PROPOSED MIXED USE SUBDIVISION AT WEST CULBURRA, SHOALHAVEN CITY, SOUTH COAST OF NEW SOUTH WALES: ABORIGINAL CULTURAL HERITAGE ASSESSMENT

A report to

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by

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EXECUTIVE SUMMARY

This Aboriginal cultural heritage assessment has been prepared by South East Archaeology Pty Ltd for Realty Realizations Pty Ltd.

Realty Realizations is seeking Concept Plan approval from the Department of Planning and Infrastructure (DoPI) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for a mixed use subdivision of part of DP 1065111 and parts of Portions 61, 81 and 90 DP 755971, at West Culburra (the 'Proposal').

The investigation area comprises approximately 99.8 hectares of land at West Culburra, 12 kilometres south-east of Nowra, on the South Coast of New South Wales. It is located within the Shoalhaven City Council local government area.

The principal aims of this assessment were to identify and record any Aboriginal heritage evidence or cultural values within the investigation area, assess the potential impacts of the Proposal on this evidence, assess the significance of this evidence, and formulate recommendations for the conservation and management of this evidence, in consultation with the local Aboriginal community.

The investigation proceeded by recourse to the archaeological and environmental background of the locality, followed by consultation with the Aboriginal community and a field survey undertaken with the assistance of representatives of the registered Aboriginal parties, in accordance with the relevant DoPI and Office of Environment and Heritage (OEH) in the Department of Premier and Cabinet (formerly the Department of Environment, Climate Change and Water {DECCW}) requirements.

These requirements included an assessment that addresses the DEC (2005) draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation*. However, to support any subsequent Aboriginal Heritage Impact Permit (AHIP) application where future approvals are sought under Part 4 of the EP&A Act, the assessment has also been conducted in accordance with the DECCW (2010) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*, OEH (2011) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* and DECCW (2010) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy.

The field inspection was undertaken on 9 and 10 August 2011 with representatives of the two registered Aboriginal parties, the Jerrinja Local Aboriginal Land Council and Jerrinja Traditional Owners Corporation.

The survey involved sampling of a heritage study area that comprised the investigation area and 5.4 hectares of immediately adjacent land. This total area subject to heritage survey sampling, measuring 105.2 hectares, is referred to as the heritage study area. It was subdivided into 16 survey areas, all of which were inspected for Aboriginal heritage evidence.

The total survey coverage (ground physically inspected for heritage evidence) equated to approximately 5.3% of the heritage study area. As this coverage only refers to an area of several metres width directly inspected by each member of the survey team, the actual coverage for obtrusive site types (for example, scarred trees and rock shelters) was significantly greater than this. The total effective survey coverage (*visible* ground surface physically inspected with potential to host heritage evidence) equated to around 0.46% of the heritage study area.

No Aboriginal heritage sites are listed within the investigation area on any heritage registers or planning instruments. No Aboriginal heritage sites or cultural sites were identified directly within the investigation area during the present survey. However, three sites were identified immediately adjacent to the investigation area during the survey, within the slightly broader 'heritage study area'. These sites (West Culburra 3/A, 4/A and 4/B) are all open artefact occurrences. In addition, 18 previously recorded sites (17 middens and one artefact scatter, OEH #52-5-57, 52-5-114, 52-5-171 to 52-5-186) are located immediately adjacent to the investigation area, between it and the Crookhaven River.

The registered Aboriginal stakeholders did not disclose any specific knowledge of any traditional or historical cultural values/places (for example, sites of traditional cultural significance or historically known places or resource use areas) within the investigation area, consistent with results from a previous study in 1983.

Two of the sites found during the survey and all of the adjacent previously recorded 18 sites are located within 100 metres of the Crookhaven River estuary. In fact, all 16 midden sites recorded by Hughes (1983) are reported as being within 30 metres of the shore, indicating that evidence of exploitation of estuarine resources in this area occurs very close to those resources. It is not certain whether the potential artefact evidence is focused within a narrow zone (for example, within 30 metres of the estuary) or a broader zone (for example, up to 200 metres from the estuary). The midden evidence may be focused within a narrow zone fringing the estuary (for example, 30 metres, as presently identified), while artefact evidence representing broader activities and occupation, may extend over a wider zone. Further investigation may reveal information about the spatial distribution of evidence in this locality.

Much of the investigation area is outside of primary or secondary resource zones, and potable water sources are absent. Therefore, it is inferred that Aboriginal occupation of much of the investigation area would have generally been of a low intensity, and probably related to transitory movement through the landscape and hunting/gathering by small groups of people during the course of the normal daily round. It is noted that the prominent ridgeline that comprises part of the investigation area would have represented the only key avenue for land-based movement between the hinterland and Culburra Beach, Orient Point and Crookhaven Heads.

Part of the investigation area borders a primary resource zone, the Crookhaven River estuary. The numerous midden sites provide evidence of the procurement of shellfish resources from this environment and their consumption immediately adjacent to the source. However, the general absence of potable water is inferred to have been a potential constraint to more focused Aboriginal occupation (such as encampments, particularly those involving larger groups of people and/or longer durations).

Stone artefact evidence has been identified within the heritage study area, adjacent to the investigation area, confirming predictions of the site location model. The potential for further stone artefact evidence to occur is reassessed as follows:

- Within a zone potentially extending up to 200 metres from the shore of the Crookhaven River, there is a high potential for sub-surface deposits of artefacts to occur, including deposits that may be of research value. This includes the location of sites West Culburra 4/A and 4/B and elsewhere on the flat (survey area WC4) immediately adjacent to the investigation area, but also survey area WC15 and minor portions of survey areas WC 3, 9 and 14 within the present investigation area; and

- In the remainder of the investigation area, the potential for artefact deposits of research value or significance is generally low, but a low-density distribution of artefacts consistent with 'background discard' is likely to be present. Repeated use of the ridgeline for transitory movement may have caused an accumulation of evidence through superimpositioning, but this is unlikely to represent focused occupation.

Substantial shell midden evidence has previously been identified adjacent to the investigation area, within a 30 metre wide zone along the foreshore of the Crookhaven River estuary. Additional midden evidence may occur within this zone, adjacent to the investigation area, that was obscured by vegetation at the time of Hughes' (1983) study. However, the potential for midden evidence directly within the investigation area is revised downward to moderate to low for small isolated middens within say 200 metres of the estuary, and low elsewhere.

Other types of heritage evidence are not anticipated to occur within the investigation area (very low or negligible potential), albeit scarred or carved trees cannot totally be discounted where mature native trees remain and skeletal remains cannot totally be discounted in sandy sediments adjacent to the Crookhaven estuary. Other traditional or historical Aboriginal cultural values or associations have not been identified during the present or previous investigations.

Two of the open artefact sites within the study area (West Culburra 4/A and 4/B) have been assessed as being of low to potentially moderate significance within a local context. Site West Culburra 3/A has been assessed as being of low significance. The adjacent Culburra midden sites (OEH #52-5-171 to 52-5-186) have previously been assessed as being of 'considerable heritage and scientific value and of considerable importance' to the Jerrinja people, a conclusion endorsed here. These midden sites are of regional representative value. It is important to observe that all heritage evidence tends to have some contemporary significance to Aboriginal people, because it represents an important tangible link to their past and to the landscape.

The draft report was provided to the two registered Aboriginal stakeholders on 13 March 2012 for their review and comment, but none was provided.

The following recommendations are made on the basis of legal requirements under the NP&W Act and EP&A Act, the results of the investigation and consultation with the registered Aboriginal parties:

1) In consideration of the results of the assessment and subject to implementation of the recommendations below, there are no Aboriginal heritage constraints to approval of the Concept Plan under Part 3A of the EP&A Act;

2) Subsequent to detailed design being completed and in association with subsequent applications for development approval under Part 4 of the EP&A Act, further heritage investigation involving test excavations should be undertaken within survey area WC15 and a sample of the portions of WC 3, 9 and 14 within the zone of high potential for sub-surface deposits of artefacts, to identify the nature, extent and significance of any heritage evidence present, and to enable the subsequent formulation of appropriate management strategies in consultation with the registered Aboriginal parties;

3) Should any subsequent development application involve proposed impacts outside of the heritage study area investigated during the current assessment, for example, in the foreshore zone between the investigation area and the Crookhaven River, further Aboriginal cultural heritage investigation should be undertaken. As a minimum this would involve the archaeological survey of any proposed impact areas outside of the present heritage study area, in consultation with the registered Aboriginal parties, with the preparation of a supplementary heritage assessment report;

4) Subsequent to detailed design and the further heritage investigations required above being completed, and in association with any subsequent application for development approval under Part 4 of the EP&A Act, in order to establish a defence to prosecution under Section 86(2) of the NP&W Act with respect to the probable occurrence of stone artefacts within the impact area, and any subsequent impacts to those objects and identification of those impacts, a Section 90 AHIP should be obtained for the impact area prior to the proposed works being undertaken;

5) The Culburra midden sites (OEH #52-5-171 to 52-5-186) adjacent to the investigation area are of significance, potentially at a regional level, and warrant total conservation. Direct impacts to this suite of sites must be avoided and indirect impacts must be managed and minimised. As a condition of any development approval under Part 4 for the immediately adjacent land, a Conservation Management Plan specific to the protection of these midden sites should be formulated by a heritage practitioner with suitable qualifications and experience, in consultation with the registered Aboriginal parties;

6) As a condition of any further heritage investigation associated with an application for development approval under Part 4 for the investigation area, the oral account recorded in the late 1970s by Jerrinja Elder, Mr Jack Campbell, and lodged with AIATSIS, of the middens adjacent to the investigation area and their importance to the Jerrinja community, should be researched;

7) Archaeological investigations should only be undertaken by archaeologists qualified and experienced in Aboriginal heritage, in consultation with the registered Aboriginal stakeholders, and occur prior to any development impacts occurring;

8) Where impacts will be avoided to the identified heritage evidence, appropriate protective measures should be implemented for those sites in close proximity to the construction works;

9) Other land users (for example, Shoalhaven City Council) should be made aware of the nature and location of the Aboriginal sites identified during the present investigation (West Culburra 3/A, 4/A and 4/B) to ensure that inadvertent impacts are avoided;

10) As a general principle, all relevant contractors and staff engaged on the Proposal should receive heritage awareness training prior to commencing work on-site;

11) Should any previously unrecorded Aboriginal sites or objects be detected prior to or during the course of development which are not covered by a Section 90 AHIP, work in the immediate vicinity of those objects would need to promptly cease and the finds be reported to the OEH and advice sought as to the appropriate course of action. If skeletal remains are identified, the proponent is required to immediately stop work and notify the appropriate authorities, including the Police and the OEH. If impacts cannot be avoided, a Section 90 AHIP would be required prior to any impacts occurring;

12) Under the terms of the NP&W Act it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object ('strict liability offence'). Therefore, no activities or work should be undertaken within the Aboriginal site areas as described in this report without a valid Section 90 AHIP; and

13) Single copies of this report should be forwarded to the registered Aboriginal parties and the OEH.

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PLATES (APPENDIX 5)

1. INTRODUCTION

This Aboriginal cultural heritage assessment has been prepared by South East Archaeology Pty Ltd for Realty Realizations Pty Ltd.

The investigation area is situated at West Culburra, 12 kilometres south-east of Nowra, on the South Coast of New South Wales (Figures 1 and 2). It is located within the Shoalhaven City Council Local Government Area (LGA).

Realty Realizations owns a substantial tract of land (around 1,000 hectares) west of Culburra Beach and Lake Wollumboola, south of the Crookhaven River, east of Coonemia Road and north of the Jervis Bay National Park. Realty Realizations aims to undertake progressive development of these holdings for urban purposes in an environmentally sensitive manner (Toon 2010).

The present proposal by Realty Realizations, that is the subject of this heritage assessment, involves a mixed use subdivision of part of DP 1065111 and parts of Portions 61, 81 and 90 DP 755971 (refer to Section 1.2 and Figure 3). These proposed works are herein referred to as the 'Proposal'.

Realty Realizations has made an application to the Department of Planning and Infrastructure (DoPI) for approval of a Concept Plan for the Proposal, under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (refer to Toon 2010). Allen, Price and Associates is assisting Realty Realizations with the preparation of the Concept Plan for submission to the DoPI.

1.1 Description of the Proposal

The Proposal for a mixed use subdivision involves six areas or 'land units', west of the urban area of Culburra Beach and south of the Crookhaven River, adjacent to Culburra Road (refer to Figures 2, 3 and 4). Concept Plan approval is being sought for subdivision of these areas as outlined in Table 1 and listed below.

Table 1: Key details of proposed mixed use subdivision at West Culburra (Toon 2010).

'Land Unit'	Area	Zoning	Proposed Use	Staging	Capacity
1	8 ha	3(f)	commercial/mixed use	as demand arises	up to 100,000 m^2 of mixed land use
2	5.5 ha (10 ha max)	2(c)	3 and 14 storey units; some single lot subdivisions	2011-2016	500 units 50 lots
3	29 ha	2(c)	single lot subdivision	2012-2014	240 lots
4	11.5 ha	2(c)	single lot subdivision	2014-2016	90 lots
5	43 ha	2(c)	single lot subdivision	2016-2020	330 lots
6	12.5 ha	4(a)	industrial	-	-

Toon (2010:1-2) further describes the proposed concept for each of the units:

- Spatial Unit 1 is envisaged to perpetuate the same built-form that exists in the existing retail development. That is a service road with 90° parking on both sides lined by commercial or retail uses with units above. The height of development has yet to be determined. The development of the area in depth will be deferred until demand determines a need. Consideration could be given to hotel or motel uses being located in this spatial unit. The rate of development of this spatial unit is expected to be slow and lumpy. The proponent envisages preparing a master plan for this spatial unit.

- Spatial Unit 2 is envisaged to be a combination of three-storey and 14 storey apartments. Depending on the resolution of the southern extent of this spatial unit (that is the extent, if any, of encroachment into the catchment of Lake Wollumboola). The southern section is anticipated to be single lot residential development adopting the water quality controls recommended in the Robinson Water Quality report. Spatial Unit 2 is estimated to have a capacity of up to 400-500 apartments and up to 50 single dwelling lots (conditional on location of Southern Bomaderry).

- Spatial Units 3, 4 and 5 are proposed as single dwelling lots with some variation in size. The north facing slope and attractive outlook are considered to confer on this area favourable attributes for residential development. It is estimated that the three spatial units together have a capacity for some 650 dwellings with lot sizes in the range 600-1000m^2. The area is expected to develop within 5-6 years from commencement. The collector road, when completed, is envisaged as the route for the Culburra-Nowra bus service and for school bus services. Some 80% of the land in spatial units 3, 4 and 5 is within 400 metres walking distance of the collector road. The collector road is also considered to be the optimal alignment for a cycleway connecting to Culburra shops.

- Spatial Unit 6 is envisaged to be a continuation of the existing industrial area and will include an electrical substation.

1.2 Objectives and Purpose of this Report

Allen, Price and Associates is assisting Realty Realizations with the preparation of the Concept Plan for submission to the DoPI, under Section 75F of Part 3A of the EP&A Act. However, subsequent to approval, further approvals may be required under Part 4 of the Act or under other Acts. In relation to Aboriginal heritage, this may involve application for a Section 90 Aboriginal Heritage Impact Permit (AHIP) to the Office of Environment and Heritage (OEH) in the Department of Premier and Cabinet (formerly the Department of Environment, Climate Change and Water {DECCW[1]}).

The Director-General (DG) of the Department of Planning and Infrastructure (DoPI) issued the Environmental Assessment Requirements (EARs) for the Project on 27 May 2011 (refer to Appendix 1). The requirements identify 'heritage and archaeology' as a key issue for the Environmental Assessment, with the requirements being to "identify whether the site has significance to Aboriginal cultural heritage and identify appropriate measures to preserve any significance" and "address the information and consultation requirements of the draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation* (DEC 2005).

[1] Prior to April 2011 the Office of Environment and Heritage (OEH) in the Department of Premier and Cabinet was known as the Department of Environment, Climate Change and Water (DECCW), and previously as the Department of Environment and Climate Change (DECC) and Department of Environment and Conservation (DEC).

The general requirements of the DoPI of primary relevance to the key issue of Aboriginal heritage also include:

- A description of the existing environment;
- An assessment of the potential impacts of the project and a draft Statement of Commitments outlining environmental management, mitigation and monitoring measures to be implemented to minimise any potential impacts of the project; and
- Consultation with DECCW (now the OEH) and the Jerrinja Local Aboriginal Land Counci and other Aboriginal community groups.

It is noted that the draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) require an assessment in accordance with the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (DEC 1997) and *Interim Community Consultation Requirements for Applicants* (DEC 2004).

However, the latter policies have now effectively been superceded by the DECCW (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and the DECCW (2010c) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy. Furthermore, subsequent applications for development approval are likely to be made under Part 4 of the EP&A Act, and these are are likely to involve an AHIP application to the OEH, of which the assessment is required to comply with the DECCW (2010b and 2010c) policies along with the OEH (2011a) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*.

Consequently, this investigation has sought to address the DEC (2005), DECCW (2010b, 2010c) and OEH (2011a) policies.

The primary objectives of this Aboriginal cultural heritage assessment are therefore:

- To assess the potential impacts of the Proposal on Aboriginal heritage; and
- To address the Director General's Requirements for the Environmental Assessment of the Project.

In order to address the above objectives, and recognising the potential future need for further approvals under Part 4 of the Act, potentially including a Section 90 AHIP, the primary aims and tasks of this Aboriginal cultural heritage assessment are to:

- Undertake register searches, research, Aboriginal community consultation and an archaeological survey and where required excavations to identify and record any Aboriginal heritage evidence or areas of potential evidence or cultural values within the investigation area;
- Assess the potential impacts of the Proposal upon any identified or potential Aboriginal heritage evidence or cultural values;
- Assess the significance of any Aboriginal heritage evidence or cultural values identified;
- Provide details of any Aboriginal heritage evidence in accordance with the OEH requirements;

- Consult with the local Aboriginal community as per the OEH policy entitled *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*[2];

- Present recommendations for the management of any identified Aboriginal heritage evidence, potential heritage resources or cultural values; and

- Prepare a formal archaeological report to meet the requirements of the proponent and the Department of Planning and Infrastructure (primarily the DEC 2005 *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation*, DECCW 2010b *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and the OEH 2011a *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*).

For the purposes of this Aboriginal cultural heritage assessment, the investigation area comprises 'land units' 1-6 as marked on Figure 5, an area measuring 99.8 hectares. However, minor additional areas totalling 5.4 hectares between and immediately adjacent to these units were also sampled during the heritage survey, and this coverage is included within the analysis due to its relevance to the assessment. This total area subject to heritage survey sampling, measuring 105.2 hectares, is referred to as the heritage study area (refer to Figure 9).

Detailed design has not been completed, as the Proposal is a Concept Plan that will be subject to further design and applications for planning approval. As such, there may be works ultimately designed outside of the areas subject to direct assessment during this investigation. Any works outside of the present heritage study area will require further assessment, subject to completion of their detailed design (refer to Sections 9 - 11).

1.3 Authorship

This assessment has been prepared by Peter Kuskie, an archaeologist with a BA (Honours) degree in Aboriginal archaeology and over 20 years experience in the conduct of Aboriginal heritage impact assessments throughout Australia.

[2] Notwithstanding that the DEC (2005) *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* reference the now outdated *Interim Community Consultation Requirements for Applicants* policy (DEC 2004). The DECCW (2010c) policy effectively incorporates the same procedures and is essential to support any subsequent AHIP application.

Figure 1: Location of West Culburra Proposal (Whereis 2009 above, Nowra 9028-3S and Crookhaven 9028-2S 1:25,000 MGA topographic maps, reduced, below).

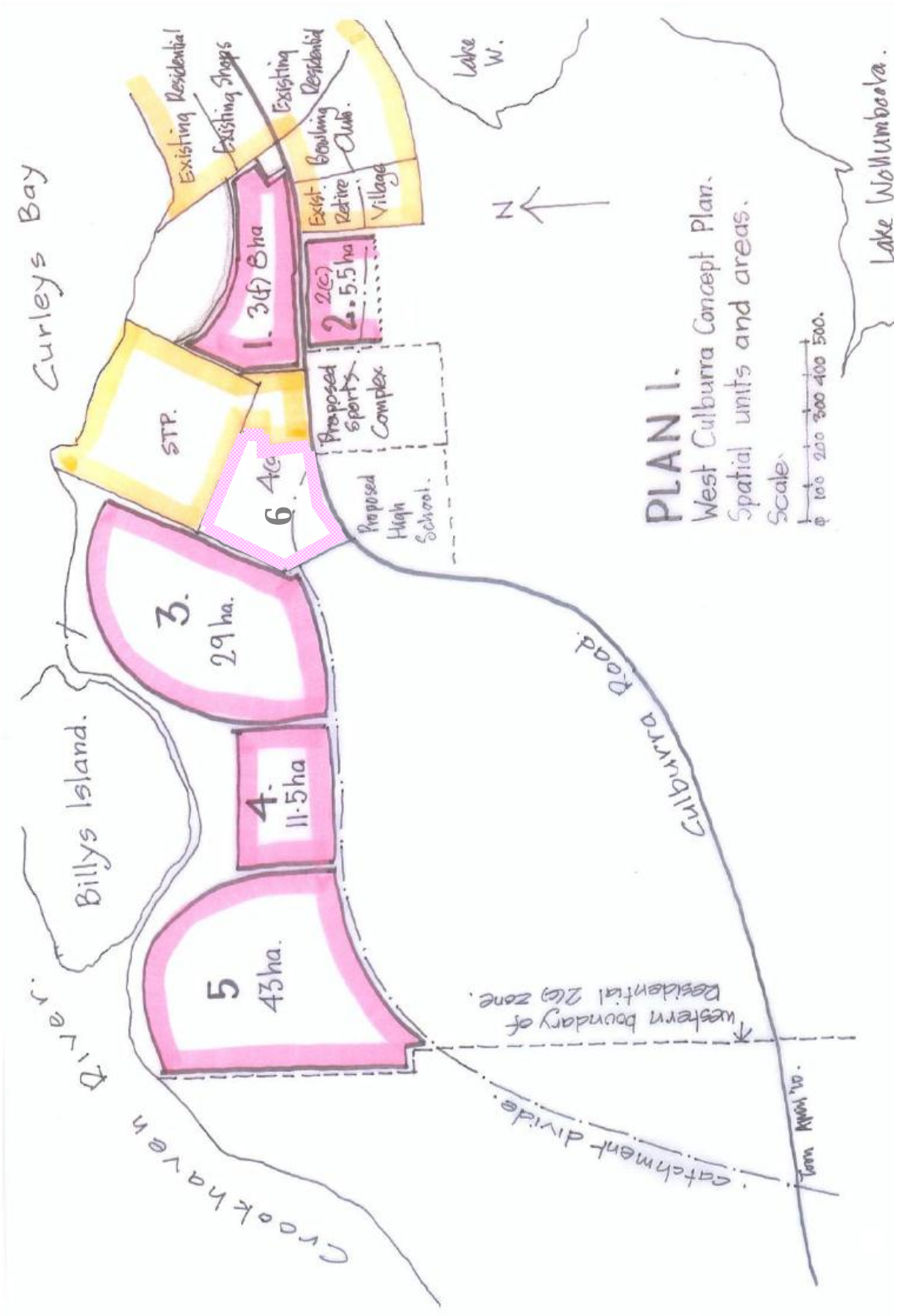

Figure 2: Plan of West Culburra Proposal (Toon 2010) (investigation areas marked with pink borders).

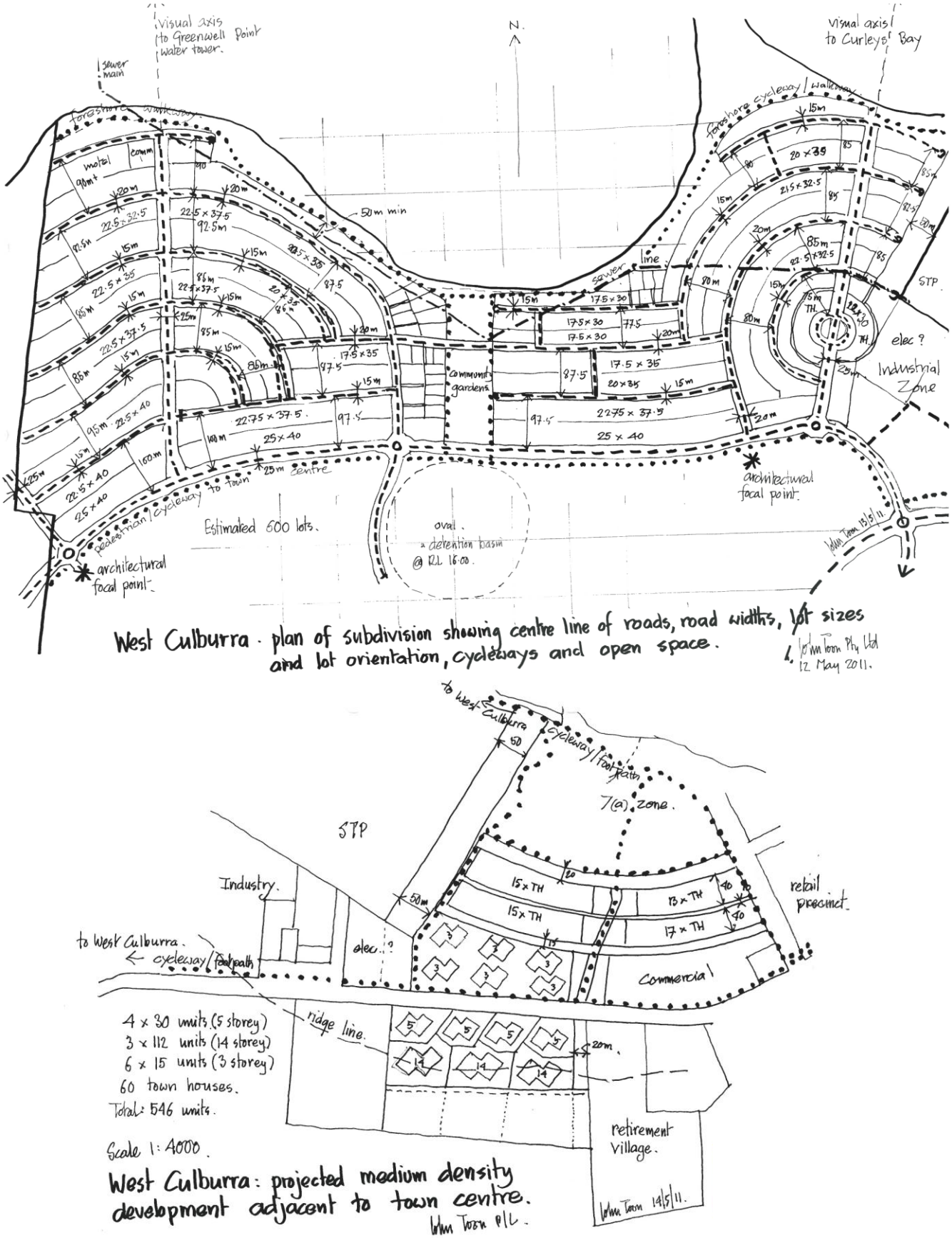

Figure 3: West Culburra concept layout plans (courtesy John Toon and Allen, Price & Associates).

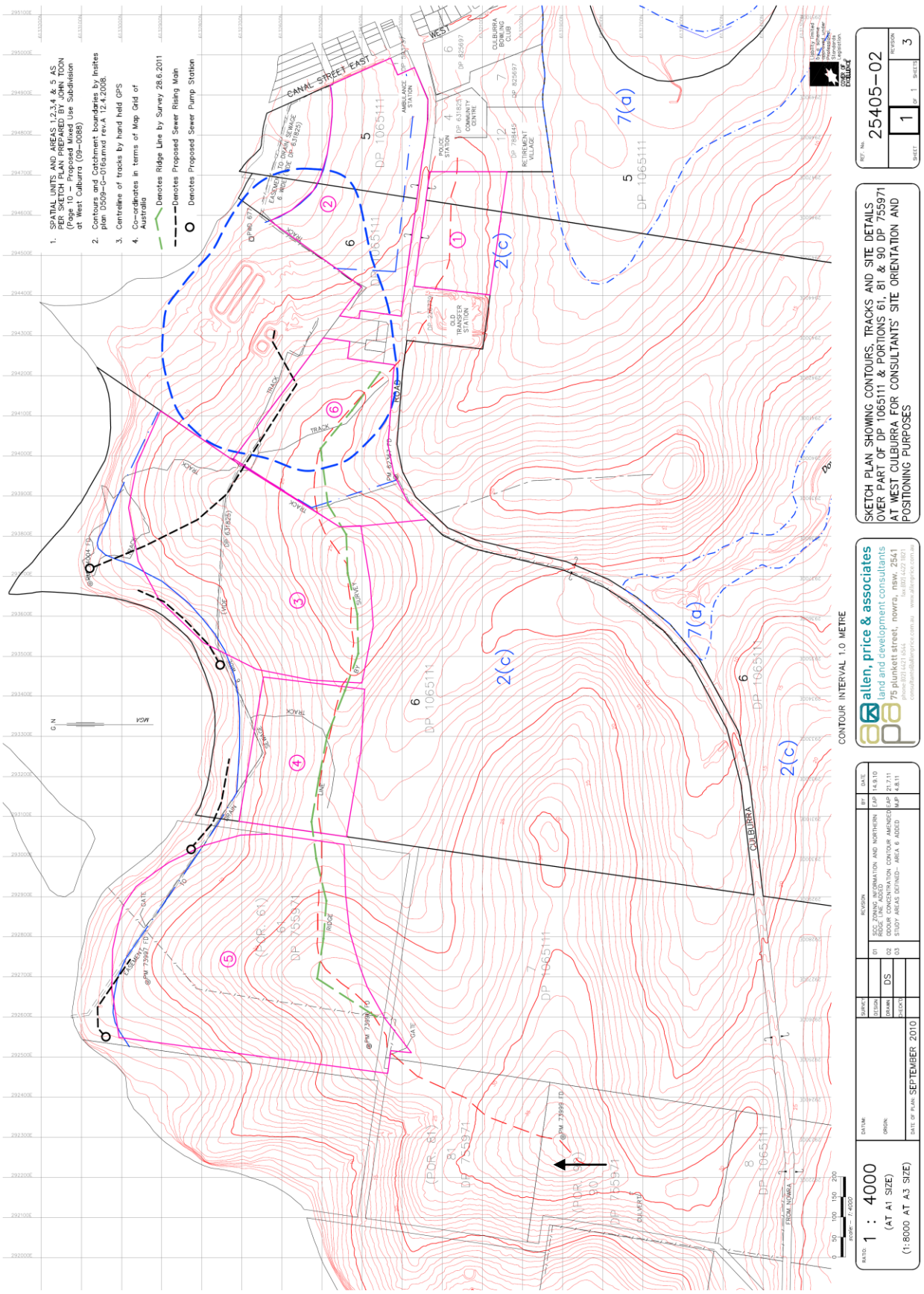

Figure 4: Contour plan of West Culburra investigation area (courtesy Allen Price and Associates) (note - 'land units' 1 and 2 numbering is transposed compared to Figure 2).

Figure 5: Location of West Culburra investigation area (orange borders) and relevant previously recorded Aboriginal heritage sites (red stars) (one metre contours courtesy Allen Price and Associates; 100 metre MGA grid; site data courtesy OEH AHIMS).

2. ENVIRONMENTAL CONTEXT

The investigation area comprises the six 'Units' as marked on Figures 1, 2, 4 and 5, which measure 99.8 hectares in area. It is situated immediately west of the urban area of Culburra Beach and south of the Crookhaven River. 'Unit 1' lies south of Culburra Road and 'Units 2-6' lie to the north of Culburra Road.

The investigation area comprises part of DP 1065111 and parts of Portions 61, 81 and 90 DP 755971 within the Shoalhaven City Council local government area. It is located between MGA grid reference eastings 292450 and 295000 and northings 6132030 and 6133030 on the Nowra 9028-3S and Crookhaven 9028-2S 1:25,000 topographic maps (Figure 1). The Culburra Wastewater Treatment Plant (WTP) and a small industrial estate separate portions of the investigation area.

The investigation area is situated within the Lower Shoalhaven district, on low, gently undulating terrain (coastal lowlands and coastal hills) that extends inland from Crookhaven Heads and Culburra Beach, and borders the adjacent coastal plain traversed by the Crookhaven and Shoalhaven Rivers. The Crookhaven River and Curleys Bay are located immediately north of the investigation area. Lake Wollumboola is situated 400 metres south-east of the investigation area. The Lake, and adjoining land to the west and south, form part of Jervis Bay National Park. Jervis Bay itself is located six kilometres south of the investigation area, with the northern arm of the Bay, Beecroft Peninsula, extending south-east from Lake Wollumboola.

The investigation area is dominated by a broad, low ridge, that extends east - west and connects Culburra Beach with the coastal hills further inland. Gentle slopes descend from the ridge down to the Crookhaven River in the north and Lake Wollumboola in the south. Elevation varies between a peak of about 27 metres above-sea-level on the ridge, down to only a few metres above-sea-level close to the Crookhaven River estuary. Notwithstanding the close proximity of the Crookhaven River, no watercourses or potable water supplies are located directly within the investigation area.

Landform units present within the heritage study area (including 5.4 hectares of land immediately adjacent to the investigation area that was subject to heritage survey sampling) comprise simple slopes (approximately 69.2% of the study area), ridge crests (20.9%), spur crests (6.6%), hillocks (1.6%) and flats (1.8%) (refer to Table 3). The slopes are largely of gentle gradient (1.45-5.45º), with this category (defined after McDonald *et al* 1984) comprising 73.4% of the study area. Areas of level or very gentle gradient (<1.45º) comprise 26.6% of the study area. The level - very gentle flat (survey area WC4) is located outside of the direct investigation area (but within the marginally broader heritage study area).

The investigation area is underlain by siltstone and silty sandstone (pebbly in part) of the Permian Era Wandrawandian Siltstone (Wollongong SI-56-9 1:250,000 geological map). However, virtually no bedrock is exposed within the study area, apart from several minor open surfaces of sandstone on vehicle tracks.

Much of the investigation area is occupied by the Greenwell Point soil landscape, while a small portion immediately adjacent to West Culburra is occupied by the Seven Mile soil landscape (Hazelton 1992). Hazelton (1992) describes these soil landscapes as follows:

- Greenwell Point Soil Landscape: Occurs on gently undulating rises on siltstone. Shallow (<50 cm) Structure Loams or moderately deep (50-100 cm) Yellow Podzolic Soils on coastal cliffs, Red Solodic Soils on simple slopes and in drainage lines. Typically on slopes such as within the investigation area, a brownish black (7.5YR 3/2) to dark brown (7.5YR 3/4), with occasional bleach, silty loam to loam, fine sandy A unit overlies a brown (10YR 4/4) medium clay B unit; and

- Seven Mile Soil Landscape: Occurs on dune ridges and swales, swamps and lagoons on Quaternary marine sands on the Coastal Plain. Deep (>150 cm) Siliceous Sands, Podzols occur on ridges, acid peats in swamps and Humus Podzols in swales (localised).

Hence, the investigation area comprises areas that are anticipated to be depositional contexts (for example, the lower portions of slopes and flats) and areas that are anticipated to be erosional contexts (for example, the upper portions of slopes), however it is noted that soil formation processes are complex and can vary over time in any locality (for example, episodes of major erosion in a typically depositional context).

The climate of the region can be described as meso-thermal, with relatively uniformly distributed high rainfall (mean 1,134 millimetres) and few extremes in temperature. Generally, there is a slightly higher rainfall in late summer with somewhat lower rainfall during the winter months. Typically, the climate of the locality is maritime with warm summers and mild winters. Average daily January temperatures (the warmest month) range between 15.9 and 25.8 degrees Celsius and the average daily temperatures in July (the coolest month) range between 6.2 and 15.8ºC (Australian Bureau Of Meteorology).

The environment of the locality of the investigation area has changed substantially over the past 30,000 years. During the last glacial maximum about 24,000 to 17,000 years ago, the environment was colder and dryer than present, and the coastline was situated at least 15 kilometres further east of its current location, as sea levels were considerably lower than they are today (Roy *et al* 1995). Drainage lines therefore extended out to this more easterly coastline and the base level for river valley channels was in excess of 100 metres lower than at present. Hence, at this time, the Crookhaven River was probably located some distance from the investigation area, and Lake Wollumboola would not have been present.

Deglaciation and melting of ice sheets occurred rapidly from 18,000 years ago as global temperatures rose. Post-glacial sea levels rose rapidly and then stabilised in the mid to late Holocene (c. 7,000 - 1,500 years ago), potentially up to 1-2 metres above their current level at times during this period. The lower Shoalhaven Valley would have formed a broad estuary in the mid-late Holocene and the land adjacent to the investigation area had become inundated with marine water (present Crookhaven River estuary and Lake Wollumboola). As coastal barrier dunes formed in the Holocene and fluvial and marine sedimentation occurred, the estuarine environment decreased in size. However, while saline then brackish swamps probably replaced the estuary in parts of the lower Shoalhaven Valley, adjacent to the investigation area the Crookhaven estuary and Lake Wollumboola would have remained present.

Hence, prior to the early Holocene, the investigation area represented a generally colder, dryer environment, further distant from estuarine or marine resources. However, subsequent to the rise of the sea to around its present level in the mid-Holocene, the investigation area has been located adjacent to estuarine subsistence resources and closer to marine resources.

Predominantly the investigation area comprises mature or regenerated open forest or woodland vegetation (refer to Plates 1 - 16 in Appendix 5). The only presently cleared portions of the investigation area are south of Culburra Road in 'Unit 2', although patches of Blackbutt Open Forest remain adjacent to the Ambulance Station in 'Unit 1' and in the western portion of 'Unit 5'. In an ecological study of the investigation area, Fanning (2008: in Toon 2010) identified:

- Blackbutt Open Forest, on generally north facing slopes south and west of the WTP and in the western portion of the investigation area;
- Bangalay - Woollybutt - Rough-Barked Apple Open Forest, occupying a small area on the western margin of the investigation area;
- Hard-Leaved Scribbly Gum Woodland, typically on east - north-east slopes across a broad portion of the investigation area;
- Bangalay Woodland Open Forest, occupying the hillock in 'Unit 3'; and
- Swamp Oak - Eucalypt Open Forest along the fringe of the Crookhaven River, occupying the lower portions of 'Units 2 and 4'.

A number of mature native trees are present within the investigation area, however numerous trees, although relatively large, are of similar height and appear to represent regrowth. This was confirmed through examination of 1944 aerial photographs of the locality (refer to Figure 6) which demonstrate the extent of clearing that existed at that time. A dense ground cover of grass, bracken fern, and in places an understorey of Casuarina, wattle and tea-tree, is present throughout the investigation area. The cover of vegetation acts to reduce ground surface visibility and thereby reduces the potential to identify archaeological evidence during a field survey. Most open artefact occurrences or shell middens are only identified when visible on exposures created by erosion or ground disturbance.

Recent non-Aboriginal land-use practices have had minimal impacts on the investigation area (Plates 1 - 16, Appendix 5). Some impacts have been caused by:

- Vegetation removal, which was once widespread across the investigation area (refer to Figure 6) but is now mainly evident south of Culburra Road, adjacent to the Ambulance Station and in the western-most portion of the investigation area;
- Pastoral use, particularly in the cleared areas;
- Construction, maintenance and use of vehicle tracks, of which a number of unsealed and generally lightly-formed tracks traverse the investigation area;
- Transport of oysters obtained from adjacent oyster leases in Curleys Bay;
- Minor recreational use, including trail bikes;
- Minor geotechnical drilling; and
- Essential services, notably sewer mains that traverse the northern portion of the investigation area.

These impacts are generally minor and are not anticipated to have had a substantial impact on any heritage evidence, other than that the removal of mature trees may have impacted any scarred trees, had they been present, and the focalised impacts (such as the sewer main) may have reduced the integrity of any artefact evidence present. However, in general, disturbance levels are low across the investigation area and should sub-surface deposits of artefacts occur, they may exhibit reasonable integrity.

The non-indigenous occupation of the investigation area has been addressed by Stedinger Associates (2011). Contact with the region commenced in 1770 when Captain Cook sighted Jervis Bay, and early non-indigenous settlement began in the Shoalhaven in 1822, with the land grants acquired by Alexander Berry and Edward Wollstonecraft at Coolangatta. In this year, Berry established himself at the southeastern base of Coolangatta Mountain, the first non-indigenous settlement on the South Coast (Bayley 1975:24; Antill 1982:347).

Principal economic activities in the Nowra region in the earlier historic period began with land clearing and timber acquisition around 1825, and moved into cattle and sheep grazing from the late 1820s onwards. The timber industry began on the Berry estate in 1829, with particular interest paid to the cedar wood available in the region. Brick making and wheat produce also began around this time, with the wheat barn at Upper Numbaa built in 1830 (Bayley 1975, Antill 1982). Wheat remained productive until around 1870 when dairy became the primary industry of the Berry Estate. The dairy industry in the region has been successful since 1824. Butter and cheese factories became so successful that at one point only Nowra and the town of Berry nearby "served the richest area of the state" with these commodities (Bayley 1975, Antill 1982).

By the 1850s, Berry was leasing his property to tenant farmers and the village of 'Broughton Creek', as Berry was then known, began to develop. A post office in the town was opened in 1861 and by 1868, 300 people resided in the village. Nowra became increasingly populated in the 1870s, following severe floods that affected villages on the lower lying ground (Bayley 1975).

In the 1800s, extensive drainage works had been undertaken on Coolangatta Estate, involving channels, canals and floodgates. Alexander Berry had built a wharf at Greenwell Point as early as 1829 and by 1872, the southern arm of the Crookhaven River was opened to large steamers and this port became the fourth busiest in the State, as produce was shipped to Sydney and elsewhere (Welch 2010).

Culburra Estate was first subdivided in 1921 and land sold by Henry Halloran (Welch 2010). Culburra developed as a quiet seaside tourist village in the 1920s, but more substantial growth did not occur until the 1950s and 1960s (Stedinger Associates 2011). The road from Nowra was sealed in 1956 and residences and holiday cottages continued to be established. A bowling club and retirement village were established through land donated by the Halloran family. In 1984 the Culburra/Orient Point Sewerage Scheme commenced, with the WTP constructed adjacent to the present investigation area. A proposal was presented in 1995 to Council for the subdivision of the present investigation area, following from initial studies in the early 1980s (Hughes 1983).

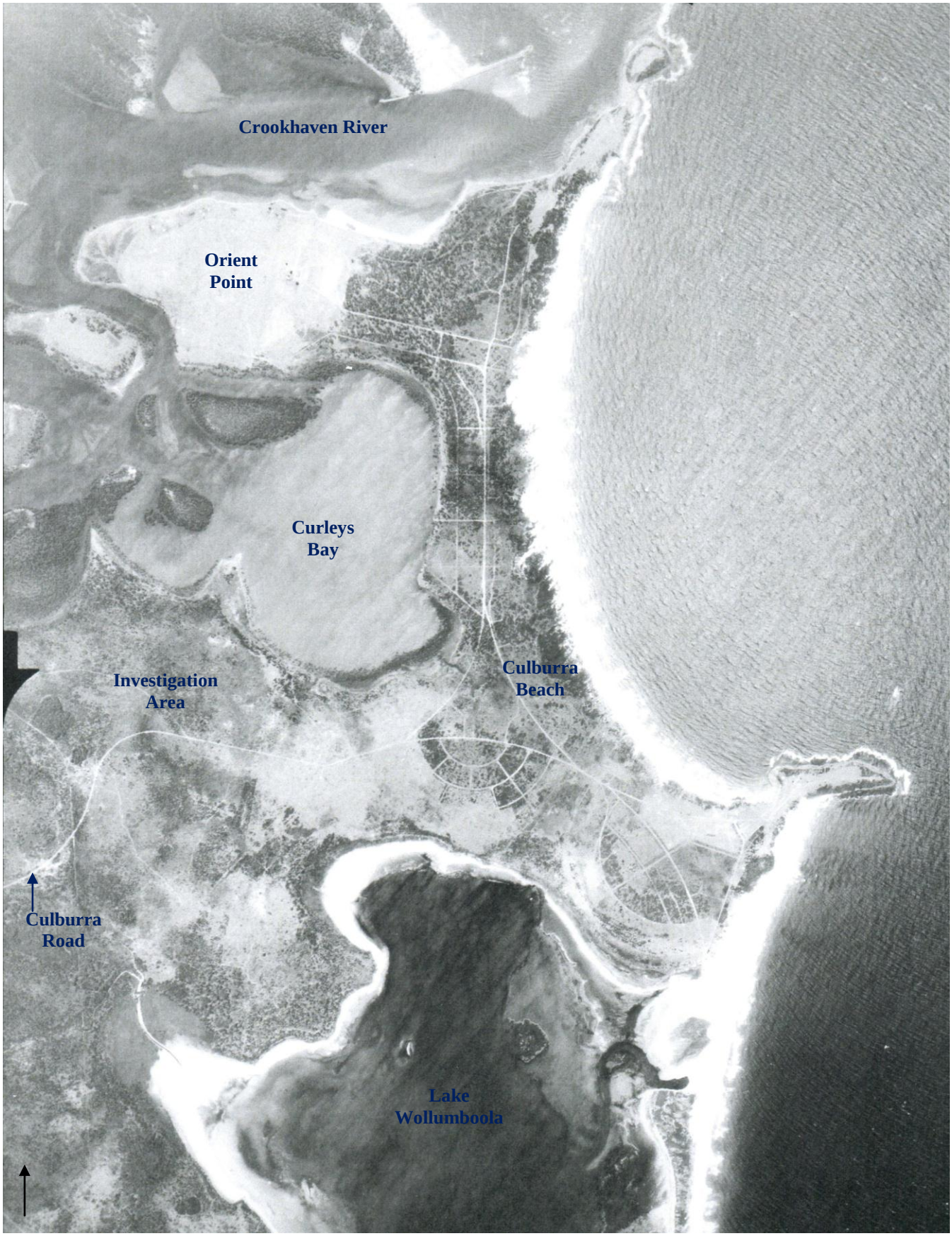

Figure 6: 1944 military aerial photograph showing the extent of vegetation removal from the investigation area (Sheet I56, Run 5, Photo 5011; 4/4/1949).

Table 2: Previously recorded Aboriginal sites within the AHIMS search area.

OEH AHIMS #	Site Name	Site Type	Recorder
52-5-0148	Crookhaven Lighthouse; Crookhaven; Orient Point;	Midden	Marjorie Sullivan
52-5-0172	Culburra 2; Greenwell Point;	Midden	Phil Hughes
52-5-0176	Culburra 6; Greenwell Point;	Midden	Phil Hughes
52-5-0180	Culburra 10; Greenwell Point;	Midden	Phil Hughes
52-5-0181	Culburra 11; Greenwell Point;	Midden	Phil Hughes
52-5-0096	Pyree;	Open Artefact Site	
52-5-0106	Orient Point; Greenwell Point;	Bora/Ceremonial	Ray Kelly
52-5-0109	Restriction applied.	Unspecified	Harry Creamer
52-5-0125	Greenwell Point; Tilbury Cove;	Midden	Graham Connolly
52-5-0041	Brundee Swamp;	Shelter with Deposit	Shoalhaven Antiquities Committee
52-5-0053	Greenwell Point;	Open Artefact Site	Shoalhaven Antiquities Committee
52-5-0054	Greenwell Point;	Open Artefact Site	
52-5-0058	Greenwell Point, Orient Mission Point Cemetery		Ray Kelly, Jack Campbell, Percy Mumbulla
52-5-0061	Greenwell Point; Culbuna Beach;	Open Artefact Site	R.L Black
52-5-0069	Wheelers Point;	Midden	Australian Museum
52-5-0458	SW4/A	Open Artefact Site	Edward Clarke
52-5-0463	SW2/A	Open Artefact Site	Edward Clarke
52-5-0621	Culburra SU3/L1-a	Open Artefact Site	Julie Dibden
52-5-0156	Crookhaven Lighthouse; Orient Point;	Water Hole/Well	Marjorie Sullivan
52-5-0173	Culburra 3; Greenwell point;	Midden	Phil Hughes
52-5-0179	Culburra 9; Greenwell Point;	Midden	Phil Hughes
52-5-0108	Orient Point; Greenwell Point;	Bora/Ceremonial	Ray Kelly
52-5-0115	Boallah; Crookhaven;	Midden,Water Hole/Well	Graham Connolly
52-5-0045	Pyree; Floodgates;	Burial/s	Shoalhaven Antiquities Committee
52-5-0205	Vineyards; Brundee Swamp;	Open Artefact Site	Tessa Corkill
52-5-0153	Crookhaven Lighthouse, Orient Point	Burial/s	Marjorie Sullivan, Jack Campbell
52-5-0174	Culburra 4; Greenwell Point;	Midden	Phil Hughes
52-5-0175	Culburra 5; Greenwell Point;	Midden	Phil Hughes
52-5-0185	Culburra 16; Greenwell Point;	Midden	Phil Hughes
52-5-0186	Culburra 12; Greenwell Point;	Midden	Phil Hughes
52-5-0462	SW2/B	Open Artefact Site	Edward Clarke
52-5-0464	SW1/A	Open Artefact Site	Edward Clarke
52-5-0363	Tallowwood Road 3	Open Artefact Site	Kerry Navin, Kelvin Officer
52-5-0171	Culburra 1; Greenwell Point;	Midden	Phil Hughes

OEH AHIMS #	Site Name	Site Type	Recorder
52-5-0178	Culburra 8; Greenwell Point;	Midden	Phil Hughes
52-5-0184	Culburra 15; Greenwell Point;	Midden	Phil Hughes
52-5-0092	Crookhaven River;	Axe Grinding Groove	
52-5-0098	Orient Point Shell Midden; Orient Point; Greenwell Point;	Midden	
52-5-0114	Shelly Point Campsite	Open Artefact Site	Jack Campbell
52-5-0128	Orient Point;	Midden	
52-5-0048	Crookhaven River;	Burial/s, Open Artefact Site	Shoalhaven Antiquities Committee
52-5-0057	Curleys Bay;	Midden	Shoalhaven Antiquities Committee
52-5-0067	Lake Wollomboola; Wheelers Point;	Midden	Graham Connolly
52-5-0068	Lake Wollombulla	Burial/s,Midden	P Wooley
52-5-0563	Culburra SU3/L1	Open Artefact Site	Julie Dibden
52-5-0620	Culburra SU2/L1-a	Open Artefact Site	Julie Dibden
52-5-0154	Crookhaven Lighthouse; Orient Point;	Water Hole/Well	Marjorie Sullivan
52-5-0099	Orient Point Semi-Tribal Burials, Greenwell Point	Burial/s	Ray Kelly, Eileen Wellington
52-5-0124	Lake Wollumboola; Boalla Point;	Midden	Graham Connolly
52-5-0202	Site A; Crookburen;	Midden	Robert Paton
52-5-0150	Crookhaven Lighthouse; Crookhaven; Orient Point;	Midden	
52-5-0157	Orient Point; Crookhaven Point; Crookhaven;	Midden	Marjorie Sullivan
52-5-0177	Culburra 7; Greenwell Point;	Midden	Phil Hughes
52-5-0182	Culburra 13; Greenwell point;	Midden	Phil Hughes
52-5-0097	Orient Point Massacre Site, Greenwell Point	Burial/s	
52-5-0107	Orient Point; Greenwell Point;	Bora/Ceremonial, Open Artefact Site	
52-5-0127	Orient Point; Pelican Rocks;	Midden	
52-5-0562	Culburra SU2/L1	Open Artefact Site	Julie Dibden
52-5-0149	Crookhaven Lighthouse; Crookhaven; Orient Point;	Midden	
52-5-0183	Culburra 14; Greenwell Point;	Midden	Phil Hughes
52-5-0060	Greenwell Point; Crookhaven Beach;	Open Artefact Site	Shoalhaven Antiquities Committee

3. ABORIGINAL ARCHAEOLOGICAL CONTEXT

3.1 Heritage Register Searches

A search was undertaken on 4 February 2011 of the OEH Aboriginal Heritage Information Management System (AHIMS), between MGA grid coordinates 287000 and 298000 east and 6127000 and 6135000 north. A total of 61 Aboriginal sites are listed on the OEH register within this area of 88 square kilometres, which encompasses the present investigation area (Table 2). The sites identified in the broad search area comprise:

- 29 shell middens;
- 1 midden and waterhole/well;
- 16 open artefact sites;
- 4 burials;
- 1 burial and midden;
- 1 burial and open artefact site;
- 2 bora/ceremonial sites;
- 1 bora/ceremonial and open artefact site;
- 1 rock shelter with deposit;
- 2 waterhole/well sites;
- 1 grinding groove site; and
- 1 unspecified (restricted) site.

No Aboriginal heritage sites listed on the OEH register have previously been recorded directly within the investigation area (Figure 6). However, 18 sites have been recorded immediately adjacent to the investigation area, between it and the Crookhaven River (Figure 6). One of these sites, 'Culburra 8' (OEH #52-5-178) appears to have an incorrect grid reference as the mapping of Hughes (1983) places it adjacent to 'Culburra 7' (#52-5-177). Notes on the OEH site records indicate the OEH view that site #52-5-114 represents the recording of two sites, a midden (#52-5-186) and an open artefact site (co-located with the midden #52-5-185).

Full descriptions of these sites are presented in Appendix 2 and they are discussed further in Section 5. These sites comprise:

- #52-5-57 (Curleys Bay) midden;
- #52-5-114 (Shelly Point Campsite) open artefact site;
- #52-5-171 (Culburra 1) midden;
- #52-5-172 (Culburra 2) midden;
- #52-5-173 (Culburra 3) midden;
- #52-5-174 (Culburra 4) midden;
- #52-5-175 (Culburra 5) midden;
- #52-5-176 (Culburra 6) midden;
- #52-5-177 (Culburra 7) midden;
- #52-5-178 (Culburra 8) midden;
- #52-5-179 (Culburra 9) midden;
- #52-5-180 (Culburra 10) midden;
- #52-5-181 (Culburra 11) midden;
- #52-5-182 (Culburra 13) midden;
- #52-5-183 (Culburra 14) midden;
- #52-5-184 (Culburra 15) midden;
- #52-5-185 (Culburra 16) midden;
- #52-5-186 (Culburra 12) midden.

No Aboriginal heritage sites are listed on the State Heritage Register, Register of the National Estate, National Heritage List or Commonwealth Heritage List under the *Environment Protection and Biodiversity Conservation Act 1999* or on the *Shoalhaven Local Environmental Plan 1985 (amended 2010)* or under the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* within the investigation area.

The draft Shoalhaven LEP 2009 is currently on public exhibition but is not in-force. No items or conservation areas are listed in Schedule 5 of the draft LEP within the investigation area.

A search of the Native Title Tribunal on 27 January 2011 identifies that no determinations of Native Title, registered Native Title Determination applications (Claimants) or Indigenous Land Use Agreements (ILUAs) apply to the investigation area.

3.2 Previous Archaeological Research

A number of Aboriginal heritage investigations have been undertaken within the vicinity of the investigation area, principally for Environmental Impact Assessments relating to development proposals. Brief discussion of the most relevant investigations will highlight the range of site types and variety of site contents in the region, identify typical site locations, and assist with the construction of a predictive model of site location for the investigation area.

Culburra Locality:

Hughes (1983) investigated the proposed Culburra Town Expansion Area, a broad area encompassing the present investigation area and additional land to the south (refer to Figure 7). A survey was conducted over several days in May 1983 with a number of representatives of the Jerrinja Aboriginal community (Frank Wellington, Norman Wellington, Jack Campbell, Graham Connolly, Dallas Carberry, Alfred Lowe and William Connolly). The primary aim was to relocate and record midden sites previously noted by Jack Campbell along the foreshore of the Crookhaven River. Hence, there was limited survey coverage of much of the investigation area, although Hughes (1983) reported that several roads were inspected without the identification of any evidence.

Hughes (1983) noted that in the late 1970s Jack Campbell had recorded an oral account of the middens and their importance to the Jerrinja community, which was lodged with the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) in Canberra. Hughes (1983) reported that the Jerrinja Elders knew the study area well and did not express concern of any potential impacts to any culturally significant sites.

Sixteen discrete shell midden sites or complexes were located, and numbered 'Culburra 1 - 16' from west to east (Figure 7; refer to full descriptions in Appendix 2). The vegetation cover appears to have been significantly less at the time of Hughes' (1983) survey than at the present time. One site was located on a track 10 - 30 metres inland from the small 3 - 5 metre high cliff that fringes the Crookhaven River and Curleys Bay. However, all remaining sites were located closer to the shore, which Hughes (1983) interpreted as indicating that evidence of exploitation of estuarine resources in this area occurs very close to those resources.

Virtually all of the middens were mounded, especially the larger ones, and well vegetated and stable. Rock oyster was the dominant shell component, often over 80% of each midden. Cockle and mud whelk and minor frequencies of other shells were also noted. Very few stone artefacts or bones were identified (Hughes 1983).

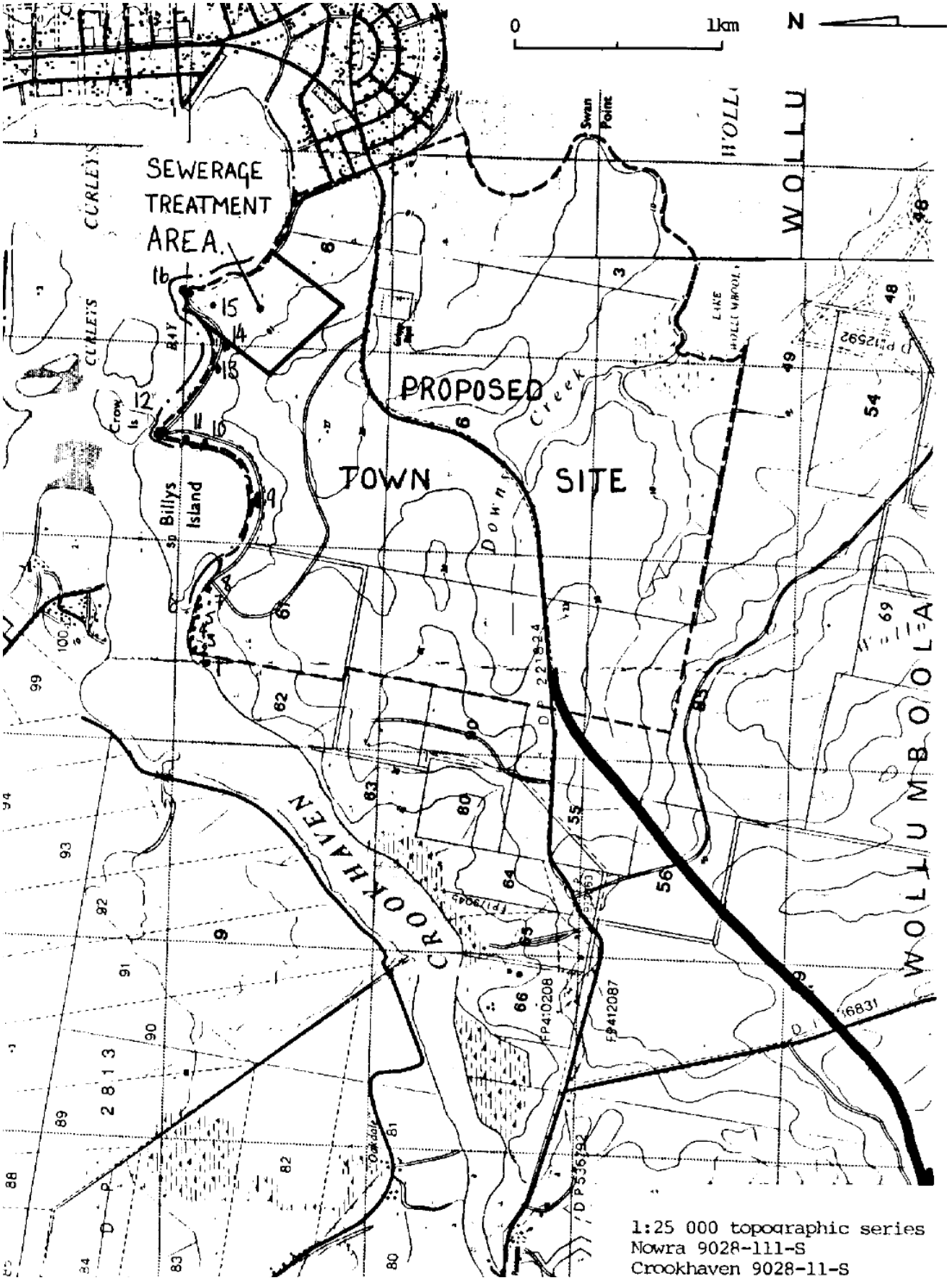

Figure 7: Investigation area and Aboriginal site locations ('Culburra 1 - 16') of Hughes (1983).

Hughes (1983) reported that the Culburra midden sites are of 'considerable heritage and scientific value and of considerable importance' to the Jerrinja people. Hughes (1983) noted the representative value of the sites, with few similar suites having been recorded, and many similar sites having been impacted since non-indigenous settlement. Conservation of the sites was recommended.

Hughes (1982) surveyed the proposed Culburra access road, extending west from the present investigation area for 12.5 kilometres. No archaeological evidence was identified.

McConnell (1978) surveyed areas to be affected by sewerage works at the Shoalhaven Heads, Culburra and Sussex Inlet, including the location of the Culburra Wastewater Treatment Plant immediately adjacent to the present investigation area. The ten hectare site was described as being densely vegetated, with marshes and further from the lake margin, open woodland. McConnell (1978) described the vegetation cover as total and therefore surface visibility as negligible. No Aboriginal heritage evidence was identified, but McConnell (1978) concluded that there was a high potential for evidence to be present. Further assessment was recommended after the initial removal of vegetation, but it is uncertain if this occurred.

Dibden (2009, 2010) investigated Lot 1 DP 614607, East Crescent, at Culburra Beach, for a proposed subdivision. This area is located less than 1.2 kilometres south-east of the present investigation area, on the northern shore of Lake Wollumboola, and possibly in the general vicinity of the large site complex reported by the Shoalhaven Antiquities Committee (refer below). One open artefact site, containing 43 artefacts, and an isolated find were identified in the 3.4 hectare study area.

Test excavations were subsequently undertaken, involving 22 units each measuring 0.5 x 0.5 metres, dug in transects approximately 20 to 30 metres apart (Dibden 2010). The excavations sampled the three survey units. No artefacts were located in the six units in Survey Unit 1, furthest from Lake Wollumboola. However, 435 artefacts were located in the eight test units in Survey Unit 2 and 91 from a similar number of units in Survey Unit 3. Artefacts occurred at a relatively high density of 131 per conflated square metre across Units 2 and 3 (170 per cubic metre). Silcrete (44%) and quartz (36%) dominated the assemblage, with lower frequencies of chert, fine-grained volcanic, quartzite and chalcedony. Flake portions (46%) and flakes (44%) dominated the artefact types, with lower frequencies of cores, core fragments, flaked pieces, retouched and utilised artefacts. Isolated shell fragments totalling 185 grams were also recovered.

Not far east of the investigation area, members of the Shoalhaven Antiquities Committee report the finding of a burial in 1930, in a sandhill on the northern shore of Lake Wollumboola. The skeleton was described as being buried in a squatting position, facing south. Numerous stone artefacts (including around 500 bondi points, several eloueras and geometric microliths, fish hook files, bone needles and an edge-ground hatchet) and a midden were also found in this location, over a broad area across the adjacent hillock (Antill 1982:330-331).

Kelly and Creamer (1978) investigated sites of significance to the Aboriginal people of Roseby Park, at Orient Point and Nowra. Of particular relevance to the present investigation is the identification of numerous sites of cultural significance at Crookhaven Heads.

Sullivan (1981) identified additional heritage sites in the Crookhaven Heads - Orient Point locality during an investigation in December 1981 of three areas for the proposed relocation of a sporting complex.

Local historian Cathy Dunn (2009) undertook an investigation of Goodnight Island, in the Crookhaven River estuary off Orient Point, for a proposed tourist facility. The 16 hectare island was not subject to an archaeological survey. In their response to the draft report, the Jerrinja LALC noted the absence of a site survey, the absence of information on which to assess the impacts of the proposal, and the inadequate consultation with the LALC, requesting that further more detailed investigation be undertaken.

Paton and Cane (1985) investigated a proposed boat ramp upgrade at Orient Point and beach reclamation works at Culburra and Crookhaven. Two previously recorded middens were relocated, and a thin layer of midden identified at the northern end of Crookhaven Beach.

Dallas (1995) surveyed an area adjacent to Culburra Beach for residential development, about two kilometres east of the present investigation area. Dallas and Byrne (1995) undertook sub-surface testing of a midden (#52-5-125) previously recorded by Graham Connolly. A total of 62 auger holes (0.1 metre diameter) were excavated along six transects, identifying midden deposits and a stone artefact.

Lower Shoalhaven Region:

A major regional study, the fourth stage of the *Lower Shoalhaven River Valley Aboriginal Heritage and Cultural Mapping Project*, has been undertaken by Clarke and Kuskie (2006) for DECC (now the OEH). Clarke and Kuskie (2006) developed a spatial model, using key environmental variables to predict Aboriginal site occurrence as a cultural thematic layer, for planning purposes. The model was tested on public land in consultation with the Aboriginal community, resulting in the recording of an additional eight artefact scatters and four rock shelters with artefacts around Nowra. Clarke and Kuskie (2006) also provided recommendations for further targeted archaeological surveys and, following the field assessment, the predictive model was refined. Further community consultation and field inspection was undertaken in 2007 (Clarke 2007).

Several surveys (eg. Kuskie 1995a, 2002, Kuskie and Ingram 2007, Paton 1990, Corkill 1986, Navin 1992a) have been undertaken in the low-lying terrain of the coastal plain to the east of Nowra, several kilometres north-west of the present investigation area. This environmental context generally differs from the present investigation area, which is more elevated and well-drained. These studies have typically not resulted in the identification of any evidence of Aboriginal occupation.

Kuskie (1995a) investigated a 26 hectare property bordering Worrigee Swamp at East Nowra. The property comprised Lots 1 and 2 DP 583161 and borders Greenwell Point Road at "Delwarra". No Aboriginal evidence was identified, a result Kuskie (1995a) concluded was probably attributable to a genuinely low intensity of Aboriginal use of the locality and/or impacts caused by recent land-use practices.

Paton (1990) surveyed a 90 hectare proposed residential subdivision at East Nowra, south of Greenwell Point Road and east of Worrigee Road, on the margin of Brundee Swamp. No evidence was identified in this investigation, despite the land being elevated and bordering the swamp/floodplain. However, Corkill (1986) located a small artefact scatter and an isolated artefact around the margins of Brundee Swamp, as part of a research project. Corkill (1986) proposed that sites in the coastal plain are likely to be located close to remnant landscape features (such as wetlands) associated with Holocene embayment infill.

Navin (1992a) surveyed proposed extensions to the Shoalhaven Paper Mill. The 72 hectare area is located on the northern side of the Shoalhaven River, near Pig (Burraga) Island. The investigation area included 22.5 hectares adjacent to the paper plant for extensions and 50 hectares immediately north of Bolong Road where the Manildra Group proposed to establish a wastewater treatment plant and ponds. Two isolated artefacts were located, a ground-edge hatchet and a broken alluvial pebble. The hatchet was identified within the wall of an artificial drainage channel, 0.3 metres below the present surface. Navin (1992a) concluded that the item was not *in situ*. The broken alluvial pebble was also located within a drainage channel and comprised a similar stone material. Navin (1992a) interpreted this evidence as accurately reflecting the generally low archaeological sensitivity of the locality, with the possible use of the elevated river banks (levee) as an access corridor.

An adjacent area was assessed by Kuskie (2002) for proposed extensions to the Shoalhaven Starches Environmental Farm. The areas subject to assessment comprised a proposed employee car park and evaporation plant and other facilities adjacent to the existing Starches Factory, and an extension to an irrigation area on land located approximately 3.5 kilometres to the northeast. No Aboriginal heritage evidence was identified, a result attributed to genuinely low Aboriginal utilisation of the area and impacts from recent non-indigenous land-use practices. Additional investigations for the proposed Ethanol Plant Upgrade, involving works within the existing Factory and an adjoining industrial site, along with minor gas and water pipelines, were conducted by Kuskie (2008) with similar result.

Kuskie and Ingram (2007) investigated the proposed Wondalga Sporting Facilities, a 25 hectare area situated adjacent to existing playing fields at Lyrebird Park, East Nowra. No Aboriginal heritage sites were identified during the investigation. Although the area was densely covered with pasture grass, which lowers surface visibility and limits the potential to identify evidence of Aboriginal occupation (particularly shell middens and stone artefacts), and levels of ground disturbance were high (potentially obscuring or removing any evidence), Kuskie and Ingram (2007) concluded that the primary factor in the absence of items was the geomorphological history of the area. For virtually the entire Holocene period (last 10,000 years) the area had been inundated with water and had therefore not been conducive to Aboriginal occupation. Kuskie and Ingram (2007) inferred that the only Aboriginal use of the area was likely to have involved exploitation of subsistence resources, initially from an estuarine environment and later in the Holocene period from brackish swamps, for which negligible evidence would remain.

In the more elevated Nowra Sandstone terrain of the Shoalhaven region, particularly around Nowra 15 kilometres west of the Culburra investigation area, and further west, numerous rock shelters with deposit and/or art have been recorded. Members of the Shoalhaven Antiquities Committee, established in 1963, recorded many sites within Shoalhaven Shire, including rock shelters with art, ceremonial grounds, stone arrangements and artefact scatters (Antill 1982). Bindon (1976) and Officer (1991) have conducted extensive research into the rock art of the region.

Lampert (1971a) excavated a rockshelter in 1970 on Bomaderry Creek (OEH #52-5-0035), revealing a shallow occupation deposit, mostly containing a low density of artefacts. Lampert obtained two (uncalibrated) radiometric dates from charcoal within the archaeological deposit: 1410±60 years Before Present (BP) (ANU-1020) and 1930±60 BP (ANU-1021). While Lampert (1971a) noted the presence of a small number of mollusc remains from a wide range of habitats, terrestrial remains comprised a far more significant component of the deposit. Of particular relevance, Lampert (1971a) suggested that terrestrial resources in the immediate surrounds of the shelter were exploited in preference to the nearby primary resource zone of the Shoalhaven River.

Other Environmental Impact Assessment related studies around Nowra on elevated terrain have often related in the identification of artefact scatter evidence, where surface visibility conditions permit (eg. Williams and Barber 1993, 1995 at Tapitallee Creek, Kuskie *et al* 1995 around Nowra, Kuskie 1996 at Nowra). Several studies have reported on rock shelter and/or grinding groove sites (eg. Navin 1991, Navin Officer 2006). Many studies have not resulted in the identification of any Aboriginal evidence (eg. Rich 1990 at West Nowra, Colley 1988 at North Nowra, Kuskie 1998 at Albatross Aviation Technology Park southwest of Nowra).

Jervis Bay:

Less than ten kilometres to the south of the present investigation area lies Callala Bay, on the northern shore of Jervis Bay. Beecroft Peninsula extends east and south, forming the northern arm of Jervis Bay.

Cane (1988) has recorded numerous sites on the peninsulas surrounding Jervis Bay, including 27 sites on Beecroft Peninsula and 23 sites on Bherwerre Peninsula. Beecroft Peninsula is reported as containing over 130 recorded Aboriginal sites, mostly middens and rock shelters with deposit (Cane 1988). Over 60 sites have been recorded on Bherwerre Peninsula, the southern arm of Jervis Bay, predominantly middens (Sullivan 1977). Cane (1988) interprets the archaeological evidence as suggesting that early, sporadic occupation of Beecroft Peninsula was followed by permanent, intense occupation within the last 2,000 years.

Cane (1988:14) found that 80 middens located on Beecroft Peninsula were directly associated with rocky shore platforms, and as such conformed to recognised site distribution patterns. 19% of middens were located in sand dunes. Cane (1988:15) classified the middens based on shell content into the following types:

- Estuarine - dominated by mud oyster and mussel;
- Hard Shore - dominated by *Turbo undulata*, *Turbo torquata*, periwinkle, *Austrocochlea* spp, abalone, and limpets; and
- Mixed middens - containing a mixture of hard and soft shore species.

According to Cane's (1988:16) analysis of middens from Beecroft and Bherwerre Peninsula, there is a direct correlation between the environmental setting of middens and their contents. Cane (1988:17) therefore argued that this indicates that middens reflect foraging events, restricted spatially and temporally, in which resources were collected immediately adjacent to camping location. The open sites are therefore somewhat different to the Currarong shelter sites excavated by Lampert, in which the inferred economic character is of base camp situations, where resources from all available environments were hunted and collected (Cane 1988:17). The distribution of middens on Beecroft is of a high density (8.5 sites/km of coast line between Long Beach and Honeymoon Bay) compared with the rest of the South Coast (3.3 sites/km - as per Attenbrow 1982, cited in Cane 1988:8). During this study Cane (1988) located 50 sites, only one of which was an artefact scatter.

South East Archaeology (Dibden and Kuskie 1999) was commissioned by the National Parks and Wildlife Service (Nowra District) to undertake an archaeological survey for Aboriginal sites within areas to be affected by proposed park management works at Red Point and Hammer Head Point, in Jervis Bay National Park. The study area is located three to five kilometres from the village of Currarong. The study area at Red Point consisted of approximately 16.3 kilometres of linear vehicle and walking tracks and several broader areas where midden sites were known to exist. The study area at Hammer Head Point measured approximately 300 x 200 metres. Comprehensive coverage was obtained during the field survey with the Jerrinja LALC and a total of six Aboriginal sites (three artefact scatters, two shell middens and one isolated artefact) were recorded at Red Point and two sites (one artefact scatter and one midden) at Hammer Head Point.

Navin (1993a) undertook a preliminary assessment of 14 areas for the St Georges Basin - Jervis Bay Regional Effluent Management Scheme, including the hinterland of Jervis Bay and the coastal lowlands east of Nowra. Field inspection was undertaken of a number of pipeline routes and other areas, with a number of open artefact sites located.

Kuskie (1995b) undertook an Aboriginal assessment of Portion 21, Parish of Wollumboola, Callala Beach Road, Callala Beach. The study area comprised approximately four hectares bordering Queen Mary Street and Callala Beach Road. A field survey was conducted with the Jerrinja LALC and no archaeological sites were located. The majority of the property was assessed as being of low archaeological potential.

Navin (1990, 1991) investigated options for a proposed road linking Woollamia with Callala Beach, including a bridge crossing Currambene Creek. Navin (1991) discusses in detail the historic Aboriginal camp at 'Bilong' along the northern banks of Currambene Creek. Four scarred trees, two artefact scatters, two isolated artefacts, one midden and a major site complex on the northern bank of Currambene Creek, comprising middens, artefact scatters, sub-surface deposits, possible burials and the historic Aboriginal camp-site were recorded. Test excavations revealed that the archaeological deposits near Currambene Creek generally occur at a depth of between 8-31 centimetres below the present surface and in a relatively undisturbed context. The results of the excavations indicated that both the use and manufacturing of stone tools occurred and that the sites were between 1,000 and 3,500 years of age (Navin 1991).

Also on the banks of Currambene Creek at Myola, Paton (1993) located a small artefact scatter in an area to be affected by erosion control measures. Navin (1992b, 1993b) investigated a proposed residential development at Woollamia, where sub-surface testing revealed five artefacts within 25 small auger holes, all silcrete flakes and flaked pieces. Navin (1993b) interpreted the evidence on the creek terrace as representing a low to moderate density artefact scatter.

Navin Officer (2000) also undertook investigations at Currambene Creek for the proposed 'Comberton Grange' development. In the 219 hectare area Navin Officer (2000) identified four artefact scatters and three 'isolated finds' as well as noting the potential presence of a 'reported' Aboriginal burial ground. Navin Officer (2000) assessed the significance of the sites, with two of the artefact scatters being of 'moderate to high' significance within a local context and the other two artefact scatters of 'low to moderate significance. Navin Officer (2000:56) recommended that three of the artefact scatters and the potential burial ground be conserved and if impacts were to occur to the remaining artefact scatter site then sub-surface investigations should be conducted.

Kuskie (2006) undertook a preliminary assessment for Shoalhaven City Council for the proposed upgrade of Forest Road, between the junction with the Princes Highway and the junction with Callala Beach Road. The total length of the upgrade measured approximately 11 kilometres, although much was confined to the existing unsealed road alignment and verges, with only minor deviations from the existing alignment in several small areas. These deviations and an existing known site were inspected with the Nowra LALC, Jerrinja LALC and Jerrinja Consultants. The recorded site of two artefacts could not be relocated, although the position of site #52-5-0364 was re-established with confidence. No additional heritage evidence was identified.

Four surveys conducted by Cane (1987), Lance (1987), Colley (1988) and Navin (1989) in hinterland immediately to the north and west of Jervis Bay, located three sites only: one shelter with deposit, one artefact scatter and one grinding groove site. While ground visibility was low during all surveys, the low site density was considered to reflect a real distribution pattern and an economic emphasis in the region on coastal and estuarine zones.

Lance and Fuller (1988) surveyed pipeline routes associated with sewerage outfalls in the Jervis Bay hinterland, including a route along Currarong Road. An extensive artefact scatter site (#58-2-261) was located one kilometre east of the St Georges Basin Sewerage Treatment Plant. The site was recorded on the crest of a spur-ridge and in a saddle, bordering the Tomerong Creek floodplain. Artefacts predominantly consisted of flakes and flaked pieces, made from silcrete, quartz and chalcedony raw materials. Lance and Fuller (1988:8) concluded that the small number of sites found in the hinterland resulted from low intensity use of inland resources.

Synthesis:

Occupation dates have been obtained from a number of excavated sites in the region. Lampert (1971a) excavated three rockshelters near Currarong, on the Beecroft Peninsula. Occupation deposits dating to 4,000 years BP (Before Present) were identified (Lampert 1971a). Paton and MacFarlane (1989) excavated Abraham's Bosom rockshelter, near Currarong, and established that occupation of the site also occurred in the Late Holocene period. Lampert (1971b), after excavating a rock shelter on Burrill Lake, established that occupation on the South Coast commenced at least 20,000 years ago. A site excavated at Bass Point yielded a similar date of 17,000 BP (Flood 1980).

Boot (2002) has excavated ten sites in the hinterland ranges. Bulee Brook 2 (#58-1-378), near Sassafras, yielded a date of 18,810±160 BP, which replaces Flood's (1980) 3,770±150 BP date at Sassafras 1 as the oldest evidence for occupation in the coastal ranges. These results indicate that from at least 20,000 years ago Aboriginal people were exploiting the coastal zone and from 18,000 years ago the coastal ranges.

Archaeological investigations in the Lower Shoalhaven region have resulted in the identification of a number of rockshelters (with archaeological deposits and/or art and/or grinding grooves) artefact scatters and shell middens, with proportionally fewer site types such as scarred trees, grinding grooves, ceremonial sites and burials occurring.

The nature of Aboriginal occupation on the South Coast has been a matter of considerable academic debate (refer to Section 3.4).

3.3 Local Aboriginal Culture

The study area lies within the territory of the Wandandian people close to the boundary with the more northerly Wodi Wodi people (Tindale 1974). Tindale (1974) describes the territory of the Wandandian as extending south from the lower Shoalhaven River to the Ulladulla area, and inland to the Shoalhaven River north of Braidwood. The Wandandian people spoke the Dharawal language, which was spoken over an area ranging from the Shoalhaven District, north across the Illawarra, to Port Hacking (Eades 1976).

Boot (2002) has undertaken a wide-ranging study of ethnohistorical observations relating to the South Coast region, based on original archival sources. Boot (2002) lists the following faunal and floral species which have been recorded in the ethnohistorical sources as having been utilised: fish species including bream, trumpeter, whiting, salmon and shark, eel, whales, seals, marine worms, shellfish including oysters and mussels, possum, kangaroo, wombat, birds, goanna, grubs, honey, kangaroo apple, native cranberry, honeysuckle, pigface, macrozamia, cabbage tree, fruit and yams. Observations of use of these food sources were made within ten kilometres of the coast (Boot 2002).

The material culture of the local Aboriginal population would have included a range of items related to subsistence, cultural and social activities and shelter. Ethnohistorical observations along the coast have been made of the following items: huts, gunyahs, canoes, spears, shell-barbed spears, fishing spears, bark/wood shields, waddy/clubs, spear throwers, boomerangs, hatchets, fish-traps, stone heat retainers, kangaroo teeth adornments, pierced nose adornments, bark drawings, possum skin cloaks, shell fish hooks and grass tree resin (Boot 2002). In the archaeological record few of these items survive. Stone, bone and shell are the materials most frequently represented in archaeological sites.

The Shoalhaven region was frequented by non-indigenous people from 1770, following its sighting by Captain Cook. Aboriginal people were sighted by Captain Cook at Murramarang, 15 kilometres south of Burrill Lake, in 1770 (White 1987). During the contact period, Aboriginal people were described as being armed and numerous (Cane 1988:29).

Cane (1988) characterises the period between 1810 and 1840 as one of exploitation and hostility. This occurred in relation to the early cedar-getting and occupation of Aboriginal land. In 1813, Jerrinja people guided a party from the ship Mathilda across the mouth of Lake Wollumboola as they travelled north (Clark 1973). Curleys Bay, adjacent to the investigation area, was named after an Aboriginal shepherd who tended Alexander Berry's sheep (Clark 1973). Other Aboriginal people also worked on Berry's property. Goulding and Schell (2002:16) report that during an overland journey in 1818, Charles Throsby was accompanied by two Aboriginal guides, Bundle and Broughton, brothers who came from the Shoalhaven region. They met five Aboriginal women and three children along the Lower Shoalhaven River, and with a large group consisting of several Aboriginal families, travelled south to Jervis Bay. Sullivan (1982) documents numerous other ethnohistorical observations from the Shoalhaven region and South Coast.

The effects of the arrival of non-indigenous people were adverse for the local Aboriginal inhabitants. The rapid spread of European diseases, which the Aboriginal population had not hitherto been exposed to or developed immunity to, was a major issue. Through disease and disintegration of their traditional social structure, the population rapidly declined. Violence may also have been a factor in population decline (*cf.* Turner & Blyton 1995). In three census returns of the entire Shoalhaven District in 1834, 1838 and 1839, the total Aboriginal population was recorded as 170, 242 and 180 respectively (Berry 1834, 1838, 1839).

By the 1840s the Aboriginal population had been reduced to small remnant groups along the coast or subsisting around the fringes of the now permanent non-Aboriginal settlements. In the latter part of the 1800s there was growing concern in NSW about the plight of the Aboriginal people. The Aborigines Protection Association was formed and in 1881 a Protector of Aboriginals appointed. In 1883 the Government established a Board for the Protection of Aborigines to achieve a "more systematic and enlightened treatment of Aborigines". Rural stations were created so that Aborigines could remain on tribal territory. One such station, 'Roseby Park', was established on 27 acres at Orient Point in 1900. A further 39 acres was added in 1907 (Bayley 1975, Welch 2010). However, the Protection Board became one of the organisations most feared by Aboriginal people, who were systematically oppressed by its actions (*cf.* Miller 1985).

By the 1940s people moved to urban areas to escape the oppression of the Aboriginal Protection Board and to find employment. Thousands of Aboriginal children in NSW were removed from their families between 1909 and 1967 and placed in institutions. Aboriginal people outside of the missions often lived in shanty settlements on the fringes of non-indigenous communities (Egloff 1995, Turner and Blyton 1995).

A vibrant Aboriginal population remains in the region today, and takes an active interest in their heritage. Consultation with the local Aboriginal community has formed an integral part of the assessment (refer to Section 6). As discussed in Section 3.5, consultation with the Aboriginal community is essential to identify certain site types and cultural values.

3.4 Occupation Model

In order for any investigation to contribute effectively to the management of the heritage resource, the following key elements of a research design (*cf*. Boismier 1991) are essential:

1) Identification of the specific environmental and cultural characteristics of the area;

2) Construction of a model of Aboriginal occupation for the locality;

3) Definition of the expected nature and distribution of evidence;

4) Formation of a methodology to test the predictive model and relevant research questions, in consideration of the expected nature and distribution of evidence; and

5) Analytical techniques for the evidence recovered that are appropriate to address the research questions and project objectives.

The environmental context of the investigation area has been outlined in Section 2, and the proposed methodology and analytical techniques are discussed in Section 4. The model of Aboriginal occupation for the locality and expected nature and distribution of evidence are discussed below and in Section 3.5.

Over the past few decades, several broad regional models of occupation have been forwarded to account for the pattern of recorded site distribution on the South Coast. These include for example:

- Bowdler (1970) argued that occupation of the coast during summer was intensive, with some exploitation of the hinterland when coastal resources were less abundant;

- Lampert (1971b) proposed a mixed economic regime on the coast, involving exploitation of littoral, estuarine and land resources, but with a greater emphasis on the littoral component;

- Poiner (1976) produced a model of occupation based on a strict seasonal regime: abundant coastal resources were exploited during summer, and the coastline and hinterland were both exploited during winter when resources were far less abundant;

- Flood (1980) argued that the hinterland was only used when coastal resources were in short supply during the winter season;

- Attenbrow (1976) proposed a model in which the coast and hinterland were occupied all year round and that movement between the two zones occurred at the family or small group level, rather than at the large population level suggested by Poiner (1976). Attenbrow's model incorporates a higher proportion of terrestrial animal foods in the diet during winter. Hinterland river valleys and highland areas would have been occupied during summer. In winter, the population distribution would have been widespread, based on family groups;

- Vallance (1983) argued that a range of subsistence strategies would have existed, that varied both within and between seasons and even from year to year. Boot (1994) suggested that if this were the case, larger archaeological sites could be expected in areas where large quantities of food were available on a single occasion or on a regular basis, and smaller sites would be the result of short term occupation during movement between such locations;

- Byrne (1983, 1984) after surveying hinterland forests and finding relatively high site densities 13-18 kilometres inland, challenged the assumption that occupation was focused primarily on the coastline. Byrne (1983) found there was an absence of sites 3-10 kilometres from the coastline in the Five Forests study;

- Walkington (1987) suggested campsites were focused along the coastline and this section of the hinterland (3-10 kilometres distance) was only exploited on daily return journeys. Distances further than 10 kilometres inland would have required overnight camps in the hinterland (Walkington 1987); and

- Boot (1994, 2002) and Knight (1996) report on the thousands of sites located within the hinterland zone between Moruya and Ulladulla, identified during surveys by Australian National University Honours students and Boot (2002) during doctoral research. These recordings dramatically change the pattern of recorded site distribution and are used to support arguments that the intensity of utilisation of the coastal hinterland is far greater than previously believed and previous researchers may have inadequately accounted for the coastal bias of earlier surveys.

The research of Boot (2002) has demonstrated that the currently available evidence does not lend support to many of the models listed above, with the exception of Vallance (1983). Boot's (2002) research has suggested that Aboriginal occupation tends to be more focused in areas of higher biodiversity and along the boundary or in close proximity to multiple resource zones.

Boot (2002) undertook extensive research into the hinterland of the South Coast. Using a variety of resources, including previous archaeological study results, ethnographic records, theoretical modelling, surface surveys and sub-surface excavations, Boot (2002:319-326) proposed a synthesis of South Coast hinterland occupation. The salient issues identified by Boot (2002) include:

- When Aboriginal people arrived in the area prior to 20,000 years ago, the (then) coastline may have been a marginal area in terms of the types of resources available. The coast may have been over 20 kilometres east of its present location and dominated by low-lying mud flats and a narrow range of estuarine resources (Boot 2002:321). The harsh Pleistocene environment may also have made occupation of inland rockshelter sites for longer periods of time favourable, with a greater range of resources available within the (then) hinterland;

- Between 17,000 and 11,000 years ago the intensity of occupation of the area was largely reduced and is associated with decreased rainfall, temperature and sea levels (Boot 2002:321). Fluctuations within this trend occurred (eg. occasional increases in occupation intensity) although this is attributed to higher rainfall episodes temporarily changing the hinterland forest environment;

- In the early part of the Holocene, the intensity of the (then) hinterland occupation was relatively low, with increased precipitation levels, rising sea levels and increased temperatures (Boot 2002:322). Coastal occupation may have increased with new littoral resources emerging; and

- By the mid-Holocene, with stabilising sea levels, reduced rainfall and warm and stable temperatures, significantly increased and widespread use of both the coastal and hinterland areas occurred. A range of complex environments developed in the hinterland, including open forests and woodlands with high biodiversity (Boot 2002:323). Small group mobility may have become lower, with the increase in resources available and exploitation of the hinterland by these groups for most of the year. However, congregations of much larger groups during warmer months also occurred. Camping sites for small extended family groups tended to be on open ridges and areas adjacent to creeks, rivers and swamps, especially in open woodlands and forests. Duration of local episodes of occupation is expected to have been lees than a week, before people moved on to the next suitable area (Boot 2002:325).

Boot (2002:317-319) offers four new models of South Coast hinterland occupation in terms of temporal trends, subsistence strategies and intensity of site use, along with the types of evidence expected to occur and its locations:

1. Pleistocene occupation:

   Identifiable Pleistocene hinterland sites were expected to be in large rockshelters in close proximity to potable water. The sites would contain a variety of evidence, potentially increasing in occupational evidence towards the terminal Pleistocene. Evidence would include a range of artefacts, including large silcrete and volcanic cores, along with small implements. Hinterland occupation during the Pleistocene was extensive and evidence of Pleistocene near-coastal occupation is expected to be rare.

2. Holocene occupation:

   Occupation during the Holocene differed somewhat, with less preference for particular habitation sites or seasonal exploitation, although types of preferred locations included flat open areas within river valley woodlands and dry open forests, broad ridges in well watered open forest, tall damp forests adjacent to rainforests and well drained elevated ground above wetlands and swamps. Occupation is expected to have occurred within all topographic contexts, although the intensity of occupation is expected to be lower during the early Holocene than in the late-Pleistocene or late Holocene. The increase of hinterland use during the mid-Holocene is underpinned by favourable changes in the environment leading to an increase in the diversity of resources available.

3. Patterns of resource exploitation:

   Subsistence strategies would be reflected by patterns of resource exploitation within a few kilometres of habitation sites and the diversity of evidence at each site would reflect the diversity of resources in the surrounding environment. Small groups of people or family groups travelling in the hinterland are expected to have exploited resources from the immediate surrounds of a site and rarely exported these resources elsewhere. Larger groups of people congregated where abundant short terms resources occurred, and subsequently, greater intensity of occupation occurred where these abundant short term resources occurred more frequently. These locations are likely to be in regions of greater biodiversity and may coincide with sacred landscape elements. The range of stone implement types is expected to be narrow, but diverse in potential uses.

4. Changes in intensity of site occupation:

   The intensity of site occupation is underpinned by the favourability of an environment to provide reliable, exploitable resources. As locations changed in terms of sustainability, locations more amenable to exploitation were substituted. Higher diversity areas of the hinterland meant that the distance between suitable locations may have been relatively low. Cultural memory of abandonment may have been relatively brief and some locations are expected to have been abandoned for extensive periods of time, while others may have experienced relatively brief hiatuses between occupational episodes.

Boot (2002: 326) has suggested that further archaeological work in the South Coast hinterland is needed in order to test these models and more fully understand occupational use of the region. This work could be in the form of more detailed surveys, functional technological analyses of implements from both open artefact scatters and sub-surface deposits, excavation of open sites and rockshelter sites, mapping of stone material distributions and more detailed and localised environmental reconstruction.

Notwithstanding arguments largely underpinned by material culture, environmental factors and resource variation, Boot (2002:334) observes that *"the economy was secondary to the sacred and that, ultimately, the primary purpose of economic life was to sustain the sacred worlds of the Yuin"*. Significantly, Boot (2002:vii) notes that the descendants of the original inhabitants of the region retain strong attachments to the hinterland's unique cultural heritage.

Following the research of Boot (2002, refer below), Clarke and Kuskie (2006) (after Kuskie and Kamminga 2000 and Kuskie 2005a) identified two main resource zones in the Shoalhaven region and presented an occupation model for the region:

- Occupation was predominantly focused on the relatively more abundant and diverse resource rich zones within the tribal territory (eg. the junction of multiple resource zones) particularly along the margins of the coast, estuaries, lakes and rivers. Within the *primary resource zones*, such occupation could include nuclear/extended family base camps, community base camps and occasional larger congregations of groups where resources permitted. Encampments in more favourable locations (eg. abundant resources and water) may have been the subject of stays of longer duration and more frequent episodes of occupation than in other areas (eg. *secondary resource zones*, refer below);

- Not withstanding the point above, widespread, generally low intensity, usage of the entire tribal territory;

- Outside of the primary resource zones sporadic occupation of *secondary resource zones*, focused on the watercourses, particularly within close proximity of higher order watercourses and associated flats and terraces. These zones were utilised for encampments by small parties of hunters/gatherers and nuclear/extended family groups during the course of the seasonal round. There was a strong preference for camping on level ground, adjacent to reliable water sources and more abundant subsistence resources. A greater range and frequency of activities were undertaken at the encampments, rather than in the surrounding landscape. Camp sites near the watercourses were occupied by these small groups of people for varying lengths of time (but of typically short duration), during both the course of the seasonal round and in different years. Occupation of these camp sites was predominantly sporadic, rather than continuous;

- Occupation outside of the primary resource zones and secondary resource zones tended to involve hunting and gathering activities by small parties of men and/or women and children, along with transitory movement between locations and procurement of stone materials. However, the utilisation of these areas (eg. typically simple slopes, ridge crests, spur crests and lower order watercourses) was far less intense than along the higher order watercourses or estuary margins where encampments were situated and potable water and more abundant resources present. These areas outside of the primary and secondary resource zones were probably typically exploited during the course of the normal daily round by inhabitants of encampments located in the primary or secondary resource zones, foraging within an area of up to ten kilometres radius from their campsites;

- Occupation outside of the primary and secondary resource zones also involved special purpose journeys (eg. to procure stone from a known source or to access an area for ceremonial/spiritual purposes) and non-secular activities (eg. ceremonial activities);

- Thus, occupation extended over the entire tribal territory, with varying intensities and involving different activities, and occurring at different times of the year and different periods within the overall time-span of occupation;

- Activities such as food procurement (hunting, gathering and land management practices such as burning-off), food processing, food consumption, maintenance of wooden and stone tools, production of stone tools (including systematic production of types such as backed artefacts, as well as hafting of implements and casual, opportunistic production of other items on an as needed basis), production of wooden tools and other implements, procurement of stone, erection of shelters, children's play, ceremonial activity, spiritual activity, human burials and social and political activity were among the types of pursuits engaged in by the local Aboriginal people across the tribal territory;

- Activities varied in frequency and occurrence within the landscape (and between the different occupation site types), probably in relation to numerous variables such as topography, distance to resource zones, distance to water, aspect, slope and cultural choice. However, few activities will be evident within the archaeological record other than those involving the use of stone, or where preservation conditions permit, other materials such as bone, shell and wood. The majority of evidence within an archaeological context will relate to the reduction of stone, but some evidence will exist of hearths, food processing, food procurement and ceremonial and other activities;

- The stone materials silcrete, volcanics such as rhyolite, and quartz were favoured for stone working activities, with the relatively intensity of use of each material was dependent upon the proximity of local sources;

- Stone was typically procured during the course of normal daily and seasonal movements, without the need for special purpose trips. The conservation of the most commonly used stone materials was not a priority. However, high quality less commonly utilised materials may have been procured from more distant sources by special purpose journeys and/or trade;

- Heat treatment of silcrete was undertaken to improve flaking qualities and possibly to obtain desired colours. Kuskie and Kamminga (2000) speculate that colours had important symbolic meaning in Aboriginal society, and part of the reason for heat treatment may have been to obtain a desired colour as well as to improve the flaking properties of the stone. This may have been especially important for armatures of fighting and hunting spears;

- Production of backed artefacts was time-consuming and resulted in a considerable quantity of stone debitage at localities where it was undertaken. It is speculated that the end purpose (hunting or fighting spears armed with stone barbs) must have been highly desirable and socially valuable (*cf.* Kuskie and Kamminga 2000). Hunting larger animals with spears was also a high-risk subsistence activity (in terms of invested time, energy and the price of failure), whereas most dietary requirements could be adequately met through low-risk means (ie. more reliable in terms of time, energy and return). Global scale analyses have demonstrated that in lower latitudes, with longer plant-growing seasons, plants and small land fauna are prominent in the economy of hunter-gatherer people *(cf.* Binford 1980, Torrence 1983), along with seafood along the coast. The investment of considerable time and energy in the production and hafting of backed artefacts to hunting and fighting spears may well have been undertaken as much in relation to the social value of these items and tasks as strictly utilitarian need (Kuskie and Kamminga 2000);

- Casual and opportunistic reduction of stone or selection of flakes to meet requirements on an 'as needed' basis was a widespread occurrence. Suitable flakes (sometimes after being retouched) were used in domestic tasks such as fashioning or repairing a wooden implement, while a higher proportion of flaked products were simply discarded at the site of their manufacture, without use;

- A low frequency of items was knapped using bipolar technology. This technology is largely, although not entirely, restricted to the reduction of quartz. It is likely that this technology was mainly employed to reduce small pebbles rather than as strategy to prolong the use-life of existing cores;

- Plant foods were processed and consumed at temporary hunter/gatherer encampments, at family base camps, and where larger groups of people congregated, as well as at the sites of procurement. A range of plant resources was available in the region. Women played a much larger role than men in obtaining and processing plant foods; and

- Animal and seafoods were processed and consumed at temporary hunter/gatherer encampments, at family base camps, and where larger groups of people congregated, as well as at the sites of procurement. Men hunted for larger game and fish, while women played a key role in obtaining smaller game, fish and shellfish.

The proposed model of occupation for the broader Shoalhaven region has been derived from archaeological, ethnographic, ethnohistorical and anthropological information. However, as these data are generally scant and subject to biases and other constraints, the proposed model is highly inferential and speculative in nature and subject to reassessment by more detailed future investigations throughout a wide range of environmental/cultural contexts in the South Coast region (Clarke and Kuskie 2006).

The present investigation area is assessed as bordering a primary resource zone, however the general absence of potable water from directly within the investigation area is noted as being a potential constraint to focused Aboriginal occupation. Much of the investigation area is outside of a primary or secondary resource zone and therefore occupation may primarily have involved hunting and gathering by small parties, along with transitory movement.

In general terms, the nature of occupation at each site identified within the investigation area could represent a variety of circumstances (Kuskie and Kamminga 2000), for example:

- Transitory movement;
- Hunting and/or gathering (without camping);
- Camping by small hunting and/or gathering parties;
- Nuclear/extended family base camp;
- Community base camp;
- Larger congregation of groups; or
- Ceremonial activity.

The evidence could represent a single episode or multiple episodes of one or more of the above types of occupations. The episodes of occupations could have occurred at different times over the entire time-span of occupation in the region. Each episode of occupation could also have been for a different duration of time.

Unless the archaeological evidence for individual activity events is readily identifiable, it can be highly problematic to determine the types of occupation, number of episodes, and times and duration represented by evidence at a particular site. Suitable circumstances are rarely present in open sites, due to mixing of evidence by post-depositional processes and the superimpositioning of evidence caused by repeated episodes of occupation.

Listed below is a brief description of the nature of each type of occupation and the material circumstances or evidence that may relate to such occupation types within the present investigation area and surrounding locality (*cf*. Kuskie and Kamminga 2000):

Transitory movement:

- May occur when an individual or group of people are moving between base camps, or from a campsite to resources or a ceremonial or other special purpose site;
- Duration would be less than a day and probably less than a few hours;
- Total numbers of people would generally be relatively low;
- Could occur on most topographical units and classes of slope, but possibly more frequently on ridge and spur crests and along watercourses and valley flats;
- Could occur in any type of rock shelter (ie. any size, topographic location, or distance from water source) where shelter may be sought from inclement weather;
- Proximity to potable water was probably not important;
- Proximity to food resources was probably not important;
- Evidence may represent accidental discard, repair of hunting or gathering equipment, children's play or knapping activity;

- Quantity and density of evidence and range of artefact and stone types are expected to be low, consistent with 'background discard', with few discrete activity areas unless repeated episodes have occurred causing superimpositioning;

Hunting and/or gathering (without camping):

- May occur when an individual, or more likely a small group of closely related people, engage in hunting activities (more likely to be a party of men) or gathering activities (more likely to be women and children);
- Duration would be less than a day, with people returning to a base to sleep;
- Total numbers of people would be relatively small;
- Would be expected to occur where food resources were available, which for different foods may be a seasonal or annual occurrence;
- Could occur in any type of rock shelter (ie. any size, topographic location, or distance from water source) particularly where shelter may be sought from inclement weather;
- Proximity to potable water was probably not important;
- Evidence may represent accidental discard, loss during use, repair of hunting or gathering equipment, children's play or knapping activity;
- Quantity and density of evidence and range of artefact and stone types are expected to be low, consistent with 'background discard', possibly with a few discrete activity areas. Loss or discard of specific tool types may be a useful indicator (particularly items with use-wear/residue that are not in association with evidence of their manufacture or maintenance). Repeated visits to particularly food sources may cause a build up of unrelated evidence over a period of time in a specific location. Small shell middens, representing single meal events, would be expected close to shellfish sources, with potentially a build up of temporally unrelated meal events from repeated visits over time.

Camping by small hunting and/or gathering parties:

- May occur when an individual, or more likely a small group of closely related people, that are engaged in hunting activities (more likely to be a party of men) or gathering activities (more likely to involve women and children) camp overnight near the resource being procured;
- Duration would be one or several days;
- Total numbers of people would be relatively small;
- Would be expected to occur close to where food resources were available, which for different foods may be a seasonal or annual occurrence;
- Would be expected to occur in open contexts and also in rock shelters, particularly relatively larger rock shelters with sufficient habitable floor areas for activities and sleeping. Aspect of the rock shelter towards the rising or setting sun may have been important;
- Proximity to potable water probably was important, although temporary sources may have been sufficient;
- Evidence may represent accidental discard, repair of hunting or gathering equipment, children's play, stone knapping activity, food processing or temporary camp fires;

- Quantity and density of evidence and range of artefact and stone types are expected to be low to moderate, and distinguishable from 'background discard', with at least several activity areas. A reasonably broad range of artefact and stone types may be discarded (although not as diverse as expected at a base camp). Shell middens representing single or multiple meal events would be expected close to shellfish sources. Items likely to be cached for future use at a base camp, or unlikely to be carried around on a hunting or gathering journey (eg. grindstones) are not expected to occur. Time-consuming activities like construction and use of ovens or heat treatment pits are also unlikely to have occurred

Nuclear/extended family base camp:

- May occur when a single nuclear family or extended family camps together;
- Duration uncertain but probably dependent on availability of food resources and potable water in the locality;
- Total numbers of people would be relatively small;
- In open sites, probably situated on level or very gently inclined ground, close to potable water and close to food resources;
- In rock shelters, probably occurred in shelters close to potable water (with greater potential near higher order sources), close to food resources and only in large rock shelters with sufficient habitable floor area for activities and sleeping. Aspect of the rock shelter towards the rising or setting sun may have been important;
- The encampment area in open contexts may consist of a several small huts, dispersed in a spatial patterning depending on the social mix of the people;
- Evidence may represent accidental discard, repair of equipment, children's play, stone knapping activity, food processing, campfires, heat treatment of silcrete and manufacturing of tools;
- Quantity and density of evidence and range of artefact and stone types discarded are expected to be high. Shell middens representing multiple meal events would be expected close to shellfish sources, including middens of larger size. Repeated visits to a camp site or stays of long duration may cause a build-up of evidence over a period of time in a specific location. Items are likely to have been cached for future use at a base camp. Specific artefact indicators include grindstones. Evidence of casual knapping and production of tools is expected to be common. The significant differences with a temporary hunter/gatherer's camp include the possible presence of features such as heat treatment pits and ovens, broader range of artefact and stone types, presence of specific artefact indicators, higher density of evidence (reflecting more activity and longer duration of use) and relatively common evidence for the production of tools.

Community base camp:

- May occur when a number of nuclear families camp together;
- Duration uncertain but probably dependent on availability of food resources;
- Total numbers of people could be relatively large (30+);
- Probably situated on level or very gently inclined ground in open contexts;
- Probably situated close to potable water;
- Probably situated close to food resources (eg. conjunction of wetlands and forest zones);
- The encampment area may exceed 100 m^2 and consist of a number of individual groups and huts, dispersed in a spatial patterning depending on the social mix of the groups;

- Quantity and density of evidence and range of artefact and stone types discarded are expected to be high. Large shell middens representing multiple meal events would be expected close to shellfish sources. Spatially discrete evidence of individual camp sites would be expected (if the resulting evidence has not been affected by disturbance or superimpositioning). Items may not have been cached for future use. Specific artefact indicators include grindstones, relatively more common evidence of food processing and possibly ochre. Evidence of casual knapping and production of tools is expected to be common. However, features such as heat treatment pits may not occur.

Larger congregation of groups:

- May occur in relation to special events (eg. major ceremonies) or when a particularly desirable food was most abundant;
- Probably of short duration (eg. less than two weeks) but potentially for longer duration (eg. up to several months);
- Total numbers of people could vary widely, but possibly exceed 100;
- Probably situated on level or very gently inclined ground in open contexts;
- Probably situated close to potable water;
- Probably situated close to food resources;
- A large area or areas of encampments would be expected, possibly covering hundreds of square metres or more;
- Spatially discrete evidence of individual camp sites would be expected (if the resulting evidence has not been affected by disturbance or superimpositioning);
- Quantity and density of evidence and range of artefact and stone types discarded are expected to be high (similar to community base camp). Substantial shell middens representing multiple, contemporaneous meal events would be expected close to shellfish sources. Items may not have been cached for future use. Specific artefact indicators include grindstones, relatively more common evidence of food processing and possibly ochre, and possibly evidence of processing uncommon foods for which the gathering may be related (eg. whale). Evidence of casual knapping and production of tools is expected to be common. However, features such as heat treatment pits may not occur.

Ceremonial activity:

- May occur when a group of people gathers at a particular location to perform a ceremony;
- Evidence may be present of ceremonial site features such as earthen rings or stone arrangements, or ochre;
- Evidence of large encampments (similar to that expected for the 'larger congregation of groups' listed below) may be present nearby, including in locations with an aspect towards the ceremonial site.

To distinguish whether single or multiple episodes of occupation occurred, several factors can be examined. Multiple episodes of occupation would tend to exhibit superimpositioning of artefact evidence (eg. mix of unrelated stone materials and artefact types and activity areas). However, identifying which items belong to which activity events can be problematical. Also, distinguishing the effects of post-depositional disturbance from cultural superimpositioning is problematical (Koettig 1994). The analysis of distributions of stone material and artefact types is of benefit in some circumstances. In a stratified deposit, multiple episodes of occupation would be indicated by evidence in different stratigraphic layers, particularly discrete activity areas to exclude the possibility that items have moved vertically through the deposit by bioturbation.

Another indicator of multiple occupation is an expectation of a relatively higher density of artefacts within a locality (combined with superimpositioning as discussed above). Larger areas of occupation may also result, when occupations only partially overlap (eg. Camilli 1989).

Identification of different episodes of occupation over time would require *in situ* deposits with stratified or vertically separated evidence of activity events and datable material (eg. charcoal or midden deposits).

Identification of the duration of individual episodes of occupation may prove very difficult. Where a single episode of occupation has occurred, a greater quantity of items, frequency of discrete activity events and size of contemporaneous shell midden deposit may be indicative of a longer stay.

Identification of the types of occupations when multiple episodes have occurred may prove highly problematical. Unless specific artefact indicators for different types of occupation are present, the superimpositioning of evidence from unrelated occupations (eg. transitory movement over a nuclear family base camp) may not be possible to determine.

3.5 Predictive Model of Site Location

A predictive model of site location was constructed to identify areas of high archaeological sensitivity (ie. locations where there is a high probability of archaeological evidence occurring), so it can be used as a basis for the planning and management of Aboriginal heritage. Predictive modelling involves reviewing existing literature to determine basic patterns of site distribution. These patterns are then modified according to the specific environment of the investigation area to form a predictive model of site location. A sampling strategy is employed to test the predictive model and the results of the survey used to confirm, refute or modify aspects of the model.

The use of land systems and environmental factors in predictive modelling is based upon the assumption that they provided distinctive sets of constraints that influenced Aboriginal land use patterns. Following from this is the expectation that land use patterns may differ between each zone, because of differing environmental constraints, and that this may result in the physical manifestation of different spatial distributions and forms of archaeological evidence (Hall and Lomax 1993:26).

The predictive model was based on information from the following sources:

- Identification of land systems and landform units;
- Previous archaeological surveys conducted within the region;

- Distribution of recorded sites and known site density;
- Traditional Aboriginal land use patterns; and
- Known importance of any parts of the investigation area to the local Aboriginal community.

In certain circumstances, such as where low surface visibility or recent sediment deposition precludes effective assessment of the potential archaeological resource, sub-surface testing may be a viable alternative for further testing the predictive model and assessing the investigation area.

The following is a brief description of the site types that may occur within the investigation area.

ARTEFACT SCATTERS: In most archaeological contexts, an artefact scatter has been defined as either the presence of two or more stone artefacts within 50 or 100 metres of each other, or a concentration of artefacts at a higher density than surrounding low density 'background scatter'. The definition of an artefact scatter 'site' is often an arbitrary one, which can offer benefits from a heritage management perspective but is a source of theoretical/analytical debate for heritage practitioners.

Due to the nature of the underlying evidence, its identification only within exposures created by erosion or disturbance, and the limited suitability of existing definitions, artefact scatter sites are defined within this study as the presence of one or more stone artefacts within a *survey area* (*cf*. Kuskie 2000). The boundaries of the site are defined by the boundaries of the visible extent of artefacts within the survey area. The *survey areas* are based on discrete, repeated *environmental contexts* termed *archaeological terrain units* (eg. a particular combination of landform unit and class of slope).

An artefact scatter may consist of surface material only, which has been exposed by erosion, or it more typically involves a sub-surface deposit of varying depth. Other features may be present within artefact scatter sites, including hearths or stone-lined fireplaces, and heat treatment pits.

Artefact scatters may represent the evidence of:

- Camp sites, where everyday activities such as habitation, maintenance of stone or wooden tools, manufacturing of stone or wooden tools, management of raw materials, preparation and consumption of food and storage of tools has occurred;
- Hunting or gathering events;
- Other events spatially separated from a camp site (eg. tool production or maintenance); or
- Transitory movement through the landscape.

The detection of artefact scatters depends upon conditions of surface visibility and ground disturbance and whether recent sediment deposition has occurred (*cf*. Dean-Jones and Mitchell 1993). Vegetation cover and deposition of sediments generally obscures artefact scatter sites and prevents their detection during surface surveys. High levels of ground disturbance can also obscure or remove evidence of a site.

Within the investigation area, there is potential for stone artefacts to occur in a widespread distribution of variable density across virtually all landform units, apart from in areas which have been substantially impacted by recent land-use. A higher density of evidence is expected to occur where more focused and/or repeated Aboriginal occupation has occurred (eg. in close proximity to the Crookhaven River estuary), although the general absence of potable water may have constrained focused occupation to some extent. Much of the present investigation area is outside of primary or secondary resource zones and therefore occupation may have involved hunting and gathering and transitory movement, resulting in a low-density distribution of artefacts typically consistent with background discard. Although recent human and natural post-depositional impacts may have affected to some extent any potential Aboriginal heritage evidence, there may exist deposits of sufficient integrity to be of research value.

BORA/CEREMONIAL SITES: Bora grounds are a type of ceremonial site associated with initiation ceremonies. They are usually made of two circular depressions in the earth, sometimes edged with stone. Bora grounds can occur on soft sediments in river valleys and elsewhere, although occasionally they are located on high, rocky ground where they may be associated with stone arrangements.

The potential for bora/ceremonial sites within the investigation area is assessed as being very low, due to the topography, recent history of land use and previous Aboriginal consultation (Hughes 1983).

BURIALS: Human remains tended to be placed in hollow trees, caves or sand deposits. Usually burials are only identified when eroding out of sand deposits or creek banks, or when disturbed by development. Aboriginal communities are strongly opposed to the disturbance of burial sites. The probability of detecting burials during archaeological fieldwork is extremely low.

The potential for burial sites to occur within the investigation area is considered to be very low, although cannot be discounted, particularly in sandy sediments adjacent to the Crookhaven estuary.

CARVED TREES: Carved trees were still relatively common in NSW in the early 20th century (Etheridge 1918). They were commonly used as markers for ceremonial or symbolic areas, including burials.

Both vegetation removal and the long passage of time since the practice of tree carving was prevalent have rendered this site type extremely rare. Given these factors and the extent of previous land clearing, the potential for carved trees to occur within the investigation area is considered to be very low.

GRINDING GROOVES: Elongated narrow depressions in soft rocks (particularly sedimentary), generally associated with watercourses. The depressions are created by the shaping and sharpening of ground-edge hatchets and grinding of seeds and processing of other plant matter and animal foods.

Grinding grooves are most likely to be located in sedimentary bedrock along watercourses, and their potential to occur within the investigation area is assessed as low, due to the absence of drainages.

LITHIC QUARRIES: A lithic quarry is the location of an exploited stone source (Hiscock and Mitchell 1993:32). Sites will only be located where exposures of a stone type suitable for use in artefact manufacture occurs. Reduction sites, where the early stages of stone artefact manufacture occur, are often associated with quarries.

Within the investigation area, lithic quarries only have potential to exist if outcrops of a suitable stone material are present. Considering the underlying geology of the investigation area, this potential is assessed as very low.

MIDDENS: Shell middens are a common site type in the coastal region. Middens are deposits of shell, the remains of what formed part of the Aboriginal diet. Middens may also include stone, bone or shell artefacts, charcoal, or the remains of small terrestrial or aquatic fauna, which were also a part of the diet. Middens exhibit wide variation in terms of their size, preservation and contents, and can provide significant information on land-use patterns, diet, chronology of occupation and environmental conditions.

Numerous midden sites have been recorded adjacent to the study area along the foreshore of the Crookhaven estuary. The potential for evidence of middens to occur within the study area is high within close proximity of the Crookhaven estuary, and generally low elsewhere.

MYTHOLOGICAL/TRADITIONAL SITES: Mythological sites, or sites of traditional significance to Aboriginal people, may occur in any location. Often natural landscape features are the locations of mythological sites. Other sites of contemporary significance include massacre sites (the location of violent clashes between early settlers and local Aboriginals), traditional camp sites and contact sites.

Consultation with the local Aboriginal community is essential to identify these site types. Considering the results of previous Aboriginal consultation (Hughes 1983), this potential is assessed as low.

ROCK SHELTER WITH ART AND/OR OCCUPATION DEPOSIT: Rock shelters include rock overhangs, shelters or caves, which were used by Aboriginal people. Rock shelter sites may contain artefacts, midden deposits and/or rock art. These sites will only occur where suitable geological formations are present.

Such contexts are unlikely to be present in the investigation area. Therefore the potential for evidence of rock shelters to occur is assessed as negligible.

SCARRED TREES: Scarred trees contain scars caused by the removal of bark for use in manufacturing canoes, containers, shields or shelters.

Mature trees, remnants of stands of the original vegetation, have the potential to contain scars. Considering the long time period elapsed since this practice was prevalent and the extent of previous vegetation removal, the potential for scarred tree sites to occur within the investigation area is assessed as low.

STONE ARRANGEMENTS: Stone arrangements include circles, mounds, lines or other patterns of stone arranged by Aboriginal people. Some were associated with bora grounds or ceremonial sites and others with mythological or sacred sites.

Hill tops and ridge crests which contain stone outcrops or surface stone, and have been subject to minimal impacts from recent land use practices, are potential locations for stone arrangements. Considering the geology, results of previous Aboriginal consultation (Hughes 1983) and recent clearing, the potential for stone arrangements to occur within the investigation area is assessed as very low.

4. METHODOLOGY

During the initial stages of the investigation, research was conducted into the environmental, cultural and archaeological background of the investigation area, and searches were undertaken of the OEH Aboriginal Heritage Information Management System and other relevant heritage registers and planning instruments (refer to Section 3.1).

Notwithstanding that this assessment is being conducted in relation to an application for a Concept Plan under Part 3A of the EP&A Act, for which the relevant OEH guidelines comprise the *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005), which references the *Interim Community Consultation Requirements for Applicants* (DEC 2004) and *Aboriginal Cultural Heritage Standards and Guidelines Kit* (DEC 1997), subsequent to Part 3A approval further approvals may be required under Part 4 of the Act. As such, an application to the OEH for an AHIP may be necessary. Consequently, this investigation has also sought to address the requirements of the DECCW (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and OEH (2011a) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (refer to Section 8.2).

Consultation and involvement of the Aboriginal community was undertaken as per the requirements of the DECCW (2010c) policy entitled *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, notwithstanding that the DEC (2005) *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* and the Director-General's Environmental Assessment Requirements for the Project reference the now outdated *Interim Community Consultation Requirements for Applicants* policy (DEC 2004) (refer to Section 6). The 2010 consultation requirements were introduced on 12 April 2010 and supercede the 2004 policy, but effectively incorporate the same procedures.

Field inspection of the investigation area was undertaken on 9 and 10 August 2011, by Peter Kuskie of South East Archaeology, assisted by Graham Connolly of the Jerrinja Traditional Owners Corporation and Gerald Carberry of the Jerrinja LALC (refer to Section 6).

The investigation occurred in accordance with the methodology dated 18 February 2011 that was provided to the registered Aboriginal parties and not subject to any comments or further modification.

The investigation area was divided into particular combinations of environmental variables that are assumed to relate to Aboriginal usage of the area. These *archaeological terrain units* or *environmental contexts* were defined on the basis of landform element and class of slope (following McDonald *et al* 1984). They are discrete, recurring areas of land for which it is assumed that the Aboriginal land use and resultant heritage evidence in one location may be extrapolated to other similar locations. Therefore *survey areas* were defined as the individual environmental context that is bounded on all sides by different environmental contexts (*cf*. Kuskie 2000).

Detailed recording of the archaeological *survey areas* was made on survey recording forms, including environmental variables and heritage resources identified or potentially present. Each *survey area* was assigned a unique reference code after the West Culburra 'WC' initials (WC1 to WC16) (refer to survey coverage database in Appendix 3).

Within each *survey area*, the areas inspected on foot correspond to the DECCW (2010b) definition of *survey units*. The *survey units* typically comprised general transects through vegetated terrain, or coverage of and separate recording of specific exposure types, such as vehicle tracks. Data for each *survey unit* was recorded separately on the survey area recording forms and representative photographs of survey units and survey areas were taken and are included in Appendix 5 where relevant and informative.

For the purposes of the analysis, *survey unit* data from each *survey area* are combined (refer to Appendix 3), and data from each survey area can be combined with comparable survey areas to analyse coverage and artefact density with respect to environmental variables such as landform element and slope (refer to Table 3). For a thorough discussion of the rationale for use of the individual artefact as the basic unit of analysis, including the problems with open artefact site definitions due to exposure/obscurement issues, and the margins of error, variables and constraints associated with the data collection procedures and analysis, refer to the comprehensive discussion in Kuskie (2000) and Sections 3.5 and 5.3 of this report.

The survey team was equipped with high resolution 1:3,000 scale mapping of the investigation area, with detailed one metre contours, a 100 metre MGA grid and an aerial photograph underlay. Along with the use of hand-held GPS units (generally accurate to within five metres), these features assisted with defining survey areas and survey units and accurately establishing the location of Aboriginal sites and marking the above onto the detailed base mapping (refer to Figures 8 and 9).

Hence, the survey sampled the entire geographic extent of the investigation area, within individual survey areas based on specific combinations of landform element and class of slope. The extent of the sample and nature of survey coverage is discussed in Section 5.1. As the investigation area encompassed the proposed impact areas, the coverage sampled the potential impact areas of the Proposal. Minor areas immediately adjacent to the investigation area were also sampled, due to the nature of the exposures (sewer main and vehicle tracks), which assisted with the assessment.

Aboriginal heritage site recording forms for each identified site were also completed. Spatially separate locations of heritage evidence were recorded as separate site loci named after "West Culburra" for the project, followed by the survey area number and a sequential letter (refer to Section 3.5 for further discussion of site definitions and delineation of site boundaries). For example, the site loci identified within survey area WC4 were named "West Culburra 4/A" and "West Culburra 4/B" (refer to detailed site descriptions in Appendix 4).

Stone artefacts were recorded on a lithic item recording form, including details about provenance, stone material type, artefact type, size class, cortex and other relevant attributes (refer to Table 4).

Each survey area was inspected on foot by the archaeologist and Aboriginal community representatives in accordance with the proposed methodology provided to and agreed to by the registered Aboriginal parties. Within each survey area:

- Inspection was made for stone artefacts, focusing on areas with ground surface visibility; and
- Inspection was made for obtrusive site types such as scarred trees and grinding grooves.

During the survey Aboriginal stakeholders were also asked of their knowledge of any areas of cultural significance within the investigation area, for example:

- Sites or places associated with ceremonies, spiritual/mythological beliefs and traditional knowledge, which date from the pre-contact period and have persisted until the present time;
- Sites or places associated with historical associations, which date from the post-contact period and are remembered by people today (for example, plant and animal resource use areas and known camp sites); and
- Sites or places of contemporary significance (apart from those areas for which Aboriginal objects remain, which are discussed above), for which the significance has been acquired in recent times.

The results of the investigation are presented in Section 5. Photographs of the identified sites are presented in Appendix 4 and additional photographs of survey areas and the general investigation area are presented in Appendix 5.

Figure 8: Location of archaeological survey areas (purple shapes) and GPS recorded transects (yellow lines) within the investigation area (orange border) (noting that dense vegetation cover limited the effectiveness and accuracy of the hand-held GPS units at times).

5. RESULTS AND DISCUSSION

5.1 Survey Coverage

For the purposes of this Aboriginal cultural heritage assessment, the investigation area comprises 'land units' 1-6 as marked on Figure 5, an area measuring 99.8 hectares. However, minor additional areas totalling 5.4 hectares between and immediately adjacent to these units were also sampled during the heritage survey, and this coverage is included within the analysis due to its relevance to the assessment. This total area subject to heritage survey sampling, measuring 105.2 hectares, is referred to as the heritage study area (refer to Figure 9).

The heritage study area has been subdivided into 16 survey areas, all of which were inspected for Aboriginal heritage evidence. The environmental contexts surveyed included the five landform elements and two classes of slope present (Table 3). The locations of the individual survey areas are marked on Figure 9 and descriptions are presented in Appendix 3. A summary of the survey coverage is presented in Table 3 for the combined environmental contexts.

The total survey coverage (ground physically inspected for heritage evidence) equated to approximately 55,890 m^2, or 5.3% of the heritage study area. As this coverage only refers to an area of several metres width directly inspected by each member of the survey team, the actual coverage for obtrusive site types (eg. scarred trees, rock shelters) was significantly greater than this. The total effective survey coverage (*visible* ground surface physically inspected with potential to host heritage evidence) equated to around 4,866 m^2, or 0.46% of the heritage study area.

Conditions of surface visibility were generally very low across the investigation area, due to the dense cover of grass and other vegetation (Appendix 3). Archaeological visibility, the actual visible ground surface with potential for heritage evidence (accounts for factors such as ground disturbance and sediment deposition), was generally similar to surface visibility. Exposures tended to be present along the vehicle tracks and sewer mains, and in minor erosion scours in cleared areas, but much of the investigation area comprised dense regrowth vegetation.

Although the property is widely vegetated by forest and woodland, aerial photographs taken in the 1940s (refer to Figure 6) show that much of the vegetation had been cleared by that time. Hence, many of the trees, albeit relatively large, represent regrowth. Nevertheless, a number of mature native trees exist within the investigation area and where identified, these were inspected for evidence of Aboriginal scarring. Virtually no rock is exposed within the investigation area.

Notwithstanding the very low surface visibility and resulting low proportion of effective survey coverage as a percentage of the entire investigation area, the level and nature of effective survey coverage is considered satisfactory enough to present an effective assessment of the Aboriginal heritage resources identified and potentially present within the investigation area, for the purpose of the Concept Plan application. The coverage was relatively comprehensive for obtrusive site types (for example, scarred trees, grinding grooves and rock shelters) but limited for the less obtrusive stone artefacts.

Nevertheless, in view of the predictive modelling and results obtained from the sample of effective coverage, it is concluded that the survey provides a valid basis for formulating recommendations for the management of the identified and potential Aboriginal heritage resources. Recommendations are presented in Sections 10 and 11 to address this issue further in relation to subsequent detailed design and further applications for development approval.

Table 3: Environmental contexts - survey coverage and artefact summary.

Survey Areas (WC)	**Slope**	**Landform Element**	**Area (m^2)**	**% Comprises of Total Heritage Study Area***	**Total Area Sampled (m^2)**	**% Sampled of Context**	**Effective Survey Coverage Total (m^2)**	**% Effective Survey Coverage of Context**	**Total # Artefacts**	**Artefact Density per m^2 of Effective Survey Coverage**
2, 6, 10, 13	level - very gentle	ridge crest	201,904	19.19%	17,860	8.85%	592	0.29%	0	-
12	gentle	ridge crest	17,953	1.71%	1,200	6.68%	1	0.01%	0	-
8, 15	level - very gentle	spur crest	42,918	4.08%	2,670	6.22%	106	0.25%	0	-
16	gentle	spur crest	26,545	2.52%	1,560	5.88%	217	0.82%	0	-
11	level - very gentle	hillock	16,275	1.55%	1,380	8.48%	2	0.01%	0	-
1, 3, 5, 7, 9, 14	gentle	simple slope	728,116	69.20%	29,720	4.08%	2,898	0.40%	1	0.0003
4	level - very gentle	flat	18,472	1.76%	1,500	8.12%	1,050	5.68%	7	0.0067
			1,052,183 (Total)	100% (Total)	55,890 (Total)	5.31% (Mean)	4,866 (Total)	0.46% (Mean)	8 (Total)	0.0016 (Mean)

* Heritage study area includes the investigation area and an additional 5.4 hectares of immediately adjacent land that was sampled during the survey. All of survey area WC4 (level-very gentle flat) is located outside of the direct investigation area.

Figure 9: Location of archaeological survey areas (purple shapes) and Aboriginal heritage sites (red stars) (previously recorded site data courtesy OEH AHIMS).

5.2 Aboriginal Heritage Evidence

No Aboriginal heritage sites are listed within the investigation area on any heritage registers or planning instruments (refer to Section 3.1 and Figure 9). No Aboriginal heritage sites or cultural sites were identified directly within the investigation area during the present survey (Figure 4).

However, three sites were identified immediately adjacent to the investigation area during the survey, within the slightly broader 'heritage study area'. These sites (West Culburra 3/A, 4/A and 4/B) are all open artefact occurrences. Their locations are marked on Figure 9 and detailed descriptions are presented in Appendix 4. Details of each lithic item recorded during the present survey are presented in Table 4.

In addition, 18 previously recorded sites (17 middens and one artefact scatter, OEH #52-5-57, 52-5-114, 52-5-171 to 52-5-186) are located immediately adjacent to the investigation area, between it and the Crookhaven River (Figure 9; refer to Section 3.1). Full descriptions of these sites are presented in Appendix 2.

The registered Aboriginal stakeholders did not disclose any specific knowledge of any traditional or historical cultural values/places (for example, sites of traditional cultural significance or historically known places or resource use areas) within the investigation area. This is consistent with the results of Hughes (1983) (refer to Section 3.2). However, the possibility cannot be excluded that Aboriginal values or associations may exist that were not divulged to South East Archaeology by the persons consulted.

Table 4: Description of stone artefacts recorded during the heritage survey.

Site Name	Artefact #	Colour	Stone Material	Lithic Item Type	Size (mm)	Cortex Amount (%)	Cortex Type	Comments
WC 3/A	1	grey	acidic volcanic	retouched piece	37x25x9			4 scars, 1 platform; flake distal portion with large retouch / flake removals
WC 4/A	1	brown	acidic volcanic	hammerstone	112x54x25	90%	pebble	extensive edge damage on both ends; no evidence of anvil use
WC 4/A	2	grey	silcrete	microblade core	24x22x22			1 platform, 7 microblade scars; 23 metres from #1
WC 4/A	3	white	quartz	flake	20x13x5			1 metre from #2
WC 4/B	1	brown	porphyritic rhyolite	core	48x40x26	10%	pebble	8+ scars, 4 platforms; several elongated microblade scars
WC 4/B	2	grey	silcrete	flake - medial	20x18x5			distal end snapped
WC 4/B	3	grey	silcrete	retouched utilised piece	34x25x6			edge damage/retouch 25 mm one lateral margin and 20 mm the other
WC 4/B	4	grey	silcrete	lithic fragment	12x7x4			west end of site

5.3 Discussion

The results of the investigation are discussed below, including the potential integrity of the evidence, nature of the evidence and interpretations of the evidence.

Integrity:

The integrity of the identified sites and the remainder of the investigation area can primarily be assessed for surface evidence only through examination of land use impacts. Controlled excavation enables integrity to be assessed through the horizontal and vertical distribution of artefacts and by conjoining items.

As discussed in Section 2, recent non-Aboriginal land-use practices have had minimal impacts on the investigation area (Plates 1 - 16, Appendix 5). Some impacts have been caused by:

- Vegetation removal, which was once widespread across the investigation area (refer to Figure 6) but is now mainly evident south of Culburra Road, adjacent to the Ambulance Station and in the western-most portion of the investigation area;
- Pastoral use, particularly in the cleared areas;
- Construction, maintenance and use of vehicle tracks, of which a number of unsealed and generally lightly-formed tracks traverse the investigation area;
- Transport of oysters obtained from adjacent oyster leases in Curleys Bay;
- Minor recreational use, including trail bikes;
- Minor geotechnical drilling; and
- Essential services, notably sewer mains that traverse the northern portion of the investigation area.

Levels of ground disturbance were recorded during the survey, after McDonald *et al* (1984) (Appendix 3). The survey areas typically exhibited low levels of ground disturbance. By virtue of their identification in exposures created by ground disturbance, the three identified open artefact sites (West Culburra 3/A, 4/A and 4/B) immediately adjacent to the investigation area exhibited moderate levels of disturbance.

Hughes (1983) reported that the Culburra midden sites (OEH #52-5-171 to 52-5-186) immediately adjacent to the investigation area have generally been subject to low post-depositional impacts, apart from some examples of impacts from rabbit warrens, erosion and recreational use, and consequently the identified evidence is typically of a moderate to high integrity.

As identified in Section 2, previous vegetation removal may have resulted in the removal of scarred trees, had they once been present. However, in the vast majority of the investigation area, the potential impacts on any sub-surface deposits of artefacts are generally low. Any sub-surface deposits of artefacts that do exist may exhibit reasonable integrity.

Lithic Items:

A total of eight lithic items were recorded during the survey, within three site loci situated immediately adjacent to the investigation area (Table 4).

The combined artefact assemblage is dominated by items that may represent the fragmented debris of on-site knapping of primary flakes and/or microblades or other on-site fracture, such as accidental breakage, or accidental discard.

One distinct microblade core was identified and a second core exhibited several elongated microblade scars. Microblade cores represent on-site manufacture of microblades and flakes, with the elongated flakes possibly then selected for use as preforms for making bondi points and other microliths. Microliths are found in artefact scatter sites dating to the mid-late Holocene. While their function is not known with certainty, most archaeologists consider that they were used in armatures of hunting and fighting spears (Mulvaney and Kamminga 1999:235-36). Microliths may have served as barbs, or else as lacerators intended to disable an enemy or prey by causing haemorrhage.

One hammerstone was identified at site West Culburra 4/A. It exhibits extensive edge damage at both ends, evidence of its use as a percussive instrument to flake pieces of stone ('cores'). No evidence was present to suggest that it was also used an anvil.

One retouched - utilised piece was identified at site West Culburra 4/B. However, the purpose of this item is uncertain.

The artefacts were made from four different types of stone, silcrete, acidic volcanic, porphyritic rhyolite and quartz.

Four artefacts were made from silcrete. Silcrete is a brittle, intensely indurate rock composed mainly of quartz clasts cemented by a matrix which may be well-crystallized quartz, cryptocrystalline quartz or amorphous (opaline) silica (Langford-Smith 1978:3). The texture of silcrete reflects that of the host rock and clasts may range in size from very fine grains to boulders.

Silcrete is produced by an absolute accumulation of silica, which can be precipitated from solution by evaporation, cooling, the neutralisation of strongly alkaline solutions, reaction with cations, adsorption by solids and the life-processes of organisms (Summerfield 1983:76). In weathered profiles, downward percolation of silica released through bedrock weathering and clay mineral authigenesis, together with water-table fluctuations, are suitable conditions for formation (Summerfield 1983:80). Silcrete is normally grey in colour, but can be whitish, red, brown or yellow. It shatters readily into sharp, angular pieces with a conchoidal fracture and newly broken rocks have a semi-vitreous sheen (Langford-Smith 1978:4).

Silcrete was an attractive material to Aboriginal people because of its flaking properties and availability. Flakes have sharp, reasonably durable edges and implements made from the stone were used for a variety of tasks, including woodworking and spear barbs. Silcrete is relatively common to the Shoalhaven region. Sources of silcrete are present in the gravels of the Shoalhaven River and its tributaries as well as naturally eroding outcrops. Hence, alluvial gravel sources are inferred for the items within the investigation area.

One porphyritic rhyolite artefact was identified, with 10% pebble cortex indicating an alluvial or colluvial gravel source. Rhyolite is solidified acid lava containing free quartz. It is the fine-grained volcanic or extrusive equivalent of granite (rich in quartz and alkali-feldspars). Rhyolite is typically light in colour, relatively light in weight and often has a flinty appearance. Porphyritic rhyolite contains small, widely spaced crystal inclusions.

Another two volcanic artefacts were identified and one quartz item. Minor quartz gravels were observed in portions of the study area, but are not inferred to represent a source of the stone due to their small nature and minimal occurrence.

Spatial Patterning:

The identified open artefact evidence may only represent a fraction of the entire artefact resource that is present within the heritage study area, because the vast majority of evidence is likely to be currently obscured by vegetation and soil.

Comprehensive studies in other locations (for example, Kuskie 2000, 2005a, 2005b) demonstrate that artefacts occur in a widespread distribution across the landscape, with higher artefact densities, representing a greater focus of Aboriginal activity, tending to occur in primary and secondary resource zones (refer to Section 3.4) than in other contexts. Many major surveys in eastern Australia have identified a virtually continual distribution of artefacts across the landscape, but at varying densities (for example, Hall 1991, 1992, Hall and Lomax 1993, Kuskie 2000, Packard 1991, 1992). The results of large area surveys and major excavation projects (for example, Kuskie and Kamminga 2000, Kuskie and Clarke 2004, Kuskie 2005a, 2005b and 2009) lend support to arguments that the landscape should be viewed as an archaeological continuum, in which 'sites' represent points where higher frequencies of activities have occurred (Foley 1981).

However, defining a 'site' is problematical, due to the manner in which the evidence is exposed and the nature of the underlying human behaviour that has created the evidence. Most evidence is exposed within areas of erosion or ground disturbance. Therefore, delineating the extent of an open artefact site is not realistically possible without extensive sub-surface testing. The recorded evidence has typically been affected by post-depositional processes to such an extent that definition of a *cultural site* may not be possible (a discrete, culturally defined unit beyond which cultural material is absent). At such locations where artefacts have been identified, unless the items can be demonstrated to be culturally and temporally associated, the evidence cannot be said to represent a *cultural site*. Instead, the evidence may reflect a number of different occupational events that are spatially superimposed or mixed by post-depositional processes, but are not temporally or culturally related. In addition, the 'site' locations and boundaries would simply reflect the distribution and size of surface exposures. The definition of a 'site' is therefore an arbitrary one, which offers benefits in terms of planning and management, but does not necessarily reflect the underlying human behaviour that created the evidence (*cf*. Dunnell and Dancey 1983).

Many survey assessments have used arbitrary site definitions such as 'two or more artefacts within 50 or 100 metres of each other' or 'concentrations of artefacts at a higher density than *background scatter*'. Neither concept is appropriate in a 'cultural landscape' approach. In recognition of the problems of 'site' definition as discussed above, the definition of an open artefact site 'as the presence of one or more stone artefacts within a *survey area*' is more appropriate (Kuskie 2000). The *survey area* will always equate to a discrete *environmental context* (a particular combination of landform element and class of slope), bounded by different environmental contexts. While the visible site locus boundaries may be defined by the extent of visible evidence, across the entire *survey area* in which a site is identified, there exists a *potential resource* of comparable evidence. This recognition of the potential resource overcomes the problem of the nature of exposure of evidence (ie. 'sites' simply equate to 'surface exposures').

The 'broad-area' approach is based on the assumption that different environmental contexts provided different sets of constraints to Aboriginal occupation, which resulted in different patterns of land use. Following from this is the expectation that land use patterns may differ between environmental contexts and that this may result in the physical manifestation of different spatial distributions and forms of archaeological evidence. It is assumed that if the specific environmental context is repeated elsewhere within the investigation area, that similar evidence would exist in both locations, reflecting the similar underlying behaviour.

Following from these issues, it is apparent that concentrations of artefacts may represent many different and unrelated episodes of occupation. Therefore, by focusing the analysis on individual artefacts, issues of 'intra-site' spatial context become less critical. It is possible to compare the frequency of individual artefact and stone material types (measured against a constant unit of area, such as a square metre of effective survey coverage or a cubic metre of excavated soil sieved) with environmental variables, in order to test and refine a predictive model.

The *heritage study area* has been subdivided into seven *environmental contexts* (Table 3). These are discrete, recurring areas of land for which it is assumed that the Aboriginal land use and resultant heritage evidence in one location (for example, one *survey area*) may be extrapolated to other similar locations (for example, another *survey area* within the same environmental context). *Environmental contexts* are defined on the basis of two environmental variables:

- Firstly, *landform element* (following the definitions of McDonald *et al* 1984) (for example, ridge crest, spur crest, simple slope and flat); and
- Secondly, *class of slope* (following McDonald *et al* 1984) (for example, level to very gently inclined slopes of less than 1°45´; gently inclined slopes greater than 1°45´ and less than 5°45´, etc.).

Environmental contexts consist of all of the *survey areas* with a particular combination of landform element and slope (for example, six separate *survey areas* may be combined to form the 'gentle simple slope' context - refer to Table 3). As each *survey area* is by definition part of a single *environmental context* (although a number of similar 'survey areas' can make up the total), it is possible to compare and analyse other environmental variables on a fine-scale between each survey area and on a broader-scale between each context.

However, in relation to the present investigation area, the inferences that can be made from this comparison are severely limited by the small nature of the sample.

The site loci identified during the present survey occur on two of the five landform units present (simple slope and flat). Flats only comprise 1.8% of the heritage study area, yet account for two of the three sites and seven of the eight artefacts. Hence, there appears to be a trend for the location of evidence on flats, rather than on other landform units.

Significantly, two of the sites (with seven artefacts) and all of the previously recorded 18 sites (OEH #52-5-57, 52-5-114, 52-5-171 to 52-5-186) are located within 100 metres of the shoreline of the Crookhaven River estuary. In fact, all 16 midden sites recorded by Hughes (1983) are reported as being within 30 metres of the shore. The artefact sites West Culburra 4/A and 4/B are situated about 50-80 metres from the shore, and site 3/A is about 150 metres from the shore. Hughes (1983) interpreted the midden evidence as indicating that evidence of exploitation of estuarine resources in this area occurs very close to those resources.

It is apparent from these results (notwithstanding issues relating to sampling and conditions of surface visibility) that there is a focus of evidence, both shell middens and artefacts, within approximately 100 metres of the Crookhaven River estuary. Further investigation (for example, sub-surface testing) may reveal important information about the spatial distribution of evidence in this locality, including in relation to the distance from the estuary. It is not presently known whether evidence is focused within a smaller zone (for example, closer to the estuary, such as within say 30 metres) or an even broader zone (for example, up to 200 metres distant; refer to Figure 10). The midden evidence, representing procurement and consumption of estuarine subsistence resources, may be focused within a narrow zone fringing the estuary (for example, 30 metres, as presently identified), while artefact evidence representing broader activities and occupation, may extend over a wider zone.

Examination of artefact counts and densities between the different landform units, classes of slope and environmental contexts (refer to Table 3) typically removes biases created by different conditions of archaeological visibility or different levels of survey coverage. However, for the investigation area, the small sample of artefacts and effective survey coverage limit any conclusions. The artefact densities are very low across the heritage study area (mean of just 0.0016 artefacts per square metre of effective survey coverage).

Site Interpretation:

The inferences that can be made about the nature of occupation at the identified sites or elsewhere in the investigation area are limited by the small nature of the sample.

The evidence identified at all three open artefact sites is consistent with background discard, manuport and artefact material which is insufficient either in number or in association with other material to suggest focused activity in a particular location (Rich 1993, Kuskie and Kamminga 2000). No evidence of activity areas is present, although the presence of a discarded hammerstone, cores and debitage, is indicative of artefact manufacturing having occurred on-site. However, the limited nature of the sample is noted, and with a high potential for sub-surface deposits at sites 4/A and 4/B, there is potential for activity areas and evidence of focused occupation to be present.

Sites of traditional cultural significance (such as mythological sites) were not identified by the Aboriginal representatives involved in the investigation, consistent with the results of Hughes (1983). The registered Aboriginal parties also did not disclose any specific knowledge of other cultural values/places (for example, historically known places or resource use areas), but have contemporary associations with the locality of the investigation area.

In terms of the occupation model of Clarke and Kuskie (2006; refer to Section 3.4), much of the investigation area is outside of primary or secondary resource zones, and significantly, potable water sources are absent. Therefore, it is inferred that Aboriginal occupation of much of the investigation area would have generally been of a low intensity, and probably related to transitory movement through the landscape and hunting/gathering by small groups of people during the course of the normal daily round.

It is noted that in the mid-late Holocene period, the prominent ridgeline that comprises part of the study area (survey areas WC 2, 6, 10, 11, 12 and 13), would have represented the only key avenue for land-based movement between the hinterland and Culburra Beach, Orient Point and Crookhaven Heads (refer to Figures 1 and 10). As such, this ridgeline (and possibly adjacent slopes) are highly likely to have been frequently used for movement between this coastal location and the hinterland.

It is also noted that areas adjacent to multiple resource zones, with potentially more potable water, are located outside of the study area (for example, on the northern margin of Lake Wollumboola, around where the Shoalhaven Antiquities Committee {Antill 1982} and Dibden {2009, 2010} have identified extensive evidence, and near Downs Creek, Wollong Creek and Coonemia Creek on the western margin of Lake Wollumboola). Much of the investigation area was probably typically exploited during the course of the normal daily round by inhabitants of encampments located in these primary or secondary resource zones, that foraged within an area of up to ten kilometres radius from their campsites.

Part of the present investigation area borders a primary resource zone, the Crookhaven River estuary. The numerous midden sites reported by Hughes (1983) provide evidence of the procurement of shellfish resources from this environment and their consumption immediately adjacent to the source. However, the general absence of potable water is inferred to have been a potential constraint to more focused Aboriginal occupation (such as encampments, particularly those involving larger groups of people and/or longer durations).

Nevertheless, the small sample sizes, in terms of effective survey coverage and numbers of artefacts, are noted. Further detailed investigation (for example, involving excavation) may result in the identification of evidence that leads to a revision of these conclusions.

Regional Context:

The nature of the evidence from the heritage study area and adjacent land can be compared with other studies and sites in the region (refer to Section 3.2). The primary purpose is to identify similarities and differences with other reported evidence, in order to provide a framework for interpreting representativeness and assessing potential cumulative impacts.

Several similarities have been identified with other survey results in the locality (for example, Dibden 2009; refer to Section 3.2) including the:

- Identification of stone artefact evidence;
- Similar stone materials and artefact types; and
- Presence of evidence in similar environmental contexts.

However, as noted by Hughes (1983), the Culburra midden sites (OEH #52-5-171 to 52-5-186) adjacent to the investigation area are of representative value within both local and regional contexts. Although examples of individual middens are relatively common, similar suites of intact evidence from Holocene estuarine contexts are not widely reported in the region. Much similar evidence is assumed to have been impacted since non-indigenous settlement.

Therefore, although no specific aspects of the evidence within the heritage study area are unique or not replicated elsewhere within a regional context, the adjacent midden sites bordering the Crookhaven River estuary are of regional representative value (refer to Section 7.2).

Reassessment of Predictive Model of Site Location:

In view of the survey results, the predictive model of site location for the investigation area (refer to Section 3.5) can be reassessed.

On the basis of the survey results, the potential for bora/ceremonial, grinding groove, lithic quarry, rock shelter and stone arrangement sites to occur within the investigation area can be reassessed as negligible.

No evidence was encountered of scarred or carved trees, and although the potential for these site types to occur within the investigation area can be reassessed as very low, it cannot totally be discounted where mature native trees remain.

No evidence was encountered of burial sites, and although the potential for skeletal remains to occur within the investigation area is considered to be very low, it cannot be discounted, particularly in sandy sediments adjacent to the Crookhaven estuary.

Sites of traditional cultural significance (such as mythological sites) were not identified by the Aboriginal representatives involved in the investigation. The registered Aboriginal parties also did not disclose any specific knowledge of historical cultural values/places (for example, historically known places or resource use areas). However, the possibility cannot be excluded that traditional or historical Aboriginal values or associations may exist that were not divulged to South East Archaeology by the persons consulted. Nevertheless, these results are consistent with the consultation documented by Hughes (1983) and the potential for these site types is therefore reassessed as very low to negligible. Representatives of the Aboriginal parties expressed a contemporary interest in the identified heritage evidence.

Stone artefact evidence has been identified within the heritage study area, adjacent to the investigation area, confirming predictions of the site location model. The potential for further stone artefact evidence to occur is reassessed as follows:

- Within a zone potentially extending up to 200 metres from the shore of the Crookhaven River (refer to Figure 10), there is a high potential for sub-surface deposits of artefacts to occur, including deposits that may be of research value. This includes the location of sites West Culburra 4/A and 4/B and elsewhere on the flat (survey area WC4) immediately adjacent to the investigation area, but also survey area WC15 and minor portions of survey areas WC 3, 9 and 14 within the present investigation area; and

- In the remainder of the investigation area, the potential for artefact deposits of research value or significance is generally low, but a low-density distribution of artefacts consistent with 'background discard' is likely to be present. Repeated use of the ridgeline for transitory movement may have caused an accumulation of evidence through superimpositioning, but this is unlikely to represent focused occupation.

Substantial shell midden evidence has previously been identified adjacent to the investigation area, within a 30 metre wide zone along the foreshore of the Crookhaven River estuary. Additional midden evidence may occur within this zone, adjacent to the investigation area, that was obscured by vegetation at the time of Hughes' (1983) study. However, the potential for midden evidence directly within the investigation area is revised downward to moderate to low for small isolated middens within say 200 metres of the estuary, and low elsewhere.

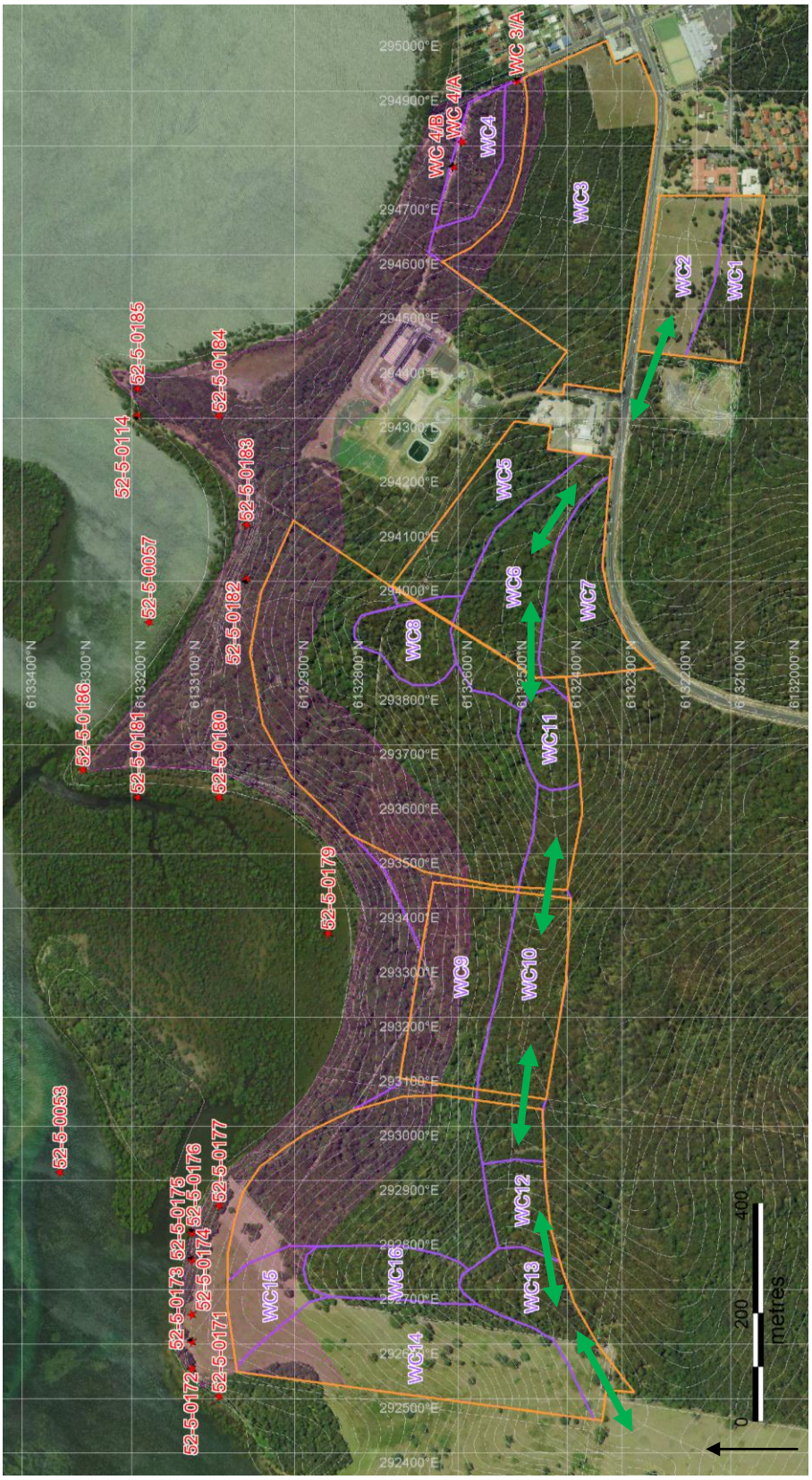

Figure 10: Location of 200 metre wide zone of high potential (pink shading), ridgeline and potential corridor for movement (green arrows), archaeological survey areas (purple shapes) and Aboriginal heritage sites (red stars) (previously recorded site data courtesy OEH AHIMS; investigation area marked by orange borders).

6. ABORIGINAL CONSULTATION

The investigation area lies within the boundaries of the Jerrinja Local Aboriginal Land Council (LALC) and within an area of interest to other Aboriginal persons and organisations.

The Aboriginal heritage impact assessment has involved a comprehensive program of consultation with the Aboriginal community that complies with the policy requirements of the OEH (refer to consultation database and relevant correspondence in Appendix 6). These requirements are specified in the policy entitled *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010c).

Notwithstanding that the DEC (2005) *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* and the Director-General's Environmental Assessment Requirements for the Project reference the now outdated DEC (2004) *Interim Community Consultation Requirements for Applicants* policy, the assessment has proceeded in accordance with the 2010 guidelines. These were introduced on 12 April 2010 and supercede the 2004 policy, but effectively incorporate the same procedures.

The consultation requirements specified in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010c) involve the following procedures (numbering follows the DECCW guidelines):

4.1.2) In order to identify Aboriginal people who may have an interest in the investigation area and hold knowledge relevant to determining the cultural significance of Aboriginal objects or places, providing written notification of the project to the relevant DECCW Environment, Protection and Regulation Group (EPRG) regional office, LALC, Local Council and Catchment Management Authority (CMA), along with the Registrar of Aboriginal Owners under the *Aboriginal Land Rights Act 1983* (Department of Aboriginal Affairs), National Native Title Tribunal and Native Title Services Corporation Ltd (NTSCORP)[3] including the name and contact details of the proponent, the location and a brief overview of the proposed project, and a request for advice on the contact details of such Aboriginal people, with a minimum 14 day response period[4];

4.1.3) Providing written notification of the project directly to those Aboriginal persons/organisations that were identified in Procedure 4.1.2, along with the LALC, and placing an advertisement in a local newspaper circulated in the general location of the investigation area, explaining the project and its location. The notification includes the name and contact details of the proponent, the location and a brief overview of the proposal, a statement about the purpose of the consultation, an invitation for Aboriginal people with cultural knowledge relevant to the investigation area to register an interest and advice on privacy matters[5], with a minimum 14 day response period[6];

4.1.6) Providing a record of the names of each Aboriginal person who registered an interest along with a copy of that registration and the notification letter in Procedure 4.1.3 to the relevant DECCW EPRG regional office and LALC within 28 days of the closing date for registrations of interest;

[3] Procedures 4.1.2 - 4.1.7 are not required where an approved native title determination exists over the entire investigation area. In this event, consultation is only required with the native title holders.

[4] Procedure #1 of the 2004 policy was implemented *in lieu* of Procedure #4.1.2 of the 2010 policy, due to the commencement of the investigation prior to the introduction of the 2010 policy.

[5] Procedure 4.1.5.

[6] Procedure 4.1.4.

4.2 & 4.3) Providing detailed information about the project, heritage impact assessment process and proposed heritage assessment methodology to all registered Aboriginal parties identified in Procedure 4.1, with a minimum 28 day response period for comments;

4.2 & 4.3) Considering any input received from the registered parties in finalising the heritage assessment methodology and process, and implementing the methodology in consultation with the registered Aboriginal parties. This included seeking input on knowledge of Aboriginal objects and places of cultural value to Aboriginal people within the investigation area and views on potential management strategies, and incorporated a field inspection of the investigation area;

4.3 & 4.4) Preparation of a draft Aboriginal heritage impact assessment report and seeking the views of registered Aboriginal parties on cultural values and potential management strategies through provision of a copy of the draft report to the registered parties, with a minimum 28 day response period for comments; and

4.3 & 4.4) Preparation of a final Aboriginal heritage impact assessment report that incorporates the input of the registered Aboriginal parties and the proponent's response to each submission made on the draft report, and making the final report available to the registered Aboriginal parties and the relevant LALC.

Compliance with Procedure #4.1.2 of the DECCW (2010c) policy was achieved through correspondence forwarded to the relevant organisations on 8 December 2010, with the following responses received:

- The Registrar of Aboriginal Owners responded on 15 December 2010 advising that there are no Registered Aboriginal Owners for this area but that the Jerrinja LALC may be able to assist further;
- Shoalhaven City Council responded on 16 December 2010 advising that the Jerrinja LALC should be contacted;
- DECCW (now the OEH) responded on 16 December 2010 and advised that the Jerrinja LALC, Jerrinja Consultants Pty Ltd, South East Coast Gadu Elders Aboriginal Corporation, Merrimans LALC, Ulladulla LALC, South Coast Aboriginal and Elders and Friends Group Organisation, Mr Lionel Mongta and Mr Shane Carriage/Walbunja Aboriginal Corporation should be contacted;
- NSW Native Title Services responded on 21 December 2010 advising that the NTS Corp will directly contact Aboriginal groups and individuals with an invitation to register an interest directly with South East Archaeology.

The Native Title Tribunal was contacted and the registers searched on 27 January 2011. No Determinations of Native Title or registered Native Title Determination applications (Claimants) or Indigenous Land Use Agreements apply to the investigation area.

As a result of the OEH, Shoalhaven City Council and Registrar of Aboriginal Owners advice, Procedure #4.1.3 of the DECCW (2010c) consultation policy was then implemented by writing to the organisations named above, with an invitation to register an interest. An advertisement was also placed in the Public Notices section of The Shoalhaven and Nowra News on 16 December 2010 (refer to Appendix 6).

At the conclusion of these procedures, two organisations (Jerrinja LALC and Jerrinja Traditional Owners Corporation) had registered an interest in the assessment, as listed in Table 5.

Table 5: Summary of registered Aboriginal parties involvement.

Registered Party	Date Registered	Sent Project Information, Methods and Selection Criteria	Responded to Methods and Selection Criteria	Participated in Field Survey
Jerrinja Traditional Owners Corporation	20/12/10	18/2/11	14/3/11	9-10/8/11
Jerrinja LALC	24/1/11	18/2/11	13/5/11	9-10/8/11

Compliance with procedure #4.1.6 of the DECCW (2010c) consultation policy was achieved on 18 February 2011 by providing copies of the required information to the OEH and Jerrinja LALC.

As per procedures 4.2 and 4.3 of the DECCW (2010c) consultation policy, both registered parties were consulted about the proposed methodology for the investigation (refer to Appendix 6). Jerrinja Traditional Owners Corporation responded to the proponent's selection criteria for those registered parties wishing to be considered for paid participation in the investigation within the required response time. No comment was made on the proposed methodology. Further consultation was undertaken with the Jerrinja LALC and a response to the selection criteria was received 50 days after the due date. Responses from both registered parties provided details of their respective experience in heritage assessments and traditional and historical connections with the locality (refer to Appendix 6).

The proponent engaged representatives from both registered parties that responded to the selection criteria to assist with the field investigation. The field survey of the investigation area was undertaken on 9 and 10 August 2011, by Peter Kuskie of South East Archaeology, assisted by Graham Connolly of the Jerrinja Traditional Owners Corporation and Gerald Carberry of the Jerrinja LALC. The representatives expressed satisfaction with the level of survey coverage and the consultation process, as well as an interest in the findings.

Compliance with procedures 4.3 and 4.4 of the DECCW (2010c) consultation policy was achieved by providing copies of the draft heritage assessment report to the two registered Aboriginal parties, with a request for their comment, followed by preparation of this final report incorporating and addressing any input received. The report was provided to the registered parties on 13 March 2012. No comments were provided by either party on the draft report.

Copies of the final report will be made available to the registered Aboriginal parties.

7. SIGNIFICANCE ASSESSMENT

7.1 Criteria

The information contained within this report, along with an assessment of the significance of the Aboriginal heritage evidence, provides the basis for the OEH to make informed decisions regarding the management and degree of protection which should be afforded to specific Aboriginal heritage sites.

The significance of Aboriginal heritage evidence can be assessed along the following criteria, widely used in Aboriginal heritage management, derived from the relevant aspects of the ICOMOS Burra Charter:

I. Scientific (Archaeological) value;

II. Importance to Aboriginal people (Cultural value);

III. Educational value;

IV. Historic value; and

V. Aesthetic value.

Greater emphasis is generally placed on scientific and cultural criteria when assessing the significance of Aboriginal heritage evidence in Australia.

Scientific (Archaeological) Value:

Scientific value refers to the potential usefulness of heritage evidence to address further research questions, the representativeness of the evidence, the nature of the evidence and its state of preservation.

Research Potential:

Research potential refers to the potential for information derived from further investigation of the evidence to be used for answering current or future research questions. Research questions may relate to any number of issues concerning past human culture, human behaviour generally or the environment. Numerous locations of heritage evidence have research potential. The critical issue is the threshold level, at which the identification of research potential translates to significance/importance at a local, regional or national level.

Several key questions can be posed for each location of heritage evidence:

- Can the evidence contribute knowledge not available from any other resource?
- Can the evidence contribute knowledge, which no other such location of evidence can?
- Is this knowledge relevant to general questions about human history, past environment or other subjects?

Assessing research potential therefore relies on comparison with other evidence in local and regional contexts. The criteria used for assessing research potential include the:

a) Potential to address locally specific research questions;

b) Potential to address regional research questions;

c) Potential to address general methodological or theoretical questions;

d) Potential deposits; and

e) Potential to address future research questions.

In terms of meeting a threshold level to have significant research potential, the particular questions asked of the evidence should be able to contribute knowledge that is not available from other resources or evidence (either on a local or regional scale) and are relevant to general questions about human history, past environment or other subjects.

Representativeness:

Representativeness is generally assessed at local, regional and national levels. It is an important criterion, because the primary goal of cultural resource management is to afford greatest protection to a representative sample of Aboriginal heritage evidence throughout a region. The more unique or rare evidence is, the greater its value as being representative within a regional context.

The main criteria used for assessing representativeness include:

a) The extent to which the evidence occurs elsewhere in the region;

b) The extent to which this type of evidence is subject to existing or potential future impacts in the region;

c) The integrity of the evidence compared to that at other localities in the region;

d) Whether the evidence represents a prime example of its type within the region; and

e) Whether the evidence has greater potential for educational or demonstrative purposes than at other similar localities in the region.

Nature of Evidence:

The nature of the heritage evidence is related to representativeness and research potential. The less common the type of evidence is, the more likely it will have representative value. The nature of the evidence is directly related to its potential to be used in addressing present or future research questions. Criteria used in assessing the nature of the evidence include the:

a) Presence, range and frequency of stone materials;

b) Presence, range and frequency of artefact types; and

c) Presence and types of other features.

A broader range of stone and artefact types generally equates to the potential for information to address a broader range of research questions. The presence of non-microlith and microlith tool types also equates to higher potential to address relevant research questions. The presence and frequency of particular stone or artefact types or other features also has relevance to the issue of representativeness (for example, a rare type may be present).

Integrity:

The state of preservation of the evidence (integrity) is also related to representativeness and research potential. The higher the integrity of evidence, the greater the level of scientific information likely to be obtained from its further study. This translates to greater importance for the evidence within a local or regional context, as it may be a suitable example for preservation within a sample representative of the entire cultural resources of a region.

The criteria used in assessing integrity include:

a) Horizontal and vertical spatial distribution of artefacts;

b) Preservation of intact features such as midden deposits, hearths or knapping floors;

c) Preservation of site contents such as charcoal and shell which may enable accurate direct dating or other analysis; and

d) Preservation of artefacts which may enable use-wear/residue analysis.

Generally, many of these criteria can only be applied to evidence obtained by controlled excavation. High levels of ground disturbance limit the possibility that the evidence would surpass the threshold of significance on the basis of integrity (ie. the area would be unlikely to possess intact spatial distributions, intact features, *in situ* charcoal or shell, etc).

Aboriginal (Cultural) Significance:

Aboriginal (cultural) significance refers to the value placed upon Aboriginal heritage evidence by the local Aboriginal community.

All heritage evidence tends to have some contemporary significance to Aboriginal people, because it represents an important tangible link to their past and to the landscape. Heritage evidence may be part of contemporary Aboriginal culture or be significant because of its connection to spiritual beliefs or as a part of recent Aboriginal history.

Consultation with the local Aboriginal community is essential to identify the level of Aboriginal significance.

Educational Value:

Educational value refers to the potential of heritage evidence to be used as an educational resource for groups within the community.

Historic Value:

Historic value refers to the importance of heritage evidence in relation to the location of an historic event, phase, figure or activity.

Aesthetic Value:

Aesthetic value includes all aspects of sensory perception. This criterion is mainly applied to art sites or mythological sites.

7.2 Significance of Heritage Evidence Within the Study Area

No Aboriginal heritage sites were identified directly within the investigation area during the course of the assessment. However, three sites were identified immediately adjacent to the investigation area during the survey, and their significance is assessed below in relation to the criteria presented in Section 7.1. The 18 previously recorded sites immediately adjacent to the investigation area are also discussed below.

The sites West Culburra 3/A, 4/A and 4/B do not surpass the threshold for significance in relation to aesthetic, educational or historic criteria. Partially this is a result of the relatively unobtrusive nature of the evidence itself and partially due to the levels of existing impacts to the natural context of the sites.

All Aboriginal heritage evidence tends to have some contemporary significance to Aboriginal people, because it represents an important tangible link to their past and to the landscape. Preliminary consultation with members of the local Aboriginal community was undertaken to identify the level of Aboriginal significance. Representatives of the Jerrinja LALC and Jerrinja Traditional Owners Corporation expressed a strong interest in the identified heritage evidence and its significance to the Aboriginal community.

In acknowledgment that the Aboriginal community themselves are in the best position to identify levels of cultural significance, the remainder of this assessment focuses on the potential scientific values of the heritage evidence. The statement of scientific significance is in no way intended to prioritise scientific values over cultural values or to lessen the importance of the views of the Aboriginal community.

West Culburra 3/A:

Site West Culburra 3/A is assessed as being of low scientific significance within a local context and low scientific significance within a regional context on the basis that:

- The site is of low representative value within a regional context. Similar evidence exists elsewhere throughout the region and the identified artefact does not represent a rare or unusual type;
- The site exhibits a very limited range of artefact and stone material types (single item);
- The site has been affected by various post-depositional impacts and is consequently of low integrity; and
- There is a low potential for sub-surface deposits that may be of high research value.

West Culburra 4/A and 4/B:

Sites West Culburra 4/A and 4/B are assessed as being of low to potentially moderate scientific significance within a local context and low scientific significance within a regional context on the basis that:

- The sites are of relatively low representative value within a regional context. Similar evidence exists elsewhere, but several of the identified artefacts represent less common types;
- The sites exhibit a low range of artefact and stone material types, due to the low artefact numbers;

- The sites have been affected by post-depositional impacts, and consequently the identified evidence is of low integrity; and
- There is a high potential for sub-surface deposits of artefacts to occur, including deposits that may be *in situ* and of research value. If substantial sub-surface deposits are identified at either site, the significance may be upgraded on the basis of research value.

Hughes (1983) reported that the Culburra midden sites (OEH #52-5-171 to 52-5-186) are of 'considerable heritage and scientific value and of considerable importance' to the Jerrinja people. Hughes (1983) noted the representative value of the sites, with few similar suites having been recorded, and many similar sites having been impacted since non-indigenous settlement. A review of the site descriptions supports the conclusions of Hughes (1983). These midden sites:

- Are of representative value within both local and regional contexts. Although examples of individual middens are relatively common, similar suites of intact evidence from Holocene estuarine contexts are not widely reported in the region;
- The sites exhibit a range of contents, including mounded deposits of varying extents, artefacts, shell and bone;
- The sites have generally been subject to low post-depositional impacts, apart from some examples of impacts from rabbit warrens, erosion and recreational use, and consequently the identified evidence is typically of a moderate to high integrity; and
- There is a high potential for sub-surface deposits of midden and artefacts to occur, including deposits that are anticipated to be *in situ* and of high research value.

8. STATUTORY OBLIGATIONS

Commonwealth, State and local legislation relevant to the protection and management of Aboriginal heritage is outlined in the sections below. The investigation area does not contain any heritage items listed for indigenous values under the *Environment Protection and Biodiversity Conservation Act 1999*, *Australian Heritage Council Act 2003*, *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* or NSW *Heritage Act 1977*, but it may contain Aboriginal objects protected under the NSW *National Parks and Wildlife Act 1974*.

8.1 Commonwealth

While the primary legislation offering protection to Aboriginal heritage in NSW is enacted by the State (refer to Section 8.2), several Acts administered by the Commonwealth may also be relevant.

Environment Protection and Biodiversity Conservation Act 1999:

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary Commonwealth legislation for the protection and management of matters of national environmental significance, which includes heritage places. The primary features of the EPBC Act relating to heritage include:

- A National Heritage List of natural, indigenous and historic places of national heritage significance;
- A Commonwealth Heritage List of heritage places owned or managed by the Commonwealth; and
- Consideration of heritage in the planning and development approvals process.

Commonwealth Heritage places are protected in that:

- Actions taken on Commonwealth land which are likely to have a significant impact on the environment will require the approval of the Minister;
- Actions taken outside Commonwealth land which are likely to have a significant impact on the environment on Commonwealth land, will require the approval of the Minister; and
- Actions taken by the Commonwealth Government or its agencies that are likely to have a significant impact on the environment anywhere will require approval by the Minister.

Australian Government agencies that own or lease heritage places are required to assist the Minister and the Australian Heritage Council to identify and assess the heritage values of these places. They are required to:

- Develop heritage strategies;
- Produce a register of the heritage places under their control;
- Develop a management plan to manage these places consistent with the Commonwealth Heritage Management Principles prescribed in regulations to the Act;

- Ensure the ongoing protection of the Commonwealth heritage values of the place when selling or leasing a Commonwealth heritage place; and
- Ask the Minister for advice about taking an action, if the action has, will have, or is likely to have, a significant impact on a Commonwealth heritage place.

The environmental assessment process of the EPBC Act protects matters of national environmental significance (including national heritage places), along with the environment where actions proposed are on, or will affect, Commonwealth land and/or where Commonwealth agencies are proposing to take an action. When a proposal is identified as having the potential to have a significant impact on a matter of national environmental significance, the proponent must refer the project to the Department of Sustainability, Environment, Water, Population and Communities. The matter is made public and referred to the relevant state, territory and Commonwealth ministers for comment. The Minister then decides whether the likely environmental impacts of the project are such that it should be assessed under the EPBC Act. State governments may, under agreement with the Commonwealth, assess actions that may have an impact on matters of national environmental significance. Following assessment, the Minister or their delegate may approve the action (with or without conditions) or not approve the action.

Australian Heritage Council Act 2003:

The *Australian Heritage Council Act 2003* established the Australian Heritage Council, an independent expert body to advise the Minister on the listing and protection of heritage places and other matters relating to heritage. This Act also enables the continued management of the Register of the National Estate, a list of more than 13,000 heritage places around Australia that has been compiled by the former Australian Heritage Commission since 1976. Places on the Register are protected under the EPBC Act by the same provisions that protect Commonwealth Heritage places.

Aboriginal and Torres Strait Islander Heritage Protection Act 1984:

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* provides for the protection of areas and objects which are of significance to Aboriginal people in accordance with Aboriginal tradition. The Act allows Aboriginal people to apply to the Minister to seek protection for significant Aboriginal areas and objects. The Minister has broad powers to make such a declaration should the Minister be satisfied that the area or object is a significant Aboriginal area or object and is under immediate threat of injury or desecration. An 'emergency declaration' can remain in force for up to 30 days.

8.2 State

National Parks and Wildlife Act 1974:

The *National Parks and Wildlife Act 1974* (NP&W Act) provides the primary basis for the legal protection and management of Aboriginal heritage in NSW. With respect to development proposals and planning approvals, the *Environmental Planning and Assessment Act 1979* (EP&A Act) is the primary legislation.

Implementation of the Aboriginal heritage provisions of the NP&W Act is the responsibility of the Office of Environment and Heritage (OEH). The rationale behind the NP&W Act is to prevent the unnecessary or unwarranted destruction of Aboriginal objects and to protect and conserve objects where such action is considered warranted (DECCW 2009a, 2009b).

Section 2A of the Act, defines its objects to include 'the conservation of nature, including …

(b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:

(i) places, objects and features of significance to Aboriginal people, and
(ii) places of social value to the people of New South Wales.

Section 2A also identifies that the objects of the Act are to be achieved by applying the principles of ecologically sustainable development, defined in Section 6 of the *Protection of the Environment Administration Act 1991* as requiring the integration of *economic* and *environmental* considerations (including cultural heritage) in the decision-making process.

In regard to Aboriginal cultural heritage, ecologically sustainable development can be achieved by applying the principle of intergenerational equity and the precautionary principle (DECCW 2009b).

Intergenerational equity is the principle whereby the present generation should ensure the health, diversity and productivity of the environment for the benefit of future generations. In terms of Aboriginal heritage, intergenerational equity can be considered in terms of the cumulative impacts to Aboriginal objects and places in a region. If few Aboriginal objects and places remain in a region, fewer opportunities remain for future generations of Aboriginal people to enjoy the cultural benefits of those Aboriginal objects and places. Information about the integrity, rarity or representativeness of the Aboriginal objects and places proposed to be impacted, and how they illustrate the occupation and use of land by Aboriginal people across the region, are therefore relevant to the consideration of intergenerational equity and the understanding of the cumulative impacts of a proposal (DECCW 2009b:26).

The precautionary principle states that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation. In applying the precautionary principle, decisions should be guided by (DECCW 2009b:26):

- A careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- An assessment of the risk-weighted consequences of various options.

The precautionary principle is relevant to the OEH's consideration of potential impacts to Aboriginal cultural heritage where:

- The proposal involves a risk of serious or irreversible damage to Aboriginal objects or places or to the value of those objects or places; and
- There is uncertainty about the Aboriginal cultural heritage values or scientific or archaeological values, including in relation to the integrity, rarity or representativeness of the Aboriginal objects or places proposed to be impacted (DECCW 2009b:26).

Where this is the case, the OEH instructs that a precautionary approach should be taken and all cost-effective measures implemented to prevent or reduce damage to the objects/place (DECCW 2009b).

With the exception of some artefacts in collections, the NP&W Act generally defines all Aboriginal objects to be the property of the Crown. The Act then provides various controls for the protection, management of and impacts to these objects. An 'Aboriginal object' is defined under Section 5(1) as:

> 'any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises 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'.

In practice, archaeologists generally subdivide the legal category of 'object' into different site types, which relate to the way Aboriginal heritage evidence is found within the landscape. The archaeological definition of a 'site' may vary according to survey objectives, however it should be noted that even single and isolated artefacts are protected as Aboriginal objects under the NP&W Act.

Under s89A of the NP&W Act, a person who is aware of the location of an Aboriginal object that is the property of the Crown or, not being the property of the Crown, is real property, and does not, in the prescribed manner, notify the Director-General thereof within a reasonable time after the person first becomes aware of that location is guilty of an offence against the Act unless the person believes on reasonable grounds that the Director-General is aware of the location of that Aboriginal object. The 'prescribed manner' is currently taken to be written notice in a form approved by the Director-General, being the Aboriginal Site Recording Forms available on the OEH website. Failure to comply with the requirements may result in a maximum penalty of 100 penalty units and, in the case of a continuing offence, a further 10 penalty units for each day the offence continues, for an individual, with double the fines for a corporation.

Aboriginal places are defined as any place declared to be an Aboriginal place under Section 84 of the Act. Typically these are locations of 'special significance with respect to Aboriginal culture' (for example, traditional or historical cultural value to Aboriginal people), for which identified Aboriginal objects may not be present.

Section 86 of the NP&W Act specifies the offences and penalties relating to harming or desecrating Aboriginal objects and Aboriginal places:

1) A person must not harm or desecrate an object that the person knows is an Aboriginal object.

Maximum Penalty:
(a) in the case of an individual - 2,500 penalty units or imprisonment for one year, or both, or (in circumstances of aggravation) 5,000 penalty units or imprisonment for two years, or both, or
(b) in the case of a corporation - 10,000 penalty units (currently $1,100,000).

2) A person must not harm an Aboriginal object ('strict liability offence').

Maximum Penalty:
(a) in the case of an individual - 500 penalty units or (in circumstances of aggravation) 1,000 penalty units, or
(b) in the case of a corporation - 2,000 penalty units (currently $220,000).

Under Section 86(4) it is an offence for a person to harm or desecrate an Aboriginal place, with maximum penalties of 5,000 penalty units or imprisonment for two years, or both, for individuals and 10,000 penalty units for corporations.

Harm to an Aboriginal object or place is defined under Section 5(1) as any act or omission that:

(a) destroys, defaces or damages the object or place, or
(b) in relation to an object—moves the object from the land on which it had been situated, or
(c) is specified by the regulations, or
(d) causes or permits the object or place to be harmed in a manner referred to in paragraph (a), (b) or (c), but does not include any act or omission that:
(e) desecrates the object or place, or
(f) is trivial or negligible, or
(g) is excluded from this definition by the regulations.

There are various exemptions and defences to offences under Section 86 of the Act, including:

- Of most relevance to development proposals generally, the offences under Section 86(1), (2) and (4) have a defence to prosecution under Section 87(1) if the harm or desecration was authorised by an Aboriginal Heritage Impact Permit (AHIP) and the conditions to which that AHIP were subject have not been contravened;

- The strict liability offence under Section 86(2) has a defence to prosecution under Section 87(2) if the person exercised *due diligence* to determine whether the act or omission constituting the alleged offence would harm an Aboriginal object and reasonably determined that no Aboriginal object would be harmed. Section 87(3) and the regulations associated with the Act (National Parks and Wildlife Regulation 2009) enable due diligence to be achieved through compliance with industry-specific Codes of Practice approved by the Minister. These include the DECCW (2010a) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* and other approved codes such as the *NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects* (NSW Minerals Council 2010).

  The 'due diligence' process is essentially intended to provide a defence to the strict liability offence under Section 86(2) of the NP&W Act, if an activity were subsequently to unknowingly harm an Aboriginal object in the absence of an AHIP. If Aboriginal objects are present or are likely to be present and an activity will harm those objects, then an AHIP application is required (excluding Part 3A projects). While the DECCW (2010a) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* sets out procedures to determine whether or not Aboriginal objects are, or are likely to be present, identify whether the activity may harm objects and whether an AHIP is necessary, it does not constitute a level of Aboriginal heritage impact assessment that is typically required to satisfy the assessment requirements for projects under Part 4 and Part 5 of the EP&A Act. However, the conduct of an environmental impact assessment for a Part 4 or Part 5 project that satisfies the requirements of the Code of Practice will satisfy the 'due diligence' defence to Section 86(2) of the NP&W Act;

- The strict liability offence under Section 86(2) has a defence to prosecution under Section 87(4) if the person shows that the act or omission constituting the alleged offence is prescribed by the regulations as a low impact act or omission.

Clause 80B of the National Parks and Wildlife Regulation 2009 describes low impact acts or omissions as including:

- Maintenance work on land already disturbed (such as maintenance of existing roads, tracks or utilities);
- Farming and land management works on land already disturbed (such as cropping or leaving paddocks fallow, or construction of farm dams, fences, irrigation infrastructure, ground water bores, flood mitigation works, erosion control or soil conservation works, or maintenance of various existing infrastructure);
- Grazing of animals;
- Activity on already disturbed land that comprises exempt development or was the subject of a complying development certificate issued under the EP&A Act;
- Mining exploration work (such as costeaning, bulk sampling or drilling) on land already disturbed;
- Geological mapping, surface geophysical surveys and sub-surface surveys involving downhole logging, sampling or coring using hand-held equipment except where conducted as part of an archaeological investigation (exempted where the DECCW 2010 *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* is followed);
- Removal of isolated dead or dying vegetation if there is minimal ground disturbance;
- On already disturbed land seismic surveying or groundwater monitoring bores;
- Environmental rehabilitation work (such as silt fencing, tree planting, bush regeneration and weed removal, but not erosion control or soil conservation works).

For the purposes of Clause 80B, land is considered to be 'already disturbed' if it 'has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable' (for example, soil ploughing, construction of rural infrastructure such as dams and fences, construction of roads, tracks and trails, clearing of vegetation, construction of buildings, installation of utilities, substantial grazing involving the construction of rural infrastructure, or construction of earthworks related to the above);

- The defence of honest and reasonable mistake of fact applies under Section 86(5) to the strict liability offence of Section 86(2) and to offences against Aboriginal places under Section 86(4);

- The offences under Section 86(1) and (2) do not apply under Section 86(6), with respect to an Aboriginal object that is dealt with in accordance with section 85A (refer below);

- Exemptions are available under Section 87A to Section 86(1)-(4) for various emergency situations, conservation works and conservation agreements; and

- Exemptions are available under Section 87B to Section 86(1), (2) and (4) for Aboriginal people in relation to the carrying out of traditional cultural activities.

Consents regarding impacts to Aboriginal objects or areas with potential for Aboriginal objects are managed through the OEH Aboriginal Heritage Impact Permit (AHIP) system, as outlined in Section 90 of the NP&W Act and clauses 80D and 80E of the Regulations. The issuing of an AHIP is dependent upon adequate archaeological assessment and review (cultural heritage assessment report), together with an appropriate level of Aboriginal community liaison and involvement.

Typically, to support an AHIP, an Aboriginal cultural heritage assessment must be undertaken in accordance with the OEH (2011a) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*, which effectively involves an assessment following the DECCW (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and Aboriginal community consultation in accordance with the DECCW (2010c) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (refer to Section 6).

The DECCW (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* contains detailed requirements for heritage assessments. Key features include:

- Investigations must be undertaken by people with appropriate skills and experience, specified in Section 1.6 as:

    1) A minimum of a Bachelor's degree with honours in archaeology or relevant experience in the field of Aboriginal cultural heritage management, and

    2) The equivalent of two years full-time experience in Aboriginal archaeological investigation, including involvement in a project of similar scope, and

    3) A demonstrated ability to conduct a project of the scope required through inclusion as an attributed author on a report of similar scope.

- Archaeological test excavation will be necessary when (regardless of whether or not there are objects present on the ground surface) it can be demonstrated through Requirements 1, 2, 3, 4, and 5 of the Code that sub-surface Aboriginal objects with potential conservation value have a high probability of being present in an area, and the area cannot be substantially avoided by the proposed activity; and

- A Section 90 AHIP is not required for test excavations undertaken in compliance with the Code (implementation of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy is required however).

Under clause 80D of the National Parks and Wildlife Regulation 2009, the cultural heritage assessment report that accompanies the AHIP application must address:

- The significance of the Aboriginal objects or Aboriginal places that are the subject of the application;

- The actual or likely harm to those Aboriginal objects or Aboriginal places from the proposed activity that is the subject of the application;

- Any practical measures that may be taken to protect and conserve those Aboriginal objects or Aboriginal places;

- Any practical measures that may be taken to avoid or mitigate any actual or likely harm to those Aboriginal objects or Aboriginal places; and

- Include any submission received from a registered Aboriginal party under clause 80C and the applicant's response to that submission.

The OEH determination of AHIP applications is guided by the OEH (2011a) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*, OEH (2011b) *Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants*, and DECCW (2009a) *Guide to Determining and Issuing Aboriginal Heritage Impact Permits* policy.

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. AHIPs may be transferred or varied (subject to conditions and approval of the Director-General). AHIPs may be refused. An application is taken to be refused (unless otherwise granted or refused earlier), 60 days after the date on which the application was received by the Director-General (not including any period during which an applicant is required to supply to the Director-General further information under Section 90F).

The Director-General may attach any conditions seen fit to any AHIP granted. Failure to comply with a condition is deemed under Section 90J to be a contravention of the Act. Such offences may result in a maximum penalty of 1,000 penalty units and/or imprisonment for six months, and, in the case of a continuing offence, a further 100 penalty units for each day the offence continues, for an individual, with double the fines for a corporation.

Under Section 90K of the NP&W Act, in making a decision in relation to an AHIP, the Director-General must consider the following matters (but only these matters):

a) The objects of the Act;

b) Actual or likely harm to the Aboriginal objects or Aboriginal place that are the subject of the permit;

c) Practical measures that may be taken to protect and conserve the Aboriginal objects or Aboriginal place that are the subject of the permit;

d) Practical measures that may be taken to avoid or mitigate any actual or likely harm to the Aboriginal objects or Aboriginal place that are the subject of the permit;

e) The significance of the Aboriginal objects or Aboriginal place that are the subject of the permit;

f) The results of any consultation by the applicant with Aboriginal people regarding the Aboriginal objects or Aboriginal place that are the subject of the permit (including any submissions made by Aboriginal people as part of a consultation required by the regulations);

g) Whether any such consultation substantially complied with any requirements for consultation set out in the regulations (specified in Section 90N of the NP&W Act and clause 80C of the National Parks and Wildlife Regulation 2009 and in the DECCW *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*);

h) The social and economic consequences of making the decision;

i) Any documents accompanying the application and any public submission that has been made under the EP&A Act in connection with the activity to which the permit application relates and that has been received by the Director-General; and

j) Any other matter prescribed by the regulations.

An appeals process is available under Section 90L of the NP&W Act whereby an applicant, dissatisfied with the refusal of the Director-General to grant a Section 90 AHIP, or with any conditions attached to the AHIP, may appeal to the Land and Environment Court. The appeal must be made within 21 days after notice of the decision that is being appealed. The decision of the Land and Environment Court on the appeal is final and is binding on the Director-General and the appellant.

Under Section 85A of the NP&W Act, the Director-General may 'dispose' of Aboriginal objects that are the property of the crown:

a) By returning the Aboriginal objects to an Aboriginal owner or Aboriginal owners entitled to, and willing to accept possession, custody or control of the Aboriginal objects in accordance with Aboriginal tradition, or

b) By otherwise dealing with the Aboriginal objects in accordance with any reasonable directions of an Aboriginal owner or Aboriginal owners referred to in paragraph (a), or

c) If there is or are no such Aboriginal owner or Aboriginal owners - by transferring the Aboriginal objects to a person, or a person of a class, prescribed by the regulations for safekeeping (typically implemented by way of a Care Agreement between the OEH and the Aboriginal person or organisation).

Under Section 85A(3) of the NP&W Act, the regulations may make provision as to the manner in which any dispute concerning the entitlement of an Aboriginal owner or Aboriginal owners to possession, custody or control of Aboriginal objects for the purposes of this section is to be resolved.

Under Section 91AA of the NP&W Act, if the Director-General is of the opinion that any action is being, or is about to be carried out that is likely to significantly affect an Aboriginal object or Aboriginal place or any other item of cultural heritage situated on land reserved under the Act, the Director-General may make a stop-work order for a period of 40 days. Various exemptions exist, such as for emergency situations and for approved developments under the EP&A Act. A person that contravenes a stop-work order may be penalised up to 1,000 penalty units and an additional 100 units for every day the offence continues (10,000 units and 1,000 units respectively in the case of a corporation). Under Section 91A, the Director-General may also make recommendations to the Minister for an Interim Protection Order in respect of land which has cultural significance, including Aboriginal objects, for a duration of up to two years. The existence of an AHIP does not prevent the making of a stop-work order or an interim protection order (Section 90O).

Under Section 91L of the NP&W Act the Director-General may direct a person to carry out remediation work to Aboriginal objects or places, if they have been harmed as a result of an offence under the Act. The remediation work may involve protection, conservation, maintenance, remediation or restoration of the harmed Aboriginal object or place. The maximum penalties under Section 91Q for contravening a remediation direction are 2,000 penalty units and 200 penalty units for each day the offence continues for a corporation.

Environmental Planning and Assessment Act 1979:

The EP&A Act requires that environmental impacts (including those to cultural heritage) be considered in land use planning and decision-making. The Minister administering the EP&A Act may make various planning instruments such as Local Environmental Plans (LEPs) or Development Control Plans (DCPs). These planning instruments may identify places and features of cultural heritage significance and define statutory requirements regarding the potential development, modification and conservation of these items. In general, places of identified significance, or places requiring further assessment, are listed in heritage schedules that form part of an LEP. Listed heritage items are then protected from certain defined activities, unless consent has been gained from an identified consent authority (typically the local government authority).

In determining a Development Application (DA) under Part 4 of the EP&A Act, a consent authority, such as a local government authority, must take into consideration matters such as the provisions of environmental planning instruments (for example, LEPs), DCPs, the likely impacts of that development, including environmental impacts on the natural and built environments, and social and economic impacts on the locality (Section 79C{1}).

If Aboriginal objects are known to exist on the land to which the development application applies prior to the application being made, under Part 4 of the EP&A Act an 'Integrated Development Application' (IDA) must be submitted to the consent authority. Any Development Approval issued for development of this kind must be consistent with the General Terms of Approval (GTA's) or requirements provided by the relevant State Government agency (for example, the OEH).

Under Part 5 of the EP&A Act, public authorities and government agencies that carry out activities have a duty to take into account to the fullest extent possible all matters affecting or likely to affect the environment (including cultural heritage) by reason of that activity. This typically takes the form of a Review of Environmental Factors (REF) or Environmental Impact Statement (EIS), with the agency (proponent) acting as the determining authority.

Under Part 3A of the EP&A Act, major infrastructure and development projects ('major projects') that were previously assessed under Part 4 and/or Part 5 of the Act are typically assessed (depending on their type, size and/or location). There are several ways to propose to carry out a major project. One is to lodge a project application that contains detailed information about the project. Another option is to submit a Concept Plan, which provides a broader overview of what is proposed, with approval of the Concept Plan establishing the framework for future more detailed development of the proposal, which may include the need for further approvals (for example, AHIPs under the NP&W Act). Project applications and concept plan applications, including those for critical infrastructure (made where the Minister is of the opinion the project is essential for the State for economic, environmental or social reasons), are all subject to the Part 3A environmental assessment process.

Under the Part 3A process, the Department of Planning and Infrastructure prepares and makes publicly available the key issues that a proponent must address in an Environmental Assessment (EA) of the proposal. These are known as the Director-General's Environmental Assessment Requirements (EARs) and typically involve consultation with, and inclusion of the requirements of, agencies such as the OEH.

The EA is generally required to include a written Statement of Commitments outlining how the project's likely environmental impacts will be minimised or managed. If Part 3A approval is granted, the proponent will be required to honour these commitments as part of the approval conditions. Under Section 75U of Part 3A of the EP&A Act, a Section 90 AHIP to impact Aboriginal objects is not required (for an approved project or for any investigative or other activities required to be carried out for the purpose of complying with environmental assessment requirements issued in connection with an application for approval to carry out a project or for a concept plan for a project). *In lieu* however, for approved projects a Statement of Commitments outlining proposed heritage management and mitigation measures must be approved by DoPI. Typically, this involves preparation of a detailed Aboriginal Heritage Management Plan to guide the management and mitigation of impacts to Aboriginal heritage *in lieu* of a Section 90 AHIP.

The interplay of the NP&W Act and Regulation and the planning system is complex. For proposed developments, the specific level of Aboriginal heritage impact assessment and Aboriginal community consultation required, and any requirement for an AHIP, is highly dependent upon not just the NP&W Act and Regulation, but the nature of the proposal, the Part and Division of the EP&A Act under which planning approval is required, any specific project approval requirements issued by DoPI and/or the OEH, the presence or otherwise of Aboriginal objects, and the potential for Aboriginal objects to occur.

8.3 Local

Under the *Environmental Planning and Assessment Act 1979* (EP&A Act) the Minister may make various planning instruments such as Local Environment Plans, that are administered at a local government level. These plans set out objectives and controls for the development of land in the local government areas.

The *Shoalhaven Local Environmental Plan 1985 (amended 2010)* (LEP) applies to the investigation area and contain several provisions relating to heritage, as specified in Division 4A. Under the LEP:

- *Aboriginal object* has the same definition as under the NP&W Act;
- *Place of Aboriginal heritage significance* means 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, Aboriginal people. It can (but need not) include items and remnants of the occupation of the land by Aboriginal people, such as:
  - i. burial places, and
  - ii. engraving sites, and
  - iii. rock art, and
  - iv. midden deposits, and
  - v. scarred and sacred trees, and
  - vi. sharpening grooves, or
  - (b) a natural Aboriginal sacred site or other sacred feature. It includes:
  - i. a natural feature such as a creek or mountain of long-standing cultural significance, or
  - ii. an initiation, ceremonial or story place, or
  - iii. an area of more contemporary cultural significance.

Relics and *archaeological sites* under the LEP relate to non-indigenous heritage. *Heritage items* principally relate to non-indigenous items, and must be listed in Schedule 7 of the LEP.

Section 20D of the LEP specifies that the objectives in relation to heritage conservation are:

a) to identify and conserve the environmental heritage of the City of Shoalhaven, and
b) to conserve the heritage significance of existing significant fabric, relics, settings and views associated with the heritage significance of heritage items and heritage conservation areas, and
c) to ensure that archaeological sites and *places of Aboriginal heritage significance* are conserved, and
d) to ensure that the heritage conservation areas throughout the City of Shoalhaven retain their heritage significance.

Section 20E of the LEP relates to the protection of heritage items and heritage conservation areas, but clause 1(d) is of relevance to Aboriginal heritage:

1. When is consent required?
   The following development may be carried out only with development consent:
a) demolishing or moving a heritage item or a building, work, relic, tree or place within a heritage conservation area,
b) altering a heritage item or a building, work, relic, tree or place within a heritage conservation area by making structural or non-structural changes to its exterior, such as to its detail, fabric, finish or appearance,
c) altering a heritage item by making structural changes to its interior,
d) disturbing or excavating a *place of Aboriginal heritage significance* or 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 or *Aboriginal object* being discovered, exposed, moved, damaged or destroyed,
e) moving the whole or a part of a heritage item,
f) erecting a building on, or subdividing, land on which a heritage item is located or that is within a heritage conservation area.

Clause 2 outlines a number of exceptions, including if the works are of a minor nature, or consist of maintenance, or would not adversely affect the significance of the *place of Aboriginal heritage significance*.

Section 20I of the LEP states that before granting consent to development required by clause 20E that will be carried out in a *place of Aboriginal heritage significance*, the consent authority must:

a) consider the effect on the heritage significance of *the place* and any *Aboriginal object* known or reasonably likely to be located at the place, and
b) except where the proposed development is integrated development, notify the local Aboriginal communities (in such a way as it thinks appropriate) of the development application and take into consideration any comments received in response within 21 days after the relevant notice is sent.

9. POTENTIAL IMPACTS

This Aboriginal cultural heritage assessment has been commissioned in relation to a Proposal by Realty Realizations for a mixed use subdivision of part of DP 1065111 and parts of Portions 61, 81 and 90 DP 755971 (refer to Section 1.1, Table 1 and Figures 2 and 3). Realty Realizations has made an application to the DoPI for approval of a Concept Plan for the Proposal, under Part 3A of the EP&A Act. Further applications for approval under Part 4 of the EP&A Act are anticipated after detailed design of the Proposal (or stages thereof) has been completed.

The Proposal for a mixed use subdivision involves six areas or 'land units', which form the current investigation area, as marked on Figures 2 and 4. Single lot residential subdivision is proposed in 'land units' 3, 4, 5 and part of 2, multiple storey higher-density residential development is proposed in part of 'land unit' 2, commercial/mixed use is proposed in 'land unit' 1 and industrial use is proposed in 'land unit' 6 (refer to Table 1).

As the Proposal is only at the 'Concept Plan' stage and has not been subject to detailed design, the following discussion is limited to a general discussion of potential impacts within the investigation area.

Within the investigation area, impacts to the ground surface are anticipated to be substantial and widespread, should the Proposal proceed. Impacts would arise from earthmoving and other works, and any identified or potential heritage evidence within the zone of impact would be affected.

On a preliminary basis, impacts from the Proposal are not anticipated to occur directly to the three identified Aboriginal sites within the heritage study area (West Culburra 3/A, 4/A and 4/B) as these are located immediately adjacent to the investigation area (Table 6). However, sites 4/A and 4/B are at risk of impacts from third parties from continued use of the vehicle track and any future maintenance works along the sewer line. Site 3/A is at a similar risk of impact from third parties from continued use of the vehicle track. Indirect impacts may arise to these sites from the Proposal, through subsequent increased recreational use and human visitation to the area. If, during detailed design, any works are proposed outside of the present investigation areas (for example, walkways, essential services or other development within the zone between the investigation areas and the Crookhaven River), impacts may occur to these sites. Any such potential impacts would need to be investigated and reassessed after detailed design is completed (refer to Sections 10 and 11).

As discussed in Section 5, no identified Aboriginal heritage evidence occurs directly within the investigation area or may be subject to impacts from the Proposal (assuming all works are confined to the investigation area). However, impacts may occur to a potential heritage resource, principally comprising stone artefacts, particularly within a zone potentially extending up to 200 metres from the shore of the Crookhaven River (refer to Figure 10), where there is a high potential for sub-surface deposits of artefacts to occur, including deposits that may be of research value. This includes the location of sites West Culburra 4/A and 4/B and elsewhere on the flat (survey area WC4) immediately adjacent to the investigation area, but also survey area WC15 and minor portions of survey areas WC 3, 9 and 14 within the investigation area.

In the remainder of the investigation area, the potential for artefact deposits of research value or significance is generally low, but a low-density distribution of artefacts consistent with low heritage value 'background discard' is likely to be present and may be subject to impacts from the Proposal.

Table 6: Summary of impact assessment.

Site Name	Type of Harm	Degree of Harm	Consequence of Harm
West Culburra 3/A	Possibly direct or none	Possibly total or none	Possibly total or no loss of value
West Culburra 4/A	Possibly direct or none	Possibly total or none	Possibly total or no loss of value
West Culburra 4/B	Possibly direct or none	Possibly total or none	Possibly total or no loss of value

Substantial shell midden evidence has previously been identified adjacent to the investigation area, within a 30 metre wide zone along the foreshore of the Crookhaven River estuary. Additional midden evidence may occur within this zone, adjacent to the investigation area, that was obscured by vegetation at the time of Hughes' (1983) study. Indirect impacts may arise to these sites from the Proposal, through subsequent increased recreational use and human visitation to the area. If, during detailed design, any works are proposed outside of the present investigation areas (for example, walkways, essential services or other development within the zone between the investigation areas and the Crookhaven River), direct impacts may also occur to these sites. Any such potential impacts would need to be investigated and reassessed after detailed design is completed. The potential for midden evidence directly within the investigation area is moderate to low for small isolated middens within 200 metres of the estuary (refer to Figure 10), and low elsewhere.

Other types of heritage evidence (for example, bora/ceremonial, grinding groove, lithic quarry, rock shelter and stone arrangement sites) are not anticipated to occur within the investigation area (very low or negligible potential), albeit scarred or carved trees cannot totally be discounted where mature native trees remain and skeletal remains cannot totally be discounted in sandy sediments adjacent to the Crookhaven estuary. Other traditional or historical Aboriginal cultural values or associations have not been identified during the present or previous (Hughes 1983) investigations.

In consideration of the above factors, if impacts (both direct and indirect) can be avoided to the identified sites adjacent to the investigation area, and impacts can be avoided or mitigated within the zone of higher potential within 200 metres of the Crookhaven River estuary (refer to Figure 10 and Section 10.3), the overall impacts of the Project on Aboriginal heritage will be relatively low within a local context and very low within a regional context.

It is concluded that the cumulative effect of the Proposal on the identified and potential Aboriginal heritage resources of the region would be very low[7], on the basis that:

- The impacts of the Proposal itself will be relatively low within a local context;
- No identified heritage evidence will be subject to impacts and much of the investigation area comprises zones of low potential;
- Similar environmental contexts to the investigation area exist in areas immediately adjacent and further afield;
- Similar heritage resources or potential resources are present in these areas which will not be affected by the Proposal or other development (for example, in Jervis Bay National Park); and
- The absence of any regionally representative values directly within the investigation area.

[7] Assuming that all impacts are confined to the investigation area, direct and indirect impacts are avoided to the identified sites adjacent to the investigation area, and impacts are avoided or mitigated within the zone of higher potential within 200 metres of the Crookhaven River estuary.

10. POTENTIAL MITIGATION AND MANAGEMENT STRATEGIES

General strategies for the management of the identified and potential Aboriginal heritage resources within the investigation area and immediately adjacent area are presented below. A key consideration in selecting a suitable strategy is the recognition that Aboriginal heritage is of primary importance to the local Aboriginal community, and that decisions about the management of the sites should be made in consultation with the registered Aboriginal parties. The recommended strategies are presented in Section 11.

As discussed in Section 8.2, the interplay of the NP&W Act and Regulation and the planning system is complex. For proposed developments, the specific level of Aboriginal heritage impact assessment and Aboriginal community consultation required, and any requirement for an AHIP, is highly dependent upon not just the NP&W Act and Regulation, but the nature of the proposal, the Part and Division of the EP&A Act under which planning approval is required, any specific project approval requirements issued by DoPI and/or the OEH, the presence or otherwise of Aboriginal objects, and the potential for Aboriginal objects to occur. For the Proposal, this is further complicated by the seeking of a Concept Plan approval under Part 3A of the EP&A Act, with the probable requirement for subsequent approvals under Part 4 of the Act after detailed design of the Proposal (or stages thereof) has been completed.

10.1 Strategy A (Further Investigation)

In circumstances where an Aboriginal heritage site is identified (particularly an open artefact site, rock shelter or shell midden), but the extent of the site, the nature of its contents, its level of integrity and/or its level of significance cannot be adequately assessed solely through surface survey (generally because of conditions of low surface visibility or sediment deposition), sub-surface testing may be an appropriate strategy to further assess the site. Sub-surface testing may also be appropriate in locations where artefact or midden deposits are predicted to occur (for example, in rock shelters or in open contexts) through application of a predictive model, in order to identify whether such deposits exist and their nature, extent, integrity and significance.

Test excavations can take the form of auger holes, shovel pits, mechanically excavated trenches or surface scrapes. The selection of a methodology (including a sampling strategy) is a process that involves (*cf.* Boismier 1991):

1) Identification of the specific environmental/cultural characteristics of the investigation area;

2) Construction of a model of Aboriginal occupation for the locality;

3) Definition of the expected nature and distribution of evidence (predictive model);

4) Formation of research questions and a methodology to retrieve the required data/evidence, in consideration of the expected nature and distribution of evidence; and

5) Analytical techniques for the evidence recovered that are appropriate to address the research questions and project objectives.

A Section 90 AHIP is not required for test excavations undertaken in compliance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b), although implementation of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (DECCW 2010c) is required.

However, under the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*, archaeological test excavation is necessary when (regardless of whether or not there are objects present on the ground surface) it can be demonstrated through Requirements 1, 2, 3, 4, and 5 of the Code that sub-surface Aboriginal objects with potential conservation value have a high probability of being present in an area, and the area cannot be substantially avoided by the proposed activity.

A Section 90 AHIP is also not required for test excavations undertaken for the investigation of artefact deposits where the investigation is being undertaken for the purpose of complying with environmental assessment requirements issued in connection with an application for approval to carry out a project or for a Concept Plan for a project under Part 3A of the EP&A Act (Section 75U).

In all other circumstances a Section 90 AHIP is normally required from the OEH to undertake sub-surface testing. The OEH determination of AHIP applications is guided by the DECCW (2009a) policy *Guide to Determining and Issuing Aboriginal Heritage Impact Permits*. Typically, approval of an AHIP can take up to 60 days, following receipt by the OEH of all necessary information.

This is a pro-active strategy, which should result in the identification, assessment and management of the Aboriginal heritage resource prior to any development activity occurring. Following assessment of each Aboriginal site, management strategies as outlined in Sections 10.2 - 10.5 can be applied.

In relation to the investigation area and current Proposal, notwithstanding the very low surface visibility and resulting low proportion of effective survey coverage as a percentage of the entire investigation area, the level and nature of effective survey coverage is considered satisfactory enough to present an effective assessment of the Aboriginal heritage resources identified and potentially present for the purpose of the Concept Plan application. The coverage was reasonably comprehensive for obtrusive site types, but limited for the less obtrusive stone artefacts. Nevertheless, in view of the detailed predictive modelling (refer to Section 3) and results obtained from the sample of effective coverage, it is concluded that the survey provides a valid basis for formulating recommendations for the management of the identified and potential Aboriginal heritage resources, without the requirement for further investigation by sub-surface testing at the Concept Plan stage.

Given that impacts will largely be avoided to the zone of high potential for sub-surface Aboriginal objects (including those with potential conservation value) (minor portions of survey areas WC 3, 9 and 14 within the present investigation area, and WC4 adjacent to the investigation area), mandatory testing under the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* is not required in these areas.

However, all of survey area WC15 comprises an area of high potential and is located within the investigation area and is therefore potentially subject to impacts (refer to Figure 10). Further investigation is warranted in survey area WC15 to identify the nature, extent and significance of any heritage evidence present, to enable the subsequent formulation of appropriate management strategies in consultation with the registered Aboriginal parties.

Given that the present Proposal is for a Concept Plan approval under Part 3A of the EP&A Act, and that detailed design has not been completed and further approvals would be required under Part 4 of the Act, any further investigation of WC15 would most appropriately be conducted after the detailed design has been completed and in association with subsequent applications for development approval. Test excavations should only be undertaken within areas subject to potential impact, at a stage of the planning process at which alternative development plans to avoid or minimise impacts can realistically be considered, and where the risks of impacts to the heritage resource from the testing itself can be justified (ie. a firm development proposal is available and lodgement of an application for approval is pending). Depending upon the development approval process, the excavations may be able to be undertaken in compliance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* rather than an AHIP, and using the same consultation process as for the present investigation.

Notwithstanding the above conclusions, significant questions remain about the distribution of heritage evidence in this locality, particularly with respect to the distance of evidence from the Crookhaven River estuary. In the portions of the survey areas WC 3, 9 and 14 within the present investigation area, that lie within the zone of high potential for sub-surface deposits of artefacts, further investigation is also warranted after the detailed design has been completed and in association with subsequent applications for development approval. This would enable identification of the nature, extent and significance of any heritage evidence present, and formulation of appropriate management strategies in consultation with the registered Aboriginal parties. Appropriate strategies may include the refinement of development plans to avoid or minimise impacts, or mitigation measures (or no further action if heritage resources are not identified within this zone).

The potential for skeletal remains is assessed as very low and on this basis further investigation of them is not warranted.

Hughes (1983) reported that in the late 1970s Jerrinja Elder Mr Jack Campbell had recorded an oral account of the middens adjacent to the investigation area and their importance to the Jerrinja community. This had been lodged with AIATSIS in Canberra. If any indirect or direct impacts are proposed within the 30 metre wide zone along the foreshore of the Crookhaven River estuary, further research into this oral account is warranted.

In relation to the midden sites and any works associated with the Proposal, or subsequent detailed designs or applications for approval under Part 4 of the EP&A Act, that involve areas outside of the heritage study area (for example, the foreshore zone between the investigation area and Crookhaven River), further investigation would be essential. This may involve survey of any proposed impact areas outside of the present heritage study area, in consultation with the registered Aboriginal parties, and preparation of a supplementary report. Any such investigation should apply the same methodology, consultation process (*Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*) and standards (*Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*) as for the current study, along with any applicable OEH requirements.

10.2 Strategy B (Conservation)

Conservation is a suitable strategy for all heritage sites, but particularly those of high archaeological significance and/or high cultural significance. Conservation is also appropriate for specific archaeological resources and environmental/cultural contexts, as part of a regional strategy aimed at conserving a representative sample of identified and potential heritage resources.

Options exist within development proposals that can be utilised for the conservation of identified or potential Aboriginal heritage resources, including exclusion of development from zones of high heritage significance or potential, preservation of areas within formal conservation zones, or the re-design of works to avoid specific areas.

The primary factors relevant to assessing the imperative for specific conservation measures for the Proposal include:

- No identified heritage evidence has been located directly within the investigation area;
- The potential for sub-surface deposits of artefacts that may be of research value or significance is generally low (although a low-density distribution of artefacts typically consistent with low heritage value background discard is likely to be widely present), apart from in the zone within 200 metres of the Crookhaven River estuary, of which only relatively small portions extend to within the investigation area (refer to Figure 10);
- Similar environmental contexts and potential heritage resources to those of the investigation area occur elsewhere in the region, including within the nearby Jervis Bay National Park; and
- The cumulative impact of the works on any heritage evidence would be very low within a regional context.

In consideration of these factors, the imperative for specific conservation measures directly within the investigation area is low.

However, as noted by Hughes (1983), the Culburra midden sites (OEH #52-5-171 to 52-5-186) adjacent to the investigation area are of 'considerable heritage and scientific value and of considerable importance' to the Jerrinja people. Although examples of individual middens are relatively common, similar suites of intact evidence from Holocene estuarine contexts are not widely reported in the region. This suite of sites is of representative value within both local and regional contexts and of high research value.

Therefore, although not subject to detailed study during the present assessment, this suite of midden sites is of significance and strongly warrants conservation. Direct impacts are not proposed (the middens are all located within a 30 metre wide zone along the foreshore outside of the immediate investigation area). However, indirect impacts may arise to these sites from the Proposal, through subsequent increased recreational use and human visitation to the area. These impacts will need to be managed to ensure that the suite of midden sites is not adversely affected. A Conservation Management Plan specific to the protection of these midden sites, as a condition of any subsequent development approval under Part 4 for the immediately adjacent land, is warranted. Any such plan should only be formulated by a heritage practitioner with suitable qualifications and experience, in consultation with the registered Aboriginal parties. It should include a location plan, a description of the Aboriginal sites, and a statement of the policies and actions required for the ongoing conservation of the relevant Aboriginal heritage evidence.

If, during detailed design, any works are proposed outside of the present investigation areas (for example, walkways, essential services or other development within the zone between the investigation areas and the Crookhaven River), direct impacts may also occur to these midden sites. Any such potential impacts would need to be investigated and reassessed after detailed design is completed (refer to Section 10.1), and measures implemented to ensure that impacts to the identified middens are avoided.

If, subsequent to detailed design and further investigation of the portions of the survey areas WC 3, 9 and 14 within the investigation area that lie within the zone of high potential for sub-surface deposits of artefacts, evidence of high significance is identified, additional conservation measures may be required.

Where impacts can be avoided to identified heritage evidence, appropriate protective measures may be required. These may include informing relevant staff and contractors of the nature and location of the heritage evidence and need to avoid impacts, along with the establishment of temporary protective fencing and signage to protect the identified evidence during the construction period.

10.3 Strategy C (Mitigated Impact)

In circumstances where an Aboriginal site may be of archaeological and/or cultural significance, but the options for conservation are limited and the surface collection of artefacts or excavation of deposits could yield benefits to the Aboriginal community and/or the archaeological study of Aboriginal occupation, mitigation measures (salvage) may be warranted.

Salvage in these circumstances may include the collection of surface artefacts and/or systematic excavation of artefact or midden deposits. Salvage of other site types may also be warranted, for example scarred trees or grinding grooves. Salvage of a scarred tree may involve cutting and removing the tree or the portion of the tree containing the scar. Similarly, grinding grooves may be salvaged by removal of the freestanding rock they are situated on, or in the case of grooves on open bedrock, cutting and removing the section of bedrock with the grooves.

The imperative for salvage measures can be assessed in relation to:

- The nature of the identified and expected evidence, its significance and its research potential (ie. the potential for salvage to provide additional, useful evidence that will enhance the overall understanding of the nature of human occupation in the locality);
- The views of the Aboriginal stakeholders, as salvage may be warranted to minimise the impacts of development on the cultural values of the evidence; and
- The extent of potential development impacts on particular sites or potential resources.

Under the terms of the NP&W Act it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object. As such, a Section 90 AHIP must normally be obtained from the OEH prior to impacting any Aboriginal objects, including through mitigation activities. The OEH determination of AHIP applications is guided by the DECCW (2009a) policy *Guide to Determining and Issuing Aboriginal Heritage Impact Permits*. Typically, approval of an AHIP can take up to 60 days, following receipt by the OEH of all necessary information.

A Section 90 AHIP is generally not required for impacts to Aboriginal objects where the project is approved under Part 3A of the EP&A Act, and commitments relating to the management of and mitigation of impacts to Aboriginal heritage *in lieu* of a Section 90 AHIP (typically in the form of an Aboriginal Heritage Management Plan) are approved by DoPI, and implemented.

Salvage typically involves the development of a detailed research design (including the nature of the methodology and sampling strategy, as discussed in Section 10.1). Where an AHIP is required, an Aboriginal heritage impact assessment must be undertaken in accordance with the DECCW (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and Aboriginal community consultation in accordance with the DECCW (2010c) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (refer to Sections 6 and 8.2).

In relation to the investigation area, a Section 90 AHIP would be required for all areas where Aboriginal objects are likely to be present (all portions of the investigation area where the A unit soil is present) and impacts will occur, to address Section 86(2) of the NP&W Act (assuming the works occur under subsequent approvals under Part 4 of the EP&A Act, not under Part 3A, in which event DoPI approval of an Aboriginal Heritage Management Plan would be required).

In relation to the zone of high potential for stone artefacts, potentially extending up to 200 metres from the shore of the Crookhaven River (refer to Figure 10), subsequent to detailed design and further investigation of survey areas WC 3, 9, 14 and 15 (refer to Section 10.1), additional mitigation measures may be required. The nature of any such measures would be dependent upon the results of the further investigations, but may involve mechanical surface scrapes and/or hand excavations.

In relation to the zones of low potential (all portions of the investigation area excluding the zone of high potential; refer to Figure 10), as a condition of a Section 90 AHIP, minor mitigation measures are warranted to reassess and test the predictive model. Within this area, a low-density distribution of artefacts consistent with low heritage value 'background discard' is likely to be present and may be subject to impacts. Mitigation measures, in the form of a limited program of surface scrapes that samples the different environmental contexts within this zone, would provide valuable information about the predictive model and identify whether repeated use of the ridgeline for transitory movement may have caused an accumulation of evidence through superimpositioning.

Surface scrapes may involve systematic mechanical exposure of samples of the potential deposit from within the impact zone, to enable investigation of the spatial distribution of artefacts and features over this area, with controlled hand excavation of any features of significance (eg. hearths, middens, heat-treatment pits or dense artefact clusters) that may be identified. This may involve use of a dozer or similar machinery to systematically expose the A unit soil by progressively removing thin layers of soil. After each layer is removed, the surface could be inspected on foot and any visible evidence collected. Where features of potential significance are identified, hand excavation could occur to retrieve the feature. In terms of an appropriate sample, surface scrapes within the following units would address this issue (refer to Table 3):

- Level - very gentle ridge crest - a sample from one of survey areas WC 2, 6, 10 or 13;
- Gentle ridge crest - a sample from survey area WC 12;
- Level - very gentle spur crest - a sample from survey area WC 8;
- Gentle spur crest - a sample from survey area WC 16;
- Level - very gentle hillock - a sample from survey area WC 11; and
- Gentle simple slope - a sample from one of survey areas WC 1, 3, 5, 7, 9 or 14.

Procedures for the recording of lithic items, additional analysis (for example, radiometric dating of charcoal samples), and reporting would need to be specified in the research design for the AHIP application. Curation of the recovered evidence would need to be resolved with the registered Aboriginal parties, with potentially a Care Agreement required under Section 85A of the NP&W Act.

10.4 Strategy D (Unmitigated Impact)

The strategy of unmitigated impact involves the proponent causing impacts to the heritage evidence without any mitigation measures. This strategy is typically suitable when the heritage evidence is of low scientific and cultural significance, the registered Aboriginal parties hold no objections, and it is unfeasible to implement any other strategy.

Under the terms of the NP&W Act it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object. As such, a Section 90 AHIP must normally be obtained from the OEH prior to impacting any Aboriginal objects. The OEH determination of AHIP applications is guided by the DECCW (2009a) policy *Guide to Determining and Issuing Aboriginal Heritage Impact Permits*. Typically, approval of an AHIP can take up to 60 days, following receipt by the OEH of all necessary information.

A Section 90 AHIP is generally not required for impacts to Aboriginal objects where the project is approved under Part 3A of the EP&A Act, and commitments relating to the management of and mitigation of impacts to Aboriginal heritage *in lieu* of a Section 90 AHIP (typically in the form of an Aboriginal Heritage Management Plan) are approved by DoPI, and implemented.

Where an AHIP is required, an Aboriginal heritage impact assessment must be undertaken in accordance with the DECCW (2010b) *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and Aboriginal community consultation in accordance with the DECCW (2010c) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* policy (refer to Sections 6 and 8.2).

In relation to the investigation area, given the probable presence of Aboriginal objects protected under the NP&W Act, a Section 90 AHIP would probably be required prior to any impacts occurring (assuming the works occur under subsequent approvals under Part 4 of the EP&A Act, not under Part 3A, in which event DoPI approval and potentially an Aboriginal Heritage Management Plan would be required). Unmitigated impact is a feasible strategy if agreed to by the Aboriginal parties and impacts are avoided to the zones of high potential (Figure 10).

10.5 Strategy E (Monitoring)

An alternative strategy for zones where archaeological deposits are predicted to occur is to monitor construction, particularly any initial earthmoving and soil removal works, for the presence of artefacts, shell or skeletal remains.

Monitoring is one of the primary strategies for managing the possible occurrence of Aboriginal skeletal remains. Monitoring for the presence of shell and stone artefacts is also often of value to the Aboriginal community, who may be seeking to identify and salvage material that was not visible on the surface during a preliminary study. The sieving of graded deposits is also a practical measure that enhances the benefits of monitoring for artefacts. However, the nature of construction methods (eg. the use of earthmoving machinery to rapidly excavate large quantities of soil) tends to limit the potential for successful identification of heritage evidence during monitoring.

Monitoring for artefacts (in preference to controlled excavation) is not a widely accepted method within the context of a scientific investigation, because it could result in substantial and costly delays to construction (particularly if a Section 90 AHIP or Part 3A approval is not in force), late revisions to development plans, and/or cause undesirable impacts to sites of cultural or scientific significance. However, monitoring for the presence of artefacts and other features during initial earthworks can be of scientific benefit and benefit to the Aboriginal community, by enabling the identification and retrieval of cultural evidence that may not otherwise have been recorded or salvaged.

In relation to the investigation area, monitoring of initial ground disturbance works is not warranted for skeletal remains due to the very low potential for them to be encountered. The nature of construction methods (use of earthmoving machinery to rapidly excavate large quantities of soil without scientifically appropriate spatial control) tends to severely limit the potential for successful identification of heritage evidence during monitoring of such work. As such, the measures proposed in Sections 10.1 and 10.3 would enable far more satisfactorily management of the potential impacts of the Proposal on the potential heritage resource, and additional monitoring or monitoring *in lieu* of these measures, is not warranted.

11. RECOMMENDATIONS

This Aboriginal cultural heritage assessment has been commissioned in relation to a Proposal by Realty Realizations for a mixed use subdivision at West Culburra. Realty Realizations has made an application to the DoPI for approval of a Concept Plan for the Proposal, under Part 3A of the EP&A Act. Further applications for approval under Part 4 of the EP&A Act are anticipated after detailed design of the Proposal (or stages thereof) has been completed.

No Aboriginal heritage sites are listed within the investigation area on any heritage registers or planning instruments. No Aboriginal heritage sites or cultural sites were identified directly within the investigation area during the present survey. However, three sites were identified immediately adjacent to the investigation area during the survey, within the slightly broader 'heritage study area'. These sites (West Culburra 3/A, 4/A and 4/B) are all open artefact occurrences. In addition, 18 previously recorded sites (17 middens and one artefact scatter, OEH #52-5-57, 52-5-114, 52-5-171 to 52-5-186) are located immediately adjacent to the investigation area, between it and the Crookhaven River (Figure 10).

Impacts may occur to a potential heritage resource, principally comprising stone artefacts, particularly within a zone potentially extending up to 200 metres from the shore of the Crookhaven River (Figure 10) in which there is a high potential for sub-surface deposits of artefacts to occur, including deposits that may be of research value. In the remainder of the investigation area, the potential for artefact deposits of research value or significance is generally low, but a low-density distribution of artefacts consistent with low heritage value 'background discard' is likely to be present and may be subject to impacts.

The potential for midden evidence directly within the investigation area is moderate to low for small isolated middens within 200 metres of the estuary (refer to Figure 10), and low elsewhere. Other types of heritage evidence (for example, bora/ceremonial, grinding groove, lithic quarry, rock shelter and stone arrangement sites) are not anticipated to occur within the investigation area (very low or negligible potential), albeit scarred or carved trees cannot totally be discounted where mature native trees remain and skeletal remains cannot totally be discounted in sandy sediments adjacent to the Crookhaven estuary. Other traditional or historical Aboriginal cultural values or associations have not been identified during the present or previous (Hughes 1983) investigations.

The following recommendations are made on the basis of legal requirements under the NP&W Act and EP&A Act, the results of the investigation and consultation with the registered Aboriginal parties:

1) In consideration of the results of the assessment and subject to implementation of the recommendations below, there are no Aboriginal heritage constraints to approval of the Concept Plan under Part 3A of the EP&A Act;

2) Subsequent to detailed design being completed and in association with subsequent applications for development approval under Part 4 of the EP&A Act, further heritage investigation involving test excavations should be undertaken within survey area WC15 and a sample of the portions of WC 3, 9 and 14 within the zone of high potential for sub-surface deposits of artefacts (Figure 10), to identify the nature, extent and significance of any heritage evidence present, and to enable the subsequent formulation of appropriate management strategies in consultation with the registered Aboriginal parties;

Test excavations should only be undertaken within areas subject to potential impact, at a stage of the planning process at which alternative development plans to avoid or minimise impacts can realistically be considered, and where the risks of impacts to the heritage resource from the testing itself can be justified (ie. a firm development proposal is available and lodgement of an application for approval is pending). The excavations may be able to be undertaken in compliance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* using the same consultation process as for the present investigation. The investigations must be undertaken by archaeologists qualified and experienced in Aboriginal heritage, in consultation with the registered Aboriginal parties, prior to any development impacts occurring;

3) Should any subsequent development application involve proposed impacts outside of the heritage study area investigated during the current assessment (refer to Figure 9), for example, in the foreshore zone between the investigation area and the Crookhaven River, further Aboriginal cultural heritage investigation should be undertaken. As a minimum this would involve the archaeological survey of any proposed impact areas outside of the present heritage study area, in consultation with the registered Aboriginal parties, with the preparation of a supplementary heritage assessment report. Any such investigation should apply the same methodology, consultation process (*Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*) and standards (*Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*) as for the current study, and address any applicable OEH requirements;

4) Subsequent to detailed design and the further heritage investigations required above being completed, and in association with any subsequent application for development approval under Part 4 of the EP&A Act, in order to establish a defence to prosecution under Section 86(2) of the NP&W Act with respect to the probable occurrence of stone artefacts within the impact area, and any subsequent impacts to those objects and identification of those impacts, a Section 90 AHIP should be obtained for the impact area prior to the proposed works being undertaken;

5) The Culburra midden sites (OEH #52-5-171 to 52-5-186) adjacent to the investigation area are of significance, potentially at a regional level, and warrant total conservation. Direct impacts to this suite of sites must be avoided and indirect impacts must be managed and minimised. As a condition of any development approval under Part 4 for the immediately adjacent land, a Conservation Management Plan specific to the protection of these midden sites should be formulated by a heritage practitioner with suitable qualifications and experience, in consultation with the registered Aboriginal parties. It should include a location plan, a description of the Aboriginal sites, and a statement of the policies and actions required for the ongoing conservation of this Aboriginal heritage evidence. Any direct impacts to these sites that may arise from works designed outside of the present heritage study area (for example, walkways, essential services or other development within the zone between the investigation areas and the Crookhaven River) must be avoided;

6) As a condition of any further heritage investigation associated with an application for development approval under Part 4 for the investigation area, the oral account recorded in the late 1970s by Jerrinja Elder, Mr Jack Campbell, and lodged with AIATSIS, of the middens adjacent to the investigation area and their importance to the Jerrinja community, should be researched;

7) Archaeological investigations should only be undertaken by archaeologists qualified and experienced in Aboriginal heritage (in accordance with the requirements of Section 1.6 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*), in consultation with the registered Aboriginal stakeholders, and occur prior to any development impacts occurring;

8) Where impacts will be avoided to the identified heritage evidence, appropriate protective measures should be implemented for those sites in close proximity to the construction works, including informing relevant staff and contractors of the nature and location of the heritage evidence and need to avoid impacts, along with the establishment of temporary protective fencing and signage to protect the identified evidence during the construction period;

9) Other land users (for example, Shoalhaven City Council) should be made aware of the nature and location of the Aboriginal sites identified during the present investigation (West Culburra 3/A, 4/A and 4/B) to ensure that inadvertent impacts are avoided;

10) As a general principle, all relevant contractors and staff engaged on the Proposal should receive heritage awareness training prior to commencing work on-site, including the presentation of information about the nature of the identified and potential Aboriginal heritage evidence within the locality, heritage management measures and protocols, and legal obligations;

11) Should any previously unrecorded Aboriginal sites or objects be detected prior to or during the course of development which are not covered by a Section 90 AHIP, work in the immediate vicinity of those objects would need to promptly cease and the finds be reported to the OEH (in accordance with Section 89A of the NP&W Act) and advice sought as to the appropriate course of action. If skeletal remains are identified, the proponent is required to immediately stop work and notify the appropriate authorities, including the Police and the OEH. If impacts cannot be avoided, a Section 90 AHIP would be required prior to any impacts occurring;

12) Under the terms of the NP&W Act it is an offence to harm or desecrate an object that the person knows is an Aboriginal object, or to harm an Aboriginal object ('strict liability offence'). Therefore, no activities or work should be undertaken within the Aboriginal site areas as described in this report and marked on Figure 10 without a valid Section 90 AHIP;

13) Single copies of this report should be forwarded to the registered Aboriginal parties and three copies should be forwarded to the OEH (South Landscape and Aboriginal Heritage Protection Section).

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DISCLAIMER

The information contained within this report is based on sources believed to be reliable. Every effort has been made to ensure accuracy by using the best possible data and standards available. The accuracy of information generated during the course of this field investigation is the responsibility of the consultant.

However, as no independent verification is necessarily available, South East Archaeology provides no guarantee that the base data (eg. the OEH AHIMS) or information from informants (obtained in previous studies or during the course of this investigation) is necessarily correct, and accepts no responsibility for any resultant errors contained therein and any damage or loss which may follow to any person or party. Nevertheless this study has been completed to the highest professional standards.