Once the variables of exposure and visibility are taken into account, it is estimated that 4.1 percent of the extension area was subject to effective coverage, ranging from two percent of the alluvial plains to almost 28 percent of the knoll footslopes (Table 2).

In view of the disturbance history and naturally poorly-drained character of the alluvial plains, and the environmental context of areas that provided useable exposures on the knoll, the effective survey sample is considered to have been adequate for the purposes of assessing the nature, extent and distribution of the archaeological resource.

Table 2. Survey coverage data

Landform	Area (ha) inspected	Mean % exposure	Mean % visibility	Effective cover (ha)	Sources of exposure	Sites #
Coastal alluvial plains	6.00	2.0	100.0	0.10	drain/pond margins, erosion, cattle tracks	0
Coastal hills (bedrock knoll) crest	0.25	10.0	90.0	0.02	vehicle track, sparse grass, erosion	0
upper and mid- slopes	1.35	10.0	90.0	0.10	vehicle track, sparse grass, erosion, dozing	0
footslopes	0.40	30.0	90.0	0.11	vehicle track, erosion	1
	8.00			0.32		1
	100%			4.10%		

7.3 Survey results

As described below, one scatter of eleven visible artefacts (designated Site 12) was recorded during the survey.

Site 12: Artefact scatter/Open campsite (to be registered)

AMG Grid Reference: 484486.6506515 Grants Head 1:25,000 mapsheet

The eleven Site 12 artefacts (Plate 7) were scattered across a four metre (N/S) by three metre (E/W) water erosion scour on the low-gradient (three degrees) western footslope of the bedrock knoll on the south-east study boundary, three metres upslope of the graveled access road. This part of the footslope supports a linear band of regrowth oaks (Plate 6). A ground cover of bladey grass reduced detection probabilities off the erosion exposure. However, survey observations suggest that the site could stretch for up to 20 metres along the knoll's western footslope, extending north from the existing downcut (but overgrown) track that leads upslope to the knoll crest (Plate 8). The northern slopes of the knoll have been disturbed by machinery and the stockpiling and spreading of spoil excavated from a residential subdivision presently under construction at Bonny Hills. Cultural materials are unlikely to survive on the northern footslope.

Although not marked on the revised concept plan (Figure 2), Luke and Company has advised of a possible proposal to construct a roadway up the knoll and a picnic area on the knoll crest. Site 12 may be threatened by this proposal.

Artefact description:

1 Siltstone single platform pebble core, 63 by 45 by 29 millimetres.
Five negative flake scars. Evidence of platform preparation.

2 Siltstone pebble flake, 40 by 29 by 15 millimetres.
Broad cortical platform, extending down one lateral margin.
Hinge termination, one dorsal negative scar.

3 Siltstone flake, 31 by 15 by 9 millimetres.
Broad flaked platform, distal snap. One dorsal negative scar.

4 Jasper single platform core, 42 by 21 by 21 millimetres.
Heavily reduced.

5 Chalcedony distal flake fragment, 13 by 14 by 4 millimetres.
Feather termination, one dorsal negative scar.

6 Chert flake tool, 58 by 27 by 7 millimetres.
Focal flaked platform, two dorsal negative scars.
Lateral and distal retouch.

7 Jasper flake, 33 by 30 by 9 millimetres.
Faceted platform, distal snap. Five dorsal negative scars.

8 Siltstone distal flake fragment, 31 by 41 by 11 millimetres.
Feather termination, six dorsal negative scars.

9 Siltstone medial flake fragment, 31 by 25 by 4 millimetres.
Pebble cortex on one lateral margin, one negative dorsal scar.

10 Siltstone flake, 35 by 23 by 8 millimetres.
Broad flaked platform, feather termination. 100 percent dorsal pebble cortex.

11 Siltstone distal flake fragment, 40 by 29 by 16 millimetres.
Feather termination, 50 percent dorsal pebble cortex.

7.4 Results assessment

The survey results are consistent with the 1996 assessment (Collins 1996), which suggested that low-gradient well-drained landform elements in the eastern (seaward) section of the Rainbow Beach area were targeted for Aboriginal occupation. This occupation seems to have centred on the inner coastal barrier at the expense of the northern hill system and alluvial plains. The 1996 recording of Site 11 (#30-6-116) on bedrock footslopes fringing the Duchess Creek basin at Bonny Hills further south, and the present recording of Site 12 on the footslopes of the bedrock knoll on the south-east study boundary, however, indicate that Aboriginal occupation was not solely confined to the sand-based grounds.

Although additional artefacts are expected to occur beneath grass cover on the Site 12 footslope, the erosional context of this landform makes it unlikely that any such artefacts will be either *in situ* or subsurface. No evidence of further sites was detected during the survey, nor were any potential archaeological deposits identified.

Whilst it is conceded that the probability of detecting artefacts on the alluvial plains was extremely low (cf Table 2), it is highly unlikely that this naturally poorly-drained landform would have been selected for Aboriginal occupation, particularly given the close proximity of more elevated barrier dune systems.

Apart from the knoll footslopes, the only other landform element within the survey area considered to have any real potential to contain archaeological sites was the level crest of the knoll. Despite careful inspection and a mean exposure of 10 percent, however, no archaeological evidence was detected and it is concluded that this crest has a low level of sensitivity.

8 LEGISLATIVE OBLIGATIONS

The **National Parks and Wildlife Act 1974** (as amended) provides the primary basis for the statutory protection and management of Aboriginal sites in NSW and the administration of legislation pertaining to sites is currently the responsibility of the Department of Environment and Conservation (DEC).

Under the terms of the National Parks and Wildlife Act an Aboriginal object is defined as-

> 'any deposit, object or material evidence, not being a handicraft made for sale, relating to indigenous and non-European habitation of the area that comprises NSW, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction.'

In accordance with the Act an Aboriginal object may not be knowingly disturbed, defaced, damaged or destroyed without written authority from the DEC. The provisions apply to all Aboriginal archaeological sites regardless of whether or not they have been registered with the DEC, or whether they occur on private or crown land. If any proposed development will or is likely to disturb, deface, damage or destroy an Aboriginal object, a Section 90

Heritage Impact Permit must first be granted by the Director-General. Such a permit is normally only issued following review of a specialist report, consideration of the object's significance, advice from the local Aboriginal community and consideration of all alternative conservation options. Except where destruction of an object/group of objects is or will be demonstrably unavoidable, DEC policy is to require conservation in its original location and context.

9 SIGNIFICANCE ASSESSMENT

9.1 Management principles and the concept of significance

Assessments of the significance of cultural heritage sites and places are fundamental to their management. Significance can be assigned to particular sites or places, or to a grouping of sites and/or places within an area. The heritage value of a site or site grouping is taken to include its 'aesthetic, historic, scientific or social significance, or other significance, for current and future generations of Australians (Australian Heritage Council Act 2003).

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" (Byme *et al* 2001:22-23). In general terms, if a site or place has importance for a particular cultural or ethnic group for religious, mythological, spiritual or other symbolic reasons, it has social significance (Moratto and Kelly 1978:10).

9.2 Aboriginal sites

With respect to Aboriginal sites and places, the two most important significance criteria are social and scientific. While sites considered to be scientifically significant are usually also

significant to the Aboriginal community, others may be of outstanding importance to the Aboriginal community but have little or no scientific value.

DEC management policies support the objective of conserving all significant Aboriginal sites/places as resources for research, vehicles for interpreting history and culture, and as elements in landscapes. The National Parks and Wildlife Act (1974) is designed to ensure that the Aboriginal cultural heritage resource is carefully managed, and that unmitigated destruction of archaeological material does not occur. The issue for resource managers is to permanently preserve a body of sites that is representative at the regional level. This regionally representative sample should comprise examples of all site types within the full range of environmental contexts.

9.3 Significance of Sites 1-10 recorded in 1996

Following consideration of the content and context of Sites 1-10 and their value as a physical link with the past, Birpai LALC representatives have assessed the sites, as a group, to be of general heritage significance (Collins 1996:36; L. Moran pers comm 2006).

As discussed by Collins (1996:37), the Rainbow Beach sites form part of an interrelated site complex, reflective of a coastal landuse strategy. The archaeological/scientific significance of Sites 1-10 is thus considered to lie more in their grouping together than in any unique or representative features exhibited by the individual sites themselves. Unlike other known site complexes at Port Macquarie, Lighthouse Beach and Point Plomer on the Hastings coast, Sites 1-10 are most likely associated with economic activities centred on the exploitation of forest, creek and backswamp resources, making this site grouping unique at the local level. However, all of these sites have been adversely affected to some degree by land clearing, cattle grazing, erosion and/or drain excavation, and some sites clearly have greater potential to provide further research information than others.

Sites 2, 5, 8 and 9, for instance, are small, disturbed, display no potential for subsurface deposit, and are poor representative examples of coastal artefact occurrences. Even though some additional artefacts may occur at Sites 2 and 8, these four sites are considered to have minimal research value above that contained in this report and are assessed to be of low archaeological/scientific significance. None of these sites would be impacted under the revised development concept plan.

Sites 1 and 3 respectively contain 20 and 11 recorded artefacts. Some additional artefacts are expected in both locations. The disturbance context, likely size and research potential of these sites indicates a moderate level of archaeological/scientific significance. Neither site would be impacted under the revised development concept plan.

Sites 6, 7 and 10 also feature relatively small numbers of recorded artefacts. These sites are associated with potentially intact aggrading landforms that may contain undisturbed subsurface evidence of future research value. While further investigation would be required to determine their actual disturbance and archaeological status, Sites 6, 7 and 10 are provisionally assessed to have a moderate level of archaeological/scientific significance. These sites would be directly impacted by residential development under the revised concept plan.

Site 4 is the largest and most extensive of the recorded artefact scatters. There is little doubt that subsurface artefacts will occur within the intact section of sand rise west of the quarry cutting. This site clearly has the potential to contain a well-preserved archaeological assemblage of substantial future research value. It represents a rare site type in the local and regional context and provides a good representative example of an inner coastal barrier campsite. While further investigation would be required to determine its full archaeological status, the available evidence supports an assessment of high archaeological/scientific significance for Site 4. Under the revised concept plan, a large proportion of this site, including the archaeologically sensitive sand rise, would be destroyed by construction of artificial wetlands.

9.4 Significance of the newly recorded Site 12

Owing to the paucity of known coastal sites within their territory, Bunyah LALC representatives have assessed both Site 12 and its wider environment to be of high social /cultural significance (see survey report, Appendix A). This assessment is enhanced by the recording of Sites 1-10 in the northern section of the development area, and Site 11 on a hill footslope some 500 metres further south.

Site 12 occurs on an eroded bedrock footslope and is in this sense typical of other artefact locations in the wider region (cf Collins 2004, 2005). The site may extend for a distance of up to 20 metres beneath vegetation that covers the remaining western margin of the outlying knoll. In the apparent absence of colluvium, there is little to no potential for subsurface archaeological deposit, and it is anticipated that future research prospects would be restricted to a surface distribution analysis. Providing spatially undisturbed artefacts do occur off the erosion exposure, however, Site 12 would offer a good representative example of a small bedrock sub-coastal campsite, and for this reason alone would be worthy of permanent conservation.

Balancing its perceived limited further research value against the relatively small number of similar sites recorded near the Hastings coastline, Site 12 is provisionally assessed to have a moderate level of local archaeological/scientific significance. A more concrete assessment could only be determined through further surface inspection conducted under improved visibility conditions, supplemented by a subsurface test investigation.

10 MANAGEMENT RECOMMENDATIONS

The management recommendations presented in this section are based on-

- The provisions of the National Parks and Wildlife Act 1974.
- Advice from Birpai and Bunyah Local Aboriginal Land Council representatives.
- A review and re-inspection of sites recorded during the 1996 survey and reassessment of these sites in terms of the revised development concept plan.
- Results of the field inspection conducted in the southern extension area.
- A consideration of the potential impact of the development proposal on Aboriginal cultural heritage sites and values.

10.1 Site 1: Artefact scatter/Open campsite (#30-6-106)

Site 1 would not be directly affected by the amended development proposal (Figure 2).

Providing the site area is spared any development-related disturbance and is retained in its present condition, no management action is warranted. The site has naturally stabilised since its 1996 recording and the previously recommended artificial stabilisation works are thus no longer necessary.

10.2 Site 2: Artefact scatter/Open campsite (#30-6-107)

Site 2 would not be directly affected by the amended development proposal (Figure 2).

Providing the site area is spared any development-related disturbance and is left to regenerate, no management action is warranted. However, to achieve a conservation

outcome, it is imperative that any track upgrading works associated with the provision of pedestrian access to Rainbow Beach be exclusively confined to the existing track alignment shown on Figure 2.

10.3 Site 3: Artefact scatter/Open campsite (#30-6-108)

The southern section of Site 3 ('location 1') would not be affected by the amended development proposal (Figure 2). However, Site 3 'location 2' is intercepted by a proposed roadway and would be destroyed as a result of its construction.

Although no longer detectable, nine stone artefacts were recorded in a drain cutting at a depth of 20 centimetres at 'location 2' in 1996. This area clearly has the potential to contain undisturbed subsurface evidence of archaeological research value. In view of this potential, and given that it would be destroyed if the development proceeds as planned, it is recommended that the Site 3 'location 2' impact area (cf Figure 3) be subject to an archaeological test investigation to assess the content, stratigraphic/disturbance context and significance of subsurface evidence, and to determine any requirement for permanent conservation or more comprehensive recording/salvage prior to destruction.

10.4 Site 4: Artefact scatter/Open campsite (#30-6-109)

The majority of Site 4 lies within an area proposed for construction of artificial wetlands. The site is the largest and most extensive of those recorded at Rainbow Beach and the topographically intact (but cleared) sand rise west of the artefact exposure recorded in 1996 has a high probability of containing a well-preserved archaeological deposit. Given that few other similar sites have been recorded in the local and regional area, Site 4 is assessed to have a high level of archaeological/scientific significance. This significance is considered sufficient to warrant the site's permanent conservation.

To preserve the Aboriginal social and archaeological/scientific values of Site 4, it is recommended that all land above the six metre contour interval (as shown on Figure 3) be excluded from the proposed wetlands and retained in its present condition. It is desirable that cattle grazing be immediately discontinued in the Site 4 area to facilitate vegetation regeneration and natural surface stabilisation.

To ensure that significant archaeological deposits are not inadvertently disturbed or destroyed, it is recommended that temporary fencing be erected and maintained along the six metre contour interval adjacent to Site 4 (Figure 3) to define the 'no-go' area for the duration of wetlands construction. No disturbance may occur above the Site 4 six metre contour interval without formal approval from the Department of Environment and Conservation.

10.5 Site 5: Isolated find (#30-6-110)

Site 1 would not be affected by the amended development proposal (Figure 2).

Providing the site area is spared any development-related disturbance and is retained in its current condition, no management action is warranted.

10.6 Site 6: Artefact scatter/Open campsite (#30-6-111)

10.7 Site 7: Artefact scatter/Open campsite (#30-6-112)

In tandem with Site 3 'location 2', Sites 6 and 7 are probably representative of a relatively dense 'background' distribution of reduced beach pebbles occurring beneath alluvial sediments in the non flood-prone eastern section of the study area. As with those at Site 3 'location 2', artefacts at Sites 6 and 7 were exposed in a drain cutting, strongly suggesting further subsurface archaeological and research potential for the surrounding alluvium.

Owing to this potential, and given that Sites 6 and 7 would be destroyed if the development proceeds as planned, it is recommended that (the apparently more topographically intact) alluvial plains east of the subject drain (cf Figure 3) be subject to an archaeological test investigation to assess the content, stratigraphic/disturbance context and significance of subsurface evidence, and to determine any requirement for permanent conservation or more comprehensive recording/salvage prior to destruction. To date, no subsurface investigations have been conducted in alluvial contexts in the Hastings region and any information generated by this investigation would be of both specific site and regional research and agency management value.

10.8 Site 8: Artefact scatter/Open campsite (#30-6-113)

Site 8 would not be affected by the amended development proposal (Figure 2).

Providing the site area is spared any development-related disturbance and is retained in its current condition, no management action is warranted.

10.9 Site 9: Isolated find (#30-6-114)

Site 9 would not be affected by the amended development proposal (Figure 2).

Providing the site area is spared any development-related disturbance and is retained in its current condition, no management action is warranted.

10.10 Site 10: Artefact scatter/Open campsite (#30-6-115)

Site 10 is intercepted by a proposed roadway and would be destroyed as a result of its construction (Figure 2). Although no longer detectable due to regenerating grass cover, 14 surface artefacts were recorded on erosion exposures in 1996, and additional materials are expected beneath aggrading sands in the site locality.

In view of its further archaeological potential, and given that it would be destroyed if the development proceeds as planned, it is recommended that the Site 10 impact area (cf Figure 3) be subject to an archaeological test investigation to assess the content, stratigraphic/disturbance context and significance of subsurface evidence, and to determine any requirement for permanent conservation or more comprehensive recording/salvage prior to destruction. The investigation offers the potential to provide information on the archaeology of an inner barrier open beach deposit that would be of both research and agency management value.

10.11 Site 12: Artefact scatter/Open campsite

Site 12 lies within an area proposed for the possible construction of a roadway to the top of the outlying knoll on the south-east study boundary. This site is of high significance to the Bunyah LALC and has further archaeological potential.

To preserve its Aboriginal social and archaeological/scientific values, it is recommended that Site 12 be conserved in its present environment, and that any future road construction disturbance on the western face of the knoll be confined to the existing downcut track easement shown in Plate 8 and highlighted on Figure 3.

The site is located within regrowth oak forest that stands on the western knoll footslope north from the existing downcut track. In the absence of an appropriate DEC Heritage Impact Permit it will be necessary to protect this forest from development-related impact.

10.12 Rainbow Beach midden (#30-6-12)

The existing Rainbow Beach access track that may be upgraded for use by subdivision residents passes through the general locality of the Site #30-6-12 midden recorded by Starling in 1970. This track is cut down through the dune and despite search of its surface

and cuttings, and the seaward scarp of the wider foredune in 1996, the closest midden shell was found some 200 metres further north.

Although the site has degraded as a result of beach erosion and natural attrition processes (cf Starling 1971; Happ and Bowdler 1983; Collins 1996), shell and stone artefacts may remain bedded within undisturbed parts of the foredune. In order to avoid inadvertent damage to the surviving remnants of Site #30-6-12, it is recommended that all upgrading works (eg the provision of a chained plank walkway etc) be confined to the easement defined by the existing track cutting.

10.13 General recommendations

Prior to the commencement of any vegetation clearing, earthworks or other invasive development-related activities, it is recommended that all construction contractors be advised of their legal obligations with regard to Aboriginal cultural materials (cf Section 8).

Should any material evidence thought to be of Aboriginal origin be discovered or exposed during any stage of the development, work must immediately cease in that locality. The Department of Environment and Conservation and the Birpai and/or Bunyah Local Aboriginal Land Council (as appropriate) should then be contacted for management advice and clearance given by these organisations before work resumes in the subject area.

10.14 Conclusion

Providing all of the recommendations presented in Sections 10.1-10.13 above are adhered to, it is recommended that the proposed development be allowed to proceed without further Aboriginal heritage constraints.

Table 3. Summary of site management recommendations

Site #	DEC site #	# surface artefacts	Potential to extend	Scientific significance	Affected 1996	1996 management recommendation	Affected by revised concept	Current management recommendation
Sites recorded in 1996								
1	30-6-106	20	Yes	Moderate	No	Stabilise and retain in situ	No	Avoid disturbance- retain in situ Stabilisation works no longer necessary
2	30-6-107	5	Limited	Low	No	Avoid disturbance- retain in situ	No	Avoid disturbance- retain in situ
3	30-6-108	11	Yes	Moderate	No	Avoid disturbance- retain in situ	Part	Subsurface investigation in impact area
4	30-6-109	115	Yes	High	No	Stabilise and retain in situ	Yes	Modify concept plan Avoid disturbance- retain in situ Construction fencing along 6m contour Stabilisation works no longer necessary
5	30-6-110	1	No	Low	Yes	Collect before development	No	Avoid disturbance- retain in situ
6	30-6-111	2	Yes- probably limited	Moderate	Yes	Subsurface investigation	Yes	Subsurface investigation
7	30-6-112	2	Yes- probably limited	Moderate	Yes	Subsurface investigation	Yes	Subsurface investigation
8	30-6-113	3	Limited	Low	Yes	Collect before development	No	Avoid disturbance- retain in situ
9	30-6-114	1	No	Low	No	Avoid disturbance- retain in situ	No	Avoid disturbance- retain in situ
10	30-6-115	14	Yes	Moderate	No	Avoid disturbance- retain in situ	Yes	Subsurface investigation
Newly recorded sites								
12	n/a	11	Yes	Moderate	No	n/a	Possible direct or indirect impact	Avoid disturbance- retain in situ
Rainbow Beach midden								
n/a	30-6-012	n/a	Yes	Undetermined	Potential	Confine disturbance to existing beach track cutting	Potential	Confine disturbance to existing beach track cutting

Figure 3. Location of sites/areas recommended for specific management actions
(excerpt from the Figure 2 concept plan, enlarged by 100%)

REFERENCES

BARTLETT, A.G. 1991 *The history of Green Hills-Bonny Hills.* Newspaper article in Camden Haven Courier, 27/11/96, Pp 9.

BLOMFIELD, G. 1981 Baal Belbora, the End of the Dancing: The Agony of the British Invasion of the Ancient People of the Three Rivers: The Hastings, the Manning and the Macleay in NSW. Apcol, Chippendale.

BYRNE, D., H. BRAYSHAW and T. IRELAND 2001 Social Significance. A Discussion Paper. NSW National Parks and Wildlife Service, Hurstville.

CAMDEN HAVEN HISTORICAL SOCIETY 1991 Early History of the Camden Haven. Garrison Print, Port Macquarie.

CAMDEN HAVEN LEARNING EXCHANGE 1987 An Historical Account of Kendall and the Camden Haven Area. Snap Printing, Port Macquarie.

CAMPBELL, J. 1985 *Smallpox in Aboriginal Australia: the early 1830's.* Historical Studies, 21(84): 336-358.

CLANCY, G.P. and R. AYRES 1983 *Vegetation report- Bonny Hills proposed international sports and leisure village.* Report to Cox and Corkill Pty Ltd.

COLEMAN, J. 1981 *Report of an archaeological survey of a proposed pipeline route and five reservoir sites between Port Macquarie and Laurieton.* Report to the NSW Public Works Department.

COLLINS, J.P. 1996 *Proposed Meridian residential subdivision, Bonny Hills, NSW mid-north coast: archaeological assessment.* Report to Luke and Company.

2003a *Lake Cathie-Bonny Hills Stage 1A Environmental Study. Aboriginal heritage assessment.* Report to Deicke Richards.

2003b *Lake Cathie-Bonny Hills Stage 1B Environmental Study. Cultural heritage assessment.* Report to King and Campbell.

2004 *Proposed Oxley Highway upgrade Wrights Road to Pacific Highway west of Port Macquarie NSW. Cultural heritage assessment.* Report to RTA Environmental Technology.

2005 *Structure plan. Area 13 urban investigation area, Port Macquarie NSW. Aboriginal heritage assessment.* Report to Deike Richards.

COX AND CORKILL PTY LTD 1983 *International sports and leisure village. Local environmental study.* Report to Hastings Shire Council.

DAWSON, R.L. 1935 *Some recollections and records of the Clarence and Richmond River Aborigines.* Clarence River Historical Society Archives, Grafton.

HAPP, G. and S. BOWDLER 1983 *An Aboriginal sites survey at Bonny Hills, near Port Macquarie, NSW.* Report to McDonald Cox Corkill Pty Ltd.

HENDERSON, J. 1851 Excursions and Adventures in NSW. W. Shobert, London.

HODGKINSON, C. 1845 Australia from Port Macquarie to Moreton Bay. TW Boone, London.

HOLMER, N.M. 1966 *An attempt towards a comparative grammar of two Australian languages.* Occasional Papers in Aboriginal Studies, No 5, Linguistics Paper No 3. Australian Institute of Aboriginal Studies, Canberra.

LILLEY, I. 1984 *Late Holocene subsistence and settlement in sub-coastal south east Queensland.* Queensland Archaeological Research, 1: 8-32.

McBRYDE, I. 1985 *Thomas Dick's photographic vision.* In I. and T. Donaldson (eds), Seeing the First Australians. George Allen and Unwin, Sydney.

McDOUGALL, M.C. 1900 *Manners, customs and legends of the Coombangree tribe.* Science of Man, 3(7): 116-117.

McFARLANE, D. 1934-1935 *Aboriginals mode of living- Clarence River tribes- No 3.* Newspaper offprints from The Daily Examiner. Clarence River Historical Society archives.

MITCHELL, P. 2002 *NSW Ecosystems database mapping unit descriptions.* Internal report, Department of Environment and Conservation.

MORATTO, M.J. and R.E. KELLY 1978 *Optimising strategies for evaluating archaeological significance.* Advances in Archaeological Method and Theory, 1:1-30.

OXLEY, J. 1820 Journals of Two Expeditions into the Interior of NSW. John Murray, London.

STANILAND MOUNSER CONSULTING PTY LTD 1994 *Flood investigation, resort development, Ocean Drive Bonny Hills.* Report to Luke and Company.

STARLING, J.A. 1971 *A survey of the Aboriginal sites on the north coast of NSW, 1970-71.* Report to the NSW National Parks and Wildlife Service.

GLOSSARY

ALLUVIAL PLAIN
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).

BIFACIAL FLAKING
Flaking which has been undertaken on two opposing faces of an artefact (McCarthy 1976).

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).

BROAD PLATFORM
A platform which, when viewed from above, obscures the body of the flake. Usually produced by detaching the flake by striking well behind the platform margin (Witter 1992:110).

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).

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).

DISTAL
The opposite end of an artefact to the platform end. The blade of an edge-ground axe or the working edge of other implements form the distal end (McCarthy 1976:101).

DORSAL
The face of a flake that was exposed on the core before removal of the flake (Phagan 1976:39).

FACETED PLATFORM
A platform carrying a series of small scars and/or crushing on its surface (Hiscock 1988:86).

FEATHER TERMINATION
Is identified on the distal end of a flake which terminates in a sharp edge with a minimal margin. Feather terminations are an indicator of good knapping control (Crabtree 1972:64).

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).

FOCAL PLATFORM
A platform having a small area such that when viewed from above, most of the remaining body of the flake can be seen. Focal platforms are produced by striking close to the platform edge (Witter 1992:110).

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

GREYWACKE
Sedimentary rock. A very hard, dark grey or greenish-grey, coarse-grained sandstone characterised by angular particles and rock fragments embedded in a clayey matrix (Lapidus 1987:265).

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).

HINGE TERMINATION
Is identified on the distal end of a flake that terminates in a blunted or rounded right angle break. Hinge terminations occur when inadequate percussive force is applied and are thus an indicator of poor knapping control (Hiscock 1986b:49).

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).

LATERAL MARGINS
The sides of an artefact- between the proximal and distal ends (McCarthy 1976:101).

LENGTH
Maximum dimension of a core or flaked piece in any direction; maximum distance along the percussion axis of a flake from the platform to the distal margin (Witter 1986:2).

MEDIAL
The middle section of an artefact (Phagan 1976:39).

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).

NEGATIVE FLAKE SCAR
Concave surface resulting from the removal of a flake (Phagan 1976:39).

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 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).

PLATFORM PREPARATION
Accomplished when the knapper strikes or brushes the edge of the core platform and removes small flakes from the edge. This prevents the platform from shattering (Hiscock 1988:86).

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).

QUARTZITE
A metamorphic rock consisting mainly of quartz grains. Formed through the recrystallization of sandstone by thermal or regional metamorphism (Lapidus 1987:430).

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).

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).

STEP TERMINATION
Is identified on the distal end of a flake which terminates abruptly in a right angle break. Step terminations occur when too much outward force is applied and are thus an indicator of poor knapping control (Hiscock 1986b:49).

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 (i.e.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).

THICKNESS
The greatest dimension perpendicular to both the length and width of an artefact (Witter 1986:2).

UNIFACIAL FLAKING
Flaking undertaken on one face of an artefact only (McCarthy 1976).

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).

WIDTH
The maximum distance between the lateral margins of an artefact, measured at right angles to the length (Witter 1986:2).

Glossary References

CHAMPION, S. 1980 A Dictionary of Terms and Techniques in Archaeology. Facts on File Inc, New York.

CRABTREE, D. 1972 *An introduction to the technology of stone tools. Part II.* Occasional Papers of the Idaho State Museum, No 28.

DUNNELL, R.C. 1971 Systematics in Prehistory. Free Press, New York.

HISCOCK, P. 1984 *A preliminary report on the stone artefacts from Colless Creek Cave northwest Queensland.* Queensland Archaeological Research, 1:120-151.

1986a *Raw material rationing as an explanation of assemblage differences: a case study of Lawn Hill, northwest Queensland.* In G.K. Ward (ed), Archaeology at ANZAAS Canberra 1984. Canberra Archaeological Society. Pp 178-190.

1986b *Technological change in the Hunter Valley and its implications for the interpretation of late Holocene change in Australia.* Archaeology in Oceania, 21:40-50.

1988 *Technological change at Platypus rockshelter (KB:A70), southeast Queensland.* Queensland Archaeological Research, 5:63-89.

LAPIDUS, D.F. 1987 Dictionary of Geology. Collins, London.

McCARTHY, F.D. 1976 Australian Aboriginal Stone Implements. The Australian Museum, Sydney.

MORWOOD, M.J. and S. L'OSTE-BROWN 1995 *Chronological changes in stone artefact technology*. In M.J. Morwood and D.R. Hobbs (eds), Quinkan Prehistory: The Archaeology of Aboriginal Art in SE Cape York Peninsula, Australia. Tempus 3. University of Queensland, St Lucia.

PHAGAN, C.J. 1976 *A method for the analysis of flakes in archaeological assemblages: A Peruvian example*. Unpublished Ph D Thesis, Ohio State University.

PLOG, S., F. PLOG and W. WAIT 1978 *Decision making in modern surveys*. In M. Schiffer (ed), Advances in Archaeological Method and Theory, 1:383-421.

SPEIGHT, J.G. 1990 *Landform*. In R.C. McDonald, R.F. Isbell, J.G. Speight, J. Walker and M.S. Hopkins (eds), Australian Soil and Land Survey: Field Handbook. Inkata Press, Sydney. Pp 9-57.

WINWARD, K. 1974 *Quaternary coastal sediments*. In N.L. Markham and H. Basden (eds), The Mineral Deposits of NSW. Department of Mines, Sydney. Pp 596-621.

WITTER, D.C. 1986 *Detailed stone artefact recording*. Report to the NSW National Parks and Wildlife Service.

1992 *Regions and resources*. Unpublished Ph D Thesis, Australian National University.

APPENDIX A

Fieldwork reports from the Birpai and Bunyah Local Aboriginal Land Councils

BUNYAH LOCAL ABORIGINAL LAND COUNCIL

SITE SURVEY REPORT

Date of Survey: 14th June 2006

Location: Proposed development- Rainbow Beach, Bonny Hills

Reason for Survey: The survey was carried, out at the request of Jackie Collins, Archaeologist to determine if the land affected by the above proposal contained any Aboriginal artifacts or sites of significance.

Survey carried out by: Trevor Roberts and Stan Chatfield

Results of survey: Eleven (11) artifacts were located on the proposed development site.

Report: The proposed subdivision is located within an area of very high cultural significance to the local Aboriginal people.

The area surveyed has been substantially cleared although there was a heavy covering of grass. The large number of artifacts located despite the heavy cover indicates that more will be located during the development.

Recommendation: All of the artifacts located have been moved to a safe location in the same area. The Bunyah Local Aboriginal Land Council has no objections to the proposed develop proceeding

Should any other artifacts or other indications of sites of significance be exposed, during the develop work, work should be halted and this Land Council and the NPWS notified immediately.

Trevor Roberts

Trevor Roberts: Sites Officer

Bulkara Enterprises

P.O.Box 433
Wauchope NSW 2446
Phones 6587 7170 65861241

ABN 99 485 987 272

10th July 2006

Archaeological Survey

An archaeological survey was undertaken at the Rainbow beach estate site.

In consultation with Archaeologist Mrs J. Collins it was agreed that six to seven test pits be carried out, this was decided due to the sensitivity of the site and the high probability that evidence of occupation will be confirmed.

The test pits are to be implemented before any archaeological clearance can be given.

Yours in unity

Lindsay James Moran
Senior Sites/Cultural Officer
BLALC/Mingaletta Development Corparation.