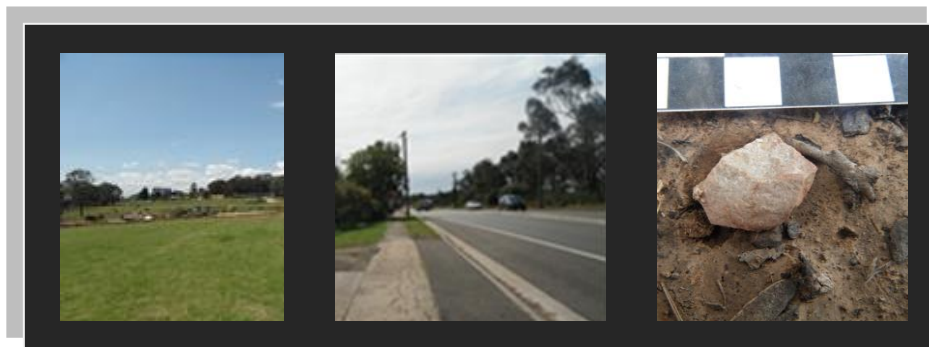


Campbelltown Road Upgrade – Camden Valley Way to Brooks Road

Cultural Heritage Assessment Report

Report to Roads and Maritime Services (RMS)

March 2013



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Executive summary

Roads and Maritime Services (RMS) propose to upgrade about 5.4 kilometres (km) of Campbelltown Road between Camden Valley Way, Casula and Brooks Road, Denham Court (the proposal). This would include widening Campbelltown Road with a central median strip along the length to accommodate for a possible future upgrade to a six-lane configuration (three lanes in each direction). Artefact Heritage has been engaged to conduct a cultural heritage assessment for the proposal in accordance with Stage 3 of the RMS *Procedure for Aboriginal Cultural Heritage Consultation and Investigation 2011* (PACHCI). Artefact had previously conducted Stage 2 of the PACHCI including a survey of the study area and the preparation of an Aboriginal Archaeological Survey Report (ASR) (Artefact 2012a).

This Cultural Heritage Assessment Report (CHAR) fulfills the RMS's Stage 3 PACHCI reporting requirements and outlines the Aboriginal heritage consultation undertaken. The CHAR is based on the ASR and adheres to the requirements of the Office of Environment and Heritage (OEH) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales 2010*.

The investigation found 14 Aboriginal sites and one site complex are located within the study area. Six of these sites were previously recorded, with eight new sites and one site complex being located during the site survey conducted for the Stage 2 PACHCI element of this assessment. Two of these sites and the site complex are within the proposal area and would be directly impacted by the proposal (CR01, CR02, and CRSC1).

Five Aboriginal sites located within the study area were assessed as having a low archaeological significance, seven sites were assessed as having moderate archaeological significance and two sites were assessed as having a high archaeological significance. The site complex CRSC1 was assessed as demonstrating moderate archaeological significance.

As part of this study the cultural significance of the study area has been assessed by the Aboriginal stakeholder groups. Aboriginal stakeholders determined that the cultural significance of the study area was high, especially the identified site complex and its association with the Aboriginal cultural heritage values of the locality.

This report recommends that an area based AHIP would be required for the proposal area including impacts to sites CR01, CR02, and site complex CRSC1. As a condition of the AHIP an archaeological salvage excavation program would be conducted. This program would investigate a representative sample of CRSC1, including sites CR01 and CR02. A preliminary methodology for



salvage excavations has been prepared in consultation with the Aboriginal stakeholder groups and is discussed in Section 10.0 of this report.



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1.0 Introduction and background

1.1 Description of the proposal

Roads and Maritime Services (RMS) propose to upgrade about 5.4 kilometres (km) of Campbelltown Road between Camden Valley Way, Casula and Brooks Road, Denham Court (the proposal). This would include widening Campbelltown Road with a central median strip along the length to accommodate for a possible future upgrade to a six-lane configuration (three lanes in each direction) (Figures 1 and 2).

Campbelltown Road is a 13.5 km corridor running between Camden Valley Way to the north-east and Moore-Oxley Street in the south-west (near Leumeah). The road functions as an arterial road, linking major urban and rural areas and is an integral component of the transport network in the south-west region of Sydney. The corridor is the main road through the suburbs of Edmondson Park, Denham Court, Bow Bowing, St Andrews, Raby and Woodbine.

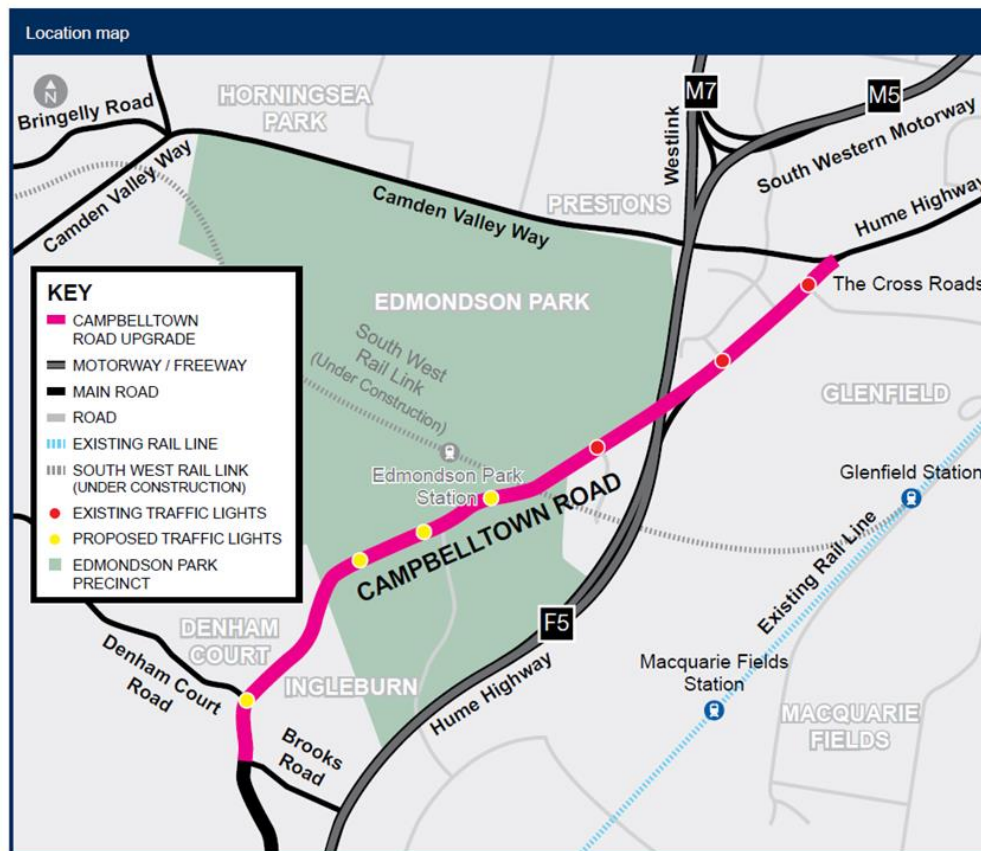


Figure 1: The study area indicated by the pink line.



The section between Camden Valley Way and Beech Road is in an urban setting and includes a service station and roadside cafe, retail shopping infrastructure, a number of food outlets close to the existing road as well as vacant lots and paddocks/grazing fields. The remaining section between Beech Road and Brooks Road is currently in a semi-rural setting. Non-residential developments in the vicinity include a public school (situated off Campbelltown Road on Macdonald Road), a service station, an early learning centre on Blomfield Road, and an irrigation and garden supply shop. The section between Ingleburn Gardens Road and Denham Court Road would in the future be in an urban setting due to the planned SWGC development adjoining and near Campbelltown Road over the next five years.

The proposal would be undertaken within the Campbelltown and Liverpool local government areas (LGAs), with Campbelltown Road forming the boundary between the two LGAs. Campbelltown Road would form one of the principal arterial transport corridors within the South West Growth Centre.

1.2 Scope of Review of Environmental Factors

RMS is currently preparing a Review of Environmental Factors (REF) for the proposed Campbelltown Road upgrade. As a part of the REF, Artefact conducted Stage 2 of the *Procedure for Aboriginal Cultural Heritage Consultation and Investigation 2011* (PACHCI) which informed the development of the concept design.

Artefact has been engaged to complete Stage 3 of the PACHCI, which includes comprehensive Aboriginal consultation and an assessment of cultural significance. It also involves preparing a methodology for recommended salvage excavations (Section 10.0). This Cultural Heritage Assessment Report (CHAR) fulfills the RMS's Stage 3 PACHCI reporting requirements and outlines the Aboriginal heritage consultation undertaken. The CHAR is based on the Aboriginal Archaeological Survey Report (ASR) and adheres to the requirements of the Office of Environment and Heritage (OEH) *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales 2010*.

The study area is defined as the road reserve of Campbelltown Road, as well as a buffer of up to 100 metres (m) on either side of the road as shown (Appendix D). The study area includes the proposal impact area for the road upgrade, access roads and compound sites.

Campbelltown Road Upgrade – Camden Valley Way to Brooks Road

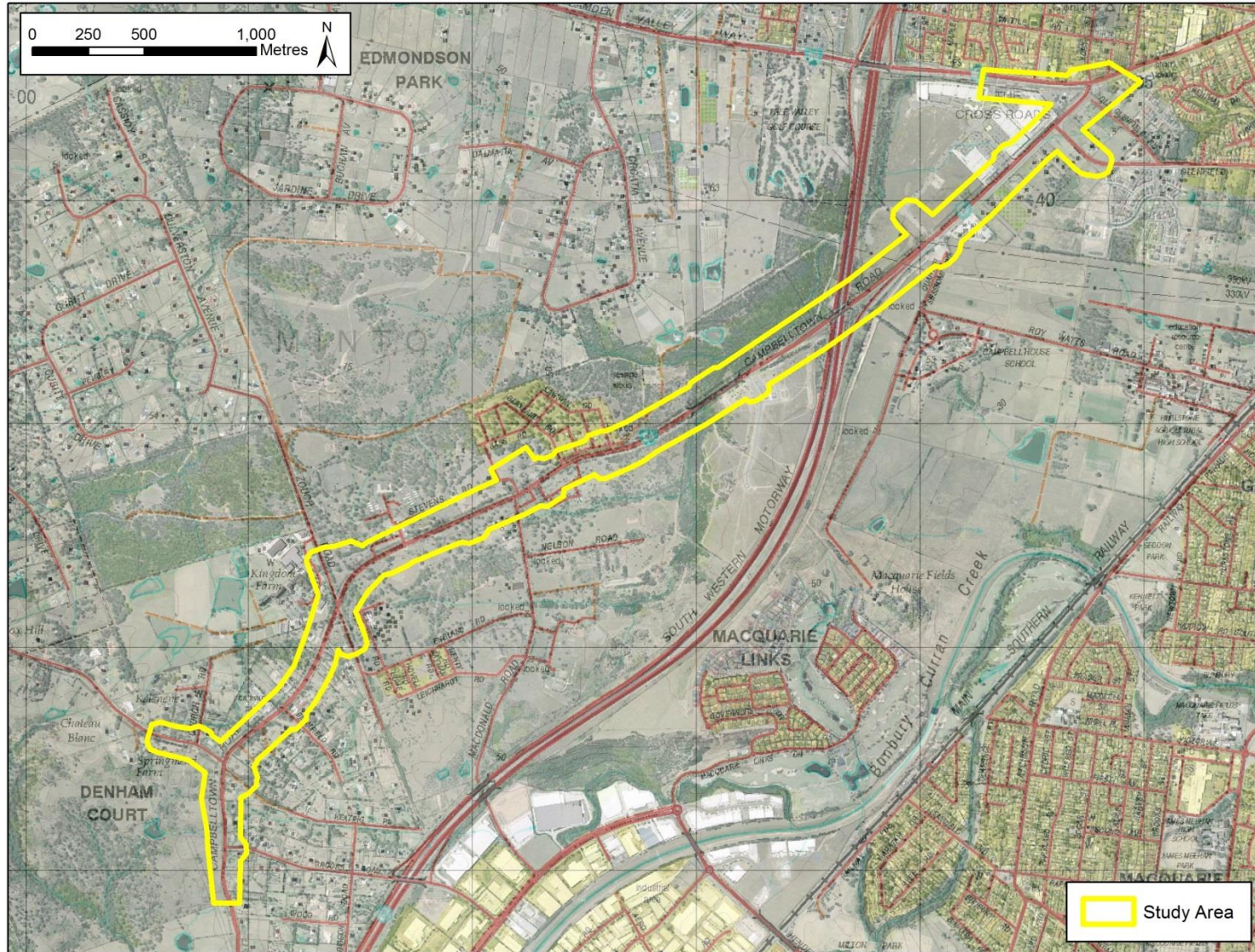


Figure 2: The study area indicated by yellow line.



2.0 Objectives of the study

The objectives of this study were to comply with the RMS PACHCI, and OEH regulations, including the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010* ('the Code of Practice'), the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales 2010* and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*. This report includes:

- A description of the scope of the proposal and the extent of the study area.
- A description of Aboriginal community involvement and Aboriginal consultation.
- A significance assessment of the study area including cultural and archaeological values.
- A description of statutory requirements for the protection of Aboriginal heritage.
- An impact assessment for the recorded Aboriginal sites and areas of archaeological potential.
- Provision of recommendations for management and mitigation measures for Aboriginal sites and areas of archaeological potential.



3.0 Aboriginal community involvement

3.1 Survey participation

In accordance with Stage 2 of the RMS PACHCI the Aboriginal community was involved in the survey and assessment conducted by Artefact (2012a). The study area is within the boundary of the Tharawal Local Aboriginal Land Council (TLALC). Alfred Fazldeen and Neale Sampson represented Tharawal LALC throughout the survey.

3.2 Stakeholder identification and consultation

The results of the Stage 2 PACHCI assessment identified potential impacts to identified Aboriginal cultural heritage values, therefore RMS initiated an Aboriginal stakeholder identification and consultation program in accordance with the PACHCI Stage 3.

The formal Stage 3 consultation process so far has included:

- An advertisement published in local and Indigenous media seeking expressions of interest from Indigenous stakeholders (Appendix A).
- Letters to agencies seeking information of knowledge holders (refer consultation log Appendix C). The following agencies were: Sydney Catchment Authority; National Native Title Tribunal; The Registrar Aboriginal Land Rights Act 1983; Campbelltown City Council; Liverpool City Council; Native Title Services Corporation (NRSCORP); OEH; Tharawal Local Aboriginal Land Council (TLALC).
- A draft copy of the CHAR has been provided to the registered Aboriginal stakeholder groups for their comments. The closing date for comments and input into the CHAR was 11 March 2013.
- An Aboriginal Focus Group (AFG) was convened by RMS on 22 February 2013. The aim of the AFG was to discuss the project and the cultural significance of the study area.

In accordance with the OEH *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* and the RMS PACHCI, the RMS advertised for Aboriginal stakeholders to be involved in the Stage 3 assessment (Appendix A). An advertisement was placed in the Koori Mail on 16 January 2013, with a closing date for registration of interest on 6 February 2013. A registered Aboriginal stakeholder list was then prepared by RMS and the final list of stakeholders included in Table 1 below.

**Table 1: Registered Aboriginal stakeholders.**

Registered stakeholder group	Representative
Darug Land Observation (DLO)	Gordown Workman
Cubbitch Barta Native Title Claimants Aboriginal Corporation (CBNTCAC)	Glenda Chalker
Tharawal Local Aboriginal Land Council (TLALC)	Elwyn Brown
Tocomwall	Scott Franks
Darug Aboriginal Cultural Heritage Assessments (DACHA)	Gordon Morton and Celestine Everingham
Darug Tribal Aboriginal Corporation (DTAC)	Sandra Lee
Darug Custodian Aboriginal Corporation (DCAC)	Leanne Watson
Gunjee-Wong Cultural Heritage Aboriginal Corporation (GWCHAC)	Cherie Carroll Turrisse
Ngunawal Heritage Aboriginal Corporation (NHAC)	Dean Delponte
Liverpool City Council Aboriginal Consultative Committee (LCCACC)	Norma Burrows
Darug Aboriginal Land Care Inc (DALC)	Des Dyer
Peter Falk Consultancy (PFC)	Peter Falk
Gandangara Local Aboriginal Land Council (GLALC)	Luke Masters

A draft copy of the CHAR was forwarded to Aboriginal stakeholders for review and with an invitation for further input into the document. Three registered stakeholders provided comments for inclusion in the final version of the CHAR (see Appendix B).

CBNTCAC's comments included concern that no representative of their organisation was involved in the Stage 2 field survey, and that the proposal area including portions of land they believed were being handed to OEHL by Landcom for conservation purposes. CBNTCAC indicated that they would not comment on individual sites as they form part of a much bigger complex of sites, most of which they note as having been destroyed by neighbouring housing development. CBNTCAC would like a representative to be on site at all times during the course of further archaeological investigations, rather than on a roster system with other stakeholders. CBNTCAC request that any retrieved artefacts are returned to the vicinity of the study area for reburial within land managed by OEHL.



NHAC's comments included a series of mitigation and management strategies for identified Aboriginal cultural heritage values within the study area. These included an Aboriginal heritage component to the site induction during the upgrade works, protection of Aboriginal sites that are located in the vicinity of works that will not be impacted, surface collection of artefacts and salvage excavation under an AHIP, and ongoing consultation with Aboriginal stakeholders. NHAC support the reburial of retrieved artefacts preferably in natural materials such as a hessian bag, bark or leaves. NHAC support the recommendations of the CHAR and note that all cultural heritage sites are considered significant to Aboriginal people.

DACHA reviewed the draft CHAR document and provided written comments supporting the investigation methodology, aims, and objectives.

An AFG was convened by RMS on 22 February 2013. Representatives of Aboriginal stakeholders DLO, DACHA, DTAC and NHAC attended the AFG. The objective of the AFG was to provide an overview of the project, details of Aboriginal heritage investigation that have been conducted, proposed methodology for further investigation, and an invitation for comment and input from Aboriginal stakeholders. The outcome of the AFG was support for the proposed methodology salvage excavation under an AHIP, and support for reburial of any retrieved artefacts.



4.0 Aboriginal cultural values assessment

4.1 Aboriginal cultural values

No specific areas of cultural importance were identified by representatives of the TLALC during the field survey, but it was made clear that the country and landscape as a whole was culturally significant to Aboriginal people.

Comprehensive consultation with Aboriginal stakeholders through Stage 3 of the RMS PACHI supported the statements of TLALC during Stage 2 that the all Aboriginal sites and the landscape as a whole are culturally significant to Aboriginal people.

As all identified Aboriginal sites are culturally significant, Aboriginal stakeholders indicated that the management of identified Aboriginal cultural heritage values was important, including details of ongoing management during construction works and protection of those areas that are in the vicinity of proposed works but will not be impacted.

CBNTCAC noted that the complex of sites not just within the study area but also across the Edmondson Park area as a whole was important to Aboriginal people, and that the complex of sites across the area should be viewed and managed cohesively. CBNTCAC are concerned that the complex of sites within the current study area had already been partially impacted by residential development in adjoining areas, and that the conservation of identified Aboriginal cultural heritage values is paramount.

Through written responses to the draft CHAR and at the AFG, Aboriginal stakeholders have indicated their strong support for reburial of artefacts retrieved during archaeological excavation.



5.0 Archaeological assessment

5.1 Environmental information

The study area is within the southern Cumberland Plain which is typically comprised of an undulating landscape of hills or low ridges with occasional more prominent rises. The landform units within the study area range from swampy creek flats and creek terraces, to gentle hill slopes and gullies. This study presents an opportunity to investigate a cross section of a number of landform units across a large area.

The Georges River runs to the east of the study area, and is approximately three kilometres distant at its closest point. Maxwells Creek transects the study area. A number of tributaries and drainage lines associated with Maxwells Creek and Cabramatta Creek are also present. Two of these drainage lines cut through the eastern section of the study area parallel to Campbelltown Road. These water courses provide a semi-permanent water source. Sections of the study area around Maxwells Creek are prone to low velocity flooding although it is understood that high levels of scouring and erosion have not occurred.

The study area is primarily underlain by Bringelly shale which forms part of the Wianamatta Group, consisting of shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone, rare coal, and tuff (Clark and Jones 1991).

The primary soil type across the study area is the Blacktown soil landscape. The Blacktown soil landscape is typified by shallow duplex soils over a clay base. The biomantle is underlain by heavily textured subsoil with a depth of generally less than a metre, and most commonly less than 30 centimetres (cm). The archaeological implications of this soil landscape are that intact deposits are likely to occur in the A horizon, which is generally up to 30 cm depth, although stratigraphic potential would be limited. The Luddenham soil landscape occurs within the western section of the study area. This landscape is represented by shallow dark podzolic soils or massive earthy clays on crests; moderately deep (70–150 cm) red podzolic soils on upper slopes; moderately deep (<150 cm) yellow podzolic soils and prairie soils on lower slopes and drainage lines. The area approximately 200 m east of Lawson Road where Maxwells Creek crosses Campbelltown Road is within the South Creek soil landscape. The soil profiles of the South Creek soil landscape generally comprise an A1 horizon of brown sandy loam with an A2 horizon of more compact bleached clay loam with gravels. This is underlain by a yellow to brown clay B horizon with high gravel content.

The study area would once have been primarily covered by open Cumberland Plain Woodland, which is typical of the Wianamatta Group shale geology (Benson and Howell, 1990). Tree species would have included Forest Red Gum (*E. tereticornis*), and Grey Box (*E. moluccana*). In the north east of the study area Sydney Coastal River-flat Forest, which occurs along minor watercourses such as Maxwells Creek,



would also have been present. Tree species in this area would also have included Forest Red Gum, as well as Cabbage Gum (*E. amplifolia*).

5.2 Aboriginal and European land use

Aboriginal people were highly mobile hunter-gatherers utilising different landform units and resource zones. Different resources may have been available seasonally, necessitating movement or trade (Attenbrow 2010: 78). Aboriginal people hunted kangaroo and wallaby and snared possums for food and skins. In marine or estuarine environments Aboriginal people caught fish and collected shellfish. There are many accounts by Europeans of Aboriginal people in canoes on rivers and the ocean, fishing and cooking the fish on small fires within the vessels (e.g. Collins 1798).

Plants were an important source of nutrition, common edible species being *Macrozamia*, a cycad palm with poisonous seeds that were detoxified and ground into a paste and *Xanthorrhoea*, or grass tree. The grass tree nectar was a high-energy food, the resin a strong hafting glue and the flower spikes used for spear barbs. From observations by early European colonists, only about twenty species of plant are identified as being used for food or manufacture by Aboriginal people of the Sydney region (Attenbrow 2010:41). It would be likely that this is only a fraction of what was actually used.

There are no known suitable stone sources for artefact manufacture within the study area. Resources for tool manufacture may have been brought in from areas such as the Georges River at Moorebank, approximately 5 km to the north-east of the study area. Raw materials such as silcrete and tuff cobbles are also found in the Nepean River gravels and have been recorded at the confluence of South Creek and Badgerys Creek 15 km north-west of the study area.

Much of the study area has been impacted by agricultural use and semi-rural development. Some areas have recently been developed as residential estates, or are in the process of such changes. The Denham Court, Edmondson Park and Bardia areas have been part of a wider agricultural district since the early 19th century. Further ground disturbance resulted from the establishment of the Ingleburn Army Camp in 1939. Widespread erosion in the area can be associated with the camp and associated structures. The eastern section of the study area to the north of Campbelltown Road along Maxwells Creek has lower levels of disturbance, primarily associated with low levels munitions testing and vehicle traffic. Urban development in the area is still minimal however it is expected to increase given that study area is within the Sydney South West Growth Centre.



5.3 Previous archaeological investigations

There have been a number of major archaeological investigations that have included sections of the study area. These have generally been associated with large land releases and the development of infrastructure to service these precincts. The following discussion takes into account the most recent and relevant studies and aims to provide contextual information for the current study.

Liverpool Release Areas: Archaeological Site Survey and Planning Study (Smith 1989).

In 1989 Smith conducted a study of the Liverpool Release Area for Liverpool Council. This study included the section of the current study area to the north of Campbelltown Road. The study recorded 21 new Aboriginal sites. Two of these sites (MC-3 and MC-4) are within the current study area. Smith assessed site MC-3 as having a high archaeological sensitivity with a high potential to contain *in situ* archaeological deposits. Smith further recommended that sites with high archaeological sensitivity should be conserved, or that subsurface testing should be conducted to investigate the nature of any *in situ* deposits. Site MC-4 was assessed as having a low archaeological sensitivity as the site condition was poor.

Preliminary Archaeological Assessment of the Department of Defence Land at Ingleburn, NSW (Dallas 1999).

Dallas conducted a preliminary Aboriginal heritage study of the Ingleburn Army Camp in 1999. The study recorded ten new Aboriginal sites, six surface scatters (DD 1-6) and four isolated finds (IF 1-4). Open artefact scatter DD1 is located within in the southeastern portion of the Ingleburn Army Camp within the current study area and consisted of two stone artefacts. IF1 and IF2 are also located within the study area. DD1 was assessed by Dallas as having a low archaeological potential as the site condition was poor.

Edmondson Park Composite Site Master Plan: Aboriginal Heritage Management Plan, Liverpool City Council and Campbelltown City Council, Final Report (Australian Museum Business Services 2003).

The Edmondson Park Composite Site (EPCS) includes approximately 2,700 ha of land bounded by Camden Valley Way to the North, Zouch Road to the West and the Hume Highway to the South-East. It therefore encompasses the portion of the current study area between the intersections of Zouch Road and the Hume Highway. Areas of high archaeological potential were surveyed in order to identify areas of archaeological and cultural sensitivity and formulate conservation management guidelines. A total of 15 sites, as well as several areas of cultural significance to the local Aboriginal community were identified during the survey. The majority of these sites were low density artefact scatters, as well as several isolated finds. Two previously recorded sites were also relocated during the AMBS survey.



Three of the sites mentioned in the EPCS are within the current study area (DD1, MC-3 and MC-4). Preservation was recommended for these sites. The sites fall within an area assessed as having a high archaeological sensitivity surrounding Campbelltown Road which extends for approximately 1 km west of the Hume Highway intersection. All other parts of the EPCS contained within the current study area were found to have a low archaeological sensitivity.

Locality LB, Edmondson Park: Archaeological Subsurface Testing Program (Navin Officer Heritage Consultants 2007).

This study involved archaeological subsurface testing within Locality LB, an area of Edmondson Park that does not overlap with the current study area. Sixty-eight test pits were excavated, from which 33 lithics were recovered. Around two thirds of the artefacts were silcrete, with the remainder rhyolitic tuff. It was concluded that the lithic items are indicative of stone flaking, spear barb manufacture and possibly spear repair.

The excavations indicated a higher density of artefacts on the lower slopes above major creek lines, which is consistent with existing knowledge of the Cumberland Plain. The archaeological deposits were assessed as having a low archaeological significance. A section 90 Aboriginal heritage impact permit (AHIP) was recommended for the identified sites, associated archaeological deposits, and any other previously unidentified relics within Locality LB.

Edmondson Park – Three School Sites: Preliminary Aboriginal and Historical Archaeological Assessment (Biosis 2008).

This study assessed three proposed school development sites. One of these, the Campbelltown Road Proposed High School Site, is partly within the current study area, between the intersections of Kelly Road and Blaxland Road. The study involved a desktop assessment and a site survey. The Campbelltown Road school site was described as disturbed by infrastructure and vegetation clearance associated with the former Ingleburn Army Camp.

During the Biosis survey one new Aboriginal site was identified in the immediate vicinity of the Campbelltown Road Proposed High School Site. The new site was located within a flat on a dirt track, and consisted of an open artefact scatter. This site (ED1) is outside the current study area. The Campbelltown Road Proposed High School Site was assessed as having a low Aboriginal archaeological sensitivity and a low probability of intact Aboriginal archaeological sites being present. No significant Aboriginal heritage constraints to future development were found.

South West Rail Link – Glenfield to Leppington Rail Line: Aboriginal Heritage Assessment (Australian Museum Business Services 2010a).



This study assessed the impact on Aboriginal heritage of the proposed South West Rail Link (SWRL) between Glenfield and Leppington, which overlaps with the current study area around the intersection of Lawson Road and Campbelltown Road. The project was designated as a major project under part 3A of the *Environmental Planning and Assessment Act 1979*. A desktop survey identified 202 Aboriginal sites within 3 km of the SWRL study area, the majority of which were isolated finds or stone artefact scatters. Site SWRL5 is both within the SWRL impact corridor and within the current study area. Site DD1, which is within the current study area is just outside the SWRL corridor.

The area of the SWRL to the north of Campbelltown Road was designated as having a high archaeological potential. It was therefore recommended that site SWRL5 and the area around it should be subject to archaeological test excavations. It was further recommended that site DD1 should be clearly demarcated during works in order to protect it from inadvertent or indirect impacts.

Following the Aboriginal Heritage Assessment AMBS conducted preliminary test excavations (see below) and a combined test/salvage excavation program.

South West Rail Link – Preliminary Aboriginal Heritage Test Excavations (Australian Museum Business Services 2010b).

AMBS conducted preliminary archaeological test excavations along the SWRL route to mitigate against possible impacts to subsurface archaeological deposits associated with geotechnical testing within the rail corridor. Twenty-five of these test pits were excavated within the Edmondson Park precinct, with three test pits within the current study area (TP29v, TP03 and BH35v). The excavations resulted in one artefact being recovered from TP29v, six artefacts from TP03 with no artefacts recovered from test pit BH35v.

A section of the current study area was assessed by AMBS as being of high archaeological sensitivity. It was recommended that further salvage excavations would be conducted within areas of moderate to high archaeological sensitivity prior to works commencing (AMBS 2010b: 46). The results of these excavations are unavailable at this stage (pers comm Jenna Weston AMBS). As ground works on the SWRL have begun the SWRL corridor, including the section within the current study area is now disturbed and has a low archaeological potential.

Edmondson Park South Part 3A Stage 1 Project Application Environmental Assessment: Aboriginal Cultural Heritage Assessment Report (Kelleher Nightingale Consulting 2010).

The Kelleher Nightingale Consulting (KNC) study assessed the proposed development of Edmondson Park South, a 40 ha area which overlaps the current study area between the Zouch Road and the Hume Highway intersection. This study was undertaken as part of the application process to have the site designated as a Part 3A major project. Five Aboriginal heritage sites were identified within the Edmondson Park South area, three of which were determined to be of low archaeological significance.



None of the sites recorded by this study were within the current study area. Two significant sites would be impacted by the Edmondson Park development, both of which were artefact scatters associated with Maxwells Creek. However, the study found that salvage excavation of these sites would result in an overall positive outcome because of its potential contribution to the archaeological understanding of the area. The majority of the current study area was assessed as having severe levels of ground disturbance and would be unlikely to contain Aboriginal archaeological deposits. The section of the current study area around Maxwells Creek was assessed as having low levels of ground disturbance.

Proposed Edmondson Park Servicing Scheme: Aboriginal Heritage Impact Assessment (Australian Museum Business Services 2011).

The AMBS study assessed the area bounded by Camden Valley Way to the north, Zouch Road to the west and the Hume Highway to the south-east, through which the current study area runs. The survey was undertaken as part of the proposed Edmondson Park Water Servicing Scheme. Five Aboriginal sites were located, including four artefact scatters and one isolated find. The survey also verified the locations of five previously recorded Aboriginal sites. The majority of the identified artefacts were flakes or flaked pieces made from silcrete or mudstone.

Thirty four areas within the proposed impact area were identified as having varying levels of archaeological sensitivity, as determined by both the survey results and by predictions based on the level of disturbance and the landform types present. The area immediately around Campbelltown Road with which the current study is concerned was not found to be archaeologically sensitive. None of the Aboriginal sites identified by AMBS are within the current study area.

Realignment of the proposed pipelines to avoid areas of moderate and high archaeological sensitivity was recommended where possible. A section 90 AHIP was recommended for sites that were of low archaeological sensitivity or could not be avoided, with or without further archaeological excavation dependent on the sensitivity of the area.

Stage One of the Edmondson Park Servicing Scheme: Aboriginal Heritage Due Diligence Assessment (Kelleher Nightingale Consulting 2011).

This study aimed to integrate the results of previous Aboriginal heritage assessments undertaken by Sydney Water. An AHIMS database search identified 46 registered sites within or adjacent to the study area. Of these sites, 87% were artefacts, with the remainder consisting of potential archaeological deposits and scarred or carved trees. Of the 46 identified sites, none were found to be within the proposed pipeline alignments. However, the AHIMS search did identify five sites within landforms which adjoin the pipeline. Management measures were therefore required to protect adjacent sites during construction. None of the sites investigated within this KNC report are within the current study area.



5.4 Aboriginal Heritage Information Management System (AHIMS)

A search of the Aboriginal Heritage Information System (AHIMS) database was undertaken on the 23 January 2012 for sites within 6 km x 4 km area with the study area at the centre (Lat, Long From : 150.83591, -33.9897 - Lat, Long To : -33.95404, 150.89543 with a Buffer of 50 m). A total of 53 Aboriginal sites were identified by the search with four registered within the study area. Four of these sites are within the current study area, although none are within the proposal area (Table 2 and Figure 3). An additional search was undertaken on 22 January 2013. The only new sites identified in the additional AHIMS search were those recorded by this study.

The location of Aboriginal sites is considered culturally sensitive information. Information, including the AHIMS data appearing on the heritage maps for the proposal would be removed from this report if it was to enter the public domain.

Table 2: Sites listed on the AHIMS database within the study area.

Site ID	Name	AGD/GDA	Easting	Northing	Site type	Recorder	Within proposal impact footprint?
45-5-0780	MC-3	AGD			Open Camp Site	Smith	N
45-5-0781	MC-4	AGD			Open Camp Site	Smith	N
45-5-2455	DD1	AGD			Open Camp Site	Dallas	N
45-5-3535	SWRL Site 5	GDA			Open Camp Site	AMBS	N (previously impacted)



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Figure 3: OEH AHIMS sites register search results



5.5 Predictive model

Beth White and Jo McDonald have recently contributed to the debate over site prediction on the Cumberland Plain in their discussion on the nature of Aboriginal site distribution as interpreted through lithic analysis of excavated sites in the Rouse Hill Development Area (RHDA) (White and McDonald 2010). This analysis brings together data from 631 dispersed 1 m by 1 m test squares from 19 sample areas, which yielded 4,429 stone artefacts in total. The findings of this study generally support earlier models that predicted correlations between proximity to permanent water sources and site location, but also highlighted the relationship between topographical unit and Aboriginal occupation.

The major findings of the study were that artefact densities were most likely to be greatest on terraces and lower slopes within 100 m of water. The stream order model was used to differentiate between artefact densities associated with intermittent streams as opposed to permanent water. It was found that artefacts were most likely within 50 m to 100 m of higher (4th) order streams, within 50 m of second order streams, and that artefact distribution around first order streams was not significantly affected by distance from the watercourse (White and McDonald 2010: 33). Overall landscapes associated with higher order streams (2nd order or greater) were found to have higher artefact densities, higher maximum densities, and more continuous distribution than lower order intermittent streams. The analysis also concluded that while there were statistically viable correlations that demonstrated a relationship between stream order, land form unit and artefact distribution across the RHDA, the entire area should be recognised as a cultural landscape with varied levels of artefact distribution (White and McDonald 2010: 37). This predictive model may be transferred to other areas of the Cumberland Plain, especially those on shale soil geology, as landscape, soils and artefacts patterning are similar throughout the region.

AMBS have previously investigated a predictive model for the Edmondson Park area (AMBS 2003:13-14). The main documented archaeological site distribution patterns for surface sites in and around the EPCS as detailed in the AMBS report are summarised below:

- The majority of recorded sites are surface open artefact scatters and isolated finds.
- Archaeological sites are found on all major landforms except where historic and recent land use have modified original landscapes thus destroying archaeological sites.
- Most surface sites have been located in close proximity to permanent water sources (creeklines and soaks) on alluvial flats and low slopes, largely concentrated within the first 100 m of the creeklines, on well-drained, elevated landforms. Subsurface testing across the Cumberland Plain has established that archaeological material is present beyond this zone and is known to extend to at least 200 m away from permanent water in decreasing artefact densities.
- There is a predominance of sites at major creekline confluences as these are prime site locations.



- Site location is usually linked to resource-rich zones where Aboriginal people had ready access to stone for tool-making, reliable water and a range of animal and plant resources.
- Markedly fewer sites occur on ridge tops and crests.
- While surface artefact scatters may indicate the presence of subsurface archaeological deposits, surface artefact distribution and density may not accurately reflect those of subsurface archaeological deposits.
- Aboriginal scarred trees may be present in areas where remnant old growth vegetation exists, however these are quite rare on the Cumberland Plain.

In addition, predictive trends were made for areas of subsurface PAD. These include:

- The majority of identified PAD sites yield subsurface archaeological material.
- PADs are most likely to occur along valley floors and low slopes in well-drained and aggrading landforms.
- *In situ* archaeological material may exist in ploughed landscapes below the plough zone.
- The survival of subsurface archaeological material is likely to depend on a combination of natural erosion and sedimentation processes and historical and more recent land use patterns.
- Sites were also found at higher elevations at the headwaters of Cabramatta Creek.
- The majority of sites with high to moderate artefact density were recovered within 100 m of the creekline.
- Of the sites located more than 100 m away, the majority of these were associated with high order streams (5th order creeks).

The predictive model used in the Stage 2 PACHCI assessment comprised a series of statements about the nature and distribution of evidence of Aboriginal land use that would be expected in the study area.

These statements were based on the information gathered regarding:

- Landscape context and landform units.
- Ethno-historical evidence of Aboriginal land use.
- Distribution of natural resources.
- Results of previous archaeological work in the vicinity of the study area.
- Predictive modeling proposed in previous investigations.
- Land disturbance levels.

Predictive statements for the study area are as follows:

- Stone artefacts/artefact scatters would be the most likely Aboriginal site type. Previous studies in the region, as discussed above, have found that stone artefacts are the most common site type.



- Scarred trees are known to exist within the region and where there is remnant old growth vegetation remaining there is a possibility of scarred trees being retained.
- Artefact densities would be generally low with interspersed areas of higher density. Previous studies in the region, and close to the study area (Navin Officer 2007 and AMBS 2010b) have found that artefacts generally occur in a low density across the landscape with some isolated areas of higher density.
- Silcrete, silicified tuff and quartz would be the dominant raw materials. Previous studies have indicated that these raw materials are most common on the Cumberland Plain, including the locality of the study area.
- *In situ* artefacts would be located in areas of least ground disturbance. This may would include the area around Maxwells Creek to the north of Campbelltown Road within the current study area.
- Artefacts may be located on terraces and slopes within 100 m of water, or on areas with a good outlook over the main valley up to several hundred metres away from water. This prediction is based on the models developed by AMBS 2003 and White and McDonald 2010, as discussed above.

5.6 Previously recorded sites within the study area

The results of the AHIMS search indicated that four previously recorded Aboriginal sites are located within the study area. These sites along with the two unregistered isolated finds that were identified during research into previous studies are described below (Figure 4).

5.6.1 45-5-0780 (MC-3)

Site MC-3 is an open artefact scatter consisting of 14 artefacts. The site was originally identified by Smith (1989) as located along a vehicle track on a low rise adjacent to Maxwells Creek. Smith suggested that the site may extend beyond the exposures on the vehicle track and include buried deposits on either side of the track.

5.6.2 45-5-0781 (MC-4)

Site MC-4 was also identified by Smith (1989). The site is an open artefact scatter consisting of six artefacts and is located within a heavily disturbed area impacted by a drainage channel between Maxwells Creek and the Hume Highway. The site was assessed as being of low significance and minimal archaeological potential.

5.6.3 45-5-2455 (DD1)

Site DD1 is a low density open artefact scatter. The site was originally recorded by Dallas (1999) with two artefacts being identified, however AMBS identified a further five artefacts in 2010. The site is located on a slope near Maxwells Creek. The area is moderately disturbed, due in part to its use as a grenade



range. KNC (2010) have identified the Maxwells Creek confluence, slopes and flats associated with the site as having potential for subsurface deposits, as well as a high cultural value.

5.6.4 45-5-3535 (SWRL Site 5)

SWRL Site 5 was recorded by AMBS (2010a) during their Aboriginal heritage assessment of the proposed SWRL. The site consists of an artefact scatter and is located on a slope approximately 90 m from site DD1. The site was assessed as possessing moderate archaeological potential. The site has since been subject to test/salvage excavations and has subsequently been impacted by the construction of the SWRL.

5.6.5 (IF1)

Site IF1 is an isolated find identified by Dallas (1999) that was located on an eroded surface on a vehicle track. This site is not registered on the AHIMS database. As the site could not be relocated during the current study it could not be registered.

5.6.6 (IF2)

Site IF2 is a silcrete core identified by Dallas (1999) in a hill slope approximately 70 m south of Campbelltown Road. This site is not registered on the AHIMS database. As the site could not be relocated during the current study it could not be registered.

5.7 Sites recorded during the current study

The survey was conducted over two days (2 April to 3 April 2012). The study area was covered on foot, apart from areas that were clearly highly disturbed, or were heavily vegetated.

Eight new Aboriginal sites were located during the site survey, seven open artefact scatters and one isolated find. One site complex was also identified during the site survey. Further detail regarding survey methodology and site descriptions is outlined in the Stage 2 PACHCI report for the proposal (Artefact Heritage 2012a).

5.7.1 CR01

Site CR01 is located within a 10 m x 20 m exposure on a terrace 100 m south of Maxwell's Creek (Plate 1). The site is across the road from Ingleburn Gardens Park and is set back 10 m from Campbelltown Road. CR01 consists of a scatter of eight artefacts (Plate 2).



Plate 1: CR01 location: facing south east.



Plate 2: Sample of artefacts at CR01.



5.7.2 CR02

Site CR02 is located on low rise on a large 50 m x 20 m exposure opposite Ingleburn Gardens Estate 100 m south of a tributary of Maxwells Creek (Plate 3). The site comprises two pieces of the same broken flake (Plate 4).

Plate 3: CR02 location: facing east.



Plate 4: Artefacts at CR02.



5.7.3 CR03

Site CR03 is a 50 m scatter of eight artefacts along a vehicle track on a terrace which rises slightly to the west (Plate 5). The track runs about 20 m from the banks of a tributary of Maxwells Creek. Sandy topsoil is evident at the surface indicating that subsoil which may contain archaeological deposits is likely to be present (Plate 6).



Plate 5: CR03 location: facing south west.



Plate 6: Sample of artefacts at CR03.



5.7.4 CR04

Site CR04 comprises of two artefacts located on the same track as CR03 on a terrace landform unit close to the banks of the tributary of Maxwells Creek (Plate 7). Vegetation on either side of the track is very heavy with no ground surface visibility. Although erosion has taken place along the track remnant sandy topsoil is visible indicating that intact subsoil may remain (Plate 8).

Plate 7: CR04 location: facing north-west.



Plate 8: Artefacts at CR04.



5.7.5 CR05

Site CR05 is a scatter of 14 artefacts located within a large 20 m x 50 m area of exposure 15 m from a tributary of Maxwells Creek on terrace (Plates 9 and 10). Sandy topsoil is evident indicating that subsurface deposits may remain.



Plate 9: CR05 location: facing north-west.



Plate 10: Artefacts at CR05.



5.7.6 CR06

Site CR06 is a scatter of four artefacts on a gradual hill slope within a 20 m x 30 m exposure (Plates 11 and 12). The site is situated on a low rise between two tributaries of Maxwells Creek which are intermittent streams. The site is located approximately 50 m from each of the tributaries. Modern rubbish such as glass was also found in the area.

Plate 11: CR06 location: facing south.



Plate 12: Sample of artefacts at CR06.



5.7.7 CR07

Site CR07 is located on a gradual hill slope within an exposure near a clearing associated with the Sewerage Treatment Plant (Plates 13 and 14). The site is further west on the same low rise as CR06. CR07 is about 100 m from each of the tributaries of Maxwells Creek. Glass fragments, gravels and other modern rubbish was evident at the surface of the exposure throughout the site area.



Plate 13: CR07 location: facing west.



Plate 14: Sample of artefacts at CR07.



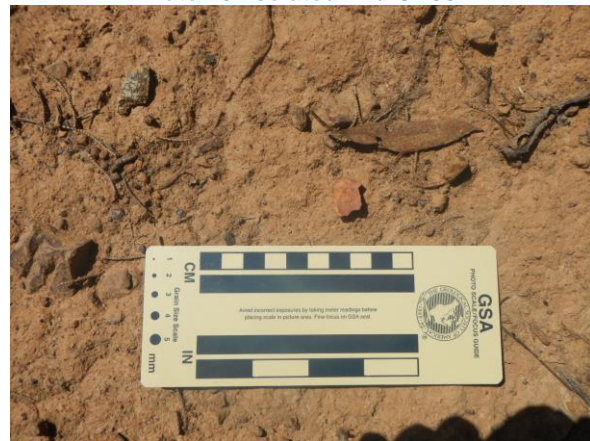
5.7.8 CR08

Site CR08 is an isolated find located to the east of Bardia Barracks on a gradual hill slope within a disturbed context (Plate 15). The silcrete flake is located on an exposed area which has been stripped by erosion and disturbance associated with the construction and demolition of barracks and other buildings (Plate 16).

Plate 15: CR08 location: facing south.



Plate 16: Isolated find CR08.



5.7.9 CRSC1 (site complex)

Twelve recorded Aboriginal sites are located across the large, relatively undisturbed area bordering Maxwells Creek and the northern side of Campbelltown Road (Figure 4). These include sites CR01 – CR07, MC-3, MC-4, DD1, SWRL5 and IF1. The area covers approximately 800 m from the eastern portion of the Landcom land to about 200 m west of the SWRL corridor where the high disturbance associated with the former Ingleburn Army Camp begins. The twelve surface artefact site locations identified within this area are likely to be surface representations of a much larger area of archaeological potential. As such, the area was considered to represent a large site complex, and named Campbelltown



Road Site Complex 1 (CRSC1). The SWRL corridor has now cut through CRSC1, dividing it into two portions.

The identification of the area as a site complex is also supported by previous archaeological assessments of the area, which include AMBS (2010) designating the portion of CRSC1 within the SWRL corridor as demonstrating high archaeological sensitivity, whilst mapping in KNC's (2010) assessment indicated the area demonstrated low disturbance levels.

The boundaries of CRSC1 were identified for the purposes of this proposal and may not reflect its true extent. Only the section of CRSC1 within the study area was examined, but it is likely to extend beyond the northern boundary of the study area and across much of the wooded area.



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Figure 4: Aboriginal sites within the study area.



Table 3: Summary of Aboriginal sites within the study area.

AHIMS number	Site Names	Easting	Northing	AGD/GDA	Site Type	Within the study area?	Within the proposal area?	Disturbance levels	Landform
45-5-0780	MC-3			AGD	Open Artefact Scatter	Yes	No	Low	Slight rise above swamp
45-5-0781	MC-4			AGD	Open Artefact Scatter	Yes	No	High	Modified creek bank
45-5-2455	DD1			AGD	Open Artefact Scatter	Yes	No	Moderate	Hill slope
45-5-3535	SWRL Site 5			GDA	Open Artefact Scatter	Yes	No	High	Hill slope
Not registered	IF1			AGD	Isolated find	Yes	No	Moderate	Hill slope
Not registered	IF2			AGD	Isolated find	Yes	No	Moderate	Hill slope
45-5-4245	CR01			GDA	Open Artefact Scatter	Yes	Yes	Low	Terrace
45-5-4246	CR02			GDA	Open Artefact Scatter	Yes	Yes	Low	Terrace
45-5-4247	CR03			GDA	Open Artefact Scatter	Yes	No	Low	Terrace
45-5-4248	CR04			GDA	Open Artefact Scatter	Yes	No	Low	Terrace

Campbelltown Road Upgrade – Camden Valley Way to Brooks Road



AHIMS number	Site Names	Easting	Northing	AGD/GDA	Site Type	Within the study area?	Within the proposal area?	Disturbance levels	Landform
45-5-4249	CR05			GDA	Open Artefact Scatter	Yes	No	Low	Terrace
45-5-4250	CR06			GDA	Open Artefact Scatter	Yes	No	Moderate	Hill slope
45-5-4251	CR07			GDA	Open Artefact Scatter	Yes	No	Moderate	Hill slope
45-5-4252	CR08			GDA	Isolated Find	Yes	No	High	Hill slope
TBC	CRCS1			GDA	Site Complex (Artefact Scatter)	Yes	Partially	Low	Terrace/Hill slope



5.8 Effective survey coverage

Ground visibility was very low throughout most of the study area due to thick grass cover promoted by a season of high rainfall (Table 4). Sections of the study area were highly disturbed, especially along the road corridor and where localised disturbance has taken place, including construction of buildings, roads and dams. Overall the effective survey coverage was relatively low, estimated to be two per cent of the study area. Where survey coverage was low the predictive model was used to assess archaeological potential. This is in line with results from comparable surveys (e.g. Artefact 2012b) and is sufficient for the purposes of this study.

Table 4: Survey coverage

Survey area (estimate)	Landform	Visibility (%)	Exposure (%)	Effective coverage area	Effective coverage (%)
530,000 m ²	The landform of the survey area varied from gently undulating hills to creek flats. Several low hill tops and ridgelines were also within the survey area.	10%	20%	10,600	2%



6.0 Significance assessment

6.1 What are cultural heritage values?

This significance assessment has been undertaken in accordance with the OEH *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales 2010*.

Cultural heritage consists of places, or objects, that are of significance to Aboriginal people. Cultural heritage values are the attributes of these places or objects that allow the assessment of levels of cultural significance.

6.2 What is cultural significance?

Assessing the cultural significance of a place or object means defining why a place or object is culturally important. It is only when these reasons are defined that measures can be taken to appropriately manage possible impacts on this significance. Assessing cultural significance involves two main steps, identifying the range of values present across the study area and assessing why they are important.

6.3 Social/cultural heritage values and significance

Social/cultural heritage significance should be addressed by the Aboriginal people who have a connection to, or interest in, the area. As part of the consultation process the registered Aboriginal stakeholder groups would be asked to provide appropriate information on the cultural significance of the study area.

All identified Aboriginal cultural heritage values within the study area are important to the Aboriginal stakeholders. The complex of sites within the study area, especially when considered in wider context of the locality, is very significant to Aboriginal stakeholders. The significance of those undisturbed portions of the site complex within the study area is heightened by neighbouring residential subdivision and associated impact to the Aboriginal cultural heritage values of the area. The study area as a whole has high cultural significance.

6.4 Historic values and significance

Historic values refer to the association of the place with aspects of Aboriginal history. Historic values are not necessarily reflected in physical objects, but may be intangible and relate to memories, stories or experiences.



Aboriginal people are known to have been associated with the colonial estate of Denham Court, with Glenda Chalker of Cubbitch Barta Native Tile Claimants stating that corroboree occurred in the grounds during the 1850s (GML 2012:22). There are also Aboriginal historic associations with the Ingleburn Army Camp. Aboriginal people served in the military during many conflicts, from being members of the Second AIF during World War Two¹ to the conflicts of the 1960s².

The study area as a whole demonstrates low historic significance in relation to Aboriginal cultural heritage values, with higher significance associated with the Denham Court and the reference to corroborees occurring at that location.

6.5 Scientific/archaeological values and significance

Archaeological significance refers to the archaeological or scientific importance of a landscape or area. This would be characterised using archaeological criteria such as archaeological research potential, representativeness and rarity of the archaeological resource and potential for educational values. These have been outlined below:

- Research potential: does the evidence suggest any potential to contribute to an understanding of the area and/or region and/or state's natural and cultural history?
- Representativeness: how much variability (outside and/or inside the subject area) exists, what is already conserved, how much connectivity is there?
- Rarity: is the subject area important in demonstrating a distinctive way of life, custom, process, land-use, function or design no longer practised? Is it in danger of being lost or of exceptional interest?

Scientific significance was assessed using criteria to evaluate the contents of a site, state of preservation, integrity of deposits, representativeness of the site type, rarity/uniqueness and potential to answer research questions on past human behaviour (NPWS 1997).

The following significance assessment has been made for the Aboriginal sites identified in this report.

- Five Aboriginal sites identified along the proposed upgrade corridor for Campbelltown Road have been assessed as having a low archaeological significance (MC-4, SWRL-5, IF1, IF2, CR08) (Table 5). This assessment was made based on the disturbance levels of the site and the number of artefacts present at the site in relation to ground surface visibility. The representative and rarity values of these sites were low.
- Seven Aboriginal sites identified along the proposed upgrade corridor for Campbelltown Road have been assessed as having a moderate archaeological significance (DD1, CR01-04, CR06-07) (Table

¹ <http://trove.nla.gov.au/ndp/del/article/92388148?searchTerm=ingleburn>

² <http://acms.sl.nsw.gov.au/item/itemDetailPaged.aspx?itemID=95041>



5). In the case of these sites their representativeness and rarity values were moderate with some potential for research value.

- Two Aboriginal sites identified along the proposed upgrade corridor for Campbelltown Road have been assessed as having a high archaeological significance (MC-3, CR05) (Table 5). These sites are both artefact scatters within areas of low ground disturbance on hill slopes and terraces associated with Maxwells Creek.

CRSC1

Site complex CRSC1 is assessed as having a moderate archaeological significance, based on the assessment criteria outlined in section 6.5. The site complex includes twelve recorded surface artefact sites across an area that demonstrates low levels of surface disturbance bordering Maxwells Creek. The area has been identified in previous archaeological investigations as both an area of low disturbance (KNC 2010) and an area of high archaeological sensitivity (AMBS 2003, AMBS 2010b).

The research potential of CRSC1 is assessed as being high as it is likely that undisturbed subsurface deposit remains within site. The site has the potential to provide information regarding the occupation of the area and enable comparative analysis of previously excavated artefact assemblages recovered in the locality of the study area. The potential for sub-surface archaeological material within CRSC1 has been demonstrated by both the frequent identification of surface artefactual material across surface exposures within the site complex, and the results of archaeological test excavation conducted by AMBS (2010b) within the portion of the SWRL corridor immediately adjacent to CRSC1. Based on the results of test excavation within the SWRL corridor, AMBS (2010b) noted that the area demonstrated archaeological sensitivity that warranted archaeological salvage excavation. The results of the salvage excavation within the SWRL are unavailable at this stage, as analysis of the artefact assemblage is still in progress (pers comm Jenna Weston AMBS).

The representative value of CRSC1 is assessed as being moderate. The portions of CRSC1 that would not be impacted by the proposal are likely to be included in a conservation area or regional park associated with the Edmondson Park development. Although discussions are still in progress regarding the conservation of this area, it is likely that portions of CRSC1 and the area of archaeological sensitivity to its north would be preserved in some form.

The rarity of CRSC1 is assessed as being moderate. The site complex as defined in this report is part of a broader site complex which is likely to extend to the north of the study area. Any impacts resulting from the proposal would only affect a portion of CRSC1 (approximately 20%). CRSC1 is therefore moderately rare in the locality as it is an area of low disturbance in the vicinity of permanent water, which has a high density of recorded surface sites.



The educational value of CRSC1 is assessed as being moderate. As there are a relatively high number of artefacts visible at the surface, especially along areas that are easily accessed such as vehicle tracks, the area could be used for educational purposes by Aboriginal community groups. The educational value of the CRSC1 to the wider community would be low, as the area is not currently on public land, and is not easily discernible as an Aboriginal site by the general public.

Based on an assessment of significance values of the site, CRSC1 is assessed as demonstrating a moderate archaeological significance.

Table 5: Summary of archaeological significance values.

Site name	Research Potential	Representative Value	Rarity Value	Educational value	Overall Significance
MC-3	High	Moderate	Moderate	Low	High
MC-4	Low	Low	Moderate	Low	Low
DD1	High	Moderate	Moderate	Low	Moderate
SWRL Site 5 (impacted)	Low	Low	Low	Low	Low
IF1	Low	Low	Low	Low	Low
IF2	Low	Low	Low	Low	Low
CR01	High	Moderate	Moderate	Low	Moderate
CR02	Moderate	Moderate	Low	Low	Moderate
CR03	High	Moderate	Moderate	Moderate	Moderate
CR04	Moderate	Moderate	Low	Low	Moderate
CR05	High	High	Moderate	Moderate	High
CR06	Moderate	Low	Low	Low	Moderate
CR07	High	Moderate	Moderate	Moderate	Moderate
CR08	Low	Low	Low	Low	Low
CRSC1	High	Moderate	Moderate	Moderate	Moderate



6.6 Aesthetic values and significance

Aesthetic values refer to the sensory, scenic, architectural and creative aspects of the place. These values may be related to the landscape and are often closely associated with social/cultural values. Much of the undeveloped land surrounding the study area retains some aesthetic significance. The majority of the study area has been highly modified and does not retained aesthetic values. The eastern section, to the north of Campbelltown Road retains its bushland character and therefore has some aesthetic significance. Those areas are significant to Aboriginal stakeholders due to its association with conservation of the large site complex. Due to the large degree of modification, the study area as a whole demonstrates low aesthetic significance, whilst the area associated with CRSC1 demonstrates higher aesthetic significance associated with the identified site complex.

6.7 Statement of significance

The archaeological significance of a large portion of the study area was found to be low due to high levels of disturbance resulting from development and semi-rural occupation. The eastern section of the study area to the north of Campbelltown Road has low to moderate disturbance levels and contained twelve Aboriginal sites and a site complex.

Five Aboriginal sites with a low archaeological significance were located within the study area, with seven sites with moderate archaeological significance and two sites with a high archaeological significance. Site complex CRSC1 was assessed as having a moderate archaeological significance.

Aboriginal stakeholders have indicated that the cultural significance of the study area as a whole, as part of Country, is high. The site complex within the study area, as well as the reference to corroborees occurring at Denham Court, are more specific Aboriginal cultural heritage values regarded as highly significant by Aboriginal stakeholders.

Overall, the significance of the study area as a whole demonstrates low significance, with the area associated with CRSC1 demonstrating moderate significance.



7.0 Statutory requirements

This study has been undertaken in the context of several items of legislation that relate to Aboriginal heritage and its protection in New South Wales.

National Parks and Wildlife Act (1974)

The *National Parks & Wildlife Act 1974*, administered by the OEH provides statutory protection for all Aboriginal 'objects' (consisting of any material evidence of the Aboriginal occupation of NSW) under Section 90 of the Act, and for 'Aboriginal Places' (areas of cultural significance to the Aboriginal community) under Section 84.

The protection provided to Aboriginal objects applies irrespective of the level of their significance or issues of land tenure. However, areas are only gazetted as Aboriginal Places if the Minister is satisfied that sufficient evidence exists to demonstrate that the location was and/or is, of special significance to Aboriginal culture.

The Act was recently amended (2010) and as a result the legislative structure for seeking permission to impact on heritage items has changed. A Section 90 Aboriginal heritage impact permit (AHIP) is required if impacts are to occur to Aboriginal objects, or Places. Various factors are considered by OEH in the AHIP application process, such as site significance, Aboriginal consultation requirements, ESD principles, project justification and consideration of alternatives. The penalties and fines for damaging or defacing an Aboriginal object have also increased.

As part of the administration of Part 6 of the Act OEH has developed regulatory guidelines on Aboriginal consultation, which are outlined in *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010). Guidelines have also been developed for the processes of due diligence - *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (2010), and for investigation of Aboriginal objects - *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (2010) in accordance with the 2010 amendment to the Act.

Aboriginal sites are located within the study area. An AHIP would be required prior to impacts to these sites occurring.

Heritage Act (1977)

The Heritage Act 1977 is administered by the Department of Premier and Cabinet and protects the natural and cultural heritage of NSW. Generally this Act only pertains to Aboriginal Heritage if it is listed on the State Heritage Register, or subject to an interim heritage order.



There are no Aboriginal heritage sites listed on the State Heritage Register within the study area.

Aboriginal Land Rights Act (1983)

The Aboriginal Land Rights Act 1983 is administered by the NSW Department of Human Services - Aboriginal Affairs. This Act established Aboriginal Land Councils (at State and Local levels). These bodies have a statutory obligation under the Act to; (a) take action to protect the culture and heritage of Aboriginal persons in the council's area, subject to any other law, and (b) promote awareness in the community of the culture and heritage of Aboriginal persons in the council's area.

There are no Aboriginal land claims current within the study area. The study area is within the boundary of the Tharawal Local Aboriginal Land Council.

Native Title Act (1994)

The Native Title Act 1994 was introduced to work in conjunction with the Commonwealth Native Title Act. Native Title claims, registers and Indigenous Land Use Agreements are administered under the Act.

There are no native title claims current within the study area.

Aboriginal and Torres Strait Islander Heritage Protection Act (1984)

The Aboriginal and Torres Strait Islander Heritage Protection Act 1984 enables the Australian Government to respond to requests to protect traditionally important areas and objects that are under threat, if it appears that state or territory laws have not provided effective protection. The government can make declarations to protect significant Aboriginal areas, objects and classes of objects from threats of injury or desecration, if an Aboriginal or Torres Strait Islander person (or a person representing an Aboriginal or Torres Strait Islander person) has requested it and has provided satisfactory evidence that explains why there is a threat of injury or desecration and why the area, object or class of objects is of particular significance to Aboriginal or Torres Strait Islander people. The power to make declarations is intended to be used as a last resort, after the relevant processes of the state or territory have been exhausted.

It is unlikely that the provisions of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* would apply to the proposal, as the relevant State processes are expected to be adequate.

Environment Protection and Biodiversity Conservation Act (1999)

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. These are defined in the EPBC Act 1999 as matters of national environmental significance. Under the EPBC Act 1999, nationally significant heritage items are protected



through listing on the Commonwealth Heritage List or the National Heritage List. Under the EPBC Act there are penalties for anyone who takes an action that has or will have a significant impact on the Indigenous heritage values of a place that is recognised in either list.

The study area for the proposal does not include any Indigenous heritage items or places that are listed on the Commonwealth Heritage List or the National Heritage List. Therefore, no further actions would be required to fulfill the requirements of the EPBC Act.

Environmental Planning and Assessment Act (1979)

The Environmental Planning and Assessment Act 1979 (EP&A Act) establishes a framework for cultural heritage values to be formally assessed in the land use planning and development consent process. The EP&A Act requires that environmental impacts are considered prior to land development; this includes impacts on cultural heritage items and places as well as archaeological sites and deposits. The EP&A Act also requires that local governments prepare planning instruments (such as Local Environmental Plans [LEPs] and Development Control Plans [DCPs]) in accordance with the Act to provide guidance on the level of environmental assessment required. The current study area falls within the boundaries of the Campbelltown and Liverpool local government area, and is covered by the Campbelltown (Urban Area) LEP 2002 and Liverpool LEP 2008.

Under both LEPs, consent is required to disturb or excavate a place of Aboriginal heritage significance. Before granting consent for development that is likely to have an impact on a place of Aboriginal heritage significance or a potential place of Aboriginal heritage significance, or that will be carried out on an archaeological site of a relic that has Aboriginal heritage significance, the consent authority must:

- Consider a heritage impact statement explaining how the proposed development would affect the conservation of the place or site and any relic known or reasonably likely to be located at the place or site.
- Except where the proposed development is integrated development, notify the local Aboriginal communities (in such way as it thinks appropriate) of its intention to do so and take into consideration any comments received in response within 21 days after the relevant notice is sent.

The provisions of the LEPs are overridden by the State Environmental Planning Policy (Infrastructure) 2007, which was introduced in order to streamline the development of infrastructure projects undertaken by state agencies, including the RMS. Generally, where there is conflict between the provisions of the ISEPP and other environmental planning instruments, the ISEPP prevails. Under the ISEPP, development for the purpose of a road or road infrastructure facilities may be carried out by a public authority without consent on any land. The ISEPP overrides the controls included in the Camden and Liverpool LEPs and DCPs, and the RMS is only required to consult with the councils when development



may “have an impact that is not minor or inconsequential” on a local heritage item. When this is the case, a Statement of Heritage Impact would be provided to the relevant council, and the response of the council must be taken into consideration (Clause 14).



8.0 Impact assessment

8.1 Summary of impacts

Three Aboriginal sites would be directly impacted by the current proposal (CR01, CR02 and CRSC1) (Table 6). Twelve sites within the study area would not be directly or indirectly impacted by the proposal (Table 7).

As part of the proposal a section of Maxwells Creek would be realigned to the north of its current crossing of Campbelltown Road and a new bridge constructed. The proposal for realignment includes new channel works to the north of the bridge across the creek (approximately 50 m x 20 m in area), and drainage works along the road corridor. A number of drainage outlets would also be constructed adjacent to the new road. The realignment works would impact on a section of CRSC1. Changes in hydrology associated with the realignment will be of a net benefit to the CRSC1 site complex and associated sites. Overall the areas subject to inundation within the site complex would be reduced, with a small section of the site complex to the northwest of the proposed culvert subject to greater inundation due to the change. This greater inundation is unlikely to be of high velocity and therefore would not cause impacts related to scouring or erosion. Additional impacts to Aboriginal sites in this area of greater inundation are expected to be minimal. The majority of the site complex is flood prone at present so overall the proposal would not significantly affect impacts to Aboriginal heritage related to hydrology at the site.

Table 6: Impacts on Aboriginal sites

Site ID	Site names	Site type	Significance	Impacts
45-5-4245	CR01	Artefact scatter	Moderate	Site CR01 would be directly impacted by the widening of Campbelltown Road. The site will be within the new road corridor.
45-5-4246	CR02	Artefact scatter	Moderate	Site CR02 would be directly impacted by the widening of Campbelltown Road. The site will be within the new road corridor.
	CRSC1	Site complex	Moderate	Site complex CRSC1 would be partially impacted by the road upgrade.

The current proposal would not impact on any of the previously recorded Aboriginal sites within the Edmondson Park conservation area. However, the current proposal would impact on newly recorded sites CR01 and CR02 which are located within the proposed conservation area. A strip of land (600 m x 25 -50 m) to the north of Campbelltown Road, east of the SWRL corridor, which has been designated by this study as CRSC1 and is within the Edmondson Park conservation area would also be impacted by the



proposal (Figure 5). A strip of land (200 m x 10-25 m) to the west of the SWRL corridor within CRSC1 would also be impacted by the proposal (Figure 5). Impact to approximately 20% of CRSC1 would result from the proposal. Site CR08 is 5 m outside the proposal area and approximately 15 m from the construction footprint. The site would not be impacted by the proposal (Figure 6).



Removed for public version

Figure 5: Impacts within CRSC1



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Figure 6: CR08 in relation to the area of proposed impact



8.2 Consideration of alternatives and justification of impacts

Significant traffic growth has been predicted along Campbelltown Road due to increased residential and commercial development in the South West Growth Centre and nearby areas, and the proposal is required to cater for this future growth. The upgraded Campbelltown Road would form one of the principal arterial transport corridors within the South West Growth Centre.

During development of the concept design, impacts on Aboriginal sites have been considered and impacts on sites of archaeological/cultural significance have been avoided where possible.

As open sites are spread across the landscape in the locality of the study area any proposed route for this linear proposal would impact upon Aboriginal objects to some extent. As the area around the existing road has already been disturbed to varying degrees the likelihood of highly significant Aboriginal sites remaining within the study area was considered to be lower than if the road was realigned through green field landscape.

It was considered that mitigation in the form of salvage excavation would be sufficient to manage impacts on Aboriginal sites of moderate archaeological significance. Aboriginal stakeholders have identified that site complex CRSC1 represented high cultural significance, especially in association with other sites in the area. The majority of CRSC1 within the boundaries of the study area will not be impacted by the proposed works.

8.3 Ecological sustainable development (ESD) principles

ESD principles are relevant to this CHAR as the OEH *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* specifies that ESD principles must be considered when assessing harm and recommending mitigation measures in relation to Aboriginal objects.

The following relevant ESD principles are outlined in Section 3A of the *Environment Protection and Diversity Act 1999*:

- Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations (the 'integration principle').
- If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (the 'precautionary principle').
- The principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (the 'intergenerational principle').



The proposal would adhere to the following ESD principles.

The Integration Principle

The proposal would comply with the Integration Principle in regard to Aboriginal heritage. A number of measures to avoid impacts and mitigate against impacts have been recommended in the context of the economic and social justification for the road upgrade.

The Precautionary Principle

The proposal would be unlikely to have significant effects on heritage values across the study area. There is no considerable scientific uncertainty as to the impacts of the proposal on heritage values. Predictive models have been used to assess the probable nature of the archaeological record within the study area, based on other studies in the locality.

The precautionary principle would nevertheless be adhered in the implementation of the proposed mitigation measures of salvage excavation.

The Principle of Intergenerational Equity

The proposal was considered to adhere to this principle in regard to Aboriginal heritage as it will not impact on areas of high archaeological or cultural significance. The proposal was also within a landscape that has already been considerably altered by the construction of the road and suburbs in the north and south of the study area. Further archaeological investigation was recommended for areas of moderate archaeological significance in order to mitigate against impacts and provide information about the sites for future research.



9.0 Management and mitigation measures

9.1 Guiding principles

The overall guiding principle for cultural heritage management would be that where possible Aboriginal heritage should be conserved. If conservation would not be practical, measures should be taken to mitigate against impacts to Aboriginal sites.

The nature of the mitigation measures recommended has been primarily based on an assessment of archaeological significance. The recommendations have also be informed by cultural significance as discussed by the Aboriginal stakeholder groups during Stage 3 PACHCI consultation.

9.2 Mitigation measures

Mitigation measures recommended vary depending on the assessment of archaeological significance of the Aboriginal site which was based on its research potential, rarity, representativeness and educational value. In general following mitigation measures would be appropriate for each level of significance:

- Low archaeological significance – Conservation where possible. An AHIP would be required to impact the site before works can commence.
- Moderate archaeological significance – Conservation where possible. An AHIP with further archaeological investigation (archaeological excavations, or artefact collection as a condition of the AHIP) would be required to impact the site before works can commence.
- High archaeological significance – Conservation as a priority. An AHIP would be required only if other practical alternatives have been discounted. Conditions of this AHIP would depend on the nature of the site, but may include removal and preservation of scarred trees, or comprehensive salvage excavations.

The archaeological significance of the study area has been adequately assessed by taking into account the archaeological potential associated with landscape and landform units; ground disturbance levels, results of previous excavations and studies in the locality, and assessment of other significance values such as rarity and representativeness. Test excavations under the Code of Practice would therefore not necessarily be warranted in this case as test excavations are intended to facilitate assessment of archaeological significance. Salvage by excavation would therefore be seen as an appropriate mitigation measure for areas with moderate archaeological significance.



Table 7: Impacts and mitigation/management measures: sites which would be directly impacted are shaded in orange.

Site ID	Site names	Site type	Significance	Impacts	Mitigation measures
45-5-0780	MC-3	Open Artefact Scatter	High	None	None
45-5-0781	MC-4	Open Artefact Scatter	Low	None	None
45-5-2455	DD1	Open Artefact Scatter	Moderate	None	None
45-5-3535	SWRL Site 5	Open Artefact Scatter	Low	None (Already impacted by SWRL project)	None
Not registered	IF1	Isolated find	Low	None	None
Not registered	IF2	Isolated find	Low	None	None
45-5-4245	CR01	Open Artefact Scatter	Moderate	Direct	Aboriginal Heritage Impact Permit (AHIP) required prior to commencement of works affecting the site. Salvage excavation as a condition of the AHIP.
45-5-4246	CR02	Open Artefact Scatter	Moderate	Direct	Aboriginal Heritage Impact Permit (AHIP) required prior to commencement of works affecting the site. Salvage excavation as a condition of the AHIP.

Campbelltown Road Upgrade – Camden Valley Way to Brooks Road



Site ID	Site names	Site type	Significance	Impacts	Mitigation measures
45-5-4247	CR03	Open Artefact Scatter	Moderate	None	None
45-5-4248	CR04	Open Artefact Scatter	Moderate	None	None
45-5-4249	CR05	Open Artefact Scatter	High	None	None
45-5-4250	CR06	Open Artefact Scatter	Moderate	None	None
45-5-4251	CR07	Open Artefact Scatter	Moderate	None	None
45-5-4252	CR08	Isolated Find	Low	None	None
TBC	CRCS1	Site Complex (Artefact Scatter)	Moderate	Partial	Aboriginal Heritage Impact Permit (AHIP) required prior to commencement of works affecting the site. Salvage excavation of a sample of the site complex as a condition of the AHIP.



9.3 Management outcomes

The heritage management outcomes of the proposal will be dependent on the conditions of the AHIP approved for the proposal. The conditions for the AHIP as recommended in this report would result in the management outcomes discussed in Table 8. These outcomes were also related to the heritage management policy for the proposal developed in consultation with the Aboriginal stakeholder groups.

Three identified Aboriginal sites would be directly impacted by the proposal. It has been recommended in the ASR that an area based AHIP be sought which would give consent for impacts on all of these sites. As a condition of the AHIP three sites would require salvage excavation (CR01, CR02 and CRSC1).

As the AHIP would only apply to sites within the proposal impact footprint, care should be taken to avoid impacts into the rest of CRSC1.

Table 8: Recommended mitigation measures

Impacts	Recommended mitigation measures	Aboriginal sites
None	None	MC-3, MC-4, DD1, SWRL Site 5, IF1, IF2, CR03, CR04, CR05, CR06, CR07, CR08
Direct Impacts	AHIP application/salvage excavations	CR01, CR02 and CRSC1

9.4 Proposed management policy for Aboriginal heritage

The management policy for Aboriginal heritage should be developed as part of the Construction Environment Management Plan (CEMP) which would be prepared prior to ground works commencing. A heritage sites map should also form part of the CEMP.

The management policy for Aboriginal heritage would be guided by the recommendations of the ASR, the CHAR, and the recommended conditions of the AHIP. The general principles of the management policy are discussed below as developed in consultation with the Aboriginal stakeholder groups during the AFG and subsequent Stage 3 PACHCI consultation process.

9.4.1 Actions required prior to commencement of works

Any impacts to Aboriginal objects or Aboriginal Places not carried out in accordance with an AHIP would constitute a breach of the *National Parks and Wildlife Act 1974*. It has been recommended by the ASR that an 'area based' AHIP be obtained from OEHL prior to works commencing for the Campbelltown Road



upgrade. The conditions of the AHIP would require salvage excavation of three sites. The AHIP would not allow impacts on sites outside the proposal area.

For areas which the AHIP specifies would be subject to salvage excavation, ground works should not commence until salvage excavations have been completed and a letter of notification has been provided by the archaeologist to RMS. It should be noted that even minor works such as the construction of fences, access tracks and site sheds would not commence until salvage works are completed within these designated areas.

The AHIP would allow impacts to previously unrecorded Aboriginal objects that may be located during construction works. The AHIP would not allow impacts on Aboriginal skeletal remains (refer to Section 9.4.6).

9.4.2 Aboriginal heritage induction

The worker induction should be completed by all RMS employees and subcontractors who will participate in works within the vicinity of an existing Aboriginal site. This would be particularly important for workers involved in the initial stages of development, and in works that would impact sites under the AHIP.

The Aboriginal heritage induction should include:

- The location of known Aboriginal sites/objects.
- Protocols for avoiding impact to known Aboriginal objects which are not covered under the AHIP.
- Protocols for actions if unexpected Aboriginal objects are uncovered.
- Protocols for actions if skeletal remains are uncovered.
- Useful contacts.
- A brief description of the legislation protecting Aboriginal objects and the penalties for impacting on objects.
- An explanation of the importance of Aboriginal objects and country to the Aboriginal community to be developed in consultation with the registered Aboriginal stakeholders.

9.4.3 Salvage excavations

Salvage excavations would be conducted in accordance with the prepared methodology for the proposal (preliminary version –Section 10.0). The AHIP would be granted on the condition that the approved methodology is implemented and once the AHIP was granted any changes in salvage methodology would require a variation to the AHIP.

9.4.4 Discovery of human remains

If suspected human skeletal remains are uncovered at any time throughout the life of the proposal the RMS *Unexpected Archaeological Finds Procedure 2012* would be followed.



A separate AHIP including further consultation with Aboriginal stakeholder groups would be required to disturb human remains.

9.4.5 Changes to development design

This CHAR was based upon the most recent concept design made available to Artefact as of the date of preparation of this report. If changes are made to the design that would impact on Aboriginal sites, or would reduce impacts on Aboriginal sites changes in the management policy and management outcomes may eventuate.

Any changes that may impact on known Aboriginal sites that are not listed on the AHIP, or may impact areas that have not been assessed during the current study, should be assessed by an archaeologist in consultation with the registered Aboriginal stakeholder groups.

9.4.6 Ongoing consultation with Aboriginal stakeholder groups

Appropriate circumstances for further Aboriginal consultation include, but would not be limited to, the discovery of Aboriginal skeletal remains, or proposed changes to heritage impacts at a later stage of the proposal. If there is an increased impact to a known Aboriginal site, or if a new area needs to be assessed to accommodate a change in the development design, the registered Aboriginal groups would be consulted. It should be noted that if there has been a gap of greater than six months in consultation for a project, and an AHIP application was to be submitted, the consultation process would restart with the compilation of a new registered stakeholder list.



10.0 Preliminary methodology for salvage excavations

10.1 Introduction

The ASR for the upgrade of Campbelltown Road has recommended that a representative sample of area of Aboriginal site complex CRSC1 (including sites CR01 and CR02) would be salvaged as mitigation against the proposed impacts to portions of that site complex. The following preliminary methodology includes a strategy for a staged salvage excavation program.

This methodology would be included in the application for an AHIP, which would be approved before archaeological excavations commenced.

10.2 Aims

The proposed outcome of the excavations would be to salvage a representative sample from site complex CRSC1, including recorded surface artefact sites CR01 and CR02 which are within the site complex area. Salvage excavation within CRSC1 was recommended based on the site complex as a demonstrating moderate scientific significance. The assessment of moderate significance was based on observed surface disturbance levels within CRSC1, recorded artefacts at the sites within CRSC1, the landform unit, and the results of previous archaeological investigations in the area.

The primary aim of the excavation program would be to provide a greater understanding of Aboriginal occupation of the study area through the analysis of the lithic assemblage. Occupation patterning would be investigated through analysis of different tool types, which may reflect different uses for different site areas (such as hunting, camp or ritual), and of the correlation of artefact density with landform unit. The research questions outlined in Section 10.3 were designed to facilitate the achievement of the specified aims.

10.3 Research Questions

The research questions were designed to focus the field work and analysis on particular aspects of archaeological investigation, and therefore to maximise the research value gained from the nonrenewable resource of the archaeological record.

Question 1: What is the evidence for occupation and resource use in the low-lying area bordering Maxwells Creek?

Site complex CRSC1 was located across the Maxwells Creek watercourse and bordering low-lying terrain. Vegetation across the site consists of moderate to dense open woodland that represents a relatively intact area compared to the cleared and modified areas across the surrounding Edmondson



Park and Ingleburn locality. The frequency of site recordings within the wooded area associated with Maxwells Creek compared with the surrounding area demonstrates the archaeological potential associated with the Maxwells Creek corridor. Subsurface archaeological investigation of this area will provide the opportunity to assess a portion of the Maxwells Creek corridor and provide a dataset for comparative analysis with other archaeological investigations in the region. An undisturbed low-lying landform unit with high surface artefact densities, such as the area surrounding Maxwells Creek, has not been investigated during other archaeological excavation programs in the vicinity of the study area. This question would be important to answer in the general context of differing activities and resource procurement across the landscape.

Question 2: Is there evidence of differing cultural activities or behaviors within different landform units?

The salvage excavation would cover the lower slope / terrace landform within CRSC1, all of which is within 100 m of Maxwells Creek. The White and McDonald predictive model argues that the highest artefact density sites would be found within 100 m of permanent water on lower hill slopes or terraces. This prediction was based on data gleaned from a number of large excavations within the Rouse Hill Development Area (RHDA) (White and McDonald 2010). The comparison of the data gained from the RHDA with excavations in the southern Cumberland Plain, such as at Oran Park (ENS/AECOM 2009), with the Campbelltown Road study area would therefore add the broader comparative analysis of sites within the Sydney region, and provide information on possible regional differences in landscape utilisation.

Question 3: Is there evidence within the study area for pockets of high artefact density within a low density background scatter as predicted for the Oran Park precinct (ENSR/AECOM 2009)?

The ENSR/AECOM excavations of archaeological landscapes across the Oran Park precinct concluded that Aboriginal occupation of the area was characterised by a low density background scatter of artefacts across different landform units, with high density pockets of artefacts representing foci of occupational or behavioral activity. The excavation program within CRSC1 would test this conclusion and build upon the data gathered at Oran Park. The proposed excavation program would assess the intrasite variation in artefact density and would aim to correlate artefact density patterning with specific activities. For example, do areas of high artefact density show evidence that they were associated with high intensity 'events' of occupation such as knapping events, or is the high density a product of deposition over longer periods of time. This research question would be answered primarily by analysis of reduction sequences within the artefact assemblage retrieved from CRSC1.



10.4 Field Methods

10.4.1 General Approach and Methodology

Given the relatively low levels of ground surface visibility throughout the study area and the widely accepted theory that the lack of surface evidence does not necessitate the absence of subsurface deposits, a staged salvage excavation approach is recommended. This would include an initial stage (Stage I) of dispersed excavation across the site grid followed by open area excavation (Stage II). The salvage program would only be conducted within the portion of CRSC1 that would be impacted by the road upgrade or associated construction.

The aim of Stage I excavation would be to identify areas of higher artefact density or the location of significant finds such as hearths or knapping events. As the portion of CRSC1 within the concept design footprint is a long, linear, shape, the dispersed excavation would aim to sample the entire length of the site complex, including the locations of CR01 and CR02, in order to demonstrate the characteristics and scientific significance of the sub-surface archaeological deposit.

The entire length of the site complex CRSC1 would be comprehensively excavated during Stage I, with pits placed on a long, linear transect across the site. Between two and five dispersed pits within the site complex would be selected for expansion into open areas (Stage II).

All excavated squares would be recorded in detail including photographs, level readings, plans and context sheets. Stratigraphic sections detailing the stratigraphy and features within the excavated deposit would also be drawn. A detailed geomorphological analysis would be undertaken by a qualified geomorphologist where appropriate.

All squares would be excavated in 10 cm or 20 cm arbitrary spits. Although Cumberland Plain soils are deflationary and not stratified, excavating in spits provides some vertical control, especially if a conjoin analysis is performed. If a stratigraphic deposit is identified, for example in alluvial soils along the creek, excavation may be conducted stratigraphically.

All material retrieved from the excavated pits would be hand sieved through nested 3 mm and 5 mm mesh. Wet sieving would be preferred, especially in clay soils. All recovered stone artefacts would be cleaned, dried and bagged with a brief analysis conducted in the field. This analysis would include logging artefact type, raw material, and dimensions. These items would then be taken off site to be analysed in detail by relevant specialists in consultation with Aboriginal stakeholder groups. Dispersed excavation pits and open areas would be backfilled by RMS. Carbon dating or OSL dating would be undertaken if suitable samples were identified during excavations.



10.4.2 Stage I Excavation (dispersed excavation)

The basis of the Stage I excavation would be hand excavated 1 m x 1 m squares laid out 15 m apart on one linear transect. The transect would be divided in two by the SWRL, with the short portion to the south and the longer portion to the north of the SWRL. The transect would form the basis of the site grid, with pits offset from the grid where trees or isolated disturbances dictate. Each excavation square would be given a grid reference in relation to an arbitrary datum established at the beginning of the excavation program. The location of each excavation square would also be recorded using a datum and dumpy level. It is estimated that at least 40 dispersed excavation squares (1m²) would be excavated within CRSC1.

Each excavation square would be hand excavated in 10 cm or 20 cm spits. If significant cultural material is encountered the hand excavations would continue in 5 cm spits or following stratigraphic layering. Squares would be excavated until the basal layer or culturally sterile deposit is reached. The initial excavation squares at each location would be excavated well into the sterile unit to confirm the absence of artefacts. The location of each excavated square would be identified on a surveyed plan of the site.

If no artefacts, or low concentrations of artefacts (less than 10 artefacts per square metre), are recovered during dispersed excavation, it may not be necessary to continue on to Stage II excavations. This decision would be discussed with RMS and the Aboriginal stakeholder groups.

10.4.3 Stage II Excavation (open areas)

The area/s of highest artefact concentration identified during Stage I would be further investigated by the excavation of an open area around the original dispersed excavation square. The aim would be to characterise the area of artefact density and to assess its extent.

Stage I excavation squares to be expanded during open area excavation would be selected by the following criteria:

- Significant features (e.g. hearths or knapping events which contain the potential to yield statistically viable assemblages).
- Identification of tools, such as backed blades or ground edge axes.
- A higher than average density of artefact in a Stage I excavation square with undisturbed deposit. The density required to trigger an expansion would generally be more than 10 artefacts per square metre. This number would depend on the density of the wider site and would be assessed on a site by site basis.

The expansion of the open area would continue until the extent of the high density site had been identified or it is assessed under the principle of diminishing returns that no new scientific information can be gathered from continuing excavations.



10.5 Post excavation analysis

It would be expected that the primary artefact type recovered during the salvage excavations would be lithics. Lithics would be analyzed by a specialist and classified in accordance with common definitions of form, function, raw material and reduction sequence. The lithic analysis would conform to methodologies used for analysis of assemblages recovered from other areas the Cumberland Plain. This would allow a comparative analysis within different portions of CRSC1, but between significant local and regional assemblages such as Oran Park (ENSR/AECOM 2009), SWRL (2012 and upcoming) and Edmondson Park (KNC upcoming).

The lithic analysis would be based on the attribute analysis and methodology as outlined in Holdaway and Stern (2004). This approach is in line with the analysis of other comparable assemblages. A number of characteristics would be recorded for each artefact and a multivariate analysis would be performed. The analysis would also allow comparison of lithic data across different site areas within the study area so that landform unit and other variables can be correlated with artefact type patterning and density.

Minimum Number of Flake (MNF) and conjoin analysis may be undertaken if required. Information from MNF analysis would allow an assessment of activities being performed at the site, such as tool manufacture or retouch. Conjoin analysis can also provide a measurement of pre depositional and taphonomic artefact movement both laterally and vertically.

10.6 Aboriginal community involvement

As part of the ongoing Aboriginal community consultation process, representatives from the registered stakeholder groups would be involved in the salvage excavation program. The level of involvement would be at the discretion of the RMS, but it has been recommended that the number of Aboriginal representatives engaged were equal to the number of field archaeologists. Aboriginal representatives would participate in all tasks during the salvage excavations.

10.7 Aboriginal objects

The Australian Museum is the primary repository for collected Aboriginal objects in NSW. Recent changes to the Museum's deposition policy mean that only significant or unusual assemblages will be accepted for storage and all approved depositions will require payment of a fee to the Museum.

During consultation for the project the Aboriginal stakeholders have indicated their strong support for reburial of the retrieved artefact assemblage as close as possible to their original context.



10.8 Reporting

At the conclusion of salvage excavations, the archaeologist would notify RMS by letter that the conditions of the AHIP have been met and that construction works can commence at the site. This may take place before the salvage report has been completed as a number of months may be required to conduct lithics analysis and post excavation data analysis.

A salvage excavation report would be prepared which outlines the results of the excavation program. This report would include the lithics analysis and geomorphological study if required. The report would adhere to OEH standards and guidelines.

10.9 Timeframe

The timeframe for the salvage excavations has yet to be determined. A detailed construction program for the Campbelltown Road upgrade has yet to be finalised by RMS.



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