ARCHAEOLOGICAL ASSESSMENT

OF INDIGENOUS HERITAGE

FOR THE

NORTH WEST RAIL LINK

October 2006

Jo McDonald Cultural Heritage Management Pty Ltd
77 Justin Street, Lilyfield NSW 2040 p 02 9555 6022

Report prepared for GHD

on behalf of TIDC

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1. INTRODUCTION

This report was prepared by Jo McDonald CHM Pty Ltd for GHD, as a component of the North West Rail Link (NWRL) environmental assessment commissioned by Transport Infrastructure Development Corporation (TIDC). The aim of the Environmental Assessment (EA) was to undertake detailed assessments of all relevant environmental aspects and impacts associated with the NWRL, including Indigenous cultural heritage. The EA supports TIDC's application for concept approval of the NWRL under Part 3A of the Environmental Planning and Assessment Act 1979. It has been prepared in accordance with the Department of Planning's Director-General's Requirements, issued on 12 July 2006.

The Consultant's Brief was to undertake an indigenous heritage assessment of the proposed alignment. This assessment includes an assessment of the proposal and the impact this will have on identified Indigenous archaeological sites and Potential Archaeological Deposit (PAD), consultation with the Aboriginal community to ensure that culturally significant items are managed appropriately and a significance assessment of the sites to be directly impacted by the proposed NWRL alignment.

This report details the results of the background research and field survey for Indigenous heritage sites within the NWRL impact corridor. The study includes land within the boundaries of the Hornsby LGA, Blacktown LGA and Baulkham Hills LGA.

1.1 Summary of findings and recommendations

The NWRL alignment traverses a generally highly modified and disturbed landscape between Rouse Hill and Beecroft. Potential for intact archaeological deposit is low for most of the alignment. No land was identified as being in pristine condition and the few areas of moderate – good potential are restricted to small parcels of land with at least some degree of previous land use impact.

Fourteen sites have been identified that could potentially be impacted by the NWRL alignment. Eleven of these sites are located between Burns Road Station and the stabling facility in Rouse Hill, where there is likely to be a high degree of impact to the sub-surface deposit. Two sites are located near proposed stations and could potentially be avoided during construction of the NWRL. One site is located at the quadruplication of tracks between Epping and Cheltenham Station and will be impacted by the development.

It is recommended that:

1. Fourteen sites and PADs have been identified that may be impacted by the proposed NWRL. Of these, BR01 + PAD and BR/H1 are considered to have moderate - high archaeological potential. A further four sites are assessed as having moderate archaeological potential;

2. The Concept Plan should identify the specific locations of Indigenous heritage sites identified in this report. Avoidance of these sites should be considered where possible in the location of construction sites and ancillary tunnel support facilities;

3. Any unavoidable impacts associated with the construction of the NWRL would require negotiations with the relevant Aboriginal groups regarding mitigation and possibly further archaeological investigation – prior to the works taking place;

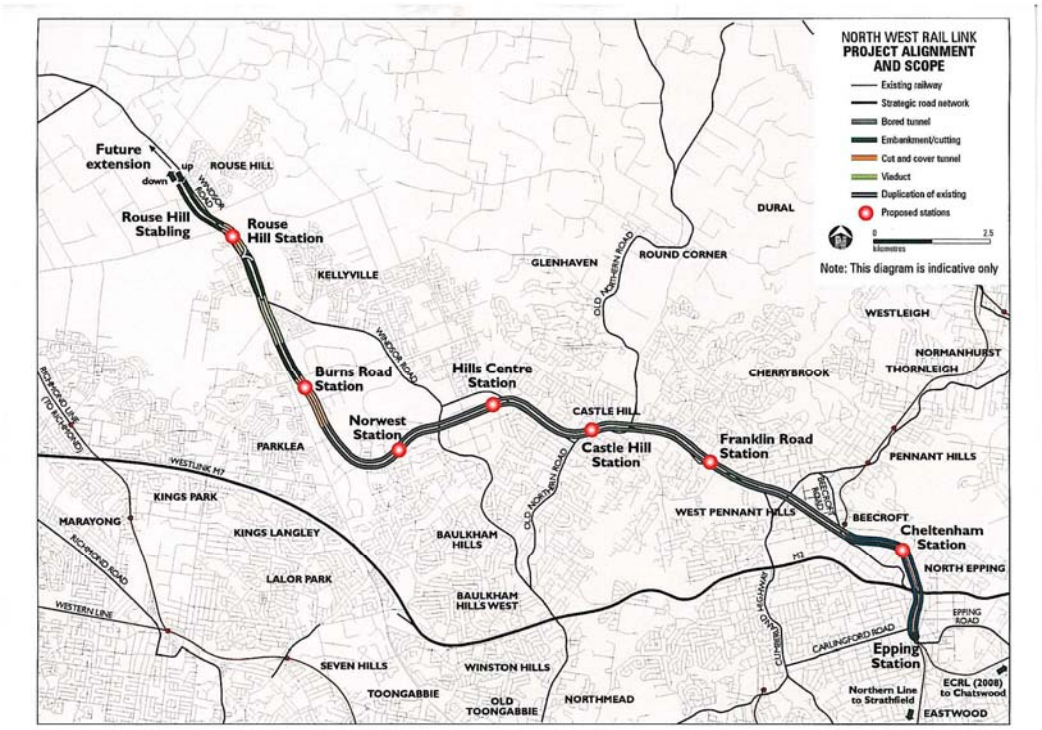
4. Ongoing consultation should be formalised with the relevant Indigenous community groups and the NSW Department of Environment and Conservation (DEC) as the NWRL Project progresses;

5. Planning for management of heritage sites should be done on a broad archaeological landscape basis, as well as in terms of specific sites, taking into account the connectivity of sites in relation to one another. There is potential for further, currently unidentified (i.e. buried) sites to occur in the study area;

1.2 Report authorship

This report was written by Amy Stevens, with management input from Jo McDonald.

Figure 1: Route of proposed NWRL. Plan shows stations and proposed construction methods.



2. INDIGENOUS COMMUNITY CONSULTATION

The study area falls within the boundaries of the Deerubbin Local Aboriginal Land Council (DLALC). It is also within an area of interest to the Darug Custodial Aboriginal Corporation (DCAC), the Darug Tribal Aboriginal Corporation (DTAC) and Darug Aboriginal Cultural Heritage Assessments (DACHA).

In accordance with the Director General Requirements (DGR's) for the EA of the proposed NWRL, community consultation was undertaken following the protocols developed by the Growth Centres Commission and the DEC. This included a briefing with DEC on 25th July 2006 and face to face meetings with each of the stakeholder groups over the 25th and 26th July 2006. At these meetings the proposed NWRL development, the known archaeological sites, PADS and landscapes within the area and the methodology to be used for assessing the archaeological significance of landscapes within the proposed impact area was discussed with the groups.

All of the stakeholders observed that the proposed route (particularly the above ground and cut and cover section of the railway through Rouse Hill) was largely along land already subject to significant disturbance from roadwork, industrial and residential development and sub-surface services. It was also noted at these initial meetings that the Rouse Hill area in particular was known to have a high density of artefacts and that any undisturbed deposit was likely to retain evidence of Aboriginal occupation.

Representatives from all four Indigenous groups participated in the field survey between the 26th and the 28th July 2006. Separate reports outlining the cultural significance of the study area to these groups will be produced independently, and included in this report (Appendix 3).

3. ENVIRONMENTAL CONTEXT

3.1 The Study Area

The proposed North West Rail Link would be the principal trunk public transport line in Sydney's North West. It would connect with the Northern Line between Beecroft and Cheltenham Stations and terminate at Rouse Hill Town Centre. The rail link would be twin track, approximately 23 kilometres in length and would include:

- A 2.5km surface quadruplication of the Northern Line between Epping and Beecroft Stations (including work at Cheltenham Station);
- A 16km section in tunnel from the Northern Line to north of Norwest Business Park, including four underground stations (Franklin Road Station, Castle Hill Station, Hills Centre Station and Norwest Station);
- A 4km surface section from north of Norwest Business Park to Rouse Hill, including two underground stations (Burns Road Station, Rouse Hill Station);
- An interim train stabling facility at Rouse Hill, which would include facilities for cleaning and maintenance of stabled trains;
- Ancillary tunnel support facilities such as tunnel ventilation, transformers and a water treatment plant;
- Construction work sites, including a large site within the Balmoral Road Release Area.

It is unlikely that boring will have any impact on extant archaeological deposit above the tunnel. The surface alignment, the train stabling facility, ancillary tunnel support

facilities and construction work sites are likely to impact on any related archaeological deposit.

3.2 Landscape Elements

Landscape parameters have been applied here in accordance with other work on the Cumberland Plain. Land units are defined by stream order, underlying geology and topography.

Topography

The following topographic categories are used to assist in the definition of landscape parameters and the assessment of archaeological sensitivity.

- CB — Creek bank, <50m to water, flat land
- FP — Flood plain, >50m to water, flat land to slightly sloping
- SW/CB — <50m to water, sloping land
- HS — Hill slope, >50m to water, site on slope
- PL — Plain, >500m to water
- CB/LR — Rocky cliff or elevated area next to / near water
- LR — Low ridge <200m to water, <10m elevation above creek
- LRT — Low ridge top >200m from water, <10m elevation above creek
- RT — Ridge top >200m from water, >10m elevation above creek

These elements have been mapped for the area surrounding the NWRL (Figure 2).

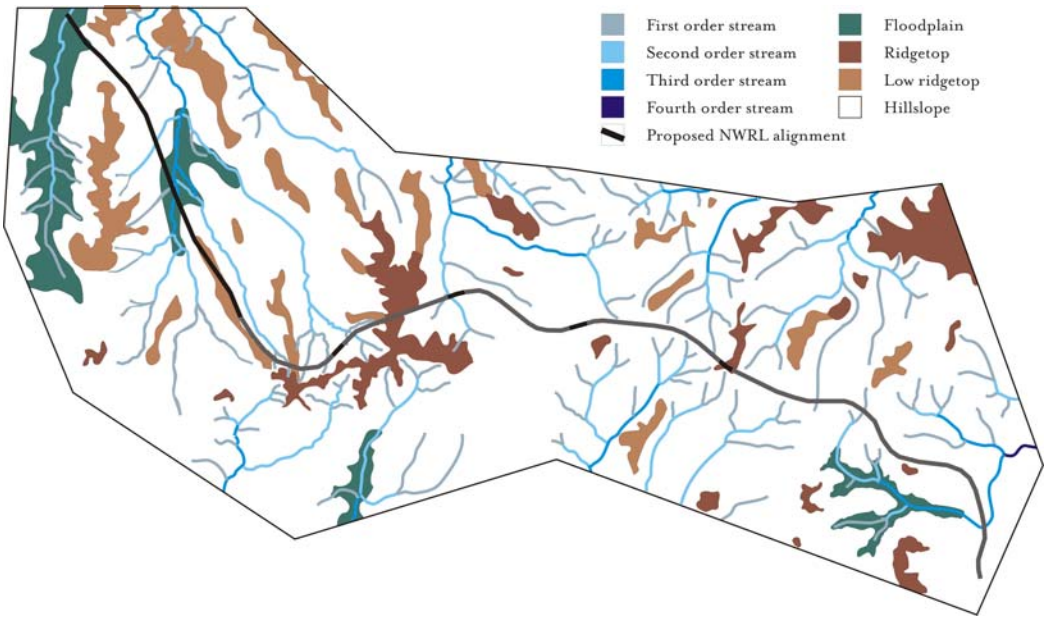
Geology

The study area traverses a number of geological zones between Rouse Hill and Beecroft. From Rouse Hill, through Castle Hill, geology is dominated by Wianamatta Group shales and gently undulating terrain. From Castle Hill to Pennant Hills, geology is Wianamatta Group shale and sandstone and is characterized by dissected slopes. From Pennant Hills to Epping, the NWRL traverses Hawkesbury sandstone along with small patches of Wianamatta shale / sandstone geology.

One of the most common rocks used for tool making in Sydney Region archaeological sites is silcrete. Cobbles of silcrete are found on the Cumberland Plain south west of the Rouse Hill station within the Tertiary terraces of the St Marys Formation at Plumpton Ridge (6km south west) and the ADI site at St Marys (15km south west) as well as the Tertiary Rickabys Creek Gravels 13.5 km north west. Other siliceous rocks are found in Quaternary alluvium of the Cranebrook Formation near Penrith (20km west). There is also a silcrete source near Homebush Bay within 10 kilometres south of the study area (Corkill 1999:72ff). Quaternary alluvium and Tertiary laterites with potential sources

are mapped in the vicinity of Duck River (Sydney 1:100, 000 Geology Series Sheet 9130). Other unknown sources may exist near the study area.

Figure 2: Landscape elements within the vicinity of the proposed NWRL alignment. Bored section of the tunnel is shown in grey.



There are a few isolated sources of igneous rocks in the vicinity, usually in the form of intrusions into shale and sandstones. An olivine basalt dyke through Ashfield Shale was reported in 1904 at Winston Hills, exposed at Rileys Quarry (Brownlow *et al.* 1991:81). A large Jurassic igneous intrusion of picrite, dolerite and basalt occurs at Prospect Hill, 8km south-west of the study area (Branagan & Packham 200:115). Sources of metamorphic and igneous cobbles used by Aboriginal people for making edge ground hatchet heads are known from the Hawkesbury/Nepean river gravels c.30km west of the study area e.g. near Richmond Hill (McBryde & Watchman 1993).

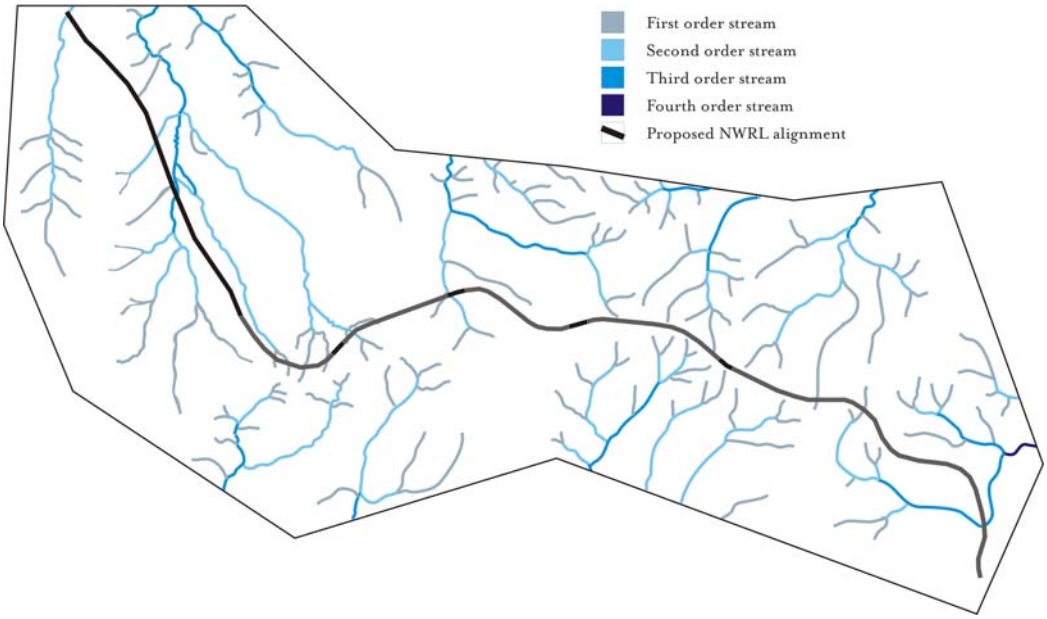
Stream Order

Stream order is used as a part of predictive modeling on the Cumberland Plain. This identifies the smallest tributary streams as first order streams, with creeks increasing in order when streams of the same order join together. Sites are predicted to occur at increased density and complexity with ascending stream order. Along first order creeks, archaeological evidence is expected to be sparse and represent little more than a background scatter. Second order creek are predicted to show evidence of sparse but focused activities such as one-off camp sites and single episode knapping floors. Third order creeks would be expected to attract more frequent occupation and more concentrated activities. Fourth order creeklines are predicted to draw repeated or permanent occupation.

The NWRL alignment passes through or close to a number of creeks and creek systems. Creeks in proximity to the NWRL range in order, with more than 100 first order creeks, 35 second order creeks and 12 third order creeks. Lane Cove River to the east

of the Main North Line comprises the only 4/5 order stream in the immediate vicinity of the study area (Figure 3).

Figure 3: Major watercourses and stream order within the vicinity of the proposed NWRL. Bored section of the tunnel is shown in grey.



The most significant watercourses associated with the NWRL study area are Caddies Creek, Second Ponds Creek and Devlin's Creek. Caddies Creek is a variable order stream in the vicinity of the NWRL, drawing on numerous first and second order tributaries. Strangers Creek is a major tributary to Caddies Creek and is a second order stream immediately east of Burns Road Station. Caddies Creek is a third order stream where it crosses Windsor Road and the surface alignment of the NWRL.

Second Ponds Creek is approximately 500m west of the proposed stabling facility in Rouse Hill. It is a second order stream at its closest proximity to the NWRL impact corridor.

Devlin's Creek is a first order tributary where it crosses the bored tunnel section of the NWRL alignment and turns into a second order stream immediately south of the tunnel. The creek becomes a third order stream south of the Beecroft dive structure and ultimately feeds into Lane Cove River approximately 500m east of Cheltenham Station and the proposed quadruplication works.

3.3 Vegetation

A complex of vegetation communities would have originally covered the alignment of the proposed NWRL. Blue Gum High Forest would have dominated through much of the eastern half of the alignment, as far west as Castle Hill. Blue Gum High Forest was characterised by Sydney Blue Gum and Blackbutt. Turpentine Ironbark Forest would likely have been present at the eastern extent of the study area at Beecroft, dominated by Turpentine, White Stringybark, Red Mahogany and Grey Ironbark. The remainder of

the alignment would generally have composed of Cumberland Plain Woodlands, dominated by the Grey Box and Forest Red Gum. River Flat Forests would have generally comprised Cabbage Gum and Rough-barked Apple and are found on the high alluvial levee banks of the Nepean-Hawkesbury River floodplain.

The preliminary environmental assessment identified 80% of the vegetation within the impact corridor as being highly modified, and 20% as remnant or regrowth native vegetation, all with some degree of disturbance. Surface alignment to Burns Road Station passes through c.2.2ha Cumberland Plain Woodland and c.0.4ha River Flat Eucalypt Forest.

3.4 Land-use impact assessment

The early settlement of the Cumberland Plain commenced in 1789 and was agricultural in nature. From initial cultivation attempts in Parramatta, settlement expanded rapidly and by 1796, agricultural properties had been established close to Lane Cove River at the eastern extent of the study area and across the Cumberland Plain as far north as the Hawkesbury River (Perry 1963). The Cumberland Plain, particularly the western end of the study area has been subject to much clearing and grazing associated with agriculture.

Residential and industrial development has completely covered the majority of land through which the NWRL alignment runs. The opening of a train line in Pennant Hills in 1886 made the areas in the east of the study area easily accessible and intense levels of urban development have had a comprehensive and severe impact on the landscape. In recent years, concentrated industrial and residential development and increasing population through the Hills District and to Rouse Hill has also left little intact deposit through the west of the study area.

In order to assess the significance and potential of Aboriginal sites and subsurface deposits within the study area, a land-use impact assessment was prepared, looking at the existing levels of disturbance within a corridor of 250m either side of the NWRL (Figure 4). This assessment was undertaken through a comparison of aerial photos, ortho-photomaps and an inspection of these locations during the current survey. This was restricted to those lands at the western end of the study area where there will be an impact on the current ground surface.

In keeping with previous studies (JMcD CHM 1997, 1999, 2002a, 2005), the following definitions were used:

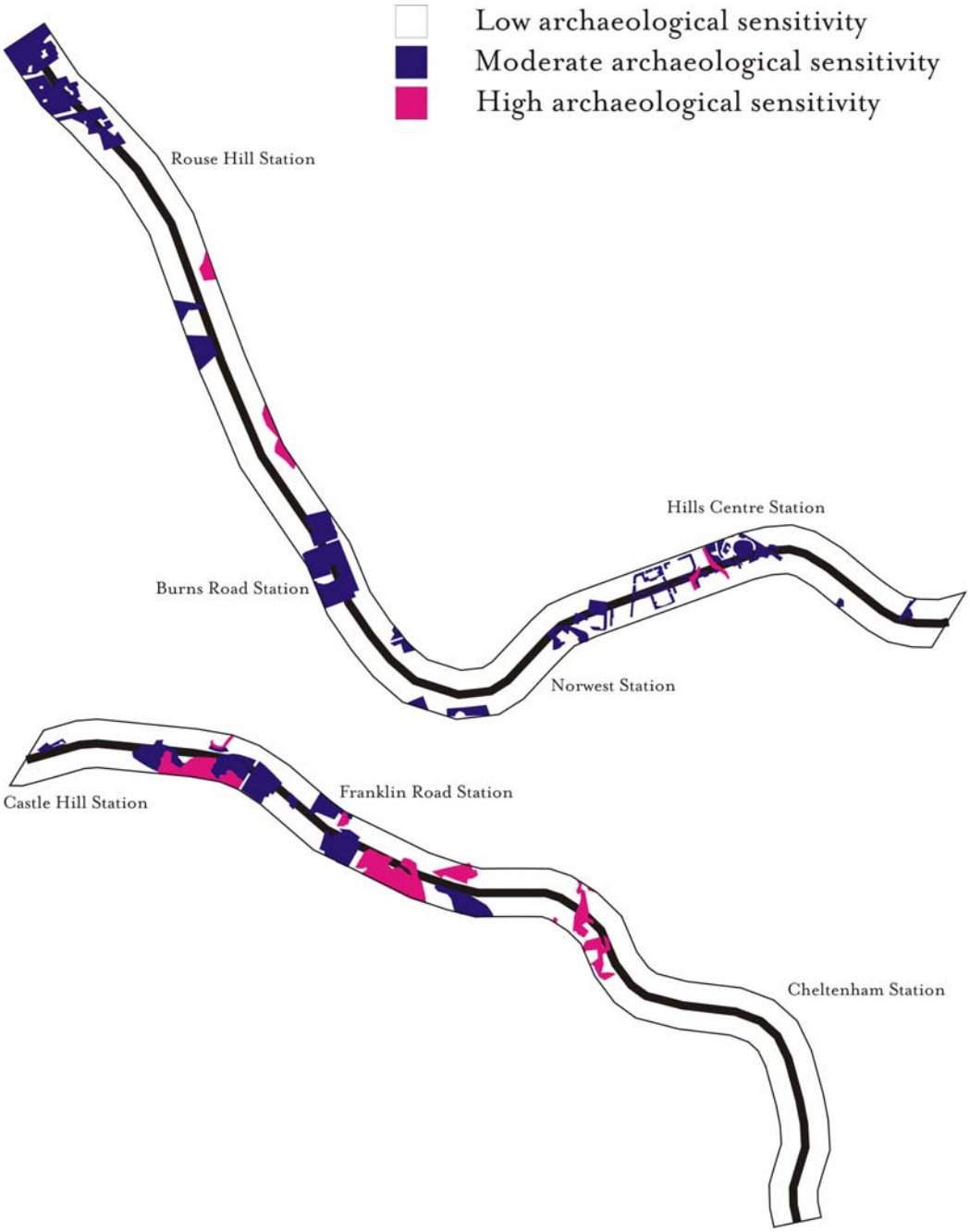
High disturbance -	Severe disturbance to the soil. Buildings, houses, suburbs, roads, market gardens, poultry farms, BMX tracks, rubbish tips, formed tracks, dams, drains and other excavations.
Moderate disturbance -	Cleared of trees at some time, cultivated or extensive soil disturbance probable – caused by machinery or extended periods of trampling. Much of this area has been used for small agricultural pursuits such as orchards, and the remainder carries improved pasture.

Low disturbance - Partly cleared and grazed at some time, but apparently never subject to extreme soil disturbance.

Land-use impact mapping demonstrates the high level of disturbance along most of the NWRL alignment. This is likely in part due to the fact that the alignment follows major roads for much of its length. Cumberland State Forest south of Castle Hill Road and large properties on Balmoral Road are the only areas of significant size and low disturbance identified within the impact assessment corridor. The remaining areas of low disturbance are tributaries, creeks and highly vegetated lands immediately adjacent to these.

On the basis of land-use mapping, areas of archaeological sensitivity are identified (Figure 4). This in effect represents the inverse of the existing land-use disturbance. It identifies which areas are still relatively intact and which therefore have the potential to contain intact archaeological sites and intact archaeological deposit. Landscapes that have already been heavily impacted by land-use disturbance have little potential for containing intact deposit. This mapping will be employed in the assessment of the significance and potential of sites and PADs that will be potentially impacted by the proposed NWRL

Figure 4: Land-use impacts within 250m of the impact corridor.



4. CULTURAL AND ARCHAEOLOGICAL CONTEXT

4.1 Ethnohistoric evidence

Linguistic and clan groupings

At the time of first European settlement, Aboriginal society was divided into a number of territorial groups of families with wider language affinities. The study area is on land originally occupied by clans and bands within the Darug linguistic group (Kohen 1993:21).

Attenbrow's study of ethnographic sources suggests that the Darramurragal local clan was inhabiting the area around Turramurra at the time of European contact, with the Bediagal further west towards Castle Hill and the Buruberongal are recorded as inhabiting country two hours walking distance north west of Parramatta, around the Rouse Hill area (Attenbrow 2002: Fig.3.3, p.23).

Resources and subsistence

While there are many early accounts of Indigenous people living around Port Jackson harbour and the coast, there are fewer references to the inland and hinterland areas. Descriptions of people on the harbour and coast often mention a reliance on fish and shellfish in the diet (Tench 1793[1996]: 259-250), although woodland, forest and wetland resources would also have been exploited at various times. People living on the Cumberland Plain would have had access to a range of resources, depending on territorial restrictions, including forests, woodland and river resources.

Flakeable stone material occurs naturally across the Cumberland Plain. Silcrete sources such as the St Mary's formation have been identified in the valleys of the Eastern Creek system and further away towards Mulgoa Creek and the Georges River at Moorebank. Rickabys Creek Gravel and Maroota Sands would also have been valuable stone sources for people inhabiting the northern Cumberland Plain, offering a range of stone materials suitable for flaking including silcrete, tuff, quartzite, porphyry and hornfels.

The study area traverses a shale/sandstone transition ecotone. These environments often have a diverse range of resources. The Hawkesbury Sandstone geology provides overhangs and rockshelters for protection from the elements, and also provides a surface on which art could be engraved or painted and ground-edged tools sharpened. In summary the following resources would have been attractive to prehistoric human occupation of the NWRL study area:

- reliable freshwater;
- freshwater plants and animals;
- hinterland resources - tall open forest, woodland, and sheltered gully plants and animals;
- timber/bark for fuel, shelter, material culture;

- sandstone overhangs for shelter and/or art;
- sandstone platforms for axe grinding;
- local stone for tool making e.g. quartz.

4.2 Regional Archaeological Context/Chronology

The earliest reliable date for Aboriginal occupation in the Sydney region is 30,735 ± 407 BP, from the radiocarbon determinations returned from RTA-G1, Parramatta. Earlier occupation has been claimed from within deep gravel beds near the Nepean River (Cranebrook Terrace) dated to 41,700 ± 3,000/2,000 BP (Nanson *et al* 1987), but the association between possible artefacts and dated material is questionable. Early occupants of the Cumberland Plain were probably highly mobile, traveling long distances between major watercourses, and carrying silicified tuff cores and large flake tools as a portable stone supply.

Early occupation within the immediate area is indicated at Darling Mills Creek SF2, West Pennant Hills, where initial occupation started around 10,000 years ago (Attenbrow 1993). On the coast, at Kurnell Peninsula, occupation dates of 12,190 ± 110 BP at Doughboy Head, and 5,620 ± 70 BP for Potter Point have been obtained (Attenbrow 2002:18). These sites are mostly in proximity to major rivers, creeks, or swamps and/or in areas of multiple habitats such as shale/sandstone interfaces or ecotones.

After sea levels rose to similar levels as today at around 6,500 years ago, people seem to have moved into areas formerly more sparsely populated. Most dated sites in the Sydney Region (including rockshelters and open campsites) reveal that occupation increased during the last 3,000 years (Attenbrow 2002:1994). Excavated shelters at Cherrybrook, Devlins Creek, Bardens Ridge and Mill Creek 11, all have recent occupation dates of <3,000BP (Attenbrow and Negerevich 1981; Haglund 1995; Koettig 1985; McDonald 1985).

During the prehistoric occupation of the Sydney Region, the choices of stone artefact raw materials, reduction strategies, and types of tools made, have varied in certain ways over time. The Eastern Regional sequence refers to changes observed in excavated stone artefact assemblages in southeastern Australia. Formerly classified by McCarthy (1964) into the "Capertian", "Bondaian" and "Eloueran", the following phases are now used to describe this sequence in the Sydney Region (see recent report on Parramatta by JMcD CHM 2005b):

- Pre-Bondaian (c.30,000-8,000 BP)
- Early Bondaian (c.8,000-3,000 BP)
- Middle Bondaian (c.3,000-1,000 BP)
- Late Bondaian (c.1,000 BP- European contact)

The Pre-Bondaian – McCarthy's "***Capertian"*** phase is characterised by the presence of relatively larger cores, core-tools, unifacially flaked cobbles, large "primary" flakes and retouched flakes. This phase also includes finely worked dentate and serrate retouched flakes as a component of assemblages (termed "saws" by McCarthy) and burinates (resembling burins). Unifacial and bifacial reduction strategies were mostly used, preferring silicified tuff and chert for raw material over other stone such as silcrete. Some bipolar reduction was used. While these characteristics are not exclusive to this phase, they tend to typify 'early' occupation sites. While tool reduction would have been more wasteful near to the source, large flakes struck off cobbles appear to have been carried for use as cores when traveling long distances away from it. Limited occupation evidence from this phase in the Sydney Region suggests a relatively small, highly mobile population, who camped briefly at widely spaced locations.

The "***Early Bondaian"*** phase is characterised by the appearance of backed artefacts mostly around 5,000 years ago (but earlier c.7-8 ka in some areas), and edge ground tools from about 4,500-4,000 years ago. Raw material preferences changed, with silicified tuff and chert still used, but silcrete becoming more frequent in assemblages. Surface cobbles of silcrete, found in Tertiary and Quaternary gravel formations were the most common siliceous rocks utilized on the Cumberland Plain and would have provided plentiful stone for people camping away from the Nepean River gravels.

The "***Middle Bondaian"*** is characterised by an increase in the production of backed artefacts and thumbnail scrapers (made on silcrete, tuff and other fine grained siliceous), which outnumber bipolar reduced pieces. The proportion of quartz artefacts increases, while edge ground tools continue to be used. Bondi points, geometric microliths, elouera and other retouched flakes, are generally smaller in size and weight than retouched artefacts of Capertian assemblages, with numbers of artefacts at sites increasing (Attenbrow 2002:155). Cores tended to be small and highly reduced when discarded, indicating material rationing. Reduction strategies changed, but did not replace existing techniques. Cores were carefully prepared using the asymmetric alternating technique.

The "***Late Bondaian"*** has been characterised by the disappearance of backed artefacts in some rockshelter sites of sandstone areas and along the coast, from about 1,600-1,500 BP. However, recent studies indicate that this was not widespread. Backed artefact production actually increases at one coastal hinterland site, Henry Lawson Drive rockshelter, in the last 1,000years (Hiscock 2003). This indicates that there is greater variation between sites and their assemblages in the Sydney Region within the last 1,500 years than the regional sequence suggests. At some open sites on the Cumberland Plain backed artefacts appear to persist up to at least 350 BP and could have continued up to European contact.

The bipolar reduction technique is also increasingly used on a range of raw materials e.g. silcrete, quartz. The number of elouera and edge ground stone tools also increases during this later phase. Edge ground hatchet heads are more frequent in the last 1,000 years, and were often noted as important personal items in early historical accounts.

4.3 Local Context

Prior to the current fieldwork, a number of sites had been recorded in the local area. A search of the AHIMS database (19.07.06) and a review of the previous studies undertaken within the local area revealed 59 sites previously identified within 1 km of the proposed route of the North West Rail Link (Figure 6), 15 of which occur within 100m of the proposed impact corridor identified in the Project Application and Preliminary Environmental Assessment (TIDC April 2006). These are predominantly open camp sites, isolated finds and areas of PAD (Table 1). Also occurring locally are Shelters and Axe Grinding Grooves, though none of these site types are located within close proximity of the NWRL proposed impact corridor.

Table 1: Sites previously identified within the study area (compiled from AHIMS database search and literature review). Sites in italics have had s.90 *Consent to Destroy* permits granted.

Site number	Site Name	Easting	Northing	Site Type
45-5-0808	*RH/SP2*	*306450*	*6271050*	*OCS*
45-5-0959	OWR4	307370	6269950	OCS
45-5-0960	OWR5	307470	6269820	OCS
45-5-3077	MTW	307556	6269771	OCS
45-5-2905	PAD 3	307568	6269737	PAD
	PAD 5	307520	6269580	
45-5-3188	*Mungerie Park*	*307783*	*6269496*	*OCS*
45-5-2649	Windsor Rd 1	307790	6269393	IF
	PAD 4	308000	6268800	
45-5-0961	*OWR6*	*308080*	*6268560*	*OCS*
45-5-0933	*RH/CD9*	*308200*	*6268420*	*OCS*
	PAD 2	309000	6266700	
	PAD 3	308600	6267500	
	BR-H-1	309235	6266632	CLAY BALL
45-5-1005	IFCH1	322310	6262100	IF

The Cumberland Plain has been extensively studied over the last two decades. A number of large scale investigations have been undertaken within the vicinity of the NWRL. These investigations are concentrated at the western extent of the NWRL alignment. Surveys associated with the Rouse Hill Infrastructure Project (JMcD CHM 1993, 2000, 2002) as well as the current excavation programmes related to these surveys (McDonald and White 1993, JMcD CHM 2001, 2005), the Balmoral Road Release Area (JMcD CHM 2002), and the initial assessment of the NWRL 2002 proposed alignment (Mills 2003) are the most relevant to the current alignment (Figure 5).

Figure 5: Previous surveys within the vicinity of the North West Rail Link

The initial impact assessment for the NWRL was undertaken by Mills Archaeological and Heritage Services Pty Ltd in 2003. This assessment included a comprehensive pedestrian survey of areas to be impacted by the 2002 NWRL alignment. Mills recorded a high degree of disturbance and few areas where potentially sensitive archaeological landforms had not already been impacted by development. These were concentrated on elevated areas adjacent to creeks, hill crests and areas of old growth timber as having the most potential to contain archaeologically sensitive deposit. At the time it was suggested that 13 sites or PADs would be directly impacted by the NWRL proposal, 10 of which were assessed as having high or potentially high significance. The subsequent realignment of the NWRL avoids the majority of these sites.

In 1993 and 2002, surveys were undertaken by Jo McDonald Cultural Heritage Management as a part of the Rouse Hill Infrastructure Project. The Rouse Hill Development Area encompasses an area from Cattai Creek in the east to Second Ponds Creek in the west. Various stages of the RHIP have covered areas relevant to the NWRL. The proposed stabling facility is located on land surveyed in 2002, between Windsor Road, Rouse Road, Cudgegong Road and Schofields Road as a part of the Stage 3 works. Rouse Hill Station and the surface alignment are within lands investigated as a part of the Stage 1 works, which included survey along Windsor and Old Windsor Roads, along Caddies Creek and much of the area between Windsor Road and Caddies Creek. Stage 2 of the RHIP covered more of the area between Windsor Road and Caddies Creek. These investigations identified 37 sites, PADs and isolated artefacts in Stage 1, 19 sites, PADs and isolated artefacts in Stage 2 and 24 sites, PADs and isolated artefacts in Stage 3. Of these, seven features are likely to be impacted by the proposed NWRL alignment.

PPK conducted a survey of the Balmoral Road Release Area in 2001 that canvassed the area of the proposed Burns Road Station and construction site. The study area incorporated land between Windsor Road and Old Windsor Road, south of Samantha Riley Drive and north of Brighton Drive. Investigations identified one open camp site and three isolated finds. The Balmoral Road Release Area was further investigated in 2002 as a part of the RHIP Stage 3. This inspection recorded another site and another area of PAD, neither of which will be impacted by the proposed railway. These were both assessed as having moderate to high archaeological potential.

A number of excavations undertaken within the vicinity of the NWRL further contribute to our understanding of the archaeology of the northern Cumberland Plain, and the prediction for sites within local contexts. Salvage excavations relevant to the study area include those undertaken as a part of the RHIP Stages 1 (1993), 2 (JMcD CHM 2001) and 3 (JMcD CHM 2005), Mungerie Park (AMBS 1999) and current salvage works being undertaken as a part of the Rouse Hill Town Centre project (JMcD CHM in prep.).

Salvage excavations associated with the Rouse Hill Infrastructure Project have demonstrated that most areas on the Cumberland Plain contain sub-surface archaeological deposits, even when there are no surface artefacts. Further, where lithic concentrations are found in aggrading and stable landscapes, they are largely intact and have the potential for internal structural integrity. Investigations within the Rouse Hill Development Area have also established that while ploughing occurs across the majority of the Cumberland Plain, this only affects deposit up to c.30cm depth. Ploughed

knapping floors have been located which are still relatively intact (West Hoxton 3: Rich and McDonald 1995, AMBS 2000).

Many areas on the Cumberland Plain have been proven to contain extremely high artefact densities, with variability depending on the range of lithic activities present. Earliest occupation is indicated as predating the Bondaian phase (RH/CC2 and RH/CD12) and it is suggested that this could be more than this could be more than 7,000 years ago based on the Bondaian elements identified at these sites (Hiscock and Attenbrow 1998; Moore 1970; Rich 1993). There is also evidence for much earlier use from RH/SP9 (JMcD CHM 2001) that could date to a much older period.

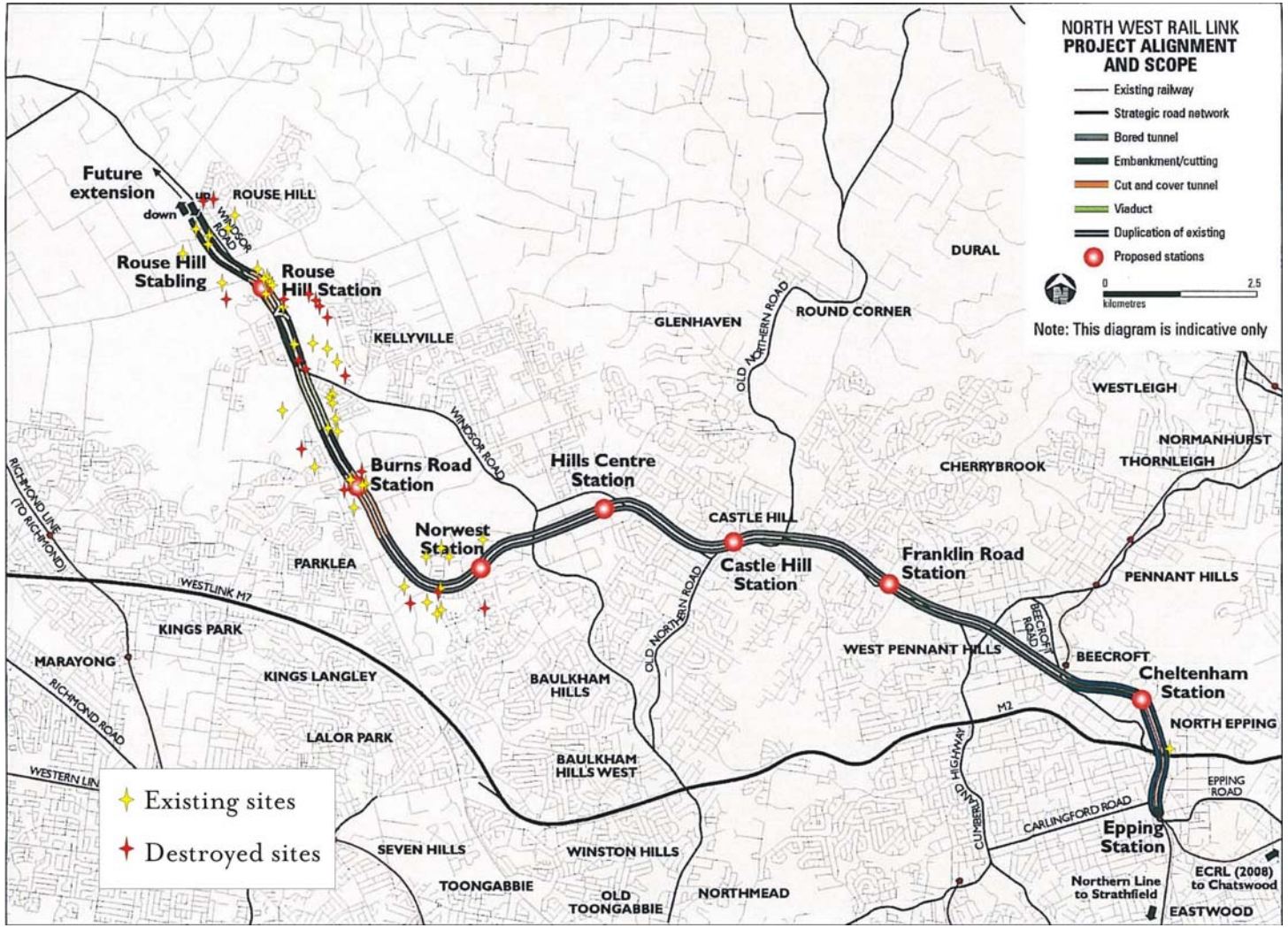
Occupation during the more recent past is confirmed by the presence of Bondaian technology and knapping floors. Backed artefacts were produced in bulk at several of these sites (RH/SP9, RH/CD12, RH/CC2, and RH/OC1) and suggest occupation within the Middle Bondaian phase. The presence of elouera and bi-polar silcrete artefacts at RH/SP9 and RH/CC2 also indicate a continuing occupation of the Cumberland Plain throughout the Late Bondaian phase.

As a part of the Mungerie Park Town Centre Project (AMBS 2000), salvage works were undertaken within the Rouse Hill Development Area between Windsor Road and Caddies Creek, encompassing RH/CD6 and RH/CD10 (this investigation area being renamed Mungerie Park 1 (MP1). Excavations at MP1 revealed an extremely high density and diverse range of tools across the site. Average artefact densities were highest within 100m of Caddies Creek and dropped significantly further upslope from the Creek. Beyond 100m, higher densities of artefacts were generally found in clusters associated with discreet knapping floors amidst a much lower density background scatter. No artefacts were recovered at more than 220m distance from the creek.

The assemblage demonstrates a continuous archaeological deposit between sites previously identified as RH/CD6 and RH/CD10. The MP1 data also suggest a distinction between the apparent manufacturing foci closer to the creek and activities being conducted further away from the creek.

Salvage works currently being undertaken by Jo McDonald CHM are located within the Caddies Creek Conservation Corridor between Commercial Road and Sanctuary Drive. Site RH/CD10 is located immediately north of the Mungerie Park 1 site, RH/CD5 slightly further north again, RH/CD7(1) on the opposite bank of Caddies Creek from MP1, and RH/CD7(2) further south again (Figure 6).

Figure 6: Location of previously identified sites (existing and destroyed) within 1 km of the proposed railway line. Data taken from AHIMS register and review of previous studies.



4.4 Predictions for sites within the local area

Prior to the current survey, there were fifteen sites known to occur within the NWRL impact corridor (Figure 7). A total of fifty-nine Indigenous sites are known to occur within 1 kilometre of the proposed NWRL. Proportions of the different site types recorded locally are presented below (Table 2).

The most likely site types to be located within the study area, based on previous archaeological surveys, known recordings, and local geology and topography, would be open camp sites and isolated finds.

Table 2: Frequency of known site types recorded within 1km of the proposed NWRL.

Site Type	*Total no. of sites*	*%f*
Open Camp Site	34	57.6
Shelter	1	1.7
Axe Grinding Groove	3	5.1
Isolated find	9	15.3
Potential Archaeological Deposit	11	18.6
Burnt (?) clay	1	1.7
Total	*59*	*100*

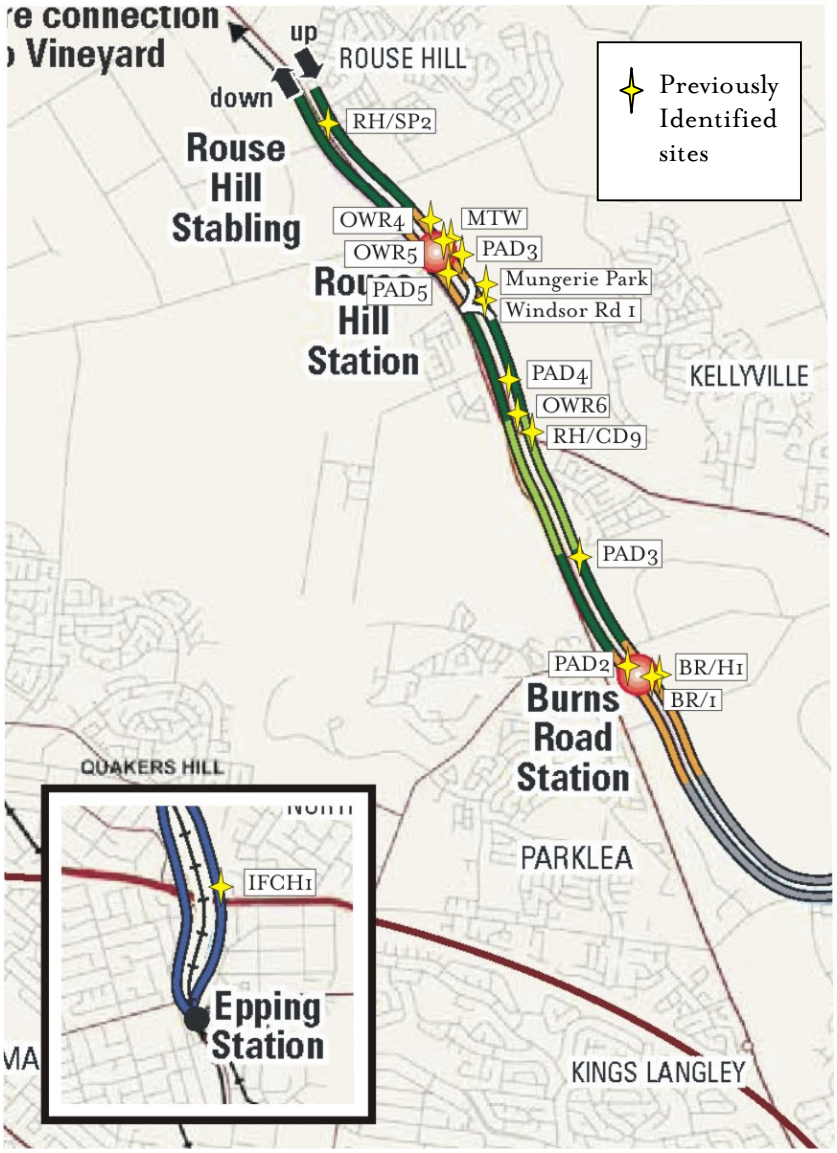
Open camp sites comprise over 57% of previously recorded sites within 1km of the NWRL alignment. Open artefact scatters are often found on slightly sloping to level ground, usually in the vicinity of a watercourse. Most previous recordings have been made on major creeks such as Caddies and Second Ponds Creeks or on surrounding shale ridges and hills. Open camp sites may be expected on elevated banks and slopes nearer to major creek confluences. Open potential archaeological deposit (PAD), may be expected in landforms where undisturbed soil horizons with intact sub-surface archaeological material remain. Isolated finds maybe found as a background scatter anywhere across the landscape.

The next most frequent site types are axe-grinding grooves (5.1%). Grinding grooves are usually found along creeklines and tributaries. This would depend on the occurrence of suitable sandstone platforms, preferably with rock pools and flowing water to facilitate grinding. These have been found elsewhere in the Sydney Region often as part of site complexes, sometimes near engraving sites and rock shelters. A number of grinding grooves occur along Caddies Creek, immediately east of the proposed alignment. It is possible that grinding grooves could occur between Windsor Road and Burns Road Station, where Elizabeth Macarthur Creek runs close enough to the NWRL alignment to be impacted in places, although there is little surface sandstone upstream of the confluence of Caddies and Elizabeth Macarthur Creeks. Grinding grooves are often highly worn by water action and may be difficult to detect.

Scarred trees could be found although land use history suggests that logging, land clearing and bushfires have occurred across most of the Cumberland Plain. Scars would be on old growth trees >150-200 years old or large, recently dead trees. Scars made by

Indigenous people are usually fairly symmetrical, unlike natural scarring produced by lightning or branch removal. These should show considerable regrowth. They may show stone or steel hatchet cut marks. There may be potential for toehold notch scars or cut hollows on tall old trees.

Figure 7: Sites within 100m of the proposed impact corridor of the NWRL alignment



5. SURVEY PROCEDURE

The field survey for the North West Rail Link Environmental Assessment was undertaken by Amy Stevens, with the assistance of Andrea Ward. Steve Randall (Deerubbin Local Aboriginal Land Council) assisted in the survey on 26th July, Scott Collogan (Darug Tribal Aboriginal Corporation) assisted on 27th July and Leanne Wright (Darug Custodial Aboriginal Corporation) and Celestine Everingham (Darug Aboriginal Cultural Heritage Assessments) were present on 28th July.

5.1 Survey rationale

An initial field inspection was undertaken in 2003 by Mills Archaeological and Heritage Services Pty Ltd along the entire length of the proposed North West Rail Link. Since that time, modifications have been made to the alignment, including:

- A section of the bored tunnel between the Beecroft dive structure and Franklin Road station has been re-aligned 250m to the south;
- A deviation of the bored tunnel and surface sections between the Hills Centre Station and Burns Road Station which swings the line further west;
- The stabling facility has been moved c.500m east, adjacent to Windsor Road;
- Quadruplication of the Main North Line from Epping to Beecroft.

Field inspections were therefore concentrated on the modifications between Burns Road Station and the Hills Centre Station and the re-alignment of the stabling facility. Landscapes that had been identified as potentially intact and/or sensitive were also investigated wherever sub-surface disturbance to the archaeological deposit was likely. Locations where sub-surface deposit will be affected by the proposed works will include the surface alignment and the cut and cover alignment between the stabling facility and Norwest Station, as well as each of the stations.

The majority of the NWRL alignment has been subject to severe land use disturbance already due to the construction of major roads, housing and industrial estates. Land with intact deposit was generally restricted to paddocks on small farming properties, unutilised space in reserves and picnic areas and narrow corridors along creeklines. Landform units within the study area included creekbank, floodplain and hillslopes. All landform units were inspected for known archaeological sites, previously unrecorded lithic scatters, isolated finds and scarred trees. Land use impacts were also assessed in order to assist with sensitivity mapping.

The Deerubbin LALC participated in field inspection of the NWRL from the stabling facility in Rouse Hill as far as Castle Hill Station, the boundary of the DLALC interests. The Darug groups participated in inspections along the entire length of the proposed route. DTAC took part in the inspection of the proposed stations between Castle Hill Station and the Beecroft dive structure. DCAC and DACHA elected to concentrate primarily on the surface alignment between the stabling facility and Norwest Station.

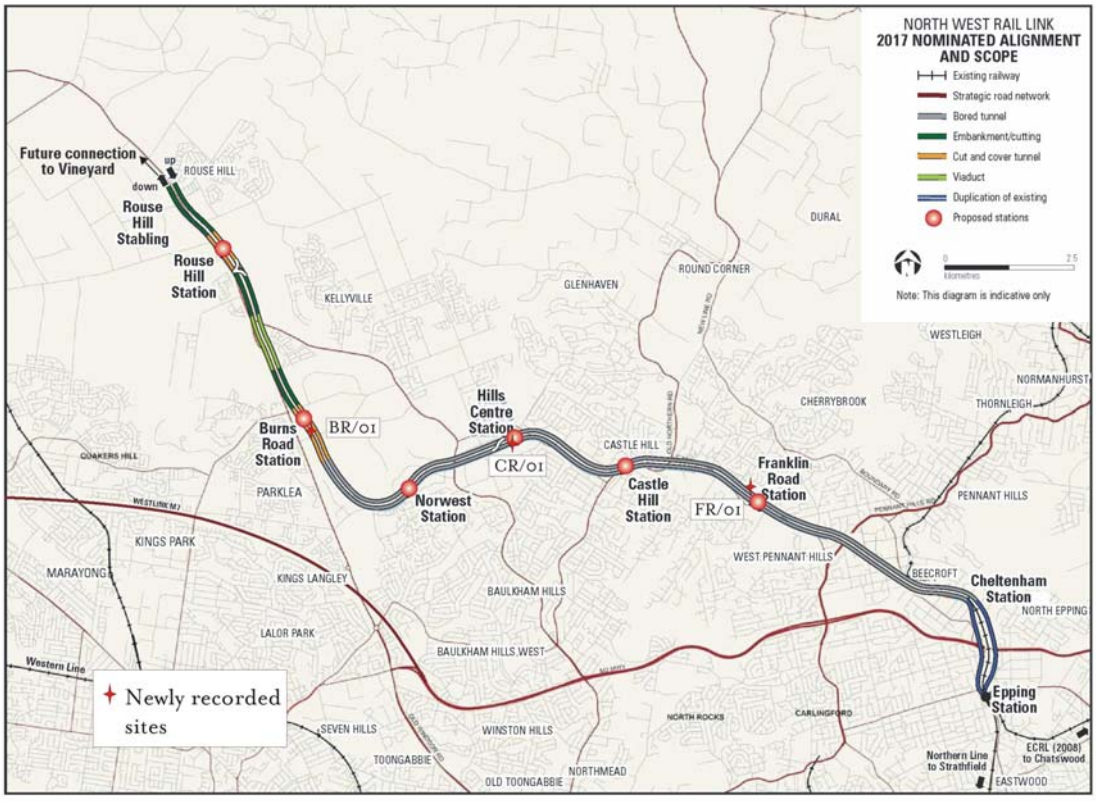
Given that the NWRL alignment runs through mostly private properties, close inspection of areas was restricted by access privileges. Property access was requested for the length of the surface alignment, Rouse Hill Station, Burns Road Station, the Hills Centre Station, Franklin Road Station and the Beecroft dive structure. The majority of these landowners had previously granted permission for consultants to undertake survey within their property and almost all of those approached on the day were also amenable to granting property access. The lands not surveyed were therefore restricted to those where landowners were not contactable and one property in Kellyville that refused access.

6. RESULTS OF SURVEY

The survey resulted in the identification of three previously unrecorded Aboriginal sites: two open lithic scatters with associated potential archaeological deposit (PAD) and one open lithic scatter (Figure 8). Of the fifteen previously identified sites and PADs within the impact corridor, four have had s.90 Consent to Destroy permits already issued. Of the remaining eleven sites and PADs, five were relocated. All sites and PADs are assessed on the basis of their potential for containing intact archaeological deposit founded on the results of the current survey, existing disturbance and landscape parameters.

Given the proposed construction plan for the NWRL, the majority of the alignment will have no impact on any potential archaeological deposit. The bored tunnel section of the route is proposed to be well below the depth of any deposit likely to contain archaeological material. The surface tracks and the cut and cover section of the tunnel will impact on the sub-surface deposit, as will the six stations along the NWRL.

Figure 8: Location of sites identified during the current field survey



6.1 Site Descriptions

Three previously unrecorded lithic scatters and isolated finds were identified as a part of the field survey associated with the significance assessment for the NWRL:

Balmoral Road 1 (BR01) Open lithic scatter with associated PAD

AGD66 56 309258E 6266445N

Location: Properties off Balmoral Road, west of Elizabeth Macarthur Creek.

Description: Moderate density lithic scatter spread over 250 x 200m eroding deposit and associated PAD. Site is located on floodplain and lower hill slopes adjacent to Elizabeth Macarthur Creek.

Condition/Disturbance: The site and associated PAD has been subjected to intense grazing and some clearing and is bounded to the west by severe disturbance associated with the construction of the Rouse Hill bus interchange. Potential for intact deposit is high across the majority of the area, with the exception of small areas of high disturbance associated with farming and stabling.

Surface artefacts:

1 x pink silcrete core

1 x yellow silcrete core

2 x red silcrete core

2 x red silcrete core fragment

5 x red silcrete flake

2 x orange silcrete flake

1 x red silcrete cobble

5 x silcrete fragment

Franklin Road 1 (FR01) Open lithic Scatter

AGD66 56 317654E 6265123N

Location: Franklin Road, off Castle Hill Road. Near back boundary of properties 186 Castle Hill Road and 128 Franklin Road.

Description: Low density lithic scatter within an 80 x 70m area of moderately intact deposit. Site is located on upper hill slopes, c.200m south of Pyes Creek.

Condition/Disturbance: Potential for intact deposit is variable across the area of identified surface artefacts. At the southwest extent of the recorded lithic scatter, artefacts were found within a highly disturbed deposit associated with the construction and demolition of a residential building.

Surface artefacts:

1 x red silcrete flake

1 x grey tuff fragment

1 x red silcrete fragment

Carrington Road 1 (CR01) ***Open lithic scatter and associated PAD***

AGD66 56 311912 6264308 N

Location: 11 Carrington Road, Castle Hill. Behind Unistat Pty Ltd building, on the west bank of Cattai Creek.

Description: A low density scatter of artefacts is located on an eroding creek bank / floodplain deposit c.40m from Cattai Creek. Surface artefacts are located within a 40 x 10m area, with associated PAD extending c.100m along Cattai Creek.

Condition/Disturbance: The small area of potentially intact deposit has been extensively cleared and is subject to small areas of disturbance associated with the construction of office blocks, car parks and picnic areas.

Surface artefacts:

1 x red silcrete flake

1 x yellow tuff flake

1 x red silcrete fragment

1 x green tuff fragment

7. DISCUSSION

New recordings within the study area include three open lithic scatters, two with associated Potential Archaeological Deposit (PAD). A further 11 sites and PADs have been identified within the NWRL impact corridor, five of which were relocated during the current survey.

Archaeological sensitivity mapping (Figure 9) has been undertaken for the NWRL alignment, based on land-use effects throughout the study area. There are no areas of very high archaeological potential identified (e.g. as was identified in the former ADI Site at St Marys [JMcD CHM 1997, 2003]), given the high rate of urban and industrial development along the entire alignment. Areas of good archaeological potential have been identified (Figure 4). These areas have the least disturbance, though they may have been cleared of vegetation in the past, subject to a range of impacts and are not considered to be in pristine condition.

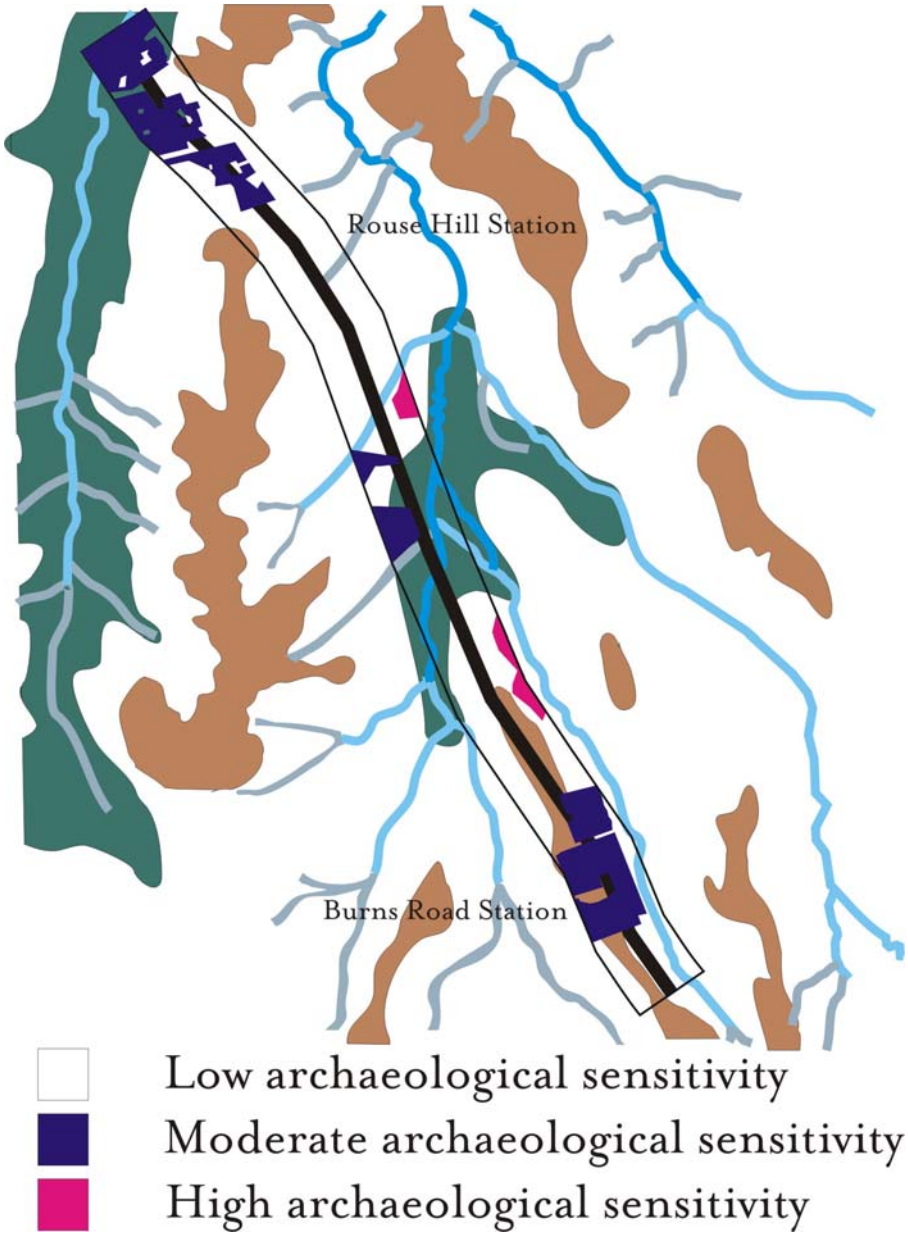
Previous investigations have identified a number of threatened landscapes (JMcD CHM 1999) based on the past impact of urban development on certain landscapes and topographic elements on the Cumberland Plain. These represent higher value landscapes in terms of local heritage conservation potential. The high value landscapes are:

- Shale hillslopes (Minchinbury and to a slightly lesser degree, Ashfield);

- First order tributary creeklines;
- Shale ridges and low ridge tops (particularly Minchinbury).

Given the proposed construction methods, it is the stations and the cut and cover / surface section of the alignment that will impact on the sub-surface deposit. There are no areas of high archaeological potential that will be directly impacted by the NWRL. There are a number of areas with moderate archaeological potential that will be impacted, in particular the stabling facility, Burns Road Station, the Hills Centre Station and Franklin Road Station.

Figure 9: Archaeological sensitivity of NWRL impact corridor



8. SIGNIFICANCE ASSESSMENT

Cultural significance

This usually refers to the importance of a site or feature to the relevant local Indigenous community. Certain sites, items, and landscapes may have traditional significance or contemporary importance to the community. This importance may involve both traditional links with specific areas, as well as an overall concern by Indigenous people for continued protection of their sites in general. Cultural significance can only be assessed by the relevant Aboriginal community, in this case the Deerubbin Local Aboriginal Land Council, and the other interested groups. Individual reports outlining the field inspection of the study area and its assessed Indigenous cultural significance will be forwarded by DLALC and these groups and included in the Appendices.

Scientific significance

One of the aims of cultural heritage management is to preserve a representative sample of the archaeological resource for the benefit of future scientific research and the wider community. Assessment of scientific significance involves placing a site or heritage item within a broader regional framework, as well as assessing the site's individual merits in light of current archaeological discourse. This usually includes an assessment of a site's potential to answer current archaeological research questions. Assessment is also based on the condition (integrity), content, and representativeness of a site, e.g. is it representative of a certain site type? Is it a rare or exceptional example? Can it contribute information that no other site can?

Public significance

This usually refers to a site's potential to educate the general public about Aboriginal culture, but can have a broader definition. Increasing public awareness and understanding about a site's Indigenous and scientific values may spare other sites from inadvertent or intentional destruction. Educating the public to appreciate the past may increase the chances of archaeological resources surviving into the future.

Public significance may also include the different community values placed on a site or heritage place. These may include its importance to local residents or the wider community e.g. aesthetic values, recreational values, links with local European history and local identity.

8.1 Site assessment

No sites within the study area have been subject to sub-surface investigation and hence an assessment of scientific significance cannot be made. On the basis of the surface manifestation of these archaeological sites and/or features, it is only possible to assess the **potential** that these have for containing intact archaeological deposit.

The following assessment is made on the basis of a combination of site condition (integrity), landscape mapping, potential to answer research questions, and representativeness or rarity. The potential of all sites have been reassessed on the basis of current land use impact and landscape elements.

Newly recorded sites

Site BR01 + PAD / PAD2 / BR/1 – Open lithic scatter: This site is assessed as having moderate - high archaeological potential. The northern boundary of the identified site is located within Mills' PAD2 recorded in 2003, though the site extends further south than the boundary of PAD2. PPK's site BR/1 is located immediately south of the identified surface exposure and these two artefacts are likely a part of the same site, though they were not relocated. The site and associated PAD is located within an area identified as having moderate potential for intact deposit and the property has been subject to clearing and probably some ploughing. The site is situated across hill slope and low ridge top and is thus considered to be in a high value landscape.

Site FR01 – Open lithic scatter: This site is assessed as having low archaeological potential. The site is located within an area identified as having low archaeological potential and artefacts are found amongst the remains of a demolished house and surroundings.

Site CR01 + PAD – Open lithic scatter: This site is assessed as having moderate potential for intact archaeological deposit. The site is located within an area identified as having moderate archaeological potential and there is patchy disturbance to the site and associated PAD from concreted picnic tables, the construction of nearby buildings and car parks and pedestrian access paths.

Previously identified sites

Five of the eleven previously identified sites within the proposed NWRL impact corridor were relocated in the current survey. The remaining sites have subsequently been assessed for potential based on landscape and land-use mapping.

45-5-1005 – Isolated Find: *Site not relocated.* This isolated artefact was reportedly covered with sandstone and sediment during historical archaeological excavations associated with the M2. The general area of the site is assessed as having low archaeological potential due to the high degree of disturbance from adjacent residential development, high level of pedestrian activity and original condition report at time of location.

45-5-2649 – Isolated Find: *Site not relocated.* The general area of the site is considered to have low archaeological potential due to recent and extensive sub-surface disturbance around the location of the site in association with development along Windsor Road.

45-5-2905 – Potential archaeological Deposit: *Site not relocated.* The general area of the site is considered to have low archaeological potential due to recent and extensive sub-surface disturbance around the location of the site in association with development along Windsor Road.

45-5-3077 – Open lithic scatter: *Site not relocated.* The general area of the site is considered to have low archaeological potential due to recent and extensive sub-surface disturbance around the location of the site in association with development along Windsor Road.

45-5-0959 – Open lithic scatter: *Site not relocated.* The general area of the site is considered to have low - moderate archaeological potential. A small area of potentially less disturbed deposit was identified in the vicinity of the site co-ordinates on the current survey amid much more severe disturbance from the construction and widening of Windsor Road and the Castlebrook Lawn Cemetery.

45-5-0960 – Open lithic scatter: *Site not relocated.* The general area of the site is considered to have low - moderate archaeological potential. A small area of potentially less disturbed deposit was identified in the vicinity of the site co-ordinates on the current survey amid much more severe disturbance from the construction and widening of Windsor Road and the Castlebrook Lawn Cemetery.

BR/H1 – Clay Ball: *Site not relocated.* This site is assessed as having moderate – high archaeological potential. The site is located within an area identified as having moderate potential for intact deposit and is in close proximity to PAD2 and Site BR01.

PAD3 – Potential archaeological Deposit: This PAD is considered to have moderate archaeological potential, although the location of the site is very close to a large area of substantial disturbance associated with the widening of Windsor Road.

PAD4 – Potential archaeological Deposit: This PAD is considered to have moderate archaeological potential, although the location of the site is very close to a large area of substantial disturbance associated with the widening of Windsor Road.

PAD5 – Potential archaeological Deposit: This PAD is considered to have moderate archaeological potential, although the location of the site is very close to a large area of substantial disturbance associated with the widening of Windsor Road.

8.2 Details of proposed construction methods

The proposed North West Rail Link would be twin track and approximately 23km long, connecting Rouse Hill Town Centre to The Main North Line between Beecroft and Cheltenham Stations. The project includes:

- A 2.5km surface quadruplication of the Northern Line between Epping and Beecroft Stations (including work at Cheltenham Station);
- A 16km section in tunnel from the Northern Line to north of Norwest Business Park, including four underground stations (Franklin Road Station, Castle Hill Station, Hills Centre Station and Norwest Station);
- A 4km surface section from north of Norwest Business Park to Rouse Hill, including two underground stations (Burns Road Station, Rouse Hill Station);
- An interim train stabling facility at Rouse Hill, which would include facilities for cleaning and maintenance of stabled trains;
- Ancillary tunnel support facilities such as tunnel ventilation, transformers and a water treatment plant;

- Construction work sites, including a large site within the Balmoral Road Release Area.

Construction works associated with the quadruplication of the Main North Line will take place within the current rail corridor between Epping and Beecroft Stations. These works will include station upgrades and a new rail bridge over the M2. The Beecroft dive structure will also be located within the current rail corridor, north east of the tennis courts at The Crescent in Beecroft. The dive structure is the beginning of the tunnel section of the NWRL.

The construction of the tunnel section of the NWRL will involve a transition from boring to cut and cover. Boring of the tunnel will commence within the existing rail corridor and continue to Franklin Road Station. The tunnel generally follows the alignment of Castle Hill Road to Castle Hill Station and continues beneath Showground Road to the Hills Centre Station. The tunnel continues beneath Salisbury Road and Norwest Boulevarde to Norwest Station, continuing towards Old Windsor Road and under Northridge Avenue and Celebration Drive.

Just north of Celebration Drive, the alignment becomes a cut and cover tunnel, crossing Balmoral Road to Burns Road Station. The cut and cover tunnel continues beneath Burns Road and changes to an open cut or embankment before proceeding onto a viaduct over Samantha Riley Drive and the Windsor Road / Old Windsor Road intersection. Cut and cover tunneling continues to follow Windsor Road to Rouse Hill Station and beneath Windsor Road to the proposed stabling facility. A 40m impact corridor has been identified for construction of the surface alignment and cut and cover tunnel.

Franklin Road Station, Castle Hill Station, the Hills Centre Station and Norwest Station would all be underground stations. The option of an underground walkway at Castle Hill Station providing direct access to Castle Towers Shopping Centre is being considered. Burns Road Station would be located within a deep cutting. It has been proposed that Rouse Hill Station be constructed as an underground station parallel to Windsor Road. A proposal to construct Rouse Hill Station as a surface station is also being considered as a part of the design process. A 60m impact corridor has been identified for construction of stations.

The train stabling facility would be located within a cut and located on an alignment that could be used in future extension to the NWRL to the Richmond Line. Ancillary tunnel support facilities will include tunnel ventilation every 2.5-3km. It is envisioned that this will be incorporated into station design, though ventilation into industrial precincts may also be considered. Transformers for power supply to the tunnel will be required every 2-3km and a water treatment plant will be required.

Construction sites have been proposed at a number of locations, though this is subject to design review. Construction sites have been proposed within the existing railway corridor between Epping and Beecroft Stations, at Franklin Road Station, Castle Hill Park, the Hills Centre Station, Burns Road Station, the corner of Windsor and Old Windsor Road, the corner of Commercial Road and Windsor Road and the northern end of the stabling facility.

Impact of proposed works on Aboriginal sites and potential deposit

A total of fourteen sites and PADs have been identified that may be impacted by the proposed NWRL:

- Sites MTW, PAD3, WR1, PAD4 and PAD3 are all located between Burns Road station and the stabling facility, where cut and cover construction has been proposed. These sites WILL BE IMPACTED by the proposed NWRL.
- Sites OWR4 and OWR5 are located within 50m of the proposed impact corridor between Burns Road Station and Rouse Hill Station. These sites are located on the western side of Windsor Road and MAY BE IMPACTED by the proposed NWRL.
- Sites BR01 (PAD 2), BR/1 and BR/H1 are located within the lands nominated for Burns Road Station and construction works. These sites WILL BE IMPACTED by the proposed NWRL.
- Site CR01 is located within Castle Hill Industrial Estate, where bored tunneling has been proposed. The site is however, in close proximity to the Hills Centre Station and MAY BE IMPACTED by the proposed NWRL.
- Site FR01 is located within the lands nominated for Franklin Road Station and possible construction works. This site WILL BE IMPACTED by the proposed NWRL.
- Site IFCH1 is located at the eastern extent of the NWRL alignment, close to the quadruplication of tracks between Cheltenham and Epping Station. This site WILL BE IMPACTED by the proposed NWRL.

Table 3: Summary of sites potentially impacted by the NWRL alignment

NPWS #	Site Name	Site Type	Impact	Archaeological Potential
	BR01	OCS	Y	Mod-High
	CR01	OCS	Possible	Mod
	FR01	OCS	Y	Low
45-5-1005	IFCH1	IF	Y	Low
45-5-2649	Windsor Rd 1	IF	Y	Low
45-5-2905	PAD 3	PAD	Y	Low
45-5-3077	MTW	OCS	Y	Low
45-5-0959	OWR4	OCS	Possible	Low-Mod
45-5-0960	OWR5	OCS	Possible	Low-Mod
	BR/1	OCS	Y	Mod-High
	PAD 2	PAD	Y	Mod-High
	PAD 3	PAD	Y	Mod
	PAD 4	PAD	Y	Mod
	PAD 5	PAD	Y	Mod
	BR-H-1	CLAY BALL	Y	Mod-High

9. RECOMMENDATIONS

The following recommendations are made regarding the results of the current cultural heritage significance assessment. These are made on the basis of:

- the Director General's Requirements for the Environmental Assessment of the proposed North West Rail Link;
- advice from the Department of Environment and Conservation on Aboriginal Cultural Heritage Assessment Requirements for the North West Rail Link;
- the findings of previous and current field investigations undertaken within the study area;
- the interests of the Deerubbin Local Aboriginal Land Council, Darug Tribal Aboriginal Corporation, Darug Custodians Aboriginal Corporation and Darug Aboriginal Cultural Heritage assessments;
- the likely impacts resulting from the proposed NWRL final alignment and varying construction impacts.

It is recommended that:

1. Fifteen sites and PADs have been identified that may be impacted by the proposed NWRL. Of these, three sites (BR01 + BR/1 and BR/H1) and one PAD (PAD2) are considered to have moderate - high archaeological potential. A further four sites are assessed as having moderate archaeological potential;
2. The Concept Plan should identify the specific locations of Indigenous heritage sites identified in this report. Avoidance of these sites should be considered where possible in the location of construction sites and ancillary tunnel support facilities;
3. Any unavoidable impacts associated with the construction of the NWRL would require negotiations with the relevant Aboriginal groups regarding mitigation and possibly further archaeological investigation – prior to the works taking place;
4. Areas of higher sensitivity will require salvage investigation prior to development as mitigation against their destruction. An s.90 *Consent to Destroy* from the Director of NSW DEC should be sought for these impacts. This should be made on the basis of a 'whole of development' approach. Advertising for interested parties will need to be undertaken prior to any sub-surface investigation;
5. Ongoing consultation should be formalised with the relevant Indigenous community groups and the NSW Department of Environment and Conservation (DEC) as the NWRL Project progresses. This should include the continued application of the Protocol and Methodology developed for the Growth Centres;

6. Planning for management of heritage sites should be done on a broad archaeological landscape basis, as well as in terms of specific sites. There is potential for further, currently unidentified (i.e. buried) sites to occur in the study area;

7. One copy of this report (each) should be sent to:

Mr. Frank Vincent,
Chairperson,
Deerubbin LALC
PO Box V184,
MT DRUITT VILLAGE, NSW, 2770

Celestine Everingham,
Darug Aboriginal Cultural Heritage Assessments,
90 Hermitage Road,
KURRAJONG HILLS, NSW, 2758

Mrs. Leanne Wright,
Chairperson,
Darug Custodian Aboriginal Corporation,
PO Box 36,
KELLYVILLE, NSW, 2155

Mr. Des Dyer
Darug Tribal Aboriginal Corporation,
PO Box 441,
BLACKTOWN, NSW, 2148

8. Three copies of this report should be sent to:

Ms Lou Ewins,
Cultural Heritage Unit
Sydney Zone, DEC,
PO Box 668,
Parramatta, NSW, 2124.

10. REFERENCES

Attenbrow, V.J. 1981 Mangrove Creek Dam: Salvage Excavation Project. Volumes 1 & 2. Report to NPWS NSW on behalf of PWD.

Attenbrow, V. 1990 The Port Jackson Archaeological Project. Report on Stage 1. Report to the Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra.

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Appendix 1 – Photographs

Plate 1: Area of Site CR/01, behind Unistat Pty Ltd Building on Carrington Road.

Plate 2: Yellow tuff flake from site CR/01.

Plate 3: Area of proposed Franklin Road Station and associated construction site. Land subject to severe land use disturbance from clearing, grazing, ploughing, residential development and imported rubbish and fill.

Plate 4: View to southwest. Area of site FR/01, in association with building rubble from demolished building.

Plate 5: Red silcrete flake from site FR/01.

Plate 6: Example of localised disturbance throughout Balmoral Road properties – site of demolished residence and associated rubble / fill. Extensive clearing and landscaping.

Plate 7: Example of more intact deposit within the Balmoral Road properties. Land subject to clearing and grazing.

Plate 8: Red silcrete core from site BR/01.

Plate 9: Example of non-artefactual silcrete fragments common across site BR/01.

Plate 10: Red silcrete flake from site BR/01.

Appendix 2 – Site cards

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☐ Additional information ☐

SITE IDENTIFICATION					
Site name	BR01			**NPWS Site Number**	
Owner/manager	Private landowners				
Owner Address	Balmoral Road. Rouse Hill				
LOCATION					
Location	North side of Balmoral Road, between Old Windsor Road and Elizabeth Macarthur Creek				
How to get to the site	Turn north off Balmoral Road from Old Windsor Road.				
1:250,000 map name	Riverstone			**NPWS map code**	
AMG Zone	56	**AMG Easting**	309258	**AMG Northing**	6266445
Method for grid reference		**Map scale (if method = map)**		**Map name**	
NPWS District				**NPWS Zone**	
Portion no.				**Parish**	
SITE DESCRIPTION					
Site type(s)	Open camp site			**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	Moderate density lithic scatter spread over 250 x 200m eroding deposit and associated PAD. Site is located on floodplain and lower hill slopes adjacent to Elizabeth Macarthur Creek. Subject to intensive grazing and some clearing, bounded to the west by severe disturbance associated with the construction of the Rouse Hill bus interchange. Potential for intact deposit is moderate, with patchy areas of high disturbance associated with farming and stabling. Artefacts include: 1 x pink silcrete core 1 x yellow silcrete core 1 x red silcrete core 2 x red silcrete core fragments 5 x red silcrete flakes 2 x orange silcrete flakes 1 x red silcrete cobble Silcrete fragments				

Version: June 1998	Data entered by:	Date entered:

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	floodplain / lower hill slope	**Aspect**		**Slope**	
Mark position of the site					
Local rock type	Bringelly shale		**Land use/effect**	Mod - very high disturbance levels	
Distance from drinking water	100m		**Source**	Elizabeth Macarthur Creek	
Resource zone (eg. estuarine, river, forest)	Cumberland Plain Woodland		**Vegetation**		
Edible plants			**Faunal resources** (include shellfish)		
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Isolated finds, OCS

SITE MANAGEMENT

Site condition	Poor		
Management recommendations			
Have artefacts been removed from site	No	**When**	
By whom		**Deposited at**	
Consent applied for	☒	**Consent issued**	☐
Date of issue		**Consent number**	

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental Assessment NWRL		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Celestine Everingham 90 Hermitage Rd, KURRAJONG HILLS, NSW, 2758 Leanne Wright PO Box 36, KELLYVILLE, NSW, 2155
Is the site important to local Aborigines			
Verbal/written reference sources		**ASR report number(s)**	C- C-
Photographs taken	Yes	**No of Photos attached**	
Site recorded by	Amy Stevens	**Date of recording**	28th July, 2006
Address/institution	Jo McDonald Cultural Heritage Management, 77 Justin St, Lilyfield, 2040		

Version: June 1998	Data entered by:	Date entered:

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☐ Additional information ☐

SITE IDENTIFICATION					
Site name	CR01I			**NPWS Site Number**	
Owner/manager	Unistat Pty Ltd				
Owner Address	Carrington Road, Castle Hill				
LOCATION					
Location	North side of Carrington Road				
How to get to the site	Turn north off Carrington Road, into Unistat Pty Ltd office building. Site located near back boundary fence, adjacent to Cattai Creek				
1:250,000 map name	Riverstone			**NPWS map code**	
AMG Zone	56	**AMG Easting**	311912	**AMG Northing**	6264308
Method for grid reference		**Map scale (if method = map)**		**Map name**	
NPWS District				**NPWS Zone**	
Portion no.				**Parish**	
SITE DESCRIPTION					
Site type(s)	Open camp site			**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	Low density lithic scatter spread over 40 x 10m of variably intact deposit. Associated PAD extends c.100m along Cattai Creek. The small area of potentially intact deposit has been extensively cleared and is subject to small areas of disturbance associated with the construction of office blocks, car parks and picnic areas. Artefacts include: 1 x red silcrete flake 1 x yellow tuff flake 1 x red silcrete fragment 1 x green tuff fragment				

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	creekbank / floodplain	**Aspect**		**Slope**	
Mark position of the site					
Local rock type	Bringelly Shale		**Land use/effect**	Moderate disturbance levels	
Distance from drinking water	40m		**Source**	Cattai Creek	
Resource zone (eg. estuarine, river, forest)	Cumberland Plain Woodland		**Vegetation**		
Edible plants			**Faunal resources** (include shellfish)		
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Isolated finds, OCS

SITE MANAGEMENT

Site condition	Disturbed		
Management recommendations			
Have artefacts been removed from site	No	**When**	
By whom		**Deposited at**	
Consent applied for	☐	**Consent issued**	☐
Date of issue		**Consent number**	

SITE INSPECTION AND RECORDING

Reason for investigation	s.87 archaeological testing programme		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Steve Randall DLALC PO Box V184, MT DRUITT VILLAGE, NSW, 2770
Is the site important to local Aborigines			
Verbal/written reference sources		**ASR report number(s)**	C- C-
Photographs taken	Yes	**No of Photos attached**	
Site recorded by	Amy Stevens	**Date of recording**	26th July 2006
Address/institution	Jo McDonald Cultural Heritage Management, 77 Justin St, Lilyfield, 2040		

Version: June 1998	Data entered by:	Date entered:

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☐ Additional information ☐

SITE IDENTIFICATION					
Site name	FR01			**NPWS Site Number**	
Owner/manager	Private landowners				
Owner Address	Franklin Road, West Pennant Hills				
LOCATION					
Location	West side of Franklin Road, off Castle Hill Road				
How to get to the site	Turn west off Franklin Road from Castle Hill Road. Near back boundary of properties 186 Castle Hill Road and 128 Franklin Road.				
1:250,000 map name	Hornsby			**NPWS map code**	
AMG Zone	56	**AMG Easting**	317654	**AMG Northing**	6265123
Method for grid reference		**Map scale (if method = map)**		**Map name**	
NPWS District				**NPWS Zone**	
Portion no.				**Parish**	
SITE DESCRIPTION					
Site type(s)	Open camp site			**Site type code (NPWS use only)**	
Description of site and contents CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock. DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types. ART: area of decorated surface, motifs, colours, wet,/dry pigment, engraving technique, no. of figures, sizes, patination. BURIALS: number & condition of bone, position, age, sex, associated artefacts. TREES: number, alive, dead. likely age, scar shape, position, size, patterns, axe marks, regrowth. QUARRIES: rock type, debris, recognisable artefacts, percentage quarried	Low density lithic scatter spread over 80 x 70m of low - moderately intact deposit. Site is located on upper hill slopes c.200m south of Pyes Creek. Potential for intact deposit is variable across the site. At the southwestern extent of the recorded lithic scatter, artefacts were found within a highly disturbed deposit associated with the construction and demolition of a residential building. Artefacts include: 1 x red silcrete flake 2 x yellow tuff flake 1 x red silcrete fragment 1 x green tuff fragment				

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	upper hill slope	**Aspect**		**Slope**	
Mark position of the site					
Local rock type	Bringelly shale		**Land use/effect**	Moderate levels	
Distance from drinking water	200m		**Source**	Pyes Creek	
Resource zone (eg. estuarine, river, forest)	Cumberland Plain Woodland		**Vegetation**		
Edible plants			**Faunal resources** (include shellfish)		
Other exploitable resources (eg. ochre)					
Are there other sites in the locality	Yes	**Are they in the Sites Register**	Yes	**Other site types include**	Isolated finds, OCS

SITE MANAGEMENT

Site condition	Poor		
Management recommendations			
Have artefacts been removed from site	No	**When**	
By whom		**Deposited at**	
Consent applied for	☒	**Consent issued**	☐
Date of issue		**Consent number**	

SITE INSPECTION AND RECORDING

Reason for investigation	Environmental Assessment NWRL		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☒ Contacted and present ☐ Contacted but not present	**Names and addresses**	Steve Randall - DLALC PO Box V184, MT DRUITT VILLAGE, NSW, 2770 Celestine Everingham - DTAC 90 Hermitage Rd, KURRAJONG HILLS, NSW, 2758 Leanne Wright - DCAC PO Box 36, KELLYVILLE, NSW, 2155
Is the site important to local Aborigines			
Verbal/written reference sources		**ASR report number(s)**	C- C-
Photographs taken	Yes	**No of Photos attached**	
Site recorded by	Amy Stevens - JMcDCHM, 77 Justin St, Lilyfield, 2040	**Date of**	1 July, 2006

Version: June 1998	Data entered by:	Date entered:

Appendix 3 – Aboriginal reports

This page left intentionally blank for insertion of reports,
upon receipt from Indigenous groups