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PACIFIC HIGHWAY SAPPHIRE TO WOOLGOOLGA UPGRADE

Aboriginal cultural heritage assessment of project area, Arrawarra

October 2010

(Updated to include additional DECCW AHIMS searches conducted December 2010 and February 2011)

Prepared for:

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1 INTRODUCTION

1.1 Assessment purpose and background

The NSW State Government approved the upgrade of the Pacific Highway between Sapphire and Woolgoolga (S2W) in January 2010. The Chief Executive of the RTA subsequently determined that construction and operation of the S2W upgrade could proceed subject to the conditions listed in the approval from the NSW Minister for Planning. The RTA engaged the Leighton Fulton Hogan Joint Venture (JV) to design and construct the Project, and vegetation clearing and preliminary earthworks have commenced towards the southern end.

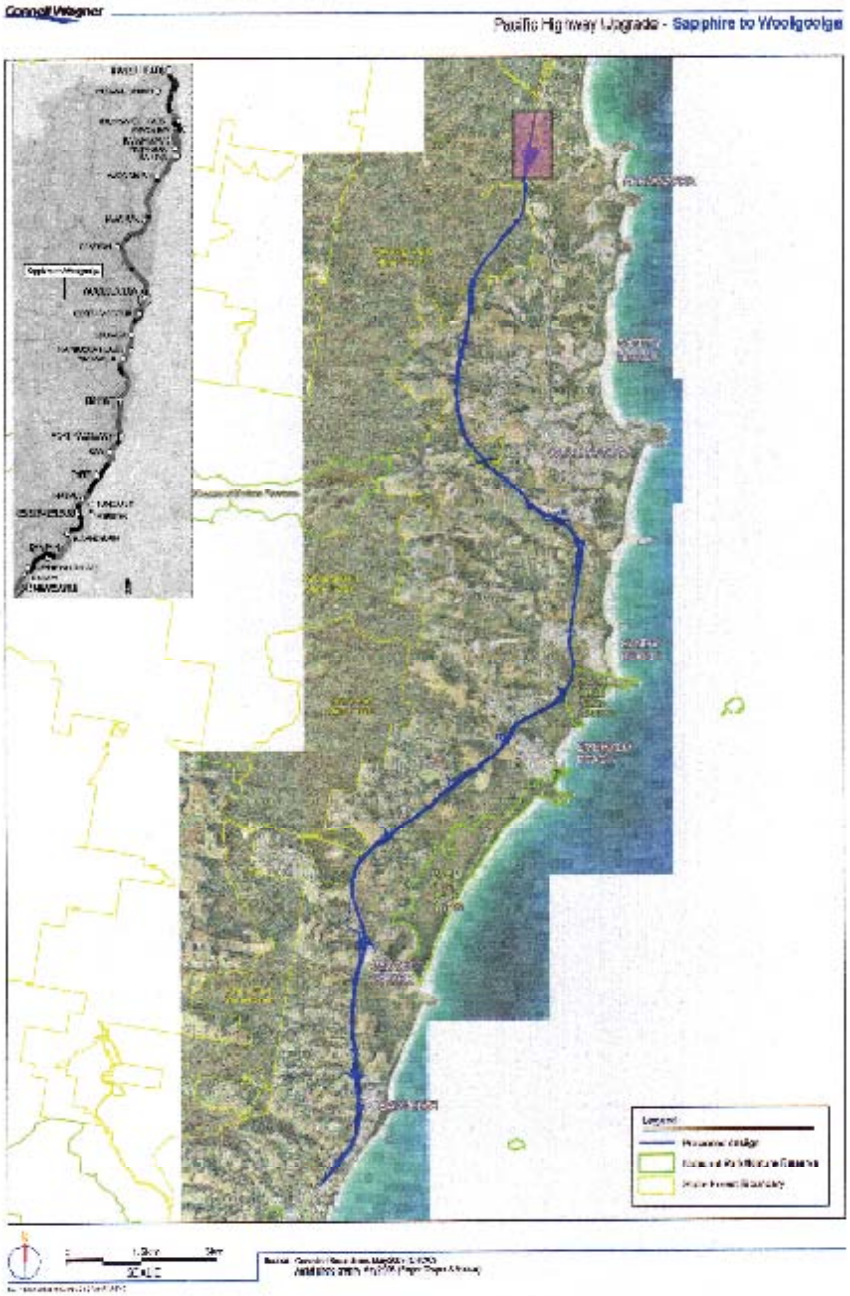

Figure 1. The approved Upgrade alignment, showing general location of the area addressed in this report (pink box) (base map source: Connell Wagner Pty Ltd 2007)

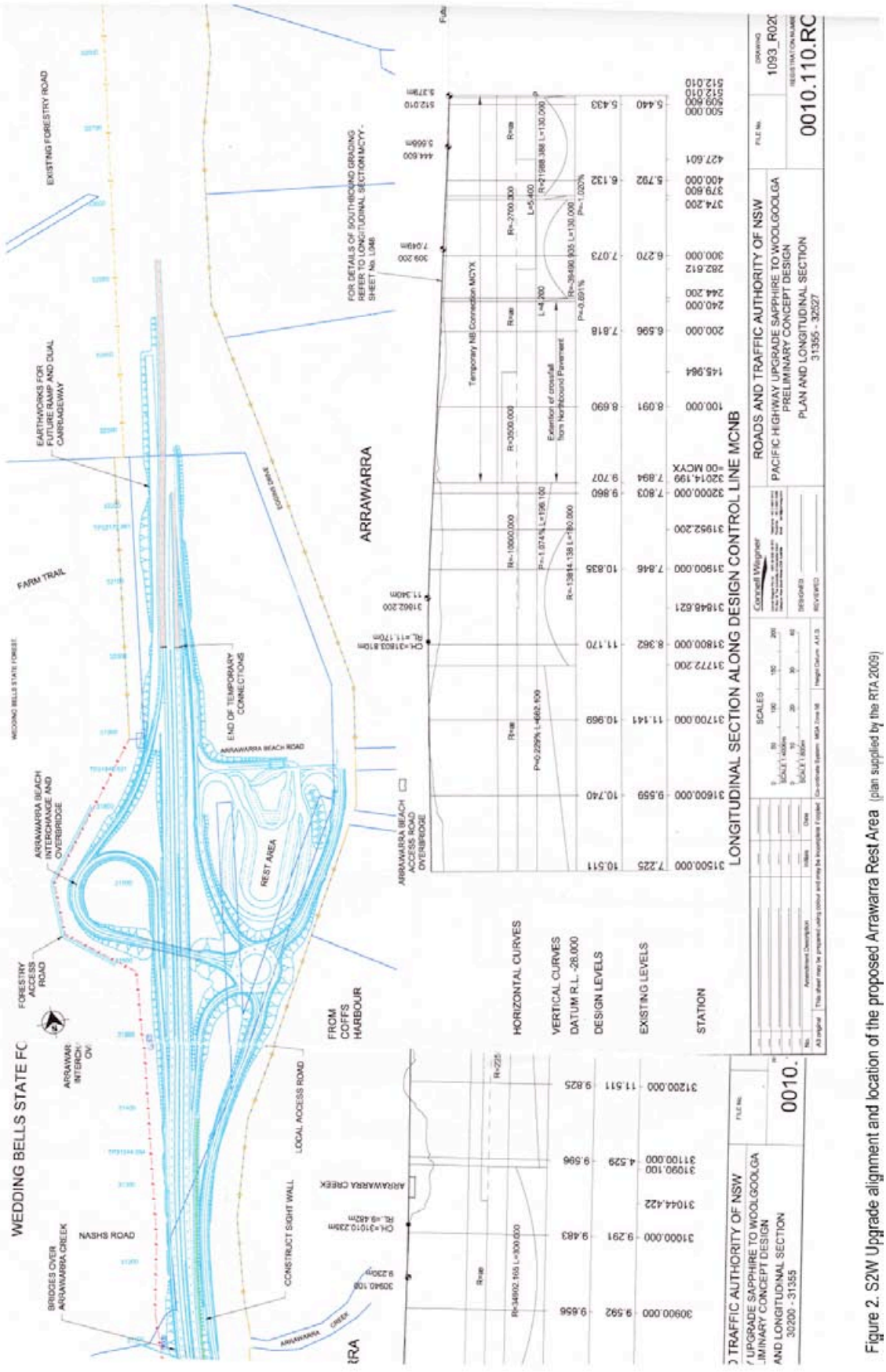

Figure 2. S2W Upgrade alignment and location of the proposed Arrawarra Rest Area (plan supplied by the RTA 2009)

The Upgrade will extend for approximately 25 kilometres from 7.15 kilometres north of Coffs Harbour at Sapphire to 32.53 kilometres north of Coffs Harbour at Arrawarra, and involves duplication of the existing highway to dual carriageway between Sapphire and South Woolgoolga, and construction of a divided dual carriageway western bypass of Woolgoola. The proposal includes an interchange with Arrawarra Beach Road north of Arrawarra Creek (Figures 1 and 2). While not part of the currently approved Project, the RTA proposes to seek approval to construct a rest area east of the new highway, south of Arrawarra Beach Road (Figure 2).

The Arrawarra Beach Road Interchange was not part of the original Project design when field surveys were undertaken in 2005 (Collins 2007). This report was thus commissioned by the RTA to identify, assess and manage Aboriginal cultural heritage impacts within the previously unassessed section of the Project between Arrawarra Creek and Arrawarra Beach Road (chainage 31100 to 31900), including the Arrawarra Beach Road Interchange and the proposed Arrawarra Rest Area. Aboriginal heritage values of alignments to be affected by the relocation of public utilities required as a result of the Upgrade are reported separately (Collins 2010a). The northern tie-in with the existing highway north of Arrawarra Beach Road has also been subject of a separate assessment (Kuskie 2007).

1.2 Approval context

The NSW Minister for Planning approved the S2W Project under Part 3A of the *Environmental Planning and Assessment Act 1979* (as amended), and declared it to constitute critical infrastructure (as per Section 75C of the Act) on the basis that the upgrade is essential to NSW for social and economic reasons. Under Section 75U of the *Environmental Planning and Assessment Act 1979* (as amended), Part 3A projects do not require certain permits/approvals required by other legislation. These include Aboriginal Heritage Impact Permits (AHIPs) required under Part 6 of the *National Parks and Wildlife Act 1974* (incorporating the *National Parks and Wildlife Amendment Act 2010*). The NSW Department of Planning nevertheless requires an equivalent level of information as would be called for by the Department of Environment, Climate Change and Water (DECCW) to satisfy the issue and reporting conditions of an AHIP.

The proposed Arrawarra Rest Area does not form part of the current Part 3A approval, but was assessed for planning purposes in the event that the RTA elects to lodge a development application in relation to construction of this facility.

2 ABORIGINAL INVOLVEMENT

Aboriginal involvement in the Pacific Highway S2W Project commenced with route selection studies in 2002, and has continued through the EA and present project implementation stages. While the *Interim Community Consultation Requirements for Applicants* (DECC 2005) were not implemented, a comprehensive program of Aboriginal consultation has been undertaken by both the consultant and the RTA, which accords with the general principles of the current DECCW (2010) consultation requirements.

Identified Aboriginal stakeholders comprise the Coffs Harbour and District Local Aboriginal Land Council (CHLALC), Yarrawarra Aboriginal Corporation, the Garby Elders, Bagawa Birra Murri Aboriginal Corporation, and the Garlambirla Guyuu-girwaa Elders Aboriginal Corporation (formerly the Gumbula Julipi Elders). These same Aboriginal stakeholder groups were the only respondents to written invitations and advertisements published in a range of newspapers in relation to archaeological test excavations on the approved Project corridor (Collins 2010b: 2-3).

A duly notified Aboriginal Focus Group meeting, held on the 10th of June 2009, was attended by Chris Spencer (CHLALC), Milton Duroux (Garby Elder), Tim Cowan and Dee Murphy (Yarrawarra Aboriginal Corporation), RTA and Coffs Harbour City Council representatives, and the consultant. An apology was received from Sue Hoskins (Bagawa Birra Murri Aboriginal Corporation). RTA Project Manager Chris Clark outlined the Part 3A approval and approval conditions, specifically those relating to Aboriginal heritage. Amongst other issues, Aboriginal stakeholder representation was discussed, along with the further assessments/investigations required ahead of construction, including field survey of the previously unassessd area north of Arrawarra Creek addressed in this report. It was resolved that representatives of the CHLALC, Yarrawarra Aboriginal Corporation, Garby Elders, Bagawa Birra Murri Aboriginal Corporation and the Garlambirla Guyuu-girwaa Elders Aboriginal Corporation would assist with the required further assessments/investigations.

A draft methodology for the present assessment was supplied to the Aboriginal stakeholder groups for comment/revision prior to its commencement. The draft methodology was verbally endorsed by all stakeholders. Field survey of the assessment area was conducted with the assistance of Mark Flanders (CHLALC senior sites officer), Tim Cowan (Manager, Jalumbo Cultural Heritage Research Unit,

Yarrawarra Aboriginal Corporation), Milton Duroux (Garby Elder), Sue Hoskins (Chairperson, Bagawa Birra Murri Aboriginal Corporation) and Trevor Wilson (Garlambirla Guyuu-girwaa Elder) on the 29th of October 2009. Cultural heritage significance issues and impact mitigation strategies were discussed during the course of the survey, and the Section 9 management recommendations were formulated as the most appropriate means of conserving cultural values in the development-related context.

The field survey was preceded by an on-site visit with Garby Elder and local knowledge-holder Cecil (Uncle Bing) Laurie on the 11th of August 2009. During this visit Uncle Bing Laurie confirmed that the Upgrade would not affect any known places of ceremonial, mythological or otherwise spiritual/sacred significance, or contemporary attachment, and that impact would be restricted to stone artefact sites reflecting traditional occupation and use of the S2W coastal hinterland.

Draft copies of this report were provided to the Aboriginal stakeholders for review and comment prior to its finalisation. No amendments to the draft report were called for. Correspondence from the Aboriginal stakeholders in support of the Section 9 management recommendations is reproduced in Appendix A.

3 ENVIRONMENT AND LANDUSE EFFECTS

The area to be affected by the approved Project (including the Arrawarra Beach Road Interchange) and the possible future Arrawarra Rest Area together comprise the approximately 20 hectares of land ('the study area') assessed in this report. The study area lies on the coastal plain 1.5 kilometres inland of the ocean, where it is traversed north-south by the existing Pacific Highway. It is bordered to the south by Arrawarra Creek, to the west by Wedding Bells State Forest, and to the north-east and east by Arrawarra Beach Road and a relict section of the highway (Eggins Drive) now used as a local property access.

Apart from the deeply dissected permanent channel of Arrawarra Creek, which is flanked by a narrow alluvial floodplain, the study area is set on low undulating erosional hills representative of the Ulong Soil Landscape, based on meta-sediments of the Coffs Harbour Association that have decomposed to produce strongly to very strongly acid silty clays up to a metre thick. The underlying meta-sediments are dominated by siliceous mudstone, greywacke and siltstone, within minor meta-basalt, volcanics, chert and jasper. These meta-sedimentary materials are all suited to the production of Aboriginal stone tools and whilst not naturally occurring on the study area surface, outcrop on the coastal headlands and in pebble beds along the beaches and some of the sub-coastal streams. Habitable rockshelters and overhangs are rare, and none have been recorded on or near the Upgrade.

Within the study area, the Ulong hills are of low relief, reaching a maximum elevation of 10 metres AHD on the eastern ends of two broad level to gently undulating spurs west of the existing highway. The southern-most of these spurs is reported to have supported a Blackbutt forestry plantation (cf Connell Wagner 2007b:Figure 3.1; Figure 3 of this report), which had been clear-felled and intensively disturbed just prior to the field survey. The balance of the elevated land supports Blackbutt/Grey Ironbark tall dry open forest with a mid-storey of shrubs and regrowth trees and a generally open grassy ground cover. In addition to that attributable to past highway construction, ecological (cf Benchmark Environmental Management 2009:16-17) and archaeological survey observations indicate disturbance caused by moderate to high intensity logging activities, construction, maintenance and on-going use of numerous forestry roads/trails, and frequent low intensity fires. A cleared electricity transmission line easement, which also houses a subsurface optical fibre cable, runs parallel with the eastern boundary of the existing highway reserve, within the study area.

The two spur ends are separated by a low-lying drainage/swampy depression that extends through the centre of the study area, across the existing highway and the eastern portion of the area to be affected by the Arrawarra Beach Road Interchange. A similar depression is situated on the north-western extremity of the study area, inland of Arrawarra Beach Road. The drainage depressions support Broad-leaved Paperbark swamp forest with a ground cover of sedges and mat-rush (Figure 3).

Recently logged forestry plantation on southern spur end (SU-1), north of Arrawarra Creek. Location of S2W-14 artefact scatter spanning Nashs Road.

Forestry trail on northern spur end west of existing highway (SU-2), within area to be impacted by the Arrawarra Beach Road Interchange.

Typical character and visibility on western margin of study area (SU-3), east of existing highway, to be potentially affected by the Arrawarra Rest Area.

Typical character and visibility adjacent to Eggins Drive (SU-3).

Typical character and visibility on drainage depression (SU-4), east of existing highway.

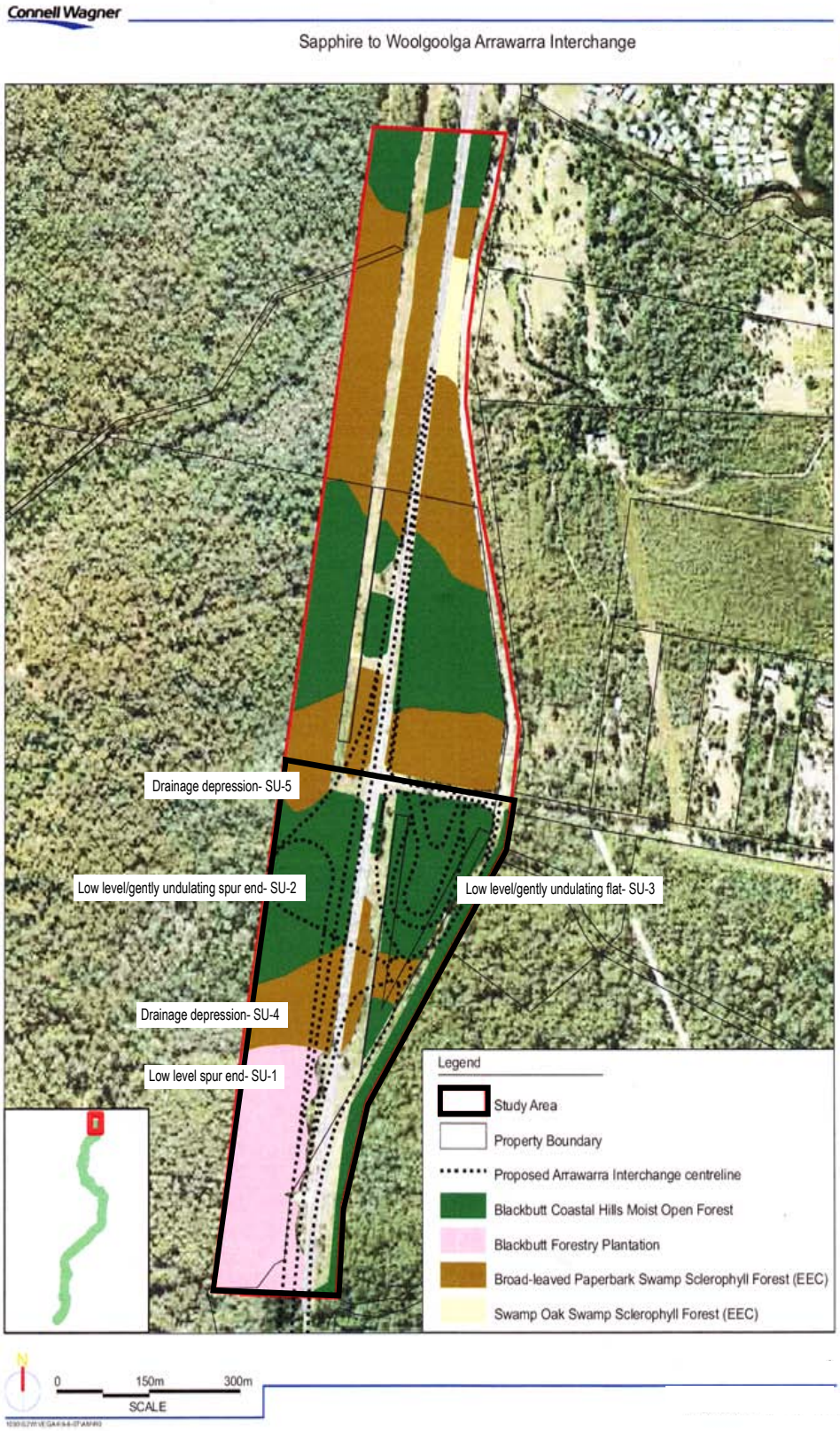

Figure 3. Study area landforms, vegetation communities and survey units (base map: Connell Wagner 2007, Figure 3.1)

4 EXISTING ABORIGINAL HERITAGE INFORMATION

4.1 Registered Aboriginal sites

DECCW Aboriginal Heritage Information Management System (AHIMS)

Aboriginal sites registered on the DECCW AHIMS database within the Arrawarra locality are plotted on Figure 4. These include low-density stone artefact occurrences on the southern side of Arrawarra Creek, west of the existing highway and south of the present study area (#22-1-370 and #22-1-371)(Collins 2010b), and an isolated artefact (#22-1-347) and two scatters containing ten (#22-1-348) and 21 (#22-1-346) surface artefacts, also west of the existing highway, north of the study area (Kuskie 2007). A complex of other sites, comprising shell middens, stone artefact occurrences, a scarred tree, a natural mythological/Bora ceremonial site and a stone fish trap, has been registered in and around Arrawarra Beach between 500 metres and 1.8 kilometres east of the study area (cf Figure 4).

To update previous AHIMS searches, a comprehensive search of land within at least 2.5 kilometres of the northern section of the approved S2W Project (including the study area) was conducted on the 17th of December 2010. Results of this search are reproduced in Appendix E. To protect archaeological sites and avoid the unauthorised disclosure of Aboriginal cultural heritage information, APPENDIX E SHOULD NOT BE INCLUDED IN ANY PUBLICLY AVAILABLE DOCUMENTS.

An updated basic AHIMS search of the study locality itself was conducted on the 10th of February 2011 (Appendix D). This search revealed two registered Aboriginal sites. These sites comprise S2W-14 (#22-1-373) recorded during the present assessment (cf Section 6.2), and the WWC 5 (#22-1-348) artefact scatter recorded by Kuskie (2007) on the proposed Pacific Highway Woolgoogla to Wells Crossing Upgrade alignment. Although the AHIMS register places WWC 5 (#22-1-348) 20 metres north of the study area addressed in this report, the site location/description and map supplied by Kuskie (2007:45 and 2007:Appendix E) indicate that WWC 5 is instead situated "north of Farm Trail ... around MGA grid reference 517728.6674907 (southern end)" (Kuskie 2007:45), approximately 275 metres north of the study area (as plotted on Figure 4).

Other heritage registers

Searches of the Commonwealth and National Heritage Lists, Register of the National Estate, NSW State Heritage Register, Schedule 2 (Heritage Items) of the North Coast Regional Environmental Plan 1988 and Schedule 5 (Heritage Items) of the Coffs Harbour Local Environmental Plan 2000 revealed no listed Aboriginal sites or places within or near the study area. The closest listed place is the Arrawarra fish trap (1.3 kilometres east of the study area), which is included in both the Coffs Harbour Local Environmental Plan 2000 and the Register of the National Estate (Place ID #13667).

4.2 Past archaeological assessments/investigations

A number of archaeological surveys and investigations have been completed in the Arrawarra locality for both academic research and development-related purposes. The most relevant of these are reviewed in this section, and provide an insight to the types, density and environmental contexts of the identified sites to assist with the construction of a predictive model for the study area.

In 1980, Piper inspected an approximately 65 hectare land parcel bordered in the west by the then Pacific Highway (now Eggins Drive) and in the south by Arrawarra Beach Road, that stretched east to the northern branch of Arrawarra Creek. The area comprised dune sands, grading inland to low-lying Paperbark swamps. The survey resulted in the recording of two widespread surface scatters of estuarine midden shell (#22-1-032 and #22-1-033) on the sand-based ground. A redeposited scatter of stone artefacts (#22-1-034) was also recorded amongst natural pebbles in the creek bed just beyond the eastern property boundary.

Figure 4. DECCW registered Aboriginal sites and location of S2W-14 recorded during the survey (cross-referenced to relevant survey reports)
(base map: Woolgoolga 9537-4N 1:25,000 scale topopgraphic map [GDA], NSW Department of Lands 2006)

In 1997, a salvage excavation was conducted by Yarrawarra Aboriginal Corporation and the Department of Archaeology and Palaeoanthropology, University of New England, on a foredune shell midden (#22-1-079) at Arrawarra Beach around a kilometre east of the study area. The salvage revealed a well-preserved archaeological deposit dating to 1,300-1,000 cal BP. The midden component was dominated by turban shell but also contained a range of other mollusc species from estuarine, rock platform and open beach environments. The large vertebrate assemblage included mammal, bird, reptile and fish bone (Smith 1998a, 1998b). Analysis of the fish bone indicated a predominance of small to medium-sized specimens, mainly of bream, which could have been captured in the nearby Arrawarra fish trap (#22-1-024)(Vale 1998, 2000). The midden also contained an unspecialised stone assemblage of cores, flakes, flaked pieces and debitage manufactured on sedimentary materials (mainly greywacke) available in pebble beds around Arrawarra Headland (Hill 2000).

More recently, Collins (2002, 2003, 2007a) assessed the area to be affected by the S2W Project between Sapphire and Arrawarra Creek immediately south of the present study area. Aboriginal stakeholders involved in the assessment identified two places of high cultural significance (a traditional ceremonial/sacred site and an historic campsite) within the Arrawarra Creek locality around 800 metres west of the approved corridor. Due to concerns that cultural materials associated with transit to and from these significant sites/places may have been intercepted by the Upgrade, archaeological test excavations were undertaken along the margin of Embankment Road (designated S2W-10 [#22-1-371]), and on the elevated southern bank of Arrawarra Creek (S2W-11 [#22-1-371]) (Collins 2010b). Two stone artefacts (unmodified flakes) were recovered from the nine square metre area test excavated on S2W-10, revealing the presence of a spatially unfocussed, low-density scatter of artefacts within the highly disturbed topsoil on this low spur crest. Two stone artefacts (unmodified flakes) were recovered from the four square metre area test excavated on S2W-11, both at the base of the disturbed topsoil. Six re-deposited artefacts (unmodified flakes, a retouched flake and a multi-platform core) were also collected from a deep artificial drain adjacent to S2W-11 ahead of the test excavations. The S2W-10 and S2W-11 stone assemblages were interpreted to represent 'background scatters' of artefacts itinerantly discarded during the course of Aboriginal transit along the Embankment Road spur and the southern high bank of Arrawarra Creek, and/or resource exploitation within and around Arrawarra Creek and wetlands sandwiched between these two sites.

Three past field surveys/Aboriginal heritage assessments have included parts of the study area itself.

In 1991, Davies surveyed a six metre wide corridor of land subsequently impacted by installation of the underground optic fibre cable that coincides with the cleared transmission line easement east of the existing Pacific Highway. No cultural materials or PADs were identified in the Arrawarra locality.

Macdonald and Collins (1999) produced a joint anthropological and archaeological report that assessed land to be affected by the Coffs Harbour sewerage strategy. This assessment included a 10 metre wide corridor targeted for installation of a reclaimed water main along the eastern edge of the existing highway reserve within the present study area. No archaeological or otherwise significant Aboriginal sites/places were identified in this locality.

Kuskie (2005a, 2005b, 2007) consulted with Aboriginal stakeholders and undertook field surveys of the area to be affected by an upgrade of the Pacific Highway between Arrawarra and Wells Crossing (approximately 26.5 kilometres north of Arrawarra Creek). The southern end of the Woolgoolga to Wells Crossing project area overlaps with the present study area north from Nashs Road. Three of the 15 Aboriginal sites recorded during Kuskie's survey of the preferred route are located west of the existing highway between approximately 200 and 800 metres north of the study area (none within the study area itself). These sites comprise an isolated stone artefact (#22-1-347) on a level-gently sloping flat, and scatters of ten (#22-1-348) and 21 (#22-1-346) artefacts on level-gently sloping spur crests. While Kuskie (2007:45) considered it possible that further undetected artefacts could occur at all three sites, the potential for *in situ* or scientifically significant subsurface deposits was assessed to be low. Overall, the survey results indicated a very low artefact density within the Woolgoolga to Wells Crossing area, consistent with background discard. There was nevertheless a trend for relatively higher artefact discard on level-very gentle flats and spur crests.

4.3 Ethno-history

At the time of first European settlement the study locality was occupied by Gumbaingirr-speaking people whose traditional country extended over a wide area from the Clarence River to at least as far south as the Nambucca (Enright 1934; Smythe 1948; Hoddinott 1978; Eades 1979; GL&CG 1992). The Gumbaingirr comprised several distinct but interrelated groupings of people, each associated with a

separate geographical area. Gumbaingirr groups shared economic resources, trading and ceremonial occasions, intermarried, and spoke a mutually intelligible language, even though differences of dialect or speech, of local territorial association, and some cultural practices varied from one group or locality to another (Macdonald and Collins 1999:37-38). As stated by McDougall (1900:116), "each tribe kept its own belt of country, and separated into small camps, and only collected together on special occasions".

From a review of ethnohistorical material, Coleman (1982) and Belshaw (1978) concluded that wide-ranging movement was usually undertaken in order to attend social gatherings and meet ceremonial obligations rather than to take up residence in another location. Early historical reports repeatedly mention the movement of Aboriginal people between the coast and interior, and between the river valleys (cf Secomb 1986:46). Oral evidence indicates that groups traveling between Moonee Beach and the inland Orara Valley used the low-gradient ridgelines now followed by Bucca Road (Collins 1994:14). This association between low-gradient ridgelines and traditional transit routes is likely to have been repeated throughout the Coffs Harbour-Woolgoolga region, where the exposed ridgelines support (or once supported) a drier and more open form of forest cover.

During the course of everyday life, resource exploitation appears to have been undertaken by family groups, and often several families would co-operate to form a highly flexible 'band' that would gather or disperse as conditions demanded (Godwin 1990:97). Away from the immediate coast, camps were shifted "about monthly as the game in the immediate vicinity became exhausted … it took several months to give each ground in the locale its turn" (McFarlane 1934-5). Base camps were established in areas protected from the elements by dense vegetation (McFarlane 1934-5). According to Dawson (1935), "the middle of each day was spent around the fire where the venison or game was procured, and the remnant of the meal … was carried back to camp for evening consumption". On the basis of this description it seems that base camps would have been situated in sheltered areas offering suitable conditions, with a large number of small task-specific sites scattered between. If group sizes in the order of 50 as claimed by England (1976:46) were the norm, then base camps are likely to have been reasonably large, even with a use-life as limited as a month.

As noted by Kuskie (2007:27; cf McBryde 1974:4-14), "material culture of the local people would have included a variety of items made from bark, other components of plants, stone, shell, bone or other animal components (eg fur), including shields, clubs, spears, digging sticks, boomerangs, water containers, canoes, rafts, message sticks, clapping sticks, spear throwers, bark and vine cords, huts, netted and woven dilly bags, bone tools, shell knives, shell pendants, stone tools, fur belts and cloaks."

During the early years of European settlement most of the Aboriginal population centred on the coastline, coastal alluvial plains and major river corridors, despite the rapid appropriation of these landsystems by timber-getters and farmers. The largest known historic camps were situated at Bagawa in the Orara Valley (England undated; Holder 1984:20), but substantial coastal camps remained east of the Pacific Highway at Moonee (England 1976:46) and Woolgoolga (Yeates 1982:23). Aboriginal landuse patterns were substantially modified in the decades following European settlement, as traditional lands were alienated and freedom to move through the country was progressively restricted. By the late 1890s the group of around 50 Aborigines that had frequented Moonee Beach during the autumn and winter months failed to return (Holder 1984:20), and no Aboriginal people remained at Woolgoolga (Yeates 1982:23). Even so, individuals and small family groups continued to occupy bush camps, often comprising clusters of earthen-floored bark huts, well into the 20th century, with many of the remembered camps dating from the 1940s, 50s and 60s (Perkins 1997). Both these camps and a range of other types of historic Aboriginal sites have been researched and mapped by Goulding (2001). A significant proportion of the historic camps were established at a place of work or in walking distance of work, but others were used seasonally for recreation purposes, or in response to the availability of certain resources (Goulding 2001:64).

Despite the massive changes brought about by European settlement, many local Gumbaingirr were able to maintain traditional knowledge of and contemporary associations with the Arrawarra area. In addition to important ceremonial and meeting places, information relating to such things as travel routes, resource use and relationships to land has been handed down through the generations (cf Goulding 2001). Forested lands have always played a prominent role in Aboriginal life and the local people still know of and use a variety of bush tucker, bush medicines and other forest products (Ahoy and Murphy 1996:35-39). A traditional ceremonial/sacred site/place and an historic campsite, both of on-going cultural significance, have been identified west of the present study area (Collins 2002:43, 2003, 2007:9-10). However, Aboriginal stakeholders involved in this assessment advised that neither of these sites/places would be adversely affected by the S2W Project, including the Arrawarra Beach Road Interchange and the possible Arrawarra Rest Area.

4.4 Synthesis of existing information and conclusions

In light of the available archaeological, ethno-historical and contemporary Aboriginal stakeholder information, the Arrawarra area appears to have been used for traditional occupation purposes over a period of at least 1,000 years (and probably for a considerably longer period, as suggested by evidence for initial artefact deposition in Tasmania and Victoria dating to between 18,000 and 44,000 years cal BP [cf Hewitt and Allen 2010:13-14], and general agreement that the first Aboriginal people most likely entered Australia via the northern coastline as long as 50,000 years ago [Lourandos 1997:84-88]).

Although a range of site types has been recorded in coastal, sub-coastal and hinterland contexts, low-density stone artefact occurrences are the most common type of Aboriginal site identified on and around the S2W corridor (Collins 2007; Kuskie 2007). Field surveys and test excavations conducted for the S2W Project have confirmed the presence of low-density surface and/or subsurface artefact distributions on the level/low gradient crests of bedrock-soil ridges/spurs and lowlands adjacent to creeks within the sub-coastal landscape between Sapphire and Arrawarra Creek. The known artefact assemblage is dominated by unspecialised simple flakes made on locally-available raw stone materials, which appear to have been collected from shoreline and/or streamline pebble beds (cf Collins 2010b:46).

Results of the S2W Project field surveys and test excavations are consistent with both the results achieved by Kuskie (2007:61-62) during assessment of the preferred Woolgoolga to Wells Crossing Pacific Highway upgrade corridor, and other surveys/investigations elsewhere in the sub-coastal and hinterland zones, which reveal an overall very low density background distribution of stone artefacts, with a trend towards relatively higher (but still usually low density) discard on level/low gradient ridge/spur crests and well-drained flats (Collins 2001). Where not exposed at the surface, these artefacts characteristically occur in an unstratified context, either within the disturbed topsoil or at the topsoil/B horizon interface (Collins 2010b; see also Hill and Murphy 2000b; Davies 2004, 2007; Collins 2006a, 2006b, 2007a, 2007b).

Owing to the strongly acid soil conditions (cf Section 3) in conjunction with the disturbance caused by construction of Arrawarra Beach Road, the existing and old (Eggins Drive) sections of Pacific Highway, Nashs Road and other forestry track/trails, installation of an above-ground electricity transmission line and underground optic fibre cable along the eastern highway margin, and past vegetation clearance and/or logging off the road corridors, organic Aboriginal occupation materials (shell, bone, wood, bark, charcoal etc), pre-contact burials and scarred trees are not expected to have survived within the study area.

In the absence of any reported sites/places of traditional ceremonial, spiritual or otherwise high Aboriginal cultural value, or any sites/ places or resources of contemporary attachment or concern, it was concluded that evidence of Aboriginal use of the study area would be primarily (if not exclusively) restricted to low-density occurrences of stone artefacts.

4.5 Predictive model of site location

On the basis of the existing background environmental, archaeological and Aboriginal stakeholder information synthesised in Section 4.4 above, it was predicted that:

- Low-density stone artefact scatters (including background artefacts) and/or low-density scatters of midden shell may occur on the low spur ends represented in SU-1 and SU-2, and on the undulating flat represented in SU-3 (as mapped on Figure 3). In view of the eroding landscape conditions and extent of past disturbance and related surface exposure, at least some evidence of any significant artefact site/cluster or midden deposit should be evident at the surface.

- Drainage depressions represented in SU-4 and SU-5 (as mapped on Figure 3) are of low to negligible archaeological sensitivity, although the possibility of isolated stone artefacts itinerantly discarded during the course of resource exploitation cannot be ruled out.

- Evidence of Aboriginal bark and/or wood removal may occur on any of the extant mature trees.

- In view of Aboriginal stakeholder advice, the extent of landscape modification/disturbance, prevailing acid soil conditions and the proximity of sand-based grounds to the east, Aboriginal burials are unlikely to occur or survive within the study area.

- In the absence of suitable natural rock outcrops, Aboriginal stone quarries, grinding grooves or inhabited rockshelters/ caves will not occur within or near the study area.

- In the absence of Aboriginal stakeholder knowledge, there is low to negligible potential for unmodified sites/places of traditional ceremonial/spiritual significance, or for sites/places or resources of known contemporary value or attachment to occur within or near the study area.

5 FIELD SURVEY

5.1 Survey conduct, strategy and coverage

Full field survey of the study area was undertaken by the consultant with the assistance of Mark Flanders (CHLALC senior sites officer), Tim Cowan (Manager, Jalumbo Cultural Heritage Research Unit, Yarrawarra Aboriginal Corporation), Milton Duroux (Garby Elder), Sue Hoskins (Chairperson, Bagawa Birra Murri Aboriginal Corporation) and Trevor Wilson (Garlambirla Guyuu-girwaa Elder) on the 29th of October 2009. The fine sunny weather conditions were conductive to the detection of surface archaeological materials. Survey within Wedding Bells State Forest on the western edge of the study area was authorised by NSW State Forests under *Special Purposes Permit for Research* No XX47477, issued to the consultant on the 22nd of July 2009.

For reporting purposes, the study area was divided into five separate survey units (SUs) delineated on the basis of topography (after Speight 1990), disturbance, exposure and visibility. The survey units are mapped on Figure 3, and their landform and disturbance context summarised in Table 1. The survey targeted all available surface exposures, including vehicle tracks, erosion scours, log dumps, the rootballs of fallen trees, areas of light and patchy ground cover, and the recently logged land in SU-1 (cf Figure 3). The trunks of all mature trees sighted within the area were inspected for evidence of Aboriginal marking.

To provide data sufficient for evaluating survey effectiveness, variables constraining archaeological visibility were recorded for each of the survey units. These included 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 exposure and visibility constraints are taken into account, it is estimated that approximately 20.4 percent of the study area (off the existing road formations) was subject to effective survey coverage (Table 2), including 36.9 percent of the spur ends, eight percent of the undulating flat, and one percent of the drainage depressions (Table 3). Given the degrading landscape context of the spur ends and the undulating flat, the widespread incidence of survey exposures on these landforms, and the low predicted sensitivity of the drainage depressions, the effective survey sample is considered to have been adequate for determining the archaeological potential of the study area.

Table 1. Environmental and disturbance context of survey units

Survey unit	Landform element	Disturbance context	Sources of survey exposure
SU-1	Low level spur end	Vegetation cleared. Forestry plantation recently fully logged.Traversed by Nashs Road and north-south track along west highway boundary.	Vehicle tracks, recent logging.
SU-2	Low level/gently undulating spur end	Mostly regrowth forest traversed by vehicle tracks with some log dumps.	Mechanical disturbances, vehicle tracks, erosion scours, sparse ground cover.
SU-3	Low level/undulating flat	Mostly regrowth forest traversed by vehicle tracks with some log dumps. Cleared electricity easement on western boundary.	Mechanical disturbances, vehicle tracks, erosion scours, fallen tree rootballs, sparse ground cover.
SU-4	Drainage depression	Mostly regrowth forest traversed by vehicle tracks.	Vehicle tracks.
SU-5	Drainage depression	Mostly regrowth forest traversed by vehicle tracks.	Vehicle tracks.

Table 2. Effective coverage data

Survey unit	Survey unit area (m2)	Horizontal exposure (%)	Area of exposure (m2)	Visiblity (%)	Area available for site detection (m2)	Effective surface coverage (%)
SU-1	44,300	80	35,440	80	28,352	64
SU-2	43,000	10	4,300	90	3,870	9
SU-3	63,700	10	6,370	80	5,096	8
SU-4	27,900	5	1,395	20	279	1
SU-5	6,000	5	300	20	60	1
Total	184,900		47,805		37,657	20.4

* Road formations totalling approximately 15,100 square metres not included

Table 3. Summary of landforms effectively surveyed

Landform	Landform area (m2)	Area surveyed (m2)	Effective coverage (m2)	% of landform effectively surveyed	# sites detected	# artefacts detected
Low level spur end	87,300	87,300	32,222	36.9	1	8
Undulating flat	63,700	63,700	5,096	8.0	0	0
Drainage depression	33,900	33,900	339	1.0	0	0
Total	184,900	184,900	37,657	20.4	1	8

* Road formations totalling approximately 15,100 square metres not included

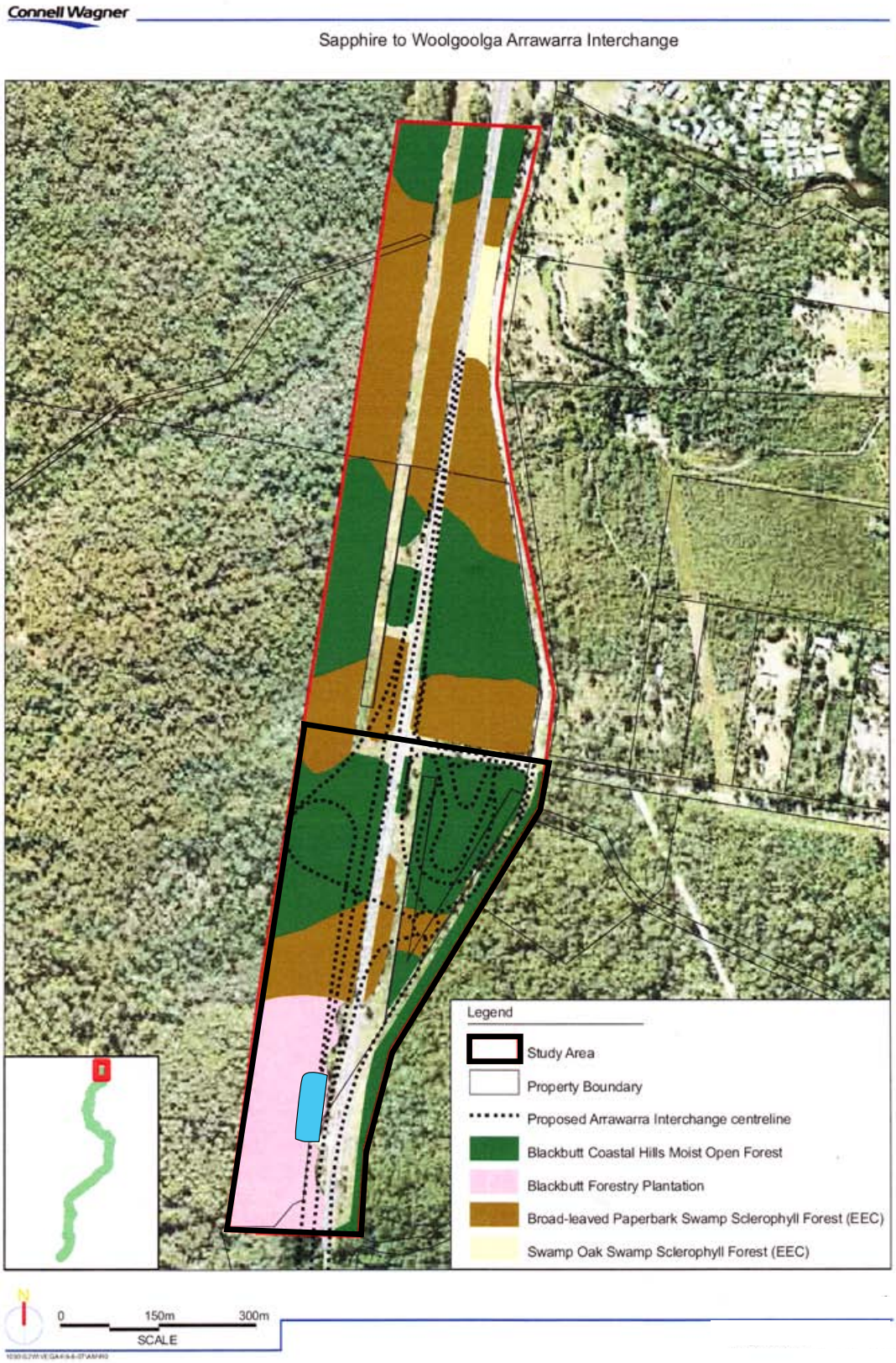

Figure 5. Location of the S2W-14 artefact scatter (blue) (base map: Connell Wagner 2007, Figure 3.1)

6 ASSESSMENT RESULTS

6.1 Unmodified sites and places of Aboriginal cultural significance

A number of unmodified sites/places of ceremonial, mythological and otherwise spiritual/sacred significance and contemporary attachment occur within the Arrawarra locality. However, the Aboriginal stakeholders advised that none of these sites/places would be adversely affected by the S2W Project, including construction of the Arrawarra Beach Road Interchange and any future construction of a rest area south of Arrawarra Beach Road.

6.2 Field survey

One scatter of eight surface artefacts (designated S2W-14, subsequently registered on the DECCW AHIMS database as site #22-1-373) was recorded during the survey. The artefacts were identified on the churned, fully cleared surface of the recently logged spur end in SU-1 (see plate on page 7), and had clearly been substantially disturbed. The artefacts occurred at a low density along a 110 metre stretch of the approved Project corridor spanning Nashs Road (Figure 5), within the area to be impacted by duplication of the existing highway between Arrawarra Creek and the Arrawarra Beach Road Interchange.

Further undetected artefacts are anticipated within the churned topsoil, but there is no expectation that any of these will be in a primary depositional context, or that intact subsurface archaeological deposits will survive if ever present.

S2W-14: Artefact scatter #22-1-373
GDA grid reference: 517610 E 6674126 N (determined by non-differential GPS)
Woolgoolga 9537-4N, Edition 3, 1:25,000 topographic mapsheet

Artefact description:

1) Fine-grained sandstone bipolar core, 75 x 57 x 20 mm.
   6 negative flake scars, 40% pebble cortex.
2) Fine-grained sandstone multi-platform core, 80 x 65 x 53 mm.
   9 negative flake scars, 40% pebble cortex.
3) Fine-grained sandstone flake, 25 x 35 x 20 mm.
   Broad flaked platform, overpass termination.
   1 dorsal negative flake scar. No cortex.
4) Greywacke bipolar core, 55 x 52 x 10 mm.
   6 negative flake scars, 40% pebble cortex.
5) Siltstone retouched flake, 45 x 39 x 10 mm.
   No platform, retouched feather termination.
   3 dorsal negative scars. No cortex.
6) Siltstone flake, 40 x 27 x 4 mm.
   Focal flaked platform, feather termination.
   2 dorsal negative flake scars. No cortex.
7) Siltstone flake, 34 x 43 x 13 mm.
   Broad flaked platform, feather termination.
   100% dorsal pebble cortex.
8) Siltstone nuclear tool (discoidal scraper), 43 x 45 x 21 mm.
   12 negative flake scars, bifacial lateral and distal retouch.

6.3 Conclusions

The survey results are consistent with the predictive model of site location presented in Section 4.5, which was developed on the basis of past survey/investigation results, Aboriginal stakeholder advice, and the landscape and disturbance context of the study area.

It is acknowledged that there is a very high probability that additional undetected artefacts will occur in association with the identified S2W-14 artefact scatter. However, on the basis of the results of both the field survey and salvage excavations conducted on local bedrock-soil lands (Collins 2006a, 2006b, 2007b, 2007c, 2008, 2009, 2010b; Davies 2004, 2007; Hill and Murphy 2000b), which have revealed subsurface artefacts to be primarily if not entirely confined to the topsoil/B horizon interface, in conjunction with the widespread and intensive level of topsoil disturbance observed as an outcome of recent logging in SU-1, it is concluded that *in situ* S2W-14 artefacts (or any other cultural heritage materials) are highly unlikely to survive. Given the low identified surface artefact density and high level of topsoil disturbance it is further concluded that controlled archaeological test excavations/salvage, or Aboriginal stakeholder monitoring of construction-related disturbance within the S2W-14 area would be unlikely to provide information of supplementary scientific or any substantial Aboriginal socio-cultural value.

The only other landforms represented within the study area with any real potential to contain Aboriginal sites/cultural materials (other than scarred trees, which were not identified) are the spur end and flat within SU-2 and SU-3 respectively. While the presence of undetected low-density artefact occurrences cannot be discounted, both of these landforms have been similarly affected by past logging activities. As such, any undetected sites/materials are unlikely to be in an undisturbed state, but may be of Aboriginal socio-cultural value.

7 SIGNIFICANCE ASSESSMENT

7.1 Management principles and the concept of significance

Unlike aspects of the natural environment, "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 site/place will be different for various groups and individuals. All sites/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/places 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 by no means 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.

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. Archaeological sites have special 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 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.

7.2 Site S2W-14 (#22-1-373)

Owing to its apparent low artefact density and disturbed landscape context, Aboriginal stakeholder representatives assessed S2W-14 to be of low-moderate *in situ* socio-cultural significance. Even though this significance was not considered sufficient to warrant controlled subsurface archaeological testing/salvage or an amendment to the S2W Project, the stakeholders advised that any intercepted artefacts would be of high cultural significance in their own right, and for this reason should be collected, recorded, and relocated to a nearby protected place within the RTA title corridor.

While probably associated with use of other nearby coastal and sub-coastal sites, the S2W-14 artefact scatter is not considered to be of any special archaeological/scientific representative value. Existing local DECCW reserves encompassing sub-coastal terrain similar to that containing S2W-14 include the Moonee Beach Nature Reserve and Yuraygir National Park. In the absence of any comprehensive archaeological survey or assessment, the conservation status of Aboriginal sites within these reserves is yet to be fully determined. However, Yuraygir National Park alone covers an area of more than 38,000 hectares, and it is envisaged that a representative sample of open stone artefact scatters on (potentially less disturbed) sub-coastal spurs will already be adequately conserved to provide future scientific research and Aboriginal community educational information. Considering its disturbance, apparent low artefact density, low potential for future academic research, and the likely preservation of a representative sample of similar sites in local reserves, S2W-14 is assessed to have a low level of scientific/archaeological significance.

8 IMPACT MITIGATION AND MANAGEMENT STRATEGIES

S2W-14 lies within the approved S2W Project corridor and would be entirely destroyed by carriageway construction. The site area has been extensively disturbed by logging activities (including the passage of heavy machinery). Surface evidence suggests that the site comprises a low-density artefact scatter only, and although additional undetected artefacts are expected within the churned topsoil, there is low to negligible potential for the survival of subsurface cultural deposits of scientific research value.

Unless the Project is re-designed to avoid S2W-14, the only feasible impact mitigation options are surface artefact collection, or surface artefact collection combined with controlled subsurface archaeological investigation/salvage and/or Aboriginal stakeholder monitoring of initial earthworks for the purposes of salvaging any artefacts able to be detected during the course of these works. Due to the apparent low artefact density and high level of existing disturbance, it is considered highly unlikely that controlled archaeological investigation/salvage and/or Aboriginal stakeholder earthworks monitoring would result in the provision of any information of scientific research or socio-cultural value above that offered by the existing surface artefact sample (which is probably representative of the site as a whole). As supported by the Aboriginal stakeholders, surface artefact collection is the preferred management strategy with respect to S2W-14. This strategy would partially mitigate impacts of the Project on socio-cultural values, and (as per RTA advice and given commitments) would enable permanent preservation of the collected artefacts in a nearby, undeveloped section of the RTA title corridor to be conserved in perpetuity.

No archaeological evidence or Potential Archaeological Deposits (PADs) were identified in SU-2 or SU-3 (Figure 3). Although it remains possible that undetected low-density artefact occurrences may occur, both of these survey units have been affected by past logging and are not expected to contain *in situ* surface materials or intact subsurface cultural deposits. SU-2 would be almost fully impacted by construction of the approved Arrawarra Beach Road Interchange, and SU-3 by any future construction of the Arrawarra Rest Area (Figure 3). In the absence of any specific landform elements with particular archaeological potential or areas of socio-cultural attachment or concern, subsurface investigations and/or Aboriginal stakeholder monitoring of initial earthworks are not considered warranted in SU-2, SU-3, or elsewhere within the study area. As agreed and supported by the Aboriginal stakeholders, the stop work provisions applicable to all Aboriginal cultural heritage materials off the recorded/individually managed sites intercepted by the approved Project (including S2W-14) (as per the JV Construction Heritage Management Plan, Appendix D Heritage Management Tool- reproduced in Appendix B of this report), in conjunction with the recording, assessment and re-deposition of salvaged artefacts, offer the only reasonable strategy for impact mitigation.

9 MANAGEMENT RECOMMENDATIONS

The Aboriginal stakeholder consultation, heritage register searches and field survey undertaken for this assessment revealed no constraints to the S2W Project within the study area, including construction of the Arrawarra Beach Interchange and any future rest area south of Arrawarra Beach Road, providing the management recommendations presented in this section are implemented. The management recommendations were formulated in liaison with, and are supported by the Aboriginal stakeholders as the most appropriate means of conserving socio-cultural values in the development-related context.

Recommendation 1

Prior to commencement of construction-related disturbance works within the approved Project corridor north of Arrawarra Creek, surface artefacts at site S2W-14 (#22-1-373; as per location shown on Figure 5) should be collected and fully recorded.

The JV has confirmed that the identified S2W-14 site area has been temporarily fenced and signposted to exclude machinery and unauthorised human access until such time as approval is given for the artefact collection and the collection has been satisfactorily completed with the assistance of Aboriginal stakeholder representatives. Once the artefacts are collected and recorded, an Aboriginal Site Impact Recording Form (ASIR) for S2W-14 will be forwarded to the DECCW for its records.

Recommendation 2

Prior to commencement of construction-related disturbance works north of Arrawarra Creek, all S2W Project personnel and subcontractors engaged for works within this area should undergo a general site induction. Consistent with the JV Construction Heritage Management Plan (2010:20-21), this induction is to include a cultural heritage component that highlights legal responsibilities under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977*, reinforces the requirement for all on-site workers to comply with the legal conditions of these Acts, and outlines procedures to be implemented in the case of unexpected (including possible) cultural heritage finds (as per JV 2010:Appendix D Heritage Management Tool; Appendix B of this report).

Recommendation 3

In the event that any identified or potential heritage item is detected off the site S2W-14 location mapped on Figure 5 (following implementation of Recommendation 1) the stop-work conditions of the JV Heritage Management Tool (JV 2010: Appendix D; Appendix B of this report) should be observed.

Consistent with the Heritage Management Tool, disturbance works should not recommence within 50 metres of the find until such time as any required archaeological investigation, artefact salvage and/or field recording is completed (as per JV 2010:Appendix C; Appendix C of this report), and clearance has been given by the appropriate government agencies (Heritage Branch, NSW Department of Planning and/or the DECCW).

Recommendation 4

As decided and agreed by the Aboriginal stakeholder groups, the Aboriginal objects storage and management strategy to be implemented for artefacts collected/salvaged from other parts of the approved S2W Project footprint (cf RTA 2010:8; Collins 2010a, 2010b) should be extended to include the S2W-14 artefacts as well as any unexpected finds requiring collection/salvage from the study area (as per Recommendation 3).

In line with the agreed storage and management strategy, the Project archaeologist would fully record and appropriately bag and label the collected/salvaged artefacts with their respective site number and location. The artefacts would then be temporarily cared for by the Coffs Harbour and District Local Aboriginal Land Council in a locked cabinet to be furnished by the RTA. On completion of the Project (including landscaping), the artefacts would be re-deposited by the Aboriginal stakeholder representatives (each site together) within undeveloped sections of the RTA title corridor as close as feasible to their place of origin.

To allow the unhindered progression of any necessary on-going management of invasive weeds (pulling and spraying), it is recommended that the collected/salvaged Aboriginal artefacts be re-deposited at a depth of at least 50 centimetres, within purpose-dug holes placed in locations of assessed low to negligible existing archaeological potential. Given the need to take factors such as on-going highway and landscape maintenance into account, suitable alternative re-deposition locations for the S2W artefacts would be identified by the RTA in the first instance, and the Aboriginal stakeholders then consulted to decide the best options.

As committed by the RTA, all efforts will be made to ensure that the artefact re-deposition locations are conserved in perpetuity. Once selected in consultation with the Aboriginal stakeholders, the artefact re-deposition locations will be accurately pinpointed by Project surveyors and mapped and cross-referenced on all RTA maps and plans to avoid any future disturbance arising from highway/landscape maintenance or further highway upgrades. To this end, it is additionally recommended that a clearly labelled location peg, able to be readily cross-referenced to the RTA maps and plans, be installed and permanently maintained (checked at annual intervals and replaced as necessary) directly above each of the artefact re-deposition locations. To minimise public knowledge of Aboriginal site locations, no post-construction site fencing or specific signage with respect to the artefact re-deposition locations is considered warranted or in order.

Following re-deposition of the collected/salvaged S2W artefacts (including those from S2W-14) in suitably protected places agreed by the Aboriginal stakeholders and accurately mapped by the RTA, the artefact re-deposition locations will be duly registered with the DECCW for inclusion on the AHIMS database in accordance with Section 91 of the *National Parks and Wildlife Act 1974.*

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GLOSSARY

ALLUVIAL FLOODPLAIN
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).

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).

BIFACIAL FLAKING/GRINDING
Flaking or grinding 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).

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 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).

CREST
Landform element standing above all or most points in the adjacent terrain. Usually smoothly convex (Speight 1990:13).

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).

DORSAL RIDGE
A ridge occurring on the dorsal face of a flake at the junction between two flake scars (Hiscock 1984).

DRAINAGE DEPRESSION
A level to gently inclined, long, narrow, shallow open depression with smoothly concave cross-section, rising to moderately inclined side slopes, eroded or aggraded by sheet wash (Speight 1990:30).

FEATHER TERMINATION
Is identified on the distal end of a flake that 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).

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. Focalised platforms are produced by striking close to the platform edge (Witter 1992:110).

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).

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 of 40m. 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).

META-SEDIMENT
A metamorphosed sedimentary rock in which the original texture is still recognisable (Lapidus 1987:345).

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 1986:49).

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).

OVERPASS TERMINATION
Is identified on the distal end of a flake whose fracture plane (ventral surface) curves markedly away from the core face (dorsal surface) and continues directly into the core, removing the base of the core and giving the flake a J shape in longitudinal cross section (Hiscock 1988:86).

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

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).

SCARRED TREE
Trees that have been scarred by Aboriginal people through the deliberate removal of bark or wood for utilitarian purposes, including collection of raw materials for the production of shelters, canoes, containers and other implements, toe-holds to assist tree climbing, and cuttings made during the course of food resource exploitation (Long 2005).

SHELL MIDDEN
Middens are Aboriginal open campsites which are dominated by shellfish remains. They are generally found near water and differ from natural shell beds in that they comprise predominantly mature specimens of edible mollusc species. They may also contain animal bone, stone artefacts, and charcoal and ash from cooking fires (Byrne 1989:10).

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).

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 which 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).

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).

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APPENDIX A. Aboriginal stakeholder correspondence

Coffs Harbour & District
Local Aboriginal Land Council
Cnr Pacific Highway & Arthur Street, Coffs Harbour 2450
PO Box 6150, Coffs Harbour Plaza NSW 2450
Phone: (02) 6652 8740 Fax: (02) 6652 5923

27th September 2010

Attention: Jackie Collins

Adise Heritage Consultants Pty Ltd
11 Camden Head Road
Dunbogan NSW 2443

Re: Aboriginal Cultural Heritage Assessment Report – Sapphire to Woolgoolga Pacific Highway Upgrade Arrawarra Section.

Dear Jackie,

Thank you for providing the Coffs Harbour and District Local Aboriginal Land Council (Council) with a draft report of results and recommendations for an Aboriginal Cultural Heritage assessment undertaken as part of the Sapphire to Woolgoolga Pacific Highway upgrade within the Arrawarra Beach Road interchange section.

After careful consideration and subsequent discussions in relation to the draft report results and recommendations, I am able to confirm that the draft report accurately reflects the discussions and recommendations discussed during the field assessment processes.

In summary the Council supports this report in its current form and holds no additions or alterations to the report in its current form.

Once again thank you for your assistance in this matter, and Council looks forward to working with you on future Cultural Heritage projects within our Land Council boundaries.

If you have any questions in relation to this matter, please do not hesitate to contact me on the number listed above.

Yours truly,

Chris Spencer
Chief Executive Officer

Garlambirla Guuyu-girrwaa Corporation
PO Box 6904,
Coffs Harbour NSW 2450
ABN 20 419 562 138

Sandra Rowe
CONTACT / SECRETARY
Telephone: 0401 201 662

29th July, 2010

Jacqueline Collins
11 Camden Head Road
DUNDOGAN NSW 2443

Dear Jacqui,

PACIFIC HIGHWAY UPGRADE SAPPHIRE TO WOOLGOOLGA ABORIGINAL HERITAGE ASSESSMENT OF PROJECT AREA, ARRAWARRA

Thank you for the Draft Report on the above. I have read the enclosed and note your recommendations regarding artefacts found during the said investigation, which reflects those of the members of the stakeholder groups and endorse the report accordingly.

If you have any questions regarding this matter, please feel free to contact me on **0401 201 662**.

Respectfully,

S. Rowe

Sandra Rowe
Contact Person/Secretary

Bagawa Birra Murri
Aboriginal Corporation
31 Soren Larsen Crs
Boambee East NSW 2452
Ph: 0405340910 -66584878

6th August 2010
Attention : Jacqi Collins

Adise Heritage Consultants
11 Camden Head Road
Dunbogan NSW 2443

Re; Cultural Heritage Assessment-Pacific Highway to Woolgoolga Upgrade

Dear Jacqi

Thank you for providing a draft copy of the recommendation of the Cultural Heritage assessment for the above mentioned properties performed by Ms Sue Hoskins.

The Bagawa Birra Murri Aboriginal Corporation performed Cultural Heritage assessments on the 29th October 2009.
After reviewing your report and consultations during the assessment the Bagawa Birra Murri Aboriginal Corporation is in agreement that the report recommendations reflect best interest of practical management in relation to Aboriginal Cultural Heritage.

If you have any further questions in relation to this matter please do not hesitate to contact me on the numbers listed above.

Yours Truly
Sue Hoskins
Chairperson

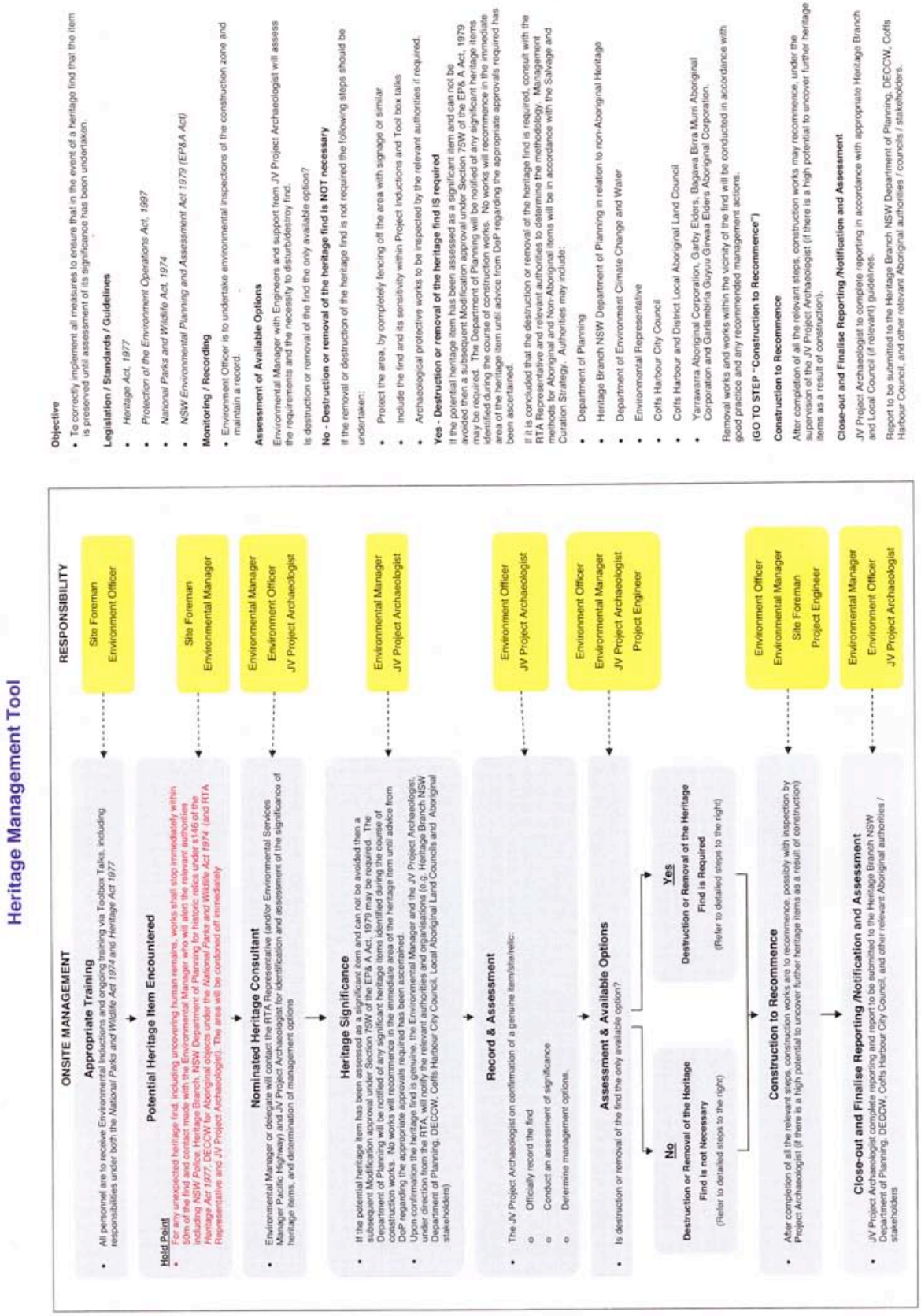
YARRAWARRA ABORIGINAL CORPORATION
Lot 170 Red Rock Road,
Corindi Beach.
NSW 2456
Ph: 02 66 407 100 Fax: 02 66 407 199
Email: admin@yarrawarra.org.au

RE: ABORIGINAL CULTURAL HERITAGE ASSESSMENT OF PROJECT AREA ARRAWARRA

I Tim Cowan (Manager, Jalumbo Cultural Heritage Research Unit, Yarrawarra Aboriginal Corporation) and Milton Duroux (Garby Elder), attended the full field survey of the study Area on the 29th of October 2009. On the day of the survey we found one scatter of eight artifacts, it was recommended by me and Milton, that we hold no constraints on the above project, as long as it stays within the proposed study area and we agree on all four recommendations within this report.

Kind regards
Tim Cowan
11/08/2010

APPENDIX B. JV Construction Heritage Management Plan Appendix D- Heritage Management Tool



APPENDIX C. JV Construction Heritage Management Plan Appendix C- Salvage and Curation Methodology

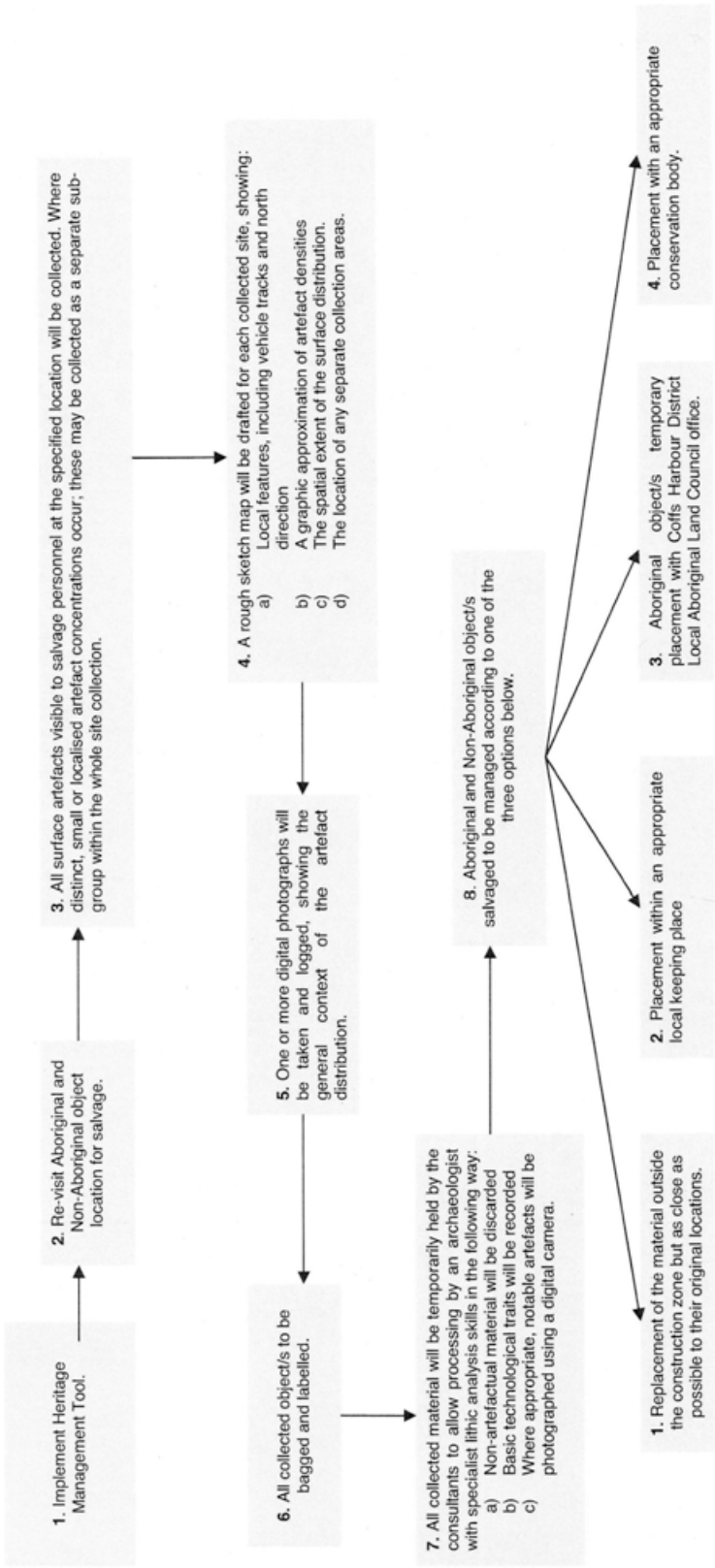


Figure 1: Salvage and curation methodology flowchart

APPENDIX D. DECCW AHIMS basic search results

Environment, Climate Change & Water

AHIMS Web Services (AWS)

Cover Letter

Your Ref Number : S2WA2

ADISE Pty Ltd

Date: 10 February 2011

Attention: Jacqueline Collins

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 517500 - 518000, Northings : 6673900 - 6674700 with a Buffer of 0 meters. Additional Info : conducted by Jacqueline Collins on 10 February 2011

A search of the DECCW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

2	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from DECCW's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- AHIMS records information about Aboriginal sites that have been provided to DECCW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

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Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

APPENDIX E. DECCW AHIMS comprehensive search results

(CONFIDENTIAL- not to be included in public documents)