NSW GOVERNMENT
Transport
Roads & Traffic
Authority

Windsor Bridge over the Hawkesbury River

Punt and wharf sites, maritime archaeological inspection

PUBLISHED AUGUST 2011

RTA/Pub. 11.336 ISBN 978-1-921899-75-1

Roads and Traffic Authority of NSW

Punt and Wharf Sites, Maritime Archaeological Inspection

Prepared February 2009 by Cosmos Coroneos and Chris Lewczak

Published August 2011

ISBN: 978-1-921899-75-1
Publication Number: 11.336

Cover image : A View of Hawkesbury, and the Blue Mountains. / New South Wales. C. 1818. Printed beneath the image is "Engrav'd by W. Preston from an Original Drawing by Cap.t Wallis. 46th Reg.t". A watercolour drawing titled "Hawkesbury & Blue Mountains, / from **Windsor**", which is inscribed "James Wallis 1815 with Camera Lucida", is in a private Sydney collection. The drawing is quite close to this engraving. (State Library of NSW Call no. PXD 373/1).

This image is of interest as it appears to show the township of Windsor high up on the bank on the left, a dilapidated jetty/wharf on the same side with a vessel tied up alongside, a double ended poled vessel (the punt) with passengers crossing the River and a road on the right side stopping at the River's edge (the punt crossing). It would appear that the punt crossing on the left (south bank) is obscured by the wharf. The wharf's poor condition maybe the result of the 1816 flood and/or it being in the process of being upgraded.

46 Gale Rd
MAROUBRA 2035
Sydney, NSW

General enquiries: +61 2 9568 5800
www.cosmosarch.com

Cosmos Archaeology Pty Ltd

A.B.N. 83 082 211 498

TABLE OF CONTENTS

Abbreviations

m	Metre
RTA	Roads and Traffic Authority
SOHI	Statement of Heritage Impact
SSBA	Surface Supplied Breathing Apparatus

Executive Summary

The Roads and Transport Authority (RTA) and NSW Heritage Branch have requested than a maritime archaeological assessment be undertaken in the vicinity of the 1795 and 1816 wharf and former punt crossing on the Hawkesbury River at Windsor. Potential upgrade or replacement works to the current bridge across the river may impact on surviving archaeological remains associated with the former wharf and punt crossing.

An archaeological survey recorded remains associated with the 1816 wharf, both above and below the waterline. Structural remains of the wharf, including a pile, deck beam and walings, are present protruding from the riverbank above the waterline. Nine underwater transects were placed around the extant remains to assess the riverbed conditions and archaeological potential. Structural timbers associated with the former wharf were recorded, as well as sandstone cobble ballast, believed to have been used to help hold the structure in place, were surveyed on the riverbed in the location of the wharf.

An underwater survey was also conducted adjacent to the current bridge on the northern side of the river in the probable location of the early punt crossing did not locate any remains of the former landing.

It has been predicted that archaeological relics are present from the wharf built at Windsor within and under the sandstone cobble ballast. This would include both structural remains relating to the 1816 wharf, including piles and other timber structural remains; and artefacts associated with the use of the facility. There is also the potential for archaeological remains to exist from the earlier 1795 wharf in the same location.

The potential archaeological remains associated with the punt crossing are expected to also be present, however, these are predicted to be limited to fragmentary remains of the former landings and cut down posts.

Terrestrial remains, both structural remains built below ground and remains buried in later reclamation works, are predicted to also be located behind the riverbank. This could include surface elements such as timber decking and compacted surfaces.

Based on the findings of the study the following recommendation is presented:

Recommendation 1 : *A Statement of Significance and a Statement of Heritage Impact should be prepared on the submerged and riverbank archaeological resource as part of the overall Statement of Heritage Impact prepared for the project when further details on the proposed development becomes available.*

The report should contain:

- Additional research on the location of the wharf and the punt landing;
- Overlays using historical plans showing the relationship of the wharf and landings to the proposed development, and;
- Only if feasible, a terrestrial site inspection to be carried out after the banks have been cleared of vegetation.

1.0 INTRODUCTION

1.1 Background

Works are to be conducted around the Hawkesbury River Bridge at Windsor, which may result in the construction of a new bridge. This could have substantial impacts to the riverbed adjacent to the existing bridge.

A Statement of Heritage Impact for the Hawkesbury River Bridge prepared by Heritage Concepts Pty. Ltd. identified a 1795 and 1816 wharf as well as a punt landing were located adjacent and downstream of the existing bridge.[1] The condition of these submerged remains and associate cultural deposits were not known and it was recommended that an underwater survey of the "wharf area" be undertaken.[2]

The Roads and Transport Authority (RTA) and NSW Heritage Branch requested the undertaking of a maritime archaeological assessment to locate any remnant features of the jetty, punt crossing or any material washed up on the bank. Cosmos Archaeology Pty Ltd was commissioned on 24th November 2008 to undertake the assessment.

1.2 The Study Area

The study area of the inspection is confined to the investigation of the riverbed, in two distinct areas (Figure 1);

- Under the bridge to the existing wharf, ca. 100 m distance, on the south bank and up to 20 m from the river edge (former wharves and punt landing);
- Under and downstream of the bridge on the north bank (punt landing).

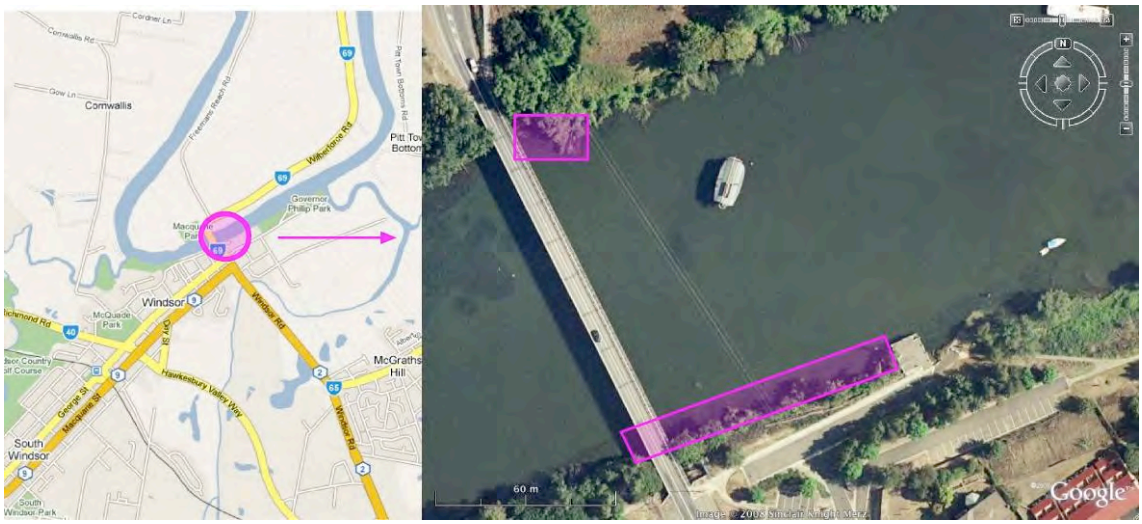

Figure 1*: Study area (source: Google Earth)*

[1] **Heritage Concepts July 2008** *Statement of Heritage Impact : Hawkesbury River Bridge (RTA No. 415), Windsor, NSW*. Prepared for NSW Roads & Traffic Authority Environmental Services Sydney. Draft.
[2] *Ibid*., Recommendation 7 pg 40

1.3 Objectives of Study

The objectives of the investigation were to:

- *Determine the nature, extent and condition of historical archaeological remains on or above the riverbed adjacent to the Hawkesbury River Bridge.*
- *Assess the historical archaeological potential for buried archaeological remains on the riverbed and river bank.*

2.0 CONDUCT OF THE INVESTIGATION

2.1 Dates and personnel

The underwater archaeological inspection was carried out on the 22nd December 2008. The diving took place between 08:30 and 14:15. The personnel involved in the diving were as follows:

Cosmos Coroneos :	Lead maritime archaeologist, Cosmos Archaeology Pty Ltd
Chris Lewczak :	Assistant maritime archaeologist. Cosmos Archaeology Pty Ltd
Russell :	Dive supervisor, Gray Diving Services
Dave :	Diver, Gray Diving Services
Steve :	Standby diver and deckhand, Gray Diving Services

2.2 Recording Process

The investigation was carried out by a commercial dive team under the direct supervision of maritime archaeologists who also be dived. The diving was done through Surface Supplied Breathing Apparatus (SSBA) from a dive boat. The inspection complied with OH&S requirements.

The following constraints were taken in to account in forming the investigation methodology:

- Water visibility was expected to be close to 0 m and so it was not guaranteed that photography or video could be obtained.
- Poor water visibility would limit the information obtained from archaeological remains.
- Vessels operating in the area may have an influence on the conduct of the investigation.

There were two main components of the inspection:

a) Works to obtain an indication of the riverbed slope and the depth of sediment over clay/rock substrate, and;

b) Works to locate and record archaeological remnants such as pile stumps and possibly rails, cobble paving, and/or bed logs.

The two work components were achieved through the use of transects. A transect was formed by attaching a 20 m weighted line from a nominated location on the edge of the river bank. The line was reeled out on the riverbed its full distance (Figure 2). The diver swam along the line noting artefacts observed/felt on the surface as well as riverbed composition.

Probing – using a steel rod - was carried out set intervals along the transect for the purposes of detecting buried objects as well as determining the nature of the sub-riverbed strata. At those intervals a relative depth reading was obtained through the kluge gauge, which forms part of the SSBA rig (Figure 3). No artefacts are to be recovered during the inspection.

The alternative method of circular snag line searches was not used as there were too many branches and trunks in the water, which would have markedly reduced the effectiveness of this search method.

Nine 20 m transects were recorded during the inspection between the bridge and the existing and functioning wharf (Figure 4). They were evenly spaced so as to ensure that this area was sufficiently examined for the below water remains of the wharf.

The search for the possible remains of the punt ramps and associated features was confined to the north bank, where a diver swam around in the shallows feeling for a hard sloping surface. No search was conducted on the south bank as the river bed has been reclaimed and any remains of the punt ramp would be buried under the fill and the recently laid Gabion walls.

Figure 2: Setting up a survey line used for each transect (Photo Cosmos Archaeology).

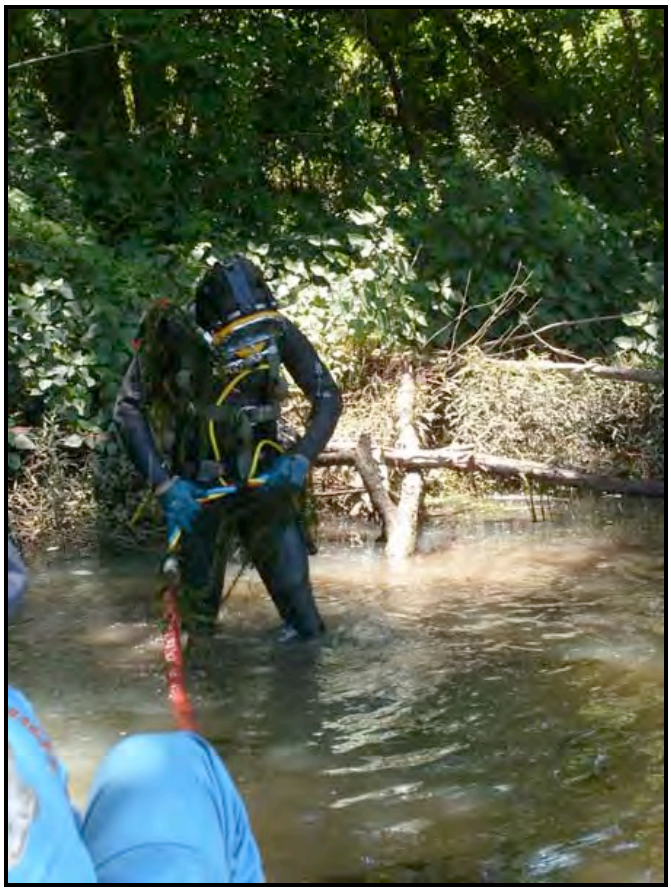

Figure 3: Diver preparing to undertake the underwater survey (Photo Cosmos Archaeology).

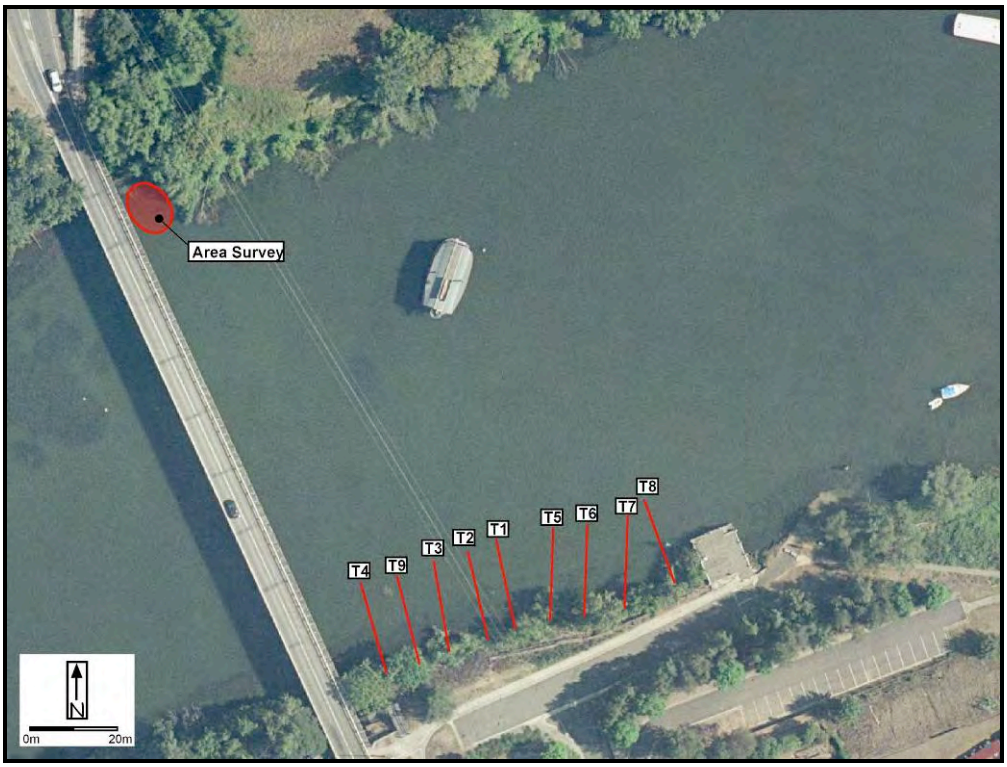

Figure 4*:* Location of surveyed areas. (Map Source; Google Earth)

3.0 FINDINGS

3.1 Above the waterline

The present southern riverbank between the bridge and the existing wharf has been recently modified with the installation of a Gabion wall. This has resulted in a near vertical retaining wall closer to the bridge with the gradient lessening with distance downstream to a point close to the existing wharf where the wall ceases (Figure 5). The thick vegetation on and around this wall prevented any further examination of the southern side of the riverbank.

Remains of a wharf structure are present on the southern side of the river to the east of the Windsor bridge. The remains are located 38 m to the east of the bridge and 34 m to the west of the current wharf situated at the eastern end of the study area (Figure 6). The extant remains are present in two adjacent areas, the first consists of remnant timber beams, and the other of a singular pile. There are also remains of a retaining wall further to the east.

Figure 5: Gabion wall recently constructed above the location of the former wharf site (Photo: Cosmos Archaeology)

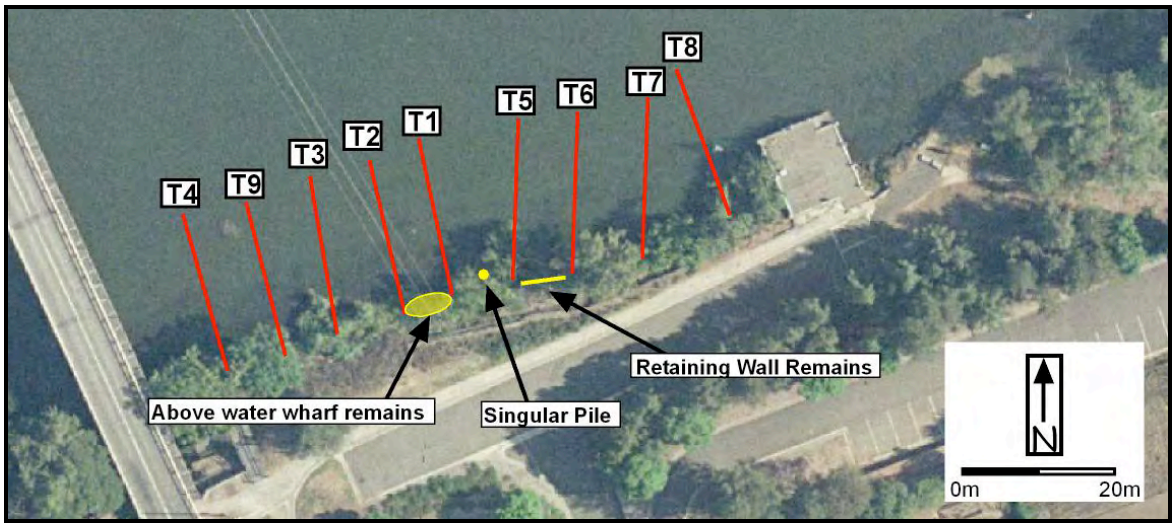

Figure 6: Location of the recorded above water features.

The first group consists of three timber beams, including a possible deck beam, parallel to the riverbank, resting on two walers (Figure 7).3 The deck beam is 5.2 m long x 0.25 wide x 0.20 thick. This beam rests on top of the walers with no visible fastenings attaching them (Figure 8). There are the remains of fastening holes in the middle of the beam above where the beam intersects the two walers, implying the beam may have been fastened to another section of the wharf positioned on, or in, the riverbank.

At either end of the deck beam are walers. On the eastern side of the deck beam there is only one timber waler remaining, while on the western side there are two. The timbers on both sides run back into the riverbank, possibly attached to a buried portion of the wharf. The two timbers on the western side of the deck beam are both 2.9 m long and 0.3m wide, and are crescent shaped, being 0.25 m at its thickest point at the middle. Both timbers appear to be from the same rounded log that has been halved, and spaced 0.4 m a part (Figure 9 & Figure 10). There are two large iron bolts that connect each waling timber together, one approximately 0.4 m in front of the deck beam, and the other at the river end of the timbers (Figure 11). The inside sections of both waler beams have also been carved out around immediately around the location of the bolts. This is likely where the beams would have been bolted through the piles. A recess has also been cut into the top of the wale beam. The recess is located approximately 1.2 m in front (river side) of the deck beam, measuring 0.35 m wide and 0.05 m deep. This may have been for the placement of another deck beam across the timbers (Figure 12).

[3] A waler is a piece of timber placed horizontally to strengthen a structure. In a wharf or jetty, these are usually placed running either side of piles, connecting two or more piles together below a headstock (which sits on top of the piles).

Figure 7: Structural remains present of the former wharf (Photo: Cosmos Archaeology)

Figure 8: Remains of a deck beam resting on two walers (Photo: Cosmos Archaeology)

Figure 9: Two waler beams on the western side of the wharf remains (Photo Cosmos Archaeology).

Figure 10: Remains of the two walers on the western side of the wharf remains (Photo Cosmos Archaeology)

Figure 11: Fastening remains present on the two waler beams on the western side of the wharf remains (Photo Cosmos Archaeology).

Figure 12: Recesses cut into the top of the walers (Red Arrow). Probable location of another deck beam. Note also the location of another waler in the centre of the photo (Red Circle) (Photo Cosmos Archaeology).

The timber on the eastern side is also crescent shaped, being 2.5 m long x 0.35 m wide, and is approximately 0.20 m thick at the middle of the beam. There are two fastening holes drilled into the side similar to those opposite, the first 0.4 m in front of deck beam, and the other at the other end of the timber remains (Figure 13 & Figure 14). There is also a less defined recess cut into the top of this waler, approximately 1 m in front of the deck beam.

Figure 13: Remains of the singular waler on the eastern side of the wharf remains (Photo Cosmos Archaeology).

Figure 14: Location of drilled holes for the location of bolts (no longer present) (Photo Cosmos Archaeology)

Approximately 5 m to the east of the of these structural remains another singular wale beam protruding from the riverbank (see Figure 12). Only a small section of this timber still remains with no other timbers located around it.

To the east of these structural remains is a singular pile. The pile was located close to shore, and was difficult to accessed The pile is 0.3 m in diameter and stands approximately 1 m tall from the riverbed.

A section of a former retaining wall was also visible in the riverbank. The retaining wall is located approximately 20 m to the west of the existing wharf at the eastern end of the study area, and approximately 15 m to the east of the extant above water wharf remains (Figure 6). The retaining wall consisted of two iron girders 2 m a part with two timber cross pieces (Figure 15). The iron girders are square in shape and stand 1.5 m above the riverbank, and are 0.20 m wide (Figure 16). The two timber cross pieces are approximately 2.5 m long x 0.30 m wide and 0.11m thick, and are spaced close together. Material behind the wall consists of dressed sandstone blocks, bricks and broken up concrete deposited onto up the riverbank. A concrete cap has been placed over the top of the fill at one stage, possibly to create a surface or to contain the backfilled material (Figure 17).

Figure 15: Remains of the retaining wall to the east of the above water wharf remains (Photo Cosmos Archaeology).

Figure 16: Iron Girder that forms part of the retaining wall present on the riverbank.

Figure 17: Example of the fill present behind the retaining wall (Photo Cosmos Archaeology).

A brief examination was made on the northern bank adjacent and downstream of the bridge for any evidence of the punt site. Though there was evidence of a cutting, it angles towards the water ending at the base of the bridge abutment. This suggests that the cutting may have been made during the building of the bridge to assist the construction. Thick vegetation precluded any detailed examination of the area.

3.2 Below the waterline

Transect 1

Diver: Dave *Recorder*: Chris Lewczak

Time in: 9:29am *Time Out*: 9:36 *Total Time*: 7 min *Max Depth*: 4.6 m

This transect was attached to the eastern section of the former wharf remains. The riverbed was sandy between from the bank of the river becoming more silty approximately 10 m from shore. Depth of the sediment is approximately 0.15 to 0.35 m before the probe reached refusal on what felt like rock.

At approximately 2 m the diver hit refusal on a possible wooden object, buried 0.35 m below the riverbed. The only artefact encountered was a timber approximately 1 m x 0.3 m x 0.3 m in size (Figure 18).

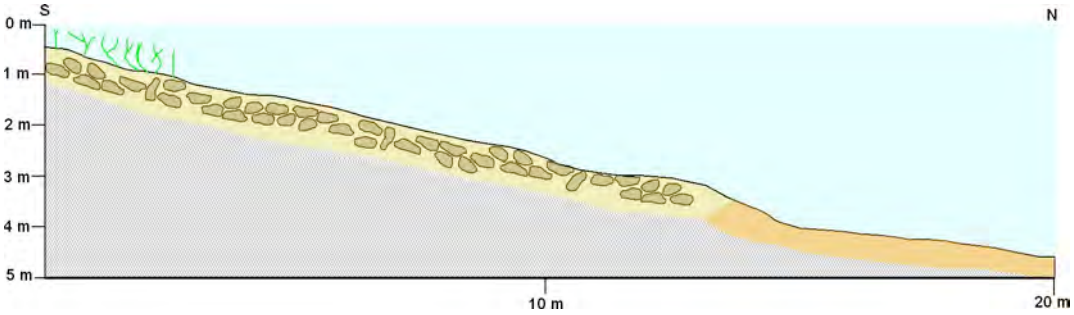

Figure 18: Profile drawing of Transect 1

Transect 2

Diver: Dave *Recorder*: Chris Lewczak

Time in: 9:48am *Time Out*: 9:58 *Total Time*: 10 min *Max Depth*: 4.6 m

This transect was attached adjacent to the western pile of the former wharf remains. The first 2 m of the survey was not undertaken as the transect was attached to above water remains of the wharf, and there was an increase in the amount of weed in this area.

Ballast (mostly rounded sandstone cobbles up to 0.3 m in size) was present on top of the riverbed along both sides of the transect line to a distance of approximately 11 m from the bank of the river. At 12 m from the bank, the riverbed changed to a sandy bottom with a refusal depth of approximately 0.1 m. The depth of refusal increased to more than 0.3 m at the 14 m mark onwards (Figure 19).

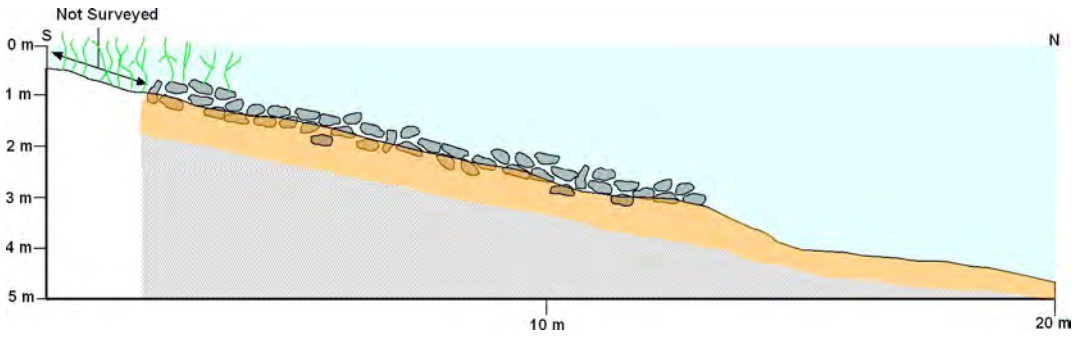

Figure 19: Profile drawing of Transect 2

Transect 3

Diver: Dave *Recorder*: Chris Lewczak

Time in: 10:15 am *Time Out*: 10:25 am *Total Time*: 10 min *Max. Depth*: 4.6 m

Ballast was present on the riverbed to a distance of 12 m from the bank of the river. Portions of the riverbed were covered by 0.05 m of river silt, however, probing was able to determine the extent of the ballast rock. Beyond the location of the ballast, the riverbed comprised a sandy bottom with probing greater than 0.25 m finding what felt like stiff clay. The only other cultural material found in this transect was a shopping trolley (Figure 20).

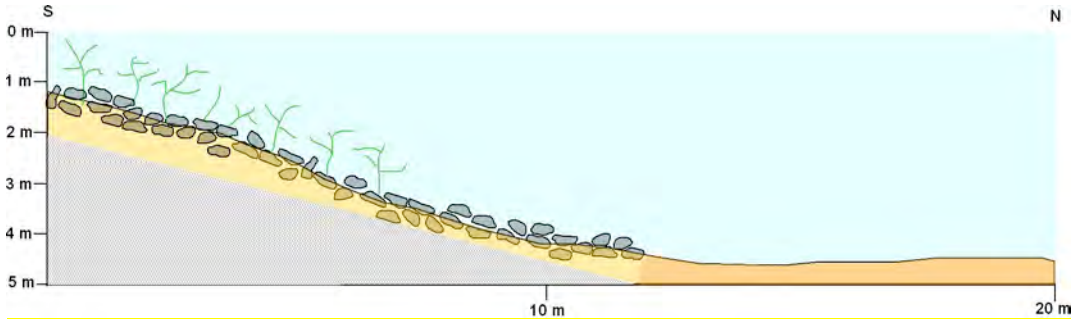

Figure 20: Profile drawing of Transect 3

Transect 4

Diver: Dave *Recorder*: Chris Lewczak

Time in: 10:31 am *Time Out*: 10:39 *Total Time*: 8 min *Max. Depth*: 4.6 m

This transect was positioned approximately 10 m to the east of the bridge. Ballast covered the area between the riverbank to a distance of 12 m into the river. Intermittent ballast rock was also recorded to a distance of 18 m resting on the sandy riverbed. Probe refusal was recorded at a depth between 0.3 m and 0.4 m, from the extent of the ballast rock (at 12 m) to the end of the transect. The only other cultural material found in this transect was a shopping trolley (Figure 21).

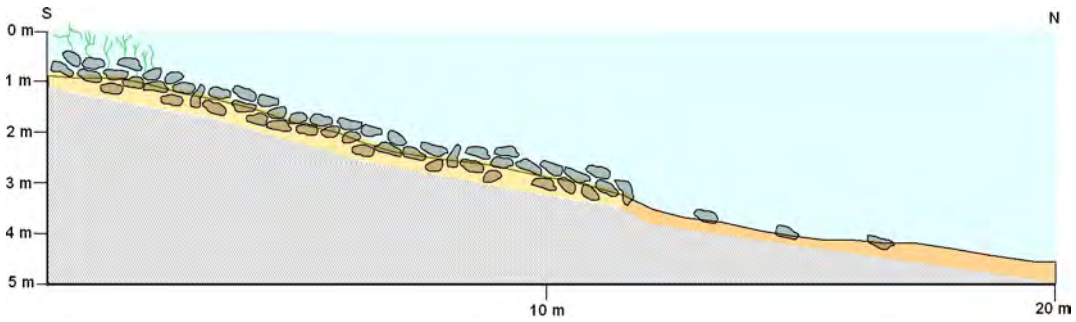

Figure 21: Profile drawing of Transect 4

Transect 5

Diver: Dave *Recorder*: Chris Lewczak

Time in: 10:40 am *Time Out*: 10:52 am *Total Time*: 12 min *Max. Depth*: 4.6 m

This transect was placed on the eastern end of the remains of the retaining wall and was angled slightly across the site and not at right angles to the bank as with the previous transects.

No ballast was visible on the riverbed within this transect. Probe refusal, however, was at a depth of 0.1m, on to rock, indicating rock below the thin river silt deposit. A sandy riverbed was recorded from a distance of 16 m from the bank. The remnants of a wooden pile, 1 m high and 0.30 m in diameter was located (Figure 22).

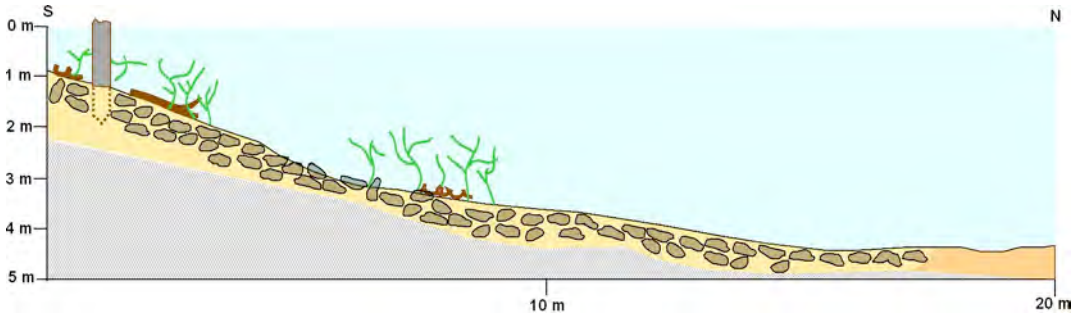

Figure 22: Profile drawing of Transect 5

Transect 6

Diver: Dave/ Cosmos Coroneos *Recorder*: Chris Lewczak

Time in: 11:55 am *Time Out*: 12:08 pm *Total Time*: 13 min *Max. Depth*: 4.3 m

This transect was on a similar angle to transect 5. Large ballast stone was present within the first 2 m from the river bank. Ballast similar in size to that seen in the previous transects continued from the 2 m mark out to the 16 m mark. Much of the ballast rock is covered by river sediment to a depth of approximately 0.5 m to 0.15m. Beyond the ballast the riverbed continued as a sandy bottom to the end of the transect. A relatively large piece of stiff rubber or plastic, 0.75 x 0.5 x 0.2 m was identified (Figure 23).

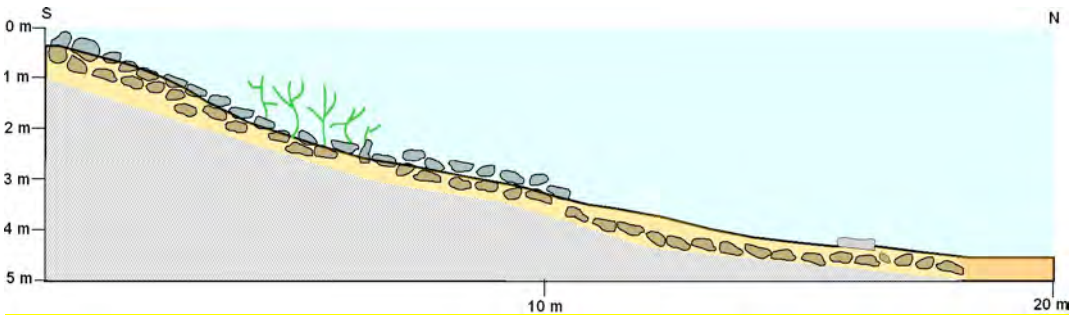

Figure 23: Profile drawing of Transect 6

Transect 7

Diver : Dave *Recorder*: Chris Lewczak

Time in: 12:15 pm *Time Out*: 12:22 pm *Total Time*: 7 min *Max. Depth*: 4 m

The riverbed consists of silty sand. There was no ballast recorded in this transect. A modern mooring - square sandstone block 0.5 x 0.5 x 0.2 m with a hole in the middle with rope still attached – was identified (Figure 24).

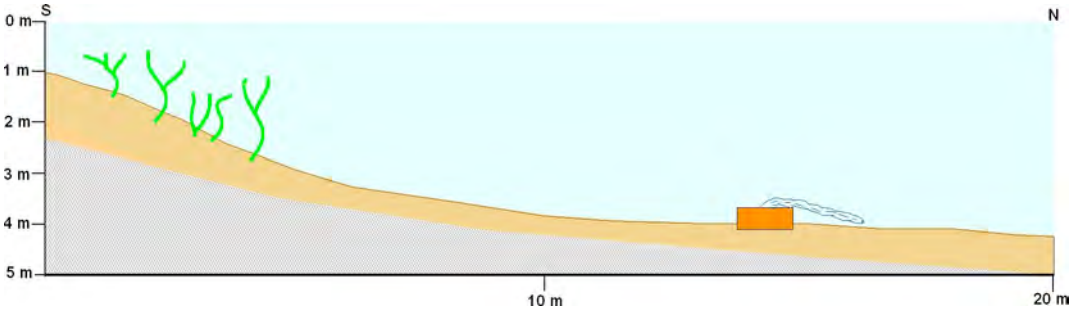

Figure 24: Profile drawing of Transect 7

Transect 8

Diver: Dave *Recorder*: Chris Lewczak

Time in: 12:33 pm *Time Out*: 12:40 pm *Total Time*: 7 min *Max. Depth*: 4 m

This transect was located approximately 10 m from the western side of the wharf currently on site. The riverbed consists of a silty sandy bottom and no ballast was identified. Depth of the riverbed was greater than 0.3 m before stiff refusal, likely to be into harder clay substrate. Fallen tree branch was located close to the riverbank (Figure 25).

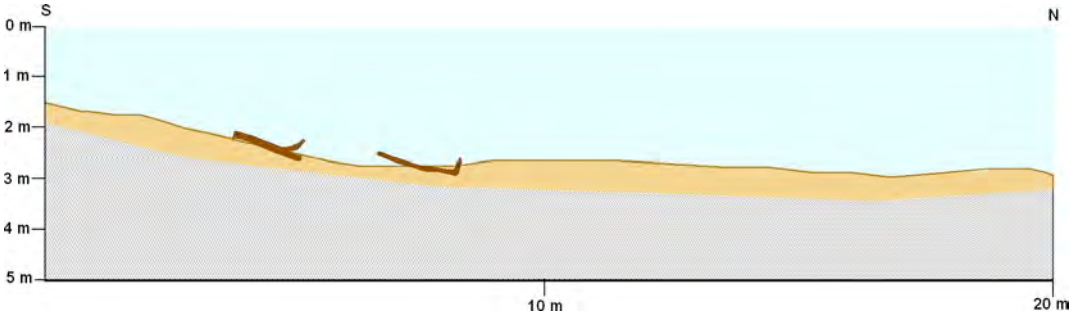

Figure 25: Profile drawing of Transect 8

Transect 9

Diver: Cosmos Coroneos *Recorder*: Chris Lewczak

Time in: 1:52 pm *Time Out*: 2:02 pm *Total Time*: 10 min *Max. Depth*: 4.3 m

This transect was placed between transects T3 and T4. The riverbed consisted of ballast out to a distance of 10 m, at which point the riverbed became a sandy bottom. At approximately a distance of 10 m, the riverbed drops down a small batter of 1m, at which point the ballast rock ceases. A timber beam similar to those seen on the above water remains (2.0 x 0.3 x 0.3 m, snapped at the near shore end, included a single bolt with a square washer) was located in the ballast zone as well as an irregular (sandstone) block – 0.75 x 0.4 x 0.15 sitting in the riverbed (Figure 26).

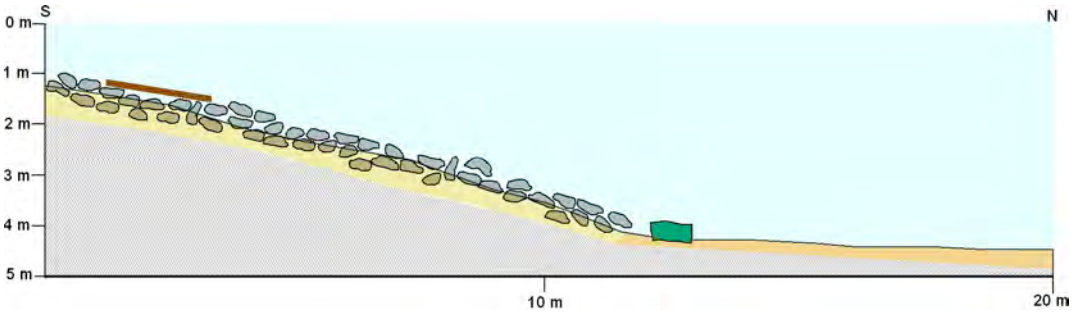

Figure 26: Profile drawing of Transect 9 (sandstone block in green)

North bank area survey

Diver : Dave *Recorder* : Chris Lewczak

Time in: 1:05 pm *Time Out*: 1:18 *Total Time*: 13 min *Max. Depth*: 2.2 m

The riverbed in this area consisted of a silty sand with a dense coverage of weed. Close to the riverbank there were a number of fallen branches and logs. No formed, rammed earth or constructed, ramps were located in the vicinity of the potential location of the northern river punt landing.

3.3 Interpretation

The timber remains observed above and below the water on the south bank are associated with the wharf that was constructed between 1816-20.[4] These timbers however are unlikely to be the original components, the wharf undoubtedly undergoing repairs, replacements and upgrading over the 75 to 100 years that it operated. Nevertheless the structural remains present on the riverbank illustrate some of the construction techniques employed for the wharf, in particular fastenings and timbers used.

Limited submerged timber remains were recorded on the riverbed. This is most likely due to the poor water visibility experienced at the time of the survey rather than the general survival of timbers on the riverbed. Those that were surveyed were similar to those recorded on the surviving above water remains. Fastenings recorded on one of the timbers, from Transect 9, was also the same as those present on the above water remains.

[4] *Opp. Cit.*, **Heritage Concepts July 2008**: pp17 - 19

Of particular interest is the rock rubble recorded in transects 1 to 6 up to 12 m from the riverbank. These rocks were rounded, like river cobbles, and were predominantly sandstone. There was the occasional 'mudstone' type rock in the mix. The maximum size of these rocks was around 0.3 m. This indicates that they were very likely collected and deposited by hand as opposed to some mechanical means such as a dump truck or excavator. If this were the case, then this rubble would most likely have been deposited anytime between the late 18th and early 20th centuries. The dimensions of these cobbles are reminiscent of what sailing ships would carry as ballast. It is possible that this rock was also transported to the area by vessel rather than bought, and/or deposited from, land.

Ballast was used in wharf construction during the 18th and early 20th centuries around piles, which could not penetrate with sufficient depth into harder substrates, which gripped the timbers and kept them from 'floating'. This was done because the existing or available pile driving technology was not adequate for the task. The rock was deposited around the piles after they had been driven in to help "weigh" them down; effectively compacting the riverbed around the piles helping to hold the piles in position.[5] Ballast was also deposited around lattice or box jetties – where piles were checked into bed logs. This was a common form of timber jetty/wharf construction in Australia prior to the 1850s.[6]

The ballast extended out from the riverbank approximately 12 m. Ballast was likely deposited just beyond the outermost piles, to assist in the stability of the structure and so it can be inferred that the edge of the wharf was approximately 10 m put from the present configuration of the river bank.

No ballast was recorded on or below the riverbed in Transects 7 and 8, located on the eastern side of the study area, close to the present day wharf. It is believed the eastern edge of the wharf would have been around the location of Transect 6, where ballast rock was recorded. The ballast extended upstream towards the bridge, past where the extant above water timber wharf remains were observed. This indicates that the wharf was originally much longer, possibly longer than that which is shown in an 1890 plan. [7]. The upstream or western section may have been dismantled during the construction of the bridge. It is also possible that the ballast maybe associated with the original 1795 jetty, which appears to have been in the same area.[8] Figure 27 shows the interpolated extent of the ballast recorded during the field survey.

The attribution of the remnant timber and steel retaining wall on the southern bank is not certain. It most likely dates from the 20th century, probably the 2nd half. It may have formed part of a river wall which passed underneath the last upgrade of the wharf, but much more likely was constructed after the wharf fell into disrepair, using elements of the wharf in its construction and in the fill behind it.

[5] For a similar example of a small river wharf see **Cosmos Archaeology June 2006** *River Heart Phase 1: Maritime Archaeological Investigation*. Prepared for Ipswich City Council. For an example of a large wharf complex see **Cosmos Archaeology May 2000** *Demolition of Pier 6/7, Walsh Bay Maritime Archaeological inspection Preliminary report.* Prepared for Tropman and Tropman Architects.
[6] **Cosmos Coroneos, 2004** 'The Maritime History and Archaeology of Port Arthur'. In *A Harbour Large To Admit a Whole Fleet*. Port Arthur Occasional Papers No. 1
[7] *Opp. Cit.*, **Heritage Concepts July 2008**:17 Figure 3.7
[8] *Ibid.*, p10 Figure 3.1

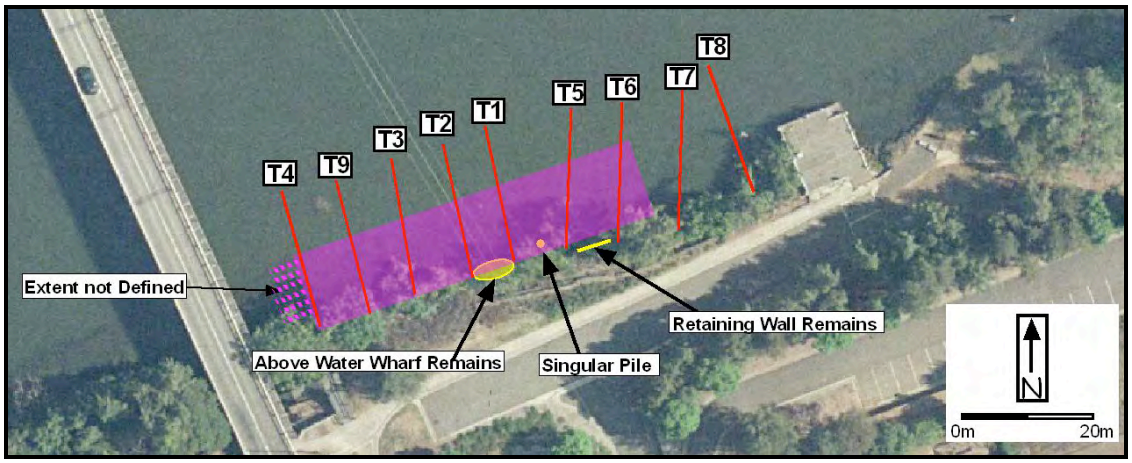

Figure 27: Plan showing the location of the ballast rock (in pink) recorded during the field survey.

4.0 ARCHAEOLOGICAL POTENTIAL

4.1 Wharf (submerged)

The survival of artefacts and other archaeological deposits in a marine environment is subject to the natural and cultural processes that have occurred on the site. Natural processes, in this case of the Hawkesbury River, such as flooring and tidal movement have the ability to cause sedimentation or erosion activity. Cultural influences also can have a dramatic effect on deposits. It is not known when or how the wharf was removed from the site, however, the activity of demolition can impact on the archaeological potential of the site.

The presence of rock ballast, very likely associated with the earliest forms of the wharf, is a positive indication of the high archaeological potential in this area despite major flooding events. Archaeological material would consist of, structural elements and artefacts relating to the working life of the wharf. Structural remains would consist of remains associated with the construction, repair and maintenance of the wharf. This would include pile remains below the ballast and in the riverbed.

Archaeological deposits associated with the shipping of cargo and transportation also have the potential to be in the vicinity of the former wharf's location as objects were deliberately or accidentally dropped from the wharf during loading and/or unloading. This is also true for the potential for other types of cultural material, such as from people who used the wharf for recreational purposes. On a similar site at Ipswich on the Bremer River, Queensland – which has also been subjected to massive flooding events - ferrous concretions recovered from within the ballast were found to contain small and delicate objects such as brooches and buttons.[9]

4.2 Wharf (terrestrial)

Though difficult to tell due to the vegetation cover there appeared to be an uneven layer of fill – perhaps a metre or so – above the walers and deck beam, under the base of the Gabion wall. The deck beam would have been close the deck and ground surface of the functioning wharf (Figure 8). This does point to the possibility that other remnant basal elements associated with the wharf, such as additional walers. land piles, deadman anchors (land ties), cables and fill as well possibly surface elements such as timber decking, bollards, cleats, and packed or cobbled surfaces, maybe present. However it should be considered that the installation of the Gabion wall in the 1990s may have required some excavation or modification to the bank which would have resulted in the limited truncation of the terrestrial archaeological resource associated with the wharf.

[9] *Opp. Cit.,* **Cosmos Archaeology June 2006**:31

Figure 28: 1888 photograph of Windsor Bridge looking onto the south bank. The wharf is clearly shown on the left. A road leads down a reasonable gradient to the wharf and branches down to the water between the bridge and the wharf. This is the likely location of the south bank punt landing. It may also have been utilised and expanded during the construction of the bridge. Of interest it the southern approach to the bridge, which appears to be on a different alignment than today. (www.council.hawkesbury.nsw.gov.au/gwsSpatial/gws/gwsspatial.htm)

4.3 Punt landings

It is thought that the locations of the punt landings are on the site of the current bridge.[10] However it should be considered that the punt would most likely have been still operating whilst the bridge was being constructed. Assuming that the bridge was sited along the road alignments leading down the punt, the landings must have been adjacent to the bridge site (see Figure 28). The roads leading down to the punt may have been modified for better access for the bridge builders.

In Figure 29 the punt landing appears on the eastern/downstream side of the bridge, though there appears a relatively flat area along the bank immediately adjacent to the bridge, upstream. However given the alignment of the roads it is thought that the original punt landing on the south bank would have been approximately in the area between the wharf and the bridge.

No evidence of the punt landings were observed during the survey. The survey however only examined the area downstream of the bridge as this appeared to be the best location. The area of the punt landing on the south bank has been modified through the installation of the Gabion walls which in effect has resulted in some reclamation. This may have resulted in the burial of the southern ramp. On the north bank the suspected reorientation of the access road to the water to assist in the construction of the bridge may have erased parts of the landing.

It is anticipated that archaeological evidence of the punt landings still remain, either completely buried on the downstream side of the bridge or in a fragmentary state around the footings of the bridge. The physical components of the punt landings around the water's edge would have been very limited – a ramp of hardened earth or sandstone paving with timber posts for tying or hauling up.

[10] *Opp. Cit.*, **Heritage Concepts July 2008**:12

Figure 29*:* Green Hills (Windsor) c1807. Shows the likely location of the punt landing – to the right of the cutter, and seems very close to the location of the bridge currently on site (red arrow). Painting does not show the 1795 jetty/wharf unless the cutter with its sails down is tied up to it, hence obscuring it. (Mitchell Library, State Library of NSW reproduced in www.heritage.nsw.gov.au/10_subnav_01_1.htm)

5.0 CONCLUSION

5.1 Summary of Key Findings

The key findings of the inspection can be summarised as follows:

- Above water remains of the 1816-20 wharf are still visible.
- Along the south bank there is a zone of sandstone cobbles (up to 0.3 m across) which formed ballast around the piles of the wharf.
- No evidence of the punt landings was identified.
- It is expected that contained within and under the sandstone cobble ballast would be the structural remains of the wharf (namely piles) and artefacts associated with the use of the facility.
- The terrestrial and normally buried components of the wharf are expected to be present as well as some remains of 'surface' elements such as timber decking and compacted surfaces.
- Remains of the punt landings in the form of ramps and cut off posts are expected to be present, at least in a fragmentary state.

5.2 Recommendations

Based on the findings of the study the following recommendation are presented:

Recommendation 1 : *A Statement of Significance and a Statement of Heritage Impact should be prepared on the submerged and riverbank archaeological resource as part of the overall Statement of Heritage Impact prepared for the project when further details on the proposed development becomes available.*

The report should contain:

- Additional research on the location of the wharf and the punt landing;
- Overlays using historical plans showing the relationship of the wharf and landings to the proposed development, and;
- Only if feasible, a terrestrial site inspection to be carried out after the banks have been cleared of vegetation.

REFERENCES

1888 photograph of Windsor Bridge looking onto the south bank. (www.council.hawkesbury.nsw.gov.au/gwsSpatial/gws/gwsspatial.htm)

A View of Hawkesbury, and the Blue Mountains. / New South Wales. C. 1818. (State Library of NSW Call no. PXD 373/1)

Cosmos Archaeology May 2000 *Demolition of Pier 6/7, Walsh Bay Maritime Archaeological inspection Preliminary report.* Prepared for Tropman and Tropman Architects.

Cosmos Archaeology June 2006 *RIVER HEART PHASE 1: Maritime Archaeological Investigation*. Prepared for Ipswich City Council.

Cosmos Coroneos, 2004 'The Maritime History and Archaeology of Port Arthur'. In *A Harbour Large To Admit a Whole Fleet*. Port Arthur Occasional Papers No. 1

Heritage Concepts July 2008 *Statement of Heritage Impact : Hawkesbury River Bridge (RTA No. 415), Windsor, NSW*. Prepared for NSW Roads & Traffic Authority Environmental Services Sydney. Draft.