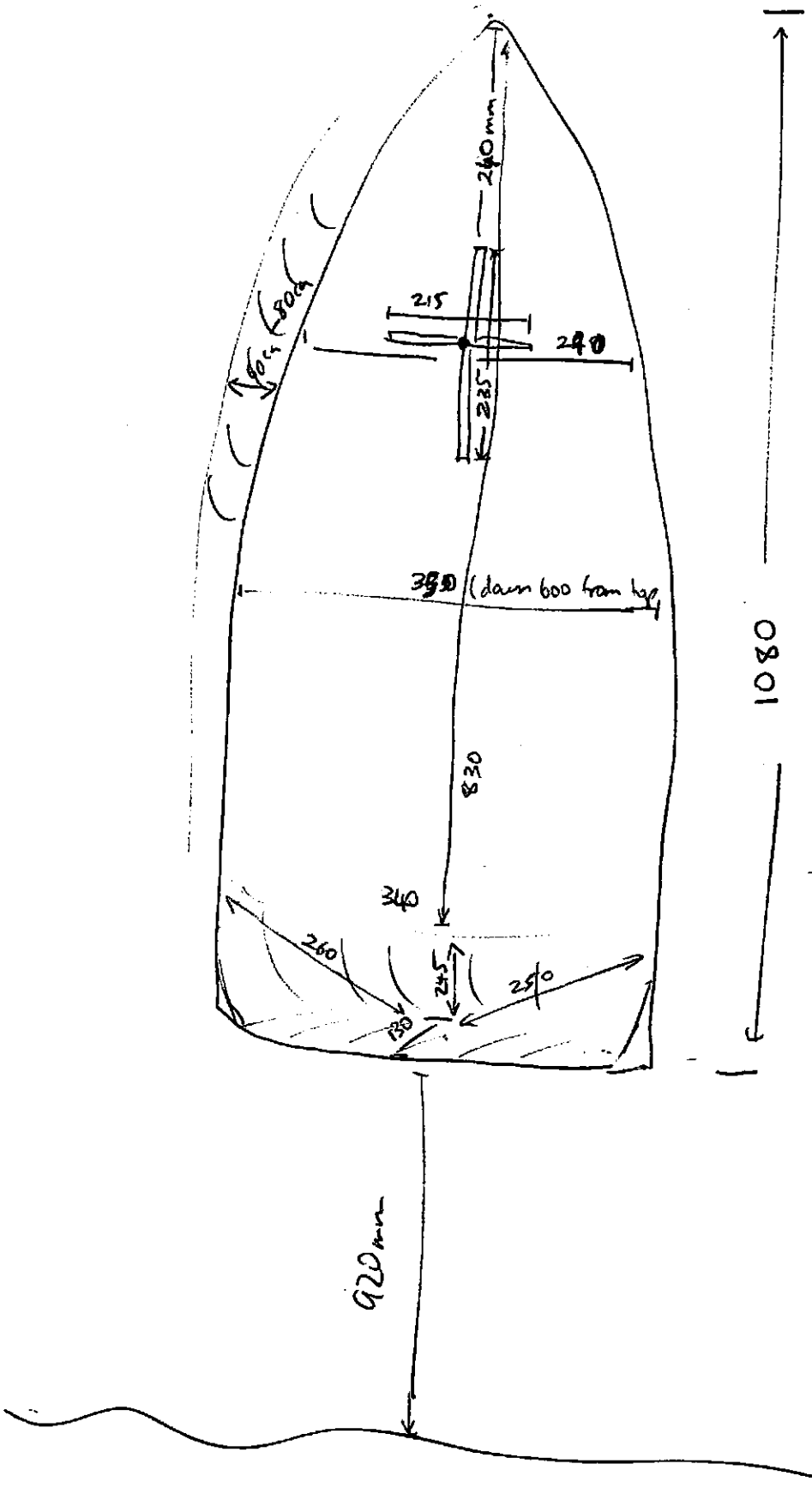
24/6/00

21.07.2000 (Ranger Davey NPWS)

- Met with Peter Beale (ELALC Heritage Officer/Ranger)
- Gave Peter copy of all these
- Peter agrees with recommendations + NPWS mgt to do.
- Peter will inform B.J.
- Peter agrees info should be recorded with CHU & register.

NB: • Inspected burial area & access track to beach
- Burial site mostly stable (some minor wind erosion) No bones exposed & vegetation (acacia sp.) growing over area & stabilising site.
Monitor after heavy weather event.
Peter will consult with B.J. & inform
- Access track - bones are appearing in sand of vehicle track (I think they are human... need to clarify). may need to close track & stabilise.
Peter will discuss with B.J & report back to us for further inspection & consultation.

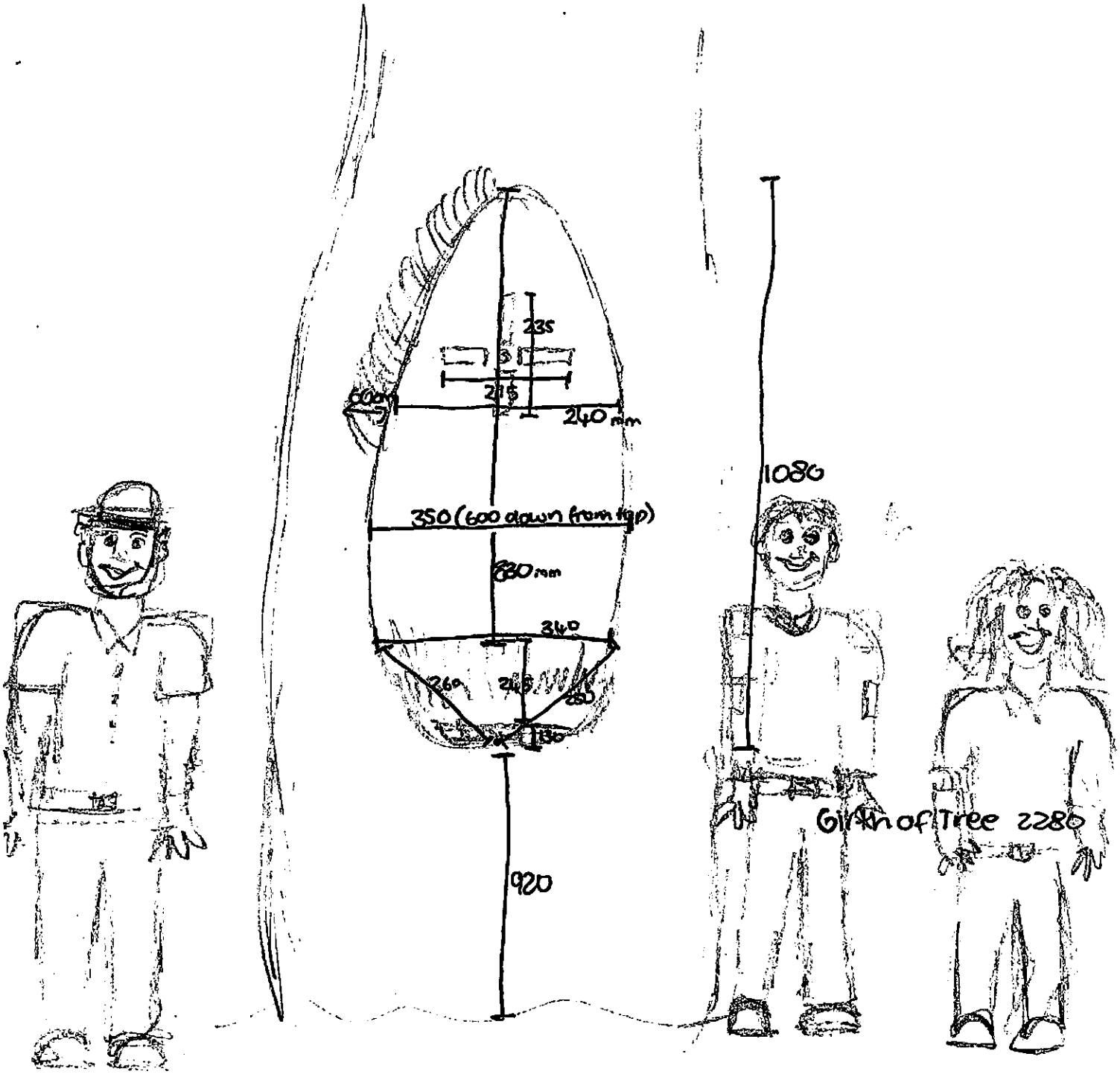
SCARRED TREE DIMENSIONS



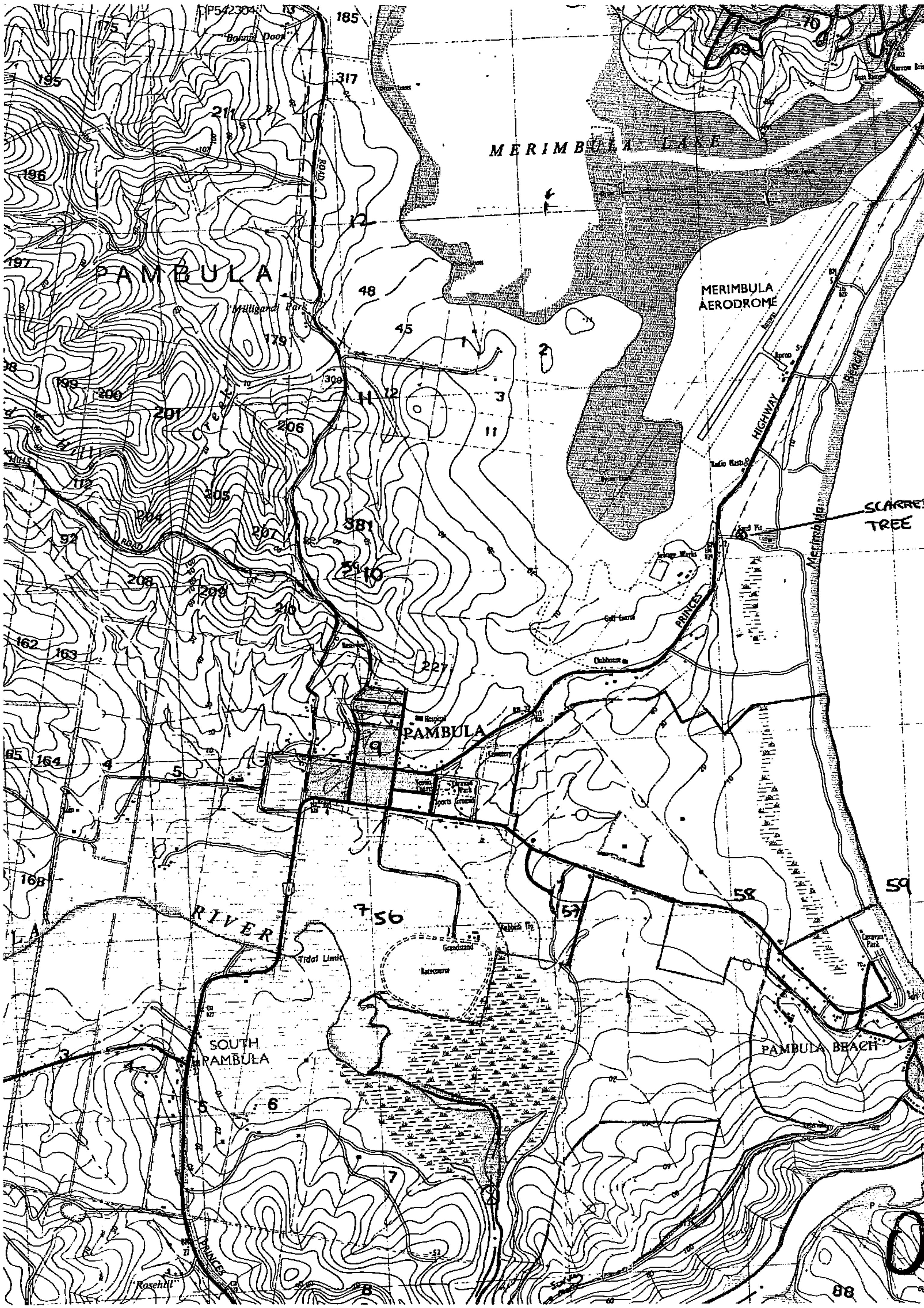
200 m in off Arthur Kane Drive

Tree DBH 2280

0



work experience
student drew
this
The people are
John Cruz
George Malolakis
& Shez !!


DP542304
175
185
Bonnie Doon
195
317
211
196
ROAD
MERIMBULA LAKE
12
197
PAMBULA
Milligandi Park
48
45
179
1
2
300
11
12
3
199
200
201
Creek
206
11
MERIMBULA
AERODROME
HIGHWAY
Beach
112
205
381
SCARRED
TREE
Merimbula
204
92
207
510
ROAD
208
209
210
PRINCES
162
163
Clubhouse
227
Hospital
PAMBULA
9
164
4
5
Sports Ground
168
RIVER
756
57
58
59
Tidal Limit
Grandstand
Racecourse
Caravan Park
SOUTH
PAMBULA
PAMBULA BEACH
3
6
7
8
Rosehill
PRINCES
88
0

Aboriginal Site Recording Form

AHIMS Registrar
PO Box 1967, Hurstville 2220 NSW

AHIMS site ID: 62-6-0788 **Date recorded:** 08-02-2018

Site Location Information

Site name: Arthur Kaine Scatter

Easting: 223651 **Northing:** 5909895 **Coordinates must be in GDA (MGA)**

Horizontal Accuracy (m): 5

Zone: 56 **Location method:** Differential GPS

Recorder Information

(The person responsible for the completion and submission of this form)

Title	Surname	First name
Mrs.	Keats	Samantha

Organisation: Biosis Pty Ltd

Address: 8 Tate Street, Wollongong NSW 2500

Phone: 0242011061 **E-mail:** ahims@biosis.com.au

Site Context Information

Land Form Pattern: Coastal Plain **Land Use:** Transport Corridor

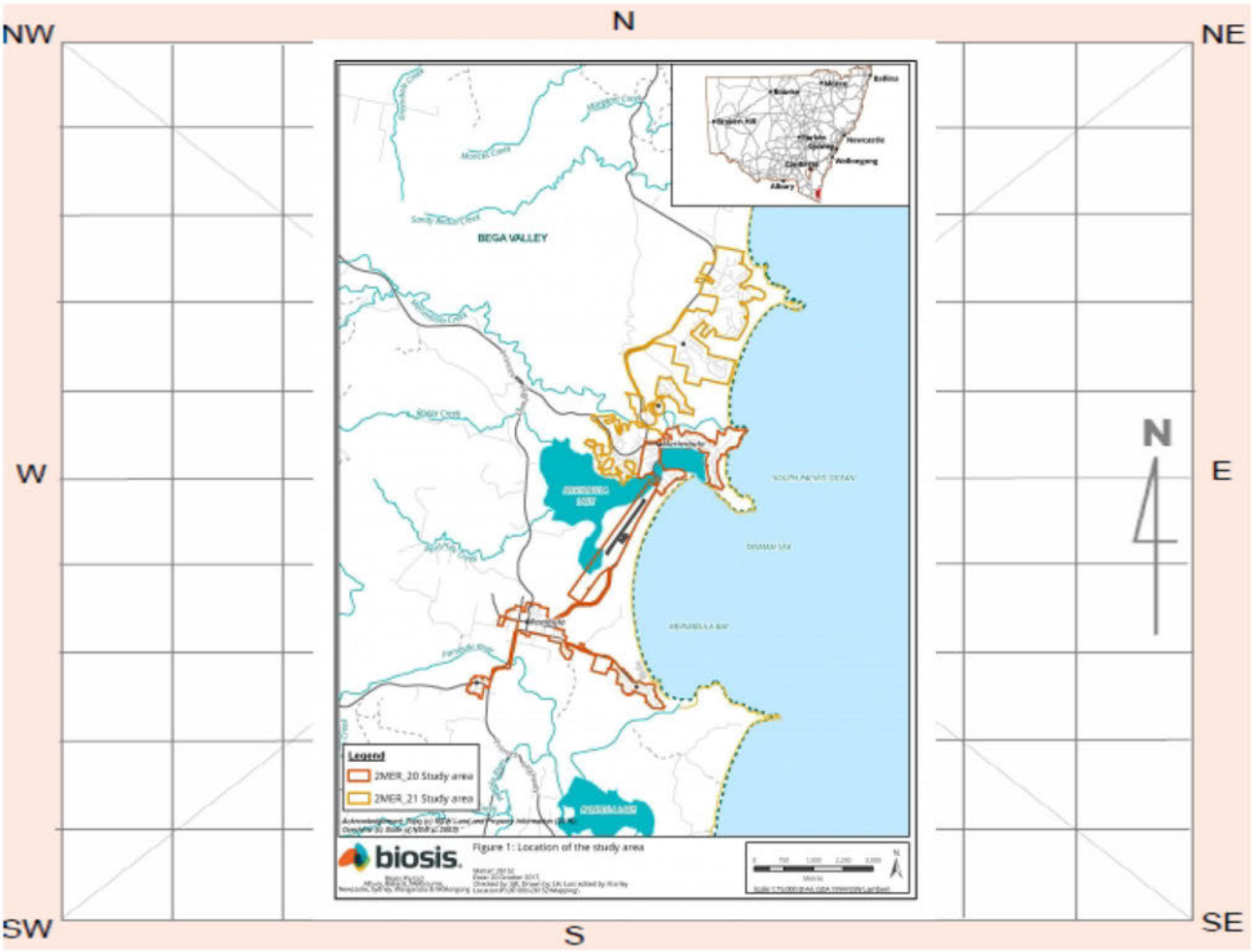
Land Form Unit: Crest **Vegetation:** Open Woodland

Distance to Water (m): 280 **Primary Report:** Aboriginal cultural heritage due diligence advice: Merimbula NSW

How to get to the site: The site is located opposite the sewerage treatment plant between Pambula and Merimbula, approximately 750 metres south of the airport entrance.

Other site information: The artefacts were discovered eroding out of the bank on the eastern side of Arthur Kaine Drive, opposite the sewerage treatment works, which indicates subsurface potential.

Site location map



Site contents information

open/closed site: Open **Site condition:** Erosion

Features:

		Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)	Scarred Trees: Scar Depth (cm)	Scarred Trees: Regrowth (cm)	Scarred Trees: Scar shape	Scarred Trees: Tree Species
1.	Artefact	30	100	10				

Description:

The site consisted of a large artefact scatter that included cores, flakes, flaked pieces, blades, and grinding stones. There was also a large amount of debitage that was not recorded.

Features:

		Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)	Scarred Trees: Scar Depth (cm)	Scarred Trees: Regrowth (cm)	Scarred Trees: Scar shape	Scarred Trees: Tree Species
2.								

Description:

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)	Scarred Trees: Scar Depth (cm)	Scarred Trees: Regrowth (cm)	Scarred Trees: Scar shape	Scarred Trees: Tree Species
3.							

Description:

Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)	Scarred Trees: Scar Depth (cm)	Scarred Trees: Regrowth (cm)	Scarred Trees: Scar shape	Scarred Trees: Tree Species
4.							

Description:

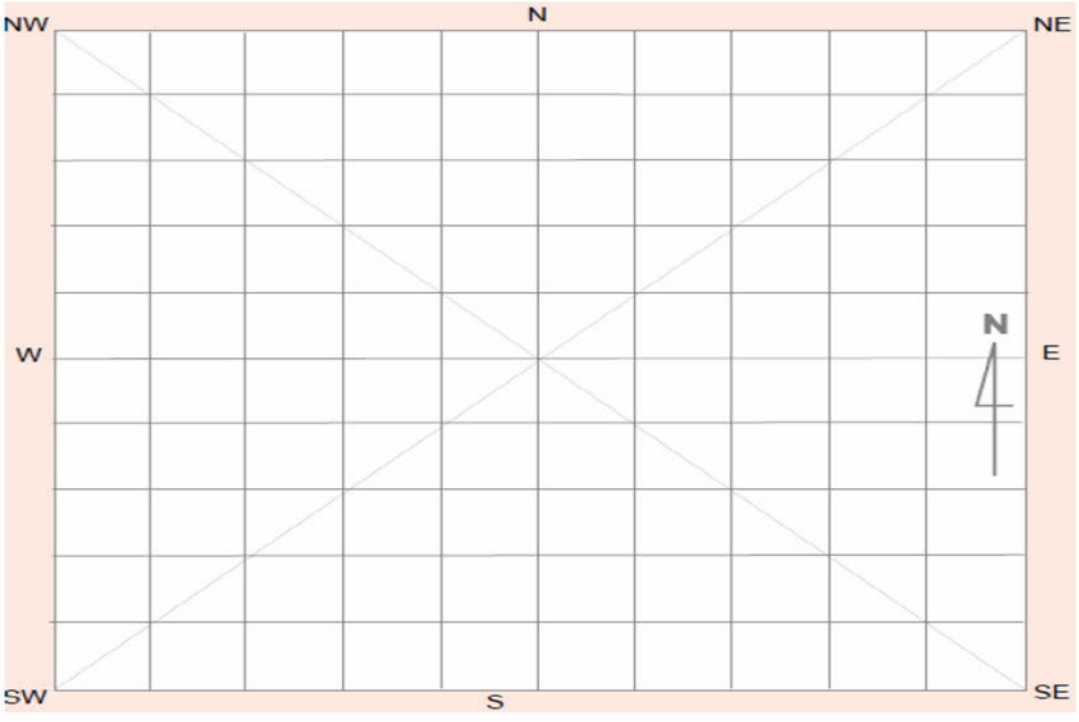
Features:

	Number of features	Length of feature(s) extent (m)	Width of feature (s) extent (m)	Scarred Trees: Scar Depth (cm)	Scarred Trees: Regrowth (cm)	Scarred Trees: Scar shape	Scarred Trees: Tree Species
5.							

Description:

Other Site Info: The artefacts were discovered eroding out of the bank on the eastern side of Arthur Kaine Drive, opposite the sewerage treatment works, which indicates subsurface potential.

Site plan

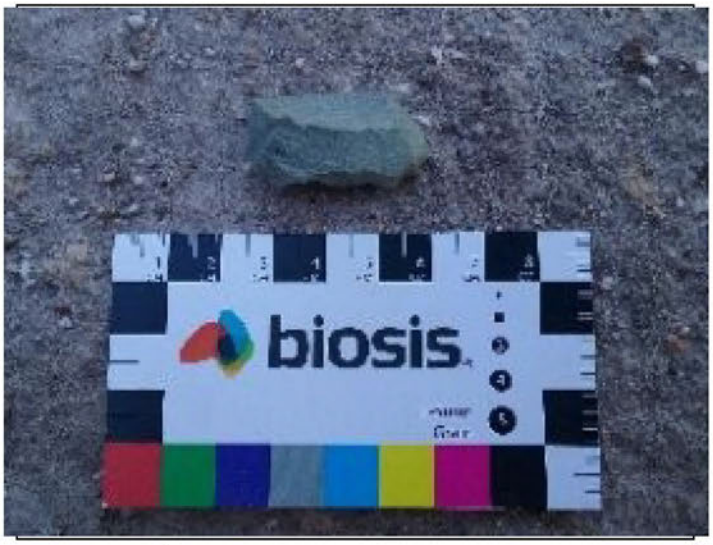


Site photographs

Description: View south along Arthur Kaine Drive showing the location of AHIMS site Arthur Kaine Scatter.

Description: Selection of blades (scale = 9cm)

Description: Grinding top stone (scale = 9cm)



Description: Complete rhyolite flake (scale = 9cm)

Site restrictions

Do you want to Restrict this site?:

Restriction type: Gender ☐ General ☐ Location ☐

Why is this site restricted?:

Further information contact

Title	Surname	First name

Organisation:

Address:

Phone: **E-mail:**