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

stoneworking (eg the manufacture or rejuvenation of a single tool during hunting, or whilst in transit from one camp to another) (Hiscock 1988:19). Artefact scatters may occur as surface concentrations or as dateable stratified deposits, and can provide information on such things as patterns of Aboriginal landuse, movement and exchange.

Shell middens

Middens are open campsites dominated by shellfish remains. They are generally found close to the shellfish source and contain predominantly mature specimens of edible shellfish species. In addition to shell, middens may contain stone tools and flaking debris, charcoal from cooking fires, ochre nodules and animal bone. Human burials have also been recorded in direct association with midden deposits.

Middens vary considerably in size. Some are thin surface scatters that have constituted little more than a meal for a small group gathering food away from a main camp, while others are well consolidated deposits representing consistent use by large groups of people over long periods of time.

Scarred trees

Scarred trees bear scars caused through the removal of bark and/or wood for making material items such as canoes, shields and containers, or which have been marked for other reasons (eg toe-holds to aid climbing). Because scarred trees are usually associated with domestic activities, their distribution often correlates with the distribution of artefact scatters, middens and other types of campsites (Long 2005).

Predictive model of archaeological site location

Existing site location data indicates that the eastern dune systems represent the most archaeologically sensitive landforms in the Rainbow Beach locality. In addition to midden horizons in the frontal dune, artefact scatters/campsites have been recorded on rises towards the inland periphery of the degraded inner barrier sands, adjacent to Duchess Gully and former backswamps.

The existing data also points to a moderate level of archaeological sensitivity for the low-gradient footslopes of bedrock-soil hills based on the Grants Head Formation, where two artefact scatters/open campsites have been recorded in direct association with surface lags of naturally occurring siltstone, jasper, chert and quartz pebbles that might have provided on-site sources of raw stone materials. Despite several surveys both within and near the proposed Rainbow Beach development area, Aboriginal site recordings on the balance of the hillslope elements are restricted to a single isolated find (#30-6-094) on a mid-slope above swamp a kilometre to the south-west. With the exception of low-gradient footslopes, the wider hillslopes are thus considered to have an overall low level of archaeological sensitivity.

A number of artefact occurrences have been recorded on the Rainbow Beach alluvial flats. However, these drainage-impeded flats (and the backswamps they once contained) are unlikely to have attracted Aboriginal occupation in their own right, and their constituent cultural materials are believed representative of a background distribution of artefacts lost or discarded during resource extraction activities. Field survey and test excavation results suggest that this background artefact distribution focuses on land close to Duchess Gully and sand-based grounds, diminishing in density with distance from these landforms.

Considering the above information in conjunction with the study area's location, landform, and disturbance character, it is predicted that:

- Open campsites may occur on elevated sections of the sand flat on the eastern extremity of the study area, especially on rises adjacent to Duchess Gully. The archaeological record is most likely to comprise scatters of stone artefacts and/or midden shell disturbed variously by past vegetation clearance, grass slashing, cattle grazing/treadage, house construction and demolition, the installation of power and sewer lines, and the construction, maintenance and use of vehicle tracks. Cultural materials may have been covered by shifting sands mobilised through these disturbance activities.

- Footslopes on the terminal ends of bedrock-soil spurs on the north-west and south-west study boundaries, and footslopes of the isolated bedrock-soil knoll towards the south-east study boundary, may contain evidence of traditional Aboriginal occupation, especially where these generally degrading footslopes offer surface outcrops of raw stone materials suited to tool production. Under low-gradient topographic and suitable geological conditions, the archaeological record of the footslopes may feature surface stone artefact scatters, disturbed by past vegetation clearance, grass slashing, fencing, erosion and cattle grazing/treadage.

- Within the bedrock-soil (study) area, the only other landform element with any real archaeological potential is the level crest of the knoll partly encompassed towards the south-east boundary, where evidence of an artefact scatter/open campsite may occur. Any cultural materials on the degrading knoll crest are likely to have been displaced as a result of past vegetation clearance, erosion, cattle grazing/treadage and the construction of an unformed vehicle track.

- Off the basal footslopes, bedrock-soil hillslopes are of low archaeological sensitivity. At most, the expected archaeological record of the wider hillslopes will be restricted to isolated stone artefacts dispersed as a result of past vegetation clearing, grass slashing, erosion and cattle grazing/treadage.

- The study area's alluvial flat will contain stone artefacts, representing an extension of the reasonably widespread background artefact distribution already identified in the Rainbow Beach locality. These background artefacts will occur intermittently across the alluvial flat, increasing in density with proximity to Duchess Gully and the eastern dune systems. Despite the aggrading landscape context, it is anticipated that artefacts on the alluvial flat will have been disturbed/displaced to some extent through vegetation clearing, the excavation of drains, a lake and stormwater ponds, and other earthworks associated with the previous sports resort/golf course development.

- Scarred trees will be restricted in their distribution to the sand flat near the Duchess Gully/tributary confluence, which contains some large mature blackbutts.

5 FIELD SURVEY

5.1 Method and procedure

Field survey of the study area was undertaken by the consultant with the assistance of Lindsay Moran (Birpai LALC senior sites officer 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 representative) on the 15th of June 2009. Weather conditions were fine and sunny, and were conducive to the detection of surface archaeological materials.

Due to the expected distribution and types of archaeological sites (cf Section 4.6) and the limitations imposed by surface vegetation, re-deposited sediments and standing water, blanket coverage of the study area was not considered warranted. Instead, a selective survey strategy was adopted to ensure full coverage of all 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.

The detailed survey was conducted on foot by the six team members walking in parallel transects, with spacings between members tailored to suit the type and extent of the available ground surface exposures. Spacings ranged from abreast on vehicle tracks, up to a maximum of ten metres apart on the hillslopes, the alluvial flat and densely grassed sections of the sand flats.

5.2 Coverage

For reporting purposes, the study area was divided into eight separate survey units (SUs), defined on the basis of topography, exposure and visibility (cf Figure 5). The extent of surface inspection undertaken across each of the SUs is mapped on Figure 6, and their landform/disturbance context summarised in Table 1.

In all, approximately 11 hectares (19 percent) of the study area was covered during the field survey. To provide data suitable for evaluating survey effectiveness, variables constraining archaeological visibility were estimated for each of the survey units. These include an estimation of the mean frequency with which surface exposures were encountered, as well as an estimation of the quality of visibility on those exposures (mean frequency of bare ground suitable for artefact detection). Once the variables of exposure and visibility 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 (Table 2), including 4.5 percent of the eastern knoll (SU-3) and ten percent of the elevated sand flats (SU-7 and SU-8).

Table 1. Environmental context of survey units

Survey unit	Landform element	Disturbance	Sources of exposure
SU-1	Moderate to low hillslope	Vegetation clearing, cattle grazing/ treadage	Nil
SU-2	Moderate to low hillslope	Vegetation clearing, cattle grazing/ treadage, erosion, cleared fencelines	Erosion pads, vehicle track, cleared fencelines, patchy ground cover
SU-3	Knoll crest/moderate to steep hillslope	Vegetation clearing, cattle grazing/ treadage, vehicle track	Vehicle track, occasional patchy ground cover, erosion scours
SU-4	Alluvial flat	Vegetation clearing, grazing, drain & lake construction, other mechanical activity	Mechanical disturbances, cattle tracks, drain & lake cutting/margins
SU-5	Indurated sand & alluvial flat	Vegetation clearing, mechanical activity on western margin	Mechanical disturbances, occasional wash exposures in tributary bed
SU-6	Indurated sand & alluvial flat	Vegetation clearing, vehicle tracks, erosion	Vehicle tracks, occasional erosion scours
SU-7	Indurated sand flat	Vegetation clearing, vehicle track, sewer pipe installation	Vehicle track, patchy ground cover
SU-8	Indurated sand flat	Vegetation clearing & grass slashing, vehicle tracks, power line installation, possible sandmining, construction, use & demolition of house & outbuildings	Vehicle tracks, mechanical disturbances, patchy ground cover

Table 2. Effective survey coverage data

Survey unit	Approx. total area (m^2)	Survey area (m^2)	% of surface exposed	% visibility on exposures	Effective survey cover (m^2)	# sites/PADs detected
SU-1	6,200	6,200	0	0	0	0
SU-2	13,670	13,670	10	90	1,230	0
SU-3	10,620	10,620	5	90	478	0
SU-4	422,030	36,250	10	100	3,625	0
SU-5	47,180	4,300	5	90	194	0
SU-6	14,450	1,400	5	100	70	0
SU-7	10,300	10,300	10	100	1,030	0*
SU-8	60,550	28,250	10	100	2,825	0*
Total	585,000	110,990			9,452	0

* Artefact scatter (#30-6-032) previously recorded by Happ & Bowdler (1983) not re-located

* Artefact scatter (#30-6-107) previously recorded by Collins (1996) not re-located

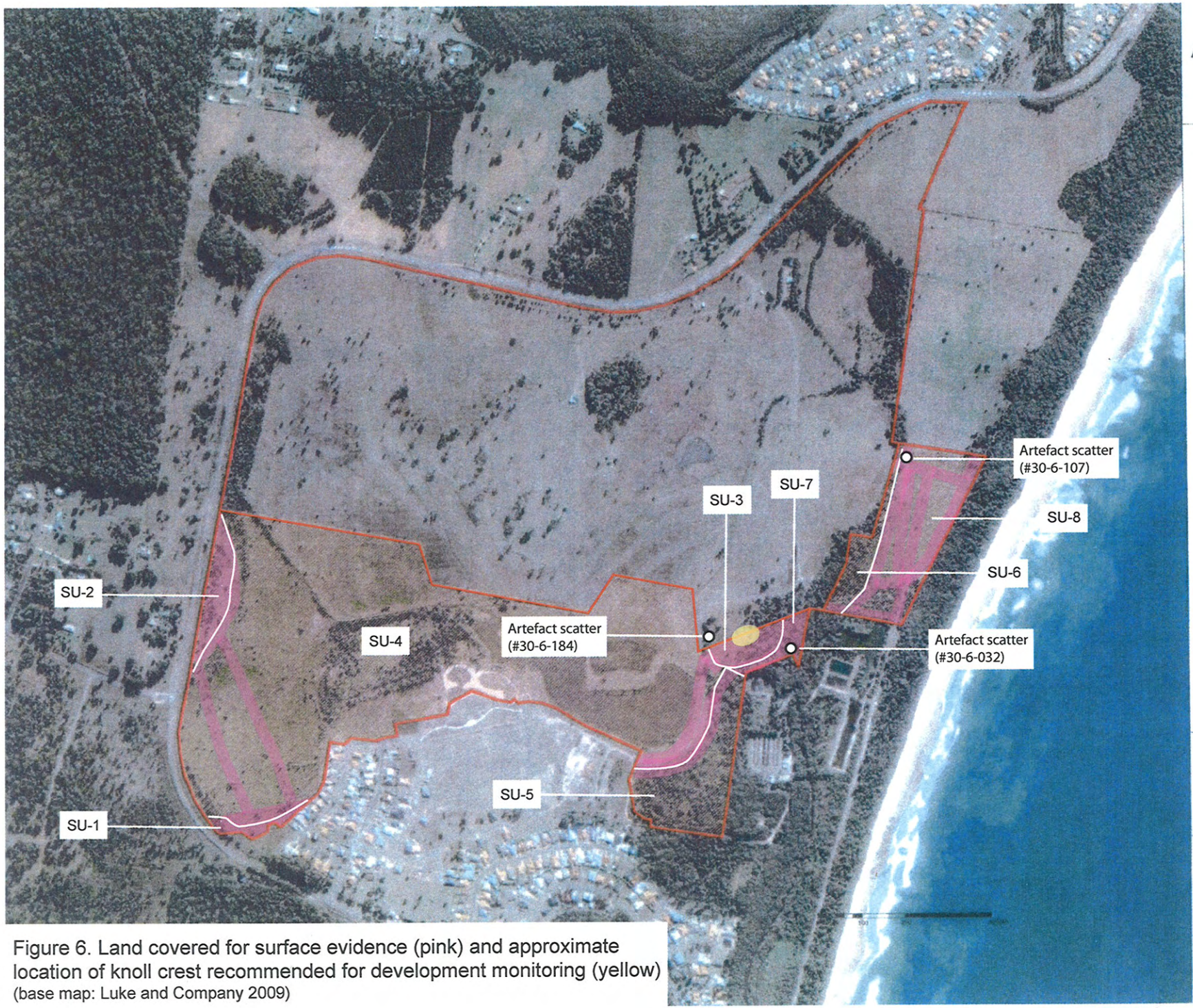

Figure 6. Land covered for surface evidence (pink) and approximate location of knoll crest recommended for development monitoring (yellow)
(base map: Luke and Company 2009)

5.3 Results

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 plotted on Figures 2 and 6 and outlined in Section 4.4, 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 in SU-7 (#30-6-032), and one on the bank of Duchess Gully in the north-west corner of the 'eco-tourist' site in SU-8 (#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 very low surface visibility due to vegetation regrowth 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.

6 SIGNIFICANCE ASSESSMENT

6.1 Concept and method

Unlike aspects of the natural environment, cultural heritage sites and places are social constructs that have no intrinsic significance- "cultural heritage places are not alive in themselves, people give them 'life' and meaning by the way they treat them and by the way they think and feel about them. ... their value lies entirely within human culture" (Byrne *et al* 2001:22-23). The degree and type of value of a place will be different for various groups and individuals. All places are not equally significant or important, and consequently are not equally worthy of conservation and management (Pearson and Sullivan 1999:17). Assessments of significance thus form the basis for management decisions and guide the development of impact mitigation strategies where these are warranted.

Aboriginal sites and places may have educational, tourism and other public values, but their primary values are generally those relating to their cultural/social significance to Aboriginal people, and scientific significance from an archaeological perspective (NPWS 1997:25). While sites considered to be scientifically significant are usually also significant to the Aboriginal community, others may be of outstanding Aboriginal cultural/social significance but have little or no scientific value.

Aboriginal cultural/social significance

Aboriginal cultural heritage is not confined to physical (archaeological) evidence. The cultural environment contains an invisible overlay of attachments and meanings, and Aboriginal people can and do hold equally strong and equally legitimate attachments to natural, unmodified, features of the landscape, and to entire landscapes themselves. The preservation of sites and places of cultural/social significance can be fundamental to maintaining an Aboriginal community's integrity, sense of place and unique cultural identity.

The level of significance that an individual site or place may hold for the present-day Aboriginal community is often dependent upon a variety of factors, including the nature, type and integrity of the site/place, the spiritual, emotional, historical and/or contemporary attachments attributed to it, its setting and importance within the traditional and/or contemporary cultural landscape, and the perceived value of the site/place in connecting past, present and future generations. The assessments of Aboriginal cultural/social significance presented in Section 6.2 below follow those communicated by Aboriginal stakeholder field representatives.

Scientific/archaeological significance

This type of significance is essentially an assessment of a site's potential to add to our understanding of past human behaviour. Such assessment is made not only with regard to currently available knowledge, theories and data retrieval methods, but with consideration of likely future scientific developments. Sites have particular potential, and thus greater scientific significance, if there are few other sites that can contribute similar types of information, if they are in a good state of preservation, if they can provide a chronology extending back into the past, and/or if they form part of a larger site complex (NPWS 1997:26-28).

From a management and research perspective it is desirable that a representative sample of Aboriginal sites be maintained for the future. This means that not only are rare and unusual site types scientifically significant, but that a well-preserved site that provides a characteristic example of other sites common to its specific type, content and setting may also be of scientific significance. Any determination of representativeness must, by necessity, be based on the known sites in a region. Clearly, this will depend on the extent to which a region has been surveyed and as more work is completed and additional sites recorded, site representation (and significance) can change.

The assessments of scientific/archaeological significance presented in Section 6.2 are based on past and present field observations, background experience of the consultant, a review of local ethno-historical and archaeological literature, including the unpublished reports reviewed in Sections 4.1, 4.2 and 4.3, and the types and distribution of Aboriginal sites registered on the DECC AHIMS database (Section 4.4).

6.2 Significance of the previously registered sites

#30-6-032 stone artefact scatter

Happ and Bowdler (1983:18) assessed the #30-6-032 artefact scatter to be of low Aboriginal cultural/social and scientific/archaeological significance owing to its lack of spatial integrity and negligible potential to yield any further research information. Given that this site occurred in a re-deposited context when recorded in 1983 and appears to have since been removed by water wash, Happ and Bowdler's (1983) scientific/archaeological significance assessment is supported.

#30-6-107 (M-2) stone artefact scatter

The #30-6-107 (M-2) artefact scatter was previously assessed by Collins (1996a:37) to be of low scientific/ archaeological significance due to its small size, level of past disturbance, apparent lack of associated cultural deposits, and limited further research opportunities. This assessment is re-confirmed by the present results,

which revealed no evidence to suggest that M-2 is any larger or more diverse in terms of its cultural contents than originally recorded.

Because Aboriginal archaeological sites contain material evidence of prior occupation and/or use of the landscape, the Aboriginal stakeholders consider all sites within their territory to have at least some general heritage value. However, following a consideration of the field survey results, the stakeholders assessed the #30-6-032 and #30-6-107 (M-2) artefact scatters to have a low level of cultural/social significance.

6.3 Significance of the identified Rainbow Beach site complex

As plotted on Figure 2, the wider Rainbow Beach locality contains an unusually dense concentration of archaeological sites (artefact scatters, isolated artefacts, middens and a scarred tree), reflective of a traditional Aboriginal coastal landuse system. The cultural/social and scientific/archaeological significance of the Rainbow Beach 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 of Rainbow Beach, and on the understanding that similar but apparently more intact examples of small artefact scatters (on both sand and alluvial substrates) are targeted for conservation within the previously assessed northern section of the proposed Rainbow Beach development area (Collins 2006:Table 3).

7 ASSESSMENT CONCLUSIONS AND IMPACT MITIGATION

Past survey results in conjunction with environmental reconstructions and Aboriginal stakeholder accounts of the wider Rainbow Beach area provide an overview of a resource-rich cultural landscape that includes traditional (and probably historic) camping places, and resource-gathering places. No sites of Aboriginal ceremonial, mythological or otherwise spiritual significance have been recorded in the Rainbow Beach area, the closest site of spiritual attachment being on the summit of the Jolly Nose escarpment more than two kilometres to the west (cf Collins 2003:6).

As outlined in Section 5.3, the present study area contains two registered artefact scatters assessed individually to be of low Aboriginal cultural/social and archaeological/scientific 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 (cf Luke and Company 2006).

The other registered artefact 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 (Luke and Company 2006) 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 (Collins 1996a:39).

Well-drained rises on the inner barrier sands close to Duchess Gully and former backswamps appear to have been preferred for traditional occupation, but small camps were also sometimes established on nearby low-gradient bedrock-soil footslopes (Collins 1996a, 2006). While it was initially anticipated that stone artefact scatters and/or middens could occur within SU-8 (Figure 6), towards the western (Duchess Gully) boundary of the 'eco-tourist' site, the field survey revealed virtually all of this survey unit to have been disturbed to such an extent as to leave very little (if any) potential for the survival of intact archaeological deposits, irrespective of its generally aggrading landscape character. It was further concluded that of the sand-based survey units, the only unit with any real potential to contain significant archaeological evidence is SU-7 (Figure 6) west of Duchess Gully (near the tributary confluence, and within the site #30-6-032 locality). This unit is reasonably well elevated, and despite the installation of a sewer pipe, standing mature trees testify to a substantially lower level of disturbance than observed over the remainder of the study area. SU-7 lies within the STP buffer zone, which would not be affected by the proposed development (cf Luke and Company 2006).

Of the bedrock-soil footslopes to be possibly affected by the development, only those represented within SU-1 on the south-west study boundary (Figure 6) did not provide surface exposures sufficient to rule out the existence of any substantial artefact scatter. However, the SU-1 footslopes fall gradually away to the alluvial flat without offering any level landform elements (eg terraces) that might have attracted Aboriginal occupation in their own right, such that SU-1 is assessed to have minimal further archaeological potential.

Although unprecedented due to the scarcity of such landforms in the coastal environment, it was predicted that an artefact scatter/open campsite could occur on the degrading crest of the isolated knoll in SU-3 (Figure 6). Ten percent of the northern half of the knoll crest was effectively surveyed in 2006 (Collins 2006), including a fully-exposed vehicle track that leads up to and over the crest from the west. The southern half of the crest was inspected during the present assessment, yielding effective survey coverage of approximately five percent. The vehicle track was also re-inspected. The absence of any archaeological evidence during either survey reinforces the 2006 conclusion that the knoll crest has a low level of archaeological sensitivity (Collins 2006:24). As a precautionary measure, the Aboriginal stakeholders nevertheless request that any vegetation clearing/topsoil disturbance associated with 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.

As demonstrated by past surveys and test excavations in the M-3 (#30-6-108), M-6 (#30-6-111) and M-7 (#30-6-112) localities (Collins 2007), the poorly-drained alluvial flats contain a background distribution of artefacts, lost or discarded during the course of traditional resource extraction. This background artefact distribution appears to be dominated by heavy-duty pebble 'tools', suggestive of the exploitation of plant resources such as fern and rush rhizomes, which still occur in and around Duchess Gully (Collins 1996a:32). The available evidence further suggests that the background artefact distribution increases in density with proximity to

Duchess Gully and the inner barrier sands, but is concealed by 20-30 centimetres of alluvium (Collins 2007), such that its constituent artefacts are only detectable where intercepted by drain cuttings and other subsurface exposures (Collins1996a:32). On the basis of this evidence, it seems certain that background artefacts will occur within the present study area, where survey coverage of the alluvial grounds was minimised due to the widespread extent of standing water, dense vegetation and past development earthworks, in tandem with a consideration of the low probability of finding any cultural materials, let alone materials that could shed further light on the local traditional landuse system. Because the locations of background artefacts cannot be predicted, and that no development requiring excavations in excess of 20 centimetres below the present surface is proposed on the more sensitive eastern portion of the alluvial flat, no further archaeological investigations are considered warranted in relation to development of the southern periphery of the proposed residential estate, southern school, artificial wetlands or cycle/walkways. It is envisaged that any loss of background artefacts caused by these developments would be sufficiently compensated by the permanent conservation of the balance of the open space/drainage/habitat corridor.

8 MANAGEMENT RECOMMENDATIONS

The management recommendations presented in this section 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 (Appendix A). The recommendations are predicated on the adoption of the current development Concept Plan (Luke and Company 2006), 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.

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GLOSSARY

ALLUVIAL FLAT
A level landscape unit with extremely low relief. There may be frequently active erosion and aggradation by channelled and overbank stream flow, or the landforms may be relict to these processes (Speight 1990:48).

ALLUVIUM
General term for detrital deposits made by rivers or streams (Lapidus 1987:18).

ARCHAEOLOGICAL SITE
A place containing cultural materials of sufficient quality and quantity to allow inferences about human behaviour at that location (Plog *et al* 1978:383).

ARTEFACT
Any object having attributes as a consequence of human activity (Dunnell 1971).

ASSEMBLAGE
A set of artefacts found in association with each other and therefore assumed to belong to the one phase or one group of people (Champion 1980:11).

BIPOLAR CORE
An artefact with either negative flake scars present on opposite ends, or with negative flake scars and crushing (point initiations) present on opposite ends (McCarthy 1976:102).

BLOCK FRACTURED PIECE
An irregular, chunky block of stone, not having a bulb of percussion or negative scars (Witter 1986:3).

CHALCEDONY
A cryptocrystalline variety of silica, having a compact fibrous structure and a waxy lustre. It may be translucent or semi-transparent and occurs in a variety of colours. Chalcedony is often found as a deposit, lining or filling cavities in rocks (Lapidus 1987:99).

CHERT
A dense, extremely hard, microcrystalline or cryptocrystalline siliceous sedimentary rock, consisting mainly of inter-locking quartz crystals, sub-microscopic and sometimes containing opal (amporphous silica). Chert occurs mainly as nodular or concretionary aggregations in limestone and dolomite, and less frequently as layered deposits (banded chert). It may be an organic deposit (radiolarian chert), an inorganic precipitate (the primary deposit of colloidal silica), or as a siliceous replacement of pre-existing rocks. Flint is a variety of chert occurring as nodules in chalk and having a conchoidal fracture (Lapidus 1987:102).

CONGLOMERATE
A coarse-grained clastic sedimentary rock, composed of rounded fragments or particles at least 2mm. in diameter (granules, pebbles, cobbles, boulders), set in a fine-textured matrix of sand or silt and commonly cemented by calcium carbonate, silica, iron oxide or hardened clay (Lapidus 1987:119).

CORE
A piece of stone that has been used as a source for flake production. Cores are thus generally characterised by negative flake scars (Morwood and L'Oste-Brown 1995:162).

CORTEX
The natural weathered surface of rock, not the result of human activity (McCarthy 1976:101).

DUNE
A moderately inclined to very steep ridge or hillock built up by the wind (Speight 1990:30).

FLAKE
A piece of stone detached from a larger mass by the application of force and having a feather, hinge or step termination and a bulb of percussion. A platform may be present if the proximal end is unbroken (Crabtree 1972:64).

FLAKE TOOL
A flake that has been sharpened through deliberate retouch or which exhibits other evidence (eg usewear) to indicate that it has been used as a tool (Witter 1992:35).

FLAKED PIECE
Chipped artefacts with negative flake scars which cannot be classified as a flake, core or retouched flake (Hiscock 1988:64).

FOOTSLOPE
A slope landform element not adjacent below a crest or flat but adjacent above a flat or depression (Speight 1990:11-34).

GULLY
An open depression with short, precipitous walls and moderately inclined floor or stream channel, eroded by channelled stream flow and consequent collapse and water-aided mass movement (Speight 1990:31).

HILL
Part of a landsystem of high relief with gently inclined to precipitous slopes. Fixed, shallow erosional stream channels, close to very widely spaced, form a non-directional or convergent integrated tributary network (Speight 1990:51).

HILLCREST
A very gently inclined to steep crest, smoothly convex, eroded mainly by creep and sheet wash (Speight 1990:31).

HILLSLOPE
A gently inclined to precipitous slope, commonly simple and maximal, eroded by sheet wash, creep, or water-aided mass movement (Speight 1990:31).

INDURATION
The hardening of rock by heat, pressure or cementation. Also, the hardening of a soil horizon by chemical action to form a hardpan (Lapidus 1987:293).

INNER COASTAL BARRIER
A sand deposit located landward of the outer coastal barrier, usually separated from the outer barrier by a lagoon or creek system. Inner barrier sands are characterised by low widely spaced ridges indurated by humic material, which abut bedrock outcrop on their western margin. Inner barrier deposits are thought to be Pleistocene in age and may be eroded or overlain by fluvial, estuarine, paludal or lagoon sediments (Winward 1974:597).

JASPER
A compact, microcrystalline variety of quartz. Its colours are variable, including white, grey, red, brown and black (Lapidus 1987:308).

LANDFORM ELEMENT
A topographic feature 40 metres or more in maximum dimension which forms part of a larger unit, the landform pattern (Speight 1990:9).

MID-SLOPE
A slope landform element not adjacent below a crest or flat and not adjacent above a flat or depression (Speight 1990:11-34).

MUDSTONE
A commonly-used synonym for Mudrock. A fine-grained sedimentary rock composed chiefly of particles in the silt-clay size range. Mudrock/mudstone is a general term used to distinguish the finer-grained sedimentary rocks from sandstones or limestones (Lapidus 1987:362).

MULTI-PLATFORM CORE
A core with at least one negative scar running in a different direction to the remainder. Multi-directional scars indicate that the core has been rotated to get the most economical use of the raw material (Hiscock 1986a:49).

NUCLEAR TOOL
A core which, rather than being specifically used to supply flakes to be used as tools, is itself the tool. A nuclear tool is thus a core-like tool that did not originate as a flake (Witter 1992:30).

PEBBLE
Stone worn and rounded by water and other natural forces (McCarthy 1976:101).

PEBBLE TOOL
A flaked and/or edge-ground nuclear tool that preserves some of the original pebble cortex.

PLATFORM
The plane or surface against which force is applied in order to detach a flake from a core. The platform may be the natural surface of the stone, or cortex, it may be a surface produced by the prior removal of one or more flakes, or a surface produced by grinding or abrading (Phagan 1976:11).

PLEISTOCENE
The lower division of the Quaternary Period dating from two million to 10,000 years ago (Lapidus 1987:96,411).

QUARTZ
Crystalline silica rock having no cleavage but a conchoidal fracture (Lapidus 1987:429).

RETOUCH
The alteration to the primary termination of a flake caused by deliberate secondary flaking in order to resharpen or modify the edge (Crabtree 1972:89).

RIDGE
A compound landform element comprising a narrow spine crest and its immediately adjoining slope with the spine length being greater than the width (Packard 1992:100).

SANDSTONE
A sedimentary rock composed of sand-sized grains, mainly of quartz, in a matrix of clay or silt, and bound together by a cement that may be carbonate (Lapidus 1987:449).

SILCRETE
A siliceous duricrust composed of sand and gravel cemented by opal, chert and quartz, formed by chemical weathering and water evaporation (Lapidus 1987:472).

SILTSTONE
A fine-grained sedimentary rock principally composed of silt-grade material. Intermediate between sandstone and shale, siltstone contains less clay than shale and lacks its fissility and fine laminations (Lapidus 1987:474).

SINGLE PLATFORM CORE
A single platform is indicated when all scars on a core or the dorsal surface of a flake run in the same direction. A single platform on a core signifies less efficient use of the raw material than a rotated core with multiple platforms (Hiscock 1986b:49).

SPUR
Landform element comprising a lower, subsidiary ridge leading down from a locally dominant ridge or crest (Packard 1992:100).

STONE ARTEFACT
Fragment of stone that generally possesses one or more of the following characteristics:
- Positive or negative ring crack
- Distinct positive or negative bulb of force
- Definite eraillure scar in position beneath a platform
- Definite remnants of flake scars (ie dorsal scars and ridges)

These traits indicate the application of an external force to a core, and are characteristic of the spalls removed by humans using direct percussion. Stone artefacts which have none of the above may be identified as such if they possess ground facet/s characteristic of human industry (Hiscock 1984:128).

VOLCANIC ROCK
Very fine-grained or glassy igneous rock produced by volcanic action at or near the earth's surface, either extruded as lava or expelled explosively (Lapidus 1987:535).

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APPENDIX A

Aboriginal stakeholder correspondence

Lindsay James Moran

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Wauchope NSW 2446
6586 1241 6587 7170 0448602483

24th June 2009

St Vincent's Foundation
Rainbow Estate,
Bonny Hills NSW

Archaeological Survey

An archaeological survey was undertaken, at Bonny Hills in the area known as the rainbow estate area.

Site One

A school project and playground area is proposed for this area, no artefact material was located on this site.

Site Two

Investigation was undertaken of the dune system adjacent to the sewerage treatment plant. No artefact material was uncovered, however artefacts have been uncovered at this site during previous surveys of the area. A walking trail and recreation area is proposed for this area.

Site Three

This survey was undertaken on this site. Area was traversed on foot and no artefact material was uncovered at this site, however artefacts have been located during previous surveys of the Duchess Creek area.

Site Determination.

Sites one, two & three.

All the sites that were surveyed are situated within a known semi permanent aboriginal occupation site.
Although no artefacts were uncovered during this recent survey, the fact that artefacts have been located within close proximity to sites one two and three, should be noted.
Site one was a previous waterway that led down to Rainbow Beach.

Recommendations

It is therefore agreed that as Birpais' senior cultural heritage and sites officer I have no objections to the development proposal.

However due to the fact that artefacts have been previously located over all the proposed development areas, it is requested that all contractors, and their employees be instructed on their legal obligations under the act, that is:- national Parks and Wildlife Act section 90 (1) as amended

"A person who without the consent of the director general knowingly destroys defaces or damages or knowingly causes or permits the destruction, the defacement of or damage to, an Aboriginal object or an Aboriginal place is guilty of an offence under this act."

Furthermore if any artefact material is uncovered during the development, all work must cease and it is requested that the appropriate Government departments and individuals be contacted. I.e.National Parks and Wildlife Service, Department of Environment and Climate Change, Hastings Council, Jackie Collins and Mr L. Moran.

Yours in Unity

L Moran

Lindsay J Moran
Senior Heritage, Cultural & Sites Officer
Birpai Nation

BUNYAH LOCAL ABORIGINAL LAND COUNCIL

PO Box 287 Wauchope NSW 2446
Telephone 02 6585 3882 Fax 02 6585 2550

SITE SURVEY REPORT

Date of Survey: 15 June 2009

Location: Rainbow Beach NSW, a parcel of land east of Ocean Road, South of the "Ghost Rd" reaching an area just north of Bonny Hill settlement..

Reason for Survey: survey conducted in relation to proposed redevelopment of the area.

Survey carried out by: Trevor ROBERTS & Stanley CHATFIELD

Results of survey: No artifacts or sites of significance were located on the areas surveyed

Report: The site surveyed is a large parcel of land with a mainly flat to undulating landscape, the land subject to this survey has been subject to significantly disturbed by clearing, grazing and some runoff and the flow of water over the area during wet periods.

There are no natural freshwater sources or other reasons why this property would hold either campsite or other sites of significance to the Local Traditional Custodians of the area.

Recommendation: As no indications of a site of significance were located the Bunyah Local Aboriginal Land Council has no objection whatsoever to any proposed works proceeding. Naturally, should any item of significance be located during the proposed works, any such discovery should immediately be reported to the Bunyah Land Council and the NPWS.

Guy Jones
Chief Executive Officer
Bunyah Local Aboriginal Land Council

Goori-Murri Cultural Services

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ABN 28 116 305 642

St Vincent Foundation
c/- Luke and Company NSW Pty Ltd
PO Box 669
Port Macquarie NSW 2444

14th July 2009

Attention: Michelle Hollis

Re: **Aboriginal Heritage Archaeological Investigation-Rainbow Beach South**

As a Traditional Owner and representative of the Bril Bril Traditional Owners, and one who participated in the Field Study as well as providing input into the report compiled by Jackie Collins, I join the other stakeholder group representatives in endorsing the report and supporting the Management Recommendations. In doing so I draw your attention to Recommendation 2 and encourage you to consider Goori involvement in the development of the proposed picnic area as it provides a good opportunity to acknowledge an Aboriginal sense of place and at the same time enhance intercultural understandings through appropriate signage and features. An example of this is available at nearby Grants Head Reserve and I invite you take the time to visit this site which I believe is a positive step in moving our communities forward.

Yours respectfully,

John Heath
Bril Bril Traditional Owners