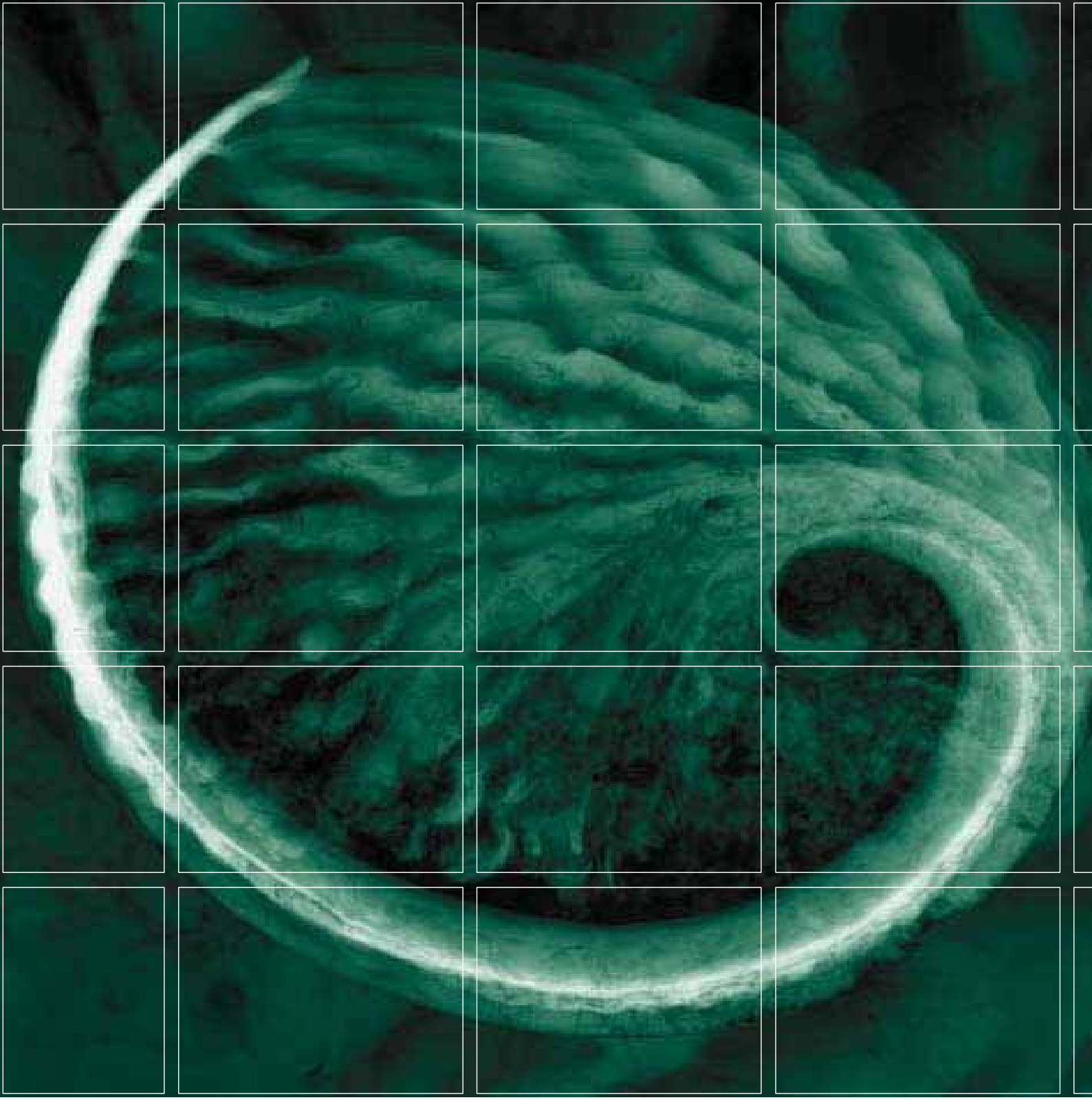
Volume 2

Aboriginal Cultural Heritage Assessment



'The Glades' Residential Development
Moonee Beach NSW
Aboriginal Cultural Heritage Assessment

Rothwell Boys Pty Ltd

October 2007

0046416 FINAL

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ERM

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Environmental Resources Management Australia Pty Ltd Quality System

'The Glades' Residential Development Moonee Beach NSW

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1 INTRODUCTION

Rothwell Boys Pty Ltd proposes to create a residential community in an area north of Moonee Beach. The proposed development, known as 'The Glades', will involve residential subdivision of an area of approximately 96 hectares and has the potential to impact upon Aboriginal cultural heritage. Rothwell Boys Pty Ltd engaged Environmental Resources Management Australia Pty Ltd (ERM) to assess the potential impacts on Aboriginal cultural heritage within the proposed development area. This report will support a Part 3A concept plan for the proposed development and project application for Stage 1 of the development.

1.1 STUDY AREA

The study area is situated to the north of Moonee Beach, approximately 13 kilometres north of Coffs Harbour, New South Wales (refer to *Figure 1.1*). The study area comprises Lots 1 and 2 on DP725785, an area bounded by the Pacific Highway to the west, Skinners Creek to the north, privately owned land to the south and Moonee Creek to the east.

1.2 PROPOSED DEVELOPMENT

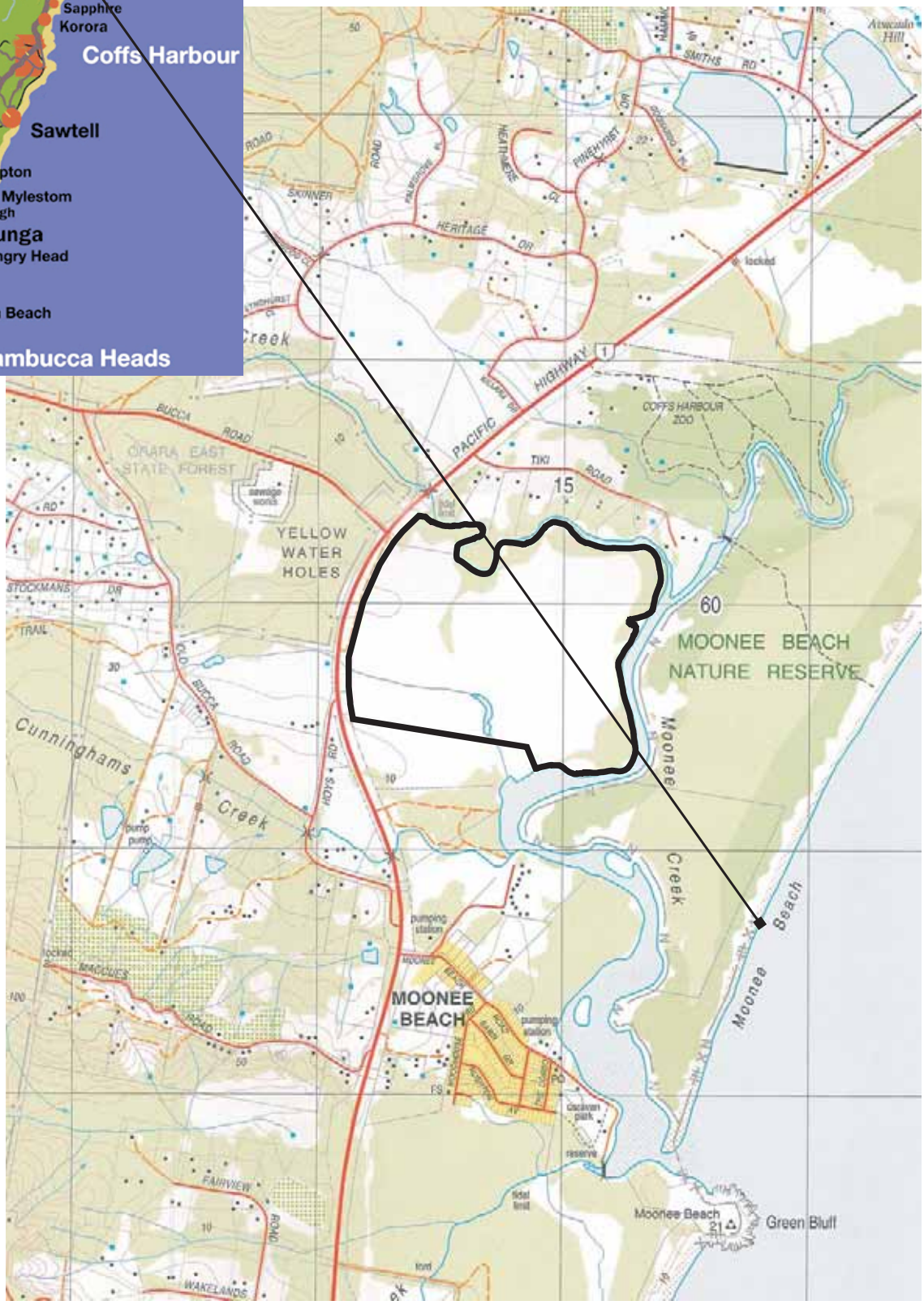
The proposed residential community will involve the subdivision of the study area into approximately 523 lots. Approximately 70 percent of the study area will be directly impacted by residential development (refer to *Figure 1.2*). The topography of the study area will be significantly altered by cutting and filling and the construction of a number of noise attenuation berms.

1.3 OBJECTIVES

The objectives of the assessment are to identify and assess the Aboriginal cultural heritage of the study area and to provide recommendations for its management. The following tasks have been undertaken to achieve these objectives:

- a review of the local environmental and cultural context to obtain information about the frequency and distribution of archaeological sites in the region, prior and existing land uses and disturbances that may effect site integrity;

- a search of relevant cultural heritage registers including the Department of Environment and Conservation (DEC) Aboriginal Heritage Information Management System (AHIMS) for known archaeological sites, the State Heritage Register, the Register of the National Estate, and the Coffs Harbour Local Environmental Plan 2000;



LEGEND

Study Area

Source: 1:25,000 Topographic Series

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Figure 1.1 **Location of Study Area**

The Glades Estate, Coffs Harbour

Jobs/2006/0046416/Arch - Fg1.1 Location of Study Area.cdr 15 02 2007 SP Environmental Resources Management Australia Pty Ltd

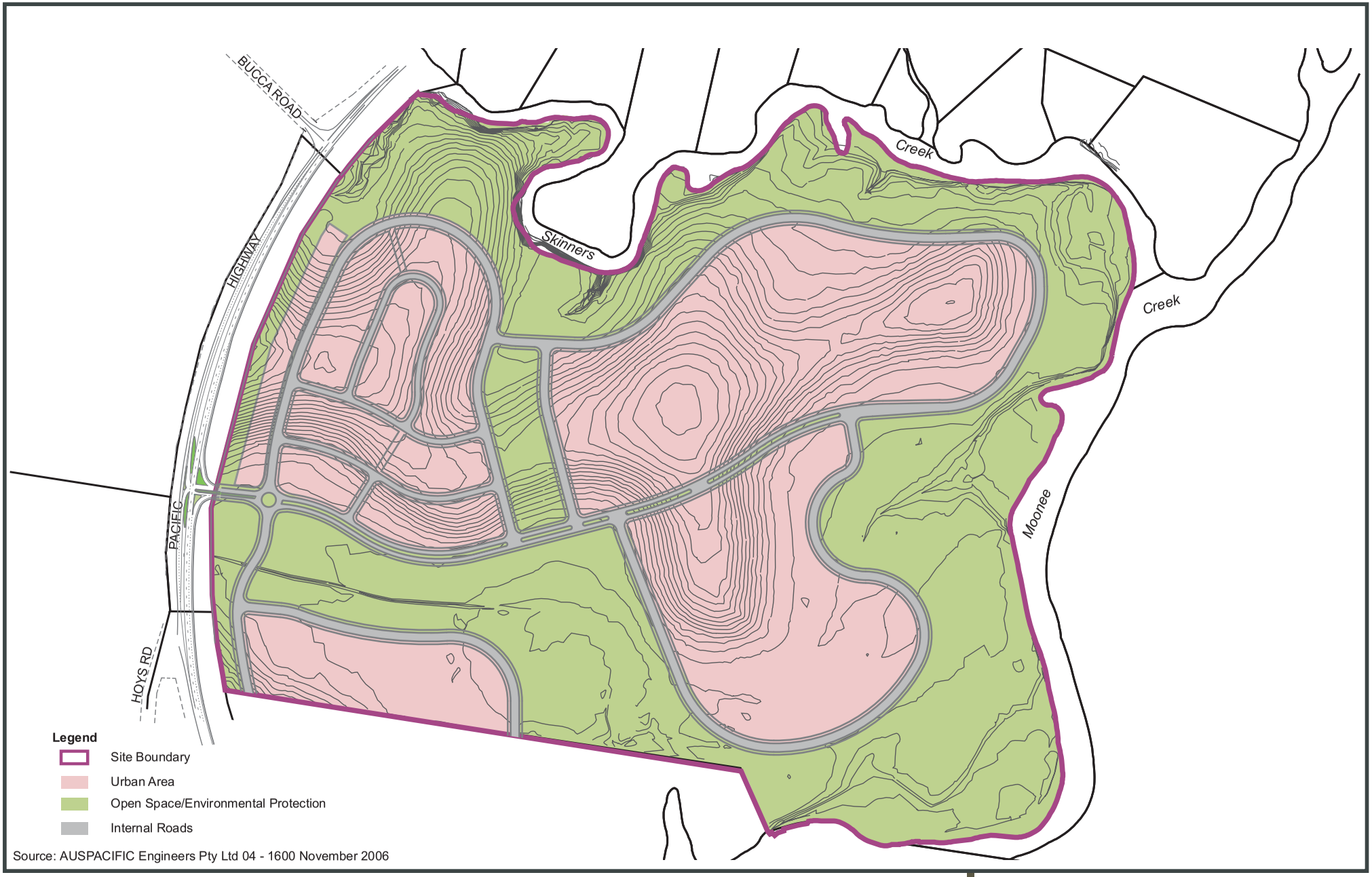

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Figure 1.2 **Concept Plan for the Proposed Development**

The Glades Estate, Coffs Harbour

- establishing a predictive archaeological statement based on the data searches and literature review;
- consultation with the Aboriginal community in accordance with Department of Environment and Conservation (DEC) Interim Community Consultation Requirements for Applicants;
- a field survey to identify archaeological sites or areas of archaeological potential within the study area; and
- outlining relevant mitigation and management measures in relation to the proposed development.

1.4 ABORIGINAL CONSULTATION

The following organisations were given written notification about the proposed development in March 2006, in accordance with DEC Interim Community Consultation Requirements (2005):

- Coffs Harbour Local Aboriginal Land Council (CHLALC);
- Coffs Harbour City Council;
- the NSW Department of Environment and Conservation;
- Native Title Services; and
- Registrar of Aboriginal Owners.

Correspondence with CHLALC and DEC resulted in the identification of an additional 22 Aboriginal interest groups, all of whom were invited to register their interest in the project. In addition, an advertisement was placed in the public notices section of the Coffs Harbour Advocate on 8th March 2006 and the National Indigenous Times on 9th March 2006. The closing date for registrations of interest was 23rd March 2006.

CHLALC and Yarrawarra Aboriginal Corporation (in conjunction with Garby Elders) registered an interest in the project. Both groups were provided with further information regarding the proposed development and its specific location. Three representatives of CHLALC and one representative each from Yarrawarra Aboriginal Corporation and Garby Elders participated in the field survey (refer to *Section 1.6*). A copy of the draft report was forwarded to all groups. No comments were received.

1.5 STATUTORY CONTROLS

The *Environmental Planning and Assessment Act* 1979 (EP & A Act) provides protection for cultural heritage. Part 3A of the Act covers the assessment and approvals process for projects that are considered (by the Minister for Planning) to be of State Significance. This assessment has been undertaken in accordance Director General's Environmental Assessment Requirements. Approved projects under Part 3A of the Act do not require Section 87 permits or Section 90 consents under the *National Parks and Wildlife Act 1974*.

Other legislation and planning instruments relating to Aboriginal cultural heritage which are of interest include *The Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (Commonwealth) and the *Coffs Harbour Local Environmental Plan 2000*.

1.6 PROJECT TEAM

The field survey was undertaken by ERM archaeologists Nicola Roche and Andy Collis with Mark Flanders and Chris Spencer (CHLALC site officers), Matt Flanders (CHLALC trainee), Shirley Duroux (Jalumbo Cultural Heritage and Research Unit linked to Yarrawarra Aboriginal Corporation) and Robyn Duroux (Garby Elder). The report was prepared by Nicola Roche and a technical review was undertaken by Neville Baker (ERM).

2 *ENVIRONMENTAL CONTEXT*

The environment context influences the way in which people live. This is particularly true for hunter gatherer societies, in which choices are impacted upon by the availability of local resources. Environmental factors such as land disturbance and vegetation coverage also affect the preservation and detectability of archaeological sites. The physical setting of the study area is therefore discussed in terms of geology and soils, topography and landforms, water availability and flora and fauna.

2.1.1 Geology and Soils

The study area is situated on Quaternary alluvial, paludal and estuarine deposits associated with Moonee Creek. These deposits overlie the Upper Palaeozoic Coramba Beds, which contain greywacke, slate and siliceous argillite (Geological Survey of NSW 1969). Other stone types present in the area surrounding Coffs Harbour include high grade siltstones and cherts (Appleton 2003:5). Rock types such as argillite, chert and greywacke are suitable for the manufacture of stone artefacts. Soils in the study area belong to the Newport soil landscape, which consists of Yellow Podzolic Soils and Humic Gleys on low, level to gently undulating coastal back barrier floodplains. These soils are deep, poorly drained and strongly acidic (DLWC 1999).

2.1.2 Topography

The topography of the study area is flat to gently undulating. Gentle slopes, open depressions, flats and ridges (refer to Speight 1990) are present across the study area (refer to *Figure 2.1*). Local relief is generally low, with two low ridges that are separated by a gently sloping saddle, as shown in *Figure 2.1.* The ridges are a maximum of 15 metres above sea level and are surrounded by gentle slopes that border flats along Moonee Creek and Skinners Creek and the southern extent of the study area. Three open depressions are present along the creeks and an artificial depression has been constructed in the flats in the south eastern corner of the study area.

2.1.3 Water Availability

Moonee Creek and Skinners Creek bound the study area in the east and north respectively and are the major watercourses in the local area. Both creeks are tidal and do not consistently provide fresh water. Prior to draining of the area, freshwater may have been available in low lying areas in the southern portion of the study area.

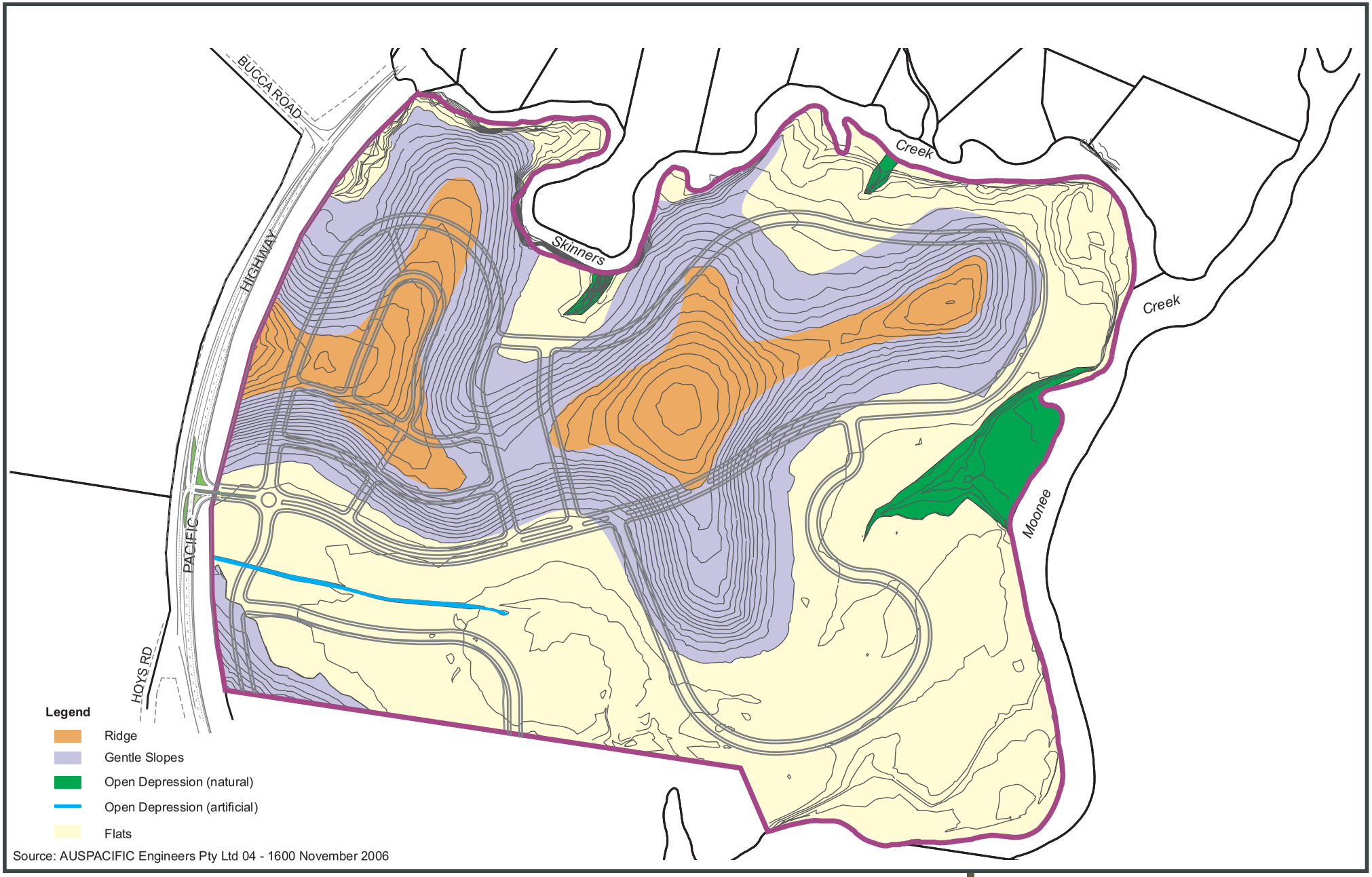

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Figure 2.1 **Landform Units**

The Glades Estate, Coffs Harbour

2.1.4 *Flora and Fauna*

Most of the study area has been cleared of its native vegetation. The remnant vegetation present on the site consists of patchy dry open forest dominated by blackbutt (*Eucalyptus pilularis*), stringybark (*E. planchoniana* and *E. tindaliae*), swamp mahogany (*E. robusta*), bush turpentine (*Syncarpia glomulifera*), grey ironbark (*E. sideropholia*) and pink bloodwood (*Corymbia intermedia*). Open swamp forest is also present in association with the creek lines and is dominated by paperbark tea-tree (*Melaleuca quinquenervia*), Sieber's paperbark (*Melaleuca sieberi*) and swamp oak (*Casuarina glauca*). Mangrove communities are present in small areas along the creeklines and small pockets of wetland vegetation remain in the south of the study area. The study area is now dominated by low closed grasslands.

The native vegetation communities described above are likely to have hosted a range of animal species relevant to Aboriginal occupation, including kangaroos, koalas, possums and a range of reptiles. In addition, Skinners and Moonee Creeks would have provided access to aquatic resources. The proximity of the study area to the coast also means that marine faunal resources were relatively accessible.

2.2 *PAST LAND USES AND DISTURBANCES*

The effects of past land use and the associated disturbances is likely to have impacted upon the archaeological record in terms of both the presence or absence of cultural materials and the integrity of any remaining deposits. The majority of the study area has been significantly impacted by relatively recent (post 1994) vegetation clearance. This has involved the removal of mature trees and associated undergrowth and has resulted in significant disturbance within the upper soil unit. The felling and removal of large trees would have caused the exposure and dispersal of upper soil deposits in the clearance areas and the potential relocation of any artefacts that may have been present. Three large vehicle tracks traverse the study area, with the main track situated on the east-west trending ridgeline. The area is used for grazing cattle, which typically increases rates of erosion.

2.3 *CONCLUSION*

A review of the environmental context of the study area demonstrates that the area contains (and would have contained in the past) a range of resources that were used by Aboriginal people. Fresh water may have been available in the low-lying areas in the south of the study area and may have been obtained from Skinners Creek during periods of high rainfall. Both Skinners and Moonee Creek would have provided a range of estuarine food resources. The vegetation communities within the study area would also have contained

plants suitable for consumption and other uses and would have supported a variety of animal species. A number of types of stone present in the local area are also suitable for the manufacture of stone artefacts. The disturbances to the study area from historic land use have impacted the archaeological record. The extent of this impact can only be determined following field survey.

3 CULTURAL CONTEXT

The following information provides the context in which Aboriginal cultural heritage in the study area can be understood and assessed. It includes a review of early historic records relating to the region and a discussion of previous archaeological investigations in the region and in the local area.

3.1 ETHNOHISTORIC CONTEXT

Early historic records provide information about the Coffs Harbour region during the period of early European settlement. These records include ethnohistoric accounts that can be used to obtain information about the way in which Aboriginal people in the area lived at the time of early European contact and may be used to make inferences regarding the pre-contact period.

Ethnohistoric records indicate that the Coffs Harbour region was part of the territory of the Kumbainggiri or Gumbaynggir language group. The Kumbainggiri lands extended south-east from the lower Nymboida River to Urunga and Bellingen, along the coast from Nambucca Heads to Woolgoolga and inland to South Grafton (Tindale 1974). Populations were comparatively dense on the coast, with reference made to gatherings of up to 500 men (Bellshaw 1978:72). Inland riverine and 'rainforest' areas were reportedly less densely occupied due to lower resource availability (Bellshaw 1978:74). Ethnohistoric records describe a population already significantly affected by the introduction of European diseases and therefore population estimates are likely to considerably under represent the numbers of Aboriginal people in the region prior to 1788 (refer to Butlin 1982).

The Kumbainggiri tribe was divided into four intermarrying sections with associated totems and rules governing marriage and social relationships (Mathews 1909 in Ryan 1964:42). Smaller sub-groups (or hordes) were composed of family groups and occupied specific areas within the tribal boundary. These smaller groups would periodically come together for seasonal resource exploitation or for particular events such as initiation ceremonies but for the most part functioned as individual units (Ryan 1964:58-60).

Ethnohistoric accounts describe the use of a broad variety of animal resources including kangaroo, possum, snake, lizard, a variety of birds, echidna, flying foxes, fish (marine, estuarine and saltwater species) and shellfish (Ryan 1964:134-147). Plants were also used for food and medical purposes and as a source of raw materials for the manufacture of items such as string, fishing line, canoes, shelters, weapons and storage implements (Ryan 1964:142-147). Stone artefacts are occasionally mentioned in the early accounts and Dawson referred to the use of stone artefacts in the pre-contact period as follows:

> With such inefficient implements as stone tomahawks, flint knives, shell scrapers and pointed sticks, imagine the infinite patience required to cut most

> of their living out of hardwood trees and logs, to strip bark for their shelters, and to shape and fashion their weapons of war and for the chase.
>
> Dawson (in Ryan 1964:162)

These ethnohistoric accounts indicate that the coastal zone of the Coffs Harbour region was relatively densely occupied and provided a rich variety of raw materials for use by the Kumbainggiri people.

3.2 ARCHAEOLOGICAL CONTEXT

3.2.1 Regional context

The primary research issues addressed by previous archaeological research in the Coffs Harbour region relate to the patterning of population movement and exchange within the region (refer to Godwin 1999). Based on archaeological evidence from sites within the Clarence River Valley and a review of ethnohistoric information, McBryde (1976) posited a seasonally-based model of population movement. McBryde (1976) argued that people focussed on the coast and the associated fish and shellfish resources during the summer months. In winter the focus shifted to the hinterland and increased exploitation of terrestrial mammals as the primary animal food resource.

There are a number of issues in relation to McBryde's model. Most notable is that the major fish runs in the region occur in winter (Godwin 1999:212) and it is assumed that people would want to exploit this plentiful resource and therefore occupy the coast during the winter months. Furthermore, ethnohistoric records indicate a degree of boundedness to the territories of north coast Aboriginal groups (as discussed above), which may have reduced the likelihood of large scale seasonal population movement (Godwin 1999:212).

An alternative model for the region was formulated by Coleman (1982) and employed data from large midden sites, with the two focal sites (Clybucca and Stuart's Point), situated in the Macleay River Valley. Coleman (1982:2) argued that coastal communities consisting of relatively high populations occupied small defined territories. Based on the apparent abandonment of estuarine sites in the Macleay River Valley between 2500 to 3000 years ago, Coleman (1982:9) suggested that there was a shift from estuarine to littoral resources, possibly triggered by geomorphological changes. By exploiting the rich coastal zone and utilising technologies such as stone fish weirs, Aboriginal people were able to become semi-sedentary, as described in the early ethnohistoric accounts (Coleman 1982).

The evidence from the Macleay River Valley is broadly explained by Coleman's theory, however it does not concur with the archaeological record from other catchments along the north coast. Based on Coleman's model, the use of estuarine sites must have been significantly reduced after 2500 years

ago. However, in the Clarence River Valley and several other locations, this is not the case (Godwin 1999:215). Furthermore, the evidence for the use of fish weirs is somewhat questionable in that they may have been European constructions (Godwin 1999:215).

It is therefore apparent that Coleman's and McBryde's models do not encompass the full range of evidence from the north coast region. However, both of these theories provide a perspective on settlement patterns along the north coast that is applicable in separate localities and provides relevant research issues for consideration within the current study.

3.2.2 DEC AHIMS Search

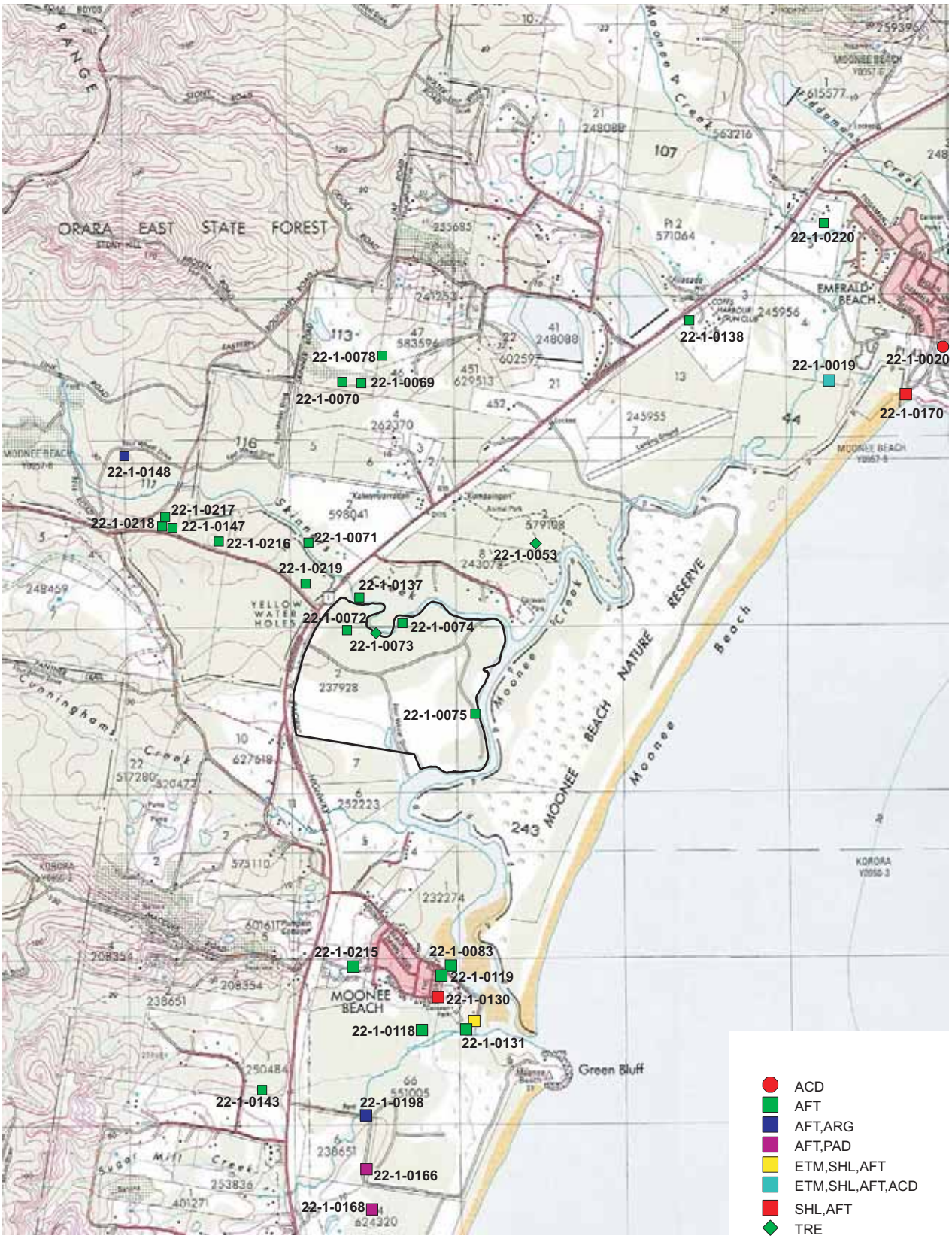
A search of the DEC Aboriginal Heritage Information Management System (AHIMS) database reveals that 41 sites are recorded within approximately five kilometres surrounding the study area. The site types are listed in *Table 3.1.*

Table 3.1 AHIMS recorded sites within the region

Site feature	Number of sites
AFT (artefact)	25
ETM,SHL,AFT (earth mound, shell, artefact)	4
AFT,PAD (artefact, potential archaeological deposit)	3
SHL,AFT (shell, artefact)	2
AFT,ARG (artefact, Aboriginal resource and gathering)	2
TRE (carved or scarred tree)	2
ETM,SHL,AFT,ACD (earth mound, shell, artefact, Aboriginal ceremony and dreaming)	1
PAD (potential archaeological deposit)	1
ACD (Aboriginal ceremony and dreaming)	1
Total	**41**

1. Source: AHIMS data 10/04/06.

The AHIMS database describes sites according to site feature rather than site type. Sites may include several different features. The feature AFT refers to the presence of artefactual material and may include stone, bone, ceramic, metal or shell artefacts. However, sites listed with this feature are typically stone artefact scatters or isolated artefacts. Artefact scatters and isolated artefacts are the most common site type in the area and are typically located in close proximity to drainage lines and creeks and are clustered near the mouth of Moonee Creek (refer to *Figure 3.1*). This may, however, be a factor of the location of previous archaeological surveys, as will be discussed in *Section 3.2.4*.



Source: 1:25,000 Topographic Series

0 500m

Figure 3.1 **AHIMS Registered Sites within the Local Area**

The Glades Estate, Coffs Harbour

3.2.3 Heritage Register Listings

As at the 2nd of May, 2006 there were no indigenous sites within the study area listed on the State Heritage Register, State Heritage Inventory, Register of the National Estate or Coffs Harbour Council Local Environmental Plan 2000.

3.2.4 Local Archaeological Context

The majority of sites recorded on the AHIMS database (refer to *Section 3.2*) have been identified during the course of archaeological assessments carried out in relation to development activities (refer to McBryde 1967 & 1972, Piper 1986, Navin 1991; Collins 1994a, 2002, McDonald and Collins 1999, Murphy 2000 and Collins 2002). The most relevant of these reports are summarised below.

Piper (1986) An archaeological survey for Aboriginal sites and relics in the Moonee Beach area, Coffs Harbour, NSW

This assessment focussed on two areas, which Piper refers to as Site 2 and Site 5A. Site 2 is located to the north-east of the current study area within the stabilised dune band that includes a large pond and is subject to regular flooding. Site 5A is situated directly opposite the study area on the western side of the Pacific Highway. This area is named 'Yellow Waterholes' and consists of a swamp formation surrounded by gentle slopes. No artefacts were present at either location.

Navin (1991) An archaeological survey of a proposed development area at Moonee, north of Coffs Harbour, New South Wales

This assessment of 90 hectares of land approximately 350 metres north of the present study area and extending along Moonee Creek included land previously surveyed by Piper (1986). A scarred tree was identified within an area of mixed regrowth and old forest. The tree is a swamp mahogany with a large (220 centimetres by 140 centimetres) sub-oval scar. The site was assigned high social and scientific significance and it was recommended that the tree be retained within a 50 metre buffer zone.

Collins (1994a) Proposed rural residential subdivision at Moonee, N.S.W. North Coast

This survey involved the assessment of a 10 per cent sample of a proposed rural residential subdivision of a 156 hectare development area located on the northern side of Skinners Creek (to the north west of the current study area). Four sites were located in the study area and consisted of one isolated find and three artefact scatters. The two larger artefact scatters (35 and 15 artefacts) may be a continuous site and were located on a ridgeline that passes

from the coastal lowlands to the inland ranges and is approximately 150 metres from the nearest permanent creek. As there were no notable resources within the study area, Collins (1994a:27) suggested that the recorded sites represent transitory and itinerant use of the area.

Collins (2002) Coffs Harbour Highway Planning Sapphire to Woolgoolga Aboriginal Heritage Assessment

This study involved the assessment of four options for the proposed upgrade to the Pacific Highway, adjacent to the present study area. Four artefact scatters were identified in close proximity to the study area. All were situated in elevated locations and contained artefacts composed of chert, siltstone and greywacke. Collins (2002:14) also reported that Yellow Waterholes is an unmodified women's site linked to other women's sites within the area and is a significant cultural site for local Aboriginal people.

3.2.5 Previous Archaeological Investigations within the Study Area

The study area has been previously assessed in its entirety by Collins (1994b). Collins' (1994b) study was conducted when the study area was heavily vegetated and focussed on areas of exposure, namely logging tracks and dumps. Seven sites were recorded within the study area and are listed in *Table 3.2*.

The sites were concentrated on the northerly slope above Skinners Creek and on the banks of Skinners Creek and Moonee Creek. Collins (1994b:26) argued that this was not a factor of the survey strategy as all landform units were surveyed and visibility was greater than 30 percent on the ridge and southerly slopes. She therefore proposed that Aboriginal people focussed their activities along Skinners Creek.

The artefacts were all made of locally available raw materials and a comparatively high proportion of cores and cortex-bearing artefacts were present. Collins (1994b:26) therefore suggested that raw materials were plentiful and that primary manufacture of artefacts occurred on site. However, none of the sites were extensive or concentrated and it was suggested that the occupation of the area may have been on an itinerant basis and focussed on the area surrounding Site 2.

Table 3.2 Sites recorded by Collins (1994b)

Site name	Location[1]	Site type	Landform unit	Contents	Comments
Site 1	514520 6659800	Isolated artefact	Simple slope	Greywacke flake with cortex.	The site was considered unlikely to contain further artefacts as there was good visibility in surrounding area but no further artefacts were identified.
Site 2	514340 6660000	Artefact scatter	Simple slope	15 artefacts (flakes, flaked pieces and cores of silcrete, quartz, coarse-grained volcanic and greywacke).	The artefacts were disturbed however undisturbed vegetated areas nearby may contain undisturbed materials.
Site 3	514500 6659990	Isolated artefact	Creek flat	Siltstone 'pebble piece'.	
Site 4	514520 6659980	Scarred trees	Creek flat	Two blackbutt trees with scars of 'potential Aboriginal origin'.	
Site 5	514680 6660040	Artefact scatter	Creek flat	4 artefacts (siltstone).	
Site 6	515120 6659480[2]	Artefact scatter	Creek flat	7 artefacts (flakes, flaked piece, core and 'micro-debitage' of siltstone).	
Site 7	515120 6659480	Isolated artefact	Creek flat	Greywacke 'pebble core tool'.	

[1] Site coordinates listed in AMG 66.

[2] Location of Site 6 and Site 7 are the same however based on field map provided by Collins, coordinates for Site 6 are incorrect.

Collins (1994b:16) also noted that whilst the Aboriginal community did not feel that the study area had any particular significance, it is known as a traditional travel route. Bucca Rd was described as part of 'a traditional Dreaming route connecting with the Kangaroo Flat area further northwest, and that Aborigines from inland areas used this route to travel to Look-At-Me-Now Headland for seafood.' (Collins 1994b:16).

In assessing the scientific (archaeological) significance of Site 2, Collins (1994b:28) emphasised the relative rarity of stone artefact scatters in the area and the possible link between Site 2 and use of the Bucca Road area as a transit route by Aboriginal people. Site 2 was also considered to have the potential to contain '*in-situ*' archaeological deposits and was assessed as being of moderate to high scientific significance. Site 1 was considered as being of low archaeological significance. The remaining five sites were outside of the proposed development footprint and were not further assessed.

Appleton (2003) conducted a re-investigation of Site 2. With the exception of an area of remnant vegetation, Site 2 had been cleared and the ground surface had been graded or 'levelled' resulting in the removal of part of the upper soil horizon and significant disturbance to the archaeological material visible on the surface (Appleton 2003:7). Visibility was limited due to vegetation coverage. However, five artefacts were found in four separate exposures within the ridge and slopes in which Site 2 was originally recorded by Collins (1994b). The artefacts were all situated on the eastern side of the remnant vegetation.

Appleton (2003) argued that the artefacts identified during the survey were in a disturbed context and that it was unlikely that test excavations would result in the recovery of significant numbers of artefacts. He defined an area of archaeological sensitivity surrounding Site 2 to include the area of remnant vegetation and a portion of the ridge and slope to the west of the remnant vegetation. It was recommended that a Section 90 Consent should be obtained for any development activity in the area of archaeological sensitivity.

3.3 PREDICTIVE STATEMENT AND EXPECTED SITES

Based on the previous assessments of the study area, stone artefact scatters and isolated finds will be present within the study area and are likely to be concentrated on the slopes above Skinners Creek and the banks of Skinners Creek and Moonee Creek. Sites will be comparatively small and artefact densities will be low. Scarred trees may also be present in the study area however due to earlier vegetation clearance, there is a possibility that scarred trees will have been removed.

3.4 CONCLUSION

The north coast region and Coffs Harbour locality have been the subject of a range of archaeological investigations. The two major models relating to population movement and settlement patterns utilise evidence excavated from datable sites with high integrity and raise research questions regarding seasonal population movements.

Previous investigations within the study area have identified stone artefact scatters and isolated finds in addition to two possible scarred trees. However, the integrity and location of these sites may have been affected by recent land use.

4 SURVEY METHODOLOGY

4.1 INTRODUCTION

In order to determine the validity of a field survey, it is necessary to review the fieldwork methodology. This section describes the survey strategy, the criteria used to identify artefacts and the means by which survey coverage was calculated.

4.2 SURVEY STRATEGY

The survey was conducted by seven people divided into two groups who traversed the area in a number of transects. Each transect was between 15 and 20 metres in width depending on the number of fieldworkers. The survey strategy focussed on the area included within the proposed development footprint, however a sample of all landforms within the study area was surveyed. Due to the vegetation coverage, the survey targeted areas of exposure and previously recorded sites.

4.3 SURVEY COVERAGE

In accordance with NSW NPWS (1997:18), the description of survey coverage includes the landform unit area and a quantification of the level of exposure and visibility. The survey units were mapped using a combination of hand-held GPS and visible landmarks, namely vehicle tracks and creeklines.

Visibility refers to the amount of ground upon which artefacts could be seen. The presence of vegetation, leaf litter and other variables can obscure visibility, which is expressed as a percentage (NSW NPWS 1997:18).

Exposure is defined as areas in which erosional processes result in the removal of soils and permit the detection of archaeological material that was formerly subsurface. Exposure is similarly determined as a percentage of the survey unit (NSW NPWS 1997:18). Discrete areas of exposure were mapped and levels of exposure and visibility were recorded.

Effective coverage was calculated for each discrete exposure by multiplying the area of the exposure by the percentage of visibility and exposure within that area. The effective coverage for the study area is the sum of effective coverage for each recorded exposure and is therefore an underestimation of overall effective coverage as it does not take into account background exposure and visibility within the survey transects. However, in this instance, it is more meaningful than broader estimations of effective coverage that average the percentage of visibility and exposure across survey units.

4.4 ABORIGINAL SITE IDENTIFICATION

The criteria applied to the identification of Aboriginal sites are outlined below.

Stone Artefacts

There are a number of grounds for distinguishing between artefacts that have been flaked through human activity and those that result from natural processes. These are features such as negative and positive bulbs of percussion, ring cracks, ripple marks, flake terminations and errailure scars (Holdaway and Stern 2004:6-9)). For the purposes of this assessment, flaked stone artefacts were identified on the basis of the presence of one or more of these attributes. Other stone artefacts such as grindstones or hammerstones are identified by the presence of distinctive pitted, crushed or abraded surfaces.

The location of each artefact was recorded using a hand-held GPS unit. The attributes listed in *Table 4.1* were recorded for each artefact (where applicable).

Table 4.1 Recorded artefact attributes

Variable	Attribute
Raw material	Mudstone, quartz, coarse-grained igneous (CGI), chert, siltstone and quartzite.
Artefact type	Flake (recorded as complete, proximal fragment or other fragment), core (unidirectional, multidirectional, bipolar), retouched flake, broken flake (proximal or other), flaked piece.
Implement	Following McCarthy (1976).
Size	Maximum dimension (mm).
Platform type	Cortex – surface is outer weathered surface of a stone cobble or fragment. Single scar – platform is a single flaked surface or freshly broken surface. Several scars - platform is comprised of several flaked scars. Faceted – platform surface is comprised of a series of small scars typically overlying larger scars.
Cortex	Proportion of cortex remaining on the artefact (%).
Notes	Includes notes on macroscopic signs of use.

1. Artefact types defined by Hiscock 2002 (see McCarthy 1976 for implement types).

The following variables were recorded for stone artefact scatters: site coordinates (AMG66); landform element; site size (visible distribution of artefacts within a continuous exposure or landform); exposure type; visibility within and outside the exposure; and the likelihood of sub-surface deposits.

Scarred Trees

The removal of bark and wood from trees results in the presence of scarring on the tree trunk. However, it is often difficult to distinguish between scars of natural and anthropogenic origin. It is similarly important to identify where scarring relates to Aboriginal rather than European activities. Two broad criteria, detailed below, were employed in the identification of Aboriginal scarred trees during this survey:

- the scar must be of a size and shape and location on the tree that suggests it was caused by removal of bark by an Aboriginal person or Aboriginal people. Typically scars are symmetrical in form and a size that suggests the removal of bark for containers, carrying implements, shields or canoes. There may also be small scars resulting from the cutting of footholds used to climb trees;

- any tool/axe marks that may be present should demonstrate a degree of weathering that indicates that they are not of recent origin; and

- the tree (and the scar) must be sufficiently old to indicate that the removal of bark took place at a time when Aboriginal people were employing traditional methods in the production of their material culture.

5 SURVEY RESULTS

5.1 SURVEY COVERAGE

The location of surveyed transects is shown in *Figure 5.1* which shows the routes walked during the survey. The area surveyed includes a small portion of land outside the study area. The calculation of effective coverage provides a means with which to describe the proportion of the study area in which it was possible to assess the presence or absence of artefacts. Effective coverage within all landform units was low at approximately 0.57 per cent (refer to *Table 5.1*).

Table 5.1 Effective coverage by landform unit

Landform unit	Area (m^2)	Effective coverage (m^2)	Effective coverage (%)
Ridge	123,189	4790	3.89
Slopes	372,583	529	0.15
Flats	508,094	652	0.13
Open depression	45,702	0	0
Totals	1,049,568	5971	0.57

5.2 PREVIOUSLY IDENTIFIED SITES

All sites identified during the survey are considered to be part of sites previously identified by Collins (1994b) and are shown on *Figure 5.2*.

5.2.1 Site 1 (Artefact scatter)

This site consists of nine artefacts (artefacts 37-40, 42 and 46-50, refer to *Annex A*) located on the central ridge within the study area and is a continuation of Collins' Site 1 (isolated artefact). Site 1 and Site 2 may have been a single site however due to the level of disturbance, this is not possible to determine. The visible extent of Site 1 is approximately 200 metres by 75 metres and is associated with exposures related to vehicle tracks. Gully erosion within the north-south track containing artefacts 46-50 was severe, resulting in the exposure of the subsoil (B horizon). The site has been disturbed by the clearance of vegetation, use of the vehicle tracks and erosion. Visibility within the exposure was high at 50 % and it is unlikely that substantial quantities of additional artefacts are present at this site.

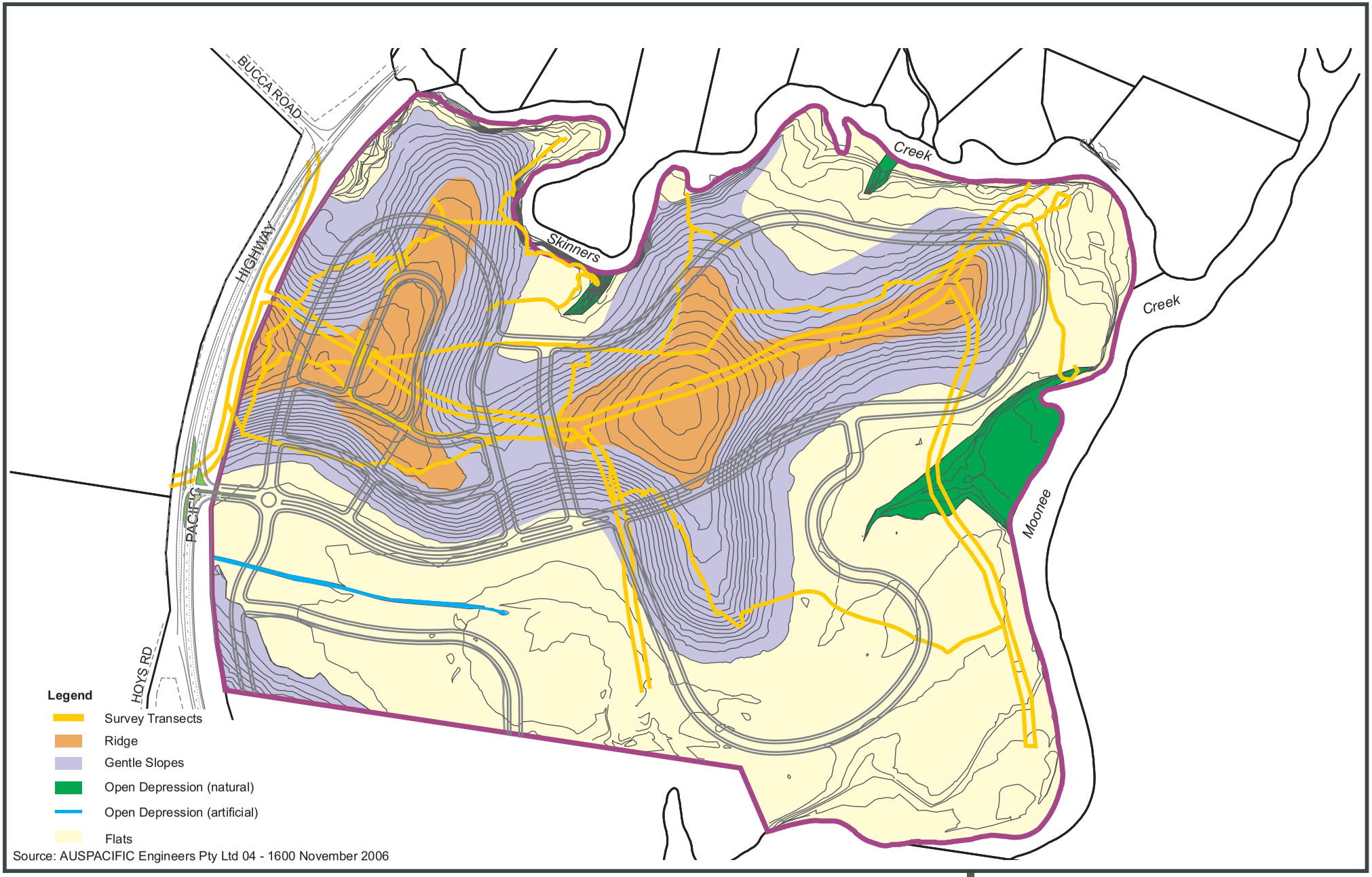
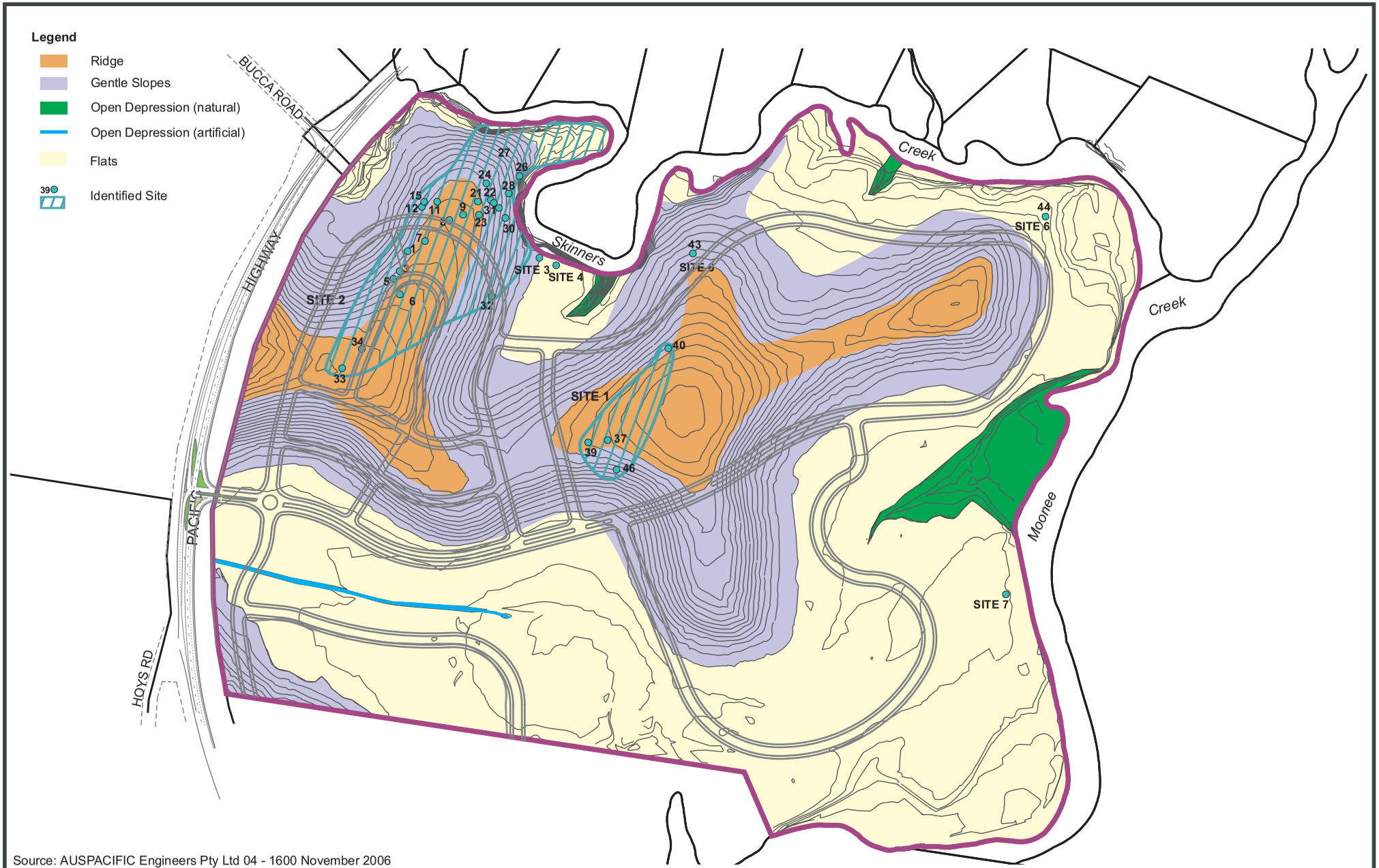


Figure 5.1 **Survey Transects**

The Glades Estate, Coffs Harbour



ERM

0 150m

Figure 5.2 **Sites Identified within the Study Area**

The Glades Estate, Coffs Harbour

5.2.2 Site 2 (Artefact scatter) 22-1-0072

Site 2 consists of a low density scatter of artefacts surrounding an area of remnant vegetation along a ridge and adjoining slope and flats in the north of the study area. Site 2 contains 36 artefacts (artefacts one to 36, refer to *Annex A*) distributed over an area with maximum dimensions of 180 metres by 450 metres. Vegetation clearance and associated heavy machinery activity has caused significant disturbance, resulting in the exposure of the upper soil unit. The artefacts in Site 2 are disturbed and have been moved both laterally and horizontally. However, the area of remnant vegetation has not undergone significant disturbance and potentially contains further archaeological deposits.

5.2.3 Site 3 (Isolated artefact)

Site 3 could not be located despite detailed inspection of its reported location.

5.2.4 Site 4 (Scarred trees)

Site 4 could not be located. All mature trees in the vicinity of Site 4 were inspected for any signs of scarring. No scarred trees were identified and it is possible that two blackbutts with scars of potential Aboriginal origin reported by Collins (1994b) have died or been removed as part of vegetation clearance.

5.2.5 Site 5 (Artefact scatter) 22-1-0074

A single artefact (artefact 43, refer to *Annex A*) present in an area of exposure approximately 10 metres by 15 metres on a gentle slope overlooking Skinners Creek is an extension of Site 5 as identified by Collins (1994b). Minor erosion due to disturbance associated with vegetation clearance and vehicle activity has resulted in the exposure of the upper soil horizon. Visibility within the exposure was high at 60 %. The archaeological potential of Site 5 is considered low. However, visibility and exposure was low in the heavily vegetated area immediately to the north. This area is considered to have the potential to contain archaeological deposits.

5.2.6 Site 6 (Artefact scatter) 22-1-0075

Site 6 (as identified by Collins 1994b) is located on the creek flat near the junction of Skinners Creek and Moonee Creek. The co-ordinates listed for Site 6 in Collins' report (1994b) do not match the location of the site on Collins' map. The same co-ordinates are listed for Site 7 and therefore the location of Site 6 on the map was used in preference to the recorded co-ordinates. Two artefacts (artefacts 44 and 45, refer to *Annex A*) were located in an exposure associated with a vehicle track on the creek flat. Minor erosion had occurred on the vehicle track and resulted in the exposure of the upper soil horizon.

Visibility within the surrounding undisturbed area was low. It is likely that further archaeological deposits will be present, hence this site is considered to have high archaeological potential.

5.2.7 Site 7 (Isolated artefact)

Site 7 could not be located despite very good visibility in its recorded location.

Table 5.2 Sites recorded during the survey

Site name	AHIMS no. (if registered	Location (centrepoint)	Site Type	Artefact numbers	Landform unit	Archaeological potential
Site 1		514573 6659660	Artefact scatter	37-40, 42, 46-50	Ridge	Low
Site 2	22-1-0072	514314 6659977	Artefact scatter	1-36	Ridge, gentle slopes, flats	High within area of remnant vegetation
Site 5	22-1-0074	514682 6659949	Artefact scatter	43	Gentle slope	Low
Site 6	22-1-0075	515180 6660008	Artefact scatter	44-45	Flats	High

5.3 STONE ARTEFACTS

A list of the stone artefacts identified during the survey is provided in *Annex A*. Mudstone was the most common raw material, followed by coarse-grained igneous, with siltstone, quartz, quartzite and very fine-grained mudstone or chert present in smaller quantities. Flakes (including broken flakes) were the most common artefact type with cores also comparatively common. With the exception of two probable hammerstones, no formal tool types were identified. The majority of artefacts did not retain cortical material.

Table 5.3 Artefacts by type and raw material

	Artefact raw material							
Artefact type	MS	MS/chert	CGI	Quartz	Quartzite	Siltstone	Total	% of total types
Flake	13	2	6	3		1	25	51%
BFP	3		1				4	8%
BFO	4		1				5	10%
BF (left)	1						1	2%
RF		1			1		2	4%
Core	3		2			4	9	18%
HS			1				1	2%
FP	1		1				2	4%
Total	25	3	12	3	1	5	49	100%
% of all raw materials	51%	6%	24%	6%	2%	10%	100%	

1. MS=mudstone; CGI=coarse-grained igneous; BFP=broken flake(proximal);BFO=broken flake(other); RF=retouched flake;HS=hammerstone;FP=flaked piece.

5.4 *POTENTIAL ARCHAEOLOGICAL DEPOSIT*

It is essential to consider the potential for archaeological material to be present either in areas of poor visibility and/or in a subsurface context. In relation to the management of the archaeological resource and legislative requirements, the likelihood that sub-surface archaeological deposits may be present within an area has implications for any proposed development activity.

In terms of archaeological assessment, it is important to recognise that not all potential deposits necessarily contribute to our understanding of past human activities. The primary archaeological importance of subsurface deposits lies in their potential to provide information that will assist in interpretation of the archaeological record through time and space. For this reason, areas described as potential archaeological deposits should satisfy one or more of the following criteria:

- sufficiently high numbers of artefacts to allow for statistically viable detailed analysis and intra- and inter-site comparison of artefact assemblages;
- deposits that have been subject to minimal disturbance and retain integrity; and
- have the potential for datable materials, either in chronological or absolute terms.

The majority of the study area has been disturbed due to vegetation clearance and associated sub-surface disturbance (as discussed in *Section 2.2*). Therefore, although additional artefacts may be present in these areas, they are likely to be disturbed and dispersed to such an extent that it is unlikely

that they will provide further information. However, a number of areas across the site remain relatively undisturbed. Of these, the areas shown on *Figure 5.3* are considered as Potential Archaeological Deposits. They are located on relatively level elevated areas in close proximity to Moonee Creek and Skinners Creek and are associated with areas in which artefacts have been identified. In particular, the area of remnant vegetation within Site 2 is considered likely to contain further surface and sub-surface deposits.

5.5 ABORIGINAL INFORMATION

During the field survey, Mark Flanders noted that the area shown on *Figure 5.3* as an area of cultural significance felt like an important area and gave him a feeling that we should not be in that area. The area consists of a level slope above the junction of Moonee Creek and Skinners Creek. Mark also expressed the view that the level vegetated area above Moonee Creek felt like good camping locations and were likely to have been used by Aboriginal people.

Shirley and Robyn Duroux spoke about Yellow Waterholes (to the west of the study area on the opposite side of the Pacific Highway) as being an important women's site however no other such sites were identified in the study area.

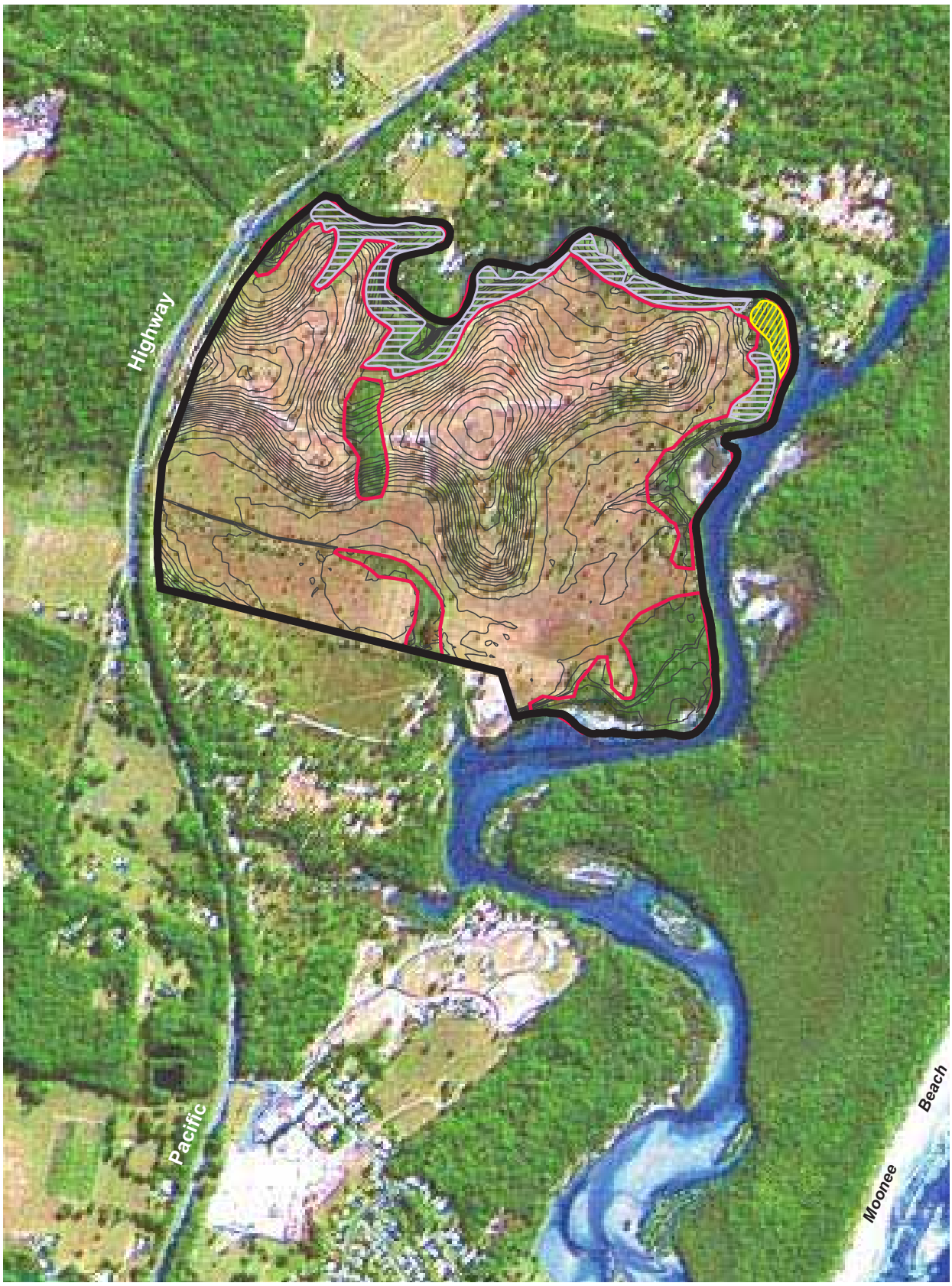
5.6 DISCUSSION

The survey of the study area resulted in the identification of a number of stone artefacts, all of which are part of sites previously identified by Collins (1994b). It was not possible to relocate three sites originally recorded by Collins however this was not unexpected due to the increased level of disturbance following vegetation clearance across the site.

The majority of artefacts identified during the survey are located on the ridge and gentle slope formation in the north-east of the study area and are situated on either side of an area of remnant vegetation above Skinners Creek. The sites identified during this and previous investigations are clustered along Skinners Creek with only two sites on the banks of Moonee Creek. This is likely to reflect the periodic availability of freshwater along Skinners Creek as opposed to the estuarine resources of Moonee Creek. The artefacts are all made of locally occurring raw materials that may have been sourced from surrounding creeklines and the beach at Moonee. In contrast to the pattern identified by Collins (1994b), the representation of cores and cortex-bearing artefacts was comparatively low. This brings into question Collins' suggestion that primary artefact reduction was occurring on site. It seems more likely that the raw materials had been curated elsewhere before being used in the study area. Although a larger number of artefacts were identified during the present survey, the overall pattern of artefact density and distribution

supports Collins' (1994b) argument that use of the area was not extensive or concentrated.

The level of disturbance associated with vegetation clearance has had a significant impact on the distribution of artefacts within the study area. Site 2 contains the highest number of artefacts however they are far more dispersed than when the site was previously recorded by Collins (1994b). The removal of vegetation and the associated movement of topsoils is likely to have resulted in the lateral and horizontal relocation of artefacts and the dispersal of artefacts across a broader area. The artefacts in Site 1 and Site 6 have similarly been affected by disturbance. However, areas of remnant vegetation remain relatively intact and the areas shown on *Figure 5.3* are considered to have the potential to contain further surface and sub-surface archaeological deposits. The Aboriginal community has previously stated that the area is part of a traditional transport route from the hinterland to the coast. An area of cultural importance was identified during the field survey.



LEGEND

Study Area | Remnant Vegetation | PAD | Area of Cultural Significance

Source: LPI-Spatial Portal

0 250m

Approximate

Figure 5.3

Areas of Archaeological Potential and Cultural Importance

The Glades Estate, Coffs Harbour

6 SIGNIFICANCE ASSESSMENT

The assessment of significance is an integral component in the formulation of management and mitigation plans in relation to cultural heritage resources (Pearson and Sullivan 1994:21). Cultural heritage management recommendations are typically made in response to an assessment of cultural significance. The Burra Charter (Australia ICOMOS Burra Charter 1999) defines cultural significance in terms of the aesthetic, historic, scientific and social value of a heritage item or place. In relation to Aboriginal cultural material, considerations of social and scientific significance are generally weighted most heavily, although other factors may also be of relevance.

For management purposes, the levels of site significance can be described as follows:

- sites that are assessed to be of high significance should be conserved and warrant protection against development;
- sites that are assessed to be of moderate significance should be conserved if possible, however in the event that these may be affected by development, management strategies should be implemented to mitigate against the impact; and
- sites that are assessed to be of low significance should be conserved if possible, but should not represent an obstacle to development.

6.1 ABORIGINAL (SOCIAL) SIGNIFICANCE

The assessment of social significance is the prerogative of the Aboriginal community and typically involves the consideration of a site(s) in conjunction with the archaeological, cultural and natural aspects of the surrounding landscape.

The area is of importance to local Aboriginal people and is considered to represent an important element of the cultural landscape as a traditional route area between the estuarine and littoral resources surrounding Moonee Creek and Skinners Creek and the hinterland to the west. Within the study area, the area shown on *Figure 5.3* as an area of cultural significance was described as being one in which no development should occur and which should not be a focus of public use.

6.2 ARCHAEOLOGICAL (SCIENTIFIC) SIGNIFICANCE

The archaeological significance of an Aboriginal site, object or place is assessed according to its potential to address research questions and provide additional information of value to interpretations of past human activities

(Australia ICOMOS Incorporated 2000:12). The assessment of scientific significance should consider the rarity and representativeness of the site, its integrity and connectedness in relation to research potential.

Table 6.1 Significance Assessment

Site	Rarity and representativeness	Integrity	Research potential	Significance
Site 1	Site 1 is an artefact scatter containing nine artefacts. The range of artefacts and raw materials is typical of other stone artefact scatters, a site type that is relatively common in the region.	Site 1 has been disturbed by vegetation clearance, vehicle movement and erosion and is of low integrity.	It is unlikely that further substantial archaeological deposits are present in Site 1 and it has low research potential.	Site 1 is considered to be of low archaeological significance.
Site 2	Site 2 is an artefact scatter containing 36 artefacts and is a comparatively large site within the local area. The location of Site 2 on a level ridge in close proximity to a water source is typical of artefact scatters within the local area. The comparatively high number of artefacts are composed of a range of raw materials found in smaller sites in the local area.	Site 2 has been heavily disturbed and it is likely that the artefacts have been dispersed. However, the area of remnant vegetation is relatively intact.	Due to the comparatively high number of artefacts for sites within the local area, Site 2 should be considered to have research potential. However the dispersal of these artefacts makes it difficult to identify discrete concentrations of artefacts suitable for excavation. The area of remnant vegetation is less disturbed and has moderate research potential.	The disturbed portion of Site 2 is of low archaeological significance. The undisturbed portion of Site 2 (within the area of remnant vegetation) is of moderate archaeological significance.
Site 3	Site 3 was recorded by Collins (1994b) as an isolated stone artefact and could not be relocated during the present study. This site type and artefact type are common within the study area.	The site was located in a vehicle track and had a low level of integrity.	The site had low research potential.	Site 3 is of low archaeological significance.
Site 4	Site 4 was recorded by Collins (1994b) as two scarred trees of potential Aboriginal origin. The site could not be relocated and it is possible it has been destroyed. Scarred trees are not common within the local area and the presence of two associated scarred trees would have high rarity and representative	The site may have been destroyed and could not be relocated.	It is unlikely that further information could be obtained from more detailed recording of the trees.	Site 4 is of low archaeological significance.

Site	Rarity and representativeness	Integrity	Research potential	Significance
	value.			
Site 5	Site 5 is an isolated artefact but is associated with artefacts previously recorded by Collins (1994b). The site type is common within the area and is of low representative value.	Site 5 is comparatively less disturbed and retains some archaeological integrity.	Site 5 is considered to have low research potential however additional archaeological deposits may be present in the vegetated area to the north of Site 5.	Site 5 is of low archaeological significance.
Site 6	Site 6 is an artefact scatter containing two artefacts on a level rise overlooking Moonee Creek and Skinners Creek. The site is common within the area and is of low representative value.	Site 6 is located within a vehicle track and has a low level of integrity.	Site 6 is considered to have low research potential. It is bordered by an area of potential archaeological deposits in which higher numbers of artefacts were identified by Collins (1994b).	Site 6 is of low archaeological significance
Site 7	Site 7 is an isolated artefact that was not relocated during the present study. Isolated artefacts are common within the local area in association with water sources.	The artefact was found in a cutting of Moonee Creek and therefore is unlikely to have retained its integrity.	Site 7 is located within a low-lying swampy area that is unlikely to contain further archaeological materials. It has low research potential.	Site 7 is of low archaeological significance.

7 IMPACT ASSESSMENT

The impacts of the proposed development will be largely confined to the development footprint shown in *Figure 1.2*. Sites included within the proposed development footprint are Site 1, part of Site 2 and Site 5. The proposed subdivision will involve the clearance and landscaping of the areas within the development footprint. The highest areas along the ridge will be reduced in height by the removal of soils and fill will be placed on top of the natural deposits in the lower areas of the development footprint. Four noise attenuation berms will be mounded along the Pacific Highway boundary of the study area. Roads (refer to *Figure 1.2*) and in-ground infrastructure (including water, power, stormwater and sewerage services) will be constructed to service the dwellings. Sub-surface disturbance will also occur in association with the construction of individual dwellings. Surface and sub-surfaces disturbances within the proposed development footprint will be extensive and are likely to result in the movement, damage or destruction of any archaeological materials that are present within the development footprint.

The area outside the proposed development footprint will be largely undisturbed. This area includes part of Site 2, Site 3, Site 4, Site 6, Site 7, the area of cultural significance and the PADs shown in *Figure 5.3*. Impacts outside the development footprint will be limited to the construction of recreation facilities and cycle and pedestrian tracks. The method of construction of tracks will vary according to the sensitivity of the area and may include concrete pathways, crusher dust walkways or elevated boardwalks. The impacts in these areas will similarly vary according to the construction method.

8 RECOMMENDATIONS

The following recommendations have been formulated in light of the archaeological context of the area; the results of the survey; the potential impacts of the proposed development; and the requirements of cultural heritage legislation.

8.1 RECOMMENDATIONS FOR SPECIFIC SITES

The site specific recommendations are as follows:

1) The area of remnant vegetation within Site 2 (as identified in *Figure 5.3*) has been identified as being of moderate significance (refer to *Table 6.1*) and should not be disturbed. During construction works, the area of remnant vegetation within Site 2 should be protected from potential impacts by high visibility fencing and all contractors should be made aware that the area should not be disturbed.

2) If activities involving ground disturbance within the area of remnant vegetation within Site 2 are unavoidable, further archaeological investigation will be necessary prior to any disturbance.

3) A surface collection of artefacts should be undertaken by representatives of the Aboriginal community and an archaeologist in the portion of Site 2 to be disturbed. Representatives of the Aboriginal community have stated that they wish to monitor initial ground disturbance works along the ridge on which Site 2 is located.

4) A surface collection of artefacts should be conducted by representatives of the Aboriginal community and an archaeologist in the vicinity of Site 1 and Site 5.

8.2 GENERAL RECOMMENDATIONS

The general recommendations are as follows:

1) The areas of potential archaeological deposits and cultural significance identified in *Figure 5.3* should not be disturbed.

2) Should any activity be necessary in the area of cultural significance identified in *Figure 5.3*, further consultation with the Aboriginal community should be undertaken prior to any such activity being initiated.

3) Site 3, Site 4, Site 6 and Site 7 are outside the proposed development footprint and should be protected during the construction process. All

contractors should be made aware that these sites should not be disturbed.

4) Should impacts outside the proposed development area occur in relation to the construction of recreational areas and pathways, it is recommended that ground disturbance be confined to previously disturbed vehicle tracks or that ground disturbance be minimised by the use of elevated boardwalks. Should this be unworkable, additional advice should be sought from an archaeologist and the Aboriginal community regarding the proposed location of any ground disturbance works. This may require further archaeological investigations in the form of surface collections or test excavation.

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Annex A

Table of Exposures

Table A.1 List of Exposures

Exposure number	Location	Landform	Size (m)	% exposure	% visibility	Effective coverage
1	514098 6659843	Ridge	30 x 15	50	50	112.5
2	514243 6659943	Slopes	20 x 20	30	60	72
3	514384 6659955	Ridge	10 x 20	40	70	1,256
4	514272 6659930	Ridge	10 x 15	40	80	48
5	514270 6659906	Ridge	10 x 5	30	70	610.5
6	514314 6659977	Ridge to slopes	40x100	40	80	1280
9	514505 6660115	Flat	25 x 35	50	60	262.5
10	514429 6660041	Slope	10 x 4	60	80	19.2
11	514463 6659963	Slope to open depression	20 x 10	30	80	48
12	514247 6659824	Ridge	5 x 7	50	70	12.25
13	514228 6659805	Ridge	10 x 10	40	80	32
14	514218 6659819	Ridge	8 x 3	50	80	9.6
15	514097 6659802	Ridge	5 x 35	60	80	84
16	514240 6659668	Slopes	10 x 15	30	50	22.5
17	514297 6659661	Ridge	25 x 10	30	50	37.5
18	514623 6659820	Slopes	5 x 5	20	50	2.5
19	514643 6659818	Ridge to slopes	20 x 20	30	50	60
20	514668 6659905	Slopes	5 x 5	20	50	2.5
21	514682 6659949	Slopes	10 x 15	30	40	18
22	514749 6659972	Slopes	10 x 5	40	60	12
23	514745 6659980	Slopes	7 x 5	60	80	16.8
24	514957 6659911	Slopes	5 x 2	30	60	1.8
25	515001 6659912	Slopes	15 x 7	20	70	14.7
27	515176 6660008	Flat	40 x 10	40	80	128
28	515194 6659783	Flat	30 x 5	70	70	73.5
29	515064 6659586	Flat	5 x 250	30	50	187.5
30	514722	Slopes	15 x 10	70	70	73.5

Exposure number	Location	Landform	Size (m)	% exposure	% visibility	Effective coverage
	6659459					
31	514666	Slopes	5 x 5	20	80	4
	6659576					
32	514651	Slopes	5 x 20	10	60	6
	6659600					
33	514648	Slopes	20 x 5	20	70	14
	6659645					
34	514575	Slopes	70 x 5	80	80	224
	6659634					
35	514520	Ridge	5 x 500	70	70	1225
	6659706					

Annex B

Artefact Data

Table B.1 Recorded artefacts

Site	Artefact no.	Easting	Northing	Raw material	Artefact type	Implement	Size (mm)	Platform	Cortex (%)	Comments
Site 2	1	514281	6659959	Siltstone	Core		75		40	
Site 2	2	As above	As above	CGI (siliceous?)	Flake		50	Cortical	10	
Site 2	3	514272	6659930	BM	Flake		30	Multiple scar		
Site 2	4	As above	As above	Mudstone	Core		40		60	Multiplatform bifacial core
Site 2	5	514264	6659926	BM	BFO		25			
Site 2	6	514270	6659906	CGI	Core		70			Multiplatform core
Site 2	7	514309	6659978	Mudstone	BFP		30	Single scar		
Site 2	8	514343	6660007	CGI	Flake		35	Single scar		
Site 2	9	514362	6660014	Mudstone	Flake		30	Single scar		
Site 2	10	As above	As above	CGI	Possible hammerstone		60		70	Cobble with some percussion
Site 2	11	514326	6660032	Mudstone	Core		55			Multiplatform
Site 2	12	514305	6660025	Mudstone/chert	Flake		35	Single scar	<10	
Site 2	13	As above	As above	Mudstone/chert	Retouched flake		30			Heat shatter
Site 2	14	As above	As above	Mudstone	BFO		20			
Site 2	15	514308	6660032	Mudstone	Flake		25	Single scar		
Site 2	16	As above	As above	Mudstone	Flake		25	Single		
Site 2	17	As above	As above	Mudstone	Core (Broken)		40			Multiplatform
Site 2	18	As above	As above	Mudstone	Flake		20	Single scar		
Site 2	19	As above	As above	Mudstone/chert	Flake		20	Single scar		
Site 2	20	As above	As above	Siltstone	Core	Possible hammerstone	95		70	Multiplatform bifacial core with pitting
Site 2	21	514383	6660032	CGI	Flake		35	Single scar		

Site	Artefact no.	Easting	Northing	Raw material	Artefact type	Implement	Size (mm)	Platform	Cortex (%)	Comments
Site 2	22	514401	6660034	Quartzite	Retouched flake		40			
Site 2	23	514388	6660015	Quartz	Flake		20	Single scar		
Site 2	24	514395	6660057	Mudstone	Flake		30	Single scar		
Site 2	25	As above	As above	Mudstone	Flake		30			
Site 2	26	514441	6660067	Siltstone	Core (broken)		50			Multiplatform
Site 2	27	514426	6660043	Quartz	Flake		20	Cortical	10	Bipolar flake
Site 2	28	514412	6660023	Mudstone	Flake		50	Single scar		
Site 2	29	As above	As above	Mudstone	Flake		30	Single scar		
Site 2	30	514421	6660009	CGI	Flake		55	Single scar		
Site 2	31	514405	6660030	CGI	BFP		45	Single scar		
Site 2	32	514401	6659901	Mudstone	Flake		30	Multiple scar		
Site 2	33	514192	6659803	Quartz	Flake		30	Single scar	30	
Site 2	34	514218	6659823	CGI	Flake		30	Cortical	10	
Site 2	35	As above	As above	Mudstone	Flake		20	Facetted		
Site 2	36	As above	As above	Mudstone	BFO		20			
Site 1	37	514561	6659701	Siltstone	Core		70		70	Uniplatform
Site 1	38	As above	As above	CGI	Core					Uniplatform
Site 1	39	514534	6659698	Siltstone	Flake		60	Cortical	10	
Site 1	40	514645	6659820	Mudstone	Flake		30	Single scar		
Site 1	42	514642	6659821	Mudstone	Flaked piece		25			
Site 5	43	514682	6659949	Mudstone	Flake		42	Single scar		
Site 6	44	515174	6660007	Mudstone	BFP		35	Single scar		
Site 6	45	515181	6660009	Mudstone	Broken flake (left)		32	Multiple scar	40	
Site 1	46	514573	6659660	CGI	Flake		42	Single scar	40	
Site 1	47	As above	As above	CGI	BFO		36			
Site 1	48	As above	As above	CGI	Flaked piece		25			
Site 1	49	As above	As above	Mudstone	BFO		30		20	
Site 1	50	As above	As above	Mudstone	BFP		35	Broken	20	

1. CGI = coarse-grained igneous; BM= banded mudstone; BFO=broken flake other; BFP=broken flake proximal.

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