

4.6.2 Previous archaeological surveys and excavations

Past archaeological assessments involving survey, test excavation and salvage have been conducted in the region around the project, relating to past residential development, subdivision and road construction. Those past surveys and assessments that are most relevant to the study area are summarised in **Table 3**.

Table 3 Previous archaeological investigations within 16 km of the study area

Author	Year	Key findings	Location in relation to the project
L. Haglund	1989	Haglund undertook a preliminary survey for Aboriginal sites along Pennant Hills Road to Lane Cove River. Previously recorded site AHIMS #45-6-977 was re-identified and six new sites were found, including two rockshelters with middens, two rockshelters with potential occupation deposits and two engraving sites. A total of 19 areas were identified for further investigation.	Within study area.
L. Haglund	1991	Haglund undertook an assessment of Aboriginal heritage from Pennant Hills Road at Beecroft to Pittwater Road at Ryde. Four archaeological sites were identified and previously recorded site AHIMS #45-6-977 relocated. Seven rockshelters with potential archaeological deposits (PAD) and three rockshelters with habitation potential were also identified.	Within study area.
T. Corkill	1991	Corkill undertook a survey of the CSIRO site at Delhi Road, North Ryde. The survey relocated AHIMS #45-6-1854. In addition, a rockshelter with PAD was found and recorded and several sandstone exposures were identified as possible venues for rock engravings.	Approximately 12 kilometres south-east of the study area.
T. Corkill	1992	Corkill undertook a Darling Mills Creek Stormwater Management Strategy Preliminary Survey for Aboriginal archaeological sites. The fieldwork resulted in the identification of two new archaeological sites in addition to the relocation of two previously known sites in the Darling Mills Creek area. Twelve new and six previously known PAD sites were found. A total of 25 potential habitation rockshelters were also noted.	Approximately two kilometres south-west of the study area.
T. Corkill	1993	Corkill excavated five rockshelters in the Darling Mills Creek Valley area, including two rockshelters with deposit (AHIMS #45-6-2548 and #45-6-2542) and three rockshelters with PAD. The excavations confirmed two of the PADs as sites. The test excavations yielded 40 artefacts. Corkill concluded that the sites had been disturbed to various levels by flooding, roof-fall and public visitation. The sites were assessed as having low significance.	Approximately two kilometres south-west of the study area.
T. Corkill	1994	Corkill undertook a survey for archaeological sites at Toongabbie Creek. The survey found one Aboriginal site, AHIMS #45-5-0970, consisting of eight stone artefacts on the creek bank.	Approximately four kilometres south-west of the study area.
T. Corkill	1995a	Corkill assessed a series of rock piles alleged to be Aboriginal burials in the path of the Hills M2 Motorway at Devlins Creek. The investigation concluded that they were European in origin, most likely relics of WWII army training that had occurred in that area.	Within study area.

Author	Year	Key findings	Location in relation to the project
L. Haglund	1989	Haglund undertook a preliminary survey for Aboriginal sites along Pennant Hills Road to Lane Cove River. Previously recorded site AHIMS #45-6-977 was re-identified and six new sites were found, including two rockshelters with middens, two rockshelters with potential occupation deposits and two engraving sites. A total of 19 areas were identified for further investigation.	Within study area.
T. Corkill	1995b	Corkill conducted an Aboriginal heritage assessment of the western end of the Hills M2 Motorway Motorway corridor between Toongabbie Creek and Windsor Road. The survey identified two artefact scatters to the east of Old Windsor Road. The sites were in disturbed contexts with low significance, and Corkill recommended Consents to Destroy be issued for the two sites.	Within study area.
T. Corkill	1995c	Corkill conducted test excavations at a possible Aboriginal rockshelter site that had been identified as a PAD. The excavations confirmed the site as an Aboriginal rockshelter with a total of 137 Aboriginal stone artefacts recovered. Artefacts were quartz (91), silcrete (40), chert (five) and basalt (one). The site was highly disturbed. Corkill concluded that the rockshelter was of “minimal” scientific significance. Corkill recommended a Consent to Destroy be issued.	Within study area.
D. Crew	1995	Crew (1995) undertook an archaeological survey at Delhi Road, Lane Cove. The survey resulted in the identification of one potential habitation shelter at the eastern end of the survey area.	Approximately 12 kilometres south-east of the study area.
L. Haglund	1995	Haglund undertook the excavation of a rockshelter site. This resulted in the recovery of approximately 602 artefacts from two 50 x 50 cm test pits. The base of the excavation was dated to c.1,400 BP. The majority of the artefacts were quartz and silcrete.	Within study area.
M. Guider	1995a	Guider undertook an Aboriginal survey. Three rockshelters were found adjacent to the Hills M2 Motorway and all were classified as having PAD. No sites were found to be disturbed by the Hills M2 Motorway.	Within study area.
M. Guider	1995b	Guider undertook an Aboriginal survey and located ten rockshelters adjacent to Darling Mills Creek. One rockshelter site contained 11 artefacts and a white hand stencil. The remaining nine sites were classified as having PAD. The survey also identified several trees as potentially modified.	Within study area.
T. Corkill	1996a	Corkill monitored sites AHIMS #45-6-2543 and 45-6-2544 to assess the effects of periodic flooding resulting from the construction of a flood retarding basin in the Darling Mills Valley. The first two sites were low in the valley and were likely to experience periodic flooding; the third rockshelter was higher and out of the flood zone. The report recommended analysis of data after five years.	Approximately two kilometres south-west of the study area.
T. Corkill	1996b	Corkill undertook salvage at a rockshelter site at Darling Mills State Forest Carlingford. A total of 895 Aboriginal stone artefacts were salvaged from AHIMS #45-6-2472. The dominant raw material of recovered artefacts was quartz (471) followed by silcrete (344), Chert (41), quartzite (22), basalt (nine), mudstone (six), and lastly fine grained siliceous (two).	Within study area.

Author	Year	Key findings	Location in relation to the project
L. Haglund	1989	Haglund undertook a preliminary survey for Aboriginal sites along Pennant Hills Road to Lane Cove River. Previously recorded site AHIMS #45-6-977 was re-identified and six new sites were found, including two rockshelters with middens, two rockshelters with potential occupation deposits and two engraving sites. A total of 19 areas were identified for further investigation.	Within study area.
T. Corkill	1997a	Corkill conducted an assessment of hand stencils at two sites adjacent to the Hills M2 Motorway corridor.	Within study area.
T. Corkill	1997b	Corkill undertook test excavation in an area of PAD. Fourteen small silcrete, chert and indurated mudstone artefacts were recovered. Along with the Aboriginal artefacts, 19th and 20th century European material was also present.	Approximately 12 kilometres south-east of the study area.
T. Corkill	2000	Corkill conducted an analysis of an artefact assemblage excavated by Attenbrow at rockshelter site AHIMS #45-6-2097. Radio carbon dating of two pits was 2,500 and 10,000 years BP. A total of 2,079 artefacts were found, consisting of mostly quartz material with lower percentages of silcrete and volcanic material.	Within study area.
V. Attenbrow	2002	Attenbrow undertook an archaeological excavation of AHIMS #45-6-2097. Several thousand stone artefacts were recovered with faunal remains. The raw materials of the artefacts recovered included silcrete, chert, indurated mudstone, quartz, quartzite and basalt. Artefact types included flakes, flaked pieces, cores and bipolar pieces. The lower floor levels of the deposit were dated to 6,700 BP and possibly over 10,000 BP.	Within study area.
P. Irish	2004	Irish undertook an Aboriginal Archaeological monitoring program. It was determined that there were no archaeological constraints to the sub-surface works.	Approximately 16 kilometres south-east of the study area.
T. Corkill	2008	Corkill provided a monitoring report for rockshelter sites along the Hills M2 Motorway. The rockshelters included the sites: AHIMS #45-6-2160, #45-6-2097, #45-6-2161, #45-6-2162, #45-6-2543 and #45-6- 2544. No detrimental effects were identified.	Within study area.
AECOM	2010	AECOM identified 15 registered AHIMS sites in proximity to the Hills M2 Motorway. All sites were inspected and erroneous coordinates identified in AHIMS.	Within study area.

4.7 Aboriginal site prediction model

This section provides a summary description of site types that possibly exist within or in proximity to the project and provides a predictive statement on the likelihood of finding such sites. This has been used to inform the identification of the site inspection areas. Further information is provided in **Appendix C**.

4.7.1 Rockshelters

Rockshelters are natural features such as rock overhangs that have been utilised for Aboriginal habitation. Rockshelters can contain surface artefacts and deposits associated with occupation periods. They can also have associated artwork, such as on a panel of the rockshelter wall. Based on the number of known sites corresponding to this site type located in the surrounding region, it is assessed as possible that rockshelters could occur within or in proximity to areas that would be impacted by the project.

4.7.2 Art sites/engravings

Art sites are locations where artwork has been produced by past Aboriginal people, including designs engraved into sandstone outcrops and motifs painted in ochre or pecked onto rock walls beneath overhangs or within rockshelters. Art surfaces can also be abraded and pitted. Based on the number of this site type located in the surrounding region, it is assessed as possible that art sites and/or engravings could occur within or in proximity to areas that would be impacted by the project.

4.7.3 Grinding grooves

Grinding grooves are produced on rock surfaces, the result of sharpening and forming tools by repeated grinding against a suitable surface. Stone tools manufacture for ground edge axes and spears can result in groove impressions left in sandstone outcrops, often in association with a water resource area. Grooves may also develop as rounded depressions from the grinding of seeds and grains. It is possible that grinding grooves could occur within or in proximity to areas that would be impacted by the project, most likely in association with a water source.

4.7.4 Stone artefact scatters

Stone artefact scatters consist of more than one stone artefact. Activities associated with this site type include stone tool production, hunting and gathering or domestic sites associated with campsites. Stone artefacts may be flakes of stone, cores (flakes are removed from the stone cores) or tools. Some scatters may also contain other material such as charcoal, bone, shell and ochre. It is assessed as possible that artefact scatters may be identified within or in proximity to areas that would be impacted by the project, most likely in association with a rockshelter.

4.7.5 Isolated artefacts

Isolated artefacts refer to a single artefact. These artefacts may have been dropped or discarded by its owner once it was of no use. This site type can also be indicative of further sub-surface archaeological deposits. These site types can be found anywhere within the landscape, however, they are more likely to occur within contexts with the same favourable characteristics as for stone artefact scatter sites. It is expected that there is a high potential for the identification of isolated artefacts within or in proximity to areas that would be impacted by the project.

4.7.6 Modified trees

Wood and bark of trees have been used in the past by Aboriginal peoples for a variety of purposes, such as carrying implements, shield or canoes. The removal of this raw material from a tree produces a 'scar'. The identification of a scar associated with Aboriginal custom as opposed to natural scarring can be difficult. The scar should be of a certain size and shape to be identifiable with its product; the tree should also be mature in age, from a time that Aboriginal people were still active in the area. Aboriginal people also modified trees through carving or binding branches together to form ring growths, used as markers in the landscape.

The area subject to this assessment has been systematically cleared of much of the native vegetation. It is predicted as unlikely that a culturally modified tree will be identified in areas of vegetation clearance, but likely that they may be located in areas where mature vegetation remains extant.

5.0 Results

5.1 Field Inspection

A total of 14 transects were inspected on 24-25 September 2013, 2 October 2013 and 19 December 2013 to ground-truth items of Aboriginal cultural heritage (refer to **Table 4**). No new Aboriginal archaeological sites were identified during the inspection. No artefacts were present at any of the inspected rock overhangs, many of which had their deposits eroded or washed away. As part of ground-truthing AHIMS sites, all inspected overhangs were compared to existing site cards and matched to previously registered sites where possible. Many site cards did not contain photographs or maps and had incorrect coordinate data, making matches difficult in some cases.

An overview of the transects is shown on **Figure 5**, with individual transects shown on **Figure 6** to **Figure 14**. A description and results for each transect are provided from **Section 5.1.1** to **Section 5.1.13**.

Table 5 details the results of the visual inspection for each transect.

Table 4 Transect details for the site inspections completed in September, October and December 2013

Number	Location	Length	Date	Participants
1	King Road and Burdett Street, Hornsby	815 m	2 October 2013	Darran Jordan Allen Madden Tracey Howie
2	Coonanbarra Road and M1 Pacific Motorway, North Wahroonga	786 m	24 September 2013	Andrew McLaren Darran Jordan Tracey Howie
3	Coonanbarra Road, North Wahroonga	264 m	24 September 2013	Andrew McLaren Darran Jordan Tracey Howie
4	Coonanbarra Road, Wahroonga	300 m	19 December 2013	Darran Jordan Rochelle Coxon Allen Madden
5	Kingsley Close, Wahroonga	980 m	2 October 2013	Darran Jordan Allen Madden Tracey Howie
6	Mount Pleasant Avenue to Lucinda Avenue, Normanhurst	1800 m	19 December 2013	Darran Jordan Rochelle Coxon Allen Madden
7	Blantyre Close, Thornleigh	145 m	24 September 2013	Andrew McLaren Darran Jordan Tracey Howie
8	Observatory Park, Beecroft	500 m	24 September 2013	Andrew McLaren Darran Jordan Tracey Howie
9	Orchard Road, Beecroft	256 m	24 September 2013	Andrew McLaren Darran Jordan Tracey Howie
10	Northern side of Hills M2 Motorway, West Pennant Hills	2000 m	25 September 2013	Darran Jordan Allen Madden

Number	Location	Length	Date	Participants
11	Haines Avenue to Yale Close, North Rocks	744 m	24 September 2013	Andrew McLaren Darran Jordan Tracey Howie
12	Perry Street to the Hills M2 Motorway, Baulkham Hills	880 m	19 December 2013	Darran Jordan Rochelle Coxon Allen Madden
13	Randall Crescent to Ventura Road, Baulkham Hills	440 m	19 December 2013	Darran Jordan Rochelle Coxon Allen Madden
14	Ventura Road to Renown Road, Baulkham Hills	1400 m	19 December 2013	Darran Jordan Rochelle Coxon Allen Madden

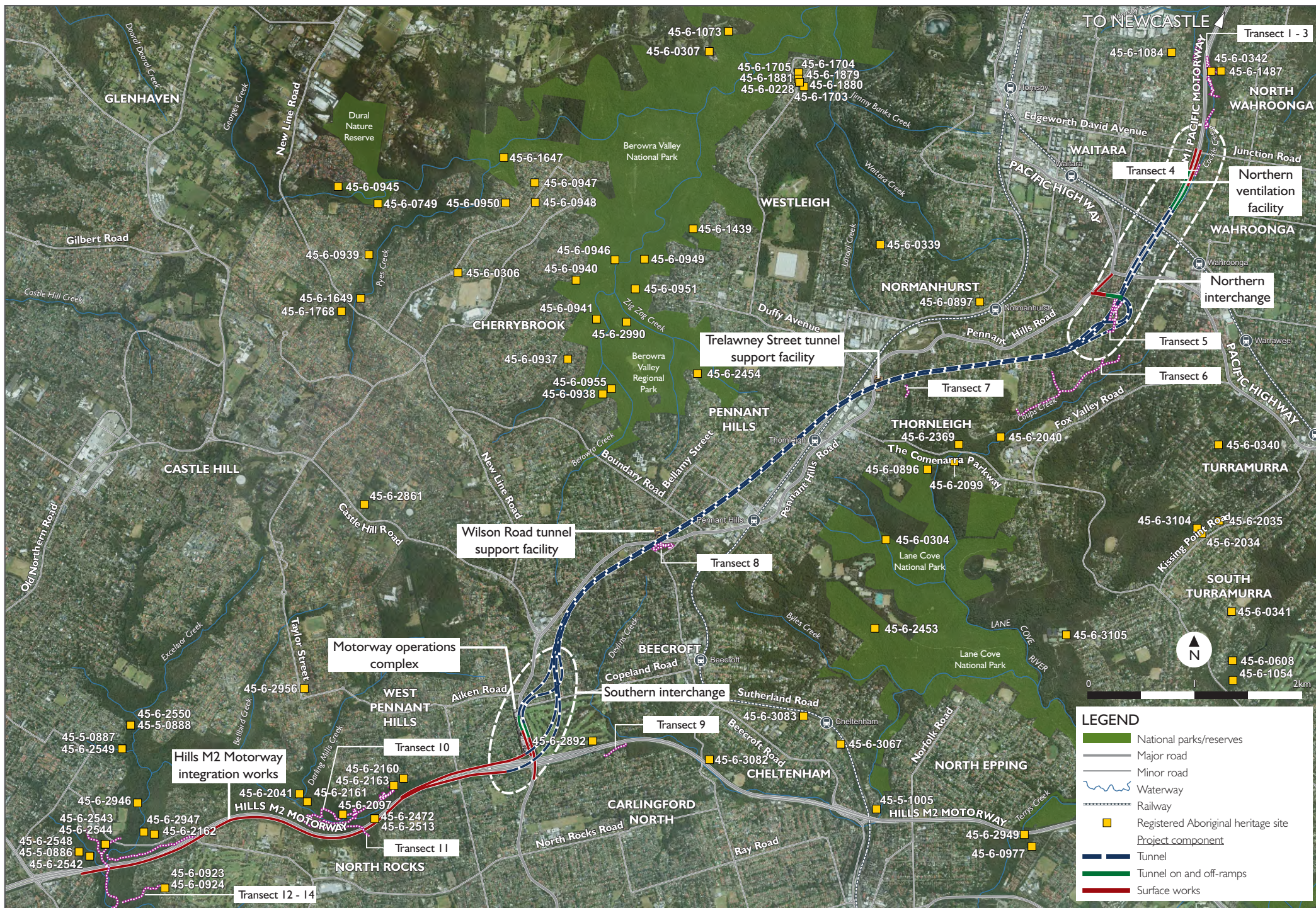


Figure 5 Overview of survey transects

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5.1.1 Transect 1 – King Road & Burdett Street, Hornsby

Transect 1 started at the intersection of King Road and Burdett Street, Hornsby, heading north on an alignment parallel to the M1 Pacific Motorway (refer to **Figure 6**).

The majority of the transect consisted of a paved road surface, created as a service road to access the motorway. This was adjoined directly on its western side by residential houses and backyard areas. A small portion of bush area was present along this transect. It had been subject to past vegetation clearance and consisted of regrowth. Some small outcrops were noted in the bush area and along Cockle Creek.

Cockle Creek crossed into the study area in this area, but the portion of creek line present here had been highly modified due to its proximity to the motorway. A culvert was present where the creek flowed under the M1 Pacific Motorway, joining to the culvert on the other side, previously identified in Transect 2. Ground surface visibility was zero to ten per cent on this transect due to vegetation growth, leaf litter and tree needles. The area was assessed as highly disturbed (refer to **Plate 1** to **Plate 4**).

No Aboriginal archaeological sites or areas of archaeological sensitivity were identified within the area to be disturbed as part of the project. Aboriginal consultation did not identify any cultural sensitivity within the area of potential impact.



Plate 1 Transect 1, paved access road



Plate 2 Transect 1, outcrops and bush area



Plate 3 Transect 1, pipe across creek



Plate 4 Transect 1, culvert

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Figure 6 Survey transects 1, 2 and 3

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5.1.2 Transects 2 and 3 – Coonanbarra Road, North Wahroonga

Transects 2 and 3 were in between and parallel to Coonanbarra Road, North Wahroonga and the M1 Pacific Motorway, following the extent of Cockle Creek (refer to **Figure 6**). Transect 2 covered between the northern end of the study area and the northern side of Carrington Park, North Wahroonga. Transect 3 covered between the southern end of Carrington Park and the residential houses backing onto Cockle Creek.

Two previously registered AHIMS sites were identified in background research as having been identified within the Transect 2 area, AHIMS #45-6-1487 and AHIMS #45-6-0342. Reference to the site cards showed that AHIMS #45-6-1487 was destroyed under permit 450001 (January 1986). AHIMS #45-6-0342 was described on the site card as “prior to 1910 the group of engravings were cut out”. A 1988 review by Tessa Corkill could not identify the site. No remnants of the two sites were located during the inspection. Sandstone outcrops and natural overhangs were identified in the area, but with no signs of cultural modification or use.

Ground surface visibility during the inspection ranged between zero per cent and 10 per cent due to high levels of vegetation and leaf litter. Moss also obscured the surface of some sandstone outcrops, which were checked for signs of modification (grinding grooves/engravings). A small waterfall was noted along the extent of the creek, with running water present at the time of inspection.

Vegetation throughout the area was predominantly regrowth, denoting vegetation clearance as a past impact. Weeds such as lantana and bamboo were noted in the area. Cockle Creek and its associated drainage lines were highly modified in this area, with concrete channels, a concrete culvert under the M1 Pacific Motorway and channel cuttings into natural rock all evidenced. Other development impacts within the area included the construction of the motorway, rubbish dumping, graffiti, construction and use of a bike track, construction and use of walking paths and roads, pipelines, construction of a stormwater pollution trap, residential properties and associated infrastructure (refer to **Plate 5** to **Plate 14**).

No Aboriginal archaeological sites or areas of archaeological sensitivity were identified within the area to be disturbed as part of the project. Aboriginal consultation did not identify any cultural sensitivity within the area of potential impact.

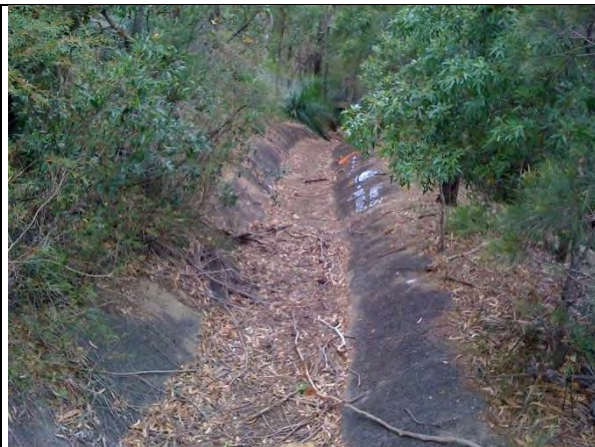


Plate 5 Transect 2, concrete channel



Plate 6 Transect 2, confluence of two concrete channels



Plate 7 **Transect 2, motorway culvert**



Plate 8 **Transect 2, channel cutting**



Plate 9 **Transect 2, pipeline**



Plate 10 **Transect 2, waterfall**



Plate 11 **Transect 2, bike track and rubbish**



Plate 12 **Transect 2, Storm water pollution trap**



5.1.3 **Transect 4 – Coonanbarra Road, Wahroonga**

Transect 4 was located at Coonanbarra Road, Wahroonga, NSW (refer to **Figure 7**).

There were no AHIMS sites along this transect.

Ground surface visibility during the inspection averaged 15 per cent due to grass cover. Vegetation throughout the area was predominantly grass with some regrowth, denoting vegetation clearance as a past impact.

Cockle Creek (also known as Spring Gully Creek) was highly modified in this area, with concrete channelling as well as brick walls shaping water flow directly behind suburban housing (refer to **Plate 15** and **Plate 16**).

Other development impacts within the area included roads and associated infrastructure (refer to **Figure 7**).

No Aboriginal archaeological sites or areas of archaeological sensitivity were identified within the area of proposed impact. Aboriginal consultation did not identify any cultural sensitivity within the area of potential impact.



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Figure 7 Survey transect 4

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5.1.4 Transect 5 – Kingsley Close, Wahroonga

Transect 5 was in a north-south alignment adjacent to Kingsley Close in Wahroonga. The transect area was accessed via Eastbourne Avenue and comprised a cleared park area adjacent to residential backyards (refer to **Figure 8**).

In the centre of this was a densely overgrown area of vegetation. Some mature trees were present, but the majority of the area was covered by regrowth with dense patches of lantana and bamboo. The area had been disturbed by past vegetation clearance and the construction of residential properties and associated infrastructure. Ground surface visibility was zero to 10 per cent on this transect due to vegetation growth and leaf litter. There was no water resource within or in proximity to this area (refer to **Plate 17** and **Plate 18**).

No Aboriginal archaeological sites or areas of archaeological sensitivity were identified within the area to be disturbed as part of the project. Aboriginal consultation did not identify any cultural sensitivity within the area of potential impact.



Plate 17 Transect 5, adjoining residential backyards



Plate 18 Transect 5, adjoining M1 Pacific Motorway

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Figure 8 Survey transects 5

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5.1.5 Transect 6 – Mount Pleasant Avenue to Lucinda Avenue, Normanhurst

Transect 6 was located at Mount Pleasant Avenue to Lucinda Avenue, Normanhurst, NSW (refer to **Figure 9**).

There were no AHIMS sites along this transect.

Ground surface visibility during the inspection averaged 15 per cent due to high levels of vegetation and leaf litter. Moss also obscured the surface of some small sandstone outcrops, which were checked for signs of modification (grinding grooves/engravings). Vegetation throughout the area was a mix of regrowth and mature vegetation.

Coups Creek was contained within a vegetation corridor with associated parks and walkways, but its associated drainage lines were highly modified.

Other development impacts within the area included roads, drains, park areas, bush tracks, housing and associated infrastructure (refer to **Plate 19** to **Plate 22**).

No Aboriginal archaeological sites or areas of archaeological sensitivity were identified within the area to be disturbed as part of the project. Aboriginal consultation did not identify any cultural sensitivity within the area of potential impact.



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Figure 9 Survey transect 6

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5.1.6 Transect 7 – Blantyre Close, Thornleigh

Transect 7 extended from the end of Blantyre Close, Thornleigh along an unnamed tributary (refer to **Figure 10**). The tributary was found to be highly modified with cement sections, brick walls, utility holes, pipes and stormwater drains along its extent. Residential houses backed directly onto either side of the channel. Rubbish had been dumped throughout the area, including machinery parts and a bicycle. Loose bricks dislodged from a wall were also identified along the channel (refer to **Plate 23** and **Plate 24**).

No Aboriginal archaeological sites or areas of archaeological sensitivity were identified within the area to be disturbed as part of the project. Aboriginal consultation did not identify any cultural sensitivity within the area of potential impact.



Plate 23 Transect 7, cemented channel



Plate 24 Transect 7, brick wall

5.1.7 Transect 8 – Observatory Park, Beecroft

Transect 8 was through Observatory Park, a heritage listed parkland area, situated in a triangular portion of land between Pennant Hills Road and Beecroft Road, Beecroft (see **Figure 11**).

It is listed as an area of local historic significance under the *Hornsby Local Environmental Plan 2013*. The park area was associated with a historic observatory located on the opposite side of Beecroft Road which dates back to the 1930s. The outer perimeter of the park is cleared lawn with paths and picnic areas, while the central portion has retained natural bush growth. Although the area has been subject to vegetation clearance in the past, its central portion retains mature trees including blue gums, blackbutt, wattle and grey ironbark. Aboriginal resource plants *Dianella* sp., *Lomandra* sp. and Kangaroo Grass (*Themeda triandra*) were also identified in the area.

Ground surface visibility was zero per cent to 10 per cent during inspection due to vegetation growth and leaf litter.

The park is not situated in a sensitive landform or close to a water source and as such was assessed as having low archaeological potential (refer to **Plate 25** and **Plate 26**).

No Aboriginal archaeological sites or areas of archaeological sensitivity were identified within the area to be disturbed as part of the project. Aboriginal consultation did not identify any cultural sensitivity within the area of potential impact.

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Figure 10 Survey transect 7

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Figure 11 Survey transect 8

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5.1.8 Transect 9 – Orchard Road, Beecroft

Transect 9 was accessed from Orchard Road, Beecroft, running parallel to an unnamed tributary of Devlins Creek between residential houses to the Hills M2 Motorway (see **Figure 12**).

Past disturbances included vegetation clearance, residential housing, walking track and storm water drains. The end of the transect intersected with a cleared area beneath a raised portion of the Hills M2 Motorway.

Ground surface visibility averaged 90 per cent due to the walking track and cleared areas around the Hills M2 Motorway. The tributary banks were heavily vegetated however, predominantly with regrowth with bamboo noted in some areas. The tributary has been modified along its extent due to residential development and roadways, including the Hills M2 Motorway (refer to **Plate 27** and **Plate 28**).

According to the available coordinates, valid AHIMS site #45-6-2892 is located to the north of this transect within the bounds of the Pennant Hills Golf Course. As there was no site card available from AHIMS and a 2010 AECOM survey was unable to relocate the site based on the coordinates alone (AECOM Australia Pty Ltd, 2010), the coordinate location was not re-inspected during these works.

No Aboriginal archaeological sites or areas of archaeological sensitivity were identified within the area to be disturbed as part of the project. Aboriginal consultation did not identify any cultural sensitivity within the area of potential impact.



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Figure 12 Survey transect 9

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