Jacqueline Collins
(Consultant Archaeologist)
11 Camden Head Road
Dunbogan NSW 2443

Proposed development a Rainbow Beach, Bonny Hills, NSW mid-north coast

---

Aboriginal cultural heritage assessment of proposed 'eco-tourist' site and previously unassessed southern portion of proposed development area

July 2009

Report to:

Luke and Company NSW Pty Ltd
PO Box 669
Port Macquarie NSW 2444

EXECUTIVE SUMMARY

Background and development proposal

A Concept Plan (and relevant Project Applications) relating to the delineation of development on coastal land at Rainbow Beach, south of Port Macquarie on the NSW mid-north coast, has been lodged with the Department of Planning for approval under Part 3A of the *Environmental Planning and Assessment Act 1979*. The Concept Plan entails development of a residential subdivision, business/retail centre, an 'eco-tourist' site, two schools, playing fields, cycle/walkways, picnic areas, an open space/drainage/habitat corridor with constructed wetlands, and the deposition of fill gained from the wetlands construction onto residential allotments and playing fields. Cultural heritage assessments of the northern section of the area covered by the Concept Plan have been undertaken, including field surveys, test excavations and Aboriginal consultation.

This report was commissioned by Luke and Company NSW Pty Ltd (Luke and Company) to assess Aboriginal cultural heritage values with respect to the proposed 'eco-tourist' site and the previously unassessed southern portion of the proposed Rainbow Beach development area, targeted for construction of the southern periphery of the residential estate, a school, and preservation as part of the open space/drainage/habitat corridor. These areas together comprise the 65 hectares of land addressed in this assessment (of which at least 6.5 hectares is covered by an artificial lake and stormwater ponds), forming part of Lot 92 DP 1078055 and Lot 5 DP 25886, Parish of Queens Lake, within the Port Macquarie-Hastings Local Government Area.

Aboriginal involvement and consultation

In response to the Department of Planning Director-General's Environmental Assessment Requirements, the Department of Environment and Climate Change (DECC) *Interim Community Consultation Requirements for Applicants* were implemented, and resulted in the registration of two stakeholder groups- the Bunyah Local Aboriginal Land Council and the Birpai Local Aboriginal Land Council (LALC). To ensure comprehensive and all-inclusive Aboriginal involvement, an invitation to register stakeholder interest in this assessment was extended to the more recently formed Bril Bril Traditional Owners group. This invitation was accepted.

The assessment methodology and management recommendations were developed in liaison with nominated stakeholder representatives, who assisted with a field survey of the study area in June 2009. Although the draft management recommendations were endorsed by all stakeholders, some minor amendments were suggested by the Bril Bril Traditional Owners as a result of their review of the draft report. These suggestions have been adopted and incorporated into this final report.

Representatives of the registered stakeholder groups were consulted to determine whether the integrity of any sites, places, resources or other values of traditional, historic or contemporary socio-cultural significance, attachment or concern would be adversely affected by the proposed study area development. The stakeholders confirmed the cultural heritage information presented in previous Rainbow Beach reports, which maintains that the Rainbow Beach area is not known to contain any sites/places of ceremonial, mythological or otherwise Aboriginal spiritual significance, but that it did contain a traditional (and probably also historic) campsite. This campsite is believed to be that represented by a relatively large artefact scatter recorded on the inland periphery of the sand barrier north of the present study area. Provisions for the long-term protection of this site in the development-related context are in place.

The Rainbow Beach area contains a comparatively dense concentration of archaeological sites. As a group, these sites are of considerable contemporary socio-cultural value owing to the material link they provide with past generations of Birpai people. Although assessed to have a low level of cultural/social significance in their own right, the two small artefact scatters previously recorded in the study area itself form part of this larger site complex. To maintain the cultural values attributed to this site complex, the stakeholders advised that development impacts on and in the immediate vicinity of the two recorded sites should be avoided or at least minimised in an effort to conserve as large a representative sample of the Rainbow Beach site complex as possible.

Environment

The study area sits within the Duchess Gully drainage basin, where it comprises coastal hills, coastal alluvial flats and a degraded coastal sand barrier towards the southern limit of the subtropical zone. The terrain is dominated by a cleared and low-lying alluvial flat modified by bulk earthworks, the construction of artificial drainage channels, a lake and stormwater ponds, associated with past development activities. This flat is likely to have been seasonally inundated under natural drainage conditions.

The south-west and north-west boundaries of the alluvial flat are fringed by previously cleared bedrock-soil hillslopes, which represent the terminal ends of spurs that trend east into the Duchess Gully basin. Other bedrock-soil lands are restricted to a high outlying knoll in the south-east, the southern half of which lies within the study area. The knoll supports regrowth forest, and is characterised by red clay soils with intermittent pebble lags on erosion pans along its west and north-west footslopes.

In the east, the alluvial flat and the outlying knoll meet a degraded inner coastal barrier of flat/very gently undulating indurated sands traversed by Duchess Gully and its small tributary, which flows into the gully within the Bonny Hills STP site just beyond the south-east study boundary. Despite past clearing and the installation of an underground sewer line, some mature blackbutt trees remain near the Duchess Gully/tributary confluence, testifying to an overall lower level of disturbance than observed over the remainder of the area.

Further seaward, the 'eco-tourist' site rises a metre or so above the drainage-impeded sand and alluvial deposits bordering the eastern bank of Duchess Gully to form a broad elevated flat of indurated sand, met on the eastern boundary by a narrow foredune system that separates it from Rainbow Beach. The broad sand flat has been fully cleared in the past, and has been subject to other disturbances arising from the construction of an overhead transmission line, construction and demolition of a house and outbuildings, vehicle tracks, grass slashing, and possible sandmining on the southern end.

Heritage registers
Searches of the DECC Aboriginal Heritage Information Management System (AHIMS), the Australian Heritage Database, the NSW State Heritage Register, and heritage schedules of the North Coast Regional Environmental Plan and Hastings Local Environmental Plan revealed two registered sites to occur within the study area. Both of these are listed on the DECC AHIMS database.

The DECC registered sites comprise a scatter of four stone artefacts recorded in the Duchess Gully tributary close to the Bonny Hills STP boundary (#30-6-032) during a 1983 survey conducted in response to a past development proposal, and a scatter of five artefacts recorded on the north-west corner of the 'eco-tourist' site (#30-6-107) during an initial survey undertaken as part of the present development proposal in 1996.

Field survey
Due to the expected distribution and types of archaeological sites and the limitations imposed by surface vegetation, re-deposited sediments and standing water, a selective survey strategy was adopted to maximise coverage of available surface exposures on the potentially sensitive hill footslopes, knoll crest and sand flat. The hillslopes and alluvial flats were selectively sampled. A general wide-area reconnaissance was additionally undertaken to locate and inspect any mature trees for signs of Aboriginal marking/scarring.

Approximately 19 percent of the study area was covered in the field, including all potentially sensitive landforms proposed for development impact. Once the constraints imposed by vegetation and modern land modification are taken into account, it is estimated that 8.5 percent of the surveyed area and 1.6 percent of the total study area was subject to effective surface inspection, including 4.5 percent of the eastern knoll and ten percent of the elevated sand flats. Even though some designated survey units provided little to no visibility, field conditions are considered to have been satisfactory for the purposes of assessing the study area's sensitivity and the potential effects of the proposed development on cultural heritage resources.

Survey results and significance assessment
No archaeological sites/materials or other evidence of Aboriginal activity were detected during the field survey, nor were any Potential Archaeological Deposits (PADs) identified.

As revealed by the DECC AHIMS search, however, two small stone artefact scatters have been previously recorded in the study area, one within the tributary gully near the Bonny Hills STP boundary (#30-6-032), and one on the bank of Duchess Gully in the north-west corner of the 'eco-tourist' site (#30-6-107 [M-2]). While the #30-6-032 artefacts will no doubt have been washed downstream since their 1983 recording, the #30-6-107 (M-2) location offered low surface visibility and it is assumed its constituent artefacts are still in place. In the absence of any contrary evidence, it is nevertheless concluded that neither of the previously recorded sites is representative of a more extensive artefact scatter/campsite.

Past survey results indicate that the Rainbow Beach locality contains an unusually dense concentration of archaeological sites, reflective of a traditional Aboriginal landuse system. The cultural/social and scientific/ archaeological significance of these sites is thus seen to lie more in their grouping together, than in any special features exhibited by the individual sites themselves. Together, the Rainbow Beach sites form an inter-related complex, which is locally unique and significant. As an outcome of the often intensive disturbance caused by land clearing and past development activities, some sites nevertheless have a higher cultural/social value and greater potential to provide further research information than others. Even when assessed in terms of their representativeness within the Rainbow Beach site complex, the #30-6-032 and #30-6-107 (M-2) artefact scatters are considered to be of low cultural/social and scientific/archaeological significance. This assessment is based on the known archaeological record, and on the understanding that similar but apparently more intact examples of small artefact scatters are targeted for conservation within the previously assessed northern section of the proposed development area.

Assessment conclusions and impact mitigation

The study area contains two registered artefact scatters assessed individually to be of low Aboriginal cultural/ social and scientific/archaeological significance, but which form part of a locally unique and significant site complex. One of these artefact scatters (#30-6-032) is (or was once) situated within the Duchess Gully tributary near the Bonny Hills STP, falls within the STP buffer zone, and would not be affected by the proposed development.

The other registered scatter (#30-6-107 [M-2]) lies on the north-west corner of the proposed 'eco-tourist' site. While detailed plans for this site are yet to be developed, the Concept Plan is consistent with the 1996 recommendation that the required road crossing of Duchess Gully be kept on the existing track/bridge alignment to allow M-2 to be preserved.

On the basis of topography, disturbance conditions, and the survey results, it is concluded that the only landform within the study area with any real potential to contain significant undetected archaeological evidence is the indurated sand flat near the tributary confluence west of Duchess Gully (within the site #30-6-032 locality). This sand flat lies within the STP buffer zone, which would not be affected by the proposed development.

While it was anticipated that an artefact scatter/open campsite could occur on the degrading crest of the isolated knoll in the south-east, no cultural materials were detected on the crest during either the present or a past survey. Despite overall low levels of exposure, it is concluded that the knoll crest is not archaeologically sensitive. However, as a precautionary measure, the Aboriginal stakeholders request that any vegetation clearing/topsoil disturbance associated with the construction of a road and picnic area on the knoll crest be monitored by their representatives in an effort to mitigate impacts on potential sites of cultural/social significance.

Past surveys/investigations have identified the existence of a low level background scatter of artefacts on the alluvial flat, which increases in density with proximity to Duchess Gully and the sand barrier. The background artefacts are covered by alluvium, and are only detectable where intercepted by drain cuttings and other subsurface exposures. While is seems certain that background artefacts will occur across the study area's alluvial flat, it is envisaged that any loss of these artefacts caused by development activities would be sufficiently compensated by the permanent conservation of the balance of the open space/drainage/habitat corridor.

Management recommendations

The following management recommendations are designed to mitigate impacts of the proposed Rainbow Beach development (within the study area assessed in this report) on Aboriginal cultural heritage sites and values, and have been endorsed by nominated representatives of the registered Aboriginal stakeholder groups. The recommendations are predicated on the adoption of the current development Concept Plan, which avoids direct impact on the registered site #30-6-032 and #30-6-107 (M-2) artefact occurrences.

Recommendation 1

Aboriginal consultation and archaeological field survey and assessment results have revealed no impediments to the proposed development Concept Plan providing Recommendations 2 and 3 below are implemented.

Recommendation 2

Although not assessed to be of sufficiently high archaeological sensitivity to warrant recording as a PAD (Potential Archaeological Deposit), Aboriginal stakeholders have advised that they would require monitoring of any vegetation clearing and topsoil disturbance associated with road construction and the development of a picnic area on the level crest of the SU-3 knoll (cf Figure 6).

In the event that a picnic area is to be developed on the knoll, it is further recommended that consideration be given to the involvement of Aboriginal stakeholders in the planning and construction of this picnic area, and in the development and installation of appropriate interpretive signage to facilitate a public appreciation of the Aboriginal values and traditional uses of the Rainbow Beach area.

Recommendation 3

In the event that any identified or suspected Aboriginal cultural materials are detected either during the Aboriginal monitoring (as per Recommendation 2), or elsewhere at any other time-

1) All disturbance in the vicinity of the find should immediately cease and temporary protective fencing be erected around the find to define a 'no-go zone'.

2) The developer should contact the Aboriginal stakeholder groups and the Department of Environment and Climate Change (Planning and Aboriginal Heritage Section, North East Branch, Coffs Harbour) to inspect the find so that appropriate actions and management recommendations can be formulated. In the event that the find consists of or includes possible or identified Aboriginal skeletal remains, the NSW Police Department should be additionally contacted.

3) Work may proceed at an agreed distance from the find, in consultation with the Aboriginal stakeholders and the Department of Environment and Climate Change.

4) If the find is identified as an Aboriginal object, work causing any disturbance or destruction of the object may not recommence until an appropriate archaeological inspection/investigation has been carried out to the satisfaction of the Department of Environment and Climate Change and the Department of Planning.

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background and development proposal

A Concept Plan (and relevant Project Applications) relating to the delineation of development on coastal land at Rainbow Beach, south of Port Macquarie on the NSW mid-north coast (Figure 1), has been lodged with the Department of Planning for approval under Part 3A of the *Environmental Planning and Assessment Act 1979*. The Concept Plan entails development of a residential subdivision, business/retail centre, an 'eco-tourist' site, two schools, playing fields, cycle/walkways, picnic areas, an open space/drainage/habitat corridor with constructed wetlands (Figure 3), and the deposition of fill gained from the wetlands construction onto residential allotments and playing fields.

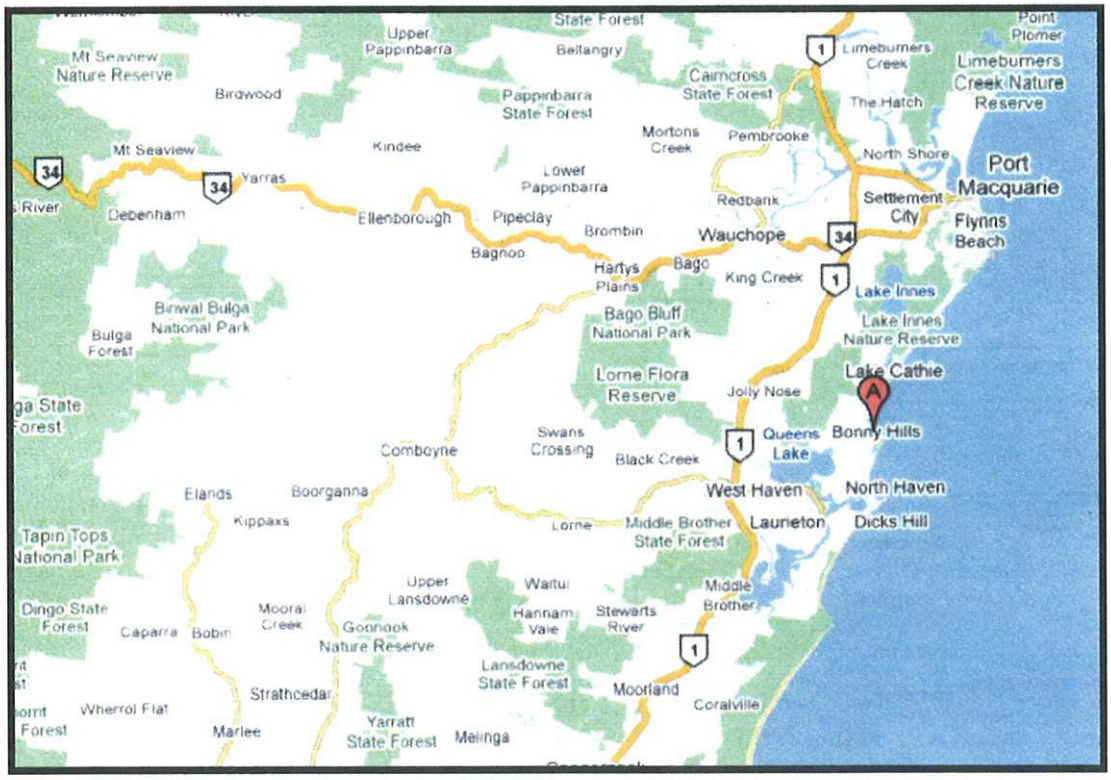

Figure 1. General location of the study area on the NSW mid-north coast
(source: Google map data, MapData Sciences Pty Ltd 2009)

Cultural heritage assessments of the northern section of the area covered by the Concept Plan have been undertaken (Collins 1996a, 2006, 2007), including field surveys, test excavations and Aboriginal consultation to adjust the eastern perimeter of a proposed constructed wetland and develop strategies to facilitate the long-term protection of a significant Aboriginal open campsite (#30-6-109 [M-4]) in its vicinity (Collins 2008).

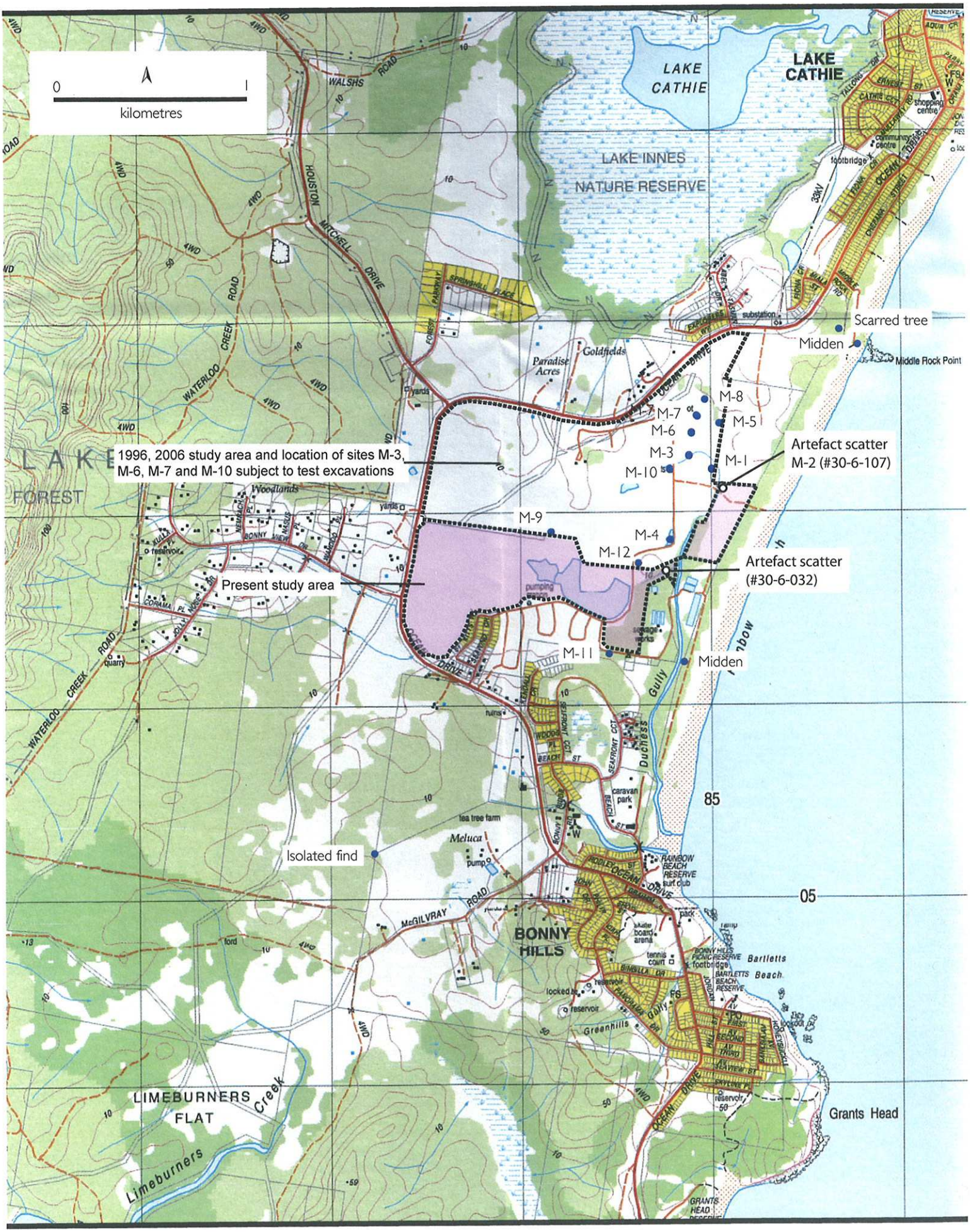

Figure 2. Location of the study area (pink) and registered/recorded Aboriginal sites in the locality
(source: Grants Head 9434-1N 1:25,000 CMA map, Edition 3, NSW Land Information Centre 2000; DECC AHIMS register)

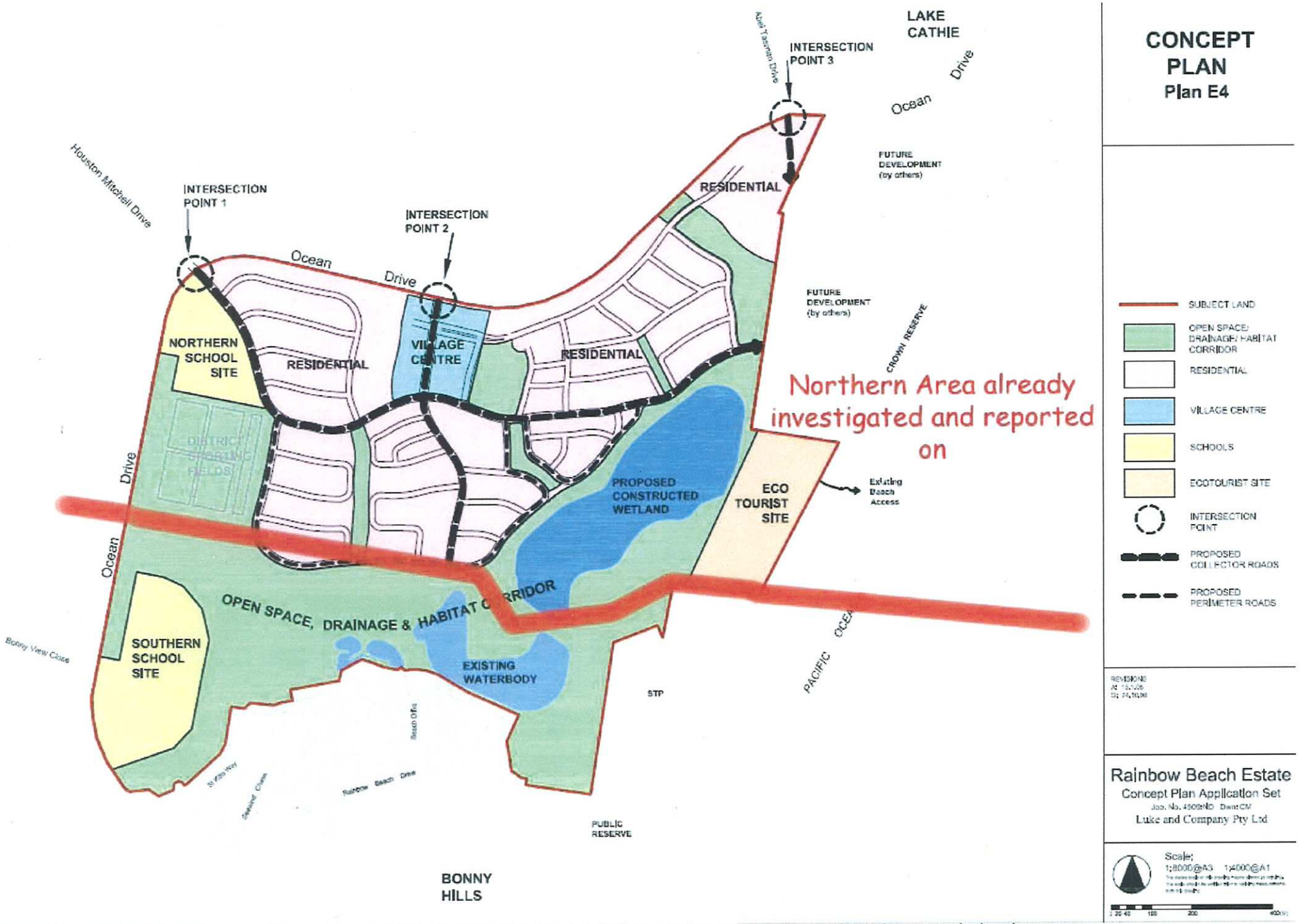

Figure 3. Location of the study area (south of red line plus 'Eco Tourist Site') in relation to the proposed Rainbow Beach development
(source: Luke and Company 2009)

ABORIGINAL ARCHAEOLOGICAL INVESTIGATIONS 2009

INVESTIGATION AREA
65 ha

REVISIONS:
A: 11.6.08

Rainbow Beach Estate
Property Management Plan Series
Job. No. 4509:ND Dwn: RM
Luke and Company Pty Ltd

SCALE:
1:8000@A3 1:4000@A1

Figure 4. Airphoto of the study area
(source: Luke and Company 2009)

This report was commissioned by Luke and Company NSW Pty Ltd (Luke and Company) to assess Aboriginal cultural heritage values with respect to the proposed 'eco-tourist' site and the previously unassessed southern portion of the proposed Rainbow Beach development area, targeted for the construction of the southern periphery of the residential estate, a school, and preservation as part of the open space/drainage/habitat corridor (Figure 3).

Apart from their locations (Figure 3), plans for the southern school and the 'eco-tourist' site are yet to be devised, and would be subject of future Development Applications to be lodged with, and approved by, Port Macquarie-Hastings Council. Pedestrian access through foredunes to Rainbow Beach would be provided towards the northern end of the 'eco-tourist' site, utilising an existing track inspected and assessed by Collins in 1996.

Development within the open space/drainage/habitat corridor would include the construction of two small artificial wetlands, and cycle/walkways linking the existing Ocean Woods subdivision with the proposed new residential estate, village centre and school to the north. The crest of a knoll within the eastern section of the study area has been proposed as the possible site of a picnic area.

1.2 Location of the study area

The study area comprises approximately 65 hectares of land (of which at least 6.5 hectares is covered by an artificial lake and stormwater ponds), forming part of Lot 92 DP 1078055 and Lot 5 DP 25886, Parish of Queens Lake, within the Port Macquarie-Hastings Local Government Area. It lies immediately east of Ocean Drive between the townships of Bonny Hills and Lake Cathie, around 19 kilometres south of Port Macquarie, and is bounded in the north by open grazing land, the Ocean Woods residential estate in the south, and the Bonny Hills Sewage Treatment Plant (STP) in the south-east. Rainbow Beach is situated between 200 metres and 1.75 kilometres further east.

1.3 Legislative background

Approval for the Rainbow Beach development Concept Plan is being sought under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), which provides an approval process specific to major projects. Under the auspices of Part 3A, authorisations for an approved project, including Aboriginal Heritage Impact Permits (AHIPs) under Sections 87 and 90 (Part 6) of the *National Parks and Wildlife Act 1974*, are not required for development-related works that may affect Aboriginal cultural heritage. In the absence of the usual AHIP requirements, the proponent will be required to manage Aboriginal cultural heritage issues in accordance with the specific conditions of approval imposed by the Minister for Planning. These may include the management recommendations presented in Section 8 of this report.

2 ABORIGINAL INVOLVEMENT AND CONSULTATION

2.1 Compliance with DECC *Interim Community Consultation Requirements for Applicants*

The *Interim Community Consultation Requirements for Applicants* prescribe Department of Environment and Climate Change (DECC) requirements in relation to Part 3A (EP&A Act) approvals and the preparation of applications for Aboriginal Heritage Impact Permits under Part 6 of the *National Parks and Wildlife Act 1974*. These requirements outline a number of steps that need to be taken to ensure that a transparent and informed Aboriginal consultation process is implemented prior to issue of the relevant approval/s.

In response to the Department of Planning Director-General's Environmental Assessment Requirements issued in 2007, notifications of the Rainbow Beach development proposal and the intention to address further Aboriginal cultural heritage matters relating to this proposal were mailed to the organisations listed below, inviting the registration of groups and/or individuals wishing to be involved in the assessment process.

- Birpai Local Aboriginal Land Council
- Bunyah Local Aboriginal Land Council
- The Kelly Family, Port Macquarie
- Jean Oxley, Indigenous Cultural Resources Management, Forster
- Garrigal Aboriginal Community Inc, Gloucester
- Minimbah Elders Group Inc, Forster
- Ghinni Ghinni Youth and Aboriginal Corporation, Taree
- Norma Fisher, Gloucester
- Saltwater Tribal Council, Taree
- Registrar of Aboriginal Owners, NSW Department of Aboriginal Affairs
- NSW Native Title Services
- The General Manager, Port Macquarie-Hastings Council
- Department of Environment and Climate Change (DECC)

On the 6th of August 2008, a newspaper notice was published in the *Port Macquarie News*, inviting interested Aboriginal parties to contact Luke and Company to formally register their interest in the Rainbow Beach area and any further cultural heritage assessments. The closing date for registrations was the 17th of September 2008. No responses were received. In line with the DECC *Interim Community Consultation Requirements for Applicants*, the Birpai and Bunyah Local Aboriginal Land Councils (LALCs) were duly registered as stakeholders in the present assessment. These two Land Councils have been involved in past assessments/ investigations conducted within the northern section of the proposed development area (Collins 1996a, 2006, 2007).

To ensure comprehensive and all-inclusive Aboriginal involvement, an invitation to register stakeholder interest in this assessment was extended to the more recently formed Bril Bril Traditional Owners group. This invitation was accepted, such that the Bril Bril Traditional Owners group was additionally endorsed as a registered stakeholder.

The assessment methodology was developed in liaison with nominated Birpai LALC, Bunyah LALC and Bril Bril Traditional Owners representatives prior to commencement of the field survey and was fully supported. The draft management recommendations were similarly discussed and developed in the field, in consultation with the stakeholder representatives. Although the draft management recommendations were endorsed by all stakeholders, some minor amendments were suggested by the Bril Bril Traditional Owners as a result of their review of the draft report. These suggestions have been adopted and incorporated into this final report.

2.2 Field survey involvement

Field survey of the study area was completed on the 15th of June 2009 with the assistance of Lindsay Moran (Birpai LALC senior sites officer, traditional owner and member of the Bril Bril Traditional Owners group), Trevor Donovan and Stan Chatfield (Bunyah LALC sites officers), Brett Nicholson (Bunyah LALC trainee sites officer) and John Heath (Bril Bril Traditional Owners group representative). Cultural heritage issues and impact mitigation strategies were discussed during the course of the field survey, and the management recommendations presented in Section 8 were endorsed by all stakeholder representatives.

2.3 Reported cultural heritage values and outcomes

Representatives of the registered stakeholder groups were consulted to determine whether the integrity of any sites, places, resources or other values of traditional, historic or contemporary socio-cultural significance, attachment or concern would be adversely affected by the proposed study area development.

The stakeholders confirmed the cultural heritage information presented in Sections 2 of the 1996 (Collins 1996a) and 2006 (Collins 2006) assessment reports. This information was given by Birpai Elder (the late) William 'Gulah' Holten (Lindsay Moran's father) in 1996. 'Gulah' Holten advised that the Rainbow Beach area was not known to contain any sites/places of ceremonial, mythological or otherwise Aboriginal spiritual significance, but that it did contain a traditional (and probably also historic) campsite, the exact or approximate location of which could not be determined. On the basis of past archaeological field survey results, Lindsay Moran believes that this campsite is most likely that represented by site M-4 (#30-6-109) on the inland periphery of the sand barrier west of Duchess Gully, and around 100 metres west of the southern end of the proposed 'eco-tourist' site (outside the present study area). Provisions for the long-term protection of site M-4 in the development-related context have been devised by Luke and Company in liaison with Lindsay Moran, including a realignment of the eastern perimeter of a proposed constructed wetland to avoid the known and potential site area (Collins 2008).

The Rainbow Beach area contains a comparatively dense concentration of archaeological sites. As a group, these sites are of considerable contemporary socio-cultural value owing to the material link they provide with past generations of Birpai people. Although assessed to have a low level of cultural/social significance in their own right, the two small artefact scatters previously recorded in the study area (#30-6-032 and #30-6-107 [M-2]) form part of this larger site complex. To maintain the cultural values attributed to this site complex, the stakeholders advised that development impacts on and in the immediate vicinity of the two recorded sites should be avoided or minimised as far as possible in an effort to conserve as large a representative sample of the Rainbow Beach site complex as possible.

3 ENVIRONMENT AND LANDUSE EFFECTS

3.1 General setting

The study area sits within the Duchess Gully drainage basin, where it comprises coastal hills, coastal alluvial flats and a degraded coastal sand barrier towards the southern limit of the subtropical zone. Rainfall is generally seasonal, with the highest falls occurring between January and April (Cox and Corkhill 1983:20).

Duchess Gully is an incised permanent watercourse, which flows south behind and within the coastal dunes to discharge into the ocean at the southern end of Rainbow Beach. The Duchess Gully catchment is defined by a broad ridge that separates it from the Cathie Creek estuarine system to the north, by an extensive series of hills and ridges (Bonny Hills) to the south, and by the Jolly Nose escarpment in the west.

The local geology includes schist, phyllite, greywacke and slate of the Port Macquarie Block in the northern half of the Duchess Gully catchment, and mudstone, sandstone, conglomerate and minor volcanics of the Grants Head Formation in the south and west (Tamworth-Hastings 1:250,000 metallogenic mapsheet).

3.2 The study area

The study area is dominated by a low-lying alluvial flat (SU-4, Figure 5) covered in open grassland with pockets of regenerating trees. This alluvial flat has been modified by bulk earthworks, the construction of artificial drainage channels, a lake and stormwater ponds (covering at least 6.5 hectares) associated with a former (but never completed) sports resort/golf course development, and the more recent development of Stage 3 of the approved Ocean Woods residential subdivision to the south (Luke and Company 2006:10). Two creeks and their associated tributaries running east from the Jolly Nose escarpment feed into Duchess Gully through the SU-4 flat (cf Figure 2), and it is envisaged that this flat was probably seasonally inundated under natural drainage conditions. Prior to widespread clearing during the mid-1980s, the flat's generally poorly-drained yellow and grey duplex soils and dark alluvial loams supported a paperbark, swamp oak, swamp mahogany and tea-tree forest with an understorey/ground cover of rainforest shrubs, grass trees, ferns, sedges and vines (Clancy and Ayres 1983:3-5).

A similar type of forest survives on low-lying flats incorporating a combination of alluvial and indurated sand deposits in the south-east corner of the study area adjacent to the Bonny Hills STP (within the open space/ drainage/habitat corridor [SU-5; Figure 5]), and on the south-eastern bank of Duchess Gully (with the proposed 'eco-tourist' site [SU-6]). In both of these locations, waist-high ferns and sedges (as well as lantana) encountered during the field survey proved virtually impenetrable.

As mapped in Figure 5, the SU-4 alluvial flat is fringed on the south-west (SU-1) and north-west (SU-2) study boundaries by moderate to low-gradient bedrock-soil hillslopes, which reach a maximum elevation of approximately 10m AHD beside Ocean Drive. These hillslopes fall gradually away to the flat, and represent the terminal ends of spurs that trend east into the Duchess Gully basin. They have been cleared of their original vegetation and are now covered by grassland (SU-1) and regenerating forest (SU-2), but are reported as once supporting dry open grey gum forest, grading to moist flooded gum forest with rainforest elements at lower elevations (Clancy and Ayres 1983:3-5). Surface rocks on the exposed compact red and orange-yellow clay surfaces are restricted to occasional small disintegrating fragments of siltstone.

An outlying bedrock knoll reaches a maximum elevation of c.15 metres AHD in the south-east, the southern half of which lies within the study area (SU-3). The knoll supports regrowth open forest with a dense ground cover of blady grass, mat-rush and bracken fern, and is characterised by red clay soils with intermittent lags of chert, jasper, quartz and quartz-feldspar pebbles on erosion pans along its west and north-west footslopes.

In the east, the SU-4 alluvial flat and the SU-3 outlying bedrock knoll meet a degraded inner coastal barrier of flat/very gently undulating indurated (Pleistocene) sands traversed by Duchess Gully and its small, deeply incised tributary, which flows into the gully within the Bonny Hills STP site just beyond the south-east study boundary. The SU-7 sand flat, near the Duchess Gully/tributary confluence, supports a largely regenerating dry forest with a ground cover of blady grass, mat-rush, bracken fern and small heath shrubs. Some mature blackbutt trees also remain in this area, which is traversed by an underground sewer line.

Further seaward, the 'eco-tourist' site rises a metre or so above the drainage-impeded sand and alluvial flat bordering the eastern bank of Duchess Gully (SU-6) to form a broad flat of indurated sand (SU-8), fringed on the eastern boundary by a narrow foredune system that separates it from Rainbow Beach. While higher and better drained, SU-8 is of low relief, and has been subject to vegetation clearing and construction of an overhead transmission line with a parallel vehicle track. A house, outbuildings, and connecting vehicle tracks were once present towards the northern end of SU-8. The demolished remnants of the buildings have been bulldozed into piles and remain in this locality. Although now covered in open grassland with dense tick-bush, tea tree and banksia regrowth on the southern end (which on surface and documentary evidence appears to have been sandmined [cf Winward 1974:Figure 12.1]), the indurated sand flat is believed to have originally supported littoral rainforest (Collins 2006:5).

Figure 5. Study area landforms and survey units
(base map: Luke and Company 2009)

ABORIGINAL ARCHAEOLOGICAL INVESTIGATIONS 2009

INVESTIGATION AREA
65 ha

REVISIONS:
A: 11.8.08

Rainbow Beach Estate
Property Management Plan Series
Job. No. 4509:ND Dwn: RM
Luke and Company Pty Ltd

SCALE:
1:8000@A3 1:4000@A1

Plate 1. SU-1. General view north from foot of moderate gradient hillslope towards the SU-4 alluvial flat (all previously cleared, and within southern school site).

Plate 2. SU-2. General view north along foot of moderate gradient hillslope (all previously cleared, and partly within southern school site).

Plate 3. SU-3. General view of potentially sensitive knoll crest (all previously cleared, and within proposed open space/drainage/habitat corridor).

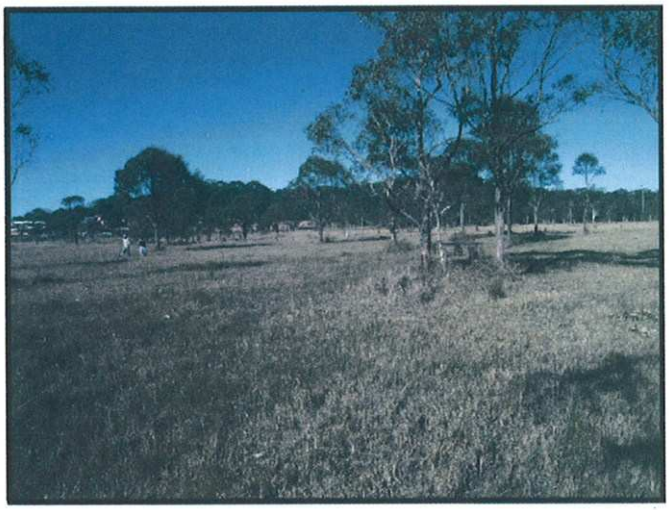

Plate 4. SU-4. General view of alluvial flat (all previously cleared, and within proposed open space/drainage/habitat corridor).

Plate 5. SU-7. General view of potentially sensitive sand flat near confluence of Duchess Gully and its small tributary (most previously cleared, and within proposed open space/drainage/habitat corridor).

Plate 6. SU-8. Vehicle track exposure following power line on southern end of sand flat east of Duchess Gully (all previously cleared, and within proposed 'eco-tourist' site).

4 ARCHAEOLOGICAL BACKGROUND

4.1 Past surveys within the study area

Happ and Bowdler 1983

In 1983, Happ and Bowdler surveyed the entire proposed Rainbow Beach development area (including the present study area) in conjunction with the previous sports resort/golf course proposal. "Ground visibility was almost nil in all situations ... although some exposures did exist and were inspected" (Happ and Bowdler 1983:4). Recordings were restricted to two silcrete cores and a silcrete flake on a gravel lag in the bed of the small tributary of Duchess Gully in SU-7 (see location, Figures 2 and 6), and a silcrete flake in a spill of sand down the northern bank of the tributary 15-20 metres further downstream (DECC #30-6-032).

Collins 1996

The proposed 'eco-tourist' site east of Duchess Gully assessed in this report was previously subject to a reconnaissance inspection conducted by Collins in 1996. This inspection resulted in the recording of a discrete scatter of artefacts (two nuclear tools and three multi-platform cores, all made on siltstone beach pebbles; DECC #30-6-107) on the eastern bank of Duchess Gully, immediately north of the small wooden bridge that provides vehicle access to the 'eco-tourist' site from the west. As reported by Collins (1996a:26), "the artefacts had clearly been disturbed and were associated with a wider scatter of unmodified pebbles".

4.2 Past surveys/investigations within the remainder of the proposed Rainbow Beach development area

Collins 1996

An initial archaeological survey and assessment of 130 hectares of land north of the study area (outlined on Figure 2) was undertaken in 1996 as part of the current development proposal (Collins 1996a). This survey targeted all reasonably level, well-drained ground, including the sand barrier, bedrock hillcrests and low-gradient footslopes. In contrast to the poor detection conditions reported by Happ and Bowdler (1983), by 1996 the area supported a substantial herd of cattle and surface exposures were common, especially on the sand substrate.

The 1996 survey resulted in the recording of eight stone artefact scatters and two isolated artefacts, designated sites M-1 to M-10 (DECC #30-6-106 to #30-6-115 inclusive). An additional artefact scatter (M-11 [#30-6-116]) was detected on a bedrock-soil footslope further south (south of the present study area) during wider reconnaissance undertaken in conjunction with the 1996 survey. The recorded artefact assemblage comprised flakes, flaked pieces, cores, split pebbles, pebble and flake tools made on a range of raw stone materials dominated by siltstone, quartz and chert. Almost half of the artefacts carried pebble cortex. All typically reflected an unspecialised stone technology revolving around the production of large amorphous pebble 'choppers' and smaller flake implements, resulting in the discard of reasonably small expanded flakes

and low profile multi-platform (and occasionally single platform and bipolar) cores that had generally ceased to be used well before reaching exhaustion levels.

Because the development proposal included a pedestrian access to Rainbow Beach via an existing track through foredunes 900 metres south of Middle Rock Point, the track cuttings and adjacent foredune scarp were inspected for evidence of registered midden #30-6-012, recorded by Starling in 1970. The inspection revealed a sparse horizon of fragmented pipi shell in the foredune scarp 200 metres north of the existing track. No cultural materials were detected in the track cuttings or its immediate surrounds, and it was concluded that any small-scale track upgrading works would be unlikely to intersect with the surviving midden remnants.

Collins 2006

Sites recorded within the 1996 study area were re-assessed in 2006 in response to intervening changes to the development Concept Plan, which in some instances altered impacts of the proposal on these sites. A field survey was also conducted within an eight hectare southern extension area, encompassing part of the alluvial flat and the northern half of the bedrock-soil knoll adjoining the northern boundary of the present study area.

One artefact scatter (#30-6-184 [M-12]) was recorded on an erosion pan on the western footslope of the knoll, just above the graveled access road and immediately north of the present study boundary (cf Figures 2 and 6). The scatter comprised 11 surface artefacts (cores, unmodified flakes/flake fragments and a retouched flake made on siltstone, jasper, chert and chalcedony). Surface and contextual evidence suggested that the artefact scatter has the potential to extend for a distance of up to 20 metres along the footslope, north from the present study boundary.

The 2006 re-assessment concurred with the 1996 findings, which pointed to preferential Aboriginal occupation of well-drained sand rises at the expense of the alluvial flats and coastal hill systems. While this conclusion is supported by the results of other surveys conducted on coastal hills in the wider Bonny Hills locality (Collins 1993, 1995, 1996b, 2003a, 2003b, 2004; ERM 2002), the detection of the M-11 (Collins 1996a) and M-12 (Collins 2006) artefact scatters on bedrock-soil footslopes indicate that traditional occupation of Rainbow Beach was not solely confined to sand substrates.

Consistent with the 1996 recommendations, the updated development Concept Plan, and assessments of the cultural and scientific significance of the recorded sites, Collins (2006) recommended that the M-1, M-2, M-4, M-5, M-8, M-9 and M-12 artefact occurrences (all of which fall within the proposed open space/drainage/ habitat corridor) be retained and protected *in situ*. To preserve the high socio-cultural values and potentially high scientific values of the M-4 (#30-6-109) artefact scatter, the eastern perimeter of a proposed constructed wetland was later realigned to ensure full retention/protection of this site (Collins 2008). It was further recommended that the M-3, M-6, M-7 and M-10 artefact scatters be subject to archaeological test excavations aimed at assessing whether these sites were significant enough to warrant either more comprehensive salvage or an amendment to the Concept Plan.

Collins 2007

Given that the Rainbow Beach development Concept Plan was not accepted for assessment under Part 3A of the *Environmental Planning and Assessment Act 1979* until after the Preliminary Research Permit application had been lodged with the Department of Environment and Climate Change (DECC), test excavations recommended in relation to the M-3, M-6, M-7 and M-10 artefact occurrences were conducted under the auspices of Preliminary Research Permit #2548, issued to the consultant by the DECC in April 2007.

As detailed by Collins (2007), the test excavations were assisted by Birpai and Bunyah LALC representatives, and involved the excavation of systematically-spaced machine trenches, taken down incrementally to a depth of at least 30 centimetres. All excavated sediments were sieved to ensure the recovery of cultural materials.

A total of 26 stone artefacts were recovered from seven of the 17 (0.5 square metre) test pits dug across the wider M-10 location, situated on a sand rise on the landward margin of the inner coastal barrier close to the upper reach of Duchess Gully. The artefacts occurred in a disturbed context and were not culturally stratified. The test pit assemblage was dominated by unmodified flakes/flake fragments, followed by cores, flaked pieces and split pebbles. One flake tool, one nuclear tool and a block-fractured piece were also recovered. The artefacts had been made on locally-available raw stone materials, primarily siltstone and volcanics. More than half the artefacts retained pebble cortex, suggesting nearby Rainbow Beach as the most likely stone procurement source. Given the overall homogeneity of raw material and artefact types identified within the recovered assemblage, it was concluded that M-10 represents a small campsite occupied on a one-off or itinerant basis.

The recovery of a single siltstone flake on the alluvial flat (at M-3, close to Duchess Gully) reinforced the contention that artefacts on this naturally poorly-drained and low lying landform comprise part of a low-density background distribution of artefacts lost and/or discarded during the course of resource extraction activities.

4.3 Other relevant surveys

Starling 1970 (and subsequent inspections by Happ and Bowdler 1983; Collins 1996)

In 1970, Starling included Rainbow Beach in her extensive survey of the northern NSW coastline, which aimed to assess the impact of sandmining on archaeological sites. Starling recorded the #30-6-012 midden along Rainbow Beach, stating that "shelly horizons outcrop for up to 10 yards over 4.5 miles of dune. Some have small talus deposits below them ... most appear to follow an old surface. Narrow low dune partly stabilised by scrub with eroding east face above indurated sand cliff. Soaks behind c.200 yards. Pipi shell deposit, occasionally charcoal, fire-shattered pebbles, few flakes, unworked pebbles" (Starling 1971).

When inspected by Happ and Bowdler in 1983, evidence of the #30-6-012 midden was restricted to four *in situ* pipi shell lenses, each 1-3 centimetres thick and 10-100 centimetres long, sitting in a dark grey organic layer 50-100 centimetres below the top of the foredune scarp. No diagnostic artefacts were observed, although one lens contained charcoal and split cobbles (Happ and Bowdler 1983:15). The locations of these materials in relation to the 1.6 kilometre stretch of the foredune surveyed were not defined.

When inspected by Collins in 1996, evidence of the #30-6-012 midden in the vicinity of the proposed pedestrian access track to Rainbow Beach through foredunes east of the 'eco-tourist' site was restricted to a sparse, intermittent horizon of fragmented pipi shell and some stone artefacts, bedded at a depth of around 40 centimetres below the current sand surface, between 200 and 675 metres further north (Collins 1996:31). Owing to the absence of any identifiable or potential Aboriginal cultural materials within the existing track cuttings or its adjacent foredune scarp, and the generally eroding context of the Rainbow Beach foredunes, it was concluded that any small-scale upgrading of the existing beach access track would be unlikely to intercept the surviving remnants of the #30-6-012 midden (Collins 1996a:31).

4.4 DECC Aboriginal Heritage Information Management System (AHIMS)

As plotted on Figure 2, 17 Aboriginal sites have been registered on the DECC AHIMS database within two kilometres of the study area. Thirteen of these sites lie within the proposed Rainbow Beach development area, two within the present study area. Registered sites within the study area comprise the scatter of four artefacts recorded by Happ and Bowdler (1983) in the Duchess Gully tributary close to the study area/Bonny Hills STP boundary (#30-6-032), and the scatter of five artefacts recorded by Collins (1996a) on the north-west corner of the 'eco-tourist' site (#30-6-107).

4.5 Other heritage registers

Searches of the Australian Heritage Database, the NSW State Heritage Register, and heritage schedules of the North Coast Regional Environmental Plan 1988 and Hastings Local Environmental Plan 2001 performed on the 2nd of July 2009 revealed no listed Aboriginal sites or places in the Rainbow Beach locality.

4.6 Archaeological potential of the study area

Potential site types

On the basis of past survey results and DECC AHIMS database entries for the Rainbow Beach locality, the potential exists for unrecorded Aboriginal sites to occur within the study area, including ceremonial and burial sites. However, in tandem with the study area's environmental and disturbance conditions, known site distributions suggest that the following types of sites would be the most likely.

Isolated stone artefacts

These can be located anywhere in the landscape and represent either the remnant of a dispersed artefact scatter (open campsite), or the simple loss or random discard of artefacts.

Stone artefact scatters (open campsites)

This type of site can range from as few as two stone artefacts to an extensive scatter containing a variety of tools and flaking debris, sometimes with associated materials such as bone, shell, ochre, charcoal and hearth stones. An artefact scatter does not necessarily mark a place where actual camping was carried out, but may instead be the product of specialised and/or short-term activities involving some level of