5.0 ARCHAEOLOGICAL BACKGROUND

5.1 HERITAGE DATABASE SEARCH RESULTS

5.1.1 Aboriginal Heritage Information Management System Search Results

A search of National, State and local heritage databases was undertaken to establish the archaeological context surrounding the Windsor Bridge study area. A summary of these results is presented below.

A search of the NSW DECC's Aboriginal Heritage Information Management System (AHIMS) was conducted, covering an area of 9 km² around Windsor Bridge. A total of 56 Aboriginal objects and/or places have been recorded within this area (Figure 5.1 and Table 5.1).

Site Feature	Total	%
Isolated Find	11	19.64
Open Artefact Scatter	33	58.93
Potential Archaeological Deposit	12	21.43
Total	**56**	**100.00**

Table 5.1: Summary of sites recorded within 8km² of the study area

5.1.2 Other Heritage Register Search Results

Searches of the Australian Heritage Places Inventory (AHPI), the Register of the National Estate (RNE), the National Heritage List (NHL) and the State Heritage Register (SHR) on the Heritage Branch website did not identify any recorded Aboriginal objects or places in or around the study area. No Aboriginal objects or places are recorded on the Hawkesbury LEP 1989 (current version 15th December 2008). Zones of potential, and five archaeological sites, were identified in the Pitt Town Local Environmental Study, and are discussed in Section 5.3.3.

5.2 THE CUMBERLAND PLAIN ARCHAEOLOGICAL CONTEXT

Archaeological investigations on the Cumberland Plain have commonly resulted from the spread of urban development, and therefore have been mainly conducted within the framework of the *EP & A Act (1979)*. Predictive models for the Cumberland Plain have been developed based on the results of these surveys, and are discussed below.

Archaeological assessments over the last three decades have indicated that access to water is an important determining factor in site location on the Cumberland Plain. Haglund (1980), based on survey work in Blacktown, predicted that sites would most likely be located near creeks and soaks, and on high ground near water. Kohen (1986) further stated that the availability of water was the most important factor determining site location, with access to food and raw stone, and also elevation, also having an influence. A predictive site model proposed by Smith (1988, 1989) supported these predictions. Based on site distribution near Rickaby's Creek and Londonderry, this model stated that sites would most commonly be found along permanent creeks and around swamp margins, with creek flats and banks considered to be focal topographical features for site location (Smith 1989: 2). In addition, a significant number of creeks would be found along temporary creeklines, particularly over Londonderry Clay (Smith 1988: 133).

Initial assessment of the ADI site allowed McDonald to undertake a more detailed analysis of site types and their distribution over the Cumberland Plain. McDonald (JMCHM Pty Ltd 1997a) noted that archaeological visibility was a significant issue however 666 Aboriginal cultural sites had been recorded with the DEC (formerly NPWS, now DECCW) in 1997 on the Cumberland Plain. McDonald's investigation identified open artefact scatters/open camp sites to be the dominant site type (composing 89% of all sites) followed by isolated finds and combination open/other site types (3.5%) and scarred trees (totalling 2.1% of all recorded features). Furthermore, this analysis emphasised the obvious disparity between surface and sub-surface artefact numbers. This investigation revealed the fact that

virtually none of the sites which had been excavated on the Cumberland Plain could be characterised on the basis of surface evidence alone. In addition, McDonald noted that open sites were found in all landscape units and that the high proportion of sites located on creek banks reflected variables such as surface visibility and taphonomy rather than being indicative of cultural artefact distribution across the landscape (JMCHM Pty Ltd 1997a: 36).

McDonald (1996) also highlighted the serious issue of archaeological visibility on the Cumberland Plain. Existing predictive models which relied heavily on surface evidence were inadequate. It was assumed that sub-surface results would provide the necessary data on which a model could be based that could predict site location and/or site variability (McDonald 1996, see also OzArk 2004: 9).

After extensive salvage and test excavations carried out for the Rouse Hill Test Excavation Programme (Brayshaw McDonald Pty Ltd 1993, McDonald *et. al.* 1994) and the Rouse Hill (Stage 2) Infrastructure Project (McDonald 1999), several important characteristics relating to the Cumberland Plain were noted:

- Most areas – even those with sparse or no surface manifestations of cultural material – contain sub-surface archaeological deposits
- Where open sites are found in aggrading and stable landscapes, some are intact and have the potential for internal structural integrity. Sites in alluvium possess potential for stratification.
- While ploughing occurs in many areas of the plain, this only affects the deposit up to 30 cm deep, and even then ploughed knapping floors have been located which are still relatively intact.
- Contrary to earlier models for open sites, many sites contain extremely high artefact densities, with variability appearing to depend on the range of activity areas and site types present.
- The complexity of the archaeological record is also far greater than was previously identified on the basis of surface recording and more limited test excavation. Intact knapping floors, backed blade manufacturing sites, heat treatment locations, a number of apparently specialised tool types, and generalised camp sites were all found.
- Two Early Bondian dates (between 5,000 – 3,000 BP) provide a context for some backed blade manufacture.
- Gross site patterning is identifiable on the basis of environmental factors: sites on permanent water are more complex (i.e. they represent foci for larger groups or are used repeatedly by smaller groups over a long period of time) than sites on ephemeral or temporary water lines (McDonald 1996: 115).

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Figure 5.1: Sites recorded in previous archaeological investigations within 9km² of the study area. Source: generated by Austral Archaeology, using the 1:25 000 Scale Wilberforce 90301-N Topographic Map © Department of Lands 2006.

McDonald also argued environmental factors, such as stream order, were integral to developing a predictive model for the Cumberland Plain. Stream order modelling, as a predictive tool, could be utilised to anticipate the potential for Aboriginal camp site locations in the landscape based on the order of water permanence. McDonald (JMCHM Pty Ltd 1997a, 1997b; McDonald 1999; JMCHM Pty Ltd 2000) in particular has drawn on stream order modelling in order to forecast the potential nature and complexity of sites. These models can also be used to predict site distribution, the possible range of activities carried out at a particular site, as well as the frequency and/or duration of occupation.

Analysing stream order can allow researchers to locate areas of past water permanence, which would have been vital for Aboriginal people. Abundant food and other resources are more likely to occur in areas of water permanence which would in turn attract Aboriginal occupation. McDonald's excavations

of open artefact scatter sites at the ADI site in St Marys provided evidence of such a correlation (JMCHM Pty Ltd 1997b: 133).

According to McDonald, the range of lithic activities and the complexity of the resulting stone assemblage observed at a location of permanent water differ depending on stream order. Overall, artefact scatters in the vicinity of a high order raking stream reflect a greater range of activities (e.g. tool use, manufacture and maintenance, food processing and quarrying) than those located on lower order streams. Temporary or casual occupations of a site, reflected by an isolated knapping floor or tool discard, are more likely to occur on smaller, more temporary water courses (JMCHM Pty Ltd 1997a: 134-135).

It is therefore possible, McDonald concluded, to use stream order to make general predictions about the location and nature of Aboriginal sites on the Cumberland Plain. Water permanence (i.e. stream order), landscape unit (i.e. hill top, creek flat) as well as the proximity to artefact raw materials can result in variations in the density and complexity of an Aboriginal archaeological feature (JMCHM Pty Ltd 1997a, 2000: 19). Site location and duration of occupation predictions therefore relate to stream order in the following ways:

Table 5.3 Stream Order Predictive Model for the Cumberland Plain

- In the headwaters of upper tributaries (i.e. first order creeks) archaeological evidence will be sparse and represent little more than a background scatter;
- In the middle reaches of minor tributaries (second order creeks) archaeological evidence will be sparse but indicate focussed activity (e.g. one-off camp locations, single episode knapping floors);
- In the lower reaches of tributary creeks (third order creeks) will be archaeological evidence for more frequent occupation. This will include repeated occupation by small groups, knapping floors (perhaps used and re-used), and evidence of more concentrated activities;
- On major creek lines and rivers (fourth order) archaeological evidence will indicate more permanent or repeated occupation. Sites will be complex, with a range of lithic activities represented, and may even be stratified;
- Creek junctions may provide foci for site activity; the size of the confluence (in terms of stream ranking nodes) could be expected to influence the size of the site;
- Ridge top locations between drainage lines will usually contain limited archaeological evidence although isolated knapping floors or other forms of one-off occupation may be in evidence in such a location (McDonald 2000: 19).

As the archaeological resource of the Cumberland Plain is dominated by stone artefacts, the raw material and extent of modification have also been subject to analysis and predictive modelling. Dallas & Witter (1981 in Ozark 2004: 10) have put forward the distance decay model, which suggests that artefacts generally get smaller with increasing distance from the raw material source, and also that the amount of cortex decreases. Observations made by Smith (1988: 108-109) tentatively suggested that there is a tendency for larger percentages of cortex to be found near raw material sources, while there is also a tendency for sites with lower to no surviving cortex to be concentrated away from raw material sources. She also found however that site size – that is, the number of artefacts in a site – does not necessarily correlate with distance from the material source: not all large sites on the Plain are associated with raw material extraction (Smith 1988: 106). Benton and Levy (OzArk 2004: 10) state, however, that the increasing number of new stone sources, particularly of silcrete, found on the Plain has made testing the distance decay model more difficult, and suggest that this model is a poor mechanism for explaining raw material preference. AMBS (2002: 31) also highlights other variables relating to raw material procurement and suggests that “simple proportional differences in raw material might not be a good archaeological indicator of quarrying behaviour”.

5.3 Previous Archaeological Investigations in the Region

5.3.1 Introduction

Archaeological assessments in the vicinity of Windsor Bridge have also been mostly undertaken in response to development, as well as for large-scale studies for the NPWS. OzArk Environment and Heritage Management (2004) undertook a large-scale assessment of lands within the proposed Windsor Flood Evacuation Route (WFER), and proposed a predictive model for the Windsor area. Site recordings from other assessments over the last 20 years have clustered around Windsor Bridge (JMCHM Pty Ltd 1998a; DSCA 2003a, 2003b; Ozark 2004; AHMS 2006a; Heritage Concepts 2008a;

Austral *in draft-b*) and Pitt Town (McDonald 1998b; Navin Officer 2002; Comber 2004; AHMS 2005, 2006b). These findings, as well as those of an earlier phase of this project (Heritage Concepts 2008a), shall be summarised for application to a predictive statement in the following section.

5.3.2 WFER Findings

OzArk Environmental and Heritage Management (OzArk 2004) undertook test excavations on four areas of PAD along the proposed Windsor Flood Evacuation Route (WFER). Located in an area within 3 km south of Windsor Bridge, on both sides of South Creek, the four PADs covered a representative range of landforms: the lower alluvial terrace and elevated terrace on the west banks, and the top of small spurs on the east banks. Archaeological material was recovered from all PADs, which were thereafter referred to as AHIMS 45-5-2963 (PAD 4), 45-5-2937 (PAD 5), 45-5-2938 (PAD 6) and 45-5-2939 (PAD 7). The assemblage at each site was dominated by silcrete (with the exception of 45-5-2963/PAD 4), followed by silicified tuff, quartz, and a small amount of chert, FGS, silicified wood, quartzite and basalt. The sites were assessed as being of low archaeological significance, with the exception of one discrete area located on the elevated knoll at the southern end of PAD 7 (45-5-2939). This area has been assessed as having moderate archaeological significance due to potentially intact occupation evidence 15-20 cm below the surface (OzArk 2004).

Their conclusions regarding the archaeological resource in Windsor are presented in Table 5.3 below.

1. The highest potential landforms are elevated areas above the floodplain which have not been built on and agricultural disturbance is minimal
2. There was little variation in lithic material with depth
3. Generally shallow soils with little or no integrity, the upper 15-20 cm of soil disturbed by agricultural activities which has re-worked artefacts
4. There was little evidence that the local Rickabys Creek gravels were exploited as a stone source; the assemblage was dominated by silcrete and silicified tuff
5. Artefacts are found anywhere across the landscape, particularly on flat elevated land, especially in association with South Creek
6. Average stone artefact density was 24.6 artefacts per square metre. This material was distributed as low to medium density scatters with small areas of high density. It was unclear whether this pattern was caused by agricultural activities re-distributing material from discreet sites across the landscape.

Table 5.3: OzArk's conclusions re: Windsor archaeological context (2004)

5.3.3 Pitt Town Local Environmental Study

In the desktop Cultural Heritage Component of the 2002 Proposed Urban Development Pitt Town Local Environmental Study, this area was zoned as low to moderate and of moderate potential (Navin Officer 2002: 35, Figure 8). The area of moderate potential spans the stretch of Bathurst Road from Buckingham Road to the end of Punt Road, and then curves around to the east to follow the terrain contours south of the Hawkesbury River (Navin Officer 2002: 33 – 35, Figure 8). The recommendations of this LES are provided below in Table 5.5.

1) Comprehensive archaeological field survey for Aboriginal sites should be conducted in all areas of the Pitt Town LES area not previously assessed by McDonald in 1998.
2) A program of archaeological subsurface testing should be conducted in areas identified as having greater than 'low' archaeological potential to ascertain the presence, extent and integrity of subsurface cultural deposits, where and if these areas are going to be impacted by development (refer Figure 8).
3) All Aboriginal cultural heritage work should be conducted by suitably qualified archaeologists and should be consistent with the (current) Guidelines specified by the NSW National Parks and Wildlife Service.
4) All cultural heritage survey and assessment work is to include appropriate levels of consultation with, and the participation of local Aboriginal community representatives.
5) Where necessary, planning and development controls should accommodate any recommended

impact mitigation strategies for sites detected during archaeological survey or subsurface testing work, and be incorporated as conditions within any development approvals.

6) The following management strategies should be adopted for the previously recorded Aboriginal sites within the LES area (after McDonald 1998: 19):

Site	NPWS No.	Strategy
PT1	45-5-2488	No further archaeological work required, Consent to Destroy required prior to any impact
PT2	45-5-2489	Archaeological subsurface investigation required to determine nature, extent and significance of site
PT3	45-5-2490	Conserve and protect from impact
PT IF 1	*no AHIMS number	No further archaeological work required, Consent to Destroy required prior to any impact
PT IF 2	* no AHIMS number	No further archaeological work required, Consent to Destroy required prior to any impact

Table 5.4: Pitt Town LES Recommendations (Navin Officer 2002)

These recommendations have since been acted on in at least two assessments (Comber 2004; AHMS 2005, 2006a). These shall be described in Section 5.3.6.

5.3.4 Archaeological Background to the Project: Option 1

In an earlier phase of the current assessment, Heritage Concepts (2008a) was commissioned by the NSW RTA to prepare a baseline Aboriginal archaeological assessment for the portion of the study area now referred to as Options 1 & 2. This area is centred on the current location of Windsor Bridge, where it crosses the Windsor Reach of the Hawkesbury River, directly to the north of Windsor town. The entire study area was identified as representing high archaeological potential: two specific areas of Aboriginal potential – PADs W-NP (45-5-3580) and W-SP (45-5-3581) – were identified, on the north and south banks of the Windsor Reach of the Hawkesbury River.

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Table 5.5: Heritage Concepts (2008a) finds

The two PADs were each divided into areas of High and Low potential, as indicated by the red and blue areas in Figure 5.2, below. Although the first 1.5 – 2 m of soil deposit may have been disturbed by historic and recent land use, the High potential areas of W-NP and W-SP were identified as having potential to contain highly detailed stratigraphic and contextual data beneath this level. These deposits would likely prove representative of the archaeological record in the area. In particular, their location on the river banks indicates that there is potential to unearth archaeological material relating to

"settlement patterns, diet, raw material procurement, trade and social interaction" (Heritage Concepts 2008a: 45).

Isolated finds W1, W2, W3 and W4 (45-5-3582 to 45-5-3585) were also recorded, within secondary alluvial deposits on the back terrace of the northern river bank, over an area approximately 30 m north of the Bridge's northern abutment. Although the GPS coordinates provided by AHIMS locate these finds approximately on the surface of W-NP (see Figure 5.3, overleaf), these were not considered to be in situ, due to their location on the alluvial plain, and therefore were of less archaeological significance than the areas of PAD.

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Figure 5.2: Sites recorded by Heritage Concepts (2008a). Source 1:25 000 Scale Wilberforce 90301-N Topographic Maps © Department of Lands 2006, and Options mapping provided by the RTA © 2009

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Figure 5.3: High and Low potential areas of PAD in the vicinity of Option 1 & 2 overlaid on previous study area.
Source: Reproduced from Heritage Concepts (2008a): Figure 5.2 Heritage Constraints Map for the Study Area.

5.3.5 Previous Archaeological Assessments in the Vicinity of Windsor

Some 420 m to the south of Windsor Bridge, the archaeological salvage of Aboriginal site BGW97 (45-5-2435) was undertaken by Jo McDonald Cultural Heritage Management Pty Ltd (JMCHM Pty Ltd 1998a). Topographically, the site was located on a high narrow spit of Tertiary Terrace at 10m elevation [AHD], above South Creek and the Windsor Reach of the Hawkesbury River. A total of 25 Aboriginal artefacts had been located during historical archaeological excavations in the underfloor deposits of colonial structures dated c. 1820s – 1860s.

Based on a site assessment and the results of a small test excavation (JMCHM Pty Ltd 1997, in JMCHM Pty Ltd 1998a), it was decided that the apparently intact underfloor deposit in Rooms 1 and 2 of the historic building were to be salvaged. A total of 1,586 stone artefacts were retrieved, of which 654 were conchoidally flaked artefacts. The remaining non-artefactual items were classified as anthropogenic. The assemblage suggests that the production of small flakes, some of which were then made into geometric microliths and other types of backed artefacts, was the primary stone-working activity at the site. The tool types present, including the relative absence of cores, was interpreted as a sign of transportation of complete artefacts and raw materials to and from the site. The site was interpreted as having moderate archaeological significance.

Dominic Steele Consulting Archaeology (DSCA 2003a, 2003b) undertook an assessment, test excavation and salvage excavation of the Former Hawkesbury Hospital Site (NPWS 45-5-2865), approximately 800 m south of Windsor Bridge. This area is located on an elevated Tertiary river terrace, forming one of the high points in the local landscape. As a result of the initial fieldwork, two small silcrete flakes were located in shallow remnant topsoils largely disturbed as a result of past building construction. It was concluded that there was potential for the proposed development to impact on relatively low-density distributions of flaked stone artefacts in the area (DSCA 2003a).

As a result, test excavations were undertaken later the same year. The interim report records the recovery of 62 flaked stone items, 37 of tuff and 25 of silcrete, from twelve test trenches spread across the study area. One naturally fractured quartzite pebble and one small unworked quartz pebble were also recovered. All raw materials were available in the Tertiary gravels of the nearby Hawkesbury River (DSCA 2003b). The assemblage was dominated by small flakes, broken flakes and flaked pieces – this was described as reflecting a 'secondary' stage of stone reduction (DSCA 2003b: 39).

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Figure 5.4: Sites near Windsor, in relation to RTA's Options. Source: generated by Austral Archaeology utilising the 1:25 000 Scale Wilberforce 90301-N Topographic Maps © Department of Lands 2006, and Options mapping provided by the RTA © 2009.

Approximately 1,200 m to the southeast of Windsor Bridge lies Windsor Cemetery, where an open artefact scatter (45-5-3118) was excavated in 2006 (AHMS 2006a). Topographically, the site is located on a low ridge oriented northeast-southwest between Rickabys Creek to the west and South Creek to the east, over Wianamatta Group shales and the Berkshire Park soil landscape. No formal tool types were identified within the assemblage, which was dominated by FGS, tuff and silcrete, followed by quartz, quartzite and chert. Examination of cortex indicated that the raw materials were river pebbles, almost certainly obtained locally (AHMS 2006a: 51). The authors noted that, in keeping with the WFER findings, the site contained very low densities of stone artefacts despite being located on an elevated landform above the floodplain, which had not been built on and has undergone only minimal agricultural disturbance (AHMS 2006a: 53).

In contrast with the WFER findings, the raw material exploited at this site was almost exclusively river pebbles, including silcrete cobbles, which are known to be found in Rickabys Creek gravels. The site has suffered extensive topsoil disturbance from vegetation clearance, grave-digging, road building, and bioturbation from animals and root systems. Therefore the majority of the archaeological resource in this area is not considered to have spatial or stratigraphic integrity (AHMS 2006a: 54).

Austral Archaeology (*in draft – b)* undertook the Aboriginal archaeological salvage excavation undertaken upon Lot 1, DP60716/Lot 3, DP 864088 (the Windsor Museum – 45-5-3011) in April 2005 and between December 2006 and January 2007. Representatives of Darug Aboriginal Heritage Assessments (DACHA), Darug Tribal Aboriginal Corporation (DTAC), Deerubbin Local Aboriginal Land Council (DLALC) and Darug Custodian Aboriginal Corporation (DCAC) participated in every day of excavation.

Excavation was postponed after the April 2005 season at the request of Hawkesbury City Council as the rapidly expanding scale and scope of the project required further consultation between all the parties concerned before excavation could recommence. For this reason Austral sought input from the then NSW DEC, Hawkesbury City Council, DLALC, DCAC and DTAC.

The result of this consultation was a focused salvage programme of those high artefact density areas already identified in the earlier phase of excavation. In total, 26 conjoining pits were excavated forming an open area excavation covering a surface area of 26m². Excavation in a small number of pits was halted as WorkCover NSW's legislative safety guidelines prohibited continued excavation at depth where the structure of the deposit is uncertain. Where this was forced to occur either culturally sterile deposit had already been struck or artefact densities had petered out. Maximum depth across the site was 1.8 m (Figure 5.5 & 5.6).

Figure 5.5: Salvage excavation of the Windsor Museum site showing example of intact archaeological deposit that can be expected beneath Windsor (Austral Archaeology)

Figure 5.6: Salvage excavation of the Windsor Museum site showing example of the intact archaeological deposit that can be expected beneath Windsor (Austral Archaeology)

An intact sandy deposit was identified beneath a previously undeveloped parcel of land (Lot 1 DP

60716) and the existing municipal car park (Lot 3 DP 864088) and historical archaeological features previously excavated on the site. It was hypothesised that the site represented an intact Pleistocene sand dune. Approximately 11,000 Aboriginal artefacts were salvaged as a result of excavation. Exact figures and a statistical breakdown of fabric and style cannot be provided at this stage as analysis is in progress and the project is ongoing. Artefact raw material types included mudstone, silcrete and quartz. Much of the material was mudstone. Both carbon and thermoluminescence samples were taken at various depths in order to determine an age range for the deposit. These samples are yet to be analysed.

As part of the Section 90 variation put to the then DEC (now DECCW) to allow a reduced salvage excavation programme to proceed, an Aboriginal archaeological development curtilage was to be placed on Lot 1 DP 60716 and Lot 3 DP 864088. The curtilage was to continue to the properties boundary with Baker Street. This was done as the extent of the PAD was anticipated to be larger than the area that was subject to subsurface investigation. Should future development approval inclusive of any areas within this curtilage be sought the NSW DECCW is to be contacted to determine an appropriate course of action. Any action would require input from the relevant Aboriginal stakeholder groups.

5.3.6 Past Archaeological Assessments in the Vicinity of Pitt Town

The Bona Vista and Fernadell properties, located south of Pitt Town and bordered on the west by Bathurst Road, which is to be affected by the RTA's Option 8, have been subjected to a number of archaeological assessments over the past decade (JMCHM Pty Ltd 1998b; Navin Officer 2002; Comber 2004). McDonald (JMCHM Pty Ltd 1998b) undertook the survey of the Bona Vista and Fernadell properties as part of a rezoning study. Five sites were recorded: Pitt Town 1 (45-5-2488), Pitt Town 2 (45-5-2489), Pitt Town 3 (45-5-2490), and two isolated finds (IF1 and IF2) for which no site cards or AHIMS numbers were created. These two finds have not been included in mapping or final counts in this report, as no AHIMS coordinates were available at the time of writing. Pitt Town 1 and 2 were open artefact scatters of indurated mudstone artefacts (4 and 3 items respectively), exposed by cultivation or track erosion. These sites are scattered from 450 m to 800 m east of Bathurst Road, in a large area of land bounded by Johnston Street to the north and Buckingham Street to the south. The properties are located primarily over the Agnes Banks alluvial soil landscape and also Freemans Reach to the south and east. This study informed the recommendations of the Pitt Town LES produced by Navin Officer (2002), as described above.

Fernadell and lands around Bona Vista were subjected to subsurface testing by Comber (2004). As a result, the previously recorded Pitt Town 2 (45-5-2489) site was relocated and expanded, and a new recording was made for the excavated area on an ancient levee paralleling Bathurst Street. No AHIMS number was available for this site at the time of writing. A total of 234 lithic items were retrieved from 13 of the 17 excavated test pits; of these, 96 could be identified as artefacts. Test pits within an ancient levee deposit adjacent to and paralleling Bathurst Street contained the highest lithic item densities, of 24 – 128/m² (Comber 2004: 59). This was interpreted as showing that the levee was a focus of flaking activity and also probably associated camping, but the artefact number and variety is not indicative of long-term or repeated encampment (Comber 2004: 59).

Lots 11-18 (DP 1021340) along Hall Street, directly to the north of the Fernadell and Bona Vista properties, have also undergone archaeological assessment and test excavation (AHMS 2005, 2006b), in keeping with the recommendations of the Pitt Town LES 2002. A baseline geomorphic and pedologic context study (Mitchell 2004) has also taken place. Located 4.8 km northeast of Windsor Bridge, the area is bordered on the east by the Punt Road section of Option 8 for the bridge replacement. Geologically speaking, these lots are located on an extensive high (20 – 24 m ASL) Pleistocene river terrace overlooking the York Reach of the Hawkesbury River, consisting of Agnes Banks sand ridges and swamps over Clarendon Formation sitting above the Londonderry Formation (Mitchell 2004: 2).

The area has historically been used for stone fruit orcharding. Comber's 2004 assessment of the area recorded four Aboriginal sites: Blighton 1 (45-5-3154), Blighton 2 (45-5-3155), Blighton 3 (45-5-3156) and Blighton 4 (45-5-3157). No report was available at the time of writing, and the following information was drawn from the relevant site cards at AHIMS. B1 was described as an open artefact scatter of over 30 artefacts, including 4 pieces of flaked dark green glass with retouch, spread over approximately 50m² on a small ridgeline in a highly disturbed agricultural landscape. A second open artefact scatter, B2, consisted of 9 artefacts over an area of 10m². B3 was described as an open artefact scatter covering an area of approximately 120m x 20m. It consisted of over 30 artefacts, many

embedded in light brown compacted clay. Charcoal scatter was observed and the clay appeared to be burnt in small portions: it was recorded as a possible hearth, and described as being relatively undisturbed. B4 consisted of 19 artefacts recorded in a freshly ploughed area measuring approximately 10m², on the eastern edge of the survey area.

The following year, AHMS (2005) undertook an Aboriginal archaeological survey and assessment of the same area. Eleven open artefact scatters (PT 1 – PT 11, numbering 45-5-3038, 45-5-3040, 45-5-3041, 45-5-3042, 45-5-3043, 45-5-3044, 45-5-3045, 45-5-3046, 45-5-3047, 45-5-3048 and 45-5-3049) and seven isolated finds (IF 1 – IF 7, numbering 45-5-3050, 45-5-3051, 45-5-3052, 45-5-3053, 45-5-3054, 45-5-3055 and 45-5-3056) were located, and the study area was divided into zones of high, moderate and low potential archaeological deposit. Designations of PAD were based on evidence of past ground disturbance. The area identified as having the greatest potential to contain intact buried archaeological deposits lies on ground bordering the former back-swamp directly south of the Hawkesbury River bank. The northern edges of the elevated and alluvial terrace and associated flat land to the south, associated with a high density of surface archaeological material, were identified as having moderate potential. Areas of low potential were identified along track cuttings, drains and other areas subjected to deep excavation (AHMS 2005: 63-64). Although described as zones of archaeological potential, these areas were not allocated a site card or AHIMS number and therefore have not been included in mapping and site totals for this report.

Based on the recommendations of this assessment, a test excavation was undertaken by AHMS (2006b). Four landform units identified earlier (AHMS 2005) were tested: river bank, lowland and hill slope (below the 1:100 year flood level); and terrace (above the 1:100 year flood level) (AHMS 2006: 28). A total of 1153 flaked stone pieces were recovered, 99 during surface collection and 1,054 during test excavation. The assemblage consisted of volcanic tuff (46.7%), silcrete (34.5%), quartz (12.5%), quartzite (4.1%) and chert (2.2%) river pebbles. These pebbles were easily available from the exposed river gravel beds of the Hawkesbury. One possible manuport, an unmodified piece of volcanic material, was also discovered (AHMS 2006b: 41).

The results of the test excavation also allowed clarification of the zones of potential designated in the earlier study.

The excavation's findings are summarised in Table 5.6 below (Figures 5.7-5.9).

1. Soil disturbance from agricultural land use practices is generally restricted to upper levels of the soil profile (i.e. the top 20 – 30 cm).
2. Bioturbation varied in soils across the study area;
3. Artefact density varies across landforms; river bank, flood channel and flood plain contain on average 0.47 items of flaked stone per cubic metre; the alluvial terrace and terrace slope at 24 m ASL contain 26.67; the intermediate area of high ground from 12 – 16 m ASL contains 3.75.
4. The elevated alluvial terrace and terrace slopes contain a deep, stratified stone assemblage with signs of spatial patterning; two phases, being a typical silcrete-dominated Bondian industry over a presumably pre-Bondian tuff-dominated assemblage, appear to have survived within the deepest parts of the sand body
5. Alluvial, rather than aeolian processes, are responsible for site formation and preservation on the sand terrace.

Table 5.6: Lots 11 – 18 (DP 1021340), Hall Street: Test Excavation Findings (AHMS 2006b)

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Figure 5.7: Sites near Pitt Town Bottoms, in relation to RTA's Options. Source: generated by Austral Archaeology utilising the 1:25 000 Scale Wilberforce 90301-N Topographic Maps © Department of Lands 2006 and Options mapping provided by the RTA © 2009

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Figure 5.8: Close-up map of sites near Hall Street, Pitt Town, in relation to RTA's Option 8 to the south side of the Hawkesbury River. Source: generated by Austral Archaeology utilising the 1:25 000 Scale Wilberforce 90301-N Topographic Maps © Department of Lands 2006., and Options mapping provided by the RTA © 2009.

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Figure 5.9: Sites near Pitt Town, in relation to RTA's Options. Source: generated from Navin Officer (2002: Figure 8) and AHMS (2006: Figure 9.1) by Austral Archaeology utilising the 1:25 000 Scale Wilberforce 90301-N Topographic Maps © Department of Lands 2006 and Options mapping provided by the RTA © 2009.

5.3.7 Previously Recorded Sites/Areas of Potential Within a 200 m Buffer Around the Centre Line of the Proposed RTA Options.

Option	Sites	Areas of PAD
Option 1	^W1 (45-5-3582), ^W2 (45-5-3583), ^W3 (45-5-3584), ^W4 (45-5-3585), *Windsor Museum (45-5-3011)	W-NP (45-5-3580), W-SP (45-5-3581)
Option 2	^W1 (45-5-3582), ^W2 (45-5-3583), ^W3 (45-5-3584), ^W4 (45-5-3585), *Windsor Museum (45-5-3011)	W-NP (45-5-3580), W-SP (45-5-3581)
Option 3	^W1 (45-5-3582), ^W2 (45-5-3583), ^W3 (45-5-3584), ^W4 (45-5-3585), *Windsor Museum (45-5-3011)	W-NP (45-5-3580), W-SP (45-5-3581)
Option 4	^W1 (45-5-3582), ^W2 (45-5-3583), ^W3 (45-5-3584), ^W4 (45-5-3585), *Windsor Museum (45-5-3011), *BGW97 (45-5-2435)	W-NP (45-5-3580), W-SP (45-5-3581)
Option 5	^W1 (45-5-3582), ^W2 (45-5-3583), ^W3 (45-5-3584), ^W4 (45-5-3585), *BGW97 (45-5-2435)	W-NP (45-5-3580), W-SP (45-5-3581)
Option 6	None	None
Option 7	None	None
Option 8	PT 1 (45-5-3038), *Ancient Levee deposit (no AHIMS number, recorded by Comber in 2004)	Moderate area of PAD (Navin Officer 2002); abuts Heritage Conservation zone (AHMS 2006b).

* = Destroyed, ^ = Extant

5.4 SECTION SUMMARY

A search of the AHIMS register has shown that 56 sites are known within a 9 km² area around the study area. Searches of other registers (the AHPI, RNE, SHR, National Heritage List, and the LEP) did not identify any other Aboriginal places or objects in the study area. Of the 56 identified sites in a 9 km² area overlapping the present study area, five were listed on the Pitt Town LES. The recorded sites are dominated by open artefact scatters (58.93%), including one contact period site with flaked and retouched dark green glass artefacts, followed by potential archaeological deposits (21.43%) and isolated finds (19.64%). In addition to recording sites, a number of past studies in the Windsor and Pitt Town areas have also identified development curtilages and conservation zones. These have been plotted against the RTA's proposed Options. The above analysis of the archaeological record for the area, plus these recommendations and zones of potential, shall be used to inform the subsequent sections of the report.

6.0 PREDICTIVE MODELLING

6.1 DEGREE OF DISTURBANCE

The historic land use activities described in Section 3.5 have impacts upon the surface and subsurface archaeological potential for the area. In general, lower levels of disturbance correlate to higher potential for Aboriginal archaeological resources. This process is described in Table 6.1 below.

Based on this table it can be seen that the study area inclusive of all eight development options covers a considerable range of land disturbance. Those options closer into Windsor township (Options 1-7) have seen mostly moderate to severe land disturbance due to the level of historic land use and urban development. Each of the seven options do, however, contain areas of lesser disturbance, particularly in relation to the banks of the Hawkesbury River and South Creek. Option 8, being away from major urban development, has not been demonstrably disturbed to any degree that could prejudice the subsurface and hence any archaeologically deposit it may contain.

It should be noted that the presence of roads and buildings (both demolished and extant) is no guarantee that the subsurface deposit is severely disturbed. The township of Windsor is situated on relatively deep alluvial deposits and there remain good opportunities that intact and potential archaeologically significant deposits and sites lay beneath. Previous archaeological excavations within Windsor itself (e.g. JMCHM Pty Ltd 1998; Austral Archaeology *in draft – b*) have yielded intact and deep archaeological deposit beneath historical land disturbances.

Table 6.1 Categories of Ground Disturbance

Degree of Disturbance	Impact Description	Impact on Archaeological Resource
Undisturbed	No apparent disturbance to original land surface.	*In situ* archaeological deposits may be present. Dependent on characteristics of original land surface: deep cracking clays recorded in study area can prevent *in situ* survival of deposits due to artefacts dropping through cracking soil.
Low	Non-mechanical vegetation clearance and stock grazing. Cattle grazing took place in the area.	Archaeological material will retain some spatial integrity although localised displacement is expected. Removal of tree stumps has subsurface impact. Cattle grazing on wet soil can seriously churn the ground surface.
Moderate	Mechanical vegetation clearance and cultivation (ploughing) sheet/gully erosion, fluvial disturbance.	Archaeological materials may be present, although localised spatial displacement and artefact damage is likely; *in situ* deposits may remain beyond plough zone (usually between 100 – 150 mm).
Severe	Removal of topsoil via excavation for residential development, road and infrastructure construction, landscaped gardens, sheer erosion through natural causes and development, capping of landfill.	While archaeological sites may be destroyed, remnant dispersed archaeological material may survive. The context of such material may be unknown.

6.2 PREDICTIVE MODEL

Predictive modelling for the Cumberland Plain region is able to draw on a wide range of past studies. The predictive statement for Cumberland Plain as proposed by McDonald (JMCHM Pty Ltd 1997a, 1997b; McDonald 1999; JMCHM Pty Ltd 2000) has been outlined in Chapter 5. Locational data for sites is based on the existing archaeological record, local topography, access to and distance from permanent water, and degree of previous land disturbance.

With this in mind a general predictive model for Aboriginal site type, site preservation, and site preservation may be proposed.

6.2.1 Site Location

The eight proposed Windsor Bridge upgrade options, as described in Chapter 1, collectively have the following landscape features:

- Are located on the banks of a major waterway, i.e. the Hawkesbury River;
- Are to cross 1st, 2nd, 3rd and 4th order streams;
- Are located on undulating slopes and rises in proximity to a major waterway and 1st, 2nd, 3rd and 4th order streams;
- Are located on hill tops as evidenced by the township of Windsor;

Predictive models for the Cumberland Plain, as summarised in Section 5.2, have suggested that while Aboriginal sites may be found on all landforms:

- Gently undulating topography is preferred over steep slopes;
- High ground or ridge crests may be used for vantage points or travel routes, and
- More permanent water sources, as well as raw material sources like quarries, are more likely to attract repeat visits of longer duration in a concentrated area.

All eight of the proposed development options for the Windsor Bridge upgrade are located on landforms that predictive modelling suggests is more likely to yield Aboriginal archaeological sites. Higher landforms overlooking resource rich areas and locales next to the resources (e.g. waterways) are particularly archaeologically sensitive.

In addition stream order predictive modelling as outlined in Chapter 5 provides a base from which the type of archaeological sites to be expected can be ascertained. As these options will impact upon first through to fourth order creek lines the range of possible activities represented in the archaeological record in the vicinity of Windsor are quite diverse. Background scatters (1st order creeks), focussed activity centres featuring one-off camp location and single episode knapping floors (2nd order creeks), repeated occupation zones by smaller bands or reused knapping floors (3rd order creeks) and more complex sites featuring permanent or repeated occupation and the full array of domestic activities this would involve (4th order creeks) are all represented in the study area comprising all eight development options. Aboriginal archaeological sites could therefore be found at any point of the study area.

6.2.2 Site Types

The archaeological record of the study area, as described in Section 5.0, shows the following trends:

- The main site types are open camp sites (58.93%), isolated finds (19.64%), scarred trees and potential archaeological deposits (21.43%).
- Attractive areas in the landscape, such as permanent water, rises overlooking stream confluences, and raw material sources, attract repeat visits of longer duration. This results in a wider range of activities, producing more diverse archaeological remains;
- Other areas may show the results of expedient tool manufacture or repair, known as dinnertime camps, produced as people move through the landscape as part of a highly mobile lifestyle;
- Historical land clearance has greatly reduced the potential that scarred trees may survive in the study area.

It is therefore likely that the site types as are recorded in the local and general vicinity will continue. Archaeological sites types most likely to be contained within the impact zone inclusive of all eight development options are open camp sites/artefact scatters, isolated finds and potential archaeological deposits.

Other site types that may be present could relate to contact era archaeology. As described in Chapter 4 development option 8 is located in the locale of a historically recorded contact site between Governor Phillip and a party from Sydney and local Aboriginal people. There therefore remains the chance that a nationally significant contact era site could lay in the vicinity or in direct proximity to this route option.

6.2.3 Artefact Characteristics

It has been stated that "predictive models tell us where sites are likely to be but not what they contain" (AMBS 2005: 4). However, it has been suggested that the site's proximity to raw materials may have potential to influence the size of artefacts. It has been suggested that the reuse and conservation of materials would increase proportionally to the distance from the source (Dallas & Witter 1981 in OzArk 2004: 10; see also Smith 1988: 108-109). This would result in the following:

- Close to the material source (such as a quarry), artefacts would be discarded with minimal retouch, and a large percentage of cortex would remain on the artefact;
- Further from the material source, artefacts would be discarded only after further retouch and repair became impractical, and so only a small percentage of cortex (if any) would remain on the artefact.

Flaked glass artefacts may also occur based on the presence of such sites in the near vicinity. It is possible that the same rules of raw material conservation would apply to glass artefacts. However, at present there is only very limited locational data for glass artefacts, as such finds are relatively rare.

6.2.4 Site Preservation

A range of natural and human-induced taphonomic factors acts upon site preservation. The considerable disparity between surface findings and subsurface materials in the Cumberland Plain identified by McDonald (1996, JMCHM 1997a) means that the potential for subsurface deposit should be considered for open artefact scatters and isolated finds. Factors acting on site preservation and the potential for subsurface deposit in the study area are considered below:

- Past excavations in the vicinity of the present study area have been characterised by a high density of subsurface artefacts (e.g. Austral Archaeology *in draft*);
- Soil profiles from excavated deposits are potentially very deep due to the alluvial nature of the landscape. As a result intact Aboriginal archaeological deposit may lay beneath seemingly severely disturbed areas;
- Clearance, ploughing, embankment construction (with imported rubble and fill), and landscaping has caused *low to moderate* disturbance in areas closest to the Hawkesbury River;
- It is possible that flooding has caused *moderate* disturbance to any surface material. Fluvial action has been suggested as a taphonomic factor leading to the redistribution of artefacts into non-systematic concentrations with less focus than expected for even transient or dinnertime camps (AMBS 2005: 21-22).

With these factors in mind, it is possible to suggest probable levels of site preservation in different parts of the study area:

- The likelihood of surface material deposits being discovered along each of the eight development options is *high*. The likelihood that any such material will be either stratified or *in situ* is also *high*.

6.3 SECTION SUMMARY

The eight options of the proposed Windsor Bridge Upgrade cover very different terrain in terms of past land disturbance. Options 1 – 7 contain a varied level of disturbance between urban and commercial development and impacts through associated infrastructure (such as

roads and services). Within the township of Windsor where these options traverse, the impacts are more pronounced due to past development. However as has been demonstrated by Austral Archaeology's salvage excavation of the Windsor Museum site on Baker Street, beneath the layer of historic development and disturbance, intact and deep Aboriginal archaeological deposit can remain.

Aspects of each of these seven options also include areas of seemingly higher archaeological potential based on past land disturbance alone. This is especially the case of those segments of the proposed options that cross the Hawkesbury River. It is likely that both the northern and southern banks have undergone impacts since the arrival of European settlers.

It is considered that the whole of the township of Windsor is to be considered sensitive in terms of the possibility of encountering intact Aboriginal archaeological deposit.

Option 8 is especially noteworthy for its potential to contain Aboriginal archaeological material in a relatively undisturbed landscape. In addition there remains the potential for contact era archaeological sites to be located in direct proximity to it.

The site types are likely to reflect the location in which they were found. That is, those sites closer to higher order streams and major waterways (i.e. the Hawkesbury River) will reflect more complex archaeological sites than those on lower order first order ephemeral or semi-permanent water sources. The likelihood of Aboriginal archaeological material being located within the development envelope as represented by the eight options is high. Similarly the likelihood of any archaeological deposit being intact and stratified is also high.

Each of the proposed development options is considered in the following Chapter.

7.0 SITE VISIT AND OPTIONS ANALYSIS

7.1 INTRODUCTION

This Chapter will present a synthesis of the results of the desktop review and the site visit involving the relevant Aboriginal stakeholder representatives. Consideration will be given to the known Aboriginal archaeological and cultural heritage values of each of the eight development options. Known and likely heritage constraints are to be identified (within the constraints of the current document) and each development option ranked on its preferability in terms of impact upon Aboriginal archaeological and cultural heritage values.

7.2 SITE VISIT

All eight options were visited on the 10th of July with Phil Khan of the Deerubbin Local Aboriginal Land Council (DLALC) and with Sandra Lee of the Darug Aboriginal Tribal Corporation (DTAC) on the 21st of July 2009. Austral Archaeology staff included Evan Raper and Pamela Kottaras. Weather conditions on both days were fine permitting excellent site inspection opportunities. Site access was limited to publicly accessible land and what could be seen on private property from the road verge.

As this is a baseline analysis only, no formal archaeological or cultural assessment was undertaken. The Aboriginal stakeholder representatives were briefed on the project and its history to date. Specifically they were made aware that this was a baseline assessment involving only the relevant Local Aboriginal Land Council and Native Title Claimant/Holder and that they were to offer advice on any Aboriginal *cultural* issues only at this stage.

No new Aboriginal archaeological or cultural artefacts or sites were located during the course of the site inspections.

7.3 OPTIONS ANALYSIS CRITERIA

In relation to development impacts the preferred outcome is one that causes the minimal impact to Aboriginal archaeological and cultural heritage. In determining preferential ranking therefore the following criteria are taken into account:

- Known Aboriginal archaeological sites or values to be directly impacted;
- Known Aboriginal archaeological sites or values in direct proximity that are likely to extend into an option's development envelope;
- Known Aboriginal cultural sites or values that will be impacted;
- Potential Aboriginal archaeological deposit or material that may be directly impacted.

It should be noted that these ranking of development options are based on Aboriginal archaeological and cultural perspectives only. No other views or disciplines are being taken into account in the production of these ranking (i.e. historical archaeology and heritage, environmental and/or social).

7.4 OPTIONS ANALYSIS

Taking the criteria as established in Section 7.3 into account, the known and potential Aboriginal archaeological and cultural heritage constraints for each of eight proposed development options for the upgrade of the Windsor Bridge are to be presented and considered in the following pages. Each option is afforded a ranking out of eight (e.g. 5 of 8) with the lower the number representing the most preferred option (i.e. 1 of 8). Plans of each route and known Aboriginal sites are presented for each. These maps are reproduced in Appendix C.

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Options 1 & 2

Known Aboriginal Sites: Yes

Site Details: Artefact sites W1 – W4 & PADs W-NP & N-SP

Aboriginal Archaeological Potential: Yes

Aboriginal Cultural Potential: Yes

Consultant's Preferred Development Option Ranking: 1/2 of 8

Aboriginal Stakeholders Preferred Development Option: 1/2 of 8

Action Required: S87 and S90 consents permitting excavation of PADs and collection/destruction of the four isolated sites.

Figure 7.1 Options 1 & 2

Figure 7.2: Intersection of Bridge and Old Bridge Streets which Options 1 & 2 are to impact

Figure 7.3: South Bank of Hawkesbury River from where bridge is to span and archaeological potential has been previously determined

Figure 7.4: South and north bank where options 1 & 2 may be placed.

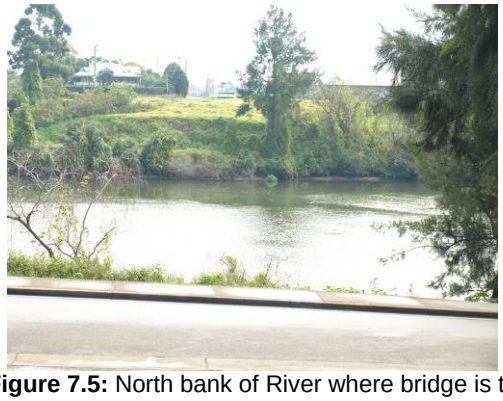

Figure 7.5: North bank of River where bridge is to land and where archaeological potential has been previously determined

Figure 7.6: Turf farm on northern bank where new bridge is to be placed and where archaeological sites and potential are located

Figure 7.7: Intersection of Wilberforce and Freemans Reach Road to be upgraded in Options 1 & 2

Aboriginal Stakeholder Comments: The Aboriginal stakeholder representatives were asked to consider the *cultural* potential of proposed options 1 and 2. Neither Aboriginal stakeholder representative was able to identify any specific cultural place, issue or concern. They both felt however that any area this close to the Hawkesbury River was imbued with intrinsic Aboriginal cultural value as it would have been a focus for past land-use and ceremony and would have been central to the lives of Aboriginal people who lived in the area. Both representatives are aware of archaeological investigations within and around Windsor and felt that where land was least disturbed there is a good potential for Aboriginal archaeological material. Such potential sites, the stakeholders also hold to be of significance to their community as it provides definite evidence of land-use. Phil Khan also wished to stress his conviction that where undisturbed sand dunes exist there remains a definite potential for burials – although he had no specific knowledge of any such sites.

Archaeological Potential: Heritage Concepts (2008a) have previously conducted an archaeological assessment involving Aboriginal consultation regarding an area that was inclusive of both options. During the course of this assessment four Aboriginal archaeological sites (W1 – W4) were identified on the north bank in the vicinity of where the proposed bridge is to make landfall. In addition two area of PAD (W-NP and W-SP) were recorded that includes both the southern and northern approaches of the newly proposed bridge. The two areas of PAD would be impacted by options 1 and 2 whilst it is considered likely that the four isolated finds would also be impacted being so close to the proposed development. They have therefore been included in the predicted archaeological impacts of option 1 and 2.

During the most recent site inspection the previously determined archaeological potential of the area where the proposed bridge is to be placed was noted and upheld. The previously identified archaeological sites were not relocated and no additional archaeological artefactual material was noted during the site inspection.

Discussion: It is offered by the consultant that these two options do represent a good preference from the perspective of Aboriginal archaeological and cultural heritage. Known Aboriginal sites are to be impacted (artefact sites W1 – W4 & PADs W-NP & N-SP) however as assessment has already been conducted the project could progress to a later phase should time constraints be an issue.

This option has been ranked as the most preferred as it is considered by both the consultant and the Aboriginal stakeholders to represent the least amount of potential disturbance to unknown Aboriginal archaeological and cultural values. The Aboriginal stakeholders particularly preferred this option as having already conducted the assessment of the area they felt they were aware of the option's potential to impact upon Aboriginal cultural heritage.

This option involves the least disturbance to potential Aboriginal archaeological deposit. Full assessment has already been completed (Heritage Concepts 2008a) and known Aboriginal sites and PADs can be effectively mitigated through collection and excavation.

Options 1 and 2 was also held by the Aboriginal stakeholders to be the preferred option as the reduced amount of ground disturbance represented the least chance of impact upon any unknown *cultural* sites.

Table 7.1: Sites impacted by options 1 and 2 and actions required

Item #	Name / Description	Heritage Listing	Heritage Significance	Impact? Yes/No	Action
1	PAD W-NP	AHIMS 45-5-3580	High	Yes	S87 investigation
2	PAD W-SP	AHIMS 45-5-3581	High	Yes	S87 investigation
3	Isolated Find W1	AHIMS 45-5-3582	Low	Yes	S90 Consent
4	Isolated Find W2	AHIMS 45-5-3583	Low	Yes	S90 Consent
5	Isolated Find W3	AHIMS 45-5-3584	Low	Yes	S90 Consent
6	Isolated Find W4	AHIMS 45-5-3585	Low	Yes	S90 Consent

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Option 3

Known Aboriginal Sites: Yes

Site Details: Artefact sites W1 – W4 & PADs W-NP & N-SP

Aboriginal Archaeological Potential: Yes

Aboriginal Cultural Potential: Yes

Consultant's Preferred Development Option Ranking: 3 of 8

Aboriginal Stakeholders Preferred Development Option: 7 of 8

Action Required: S87 and S90 consents permitting excavation of PADs and collection/destruction of the four isolated sites.

Additional archaeological assessment of west side of bridge approaches.

Figure 7.8 Option 3

Figure 7.9: Location proposed bridge location (current Windsor Bridge in background)

Figure 7.10: North Bank of Hawkesbury River

Figure 7.11: South and north bank where option 3 may be placed.

Figure 7.12: North bank of River

Figure 7.13: Turf farm on northern bank where new bridge is to be placed and where archaeological sites and PAD are located

Figure 7.14: Intersection of Wilberforce and Freemans Reach Road to be upgraded in Option 3

Aboriginal Stakeholder Comments: The Aboriginal stakeholder representatives were asked to consider the *cultural* potential of proposed option 3. Neither Aboriginal stakeholder representative was able to identify any specific cultural place, issue or concern. They both felt however that any area this close to the Hawkesbury River was imbued with intrinsic Aboriginal cultural value as it would have been a focus for past land-use and ceremony and would have been central to the lives of Aboriginal people who lived in the area. Both representatives are aware of archaeological investigations within and around Windsor and felt that where land was least disturbed there is a good potential for Aboriginal archaeological material. Such potential sites the stakeholders also hold to be of significance to their community as it provides definite evidence of land-use.

Phil Khan of DLALC wished to stress his conviction that where undisturbed sand dunes exist there remains a definite potential for burials – although he had no specific knowledge of any such sites. Neither stakeholder was supportive of option 3 as they felt that the likely impact to built heritage would be too great. These comments were not based on Aboriginal cultural heritage concerns but over concerns for the heritage of Windsor, which they also value.

Archaeological Potential: Heritage Concepts (2008a) have previously conducted an archaeological assessment inclusive in the area. The assessment located two PADs and four isolated finds. The assessment however does not include the northern and southern approaches to the west of the bridge. These would need to be subject to additional full Aboriginal archaeological and cultural assessment. It is likely that the areas of PAD currently demarcated as W-NP and W-SP along the banks of the Hawkesbury River would be expanded to include the new development envelope as dictated by development option 3.

This option involves limited disturbance to potential Aboriginal archaeological deposit. In addition it is likely that the four isolated finds will be impacted by development works on the northern bank and will require mitigation. There does remain the potential for additional sites to be impacted, based on the results of subsequent assessment. Option 3 is considered by the consultant to be the third best option.

Item #	Name / Description	Heritage Listing	Heritage Significance	Impact? Yes/No	Action
1	PAD W-NP	AHIMS 45-5-3580	High	Yes	S87 investigation
2	PAD W-SP	AHIMS 45-5-3581	High	Yes	S87 investigation
3	Isolated Find W1	AHIMS 45-5-3582	Low	Likely	S90 Consent
4	Isolated Find W2	AHIMS 45-5-3583	Low	Likely	S90 Consent
5	Isolated Find W3	AHIMS 45-5-3584	Low	Likely	S90 Consent
6	Isolated Find W4	AHIMS 45-5-3585	Low	Likely	S90 Consent

Table 7.2: Sites impacted by option 3 and actions required

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Option 4

Known Aboriginal Sites: Yes

Site Details: Artefact sites W1 – W4 & PAD W-NP;

PAD sites 45-5-3011 Windsor Museum and Development Curtilage;

BGW97 (45-5-2435).

Aboriginal Archaeological Potential: Yes

Aboriginal Cultural Potential: Yes

Consultant's Preferred Development Option Ranking: 7 of 8

Aboriginal Stakeholders Preferred Development Option: 6 of 8

Action Required: S87 and S90 consents permitting excavation of PAD W-NP and likely collection/destruction of the four isolated sites W1 – W4;

Full Aboriginal archaeological and cultural assessment of option;

Consultation with DECC and Aboriginal stakeholders re Windsor Museum Development Curtilage

Figure 7.15 Option 4

Figure 7.16: Northern bank where bridge will land

Figure 7.17: Baker Street – south bank

Figure 7.18: Corner of Baker and Macquarie Streets – south bank

Figure 7.19: North bank of River

Aboriginal Stakeholder Comments: The Aboriginal stakeholder representatives were asked to consider the *cultural* potential of proposed option 4. Neither Aboriginal stakeholder representative was able to identify any specific cultural place, issue or concern. They both felt however that any area this close to the Hawkesbury River was imbued with intrinsic Aboriginal cultural value as it would have been a focus for past land-use and ceremony and would have been central to the lives of Aboriginal people who lived in the area. Both representatives are aware of archaeological investigations within and around Windsor and felt that where land was least disturbed there is a good potential for Aboriginal archaeological material. Such potential sites the stakeholders also hold to be of significance to their community as it provides definite evidence of land-use.

Phil Khan of DLALC wished to stress his conviction that where undisturbed sand dunes exist there remains a definite potential for burials – although he had no specific knowledge of any such sites.

Neither stakeholder was supportive of option 4 as they felt that the likely impact to built heritage would be too great. These comments were not based on Aboriginal cultural heritage concerns but over concerns for the heritage of Windsor that they also value.

Archaeological Potential: Considerable archaeological investigation has been undertaken along Baker Street. An excavation on the corner of Gorge and Baker Streets of BGW97 (45-5-2435) revealed 1,586 stone artefacts beneath historic floor deposits (JMCHM Pty Ltd 1998). Although no further works would be necessary for site BGW97 (45-5-2435) the extent of archaeological may continue beyond the boundaries of the property tested thereby representing an archaeological constraint.

In addition Austral Archaeology's excavation of deposits beneath undeveloped land at the back of the old Windsor Museum and the existing municipal car park beside the Macquarie Arms Hotel revealed in excess of 11,000 artefacts (*in draft – b)*. In addition Lot 1 DP 60716 on which the new Windsor Museum now stands and Lot 3 DP 864088 is part of a heritage development curtilage. As part of the varied S90 consent allowing salvage works to be completed in 2007 the Lot 1, DP 60716 and Lot 3 DP 864088, upon completion of the Windsor Museum extension, was to be subject to a development curtilage. It was believed that the Windsor Museum PAD likely extended from where it had been subject to surface archaeological testing and salvage. Therefore any development works impacting upon Lot 1, DP 60716 would require consultation with the NSW DECC and the Aboriginal stakeholders consulted for that project (DLALC, DCAC, DACHA and DTAC).

Full Aboriginal archaeological and cultural assessment of this option is therefore recommended should it be selected. It is likely that development closest to the river (i.e. both the northern and southern banks of the Hawkesbury River) will be highlighted as impacting upon potential Aboriginal archaeological deposit. The outcome of such an assessment is likely to be similar to that recommended by Heritage Concepts (2008a) in their assessment for the Windsor Bridge (i.e. a programme of archaeological subsurface excavation).

It is likely also that additional areas along Baker Street would be highlighted as areas of potential. As the 1998 Jo McDonald Cultural Heritage Management and 2005-2007 Austral Archaeology excavations have shown, deep intact deposit can lay beneath seemingly severe urban and historical disturbances. The abandoned car park/service station on the corner of Baker and Macquarie Streets is an example of a potential archaeological deposit that could be identified during assessment (Figure 7.18).

Option 4 is not considered by the consultant to be a favourable option for the Windsor Bridge upgrade. Considerable known and a high potential of unrecorded Aboriginal archaeological deposit would be impacted by the development of this option. If considered for development a full Aboriginal archaeological and cultural assessment is recommended for option 4.

Table 7.3: Sites impacted by option 4 and actions required

Item #	Name / Description	Heritage Listing	Heritage Significance	Impact? Yes/No	Action
1	PAD W-NP	AHIMS 45-5-3580	High	Yes	S87 investigation
3	Isolated Find W1	AHIMS 45-5-3582	Low	Yes	S90 Consent
4	Isolated Find W2	AHIMS 45-5-3583	Low	Yes	S90 Consent
5	Isolated Find W3	AHIMS 45-5-3584	Low	Yes	S90 Consent
6	Isolated Find W4	AHIMS 45-5-3585	Low	Yes	S90 Consent
7	PAD BGW97	AHIMS 45-5-2435	Moderate	No	None
8	PAD Windsor Museum and development curtilage	45-5-3011	High	Yes	Consultation with DECC and Aboriginal stakeholders

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Option 5

Known Aboriginal Sites: Yes

Site Details: Artefact sites W1 – W4 & PAD W-NP

Aboriginal Archaeological Potential: Yes

Aboriginal Cultural Potential: Yes

Consultant's Preferred Development Option Ranking: 6 of 8

Aboriginal Stakeholders Preferred Development Option: 5 of 8

Action Required: S87 and S90 consents permitting excavation of PAD W-NP and likely collection/destruction of the four isolated sites W1 – W4;

Full Aboriginal archaeological and cultural assessment of option

Figure 7.20 Option 5

Figure 7.21: Kable Street – south bank

Figure 7.22: Car park at corner of Kable and Macquarie Streets

Figure 7.23: Car park - corner of Kable Street and the Terrace

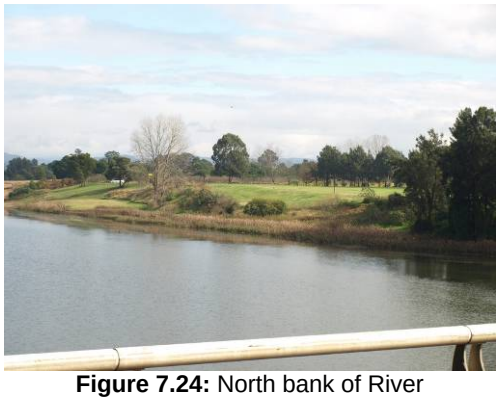

Figure 7.24: North bank of River

Aboriginal Stakeholder Comments: The Aboriginal stakeholder representatives were asked to consider the *cultural* potential of proposed option 5. Neither Aboriginal stakeholder representative was able to identify any specific cultural place, issue or concern. They both felt however that any area this close to the Hawkesbury River was imbued with intrinsic Aboriginal cultural value as it would have been a focus for past land-use and ceremony and

would have been central to the lives of Aboriginal people who lived in the area. Both representatives are aware of archaeological investigations within and around Windsor and felt that where land was least disturbed there is a good potential for Aboriginal archaeological material. Such potential sites the stakeholders also hold to be of significance to their community as it provides definite evidence of land-use.

Phil Khan of DLALC wished to stress his conviction that where undisturbed sand dunes exist there remains a definite potential for burials – although he had no specific knowledge of any such sites.

Neither stakeholder was supportive of option 5 as they felt that the likely impact to built heritage would be too great. These comments were not based on Aboriginal cultural heritage concerns but over concerns for the heritage of Windsor that they also value.

Archaeological Potential: As noted for option 4, considerable Aboriginal archaeological excavation has been undertaken along Baker Street to the east. Although no known Aboriginal sites are to be impacted by option 5, it is likely that similar Aboriginal archaeological material and deposit exists along Kable Street as it does on Baker Street. Given that the historic buildings along Kable are unlikely to have deep foundations and given that Aboriginal archaeological material was located beneath historical sites on Baker Street the potential for intact Aboriginal archaeological deposit is high.

Full Aboriginal archaeological and cultural assessment would be recommended for this option. It is likely to highlight and focus upon those areas of least disturbance, for example the car parks at the corner of Kable & Macquarie Streets and Kable Street and The Terrace. In addition it is likely that Aboriginal archaeological potential would be identified with both the northern and southern banks of the Hawkesbury River.

This would be in addition to mitigation to known sites W1 – W4 & PAD W-NP that are to be impacted on the northern bank.

Option 5 is not considered by the consultant to be a favourable option for the Windsor Bridge upgrade. Considerable known and a high potential of unrecorded Aboriginal archaeological deposit would be impacted by the development of this option. If considered for development a full Aboriginal archaeological and cultural assessment is recommended for option 5.

Item #	Name / Description	Heritage Listing	Heritage Significance	Impact? Yes/No	Action
1	PAD W-NP	AHIMS 45-5-3580	High	Yes	S87 investigation
3	Isolated Find W1	AHIMS 45-5-3582	Low	Yes	S90 Consent
4	Isolated Find W2	AHIMS 45-5-3583	Low	Yes	S90 Consent
5	Isolated Find W3	AHIMS 45-5-3584	Low	Yes	S90 Consent
6	Isolated Find W4	AHIMS 45-5-3585	Low	Yes	S90 Consent

Table 7.4: Sites impacted by option 5 and actions required

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Option 6

Known Aboriginal Sites: No

Site Details: NA

Aboriginal Archaeological Potential: Yes

Aboriginal Cultural Potential: Yes

Consultant's Preferred Development Option Ranking: 5 of 8

Aboriginal Stakeholders Preferred Development Option: 3 of 8

Action Required:

Full Aboriginal archaeological and cultural assessment of option

Figure 7.25 Option 6

Figure 7.26: North bank where option 6 is to land

Figure 7.27: North bank where option 6 is to land

Figure 7.28: Reserve at end of Palmer Street

Figure 7.29: View towards South Creek

Aboriginal Stakeholder Comments: The Aboriginal stakeholder representatives were asked to consider the *cultural* potential of proposed option 6. Neither Aboriginal stakeholder representative was able to identify any specific cultural place, issue or concern. They both felt however that any area this close to the Hawkesbury River was imbued with intrinsic Aboriginal cultural value as it would have been a focus for past land-use and ceremony and would have been central to the lives of Aboriginal people who lived in the area. Both representatives are aware of archaeological investigations within and around Windsor and felt

that where land was least disturbed there is a good potential for Aboriginal archaeological material. Such potential sites the stakeholders also hold to be of significance to their community as it provides definite evidence of land-use.

Phil Khan of DLALC wished to stress his conviction that where undisturbed sand dunes exist there remains a definite potential for burials – although he had no specific knowledge of any such sites.

Both stakeholders preferred this option to others as they felt that Aboriginal cultural impacts would be limited to the banks of South Creek and the Hawkesbury River. Although of significance to them they felt that appropriate consultation, assessment and further mitigation (i.e. excavation) would effectively meet cultural concerns.

Archaeological Potential: No known Aboriginal archaeological sites or material are to be impacted by this option. Given known models of site prediction, the consultant considers it likely that Aboriginal archaeological material would be encountered, therefore impacted, by development of this option (refer Chapter 6). This is especially the case in relation to land closest to South Creek and the Hawkesbury River. No Aboriginal artefactual material was noted during the site inspection; however full access was not possible to South Creek.

Also, although portions of this option follow areas of urban and historic land disturbance, given the particular Aboriginal archaeological sensitivity of the township of Windsor as a whole the location of archaeological material along such sections of Palmer Street cannot be discounted.

It is the consultant's opinion that option 6 is considered as one of the preferred routes as it does not contain any known Aboriginal archaeological sites. It is recommended however that a full Aboriginal archaeological and cultural assessment be undertaken for this option to ascertain the route's Aboriginal archaeological potential.

Item #	Name / Description	Heritage Listing	Heritage Significance	Impact? Yes/No	Action
-	-	-	-	-	-

Table 7.5: Sites impacted by option 6 and actions required

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Option 7

Known Aboriginal Sites: No

Site Details: NA

Aboriginal Archaeological Potential: Yes

Aboriginal Cultural Potential: Yes

Consultant's Preferred Development Option Ranking: 4 of 8

Aboriginal Stakeholders Preferred Development Option: 4 of 8

Action Required:

Full Aboriginal archaeological and cultural assessment of option

Figure 7.25 Option 7

Figure 7.26: North bank where option 7 is to land

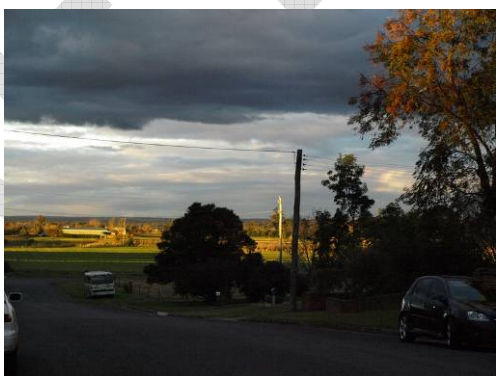

Figure 7.27: North Street

Aboriginal Stakeholder Comments: The Aboriginal stakeholder representatives were asked to consider the *cultural* potential of proposed option 7. Neither Aboriginal stakeholder representative was able to identify any specific cultural place, issue or concern. They both felt however that any area this close to the Hawkesbury River was imbued with intrinsic Aboriginal cultural value as it would have been a focus for past land-use and ceremony and would have been central to the lives of Aboriginal people who lived in the area. Both representatives are aware of archaeological investigations within and around Windsor and felt that where land was least disturbed there is a good potential for Aboriginal archaeological material. Such potential sites the stakeholders also hold to be of significance to their community as it provides definite evidence of land-use.

Phil Khan of DLALC wished to stress his conviction that where undisturbed sand dunes exist there remains a definite potential for burials – although he had no specific knowledge of any such sites.

Neither stakeholder was supportive of option 7 as they felt that the likely impact to built heritage would be too great. These comments were not based on Aboriginal cultural heritage concerns but over concerns for the heritage of Windsor that they also value.

Both highlighted the potential cultural significance of that part of the development area close to the River and although of significance felt that appropriate consultation, assessment and further mitigation (i.e. excavation) would effectively meet cultural concerns.

Archaeological Potential: No known Aboriginal archaeological sites or material are to be impacted by this option. Given known models of site prediction, the consultant considers it likely that Aboriginal archaeological material would be encountered, therefore impacted, by

development of this option (refer Chapter 6). This is especially the case in relation to land closest to the Hawkesbury River. No Aboriginal artefactual material was noted during the site inspection.

Also, although portions of this option follow areas of urban and historic land disturbance, given the particular Aboriginal archaeological sensitivity of the township of Windsor as a whole the location of archaeological material along such sections such as North, Court and Palmer Streets cannot be discounted.

The consultant feels option 7 to be a preferred option as known Aboriginal archaeological sites are not to be impacted. It is recommended however that a full Aboriginal archaeological and cultural assessment be undertaken for this option to ascertain the routes Aboriginal archaeological potential.

Item #	Name / Description	Heritage Listing	Heritage Significance	Impact? Yes/No	Action
-	-	-	-	-	-

Table 7.6: Sites impacted by option 7 and actions required

This information has been omitted from the current document due to its potentially culturally sensitive nature. Such data is presented in the restricted version only.

Option 8

Known Aboriginal Sites: Yes

Site Details:

PT 1 (45-5-3038), *Ancient Levee deposit (no AHIMS number, recorded by Comber 2004);

Moderate area of PAD (Navin Officer 2002);

Heritage Conservation zone (AHMS 2006b).

Aboriginal Archaeological Potential: Yes

Aboriginal Cultural Potential: Yes

Consultant's Preferred Development Option Ranking: 8 of 8

Aboriginal Stakeholders Preferred Development Option: 8 of 8

Action Required:

Full Aboriginal archaeological and cultural assessment of option;

Review of management Plans for areas off Punt Road for further clarification

Figure 7.28 Option 7

Figure 7.29: Landscape of King Road where option 8 is to cross

Figure 7.30: End of Punt Road – south bank

Figure 7.31: Punt Road – south bank

Figure 7.32: Landscape off Pitt Town Bottoms Road – south bank

Aboriginal Stakeholder Comments: The Aboriginal stakeholder representatives were asked to consider the *cultural* potential of proposed Option 8. Both identified that area closest to the Hawkesbury River to either side of Punt Road to be of cultural significance due to their knowledge of the large numbers and complexity of archaeological sites located there. The DLALC representative in particular highlighted the area to be significant.

Both representatives also stressed the necessity to perform assessment on the northern bank where Option 8 is to impact as this area had not previously been assessed to their knowledge and they believed considerable Aboriginal archaeological and cultural values would likely be affected.

Phil Khan of DLALC wished to stress his conviction that where undisturbed sand dunes exist there remains a definite potential for burials – although he had no specific knowledge of any such sites.

Both Aboriginal representatives believed that this option was by far the least favourable of the eight as there are known Aboriginal archaeological and cultural heritage values that will be impacted by development of this option through this region. Neither supported this option and both stressed the need for comprehensive Aboriginal archaeological and cultural assessment should it be selected for development.

Archaeological Potential: As can be seen in Chapter 5 of this report there has been considerable archaeological investigation in the area to the east of Punt Road. The area closest to the Hawkesbury River from Pitt Town Bottoms Road to the waterway is likely to be identified as an extremely sensitive Aboriginal archaeological and cultural heritage area.

No records could be located of any such Aboriginal archaeological sites, assessments or investigations on the northern bank of the River towards King Street/Wilberforce. It is highly likely that no areas of Aboriginal archaeological potential have been identified on the northern or to the west of Punt Road on the southern bank as no assessments have been so far undertaken. This does not negate the presence of Aboriginal archaeological and cultural heritage values.

Several known sites, PADs and heritage conservation zones are likely to be impacted by the development of option 8 along Bathurst and Punt Roads. It is likely that further mitigation in the form of additional assessment and archaeological subsurface investigation would be required.

Also worthy of consideration is the historically recorded episode of Governor Phillip and a party from Sydney exploring the area and meeting with local Aboriginal people in the vicinity of Pitt Town Bottoms. This episode involving an extremely important historical figure would certainly require further assessment as there remains a low possibility that evidence of this encounter (as well as any contact era archaeological material created as a result) is extant in the archaeological record in the vicinity of the proposed development envelope.

The landscape associated with this option is extremely archaeologically sensitive in respect of Aboriginal archaeological and cultural heritage. The consultant does not see this option as a preferable one for several reasons: firstly known Aboriginal archaeological values are to be impacted; it is highly likely that previously unrecorded Aboriginal archaeological and cultural sites will be impacted and; there remains the opportunity for contact era sites to be located within the development envelope involving highly important historical figures. Should this option be selected for development full Aboriginal archaeological and cultural assessment is recommended.

9	PT 1	AHIMS 45-5-3038	Unknown	Possible	S90 Consent if not destroyed already - Further enquiry required as part of full assessment
10	Ancient Levee deposit - (Comber	No AHIMS details	Unknown	Possible	Further enquiry required as part of full

	2004)				assessment
11	PAD - (Navin Officer 2002)	No AHIMS details	Moderate	Yes	Possible S87 investigation. Further enquiry required as part of full assessment
12	Heritage Conservation Zone – (AHMS 2006)	No AHIMS details	High	Possible	Further enquiry required as part of full assessment

Table 7.7: Sites impacted by option 8 and actions required

8.0 CONCLUSION

8.1 DISCUSSION

Desktop assessment and site inspection of the eight development options being proposed by the RTA for the Windsor Bridge Road upgrade was undertaken by Austral Archaeology in June and July of 2009. Through desktop and database research a total of twelve known and likely Aboriginal archaeological heritage constraints were noted (Table 8.1). Of the eight options only two (options 6 and 7) were without known Aboriginal archaeological constraints.

Such analysis however does not take into account probable Aboriginal archaeological potentials and constraints. The local Aboriginal archaeological context, ascertained through background research, as well as application of quantifiable regional archaeological site prediction models has identified that each of the eight options has the likelihood of impacting upon previously unrecorded Aboriginal archaeological sites and areas of potential archaeological deposit (PAD). This is especially the case in proximity to the major waterway that each option must cross (i.e. the Hawkesbury River) thereby impacting its southern and northern banks.

It has been shown that urban and historic disturbance to ground deposit is no guarantee that any remnant Aboriginal archaeological deposit within or under such disturbances is without integrity or significance. Several Aboriginal archaeological subsurface investigations within the township of Windsor itself (e.g. JMCHM Pty Ltd 1998 & Austral Archaeology *in draft – b*) have revealed considerable site complexity and deposit depth.

Item #	Name / Description	Heritage Listing	Heritage Significance	Impact? Yes/No	Action
1	PAD W-NP	AHIMS 45-5-3580	High	Yes	S87 investigation
2	PAD W-SP	AHIMS 45-5-3581	High	Yes	S87 investigation
3	Isolated Find W1	AHIMS 45-5-3582	low	Yes	S90 Consent
4	Isolated Find W2	AHIMS 45-5-3583	low	Yes	S90 Consent
5	Isolated Find W3	AHIMS 45-5-3584	low	Yes	S90 Consent
6	Isolated Find W4	AHIMS 45-5-3585	low	Yes	S90 Consent
7	PAD BGW97	AHIMS 45-5-2435	Moderate	No	None
8	PAD Windsor Museum and development curtilage	AHIMS 45-5-3011	High	Yes	Consultation with DECC and Aboriginal stakeholders
9	PT 1	AHIMS 45-5-3038	Unknown	Possible	S90 Consent if not destroyed already - Further enquiry required as part of full assessment
10	Ancient Levee deposit - (Comber 2004)	No AHIMS details	Unknown	Possible	Further enquiry required as part of full assessment

11	PAD - (Navin Officer 2002)	No AHIMS details	Moderate	Yes	Possible S87 investigation. Further enquiry required as part of full assessment
12	Heritage Conservation Zone – (AHMS 2006)	No AHIMS details	High	Possible	Further enquiry required as part of full assessment

Table 8.1: Known Aboriginal archaeological constraints and actions required

The Aboriginal stakeholders consulted for this project did not identify any specific cultural sites, issues or concerns. Although no specific concerns were raised both the DLALC and DTAC representatives wished it noted that those areas closest to the Hawkesbury River and to a lesser extent South Creek hold intrinsic Aboriginal cultural value. Although no specific examples in the region of this study were given the DLALC representative wished it recorded that it is felt that where intact sand dunes are located there remains a good chance for burials to be located. Such burials would be of considerable cultural significance to the Aboriginal community as well as possessing a high level of research value.

In terms of the development options presented the stakeholders were unanimous in their consideration of options 1 and 2 to be the most preferable from their perspective. They felt that as the Aboriginal archaeological and cultural assessment had already been conducted they were aware of the archaeological and cultural values of the area and were confident in the mitigation and management strategies proposed as a result (i.e. excavation). They also felt that these options involved the least amount of new disturbance to potential Aboriginal archaeological and cultural deposits.

The Aboriginal stakeholders expressed a lesser preference for options 6 and 7 and held no strong preference on the remainder of the options presented. They were expressly unfavourable towards option 8 which they feel will have a considerable impact upon the Aboriginal cultural values of that stretch of the River and its banks.

From the consultant's perspective based on the archaeological values of the study it is posited that Options 1 and 2 are the more favourable preferences with which to proceed. The impacts to potential archaeological deposits are known and adequate strategies for their mitigation proposed. Utilising existing road approaches to the bridge on both the southern and northern banks as much as possible seems a preferable outcome compared to landing a new bridge on relatively undisturbed river bank as would occur for all the other options (with the exception of option 3).

Option 3 is also a favourable option to consider due to the similar rationale of minimal impact to potential Aboriginal archaeological deposit. The drawback to option 3, as with all of the other options, apart from 1 and 2, is the necessity for full and additional Aboriginal archaeological and cultural assessment as aspects of this option have not been included in such an assessment previously.

Development options 4 and 5 through the township of Windsor do not, from the consultant's perspective, present favourable options. Given the known archaeological sensitivity of the subsurface deposit within the township itself the recommended course would be full Aboriginal archaeological and cultural assessment. This would likely lead to the identification of areas of Aboriginal archaeological potential considered worthy of further investigation and within the purview of development impacts in addition to areas closer to the river. This would likely mean a more considerable project delay and cost in addition to the increased impact upon the Aboriginal archaeological and cultural resource.

This is also the likely scenario to be followed should options 6 and 7 be selected. Option 6 will cross South Creek in additional to the banks of the Hawkesbury River, both of which are known areas of Aboriginal archaeological sensitivity. It is likely that an assessment of this option would identify PAD and propose archaeological subsurface investigation. Option 7 which will avoid the sensitive archaeological area that South Creek represents would also entail further consultation and archaeological assessment as the sensitive banks of the Hawkesbury will again be crossed.

Option 8 is, in the consultant's opinion, the least favourable of all the options proposed. The area to the east of Punt Road is an area of particular Aboriginal archaeological and cultural sensitivity. The

recommended assessment of the development route that is to cross to the west of Punt Road would likely confirm the area's Aboriginal archaeological sensitivity. It is considered that considerable archaeological assessment and further investigation, mitigation (involving both banks of the river) and impact to the Aboriginal archaeological resource would be required should option 8 be selected.

8.2 CONCLUSION

Taking the background Aboriginal archaeological contextual data and site inspection into account, the consultant can offer a preferred ranking of each option from both an archaeological and cultural heritage perspective:

Development Option	Aboriginal stakeholders' Cultural Preference	Consultant's Archaeological Preference
Option 1/2	1	1
Option 3	7	3
Option 4	6	7
Option 5	5	6
Option 6	3	5
Option 7	4	4
Option 8	8	8

Table 8.2: Windsor Bridge Development Option Preference

To précis, Options 1, 2, 3, 4, 5 and 8 have been determined in this baseline report to impact upon known Aboriginal archaeological values. In addition Options 3 through 8 have also been determined to impact upon areas of previously unassessed archaeological sensitivity and potential. Selection of any of these options would therefore require the undertaking of an Aboriginal archaeological and cultural assessment involving full consultation with the Aboriginal stakeholders. The purpose of such an assessment would be to formally identify any specific areas of Aboriginal archaeological and cultural value or potential and consult with Aboriginal stakeholders as to appropriate management and mitigation strategies.

Taking the background Aboriginal archaeological contextual data and site inspection into account it is the consultant's opinion that options 1 and 2 and to a lesser extent option 3 represent the preferred options for the Windsor Bridge upgrade programme in respect of Aboriginal archaeological and cultural heritage. These three options will involve the least amount of disturbance to known and potential Aboriginal archaeological and cultural values as well as the least amount of further assessment, investigation and mitigation. Options 1 and 2 in particular have already been subject to Aboriginal archaeological and cultural assessment (Heritage Concepts 2008a). Artefacts and areas of potential have been identified along these options and management and mitigation advice offered as a result. Selection of either options 1 and/or 2 would therefore progress the RTA's project to the next stage of development without the necessity for additional assessment.

Please note: This report contains descriptions and locational data relating to Aboriginal archaeological and cultural material and sites. Apart from legislative protection afforded by Section 90 of the *National Parks and Wildlife Act 1974 (amended)* this information is considered sensitive and of great importance to the Aboriginal community. As a result public exhibition of this report in its present form would not be appropriate. Should public exhibition of this document be required it is advisable that additional liaison between the Aboriginal stakeholders identified in this report, RTA and Austral Archaeology Pty Ltd take place in order to ascertain that information which should be removed.

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