9 THE PROJECT

9.1 Project scope

RMS is seeking approval to replace the existing Hawkesbury River Bridge at Windsor (Windsor Bridge) with a new bridge approximately 35 metres downstream. The Windsor Bridge is aging, having been opened in 1874, raised in 1897 and then upgraded with concrete decking in 1922. An RMS engineer's inspection of the Windsor Bridge concluded that it is deteriorating.

In addition to the replacement of the Windsor Bridge, the project would unite the two parkland areas of Thompson Square by infilling the existing road cutting from George Street to the Windsor Bridge and upgrading and infilling with minor landscaping of the northern approach to the bridge.

The project would comprise:

- Construction of a replacement bridge over the Hawkesbury River at Windsor, around 35 metres downstream of the existing Windsor Bridge.
- Reconstruction and upgrading of existing intersections and bridge approach roads to accommodate the replacement bridge, including:
  - Removal of the existing roundabout and installation of traffic signals at the intersection of George and Bridge Streets.
  - Construction of a new dual lane roundabout at the intersection of Freemans Reach Road, Wilberforce Road, northern bridge approach road and the access road to Macquarie Park. All roads serviced by the new roundabout would require minor realignments.
  - Realignment of the southern and northern bridge approach roads. The new southern bridge approach road would generally follow the alignment of Old Bridge Street along the eastern side of Thompson Square. The northern bridge approach road would be a new road connecting the bridge to the new dual lane roundabout.
- Construction of a shared pedestrian/cycle pathway for access to and across the replacement bridge.
- Removal of the existing bridge approach roads and then backfilling, rehabilitating and landscaping these areas.
- Demolition of the existing Windsor Bridge including piers and abutments.
- Landscaping works within Thompson Square parkland and adjacent to the northern intersection of Bridge Street, Wilberforce Road, Freemans Reach Road and the access road to Macquarie Park.
- Redevelopment of part of The Terrace to provide continuous access along the southern bank of the river and under the replacement bridge to Windsor Wharf.
- Construction of scour protection works on the southern and northern banks and around three bridge piers.
- Construction of a permanent water quality basin to capture and treat stormwater runoff from the bridge and northern intersection prior to stormwater being discharged to the Hawkesbury River.
- Architectural treatments for noise mitigation, as required, where feasible and reasonable and in agreement with affected property owners.
- Ancillary works including:
  - Adjustment, relocation and/or protection of utilities and services, as required.
  - Construction and operation of temporary construction, stockpiling and compound sites.

In addition to the above-listed work elements, early works for further identification, salvage, recording and protection of Aboriginal and historical heritage, would be carried out as part of impact mitigation for the project. These early works would include:

- Salvage excavation at identified Aboriginal heritage sites on the southern bank of the river in accordance with the procedures identified in the Aboriginal heritage chapter of the Environmental Impact Statement for the project.
- Recording and protection of historic heritage in accordance with the procedures identified in the historic heritage chapter of the Environmental Impact Statement for the project.

9.2 Project elements

9.2.1 The replacement bridge and intersections

The replacement bridge would be located around 35 metres downstream of the existing Windsor Bridge. The southern bridge approach road would be via a new realigned section of Bridge Street, which would start at the existing intersection of George Street and Bridge Street and head generally north-west along the alignment of Old Bridge Street on the eastern side of the Thompson Square parkland. The existing roundabout at the George Street and Bridge Street intersection would be replaced by traffic signals. The replacement bridge would connect with the junction of Wilberforce Road, Freemans Reach Road and the Macquarie Park access road at a new dual lane roundabout intersection.

The replacement bridge would be an incrementally launched bridge constructed of reinforced concrete and comprising five spans. The bridge deck would be about 15.5 metres wide and be supported on up to four piers in the river. It would have an overall length of about 160 metres, spanning both the river and The Terrace. This would enable The Terrace to be reconnected to provide vehicular, pedestrian and cyclist access to Windsor Wharf. The clearance under the bridge where it spans The Terrace would be about 3.6 metres, which would allow a range of service and emergency vehicles to pass under the bridge and access Windsor Wharf.

The replacement bridge would initially comprise two traffic lanes (one in each direction), each about 3.5 metres wide and with an adjacent two metre wide shoulder. There would also be a three metre wide shared pedestrian/cycle path on the western side of the bridge. The two metre wide road shoulders of the replacement bridge would allow the bridge to be re-configured to a three lane bridge in the future, when required. The introduction of the three lane configuration would occur when additional traffic capacity is required. The three traffic lanes would consist of two southbound lanes and one northbound lane.

The low point of the replacement bridge would be around 9.8 metres Australian Height Datum (AHD), making it around 2.8 metres higher than the lowest point of the existing bridge. The height of the replacement bridge may change slightly during the detailed design phase. This would give the replacement bridge a slightly higher level of flood immunity than the existing bridge. While the existing bridge is overtopped in a one in two year flood, the replacement bridge is predicted to remain above water for the one in two year flood but be overtopped in an event just smaller than the one in three year flood. This level of flood immunity is consistent with that of the northern approach roads (Wilberforce Road and Freemans Reach Road), which have a flood immunity that lies about midway between the one in two year and one in three year flood levels.

9.2.2 Demolition of the existing bridge

The existing Windsor bridge would be removed following commissioning of the replacement bridge and associated bridge approach roads. The existing bridge superstructure and substructure would be removed in sections, with temporary bracing installed, as required, to maintain the stability of remaining sections during the demolition process. Where possible the process of demolition would involve cutting or dismantling the superstructure and substructure into sections, with each section transported off-site for further demolition at an appropriately approved and licensed facility. Where possible the dismantled bridge elements would be reused or recycled, however some components of the bridge would require disposal at a landfill. Lead based paint has also been found on the bridge, so demolition activities would need to comply with relevant standards for managing lead based paint. Disruption of waterway traffic would be limited to the greatest extent practicable, with alternative navigation channels provided while the existing navigation span is closed for the demolition works.

9.2.3 Pedestrian and cycling facilities

The project would incorporate facilities for pedestrians and cyclists and include a shared pedestrian/cycle pathway that would be constructed from Wilberforce Road and Macquarie Park,

across the western side of the replacement bridge and southern approach road to the corner of George and Bridge Streets. Pedestrian and cyclist access along the southern bank of the river would also be improved with the connection and redevelopment of The Terrace. In addition, the following general works would be undertaken to improve pedestrian safety and access:

- Provision of a new 1.2 metre wide footpath adjacent to properties fronting Old Bridge Street.
- Provision of a new signalised pedestrian crossing on all four approaches to the intersection of Bridge Street and George Street.
- Provision of new pedestrian footpaths for safe access around and across the proposed dual lane roundabout at the junction of Freemans Reach Road, Wilberforce Road and the Macquarie Park access road including a path under the northern bridge abutment.

9.2.4 Water quality basin

The project would include construction of a permanent water quality basin to capture and treat stormwater runoff from the bridge and northern intersection prior to stormwater being discharged to the Hawkesbury River. The water quality basin would be located on the eastern side of the proposed roundabout, which is at the junction of Freemans Reach Road, Wilberforce Road and the Macquarie Park access road.

For the southern approach road a trash net to collect litter and a shut-off-valve to contain any spills in the stormwater system would be installed at the discharge point of the drainage system near Windsor Wharf.

9.2.5 Scour protection

Scour protection would be provided to protect the bridge abutments and piers from the erosive impacts of high river flows. On the southern bank, the scour protection would consist of a concrete panel retaining wall between Windsor Wharf and the existing bridge. Large diameter rocks (900 millimetres) and/or sandstone blocks would also be used to provide scour protection in some locations on the southern bank.

On the northern bank extensive rock and sandstone block scour protection would be required extending up the bank to about five meters above the usual water level. Other forms of scour protection such as a concrete grid planted with grass would be installed in areas above this where scour protection is required.

Scour protection using large rocks would be provided around three of the four bridge piers. Scour protection for each pier would cover an eight metre radius and would be to a depth of 4.5 metres. Dredging around the piers would be required to place the rocks below the river bed level. For the southernmost pier little or no scour protection would be required as bedrock is close to the surface in this location.

During the detailed design phase further work would be undertaken to minimise the visual impact of all visible scour protection.

9.2.6 Public utility works

The existing bridge supports a number of public utilities which would be replicated on the replacement bridge including:

- A 450 millimetre water main (cement lined steel pipe).
- A 50 millimetre sewer rising main (galvanised iron pipe).
- A 100 millimetre electrical conduit.
- Telecommunications conduits (3 x 80 millimetre galvanised iron conduits).

Other public utilities that may need to be adjusted as part of the project include:

- High voltage overhead power lines from Macquarie Street to Wilberforce Road which cross the river on a similar alignment to the replacement bridge. These power lines would need to be relocated prior to bridge construction.

- Power lines near the corner of Wilberforce Road and Freemans Reach Road.
- Local stormwater drainage infrastructure.
- A rising main from Windsor Wharf to the local sewer system, which is used to pump out boat sewage holding tanks.
- A gravity sewer main, which runs beneath Old Bridge and Bridge Streets.
- A number of water mains on both the northern and southern river banks.
- Street lighting on both the northern and southern river banks.
- Telstra assets located on both sides of the river. In particular, Telstra assets located near the proposed southern bridge abutment would need to be relocated prior to construction of the bridge abutment.
- A new recycled water main for future use if required.
- Traffic signal cables along Bridge Street between George Street and Macquarie Street.

9.2.7 Urban and landscape concept design

The urban design and landscape concept design associated with the project was developed by applying project specific urban design principles and treatments. Works associated with the current concept design are described below.

Southern bank and Thompson Square area

At this stage of project development, the scope of works in Thompson Square parkland has yet to be fully defined and would be subject to further consultation with the community, government stakeholders and most importantly Hawkesbury City Council – who would be responsible for managing Thompson Square parkland in the longer term. For the purposes of assessment in the EIS, preliminary urban design and landscaping works for Thompson Square have been identified. These works have been developed with the objectives of providing pedestrian and cyclist access from the replacement bridge to various areas in Thompson Square and providing a base for additional urban design and landscaping works arising from the consultation process. The consultation process for the additional urban design and landscaping works for Thompson Square is ongoing and if possible the full scope of works would be presented and assessed in the Submissions Report. However, it is recognised that the full scope of works may not have been agreed before the completion of the Submissions Report and a post-approval Urban Design and Landscaping Plan for Thompson Square parkland maybe be required.

The scope of works assessed in the EIS include:

- Infilling the southern approach road to the existing bridge.
- Removal of some trees which are either in poor condition or would be impacted by the project.
- Minor earthworks in the Thompson Square lower parkland area to improve the connection of the parkland to the river.
- Construction of stairs from the bridge pedestrian/cyclist path to The Terrace and from Thompson Square road to The Terrace to provide pedestrian access.
- Reinstatement of the section of The Terrace and river bank currently bisected by the existing bridge and approach roads.
- Planting of trees and other vegetation in Thompson Square parkland.
- Landscaping in the road reserve between the three properties on Old Bridge Street and the southern approach road.

Bridge

The project specific urban design principles have been used to refine the visual appearance of the replacement bridge. This includes refinements to the pier shape, bridge superstructure and abutments to minimise its visual impact and provide context to the heritage values of Windsor.

Northern bank

- Infilling the northern approach road to the existing bridge.
- Minor earthworks to improve the visual appearance of the bank.
- Construction of pedestrian/cyclist paths to Wilberforce Road and Macquarie Park.
- Planting of trees and other vegetation.

9.2.8 Construction works

Temporary construction facilities

Construction of the project would require establishment and operation of temporary construction and compound sites for the duration of the construction period (about 20 months). These facilities would be removed at the completion of construction and the sites would be restored and landscaped.

The main construction compound would be located on the north side of the river within the existing turf farm between the Hawkesbury River and Wilberforce Road (Lot 2 DP 1096472 and Lot 2 DP 65136). This main construction compound is identified as the turf farm (inventory number 27 in this report and Figure 5-2 in the EIS) and is discussed in more detail below.

Additional areas would be used for construction purposes and as secondary compound sites. These include:

- Windsor Wharf car park and open space (Lot 7008 DP 1029964) – on the south side of the river immediately to the south of Windsor Wharf between Old Bridge Street and Windsor Wharf. Construction compound and facilities would be limited to the existing paved areas and grassed areas.
- The lower Thompson Square parkland (Lot 342 DP 752061) – this area would be required to allow construction of the southern bridge abutment and approach road.
- Office space in a building near the project – this location has not yet been identified.

Temporary construction facilities would be the main focus of construction activity and would also be used for temporary storage of construction materials and equipment and the placement of temporary facilities for construction workers. The key factors considered in selecting the proposed construction compound sites were as follows:

- Access to the main road network
- Access to services such as electricity and water
- Proximity to key construction areas
- Minimising local traffic disruptions
- Distance to residences and other land uses that would be particularly sensitive to the impacts of construction activities
- Minimising heritage, visual and vegetation impacts.

The main construction compound site, secondary compound site and additional areas would be used for construction purposes are described below.

Turf farm site

The main construction and compound site would be located within the area of land designated as Lot 2 DP 1096472 and Lot 2 DP 65136 between Wilberforce Road and the northern side of the Hawkesbury River. This land is currently used for turf farming and would be acquired by RMS for the project. The site would support bridge construction activities and would include the main compound facilities and site office for the project. The casting yard, large cranes, laydown area and other facilities supporting the incrementally launched bridge would be located on this site. Piling and excavation of up to 4000 cubic metres of soil for establishment of the casting yard and supporting facilities would be required.

The site is generally level and would only require very minor grading and contour works to provide for safe vehicle turning areas and access to/from Wilberforce Road. Access to the main construction and compound sites would be from the Wilberforce Road. Minor modification to Wilberforce Road such as the construction of temporary road pavements, a roundabout or slip lanes would be required to provide safe access to the site.

Temporary jetties or pontoons would also be established on the foreshore to allow water access to and from the bridge piers for workers and materials. A temporary access road from the construction compound to the temporary jetties or pontoons would also be constructed.

Establishment of the construction compound would require removal of irrigation water pipes and sprinklers that currently provide water for turf farming. The site includes an area of land at the foreshore that would need to be cleared of vegetation to allow for the construction of scour protection works associated with protecting the northern abutment and a temporary access road.

Construction activities at the site would be predominantly confined to standard daytime working hours, with some intermittent deliveries by heavy vehicles and unloading of bridge components and equipment taking place at night. Inaudible works may be undertaken in the casting yard outside standard construction work hours.

Part of the site would also form the permanent northern abutment for the replacement bridge as the new intersection of Wilberforce Road, Freemans Reach Road and the Macquarie Park access road.

Windsor Wharf car park and open space

This secondary construction and compound site would be established on council-owned car parks and open space near Windsor Wharf (Lot 7008 DP 1029964). Construction facilities would be limited to the existing paved area and grassed areas. Clearing of the existing vegetation would be limited to a number of small planted trees that may require removal or trimming to allow access.

The car park immediately to the west of Old Bridge Street is about 180 square metres and would support road and bridge construction activities. It would also form part of the new bridge approach road between George Street and the replacement bridge. The car park adjacent to Windsor Wharf is about 500 square metres and would be used for a secondary project office, compound facilities and storage area. The grassed areas would be used as a storage area or portable offices may be located in these area. Construction activities on the sites would be predominantly confined to standard day time working hours, with some intermittent deliveries by heavy vehicles and unloading of construction components and equipment taking place at night.

Vehicle access to the construction site would be via Old Bridge Street or via The Terrace. Public vehicle access to Windsor Wharf would need to be temporarily closed until road works between George Street and the replacement bridge are completed. Pedestrian access (via The Terrace) would be temporarily restricted during critical activities, such as landing the final bridge span into position, reconstructing The Terrace and constructing the southern bridge abutment.

Lower Thompson Square parkland

The lower Thompson Square parkland has been identified as a secondary compound for the project. While it would be required for construction, the types of activities undertaken in the parkland would be limited and would include:

- Part of the southern approach road and abutment would be located in the lower parkland area and these areas would be directly disturbed by construction activities
- An area directly adjacent to the southern approach road and abutment would be required to provide access to enable construction of these project elements

- A small demountable may be located near The Terrace for security and traffic control for access to the southern bank construction area
- Temporary fencing would be installed for security and safety reasons

In recognition of the heritage value of the lower Thompson Square parkland, the area would not be used for parking, storage of materials, office demountables or any other typical construction compound activity.

It should be recognised that heritage excavations in the lower parkland area may be substantial and extend outside the directly impacted construction area as this area contains both Aboriginal and historic areas of interest.

While not all of the lower Thompson Square parkland would be required for construction, the lower parkland would be closed to public access during construction for safety reasons.

Order of Construction Works

The order of construction works would be implemented to minimise environmental and traffic impacts as far as practical. The likely order of construction works would consist of the following:

- Pre-construction activities and early works – including construction compound and casting bed establishment, installation of environmental controls, public utility relocations or adjustments and additional investigations and heritage salvage.
- Construction of the bridge - including construction of the piers in the river, two bridge abutments and construction and launching of the bridge superstructure.
- Installation of scour protection on the banks and in the river.
- Construction of the northern roundabout and approach road and most of the southern approach road.
- Construction of temporary pavement both at Wilberforce Road and near the corner of George and Bridge Streets to provide additional road width to enable construction of the subsequent stages.
- Construction of the remainder of the southern approach road and the new sections of Freemans Reach Road, Wilberforce Road and Macquarie Park access road.
- Commissioning and opening of the replacement bridge to traffic.
- Demolition of the existing bridge and urban design works in Thompson Square, on the southern bank, northern bank and other adjacent areas.
- Removal of temporary structures and demobilisation of the construction facilities.

This proposed order of construction works is indicative and may change once detailed construction planning is completed. It is likely that some aspects of construction may overlap.

Construction period

It is anticipated that a construction period of around 20 months (excluding pre-construction and early works) would be required to complete the proposed works including demolition of the existing bridge.

Work hours

The majority of the construction works would be carried out during standard working hours, as detailed in Table 8: Standard working hours. Some construction activities, in particular those requiring road closures, would need to be undertaken outside of standard working hours to prevent major disruptions to traffic and access. Other construction activities such as service relocations and cutovers may also need to undertaken outside normal working hours. Low noise activities may also be undertaken outside of normal working hours to optimise construction efficiency.

Table 8: Standard working hours

Day	Start time	Finish time
Monday to Friday	7am	6pm
Saturday	8am	1pm
Sunday and public holidays	No work	

Construction equipment

The types of construction equipment likely to be used for the project would include (but would not necessarily be limited to) the following:

- Excavation plant, such as excavators, back hoes and front end loaders for pavement cutting, removal and general earthworks.
- Bobcats and sweepers.
- Compaction plant, including rollers, vibrating rollers, concrete vibrators and trench plate compactors.
- Pneumatic jack hammers.
- Profiling, milling and road paving plant.
- Jet-blasting and shot-blasting machines.
- Miscellaneous vehicles, including utilities, trucks, bogies and semi-trailers.
- Miscellaneous hand tools and equipment.
- Generators, lighting towers, signage and variable message boards.
- Various barges, workboats and pontoons.
- Piling rigs and various mobile and fixed cranes.
- Concrete and grouting pumps and transport vehicles.
- Support trusses, stress jacks and scaffold systems.

The equipment chosen would be the current best-practice technology for the construction industry.

10 STATEMENT OF HERITAGE IMPACT

10.1 Introduction

The following section assesses the predicted impact of the project on the significance of the project area by identifying proposed changes to individual items and the cumulative effect of the project. Impacts that are identified in this section are then addressed in the recommendations (Section 10) where mitigation measures are proposed.

This statement of heritage impact has been assessed in accordance with the guiding document published by the NSW Heritage Office & Department of Urban Affairs & Planning (2002) *NSW Heritage Manual – Statements of Heritage Impact.*

Expert opinion has been sought from various specialists and the results of the specialist investigations have been drawn on where required in this assessment. These include:

- The structural integrity of the existing Windsor Bridge assessed by CTI, Access UTS and the RTA (now RMS)
- The noise and vibration assessment and mitigation report prepared by SKM.
- Noise treatment for the upper level of one of the heritage listed buildings (10 Old Bridge Street) has been recommended by a conservation architect with City Plan Heritage.
- Impacts to the archaeological resource have been assessed by Wendy Thorp of Cultural Resources Management and the results incorporated into this section.
- Impacts to the setting of Thompson Square and the components on the north side of the Hawkesbury River have been assessed by Pamela Kottaras and are based on the assessment of historic views and vistas prepared by Peter Woodley.
- Impacts to maritime archaeological resources have been assessed by Chris Lewczak of Cosmos Archaeology in a separate report. Scour protection proposed for the replacement bridge has been addressed in the maritime archaeological assessment and SoHI.
- A detailed landscape character and visual impact assessment of the bulk, scale and design of the project has been undertaken by Spackman, Mossop and Michaels. Mitigation measures relating to these impacts have been addressed in detail in that report.
- The bridge design has been undertaken by Philip Thalis and Laura Harding of Hills Thalis Architecture + Urban Projects.

This statement of heritage impact was written by Pamela Kottaras of Biosis Research.

All consultants identified in this section are qualified and have extensive of experience.

10.2 Identification of impacts

The project would impact on known and potential items of heritage significance within the project area. These impacts have the potential to extend beyond the project area to affect historic views and vistas from the north side of the river and would have a negative impact on the setting of Thompson Square. It is clear that the project will have a number of impacts on the significance of Thompson Square, Windsor Bridge and Bridgeview.

Three classes of impact have been identified that would be associated with the project. They are construction impacts, demolition impacts and operational impacts.

Construction impacts relate to the construction phase of the project and would be temporary as well as permanent. They include:

- Potential damage to heritage items and buildings due to vibration from construction activities.
- Direct and indirect damage to known and unknown terrestrial and maritime archaeological resources.
- Temporary visual impacts of construction sites and compounds.
- The impact on Thompsons Square and the northern bank during the removal and infilling of the approach roads to the existing bridge.
- Other early works such as installation of environmental controls, temporary pavements (for a detailed list of proposed actions, refer to Section 8 Project Elements).

Demolition impacts would be temporary and permanent and include:

- The demolition of the existing Windsor Bridge
- Direct and indirect damage to unknown maritime archaeological resources.
- Temporary visual impacts of construction sites and compounds.

Operational impacts are those that would result from the completion of the project. Resulting changes to the cultural landscape would include the following:

- The visual impact of the project and its constituent elements including:
    - The proposed southern approach to the replacement bridge as a new element
    - The height of the southern approach
    - The replacement bridge as a new element
    - Upgrade to the George Street/Bridge Street intersection
    - The proposed northern approach to the replacement bridge as a new element
    - The proposed roundabout on the northern bank as a new element
    - The proposed water quality basin as a new element
    - Infilling the Bridge Street road cutting to the existing bridge
    - Infilling the northern approach to the existing bridge
    - Construction of pedestrian/cyclist paths to Wilberforce Road and Macquarie Park
- Utilities installation extending from Macquarie Street in the south to the George Street/Bridge Street intersection

The discussion of impacts has been framed by questions in "Statements of Heritage Impact"[568].

Questions relevant to the project will be applied to the proposed demolition of the Windsor Bridge, the actions proposed within Thompson Square, the construction of the replacement bridge and the impact of the proposed works on the north bank including those to Bridgeview and the northern foreshore. The process of asking a specific set of questions helps focus the considerations of impacts on heritage significance. Relevant questions are as follow:

- *Have all options for retention and adaptive re-use been explored?*
- *Can all of the significant elements of the heritage item be kept and any new development be located elsewhere on the site?*
- *Is demolition essential at this time or can it be postponed in case future circumstances make its retention and conservation more feasible?*
- *Are particular features of the item affected by the demolition?*

[568] NSW Heritage Office and Department of Urban Affairs & Planning, 2002.

- *Have the consultant's recommendations been implemented? If not, why not?*
- *Does the existing use contribute to the significance of the heritage item?*
- *How is the impact of the addition on the heritage significance of the item to be minimised?*
- *Will the additions tend to visually dominate the heritage item?*
- *Are the additions sited on any known, or potentially significant archaeological deposits? If so, have alternative positions for the additions been considered?*
- *How has the impact of the new work on the heritage significance of the existing landscape been minimised?*
- *Has evidence (archival and physical) of previous landscape work been investigated? Are previous works being reinstated?*
- *Has the advice of a consultant skilled in the conservation of heritage landscapes been sought? If so, have their recommendations been implemented?*
- *Are any known or potential archaeological deposits affected by the landscape works? If so, what alternatives could have been considered?*
- *How does the work impact on views to, and from, adjacent heritage items?*

10.3 Demolition of the existing Windsor Bridge

10.3.1 Setting and Views

The demolition of the existing Windsor Bridge would be a loss to the cultural landscape of Windsor as the item contributes to the historic character of the locality and is also significant as an individual heritage item. Since it was built it has featured in numerous photographs and is a component of the iconic image of Thompson Square as viewed from the north bank as well as vistas across the river from Thompson Square. The existing bridge contributes to the cultural landscape in the location, which incorporates, in particular, Thompson Square down to the river, and connects the contrasting landscapes of the developed ridgeline of Windsor and the rural expanse on the north side of the river.

10.3.2 Physical Impact

The 1874/1922 bridge over the Hawkesbury River has been assessed to be of State significance in this report as well as the RMS Heritage and Conservation Register. Its demolition is proposed because of its condition and its location upstream of the proposed replacement bridge.

The bridge fabric has been assessed by RMS and independent experts with the conclusion that the condition of the bridge is poor. The discussion about the bridge's structural integrity in this section as well as Section 6.6 of this report is informed by assessments undertaken by two independent experts as well as RMS' own condition reports.[569] No conclusions regarding the bridge's structural integrity have been made by Biosis.

The condition of the iron cylinders, installed in the river in 1874 and raised in 1897 is considered to be of particular concern. Drilling sections beneath the water line show that where the thickness of the piers was originally approximately 40 mm it is as thin as 18 mm in some places. Some piers are also displaying circumferential cracking as well as minor surface rusting.

The condition of the concrete elements, many of which were used to upgrade the bridge in 1922 and 1948 is also considered to be poor. Carbonation in the concrete girders, cross girders and headstock has been reported to be compromising the strength of the entire structure.

A factor in the decision to demolish the existing Windsor Bridge is that should it fail, it poses a threat to the replacement bridge which is proposed to be built 35 m downstream.

The bridge has been used continuously since constructed in 1874. Although the fabric of the superstructure was modified significantly through the removal of the timber element and replacement with concrete girders, cross girders and deck, the original form of the bridge has been retained. Also

[569] CTI 2005; Access UTS 2011; RMS File 05m726.1.

of note is that the refurbishment was an early use of mass concrete and the construction methods that allowed one lane to be kept open, were unusual.

Rehabilitation is possible by removing the deck and inserting reinforced steel through the cylinders but this option has ben rejected by RMS due to the estimated costs.

10.3.3 The Archaeological Resource

The existing bridge is thought to be in the general location of the original wharf, built in 1795, as well as the former punt wharf and the temporary bridge built for the 1897 modifications, which raised the height of the Windsor Bridge. Archaeological management during the removal of the bridge would need to consider these potential historic elements.

Research and underwater survey conducted by Cosmos Archaeology with the assistance of SSS undertaken by the RMS Hydrographical Department concluded that high potential for evidence of the c 1815 wharf (government wharf) within the river and into the southern riverbank survives and moderate potential for evidence of the c. 1835 punt wharf on the north side of the river (upstream of the existing bridge).[570]

Research conducted by Biosis and Cultural Resources Management indicates that the site of the punt landing on the southern bank (or the vicinity) is likely to be the site of the earliest wharf.

In addition to the maritime archaeological program recommended for the area beneath the existing bridge, further recommendations have been made to capture data that would otherwise be lost in the demolition process.

The mitigation measure relating to archaeological management (11.8.3) has been written with the aim that if any archaeological program is undertaken, it will be formulated in consultation with stakeholders. It is strongly recommended the 11.5.5 *Principles to guide future archaeological investigation* is considered when preparing an archaeological program as per mitigation measure 11.8.3.

10.3.4 Conclusion

The primary recommendation that has been made is to retain Windsor Bridge (Recommendation 11.7.2). Should demolition of the bridge proceed, mitigation measures have been formulated to partially reduce the impact of the removal of the bridge and include archival recording and re-use of the bridge elements, preferably on site. Refer to Section 11.7 for recommendations and 11.8 for mitigation measures.

10.4 Thompson Square, Bridge Street and The Terrace

10.4.1 Setting and Views

The project would result in a replacement bridge 35 m downstream of the existing bridge. This would require new southern and northern approaches to access the bridge, the design of which is constrained by current road design standards. The proposed roads are confined to the section of the project area that commences at the roundabout at George and Bridge Streets and travels north across the replacement bridge. Services also form a component of the project and would be installed beneath Bridge Street from Macquarie Street to the proposed roundabout connecting Freemans Reach Road with Wilberforce Road.

The discussion on impacts to Thompson Square includes the area to the north of the SHR boundary down to the river bank. This is because activities within the square historically extended to the waterline and into the river. Impacts to Thompson Square would predominantly be archaeological and visual. Thompson Square is State significant for a number of reasons, one of which is its still-recognisable form as a civic space that has its origins in the early establishment of Green Hills. It owes its current form to Governor Macquarie and the changes to Bridge Street made in 1934. One

[570] Cosmos Archaeology, 2012 (October): 98 – 99.

element of Thompson Square's significance is that it retains the ability to be identified as the Macquarie-planned square.

The impacts to Thompson Square would be substantial as the evaluation of significance noted two major factors: the significance of Thompson Square is embodied in its setting and a significant archaeological resource that is very likely to survive intact in some places and fragmented in others.

The introduction of a modern bridge, approaches and roundabout on the north bank will add a disproportionate (to the setting), modern element to what essentially continues to be a rural, historic landscape. Iconic views back to Thompson Square from the north side of the river will be changed to incorporate the replacement bridge and the traditional road alignments that are still visible in the landscape of Thompson Square will be removed by the project.

Views of the square from the intersection of Bridge and George Streets will be modified as the road to the bridge will now change in orientation and scale. Since it was constructed in 1934, the Bridge Street cutting has taken traffic from the ridge of George Street down to the modified river bank and on to the bridge. The cutting, although a negative impact on the unity of the two reserves, descends out of view and does not impose itself on views across the square, maintaining the illusion of unity and keeping the perimeter buildings that have defined Thompson Square for a substantial amount of time largely unobscured.

Reference should be made to Section 6 of the Urban Design, Bridge and Landscape Concept Report for concept cross and longitudinal sections that illustrate the description below (Spackman Mossop and Michaels 2012).

The southern approach road, would start at approximately the same level as the existing footpath in front of 10 Old Bridge Street and fall gently as it approaches The Terrace. As the current landform from George Street to The Terrace is quite steep, the result would ensure that the southern approach road would remain elevated to allow The Terrace to pass beneath it with sufficient clearance for service and other vehicles (about 3.6 m). The level difference between the approach road and the existing terrain becomes more apparent between the northern elevation of 4 Old Bridge Street and The Terrace.

On the western side of the southern approach road, the height of the road (and therefore the retaining wall to the parkland) would be about 2.5 m.

No direct physical impacts are proposed to the buildings that surround the open space. However, noise and vibration investigations undertaken for the project have identified potential construction vibration impacts that would require mitigation measures to reduce the risk of damage. These measures include preparing dilapidation reports to record any changes to the fabric of significant buildings during construction, noise and vibration monitoring and the separation of heavy machinery. Qualified consultants prepared the noise and vibration report (SKM) and the noise mitigation assessment on 10 Old Bridge Street (City Plan Heritage). The information presented in this section with respect to noise and vibration impacts is informed by those reports.

By locating the southern approach road close to the eastern perimeter of Thompson Square, the opportunity has arisen to consolidate the two open spaces that create the upper and lower parkland area at present. The space within Thompson Square has been divided into two areas since at least 1842 when a road from the south west corner of the square winding down the slope was created to access the punt wharf (refer Armstrong survey 1842). However, the division between the two spaces has never been as marked as it is now, since the re-alignment of Bridge Street into the cutting. The Bridge Street cutting physically disconnects the two spaces and makes access from the commercial side of Windsor to the lower parkland area difficult and dangerous. Bridge Street disconnects eastern Windsor from the rest of the town during peak traffic periods.

Early in the life of the settlement, during its Green Hills phase, tracks to the river were important but they don't appear as dominant components in the early depictions of the landscape. Consolidation of the two parkland areas would allow the opportunity for some reinterpretation of the square as it would have been in the late eighteenth/early nineteenth century. Consolidation would also provide the opportunity for Thompson Square to be utilised for civic and social events as one large contiguous space.

10.4.2 Physical Impact

The predicted physical impact to Thompson Square is predominantly confined to the archaeological resource (refer below). Inadvertent impacts, such as the unauthorised removal of the archaeological resource, have been considered in the mitigation measures, which includes heritage inductions for all staff working on the project (refer to mitigation measures Section 10).

Another substantial physical impact would be the results of the consolidation of the two parkland areas into one. The purpose of consolidation and one of the outcomes of the project would be to transform the two parkland areas into a more useable space with a connection to the river. The Urban Design and Landscape Concept Report[571] (UDLC) promotes a future design for an informal landscaping scheme that retains the "natural" character of the parks. To create a pedestrian connection from George Street to the river, the concept plan is for a gentle terracing that begins halfway down to the river. The realisation of a landscape scheme such as this would have impacts that include filling the existing 1934 road cutting and cutting and/or filling the flanking sections of the space to create accessible terracing.

Some trees have been identified for removal, most of which are self-seeded and are not considered by the Urban Design team to be significant planting. One significant "landmark" tree is identified for removal as it is a large, aged tree growing in the cutting on the south east corner of the upper park (on the corner of Bridge and George Streets). This landmark tree is a Silky Oak (*Grevillea robusta).* The UDLC report notes that a number of trees would be removed from Thompson Square and the northern foreshore. Most of the trees that would be removed in Thompson Square occur in the lower section of the parks, predominantly in the lower parkland area[572] (Plate 118 below). The principles guiding the vegetation scheme for future landscaping include the retention of mature and significant specimens, removal of trees in poor health, using species that are established in the parkland areas and using plantings to create an open park to enhance views to the river and assist to reduce the scale of the proposed roundabout on the northern foreshore.[573]

[571] Spackman Mossop and Michaels with Hills Thallis 2012.
[572] *Ibid: 71.*
[573] Spackman Mossop and Michaels with Hills Thalis 2012: 71.

gure 6.6: Existing trees and trees to be removed.

Plate 118: Detail of the Urban Design and Landscape Concept Report illustrating which trees can be removed (top plan, red dots) and the replanting scheme proposed (lower plan, pale green dots) from page 71 (Spackman Mossop and Michaels with Hills Thallis).

10.4.3 The Archaeological Resource

The section of the report addressing archaeological resources, which is included in Appendix 3, has been informed by the excavation report prepared by Wendy Thorp.

Test excavation undertaken in late April/early May 2012 exposed deposits that suggested the substantial survival of an accumulated complex archaeological resource of varying degrees of significance. The project footprint would impact about a third of Thompson Square (to the waterline) resulting in substantial impact on the archaeological resource within the project area on both sides of the Hawkesbury River.

The total footprint of the replacement bridge is expected to be limited in depth and extent, and design iterations have sought to continually reduce the total area affected. This may be considered a positive factor for the survival of the archaeological resource. However, test excavations revealed that historic land uses and cultural and environmental modification have created a complex and significant stratigraphic sequence that would require an archaeological excavation greater in extent than the impacts of the construction footprint to retrieve meaningful information. The varied depths of excavation required for the project, from 0.5 m to 1.5 m on the southern bank will leave components of the profile disassociated from their contexts and isolated and inaccessible if the bridge and roads were constructed above them; disruption of the archaeological profile through excavating selective locations will further fragment the surviving archaeological resource, which has been established to be potentially of State significance with some elements graded as exceptional.

In other places, particularly the middle and northern portions of the Thompson Square Conservation Area excavation for the project would impact on places of assessed and potential State significance.

The remnant wharf that is visible on the river bank was assessed by Cosmos Archaeology (2012). This particular site is located approximately 35 metres downstream of the existing bridge and would

be removed by the project. The remnant wharf is located within the riverbank at the base of Old Bridge Street but is not within the Thompson Square Conservation Area as identified on the SHR.

In addition to the 1795 wharf, another wharf may also have been built around 1800 to service government house; if this assumption is correct, remnants may survive in the bank or mud flats at the base of the Arndell Street extension (about 170 m downstream of the existing bridge and within the project area).

Modern road construction results in a disturbance layer of around 0.5 metres, which accounts for the road base and pavement. Excavation of the archaeological test trenches in Thompson Square confirmed that the current road profile there is approximately 0.5 metres deep. The impact of road construction events would have removed at least the top 0.5 m of historic cultural fill and possibly, natural deposit, as modern disturbances include maintenance works such as resurfacing with crushed gravel, macadamising and asphalting as well as previous installation of utilities.

An RTA utilities plan from 2005 indicates that an underground Telstra optic fibre and main cables have been installed within the footpath on the eastern and western side of Bridge Street. The cables on the western side of Bridge Street cross the roundabout under the northbound lane and continue to the eastern footpath of Old Bridge Street in front of no. 10.

Also installed in the footpath on the western side and the eastern side of Bridge Street is a 150 mm watermain. The watermain crosses Bridge Street close to the corner of George Street and another crosses the roundabout east west on the descent to the bridge (Plate 119).

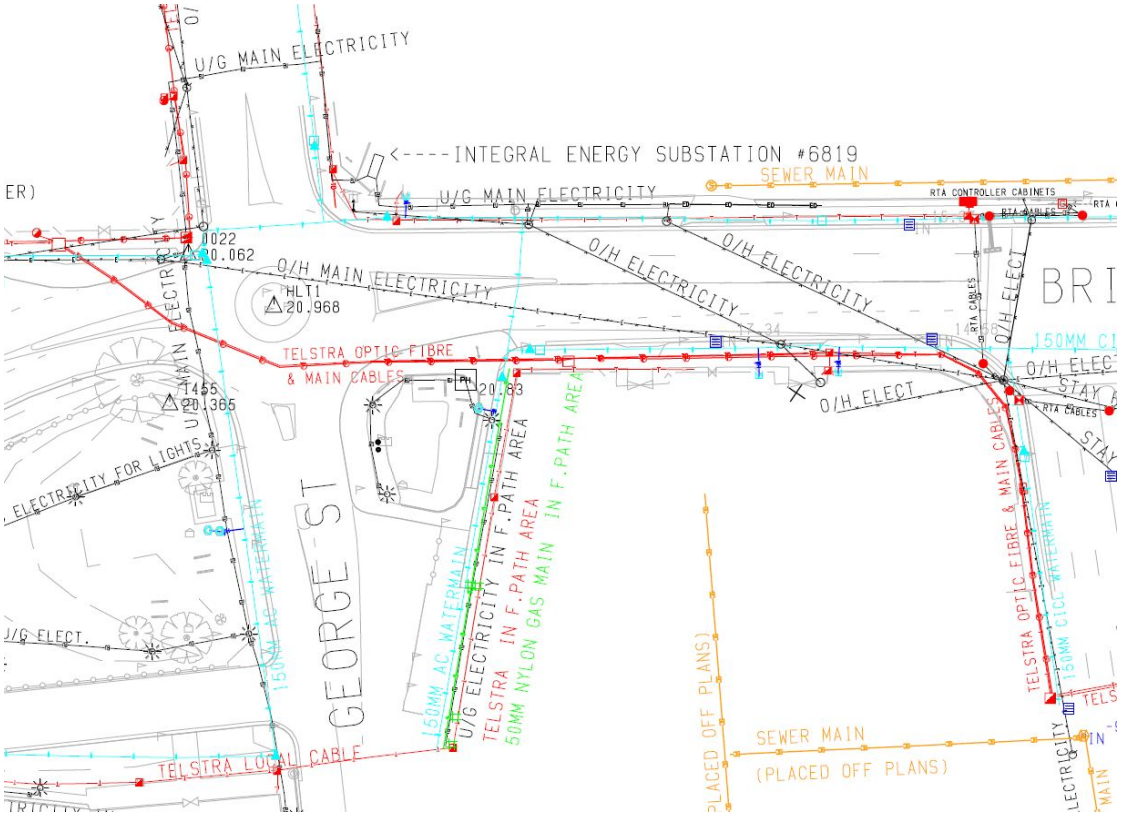


Plate 119: A detail of the 2005 utilities plan in the location of the Bridge Street/George Street roundabout to Macquarie Street.[574]

Impacts to the archaeological resource are also predicted at the George Street/Bridge Street roundabout where traffic signals would be installed, although impacts related to the construction of the road would have caused some disturbance. Disturbance associated with the installation of traffic lights would be localised although wider impacts should be considered, especially given the roundabout's

[574] Roads and Traffic Authority of NSW, *Hawkesbury City Council Area Bridge St, Wilberforce Rd, George St, Macquarie St, Windsor. Proposed Bridge over Hawkesbury River Utility Plan/Subject to Further Investigation (3 December 2005); sheet 2 of 2.*

proximity to the location of a former government building where the School of Arts building now stands.

The installation of utilities is also proposed for a length of Bridge Street from Macquarie Street to the Bridge Street/George Street intersection. Cabling from the signal box on the western side of Bridge Street at the intersection with Macquarie Street would be installed behind the kerb (that is, within the footpath) to signalise the intersection at George Street and Bridge Street. A 33 kV cable (electricity) would be installed within the road in the northbound lane.

Research undertaken for this report suggests that the western side of Bridge Street is likely to have a high level of archaeological sensitivity as the footprint of at least one of the government buildings may have extended onto what is now the northbound lane of Bridge Street. The depth of the road and road base of approximately half a metre (0.5 m) is likely to have removed a large proportion of the potential archaeological resource relating to this and other structures in this location as would the installation of the underground main electricity cables and the 100 mm watermain; however, the 33 kV cable would require excavation to a maximum of 1.6 m, which may result in impacts to a potential archaeological resource beneath the current level of disturbance.

There is no evidence to suggest that structures extended beyond the current property boundaries on the western side of Bridge Street, between Macquarie and George Streets and consideration is being given to installing all underground services on this side of the road. There is the potential for the traffic signal cables to be extended from the signal box, across Bridge Street from where they would be laid within the footpath on the western side of the street.

At this stage of the project, the installation method has not been confirmed but the options are open trenching or directional drilling. Directional drilling would be less intrusive to the everyday flow of the Bridge Street and cause less of an impact that open trenching but both methods would require an understanding of what the archaeological resource could be in the area and what the impacts of both methods would be.

The physical result of archaeological excavation is similar to construction impacts and in some cases can be more destructive because of the data-gathering nature of the activity; its aim is to systematically target and remove deposits and artefacts whereas construction-related impacts can be hit and miss. Archaeological excavation is destructive of its primary resource but its sole purpose is to extract information that is not accessible from other sources, in a systematic and controlled way. As soon as that resource is excavated, it has the potential to be meaningless if not treated and recorded correctly. An archaeological resource of this significance should be either left where it is or excavated to a high standard, with direction by an experience archaeologist. The information that is extracted from any excavation, but particularly from a place as significant as Thompson Square, then needs to be disseminated to contribute to knowledge about the development of the colony to various audiences and to offset the destruction of the resource.

10.4.4 Conclusion

The primary recommendation is to avoid all impacts to Thompson Square (Recommendation 11.7.2). Should the project proceed, mitigation measures have been formulated to partially reduce the impact of the removal of the bridge and include archival recording and re-use of the bridge elements, preferably on site. Refer to Section 11.7 for recommendations and 11.8 for mitigation measures.

10.5 Freemans Reach and Bridgeview

10.5.1 Setting and Views

On the north side of the river, the project would fill the cutting to the bridge and construct a roundabout to service the replacement bridge, Macquarie Park, Freemans Reach Road and Wilberforce Road. Impacts on this side of the river are predominantly restricted to the visual landscape as the configuration of the roads here have not changed for a century or more and the land uses are rural agricultural.

A roundabout would be constructed within what is currently a turf farm to the east of the existing road parallel with the boundary of Macquarie Park. The roundabout would be two lanes wide and feed into

Macquarie Park, Freemans Reach Road, Wilberforce Road and the proposed new alignment of the northern bridge approach.

Bridgeview, a heritage listed residence is located adjacent to the project area. Bridgeview is a fine example of a Federation bungalow with landmark qualities as its name suggests. It is visible from Thompson Square and from Wilberforce Road and currently greets travellers as they leave the bridge and head to the north and northwest. Bridgeview would not be physically impacted by the project, however construction impacts have been considered and a dilapidation report has been prepared as a benchmark to monitor its condition during construction. Additionally, the controls that would be put in place in Thompson Square would also be put in place in the vicinity of Bridgeview. Construction compounds will be located away from the house to the easternmost extent of the turf farm fronting the river.

Design changes have been made with respect to reducing the visual impact of the proposed roundabout by lowering the proposed level by approximately one metre. The finished roundabout would be a new addition to the landscape on the northern bank and with the feeder roads will create a substantial visual impact when viewed from Thompson Square. Views to Bridgeview would also be affected negatively but would be reduced by landscape design to obscure the road from the house.

10.5.2 Physical Impact

Physical impacts to listed heritage items on the north bank are not anticipated, except the removal of the existing bridge. Potential impacts to the archaeological resource are discussed below.

10.5.3 The Archaeological Resource

The archaeological sensitivity in the northern section of the project area is considered to be variable. Archaeological monitoring of the geotechnical test pits suggests that evidence of landscape modifications survives, particularly around Geotechnical Test Pit 5 (refer to Plate 117). Concrete beams, interpreted as infrastructure created in 1897 to raise and improve the level of the southern approach road, were also found on the north side in proximity to the northern approach road. The excavation for the project on the northern side of the river would reach depths of up to three metres. On the basis of the evidence found in the test pits excavated here most of the impact would be on deposits of soil laid down in the twentieth century or through floods. However, in the immediate area of the approach to the proposed bridge it could be anticipated that the work would impact on infrastructure associated with raising the bridge in 1897, specifically the roads and approach to the bridge. This might preserve older evidence although the test pit program did not reveal any material predating the beams.

Records on the north side of the river are scarce and those that were found during the course of this report were scant on the definitive location of structures. It is known that one of the earliest European inhabitants in the region, Edward Whitton had land holdings within the project area. Archival sources describing a hotel, known as the Squatters Arms, have also been found describing its location on the corner of Freemans Reach and Wilberforce Roads. This potential archaeological site has also been considered in the discussion of archaeological resources (refer to the excavation report) and is included in the recommendations.

The archaeological resource within the project area on the north side is considered to be less complex with the possibility of substantial pockets surviving in discrete areas. The impact, of works associated with the replacement bridge, to archaeological resources of significance are not considered to be as substantial as the south side of the river. The possibility of impacts however, is real and mitigation measures are required.

10.5.4 Conclusion

Views and vistas from Thompson Square and the rural character of the north bank would be impacted by the project. Physical impacts to confirmed heritage items within the project area are not expected. Impacts to potential archaeological resources are difficult to predict as the landscape on the north side of the river has not been highly developed and records are scant. Refer to Section 11.7 for recommendations and 11.8 for mitigation measures.

10.6 Reduction of impacts through project team collaboration

The potential impact of the project has been reduced from the original design through an iterative process involving RMS, the project architects, urban design and landscape architects and archaeologists. Improvements achieved through this integrated process include:

- Lowering of posted speed limit for bridge and approaches, which would result in:
    - an overall lowering of the bridge profile through Thompson Square
    - lowering the southern approach road to prevent buildings on the eastern side being addressed by a 2-3 metre high road formation
    - reducing visual impacts generally
    - a reduction in the need for extensive slope batters on the approaches, which would reduce the area of impact of the southern approaches on the total open space of Thompson Square.
- Identification of construction techniques for the bridge that minimise construction impact. An incrementally launched bridge would minimise construction impacts in Thompson Square.
- The selection of an incrementally launched bridge that would allow for greater design detail, a higher quality finish to the structure and the incorporation of elements reflecting site history. It would also provide the opportunity to design with a view to keeping the bulk and scale of the replacement bridge to a minimum.
- The scale of the bridge piers has been modified to reduce the impact to views from the southern to the northern bank of the river.
- The connection between the open space of the square and the river front, which was a fundamental part of the original purpose of the square, will be enhanced.
- Landscape principles for the proposed changes to Thompson Square, which have been informed by its significance and provide future opportunities to further interpret significance.
- Cultural plantings have been assessed and separated from self-seeded vegetation, and current significant views and vistas have been identified to ensure that they are incorporated as much as possible into a future urban design and landscape plan.
- The archaeological test excavation results have shed more light on the archaeological significance of the project area, contributing to the design decisions.

Despite these design refinements that aim to minimise potential impacts, significant impacts to heritage values will not be negated.

Mitigation measures recommended for the project are discussed in Section 11.8. Impacts to key values and significance are presented in Table 10, which also lists references to the mitigation measures that have been proposed to lessen the impact.

Plate 120: Detail from the landscape concept plan prepared by Spackman Mossop and Michaels with Hills Thallis; page76. The area that would require future landscaping is coloured pale green.

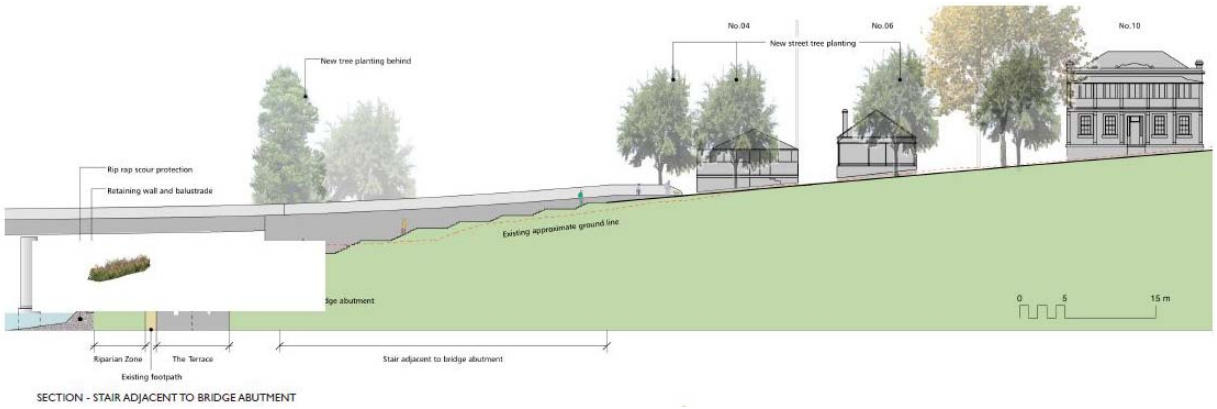
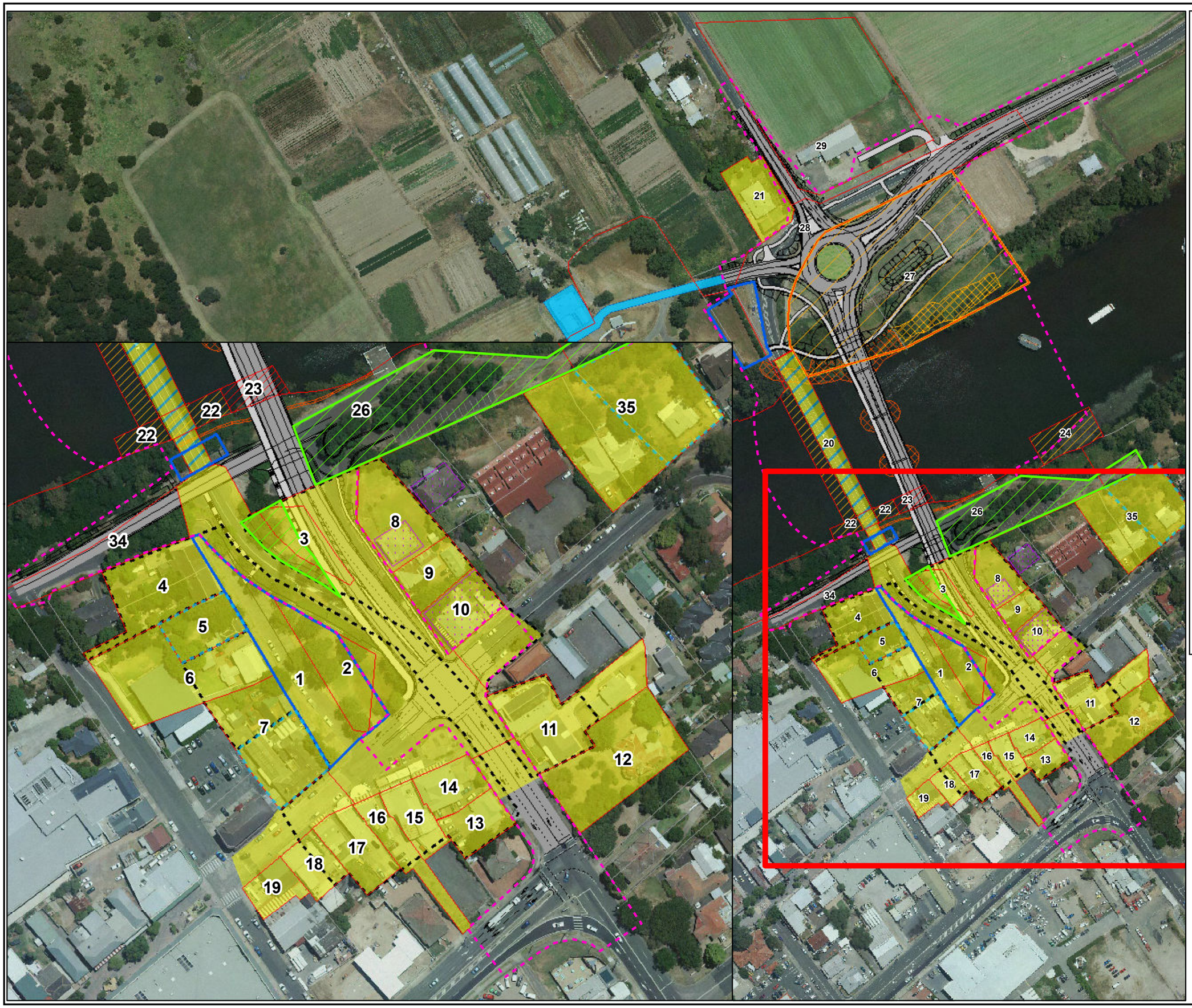


Plate 121: Detail from the landscape concept plan prepared by Spackman Mossop and Michaels with Hills Thallis; page 89. This section shows the naturalistic terracing proposed to join Thompson Square park with The Terrace.

Plate 122: Detail from the landscape concept plan prepared by Spackman Mossop and Michaels with Hills Thallis; page 77. The northern bank would be landscaped with a combination of grass, trees, a riparian zone to screen the scour protection and the roundabout.



Legend

- Investigation Units
- Main Construction Compound
- Temporary Construction and Secondary Compound Sites

Listed Heritage Items

- LEP/Draft LEP
- s170 Register
- SHR

Non-listed Items

- Known Heritage Items
- Potential Heritage Items
- Thompson Square Conservation Area (SHR)

Construction Works

- Construction Work Zone
- Concept design
- Permanent rock scour protection
- Temporary rock scour protection
- Properties requiring flood mitigation works. Works subject to further consultation with and agreement from affected property owners
- Properties requiring noise mitigation works. Works that are feasible and reasonable would be subject to further consultation with and agreement from affected property owners.
- Works subject to further stakeholder consultation

Figure 13: Project components showing heritage items

Numbers relate to investigation units presented in table 1 and the data sheets

0 25 50 75 100 125

Metres

Scale: 1:2,500 @ A3

Coordinate System: GDA 1994 MGA Zone 56

Biosis Research Pty. Ltd.
18-20 Mandible Street
Alexandria
NEW SOUTH WALES
2015

Offices also in: Ballarat, Melbourne, Wollongong, Canberra, Wangaratta

N

Date: 05 November 2012, File number: 14020
Checked by: PBK, Drawn by: JMS
Location:P:\14000s\14020\Mapping\14020_SoHI_F13_wInset_HeritageItems_w_design_051112.mxd

Table 9: Impact minimisation measure undertaken through the iterative design process

Project Element	Impact Minimisation Measures Through Iterative Design	SoHI After Minimisation Measures
Demolition of Windsor Bridge The demolition of this item would have a negative impact on the cultural landscape and the significance of the item itself.	The project would demolish the existing Windsor Bridge due to its structural integrity and the cost implications of refurbishing it. Measures to minimise the loss of significance are included in Chapter 10 "Conclusions and Recommendations"; they include actions such as archival recording and re-use of fabric.	The impact of the demolition of Windsor Bridge would be high.
Construction of the Replacement Bridge The replacement bridge would be a dominant, new feature in the landscape; the configuration of the river crossing and its relationship to Thompson Square would be altered significantly.	The design of the replacement bridge has considered the heritage sensitivity of the surrounding cultural landscape. An incrementally launched bridge has been selected to achieve: - A higher level of control over the detail design and a smaller number of piers, which will result in views through and across the bridge that are more open than would be possible with the design of a plank bridge. - Pier design that would be curved, giving them a more refined appearance than piers with straight edges. - The placement of the bridge abutments to ensure a more open access to the waterfront and along The Terrace and thus closer and safer connection to the river. - The bulk and scale is less than what could be achieved with a plank bridge and would be kept to a minimum through design and reduce its visual impact from the surrounding elevated areas. A 50 km/hr speed limit on the approach roads and replacement bridge, which has also enabled the design of a lower bridge and a lower southern approach road.	The impact of the replacement bridge to the existing significant cultural landscape is anticipated to be high. Physical impacts associated with the construction of the replacement bridge are anticipated to be very high. The choice of an incrementally launched bridge and lowering of the design speed limit would greatly improve the visual and physical impacts associated with construction of the replacement bridge.
Thompson Square The existing character of Thompson Square will be	The height of the southern approach road has lowered by between 1 to 2 m through the modified design speed. The southern approach road has been lowered in order to remove the potential obstruction of views east-west across	The visual impact of the project on Thompson Square is anticipated to be very high.

Project Element	Impact Minimisation Measures Through Iterative Design	SoHI After Minimisation Measures
affected by the introduction of the southern approach road affecting archaeological resources and the setting.	Thompson Square. The southern approach road has also been re-aligned from the original design to allow for a larger parkland area on its west side. The 1934 road cutting that bisected Thompson Square with significant intrusive results would be filled so that the two parkland areas would be consolidated to form one larger civic space. The landscape concept (SMM 2012) includes recommendations to landscape Thompson Square to provide a more direct connection to the foreshore than is currently available.	The physical impact on relics within Thompson Square is anticipated to be very high. The predicted impact of the southern approach road would be high, however, it has been reduced by the lowering of the level by approximately 2 -3 metres. This modification is a great improvement on the original road design, which would have obscured views across Thompson Square significantly.
The Terrace and river foreshore The Terrace would be turned into a low speed, shared pedestrian/cycle/vehicle way	The removal of Bridge Street would allow the continuation of The Terrace from west of Thompson Square to the end of the existing car park along the foreshore. This modification is a positive one as it will create a shared path for use by pedestrians, cyclists and vehicles and allow closer access to the river foreshore. The spaces between the scour protection would be planted with suitable vegetation (e.g. sedges) to reduce the visual impacts of the works. Potential archaeological resources would be addressed through further archaeological investigations in the next phase of the project.	Physical impacts of the modification to The Terrace are anticipated to be high with respect to archaeological resources and low with respect to the relationship of The Terrace with Thompson Square and the river foreshore. The project presents an opportunity to extend The Terrace from the western side of Bridge Street across to the east to make access to the foreshore easier. The result would be more recreational use of the foreshore, better views across the river in some places and an improved connection from Thompson

Project Element	Impact Minimisation Measures Through Iterative Design	SoHI After Minimisation Measures
		Square to the foreshore.
The north bank The approach road to the existing bridge would be filled in; a roundabout would be constructed on what is currently a turf farm; and a new road to the replacement bridge would be constructed from the proposed roundabout.	The scale of the roundabout was identified early in the project as creating a large visual impact. A reduction of its visual impact has been achieved through modification of its design to lower the finished level by approximately 1 m. The possibility of further reducing the size of the roundabout will be investigated by the design team, but cannot be assured for engineering design reasons. Trees would be planted in the area surrounding the roundabout to reduce the magnitude of the impact. The future archaeological project would consider locations in the north bank to investigate.	The visual impact of the roundabout on the northern bank is anticipated to be high with respect to the existing cultural landscape. The impact would be decreased to a lesser degree with plantings to screen the modern addition within the landscape.
Utilities installation The installation of traffic signal cables from a controller box on the eastern side of Bridge Street close to the junction with Macquarie Street. A 33 kV cable is proposed from the corner of Macquarie Street to the replacement bridge.	Traffic signal cables are proposed to be installed within the footpath on the eastern side of Bridge Street, between Macquarie Street and George Street, which has the potential to impact on significant relics related to the government domain. The possibility of moving the cables to the western side of Bridge Street, where the existence of significant relics is less likely has been discussed within the project team and needs to be followed up prior to detail design stage. Buried cables would ensure that visual impacts associated with overhead power lines are removed. There is no visual impact associated with buried cables.	The physical impact would be archaeological in nature and the choice of installing utilities within the western side of Bridge Street would have an anticipated impact of moderate to low.
Construction Impacts Impacts would be expected during construction, that include vibration from heavy machinery, ground breaking works, the removal of the existing bridge as well as from the construction of the	Where vibration impacts are predicted, vibration monitors would be installed in key locations and mitigation measures enacted if vibration levels exceed acceptable levels by: - Undertaking dilapidation reports to monitor the condition of significant buildings - Ceasing work temporarily to separate heavy machinery - Redesigning work methods	The impact of construction-related activities is anticipated to be low. Impacts associated with construction have been modified from potentially high to negligible through the implementation of vibration monitoring and control, heritage inductions and the

Project Element	Impact Minimisation Measures Through Iterative Design	SoHI After Minimisation Measures
replacement bridge.	Site compounds would be built in areas of low sensitivity or on existing ground levels	identification of heritage items not planned for demolition.

Table 10: Potential heritage impacts on sites within the project area

01 – THOMPSON SQUARE (State significant)	
Statutory heritage listings	SHR (#00126 – excludes the 1934 road cutting) LEP (C4) The original civic/service precinct includes the area down to the river bank, which is excluded from the SHR boundary. The additional area is part of item 26.
Brief overview of the item	The historical identity of Thompson Square was much larger than it is today. The square is a result of over 200 years of evolution that has gradually changed from a large, informally created space to a heritage item defined by property descriptions. The heritage item is part of a cultural landscape that extends beyond its SHR curtilage and includes, as part of its significance, fabric, configuration and appearance.
Potential or known impact prior to mitigation measures?	**Fabric:** Physical modification of the existing cultural landscape would occur as part of the project. Physical impacts would be restricted to the public domain on the eastern side of Thompson Square at Old Bridge Street, the lower reserve, the riverbank and the south east corner of the upper reserve at the corner of Bridge and George Streets. The existing Bridge Street approach would be infilled and incorporated into a future landscape plan at the northern end of the proposed new reserve. The existing roads within the envelope of Thompson Square continue to demonstrate the historical development of Thompson Square in their alignment and these would be removed as part of the proposal. The proposal would also remove significant archaeological resources that have a high potential to demonstrate historic activities from the Green Hills period to the present; these are of State, and potentially, of National significance. **Curtilage:** The work would be occurring within the curtilage of the SHR boundary and down to the riverbank, which encompasses the historic identity of the Green Hills public precinct as well as Macquarie's Thompson Square. Impacts to curtilage would be similar to those on fabric, particularly with respect to the impact on the current road alignments within the square. **Visual:** The project would disrupt the familiar and accepted configuration of Thompson Square through the reconfiguration of roads, addition of traffic signals at the George Street/Bridge Street roundabout; disruption of the existing and familiar relationship of one side of the square with the other, the construction of a roundabout on the rural character on the north side; the change in location of the crossing; the addition of the larger replacement bridge; removal of the existing bridge; the removal of trees within Thompson Square.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction

01 – THOMPSON SQUARE (State significant)	
	11.8.3 Archaeological management **11.8.4** Archival recording **11.8.5** Post-construction landscaping **11.8.6** Interpretation
Potential or known impacts after mitigation measures?	The design process for the project has responded to the heritage significance of Thompson Square and the affected landscape in Freemans Reach. The process has been iterative and all efforts have been made to minimise negative impacts. In this instance, mitigation measures respond to impacts only by interpreting the values rather than avoidance. The proposal would irrevocably alter fabric, the setting, views and vistas as well as the configuration of roads and spaces within Thompson Square. **Fabric:** Modification to the existing and significant landscape within Thompson Square would be one of the results of the project after mitigation measures have been put in place. State significant values that are represented by the archaeological resource would be removed by the proposal. The proposal would also impact on archaeological resources that, if they survive intact, may have national significance values. Mitigation by archaeological investigations and interpretation will recover some of the research potential, of these deposits. Mitigation by archaeological excavation however, is nonetheless a destructive process that can inform interpretation and uncover artefacts with separate and individual significance but the overall effect will be an irreversible loss. Given its high significance and likelihood of retaining research value that underwrites our understanding of the pattern of historic settlement in NSW, this will represent a major loss of such deposit within the context of Windsor and NSW generally. Also given its placement within Green Hills and early Windsor, its removal has the potential to sever the archaeological relationships of surviving deposits, and reduce their interpretability. Other risks identified to fabric are damage by the operation of heavy machinery and the removal of the existing bridge. Vibration monitoring and exclusion zones would be put in effect to ensure that the potential for inadvertent impacts is reduced significantly. Methods of construction will be selected to minimise risks from vibration and unnecessary noise and thus the likelihood of inadvertent impacts is negligible. **Curtilage**: The approach road would be constructed within the SHR curtilage of Thompson Square. The replacement bridge would have abutments within the curtilage of the historical identity of Thompson Square. The mass of the southern bridge approaches, while substantial, has been reduced considerably through design effort to closely follow the ground surface and is only elevated at its northern end. These new elements would be visible and permanent introductions into the heritage item.

01 – THOMPSON SQUARE (State significant)	
	A final consideration is the impact that incremental change would have on the significance of Thompson Square. **Visual:** The project will permanently modify the cultural landscape within Thompson Square and on the north side of the river. While the landscape concept design proposes an informal scheme with few hard-paved areas, an informal planting scheme and a gently terraced ground plane down to the river, the changes required as part of the project can only be minimised, rather than avoided where heritage significance is affected.
Effects of proposal on significance	The SHR statement of significance for Thompson Square was examined during the current project and was found to require updating. The re-assessment of Thompson Square's significance in this investigation has confirmed the significance at a State level but demonstrated the complexity of the values and questioned some of the accepted beliefs about the place. Some of the State significant values of Thompson Square would be affected by the project's cumulative impacts on its constituent elements as well as on the item as a whole. The extent and nature of these impacts would not directly affect the full range of heritage values but the State significant, and potentially Nationally significant values of the potential archaeological resource would be impacted by its removal or fragmentation. Aesthetic significance associated with the setting (including views and vistas and configuration of roads and spaces within the square) would be modified permanently removing the opportunity to reinstate a low-traffic character to the place. Incremental change following completion of the project could threaten significance and should be avoided. The consolidation of the two parks is positive in one respect in that connection between the open space and the river would be reinstated. Historically, the space would have had a solid connection to the river, albeit along challenging terrain; however, the replacement bridge, southern approach road and roundabout and landscaping on the north bank, would substantially impact on significant and enduring views within and outside of the square. When viewed from the north side of the river, Thompson Square would be devoid of the existing bridge, which over the last 138 years has become part of the cultural landscape and an extension of Thompson Square. The new elements of the approach road and replacement bridge would be substantial visual introductions to a landscape that has changed modestly in visual terms over the last 200 years and retains the potential for better heritage outcomes in the future. Some of the State significant values that are represented by views and vistas would be reduced or lost. Views from the north bank back to Windsor will be significantly modified by the removal of the existing bridge, and the construction of the replacement bridge. Views from the south to the north would also be affected by the construction of a roundabout on the north bank. Views back to Thompson Square are iconic and have been captured in paintings and photographs since 1807. This view and the setting of Thompson Square would be compromised as a result of the project.

01 – THOMPSON SQUARE (State significant)	
	Significant views across Thompson Square will also be affected through the permanent visual addition of the southern approach road that would remain at grade with the buildings surrounding the square. While this may be concealed through landscape design, it increases the visibility of vehicle traffic within the square. The legibility of Thompson Square as a historical entity, which has evolved over 200 years, and the familiarity of its form would be changed by the project. It is this familiarity of form that has been identified as demonstrating the place's aesthetic and social values. The landscape that began to develop during the Georgian period, and which matured during the late nineteenth century, is evident today and would remain so at the completion of the project. However, the configuration, fabric and appearance of Thompson Square would undergo a substantial transformation. The proposed landscape scheme would create a space that would be recognisable as a town square, albeit on a different configuration, and more readily used as one; a connection between the public domain and the river bank would be reinstated. High quality interpretation would facilitate an appreciation of Thompson Square, as it is today and was in the past, and its role in the formation of Windsor and the early colony. Social significance has been identified as a major value of Thompson Square but the effect of the proposal on the social significance of Thompson Square cannot be appreciated at this time. It is apparent that the social significance of Thompson Square is related to its historical significance and the esteem that the community has for its ability to visually demonstrate the historical phases of the place. Other State significant values such as historical and associative significance would not be lost. Noise-proofing that has been proposed for historically significant residences also forms part of the project, but this element is not considered to be a potential issue for significant fabric as the work would be reversible. This report has also identified the relationship of Windsor Bridge to Thompson Square as a significant value in the setting and this too would be impacted by the proposal when the bridge is removed. The rural character of the north bank as viewed from Thompson Square would also be affected, with greater visibility of vehicle movements and modification to the rural landscape with the addition of the roundabout, scour protection and the water quality basin.

02 – Thompson Square Upper Parkland Area (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: C4
Potential or known impact prior to mitigation measures?	The form of the upper park within Thompson Square has undergone the least amount of change from the twentieth century onwards. Early in the life of Thompson Square, the road from the corner of the Macquarie Arms Hotel traversed the upper park diagonally down the slope and this has now been covered over. The majority of impacts including future landscaping would be occurring to the east of the upper park. **Fabric:** The south east corner of the upper park would be removed to construct a footpath across the bridge. Some landscaping in the south east corner is proposed as part of a separate phase and is currently a concept design. The mature Silky Oak growing on the south east embankment of the upper park would be removed but as the tree is in a precarious position and is approaching senescence, its removal cannot be avoided. The removal of archaeological resources at the higher end (south) of the upper park is not anticipated; however the entire project area has been included for archaeological management prior to demolition and construction commencing. It is anticipated that impacts to fabric of the upper parkland area would be peripheral and minimal. **Curtilage:** The project would construct a road along the eastern side of the square, the results of which would have a minor physical impact on the south east corner of the upper park. The proposal however would affect the relationship of the upper park with the eastern side of the square. Other trees within the upper park would also be removed but would be replaced with like species at the completion of construction. **Visual:** Modifications to the existing landscape are proposed with the removal of trees and their replacement with younger specimens. The southern approach road, the replacement bridge and the roundabout and landscaping on the northern bank would have significant impacts on the views, vistas and setting of the upper parkland area.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction **11.8.3** Archaeological management **11.8.4** Archival recording **11.8.5** Post-construction landscaping **11.8.6** Interpretation

02 – Thompson Square Upper Parkland Area (a component of the State significant Thompson Square Conservation Area)	
Potential or known impacts after mitigation measures?	As discussed in 01 above, the design process has been responsive to the heritage significance of Thompson Square and the affected landscape in Freemans Reach. The final design of the proposal will however be constrained by the relevant design standards for road and bridge construction. These standards specify parameters for design that would have an impact on the fabric, configuration and appearance of the upper park. **Fabric:** The south east corner of the upper park would be removed to construct a footpath across the bridge. The mature Grevillea on this corner would be removed as part of the project as it is currently within the footprint of the proposed footpath. The existing road, constructed in 1934 would be infilled to join the remaining portion of the lower park with the upper park. This section of the proposed consolidated park would be subject to a future landscaping scheme, which is currently in concept form. The majority of the upper park is not included in the landscape concept and would remain as is. Archaeological management will need to consider the potential impacts of landscaping and road construction works in this area. **Curtilage**: The work would be occurring within the curtilage but exclusion zones for areas of the park that are not to be impacted by the construction of the approach road would manage inadvertent impacts (refer to mitigation measure 11.8.2). The trees that have been identified for removal would be replaced with like species at the completion of the project. The significant specimen, the Silky Oak growing in the road cutting at the south east corner of Thompson Square is likely to require removal at some stage in the near future because of its position and age. **Visual:** The project will permanently modify the form of the parkland areas. While the landscape concept design proposes an informal scheme with few hard-paved areas, an informal planting scheme and a gently terraced ground plane down to the river, the modifications required to create a single unified park and the introduction of the new elements of the project would change the setting, view, vistas and character of the lower park.
Effects of proposal on significance	The State level of significance of Thompson Square would not be affected by the impacts to the upper parkland area. Changes to the surrounding landscape would however, have an impact on the setting of the upper parkland area as visual and spatial relationships would change permanently as a result of the proposal. Physical impacts to the upper park fabric and curtilage are anticipated to be peripheral therefore changes to the upper park would not affect Thompson Square in a measurable way; changes to the eastern side of Thompson Square however, would have an effect on the relationship between the upper park, the buildings on the western and southern perimeter with the eastern side of the square, buildings and waterfront. Although direct impacts to the upper park are anticipated to be minimal, substantial modifications to the surrounding

02 – Thompson Square Upper Parkland Area (a component of the State significant Thompson Square Conservation Area)	
	landscape will result from the proposal. The consolidation of the two parks is positive in one respect in that connection between the open space and the river would be reinstated. Historically, the space would have had a solid connection to the river, albeit along challenging terrain; however, the replacement bridge, southern approach road and roundabout and landscaping on the north bank, would substantially impact on what are considered to be the significant and potentially enduring views within and outside of the square. When viewed from the north side of the river, Thompson Square would be devoid of the existing bridge, which over the last 138 years has become part of the cultural landscape and an extension of Thompson Square. The new elements of the approach road and replacement bridge would be substantial visual introductions to a landscape that has changed modestly in visual terms over the last 200 years and retains the potential for better heritage outcomes in the future.

03 – Thompson Square lower parkland area (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: C4
Brief overview of the item	This component of Thompson Square formed when the current road was cut through the square in 1934. It demonstrates one of the historical levels of the square and is likely to retain archaeological resources that would yield information on land shaping and early improvements to the square, including the brick drain constructed by Howe and McGrath on the instructions of Macquarie. The southern approach and bridge abutment will be constructed along the eastern margin of the lower parkland area, following Old Bridge Street.
Potential or known impact prior to mitigation measures?	**Fabric:** The eastern side of the lower park of Thompson Square would be removed as part of the project; the western side of the park would be incorporated into the proposed consolidated park but would also undergo future modification with the final landscape scheme. Significant archaeological resources that have a high potential to demonstrate historic activities from the Green Hills period to the present would be removed by the physical modification to this section of Thompson Square. **Curtilage:** The work would be occurring within the curtilage of the SHR boundary and down to the riverbank, which historically was part of the Green Hills civic space as well as Macquarie's Thompson Square. This area incorporates part of the lower park that would be affected specifically by the project.

03 – Thompson Square lower parkland area (a component of the State significant Thompson Square Conservation Area)	
	This component of Thompson Square has undergone some modern impacts with the construction and subsequent removal of the boat club building. The building would have had associated services such as drains and possibly a grease trap. Other than the boat club building, other impacts to the lower park are predicted to be part of the significant archaeological profile of this component of Thompson Square. It survives at a level (height) that suggests prior phases of Green Hills and Thompson Square survive archaeologically. Based on the archaeological evidence that was collected from Test Trench 1 within the road and at a much lower level, it is predicted that significant archaeological resources survive in the lower park of Thompson Square as it has undergone relatively little change since the nineteenth century. The modifications required to create a single unified park would physically modify the extent of the lower park by constructing the proposed approach road across the eastern edge of the park and incorporating the majority of the western portion of the lower park into a future landscape scheme. **Visual:** The project would permanently modify the form of the parkland areas. While the landscape concept proposes an informal scheme with few hard-paved areas, an informal planting scheme and a gently terraced ground plane down to the river, the modifications required to create a single unified park and the introduction of the new elements of the project would change the setting, view, vistas and character of the lower park.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction **11.8.3** Archaeological management **11.8.4** Archival recording **11.8.5** Post-construction landscaping **11.8.6** Interpretation
Potential or known impacts after mitigation measures?	As discussed in 01 above, the design process has been responsive to the heritage significance of Thompson Square and the affected landscape in Freemans Reach. The final design of the proposal will however be constrained by the relevant design standards for road and bridge construction. These standards specify parameters for design that would have an impact on the fabric, configuration and appearance of the lower park. Impacts to the significance of the lower park would have a consequential effect on the significance of Thompson Square as an item. **Fabric:** The mitigation measure for the removal of the archaeological resource in the project area is for an integrated program to be devised with the input of stakeholders, it is therefore not clear what level of excavation would occur. The plan

03 – Thompson Square lower parkland area (a component of the State significant Thompson Square Conservation Area)	
	of excavation would require, at minimum, recovery of maximum possible information in areas to be disturbed or which are to have impact to potential archaeological resources. A large segment of ground on the eastern margin of Thompson Square would be disturbed and archaeology removed. This will be an irreversible loss. Given its high significance and likelihood of retaining information value that helps to understand the pattern of historic settlement, this will represent a major loss of such deposit within the context of Windsor and NSW generally for this type of archaeological resource. Also given its placement within Green Hills and early Windsor, its removal has the potential to sever the archaeological relationships of surviving deposits, and reduce their interpretability. The mitigation measure for the removal of the archaeological resource in Thompson Square is for an integrated program to be devised with the input of stakeholders, thus at this stage it is not clear what level of excavation would occur. This report discusses open area excavation over a greater area than construction excavation is proposed (section 11.5.5). Open area excavation is considered appropriate in this case as archaeological excavation targeting areas that will be directly impacted by the proposal is likely to only extract fragmented information from a complex, multi-phased deposit. **Curtilage**: The modifications required to create a single unified park would physically modify the extent of the lower park by constructing the proposed approach road across the eastern edge of the park and incorporating the majority of the western portion of the lower park into a future landscape scheme. The line of the approach disrupts the connection across Thompson Square as a unified space. **Visual:** The project would permanently modify the form of the parkland area and therefore the relationship of these spaces with the rest of Thompson Square.
Effects of proposal on significance	The project would have a detrimental impact on the Thompson Square Conservation Area with respect to impacts to the lower reserve. Significance associated with the park's research potential (archaeology) and its views, vistas and setting would be either removed or reduced substantially. The value of the potential archaeological resources within the lower parkland area has been assessed as being of local and State as well as possibly National significance for resources that can be determined to have a direct association with the Green Hills settlement or the period of expansion under the direction of Governor Macquarie. Significance that is linked to archaeological resources would be lost with the removal or substantial impact on those resources, although the loss of significance would be ameliorated to some degree through controlled archaeological excavation. The rarity value of remaining archaeological resources outside the project area would increase. The State significant views, vistas and setting would also be removed with the introduction of the replacement bridge and

03 – Thompson Square lower parkland area (a component of the State significant Thompson Square Conservation Area)	
	approach road. Views from the park to the northern bank would also be substantially modified by the proposal.

04 - The Doctors House, 1 – 3 Thompson Square (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126 and within C4
Brief overview of item	The Doctors House is a substantial two-story early Victorian building with landmark qualities. It is a prominent and characteristic element of Thompson Square from within the space as well as from the north bank of the Hawkesbury River. The curtilage of the building is outside the project area. Indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** Potential vibration-related impacts during the removal of Windsor Bridge and generally during construction **Curtilage:** No **Visual:** Modification of the existing cultural landscape of which the Doctors House forms a part would be a result of the project. Impacts to views to and from the building and views of the bridge, which has for 138 years been a visible component within the building's visual curtilage, would occur. The new element of the replacement bridge would be a noticeable addition to the views across the river to the north east as would the roundabout on the north bank. Views across the square, which are generally impeded at present by mature trees would be opened up but would also be modified with the addition of the southern approach and abutments. The project will permanently modify the form of the parkland areas in front of the building. While the landscape concept design proposes an informal scheme with few hard-paved areas, an informal planting arrangement and a gently terraced ground plane down to the river, the proposed modifications that would create one parkland space would change the undeliberate character of the existing parkland area.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape. **11.8.2** Safeguards prior to and during construction

04 - The Doctors House, 1 – 3 Thompson Square (a component of the State significant Thompson Square Conservation Area)	
	11.8.4 Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** Visual impacts would occur to the as a result of the project. A selection of plantings and design of the park should enhance the quality of the post-construction view from the Doctors Residence and also reduce the visual impact of elements such as the approach road. When viewed from the Freemans Reach, the Doctors House would retain its prominent, landmark status and views to the building would be more accessible as a result of the foreshore design.
Effects of proposal on significance	The State significance of Thompson Square would not be affected by the impacts on No. 1-3 Thompson Square (the Doctors House). The significance of No. 1-3 Thompson Square (the Doctors House) would be affected but not reduced by the proposal. The Doctors House as an individual element of Thompson Square would experience loss of values related to views, vistas and setting but the overall State significance of the item would not be reduced.

05 – House and outbuildings, 5 Thompson Square (State significant)	
Statutory heritage listings	SHR: 0005 LEP 2012: I0005; C4
Brief overview of item	The House and outbuildings at 5 Thompson Square are listed as State significant items on their own merit. They demonstrate the development of Thompson Square as an urban area and are part of the cultural landscape but they are not included in the SHR listing. They are however, included in the LEP conservation area. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** Low potential for vibration-related impacts **Curtilage:** No **Visual:** Impacts to views to and from the building, particularly across Thompson Square would occur.

05 – House and outbuildings, 5 Thompson Square (State significant)	
	Current views to the proposed location of the replacement bridge are impeded by trees, which also obscure glimpses of the existing bridge. The most noticeable elements of the project from 5 Thompson Square would be the southern approach road and the roundabout in Freemans Reach.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction – vibration monitoring **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage**: No **Visual:** Visual impact to and from the item would occur as a result of the project. However, the concept landscape plan includes an informal planting scheme of tall trees, which would screen 5 Thompson Square to a degree and views to the hard paved approach road would be minimised. The opportunity to open up views across the square would, however, be lost as the southern approach road would be an intrusive element on the views across the square.
Effects of proposal on significance	The State significance of Thompson Square would not be affected by impacts to 5 Thompson Square. The proposal would not alter the State significance of 5 Thompson Square. Views across the square from the house and to the north east would include the replacement bridge as a permanent element. However, these views have been generally obscured by tree growth in the upper park as the trees have matured. The proposed landscape scheme would retain the current visual aspect from 5 Thompson Square and it is anticipated that the views to the north east would remain screened. Views across Thompson Square, which currently comprise of the buildings on the eastern side of the square through the trees in the upper park, would be impacted by the approach road, which would be level with those buildings. Vehicles using the approach road would be more visible from the front of 5 Thompson Square than they are currently.

06 – Hawkesbury Museum also known as Howe's House, 7 Thompson Square (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126; C4
Brief overview of item	7 Thompson Square was built by John Howe sometime around 1837. It has variously been a home, an inn and is now part of the Hawkesbury Museum. It is not listed as an individual item. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	Fabric: Low potential for construction impacts such as vibration. Curtilage: No Visual: Physical modification of the existing cultural landscape of which the building forms a part will occur as a result of the project. Views to and from the building, particularly across Thompson Square and to the southern approach of the replacement bridge would be impacted by the southern approach road. The new element of the replacement bridge would be a noticeable addition to the views across the river to the north east. The roundabout on the north bank would also be potentially visible; however at present, those views to the location of the proposed roundabout (Freemans Reach Road) are obscured by vegetation and could remain so with an appropriate post-construction planting scheme. As some trees are proposed for removal, the changed landscape would be noticeable in the short-term.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** The concept landscape plan includes and informal planting scheme of tall trees, which would screen the building to some degree and minimise views to the hard paved approach road. The opportunity to open up views across to the

06 – Hawkesbury Museum also known as Howe's House, 7 Thompson Square (a component of the State significant Thompson Square Conservation Area)	
	north east of the square would, however, be lost as the southern approach road would be an intrusive element on the views across the square.
Effects of proposal on significance	The proposal would not alter the overall significance of 7 Thompson Square. Views across the square from the item would be affected by the southern approach road and this would have an impact on the views and vistas from the building. There will be no impact on the fabric of the Hawkesbury Museum provided that the mitigation measures relating to safeguards are applied. The building is dates from approximately 1835 and along with the Macquarie Arms Hotel is one of the "Georgian" buildings within the square. The property as an individual element will experience loss of values related to views, vistas and setting but the overall significance of the item will not be reduced. The current visual relationship experienced by the buildings facing into Thompson Square would be affected by the proposal.

07 – Macquarie Arms Hotel, 81 George Street (State significant)	
Statutory heritage listings	SHR: 00041 LEP 2012: I00041, C4
Brief overview of the item	Construction of the Macquarie Arms Hotel was complete in 1815. The hotel was built by Robert Fitzgerald on the orders of Governor Macquarie and occupies a prominent position in Thompson Square and in Windsor. It is the earliest of the buildings facing into Thompson Square by approximately twenty years. The building has been used variously as a hotel, military mess and residence. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** None anticipated, however due to the age and fragility of the building fabric and the surrounding masonry wall (which is not all included in the SHR listing) vibration monitoring would be evaluated and, if necessary, put in place prior to construction. **Curtilage:** No

07 – Macquarie Arms Hotel, 81 George Street (State significant)	
	Visual: Modification of the existing cultural landscape of which the hotel forms a part will occur as a result of the project. Views to and from the building, particularly across Thompson Square and to the southern approach of the replacement bridge would be impacted to a high degree. The new element of the replacement bridge would be a noticeable addition to the views across the river to the north east as will the roundabout on the north bank when viewed from the Thompson Square entry of the hotel. In particular as trees would be removed, the changed landscape would be noticeable in the short-term.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction – vibration monitoring **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** The concept landscape plan includes and informal planting scheme of tall trees, which would screen the Macquarie Arms Hotel to some degree and minimise views to the hard paved approach road. The result would be moving glimpses of the southern approach road through vegetation.
Effects of proposal on significance	The overall State significance of Thompson Square would not reduced by the impacts on the Macquarie Arms Hotel. Significance related to views from the Macquarie Arms Hotel would be affected by the project as it is a landmark building; however, the most prominent view of the hotel is from the corner of George and Bridge Streets and this would not be affected by the project. The Macquarie Arms Hotel also has other values that contribute to its level of significance the overall level of State significance would not be reduced. The current visual relationship experienced by the buildings facing into Thompson Square would be affected by the proposal but this affect would be reduced with an appropriate landscape plan. Impact to the fabric of the Macquarie Arms Hotel is not anticipated, therefore values associated with original fabric, layout and technical/aesthetic values would not be impacted by this project.

08 – House, 4 Bridge Street (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126, C4
Brief overview of the item	4 Bridge Street was constructed in the 1950s by the Armstrong family. The house is a weatherboard vernacular single-storey bungalow with a wrap-around verandah on the facade and river elevation. The rational for the listing of this property is not made on the SHR listing but as the property has high archaeological potential and it encompasses part of Andrew Thompson's property and is on an allotment facing Thompson Square. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** Vibration related impacts may occur during construction and possibly during operation, with potential effects on the building and on the archaeological resource. **Curtilage:** No **Visual:** The setting of the bungalow would be impacted and views from the verandah across the square and the river would change substantially as part of the project. The property has views to the bridge and across the river that have changes minimally since the bridge was built. Visual impacts to the archaeological site although not to its significant fabric, which is behind a tall paling fence. A pedestrian pathway alongside the property will allow clearer views to the brick retaining wall, which is an enduring and significant aspect of the archaeological resource in the back yard. Close up, it provides evidence of earlier structures on the site and hints at the archaeological potential of Thompson Square. Its visibility is significant also because it is able to demonstrate the type of brick and mortar used, it defines the edges of what may be an early garden and it is testament to the historic significance of the place having survived the weight of the earth behind it and numerous flooding events.
Mitigation Measures	**11.8.1 R**educe impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction – vibration monitoring **11.8.3** Archaeological management – in conjunction with any works to mitigate potential vibration impacts on the archaeological resource. **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation	**Fabric:** Potential need to undertake archaeological impacts to provide long-term physical prevention of vibration impacts (e.g., re-mortaring loose bricks, moving deposit to best place protective barriers, such as sand bags)

08 – House, 4 Bridge Street (a component of the State significant Thompson Square Conservation Area)	
measures?	**Curtilage:** None anticipated. **Visual:** Visual impact will remain substantial.
Effects of proposal on significance	The significance of the house would not be affected by the proposal. The level of significance of the archaeological resources within the boundary of 4 Bridge Street will not be reduced by the project. It will remain at a level of at least State significance. In the event that the wall collapses during or after construction of the project, the loss would be great but the significance of the predicted archaeological resource would still be high. Generally, the removal of an archaeological resource in one section of the project area would sever its relationship with the resource in another location. The topography in the back yard of 4 Thompson Square suggests that the archaeological resource here is likely to be more closely associated with the resource in the lower park rather than Old Bridge Street, which is at a reduced level through successive road making events. This would decrease the significance of the overall resource across the landscape in this locality but controlled archaeological excavation would partially counter the loss of significance by the collection and interpretation of the data.

09 – House, 6 Bridge Street (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126, C4
Brief overview of the item	6 Bridge Street (also identified as 8 Bridge Street in the *Hawkesbury LEP 2012)* was constructed in the 1860s. It is located in the former government domain and is likely to be built near or over Andrew Thompson's house. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** Vibration-related during construction possible. **Curtilage:** No **Visual:** The setting of the building would be affected by the approach road that would pass directly in front of it. Views from the front of the house down to the river and the existing bridge would also be impacted.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape

09 – House, 6 Bridge Street (a component of the State significant Thompson Square Conservation Area)	
	11.8.2 Safeguards prior to and during construction – vibration monitoring **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** The urban design and landscape concept suggests screening the view of the road from the house with vegetation, which will help to soften the hard edge of the road. However, screening would also reinforce the separation of the eastern side of Bridge Street to the rest of Thompson Square and the visual relationship of the building with the river and the existing bridge. The setting of the building would be impacted by the project.
Effects of proposal on significance	The State significance of Thompson Square would not be affected by the impacts to No. 6 Bridge Street. The significance of No. 6 Bridge Street would be affected by the project. Views that have been identified as significant would be impacted by the project to a high degree. However, views across the square are presently affected by the road cutting and the topography of the upper park. The proposed southern approach road would also impact on the limited views across the upper park. However, the item has other values that would not be impacted by the project, therefore overall its significance would not decrease. Impacts to significance as a result of the approach road would affect the Thompson Square Conservation Area as the separation of the built form on the eastern side of Bridge Street would be more visually defined when viewed from the west than it is currently. Impacts would be temporarily greater during peak hour. At present, the three buildings on Bridge Street south of the George Street intersection can still be viewed as part of Thompson Square as they have been for between fifty and 156 years. They have settled into the familiar historic landscape and define the eastern perimeter of Thompson Square.

10 – House and outbuilding, 10 Bridge Street (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126, C4
Brief overview of the item	10 Bridge Street was constructed in 1856 by Joshua Dowe and has variously been used as a home, hospital and school. It currently operates as a music shop with rooms upstairs for music lessons. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** Vibration-related during construction. **Curtilage:** No **Visual:** Views to and from the item would be affected by the new elements including the signalised intersection at George and Bridge Streets, and the removal of the existing bridge. Other visual impacts include the construction of the roundabout in Freemans Reach. Trees proposed for removal would modify the current views and vistas to and from the item in the short-term.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape. **11.8.2** Safeguards prior to and during construction – vibration monitoring **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** The setting of the building would be affected by the approach road that would pass directly in front of it. Views from the front of the building down to the river and the existing bridge would also be impacted. Views along George Street would be minimally affected. The urban design and landscape concept suggests screening the view of the road from the building with vegetation, which will help to soften the hard edge of the road. Screening would also create a greater visual separation of the eastern side of Bridge Street to the rest of Thompson Square but would continue the existing situation where moving glimpses across the square are possible.
Effects of proposal on	The significance of No. 10 Bridge Street would be affected by the proposal. Significant views and the visual curtilage of the

10 – House and outbuilding, 10 Bridge Street (a component of the State significant Thompson Square Conservation Area)	
significance	building would be affected by the southern approach road passing the front of the property. Visual impacts would temporarily increase during peak hour as the traffic that currently descends into the cutting would remain level with the buildings on Old Bridge Street. Impacts to significance as a result of the approach road would affect the Thompson Square Conservation Area as the separation of the built form on the eastern side of Bridge Street would be more visually defined than it is currently when viewed from the west.

11 – Former School of Arts Building, 14 Bridge Street (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126, C4
Brief overview of the item	The former School of Arts Building was constructed over the site of one of the government buildings in 1861. It is not within the curtilage of the project area, however there is a possibility that archaeological resources relating to the earlier government building survive beneath it and extend under Bridge Street. Refer to site number 32 for information on the potential archaeological resource. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** Vibration-related during construction should be considered. **Curtilage:** No **Visual:** Views to and from the item would be affected by the new elements of the project including the signalised intersection at George and Bridge Streets, and the altered form of Thompson Square parkland. Visual impacts along Old Bridge Street when viewed from 14 Bridge Street would be high as at present the viewline to the north west catches glimpses of the existing bridge, *Bridgeview* (21 Freemans Reach Road) and the river. Impacts associated with the installation of traffic signals are predicted to be low as the signals would be readily incorporated into the visual landscape. Trees proposed for removal would modify the current views and vistas to and from the item.

11 – Former School of Arts Building, 14 Bridge Street (a component of the State significant Thompson Square Conservation Area)	
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction – vibration monitoring **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** Views from the front of the building down to the river and the existing bridge would be altered.
Effects of proposal on significance	The State significance of Thompson Square would not be affected by the impacts to No. 14 Bridge Street, although significant views would be substantially altered as Thompson Square has State significant values that would not be affected by the proposal. The overall significance of No. No. 14 Bridge Street would not be reduced by the proposal although views that have been identified as significant would be modified considerably by the southern approach road where there is now an infrequently used road (Old Bridge Street). Visual impacts would temporarily increase during peak hour as the line of traffic that now descends into the cutting would remain level with the buildings on Old Bridge Street.

12 – Cottage, 20 Bridge Street (locally significant)	
Statutory heritage listings	LEP 2012: I147
Brief overview of the item	A single storey early Victorian cottage set back from the street. The land was officially granted in 1908 to Sarah Ann Boyd. No other information was found about the property. It was the earlier location of stores buildings when it was part of the government domain. The curtilage of the building is outside the project area. Direct and indirect impacts are unlikely.
Potential or known impact prior to mitigation measures?	**Fabric:** None anticipated **Curtilage:** No **Visual:** No

Mitigation Measures	**11.8.2** Safeguards prior to and during construction – vibration monitoring that would be applied to other buildings would apply here as a precautionary measure.
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** No
Effects of proposal on significance	The local significance of No. No. 20 Bridge Street would not be affected by the proposal**.**

13 – Cottage, 17 Bridge Street (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126, C4
Brief overview of the item	A building of similar size appears on an 1835 plan of Windsor and given the dearth of information and the architectural style of the cottage, it must be assumed to be one and the same building. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Yes:** None anticipated **Curtilage:** No **Visual:** None.
Mitigation Measures	**11.8.2** Safeguards prior to and during construction – vibration monitoring that would be applied to other buildings would apply here as a precautionary measure. **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** Impacts to views to and from this building would be low. Only oblique views of traffic lights at George Street intersection; visual impacts of the approach road, replacement bridge and modification of the parkland areas is not visible

13 – Cottage, 17 Bridge Street (a component of the State significant Thompson Square Conservation Area)	
	from within the curtilage of this building or on the footpath in front..
Effects of proposal on significance	The state significance of Thompson Square would not be affected by the impacts on No. 17 Bridge Street. The significance of No. No. 17 Bridge Street would not be affected by the proposal. The proposal would have a negligible effect on the significance of 17 Bridge Street as an individual item and as part of Thompson Square as the road in this section of the project area would be upgraded with little change to the existing outlook. The installation of traffic lights is not anticipated to reduce significance by modifying the outlook to and from this item.

14 – Shops, 62-68 George Street (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126, C4
Brief overview of the item	This building comprises a single storey building that was partially demolished to make way for the former Hawkesbury Stores. Based on photographic evidence, the site has undergone approximately three phases of development. The curtilage of the buildings is outside the project area and behind road reserve that is not proposed to be impacted. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** Vibration-related impacts during construction are possible. **Curtilage:** No **Visual:** Traffic lights in immediate foreground would modify the outlook initially. However, due to the vertical form of the traffic lights and other existing vertical elements in the landscape (power poles) it is anticipated that the traffic lights would be readily incorporated into the landscape. As this group of buildings overlooks Bridge Street and Thompson Square and has a direct line of site to Old Bridge Street, visual impacts would occur. The southern approach road, the replacement bridge and the roundabout on the north bank would be visible from the front verandah of the single-storey structure and the upper verandah of the double-storey structure.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape

14 – Shops, 62-68 George Street (a component of the State significant Thompson Square Conservation Area)	
	11.8.2 Safeguards prior to and during construction – vibration monitoring **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** Altered views from the buildings into Thompson Square and down the alignment of Old Bridge Street would be substantial. Views towards the buildings will not be affected, except by minor visual intrusion of traffic lights. Impacts to the outward view across the river would be high and impacts to the Macquarie Arms would be moderate
Effects of proposal on significance	Impacts to the setting of key buildings framing Thompson Square would have an effect on its significance but would not reduce the level of State significance as the square has other values that are also to be considered of State significance and these would not be affected. The approach road and replacement bridge would have an impact on the significance of the group of buildings as they would be new visual elements in a landscape that is currently comprised of a road descending into a cutting, the lower parkland area and southern bank and the river with the rural landscape in the distance. These changes would not reduce the overall significance of 62-68 George Street. The overall effect of the proposal on the group of buildings would be minor as fabric and curtilage would not be affected.

15 – Shops, 70-72 George Street, the former Hawkesbury Garage (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126, C4
Brief overview of the item	The former Hawkesbury Garage was constructed over the site of the former *Sir John Young/Hawkesbury Hotel,* which burnt down in 1915. The building was constructed in 1923. The building currently houses restaurants with al fresco eating areas. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** None anticipated. **Curtilage:** No **Visual:** This building overlooks the upper parkland area of Thompson Square and has views to the north and north east. The southern approach road and replacement bridge would be obvious elements in the landscape and affect views from the building. Visual impacts as a result of the project would be high to moderate.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction – vibration monitoring that would be applied to other buildings would apply here as a precautionary measure. **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** The building addresses Thompson Square; familiar views across the square and to the buildings at 4, 6 and Bridge Street that would be affected would be minimised through an appropriate landscape scheme.
Effects of proposal on significance	The state significance of Thompson Square would not be affected by the impacts on Nos. 70-72 George Street. The overall significance of No. 70-72 George Street would not be reduced by the proposal. The building is part of a State significant conservation area. The change to Thompson Square open space and road will alter the established views from the building.

16 – AC Stearn Building, 74 George Street (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126, C4
Brief overview of the item	The A C Stearn Building was constructed in 1907 after an earlier building was destroyed by fire. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** Yes. The A C Stern Building overlooks the upper parkland area of Thompson Square. Upper storey views from this building are to the north and north east. It addresses Thompson Square. The existing bridge cannot be seen from the A C Stearn Building. The new southern approach and landscaped park will be readily visible.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction **11.8.4** Archival recording **11.8.5** Post-construction landscaping
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** Yes. The new landscaping and bridge will be readily visible.
Effects of proposal on significance	The state significance of Thompson Square would not be reduced by the impacts on No. 74 George Street. The overall significance of 74 George Street would not be reduced by the proposal. The level of significance of the A C Stearn Building as an individual item is considered to be "local". The local level of significance of the individual item would be detrimentally impacted to a minor degree. As part of the Thompson Square Conservation Area the A C Stearn Building contributes to the historic character of the place. The building, in combination with the other buildings that make up the conservation area, demonstrates the many historic phases that the place has undergone.

17 – Shops, 80-82 George Street (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126, C4
Brief overview of the item	The description in the SHR consist of two buildings and an access way. Number 80 is a modern building. Number 82 is likely to date from 1835. Neither of these buildings face Thompson Square although they have oblique views. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction.
Potential or known impact prior to mitigation measures?	**Fabric:** No **Curtilage:** No. The buildings are on George Street beyond the interface with Thompson Square. **Visual:** Minor impact for No. 82; No 82 dates to c.1835 and has an oblique view to Thompson Square past the Macquarie Arms.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.4** Archival recording
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** No
Effects of proposal on significance	The state significance of Thompson Square would not be reduced by the impacts on Nos. 80 and 82 George Street. The significance of 80 and 82 George Street would not be reduced by the proposal. The view to Thompson Square is not considered to be part of the significance of No. 82.

18 – Shops, 84 & 88 George Street (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	SHR: 00126 LEP 2012: Part of I00126, C4
Brief overview of the item	84 – 88 George Street is a ca. 1910 building with the gated access to the side. The curtilage of the building is outside the project area. No direct or indirect impacts on these buildings.
Potential or known impact prior to mitigation measures?	**Fabric:** No. This group of buildings is removed from Thompson Square proper. **Curtilage:** No. The buildings are on George Street beyond the interface with Thompson Square. **Visual:** No. The buildings are on George Street beyond the interface with Thompson Square.
Mitigation Measures	None required
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** No
Effects of proposal on significance	The significance of 84 and 88 George Street would not be affected by the proposal.

19 – Shops, 92 George Street (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	LEP 2012: C4
Brief overview of the item	The curtilage of the building is outside the project area. No direct or indirect impacts on these buildings.
Potential or known impact prior to mitigation measures?	**Fabric:** No. The buildings are on George Street beyond the interface with Thompson Square. **Curtilage:** No. The buildings are on George Street beyond the interface with Thompson Square. **Visual:** No. The buildings are on George Street beyond the interface with Thompson Square.
Mitigation Measures	None required

19 – Shops, 92 George Street (a component of the State significant Thompson Square Conservation Area)	
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** No
Effects of proposal on significance	The significance of No. 92 George Street would not be affected by the proposal.

20 – Windsor Bridge (a component of the State significant Thompson Square Conservation Area)	
Statutory heritage listings	S.170: 4309589 LEP 2012: I276
Brief overview of the item	The Windsor Bridge was opened in 1874; it was constructed in the vicinity of the earlier river crossings. It was raised in 1897 and the timber superstructure was replaced with mass concrete in 1922. Windsor Bridge would be completely removed by the project.
Potential or known impact prior to mitigation measures?	**Fabric:** The bridge would be demolished as part of the proposal. **Curtilage:** Yes **Visual:** The contribution that the bridge makes to the Thompson Square Conservation Area and the surrounding cultural landscape would be removed.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction **11.8.3** Archaeological management **11.8.4** Archival recording **11.8.5** Post-construction landscaping **11.8.6** Interpretation **11.8.7** Re-use

20 – Windsor Bridge (a component of the State significant Thompson Square Conservation Area)	
Potential or known impacts after mitigation measures?	**Fabric:** Complete loss of fabric, apart from any retention for archaeological or interpretative reasons. **Curtilage:** The informal curtilage of the bridge would be impacted by its removal. Maritime archaeological resources are possible within the river at this point therefore archaeological management (mitigation measure 11.8.3) would be required as would archival recording (mitigation measure 11.8.4) during the dismantling. **Visual:** Yes.
Effects of proposal on significance	The state significance of Windsor Bridge would be lost by its removal. The removal of Windsor Bridge would adversely affect the significance of Thompson Square, but would not reduce the Square's overall state heritage significance**.** The bridge is settled into the significant cultural landscape; it interprets the punt crossing used prior to 1874 and articulates smoothly with Thompson Square. It is an element that has been determined in this report to be part of the Thompson Square cultural landscape. The effect to the significance of Thompson Square that the removal of the existing bridge would have would be detrimental. While the square is listed separately to the bridge, both items are now part of the same cultural landscape and the loss of the bridge amount to the loss of a significant and familiar element to Thompson Square.

21 – Bridgeview (Local significance)	
Statutory heritage listings	LEP 2012: I274
Brief overview of the item	It is likely that this item was built over the site of the Squatters Arms Hotel, which was demolished in 1915. No impacts to the physical curtilage of Bridgeview are proposed. The curtilage of the building is outside the project area. Minor indirect impacts may occur during construction. The item is located close to the northern approach roundabout and therefore potentially subject to construction vibration and other indirect impacts.
Potential or known impact prior to mitigation measures?	**Fabric:** Vibration-related during construction are possible due to the proximity of the proposed works. There is low potential for the Squatters Arms hotel to be located partly within the curtilage of the project area; however the possibility must be considered as a precautionary measure. **Curtilage:** No **Visual:** Views from the building across the open rural farmland (turf farms) to the south east and to Thompson Square

21 – Bridgeview (Local significance)	
	would be affected by the proposal.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.2** Safeguards prior to and during construction – vibration monitoring **11.8.3** Archaeological management – potential for Squatters Arms Hotel to encroach on the project area. **11.8.4** Archival recording **11.8.5** Post-construction landscaping **11.8.6** Interpretation
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** The identified impacts would be mitigated to a lesser degree but the item's landmark values would be compromised by the proposal.
Effects of proposal on significance	The local significance of Bridgeview would not be reduced by the proposal. Bridgeview is a fine example of a Federation bungalow, which has landmark qualities. The landmark qualities of the item would be compromised by the proposal but its level of significance would be retained as the building and its immediate curtilage would remain.

22 – Green Hills Wharf c. 1795 (Potential site – State significant)	
Statutory heritage listings	Nil
Brief overview of the item	This has been identified as a potential archaeological resource inferred from the research. If it was in the location of the existing bridge, remnants may survive although they would be expected to be fragmentary and they would be impacted by the removal of Windsor Bridge. Refer also to inventory items 32 & 33 below.
Potential or known	**Fabric:** The wharf remains would be removed with the removal of the existing bridge.

22 – Green Hills Wharf c. 1795 (Potential site – State significant)	
impact prior to mitigation measures?	Note: as this is a potential site inferred from the research and has not been verified, the location should be treated with caution and included in the archaeological management process (11.8.3). The results of the underwater survey did not locate anything that could be interpreted as a wharf; however, a large amount of tree branches obscured the river bottom. **Curtilage:** The curtilage would be impacted by the placement of the abutment, the southernmost pier and bridge soffit constraining the experience of the site. **Visual:** N/A
Mitigation Measures	**11.8.3** Archaeological management **11.8.4** Archival recording **11.8.6** Interpretation These mitigation measures apply if the wharf survives in archaeological form.
Potential or known impacts after mitigation measures?	**Fabric:** Removal of archaeological remains of the wharf. **Curtilage:** As above. **Visual:** N/A
Effects of proposal on significance	The state significance of Thompson Square would not be affected by the impact on the Green Hills Wharf.

23 – Government Wharf site c. 1815 (State significant)	
Statutory heritage listings	Nil
Brief overview of the item	The remains of the government wharf are visible in the river bank in certain conditions. Maritime archaeological survey confirmed the survival of timbers (from an unknown date) and cobbles in the riverbed. A wharf was initially constructed in this location by James McGrath and John Howe on the orders of Governor Macquarie. A flood washed it away as it was being constructed and a second wharf was commissioned and constructed between 1815 and 1820. This location will be adversely affected by construction of the southern abutment and southernmost pier.

23 – Government Wharf site c. 1815 (State significant)	
Potential or known impact prior to mitigation measures?	**Fabric:** The wharf remains would be removed as part of the project as the replacement bridge abutments and scour protection are required in this location. The results of the underwater survey did not locate anything that could be interpreted as a wharf; however, a large amount of tree branches obscured the river bottom. **Curtilage:** The curtilage would be impacted by the placement of the abutment, the southernmost pier and bridge soffit. **Visual:** N/A
Mitigation Measures	**11.8.3** Archaeological management **11.8.4** Archival recording **11.8.6** Interpretation
Potential or known impacts after mitigation measures?	**Fabric:** Removal of archaeological remains of the wharf for the abutment and pier. Archaeological recovery of associated information on pier. **Curtilage:** The curtilage would be impacted by the placement of the abutment, the southernmost pier and bridge soffit. **Visual:** N/A
Effects of proposal on significance	The significance of Thompson Square would be affected by the impact on the Government Wharf but not to the extent that it would impact on the level of State significance. The removal of the wharf remains will remove the significance of the wharf should it exist. Although the wharf remains are not acknowledged as significant components of Thompson Square, they are directly tied to the square beginning with Governor Macquarie's involvement with Windsor. Should archaeological resources relating to the 1815 wharf survive, loss of significance would be offset to the extent that they can provide archaeological information**.**

24 – Government house wharf site c. 1800 (Potential site – State significant)	
Statutory heritage listings	Nil
Brief overview of the	A tentative identification of a wharf site servicing the government cottage. The assessment was based on historic

24 – Government house wharf site c. 1800 (Potential site – State significant)	
item	illustrations and precedent. The location is at the north-eastern end of the project area; no work is proposed in this location except the installation of exclusion fencing. Note: as this is a potential site inferred from the research and has not been verified, the location should be treated with caution and included in the archaeological management process (11.8.3). An underwater survey was not undertaken in this area. Refer also to inventory items 32 & 33 below.
Potential or known impact prior to mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** N/A
Mitigation Measures	**11.8.3** Archaeological management – include in archaeological management as a precautionary measure **11.8.4** Archival recording if the item exists **11.8.6** Interpretation if the item exists These mitigation measures apply if the wharf survives in archaeological form.
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** N/A
Effects of proposal on significance	Proposed work will not affect any archaeological or other significance of any surviving archaeological resource. The existence of this item as an archaeological site at the base of the former location of Old Government Cottage has not been confirmed.

25 – The Terrace (west of Windsor Bridge – Significance undetermined)	
Statutory heritage listings	Nil
Brief overview of the item	The Terrace to the west of the existing bridge was historically part of the greater civic/service precinct of Green Hills and later of Thompson Square. It appears to have undergone significant modifications that have reduced the natural levels of

25 – The Terrace (west of Windsor Bridge – Significance undetermined)	
	the topography and has suffered land slip as a result of floods. It is considered unlikely that this section of the project area contains archaeological resources and project-related disturbance of the deposits beneath the formation in this location are unlikely. Views from The Terrace in this location are fleeting and through trees growing on the bank. Refer also to inventory items 32 & 33 below.
Potential or known impact prior to mitigation measures?	**Fabric:** No known impacts **Curtilage:** No known impacts **Visual:** Moderate impacts to views from this location of the project area
Mitigation Measures	**11.8.3** Archaeological management – include this area in future archaeological management as a precautionary measure **11.8.4** Archival recording if archaeological resources exist. **11.8.5** Post-construction landscaping (if required) **11.8.6** Interpretation if archaeological resources exist.
Potential or known impacts after mitigation measures?	**Fabric:** No known impacts **Curtilage:** No known impacts **Visual:** Potential impacts to views would be managed by an appropriate landscape scheme.
Effects of proposal on significance	Effects to the significance of Thompson Square are considered to be low in this location of the project area and would not reduce the level of State significance of the Square.

26 – River bank – south bank (west of Windsor Bridge – Significance undetermined)	
Statutory heritage listings	Nil
Brief overview of the item	This section of the project area is adjacent to The Terrace west of the bridge. It has been subject to the impacts of flooding and is likely to have been affected by natural forces. Nevertheless, the survival of maritime resources in this area should be considered as it is in close proximity to the historic entity of the Green Hills civic/service precinct and Thompson Square.

26 – River bank – south bank (west of Windsor Bridge – Significance undetermined)	
	Refer also to inventory items 32 & 33 below.
Potential or known impact prior to mitigation measures?	**Fabric:** No known impacts as no sites identified in this location **Curtilage:** No known impacts **Visual:** Moderate impacts to views from this location of the project area
Mitigation Measures	**11.8.3** Archaeological management – include this area in future archaeological management as a precautionary measure **11.8.4** Archival recording **11.8.5** Post-construction landscaping **11.8.6** Interpretation
Potential or known impacts after mitigation measures?	**Fabric:** No known impacts as no sites identified in this location **Curtilage:** No known impacts **Visual:** Potential impacts to views, particularly across the river would be managed by an appropriate landscape scheme.
Effects of proposal on significance	Effects to the significance of Thompson Square are considered to be high in this location as the area south and to the east of the SHR listed Thompson Square was part of the historical entity. It is anticipated that archaeological resources related to the earliest days of the settlement survive. The removal of the archaeological resources would significantly impact on its significance. The effect is not expected to reduce the overall State level of significance of Thompson Square as it has other values that reach the State significant threshold.

27 – North river bank and turf farm (east of Windsor Bridge – Nil)	
Statutory heritage listings	Nil
Brief overview of the item	The river bank and turf farm on then north side of the river has been assessed to be of low archaeological potential, and it does not contain any built items of potential or confirmed heritage significance. Archaeological monitoring of geotechnical test pits did not yield information that would suggest an intact archaeological site although evidence of soil deposition was noted. As it was part of the earliest land grant in the district, it has been included for archaeological management as a

27 – North river bank and turf farm (east of Windsor Bridge – Nil)	
	precautionary measure. A roundabout would be constructed in this location of the project area.
Potential or known impact prior to mitigation measures?	**Fabric:** No known impacts **Curtilage:** No known impacts **Visual:** High impacts to views from this location of the project area
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.3** Archaeological management – include this area in future archaeological management as a precautionary measure **11.8.4** Archival recording **11.8.5** Post-construction landscaping **11.8.6** Interpretation
Potential or known impacts after mitigation measures?	**Fabric:** No known impacts **Curtilage:** No known impacts **Visual:** High impacts to views from this location of the project area
Effects of proposal on significance	Effects to the significance of Thompson Square are considered to be high in this location as the turf farm contributes to the rural character of the landscape that is viewed from Thompson Square and specifically the Doctors House and the view down Old Bridge Street. The effect is not expected to reduce the overall State level of significance of Thompson Square.

28 – Existing Bridge Approach – north side (Significance undetermined)	
Statutory heritage listings	Nil
Brief overview of the item	This component within the project area comprises the existing northern approach road to the bridge. It is significant as part of the early alignment to the bridge and is likely to have been in use when the punt and the ferry were operating prior to 1874. Archaeological monitoring of geotechnical test pits in this location revealed concrete planks that may have been

28 – Existing Bridge Approach – north side (Significance undetermined)	
	used to raid and/or stabilise the road.
Potential or known impact prior to mitigation measures?	**Fabric:** The fabric of the current northern approach road would be removed as part of the project. Proposed landscaping of the northern bank would require modifications to the road fabric in some places; in others it would be obscured. **Curtilage:** The road would be removed. **Visual:** Visual impacts from the northern approach road would vary from low to potentially high depending on where the views were taken from and would predominantly affect pedestrians. Currently the views are obscured by uncontrolled vegetation on the riverbank.
Mitigation Measures	**11.8.1** Reduce impacts to the existing cultural landscape **11.8.3** Archaeological management **11.8.4** Archival recording **11.8.5** Post-construction landscaping **11.8.6** Interpretation
Potential or known impacts after mitigation measures?	**Fabric:** The fabric of the current northern approach road would be removed as part of the project. Proposed landscaping of the northern bank would require modifications to the road fabric in some places; in others it would be obscured. **Curtilage:** The road would be removed. **Visual:** Visual impacts from the northern approach road would vary from low to potentially high depending on where the views were taken from and would predominantly affect pedestrians. Currently the views are obscured by uncontrolled vegetation on the riverbank.
Effects of proposal on significance	The effects of the proposal on the significance of this particular component of the project would be low to high depending on the survival of significant archaeological resources. The removal of the northern approach road would have a detrimental impact on the significance of Thompson Square as it has become an integral part of the cultural landscape and the experience of entering Windsor from the northern side of the river. The overall State significance of Thompson Square would not however, be reduced.

29 – Turf farm on north side of Wilberforce Road (Significance undetermined)	
Statutory heritage listings	Nil
Brief overview of the item	This area is the turf farm on the north east corner of Freemans Reach and Wilberforce Roads. A narrow strip along Freemans Reach Road is included in the project area.
Potential or known impact prior to mitigation measures?	**Fabric:** No **Curtilage:** Yes, but not to significant fabric **Visual:** Views along Freemans Reach Road to the south would be affected by the project, which would introduce the new visual element of the roundabout between the viewer and Thompson Square**.**
Mitigation Measures	**11.8.3** Archaeological management – include this area in future archaeological management as a precautionary measure **11.8.4** Archival recording – of the landscape prior to construction commencing **11.8.5** Post-construction landscaping **11.8.6** Interpretation
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** Yes, but not to significant fabric **Visual:** Views to the south would change to incorporate the new landscaping, which would include the northern approach road and roundabout. These new elements would be screened by appropriate landscaping that would also invite access along the top of the riverbank for views back to Thompson Square.
Effects of proposal on significance	This location within the project area does not possess significance, although views from here are similar to those on Wilberforce Road. Impacts to this location would not have an effect on the significance of Thompson Square.

30 – Macquarie Park (Significance undetermined)	
Statutory heritage listings	Nil
Brief overview of the	A public park in Freemans Reach. Macquarie Park has access to the river and picnic facilities. There are no direct impacts

30 – Macquarie Park (Significance undetermined)	
item	associated with the project. Access improvement will encourage use of park.
Potential or known impact prior to mitigation measures?	**Fabric**: None anticipated **Curtilage**: None anticipated. **Visual**: Negligible visual impacts are anticipated with the construction of the roundabout. These impacts would be focused at the entrance only.
Mitigation Measures	**11.8.2** Safeguards prior to and during construction **11.8.4** Archival recording (of views and vistas from the park) **11.8.6** Interpretation
Potential or known impacts after mitigation measures?	**Fabric**: None anticipated **Curtilage**: None anticipated **Visual**: None anticipated
Effects of proposal on significance	The significance of Macquarie Park will not be adversely affected. The construction of a safer link across the river is likely to encourage visitation and appreciation of the park, and indirectly of views back to Windsor and riverscape.

31 – Temporary bridge (Significance and potential undetermined)	
Statutory heritage listings.	Nil
Brief overview of the item	A temporary timber bridge was constructed adjacent to the existing bridge in 1879. The temporary bridge was demolished soon after Windsor Bridge was raised. The integrity of the potential archaeological resource is not known and a recent underwater survey did not locate any evidence. The exact location of the temporary bridge has not been confirmed but it is likely to be on the upstream side as suggested by construction plans.
Potential or known impact prior to	**Fabric:** If archaeological resources survive they may be affected by the construction works. **Curtilage:** Compromised by removal of existing bridge.

31 – Temporary bridge (Significance and potential undetermined)	
mitigation measures?	**Visual:** N/A
Mitigation Measures	**11.8.2** Safeguards prior to and during construction. The decision and method of safeguarding archaeological sites would be determined by the archaeological management program proposed below (11.8.3). **11.8.3** Archaeological management **11.8.4** Archival recording if archaeological resources exist. **11.8.6** Interpretation (if archaeological resources exist.)
Potential or known impacts after mitigation measures?	**Fabric:** Any archaeological resources encountered are likely to require removal. **Curtilage:** Compromised by removal of existing bridge. **Visual:** N/A
Effects of proposal on significance	Should archaeological resources relating to the temporary bridge survive, the significance of the item would be removed. Loss of significance would be offset to the extent that they can provide archaeological information. The proposal would impact on the overall significance of the existing bridge and of its relationship to Thompson Square.

32 – General terrestrial archaeological resources SoHI (Significance undetermined)	
Statutory heritage listings.	Nil
Brief overview	Terrestrial archaeological resources are predicted to survive within the historic and SHR curtilage of Thompson Square.
Potential or known impact prior to mitigation measures?	Construction of approach will impact a substantial portion of the likely surviving archaeological resource of Thompson Square. Effects of future Thompson Square landscaping on the archaeological resource have not been quantified but are likely to occur. Construction of northern approach may affect known but un-located archaeological site. **Fabric:** Dependant upon the location of the archaeological resources. The proposals would also remove significant archaeological resources that have a high potential to demonstrate historic activities from the Green Hills period to the present. For instance, the site of the Squatters Arms Hotel has tentatively been identified as the corner of Freemans Reach and Wilberforce Roads. It may be beneath the house known as Bridgeview or within the verge at the front of the house. Prior to construction commencing, the archaeological program would include research into the site of the Squatters Arms Hotel with the aim of avoiding impacts to the archaeological resource. Should impacts be unavoidable, the site would be included in an excavation program. **Curtilage:** Dependant upon the location of the archaeological resources. **Visual:** N/A
Mitigation Measures	**11.8.2** Safeguards prior to and during construction. The decision and method of safeguarding archaeological sites would be determined by the archaeological management program proposed below (11.8.3). **11.8.3** Archaeological management **11.8.4** Archival recording if archaeological resources exist. **11.8.6** Interpretation if archaeological resources exist.
Potential or known impacts after mitigation measures?	**Fabric:** Dependant upon the location of the archaeological resources. **Curtilage:** Dependant upon the location of the archaeological resources. **Visual:** N/A
Effects of proposal on significance	Archaeological resources have not been explicitly identified in the acknowledged statement of significance for the SHR listing of Thompson Square; however it has been demonstrated through historical research and test excavation that the potential for a complex, multi-phased resource to survive is high. The contribution that the archaeological resource makes

32 – General terrestrial archaeological resources SoHI (Significance undetermined)	
	to the significance of Thompson Square has been assessed as being high. The significance of the archaeological resource within Thompson Square would be impacted by its removal. The effect that this would have on Thompson Square is that it would remove a portion of one of its significant values**.** Removing archaeological resources extinguishes their significance as an *in situ* resource embodying a range of heritage values. Recovery of information by archaeological investigations offsets the impact by providing information that interprets the lost component and improves understanding of the remainder. Balancing destruction with information benefit versus retention of the resource (commonly for future information recovery) is guided by conservation principles, the relevance of the information to contribute to current areas of research and exploration in archaeology. On the north side of the river within the project area, the archaeological potential is lesser than that on the south bank as is the potential significance. The Squatters Arms Hotel, location uncertain, has been assessed as being of potential local significance. Impact to archaeological resources related to the Squatters Arms Hotel would result in their significance being reduced. Details of the potential for archaeological resources and their significance are included in data sheet 32 in Appendix 4.

33 – General maritime archaeological resources SoHI (Cosmos Archaeology 2012) (Significance undetermined)	
Statutory heritage listings.	Nil
Brief overview of the item	The discussion and mitigation measures included in this item number apply to all maritime resources including those that have not been identified but may exist. The construction of the southern pier would impact on the former government wharf site (refer to item no. 23); the southern pier and abutment of the replacement bridge and scour protection would impact on the known archaeological site (23). The impact on all potential sites has not been confirmed.
Potential or known impact prior to mitigation measures?	**Fabric:** Possible. The underwater survey confirmed the existence of elements associated with the Government Wharf within the river. Landward elements of the wharf can only be confirmed through archaeological excavation. Other discrete sites that are related to Thompson Square and form part of the maritime assemblage along the river may also exist. **Curtilage:** Dependant upon the location of the archaeological resources. **Visual:** N/A
Mitigation Measures	**11.8.2** Safeguards prior to and during construction. The decision and method of safeguarding archaeological sites would

33 – General maritime archaeological resources SoHI (Cosmos Archaeology 2012) (Significance undetermined)	
	be determined by the archaeological management program proposed below (11.8.3). **11.8.3** Archaeological management **11.8.4** Archival recording (if archaeological resources exist). **11.8.6** Interpretation (if archaeological resources exist).
Potential or known impacts after mitigation measures?	**Fabric:** Recovery of underwater archaeological remains will offset impact on the mapped underwater resource to a degree. Recovery of archaeological evidence would ensure that information is recovered from any resources prior to their destruction. **Curtilage:** Dependant upon the location of the archaeological resources. **Visual:** N/A
Effects of proposal on significance	The State significance of Thompson Square would not be affected by the impact on the potential maritime archaeological resource. The value that these resources could contribute to the significance of Thompson Square will not however be realised. As maritime resources are not considered to be part of the acknowledged significance of Thompson Square, their removal would not affect its significance. Impact upon the maritime resources on land and underwater would affect their heritage significance. Archaeological documentation of the maritime remains would enhance our understanding of the role of river traffic in the history of Thompson Square. The extent of the surviving archaeological resource is not clear but it unlikely to be completely removed by the construction works. Details of the potential for archaeological resources and their significance are included in data sheet 33 in Appendix 4 and in the maritime archaeology report for the project prepared by Cosmos Archaeology Pty Ltd.

34 – Location of the former punt house (Significance and archaeological potential undetermined)	
Statutory heritage listings	Nil
Brief overview of item	The former punt house was located on a landform between the rear yard of the Doctors House and the river. It is unlikely to survive as substantial modifications have been made to the riverbank, which include the levelling of the landscape to

34 – Location of the former punt house (Significance and archaeological potential undetermined)	
	create The Terrace. Disturbance of the deposits beneath the formation in this location are unlikely. Refer also to inventory items 32 & 33.
Potential or known impact prior to mitigation measures?	**Fabric:** No known impacts **Curtilage:** No known impacts **Visual:** N/A
Mitigation Measures	**11.8.3** Archaeological management; unexpected finds procedure **11.8.4** Archival recording if archaeological resources survive **11.8.6** Interpretation if archaeological resources survive
Potential or known impacts after mitigation measures?	**Fabric:** No known impacts **Curtilage:** No known impacts **Visual:** N/A
Effects of proposal on significance	The State significance of Thompson Square would not be affected by the impact on the potential archaeological resource of the Punt House. The effects on the significance of Thompson Square should this item survive archaeologically would be nil as it is not considered to be part of the square's acknowledged significance presently. If the punt house survives as an archaeological resource, its significance is likely to be high as part of the early landscape of Thompson Square. Information recovery would also remove significance in total.

35 – Government Cottage archaeological site, 41 George Street (State significant)	
Statutory heritage listings	SHR: 01843 LEP 2012: I01843
Brief overview of item	41 George Street is the location of the Government Cottage (Government House). It is included in this report to provide context for historic extent of the government domain and also due to the possibility that an associated wharf was

35 – Government Cottage archaeological site, 41 George Street (State significant)	
	constructed at the base of the historic property. It is located outside the project boundary.
Potential or known impact prior to mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** No
Mitigation Measures	None apply
Potential or known impacts after mitigation measures?	**Fabric:** No **Curtilage:** No **Visual:** No
Effects of proposal on significance	No impact on the significance of the Old Government Cottage sites. This includes the adjacent properties not listed on the SHR but which are likely to contain archaeological resources.

10.7 Summary Assessment of Heritage Impact

10.7.1 Major Negative Impacts

(*Affects fabric or values of State significance*)

- Archaeological resources relating to the pre-Macquarie phase of Green Hills within Thompson Square impacted by southern approaches and bridge construction
- Archaeological resources relating to the Macquarie phase of Thompson Square and Bridge Street impacted by southern approaches and bridge construction
- Archaeological resources potentially within the area proposed for utilities installation
- Impacts to built heritage by the removal of the existing Windsor Bridge
- Impacts to the significant historical view from the northern bank from Bridgeview
- Impacts to the cultural landscape through:
    - the removal of the existing Windsor Bridge
    - Substantial modification to the setting of Thompson Square as well as significant views and vistas to and from it
    - Visual intrusion of the replacement bridge and roads into the historic landscape
- Missing the opportunity to reinstate Thompson Square to a nineteenth century form by the removal of through traffic.

10.7.2 Moderate Negative Impacts

(*Irreversible loss of fabric or values of local significance*)

- Archaeological resources relating to the post-Macquarie phase of Windsor, that is, post 1822, impacted by southern approaches and bridge construction
- Archaeological resources on the north bank of the project area, in particular, the Squatters Arms Hotel (note that the location of this site has not been determined) impacted by northern approaches, road and roundabout construction
- Views and vistas to Bridgeview
- Change to the current layout of Thompson Square, which is identified by many in the Windsor community as an authentic representation of historical Windsor.
- Removal of old and unstable significant trees
- Traffic lights installed at George Street where they will be prominent in the skyline

10.7.3 Minor Negative Impacts

(*Reversible loss of local significance or fabric where mitigation retrieves some value of significance; loss of fabric not of significance but which contributes to local significance values*)

- Noise-proofing measures on Bridge Street residential properties.
- Removal of stone kerbing and guttering

10.7.4 Negligible or Neutral Impacts

(*Does not affect heritage values either negatively or positively*)

- Refilling of the road cutting through Thompson Square
- Potential relocation of existing historical markers in the project area
- Removal of aging, non-significant trees

10.7.5 Minor Positive Impacts

(*Enhances access to, understanding or conservation of fabric or values of local significance*)

- Removal of uncontrolled vegetation growth on the waterfront
- The project has boosted interest in Windsor's heritage and its presence in contemporary urban life, the local economy, and the limits of acceptable change in the community's environment
- Improving pedestrian access to the north side of the river to allow views back to Windsor and Thompson Square.

10.7.6 Moderate Positive Impacts

(*Enhances access to, understanding or conservation of fabric or values of State significance*)

- The consolidation of the two parkland areas to create an integrated civic open space that addresses the river
- Realisation of the archaeological potential of State significant resources. It is acknowledged that the impact to State significant archaeological resources, or relics, is a major negative impact, but if the project is approved, archaeological investigation can inform, educate and interpret the significance of the civic space at Green Hills and Macquarie's Thompson Square.
- The opportunity to interpret historic views and vistas, particularly from the north bank by the management of overgrown vegetation on the southern bank
- The opportunity to incorporate the interpretation of Windsor's complex human history into the new fabric and urban design
- Provision of accurate information about Windsor's history in formats available to a range of audiences, including the possibility for museum displays, online data and publications
- Improving a connection to the waterfront directly from George Street
- The potential relocation of electricity cables underground within Thompson Square.

10.7.7 Residual Impacts

(Impacts that cannot be mitigated against or ameliorated through avoidance, design changes or alternative methods prior to development approval)

- Physical modification of the current cultural landscape - replacement of the existing bridge with another larger bridge in a different position
- Visual impacts of the project within the current cultural landscape - presence of a larger bridge, new bridge in an old setting, larger footprint for traffic on northern side
- The removal or disturbance of archaeological resources
- Changes to the established pattern of use and familiarity with the current configuration of Thompson Square

10.8 Statement of heritage impact

The replacement of Windsor Bridge as proposed by RMS would irreversibly impact elements of Windsor's State significant heritage values, including the layout and setting of Thompson Square, archaeological resources from the early historic period of the project area and the surrounding cultural landscape that is integral to the local area's rural, historic character. The significance of Thompson Square would be detrimentally impacted by the proposal.

The heritage listed Windsor Bridge would also be affected by the project, as it would be removed resulting in the loss of an individual heritage item as well as one that contributes to the surrounding cultural landscape. Its removal would result in total impact to the bridge's significance.

Other impacts that are also identified to State and local heritage values include the visual character and established patterns of use and familiarity with the current configuration of the bridge and open space.

The extent of these potential impacts has been partly reduced by design modifications, particularly the opportunities allowed by the reduction in planned speed limits. Further reductions to the proposed impact would be achieved through a commitment to quality urban design, consideration of the detailed design of the replacement bridge, the recovery of culturally significant archaeological resources and quality interpretation of heritage values (both lost and surviving) in the final form of the project area. The proposed urban design concept reinforces the key themes of connection to the river and the form of the open space that were key elements of Macquarie’s town designs. The urban design concept also reinforces the informal and "organic" character of the parkland areas.

The creation of a new high quality civic space that integrates historic elements (Thompson Square, waterfront, heritage interpretation) and other enduring heritage outcomes can only partially compensate for the loss of significance that will result from the project.

11 CONCLUSIONS & RECOMMENDATIONS

11.1 Summary of project

The existing Windsor Bridge is in poor condition and deteriorating through age. A crossing at or near Windsor is necessary to keep the communities on either side of the river connected; access across the river is of vital importance. Should the existing bridge fail before a replacement bridge has been constructed, a trip of at least 26 km via Richmond and more than 60 km via the Sackville Ferry would be necessary to complete the same journey.

RMS' preferred location for the replacement bridge is 35 m downstream of the existing bridge with the approach road from Windsor through Thompson Square and connecting to Freemans Reach Road. RMS formed the opinion that the impact of the project on non-Aboriginal heritage would be likely to significantly affect the environment and would require an environmental impact statement under Part 5 of the EP&A Act. Therefore RMS is seeking approval under Part 5.1 of the EP & A Act to undertake the Project.

This report has, through archival research, site survey and archaeological test excavation, comprehensively evaluated the heritage significance of the project area and assessed the potential impacts of the project. It has been prepared to guide the decision making process with respect to the approval and identifies actions to avoid, mitigate or ameliorate adverse impacts to the cultural heritage of Thompson Square, Windsor Bridge and Bridgeview.

RMS assessed possible bridge locations and identified the project as described in Section 9.1 as its preferred option. The option assessment process is discussed in Chapter 4 of the EIS. RMS commissioned reports addressing Aboriginal, maritime and historical heritage issues, as well as urban design and landscape assessments to identify environmental constraints relating to these options. Heritage was identified as a key constraint for the project as it was for a number of other options considered. It is inevitable in a place as historic as the Hawkesbury and in particular Windsor, that heritage values would be a significant issue for most types of development. Thompson Square is one of the earliest and most important sites in the region; this fact has been understood for a number of years and has been supported by the research and evaluation undertaken for this report.

Thompson Square retains a physical connection to the early colony through the retention of civic open space down to the river dating from the eighteenth century, through the fabric of its buildings and the archaeological resource. It has landmark qualities that have been valued for many years. The 1934 road cutting, which severed the open space and is very likely to have destroyed archaeological evidence, was the most dramatic of many changes to Thompson Square and its environs. The 1934 road did not, however, diminish the recognition of its historic character as shown when the National Trust of Australia (NSW), a community sponsored heritage advocate, classified Thompson Square and its surrounding buildings in the mid-1970s. Development issues were recognised as early as 1978 and the place was given a Permanent Conservation Order (PCO) in 1982 and incorporated into the SHR in 1999. Acknowledgment of the place's significance occurred early in the development of a heritage framework for NSW.

Even before then Windsor was recognised for its historic character and its picturesque qualities. Thompson Square holds a high place in the esteem of the local community and for the State of NSW on a number of different levels.

Windsor Bridge retained a character that was sympathetic to the appreciation of the historic town, particularly as part of a river setting. The location of Green Hills was determined by the river and the later juxtaposition of the densely built townscape, sparsely occupied square and the low bridge across the Hawkesbury River resulted in a much painted and photographed scene. This has been part of the collective memory of the people of NSW since 1874, and it is the prospect of the project being constructed that has triggered a substantial outcry from many Windsor locals and others who love the town as it is.

The structure of the project team has placed heritage considerations at the same level as other key issues to ensure that these were thoroughly understood and were being considered in all aspects of project design. A range of heritage specialisations are represented on the project team including non-Aboriginal heritage, Aboriginal heritage, maritime heritage, built heritage, urban design and landscape architecture. This diversity of perspectives and the continual peer review within and across disciplines

has been necessary to ensure that the assessment of significance results in a comprehensive understanding of the human history of the project area, and that the impacts of the project are assessed within this framework.

This report addresses historical heritage, including the built environment and current cultural landscape, as well as archaeological evidence of past land use from the time of the arrival of European settlers. It integrates relevant information from the maritime archaeological assessment, which is presented as a separate report (*Proposed Windsor Bridge Replacement Windsor, NSW: Maritime Archaeological Statement of Heritage Impact*, prepared by Cosmos Archaeology August 2012). Relevant data from the Aboriginal archaeological assessment has been used to inform this report. The Aboriginal heritage assessment and test excavation results are presented as a separate Technical paper (*Windsor Bridge Replacement Project: Aboriginal Cultural Heritage Assessment and Excavation Report,* Kelleher Nightingale Consulting July 2012).

11.2 Overview of the project

While the potential impact has been tempered through iterative design and input from heritage specialists, predicted impacts on the heritage significance of Thompson Square, Windsor Bridge and the northern bank of the project area will be too great to completely mitigate or ameliorate resulting in a residual impact that is discussed below.

By proceeding with the project in this form RMS will reconfigure Thompson Square, removing the current bridge approach road through the cutting, which will be backfilled, and placing it on the eastern margin of the square. The existing low level bridge would be demolished and a new higher structure built. This will be a major heritage impact as it will irreversibly affect the significance of Thompson Square and Windsor Bridge as State significant heritage places, and the State significant vista from the northern bank looking back towards the town. It is also likely to have a major impact on the surviving archaeological resource, particularly that component that reflects the earliest phase/period of European occupation.

11.3 Improvements to the concept design

The Project team has worked in an integrated way to identify and reduce the negative impacts to the heritage significance of the place and to promote opportunities to mitigate the impact. A number of improvements to the design and alignments have been made to respect the importance of the place through the integrated design process. These include:

- Lowering of the posted speed limit for the replacement bridge and approach roads, which results in an overall lowering of the bridge profile through Thompson Square, reducing visual impacts generally, and preventing buildings on the eastern side being addressed by a 2-3 metre high road formation.
- Identification of construction techniques for the bridge that minimise construction impact. An incrementally launched bridge would minimise construction impacts in Thompson Square. Options for construction methods that minimise soil excavation and trenching are currently being assessed to inform the detailed design.
- An incrementally launched bridge allows for greater design detail, which allows for a higher quality finish to the structure or the incorporation of elements reflecting site history.
- Design and configuration of bridge piers to lessen the impact on views from the southern to the northern bank of the river.
- The connection between the open space of the square and the river front, which was a fundamental part of the original purpose of the square will be enhanced.

Improvements to the design also need to address mitigation of the residual impact that cannot be removed by planning before construction or the physical design of the project components. The following considerations will guide the design team during further development in consultation with Hawkesbury City Council, the community and other identified stakeholders.

- The project area is an actively used urban space in a heritage setting. After completion, the project area should continue to be as attractive as possible for people to enjoy, use and explore.
- Heritage is multilayered with complex stories, this is also reflected in interpretation. Presenting this is likely to take a combination of historic elements - buildings, landscape, access to the river, interpretation in built form, words and signage, and highlighting key connections through naming or prominent display.
- Mitigation of impacts on the archaeological resource can provide an opportunity to explore and reveal the complex history of Windsor, and if well thought through can form an enduring legacy in their own right.
- Implementation of the project has been contested in the community. This is an important part of the story and should be represented.

Despite this, the construction of the project misses the opportunity to remove all through traffic from within Thompson Square, which is a preferred outcome identified by the Heritage Council of NSW as a once in a lifetime opportunity for RMS to consider during its options assessment.[575] The Heritage Council's preferred outcome would symbolically reconstruct Thompson Square to an agreed stylised form by removing modern traffic, allowing its significance as an early and evolved civic open space from the colonial period to be revealed and appreciated.

The overall impact of the proposed road level with the buildings framing Thompson Square and a new bridge through the cultural landscape is not in keeping with its significance. The impacts predicted from realisation of the project will irreversibly and negatively impact on certain aspects of significance within the project area.

Conversely, the mitigation measures that have been identified provide opportunities that may not have otherwise not be realised:

- Detailed archaeological investigation can realise the potential of deposits to reveal eighteenth century and later life in Green Hills/Windsor
- Consolidating the sections of the square that were severed in 1934 into a single usable space
- Re-opening access to the river from the square
- Community involvement in the investigation process resulting in a better understanding of Windsor's past and its involvement in the development of NSW.

The impacts that will arise from constructing the project are discussed in detail in Section 0.

11.4 Opportunities arising from the project

Direct opportunities arising from the project would include:

- Uniting the two parkland areas to create one cohesive civic space that addresses the Hawkesbury River
- Shared access along The Terrace to increase the use and enjoyment of the foreshore
- The potential to integrate The Terrace and the northern bank into the Great River Walk
- Realising the potential of the archaeology to tell us more about the place and life in Windsor during human occupation
- Creation of an integrated view of Windsor's heritage, based on diverse sources, that is accessible to the widest possible audience
- Interpretation opportunities *in situ,* in the museum and as part of the Great River Walk

[575] Raised by the Heritage Council during the presentation of options by the [then] RTA (Heritage Council meeting 5 August 2009).

11.5 Impacts to significance arising from the project

11.5.1 The completed project on setting and views

The setting of Thompson Square and Windsor Bridge and the significant views and vistas are part of the cultural landscape intersected by the project area.

The project is predicted to impact on a number of aspects of the significance of Thompson Square, Windsor Bridge and the north bank in Freemans Reach. One of the key impacts to significance that has been identified is the effect that the project will have on the setting and the views and vistas of Thompson Square and the rural vistas across to Freemans Reach west of the Cumberland Plain. The impacts to significant view and the setting of Thompson Square will result in an impact to this State significant value.

Another aspect of the significance of the setting of the project area (on the south and north banks of the Hawkesbury River) is the Windsor Bridge, which at 1874 is a more recent addition to the identity of Thompson Square. Demolition of the existing bridge will have the two-fold affect of removing a heritage item with its own significance and a contributory item to Thompson Square. Removal of the Windsor Bridge will affect the views from Freemans Reach back to Thompson Square by removing the boundary to the square that the bridge forms at the base of the Doctors House.

View and vistas across Bridge and Old Bridge Streets, which retain a high level of significance and for the most part are unbroken by the road cutting to the bridge will be affected by the proposal. The proposed southern approach to the bridge has been designed, through an iterative process with the project team, to be almost at pedestrian level on what is currently Old Bridge Street. The results will be a flow of traffic that does not recede into the cutting but remains at grade with the George Street intersection to be carried across the replacement bridge. This impact is considered to be high as it will encroach on views from George Street and Thompson Square road across to the eastern side of the square as well as views from the eastern side of the square to all other areas of the immediate locality.

Views to the northern river bank, which to the present have remained largely unchanged as rural activity and farmsteads since the construction of the Windsor Bridge, will be modified by the large roundabout proposed within part of what is currently a turf farm. It is predicted that the roundabout would be visible from the George Street/Bridge Street intersection and locations within Thompson Square and The Terrace. The gross visual effect will be that a modern bridge and roundabout will be located within an historic precinct that currently retains a strong sense of the rural picturesque.

11.5.2 Noise and Vibration on adjacent heritage items

Other impacts to the cultural landscape that have been identified are the potential operating affects of the proposed southern approach to the replacement bridge. At present, Bridge Street descends into a cutting on approach to the southern abutment of the Windsor Bridge, removing all but the largest trucks from view and at a distance from the heritage structures that define Thompson Square. The effects of the proposal would keep all vehicles at a similar height to the southern end of Bridge Street.

Noise and vibration impacts have the potential to affect heritage items above and below ground during the construction phase and after that, the operational phase of the project. These potential impacts have been addressed as part of a specialist noise and vibration investigation ("Noise and Vibration Working Paper" prepared by SKM for RMS). The noise and vibration paper concluded that predicted noise levels were expected to be similar to current levels within and outside of the project area. A slightly larger area with low noise levels was expected within the project area at completion of the project as the new alignment on the southern approach would be located along the eastern boundary of the parkland.

With respect to the expected noise level, three sensitive receivers on Bridge Street (in the location of the buildings) meet the criteria that trigger consideration of noise mitigation measures. Where noise mitigation measures would be implemented on heritage listed buildings, the advice of a heritage architect (City Plan Heritage 9 August 2012) has been sought for appropriate architectural treatments.

Assessment of vibration related to the operation of the project on human comfort and heritage buildings and items as a result of the project concluded that the effects would be insignificant (SKM 2012, Section 8.1).

Construction noise was identified as a temporary impact that would have an effect on the significance of Thompson Square (as well as the amenity of the local area) and the report recommended a Noise and Vibration Management Plan (CNVMP) to be prepared prior to construction commencing. Noise and vibration mitigation during construction would employ controls such as limiting working hours, avoiding grouping noisy machinery and the use of temporary noise shielding SKM 2012, Section 8.2). Mitigation measures identified in the *Noise and Vibration Working Paper* (SKM 2012) that pertain specifically to heritage are:

- *A Construction Noise and Vibration Management Plan will be prepared for the project and it will contain detailed assessment methods for high risk works, identification of sensitive receivers, complaints handling process, consultation protocols, monitoring requirements and mitigation measures. Mitigation measures that will be contained in the plan include:*

    - *Buildings/structural conditions surveys will be undertaken prior to and following construction works at receivers within 50 metres of piling, rock breaking and vibratory compaction activities, including the heritage retaining wall at 4 Bridge Street.*
    - *No impact piling works will be undertaken within 20 metres of any heritage structure, unless additional assessment and monitoring confirm that vibration levels will be below project specific criteria.*
    - *Rock breaking/hammering will not be undertaken within seven metres of any heritage item or building unless additional assessment and monitoring confirm that vibration levels will be below project specific criteria.*
    - *Where heavy plant is used within seven metres of a heritage structure, attended vibration monitoring will be undertaken to assess compliance with project specific vibration criteria.*
    - *Where an exceedance of project specific vibration criteria for structural damage is recorded during monitoring, work will cease immediately and alternative construction methods will be used.*

11.5.3 Construction impacts on archaeological resources

Archaeological test excavation has demonstrated that a significant archaeological resource exists within Thompson Square.

Works required for the project would impact on the archaeological resource within the footprint of the bridge and approaches from the George Street intersection on both northern and southern banks. In places the impacts are within levels that appear to have relatively low significance in their own right, however, they are part of a complex stratigraphic sequence of very great significance. In other places, particularly the middle and northern portions of Thompson Square and the riverfront, excavation for the project would impact on places of potential exceptional significance including elements that are likely to be of State significance for their archaeological value.

The resource is too significant and too unpredictable with respect to the survival of deposits and relics to allow anything but open area excavation of the entire project area with the opportunity to extend beyond. Open area archaeological excavation ensures maximum exposure and recovery of information in circumstances where the evidence has become discontinuous by later cutting and filling, as identified during the test excavation program. However, archaeology is destructive of its primary resource. A large portion of an intact profile would be removed, fragmenting the resource. It could be argued that what remains “banks” evidence for the future but in this case, because of the unpredictability of the resource and the complex processes of land-forming that are evident from both archival and physical sources there is no guarantee that what would be identified would be representative of the full range of past activities, its resources and complexity. Furthermore it is highly likely that the division between what is preserved and what is removed if archaeological excavation is undertaken only within the footprint of the project would fragment now complete deposits, units and structures the same as would bulk excavation. The arbitrary depths of required excavation would also remove the top of the archaeological profile at the northern end of Thompson Square, which may be crucial for making sense of archaeological remains of the historic wharves.

It must be recognised that, while professional archaeological excavation and documentation would retrieve evidence that would otherwise be lost, the final outcome of archaeological excavation is the same as that for bulk excavation - fragmentation of a significant potential archaeological resource. It is concluded that the excavation required for the project to allow for appropriate levels of recovery and understanding would have an adverse impact on the archaeological profile of Thompson Square, the project area on the northern riverbank and to the cultural significance of these places. The preferred outcome, for an archaeological resource of potential state significance is that this resource remains intact and its potential unrealised.

An alternative option that must be considered to redress the impact to archaeological resources within the project area is an extensive and comprehensive salvage excavation of Thompson Square within the project area and outside it. This would be the only way to ensure that the complexity of the archaeological resource is identified and documented and would remove the issue of fragmenting the resource further. However, while this is a better outcome for recovering and interpreting archaeological evidence and realising its potential it would completely and irrevocably remove the entire resource, therefore remove its associated significance. It is also a massive program that has major repercussions for the future form and rehabilitation of Thompson Square.

The South Bank

Test excavations on the southern side of the river have demonstrated that beneath present surfaces there are archaeological deposits that date from the early nineteenth century onwards, as well as underlying deposit containing Aboriginal archaeological material.

Installation of the gabion walls at the base of the southern abutment of the existing bridge are likely to have added to the impacts on the shoreline originally created by the construction of the bridge. However, it is possible that the first Green Hills wharf (1795) is located in this area, and remnants may survive despite the impact of bridge construction and later improvement. Anomalies were identified in the Side Scan Sonar study conducted as part of the maritime assessment (Cosmos Archaeology 2012), which suggest that fabric, perhaps remnants of a structure, are located beneath the existing bridge at the southern end. The recommendations included for the Windsor Bridge have been formulated to ensure that the bridge's dismantling is careful and archivally recorded with a photographic and archaeological program underpinning the process. An approach that would integrate the maritime and terrestrial archaeological programs should be discussed during the preparation of the archaeological program.

Construction impacts would require the removal of between 0.5 and 1.5 metres depth of deposit across the southern project footprint, plus localised trenching or boring for piers into bedrock. The excavation required for the project would remove the accumulated profile across more than a third of Thompson Square. In addition to this impact the excavation would fragment the complex stratigraphic relationships within the profile. Remnant deposits beneath the bridge and roads would be inaccessible and isolated from their original context.

The best means of addressing these impacts is by open area excavation. An archaeological program that recovered information from the entire area to be disturbed by construction would address the loss of information that would occur if the project proceeds. It would transfer the information that is now in the ground to other permanent archival sources. This work and interpretation outcomes would inform and expand our present knowledge of the history of this place and make it more readily accessible to the community and for future research.

An archaeological program would provide an opportunity to enhance the documented history of Windsor. The maritime archaeological resource provides a window into Windsor’s main lifeline with the rest of the world in its early history. We know that Aboriginal people used Thompson Square as a marginal place where they were allowed to congregate in nineteenth century Windsor.

The North Bank

The construction impacts to the potential archaeological resource on the north side of the Hawkesbury River are expected to be fewer but the location of the Squatters Arms Hotel, which has been identified as a landmark inn that evolved out of a first settlement grant, remains undetermined. Test excavation has demonstrated that archaeological evidence remains intact of the works undertaken to improve the approaches for the newly raised bridge in 1897. By inference evidence of earlier works and roads might survive below that work.

11.5.4 Implications of significance

Thompson Square is rare at a State level of significance for its historical, associative, research and social values. Some of the archaeological resource within Thompson Square and extending further south and north is also likely to be of state heritage significance, as are archaeological remains of the wharves within the body of the river. Windsor Bridge is a State significant structure that is rare and has historical and technical significance. Each item has, through the historical association with the other, become part of the same landscape. Both Thompson Square and Windsor Bridge contribute to State significant views of Windsor as a historic township.

From a heritage perspective the most appropriate mitigation measures for Thompson Square and Windsor Bridge are to select an alternative river crossing location that avoids impacts on Thompson Square and to refurbish and retain the existing Windsor Bridge for light vehicles or pedestrians. The working paper for terrestrial historical heritage has identified that the significance of the built and the archaeological environment has a high level of heritage value.

RMS' preferred option is the current project, therefore mitigation measures to minimise the impact of the preferred project need to be identified. Mitigation measures are presented in the Section 11.8. Principals to guide future archaeological investigation are presented below; they were developed as part of the non-Aboriginal working paper and respond to the level of archaeological potential and significance as assessed in that paper.

11.5.5 Principals to guide future archaeological investigation

The principals and guidelines are consistent with Director General's Requirements to outline the proposed mitigation and management measure to avoid significant impact (refer to Table 11 below). This report sets out recommendations that will assist to avoid inadvertent impacts, collect information prior to its destruction, and promulgate knowledge that has been gained through this process and to enhance the resulting landscape.

Any option that requires excavation is likely to uncover relics that are, at a minimum, state significant. The issue of *in situ* preservation must be considered and it is as complex an issue as that of the extent of acceptable excavation. Consideration must be given to the following issues:

- Preservation of relics exposed in total extent but not depth due to the variable depths of excavation required for the project and whether this is an acceptable outcome.
- The outcome for relics that may be exposed in total depth but not for their full extent in the bridge excavation.
- The retention of archaeological resources beneath the replacement bridge and roads does not provide access for research, study or enjoyment.

The mitigation measure relating to archaeology is for a coordinated archaeological program to be developed prior to any impacts occurring on site. The following points should be considered when developing this program if the project is approved in its current form.

The Southern Bank, Thompson Square

- *Open area excavation of the project area and the areas adjacent is the only appropriate strategy for the proposed impact on the archaeological resource within Thompson Square to ensure adequate information recovery.*
- *Undertake the open area archaeological excavation and documentation to professional standards of excavation, recording and artefact curation.*
- *Plan all archaeological investigations, including impacts to Windsor Bridge as a single integrated investigative process with clearly expressed research outcomes.*
- *It is expected that the screw mechanism of the screw pile attempted at Pier 6 (Refer to Section 5.0 "Bridge History") remains embedded in the bedrock. If it is determined that the screw mechanism survives and will be impacted by the project, archaeological excavation should be undertaken (by maritime archaeologists).*

The Northern Bank

- *Open area salvage excavation and documentation is a suitable mitigation measure with Geotechnical Test Pit 5 as the focus; extension of the archaeological salvage excavation outwards from Geotechnical Test Pit 5 should be undertaken until it is certain that the impact area has been fully exposed and documented.*
- *Archaeological monitoring and documentation of the remainder of the project area on the northern bank is an appropriate mitigation measure for unpredicted sites. Monitoring will allow archaeological resources that are exposed during construction, to be recorded and if necessary archaeologically excavated and documented.*

Windsor Bridge

- *The 1874 bridge should be dismantled carefully so that its construction methods and evolution can be archivally recorded through an archaeological program. Particular attention is required around the southern abutment and beneath and around the existing gabion walls for evidence of the first wharf at Green Hills.*
- *Ensure that the terrestrial and maritime archaeological programs are coordinated to gain maximum information through the simultaneous investigation of the river/land interface.*

Utilities Excavation

Utility excavation on Bridge Street from Macquarie Street to George Street intersection is proposed. Directional drilling may be used and is preferred. Trenching is the alternative but will require additional research, hand excavation, recording, with the possibility of excavating a greater area to adequately recover high significance archaeological information.

- *Outside Thompson Square, where directional drilling, localised excavation or trenching is to be used to install utilities and infrastructure, prior archaeological assessment is required to understand the nature of the archaeological resource. Where archaeological significance may be affected the location is to be avoided, or subject to controlled archaeological investigation. This may expand beyond the impact requirements of the utility excavation in order to recover comprehensible archaeological information.*

11.6 Fulfilment of the Director General's Requirements

Director General's Requirements (DGRs) have been published to direct the assessment of key environmental issues so that mitigation measures can be formulated. The DGRs relating to historic heritage are reproduced in the Table 11 below with a response informed by the methodology and outcomes of the historical heritage investigation.

Table 11: DGRs and summary response

Director General's Requirements	Response
"impacts to State and local historic heritage (including archaeology, heritage items and conservation areas), in particular, impacts on the Thompson Square Conservation Area, heritage listed buildings and sites in the Thompson Square conservation area and the Windsor Bridge should be assessed. Where impacts to State or locally significant historic heritage items are identified, the assessment shall:	The DGRs have been addressed in this report as follows:
• *outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures) generally consistent with the guidelines in the NSW Heritage Manual (1996),*	This report was prepared using the guidelines of the *NSW Heritage Manual (1996)* and in accordance with the philosophy of the ICOMOS *Burra Charter.* Impacts associated with the project were identified in Section 10 of this report. This report concludes that significant impacts to the heritage significance of Thompson Square and

	Windsor Bridge cannot be avoided as archaeological fabric and current views, vistas and setting will be adversely affected by the project. Mitigation and management measures of the identified and potential impacts have been provided in Sections 11.7 and 11.8 of this report. The recommendations and mitigation measures have been formulated with the aim of reducing the level of impact that the proposal is predicted to have on the heritage significance of Thompson Square and Windsor Bridge.
• *be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria),*	The historical heritage report was researched by a team of qualified heritage consultants with the core team comprising Pamela Kottaras, Wendy Thorp and Peter Woodley with assistance from Peter Howard and Anna Nardis. A substantial contribution was made by Gary Vines (Biosis Research Melbourne Resource Group). Wendy Thorp (Cultural Resources Management) was the excavation director; her role was approved by the Department of Planning and Infrastructure, and the Heritage Branch. CVs for the historical heritage team members were provided to the Department of Planning.
• *consider impacts from vibration, demolition, archaeological disturbance, altered historical arrangements and access, landscape and vistas, and architectural noise treatment, and*	Potential impacts are identified in Section 10, with additional detail on architectural noise treatment in Appendix 6.
• *develop an appropriate archaeological assessment methodology, including research design, to guide physical archaeological test excavations (terrestrial and maritime) and include the results of these excavations"*	This report incorporates an assessment of built heritage and terrestrial archaeological resources in detail and maritime archaeology in brief. A detailed maritime archaeological assessment has been prepared as a separate document by Cosmos Archaeology Pty Ltd. The report includes all components required to assess archaeological sensitivity and significance. It includes the research design that was formulated to guide test excavations and the results of those test excavations. The archaeological research design was reviewed and agreed to by the Department of Planning and Infrastructure and by the Heritage Branch. The results of the archaeological program have been incorporated into this report and the detailed excavation report is provided in Appendix 3.

11.7 RECOMMENDATIONS

11.7.1 Format of the recommendations and mitigation measures

Recommendations have been formulated to respond to the Director General's Requirements as well as accepted heritage management practices. The recommendations respond to the significance of the

project area and how it should best be managed. The mitigation measures provide guidance for the appropriate level of data-gathering should the application for the project be approved.

11.7.2 Conservation

Thompson Square is significant to at least a State level for its historical, associative, research and social values. It has an exceptional level of rarity. Some of the archaeological resource within Thompson Square and extending further south and north is also likely to be of at least State heritage significance, as are archaeological remains of the wharves within the body of the river. Windsor Bridge is a State significant structure that is rare and has historical and technical significance. Each item has, through the historical association with the other, become part of the same landscape. Both the square and bridge contribute to State significant views of Windsor as a historic township.

From a heritage conservation perspective the most appropriate treatment of Thompson Square and Windsor Bridge is to avoid any further negative impact and to take the opportunity identified by the Heritage Council to remove through traffic. The recommendations below have been made in response to the cultural significance of the project area.

As the significance of the archaeological resource within the project area, and in particular within Thompson Square and down to the river would be diminished by the project, the preferred outcome is that this resource remains intact.

1. *All components of Thompson Square are formally recognised as being of State significance; preservation is the primary recommendation to retain significance. The project will impact on the State significance heritage values of Thompson Square and the most appropriate management measure for a significant cultural landscape such as this is to avoid the impacts proposed by the project.*
2. *The Windsor Bridge is also of State significance and retention and stabilisation of the bridge is the preferred action to ensure that its significance is retained.*
3. *If the project proceeds, mitigation strategies that reduce the impact are to be implemented. Refer to the mitigation measures below.*

11.8 MITIGATION MEASURES

11.8.1 The cultural landscape

Impacts to the cultural landscape would be generated by the project. These impacts would effect the setting and view and vistas as well as archaeological fabric (which is addressed in a separate section below). The measures below have been formulated to reduce the overall impacts to the cultural landscape.

1. *Ensure that the replacement bridge is designed to minimise visual impact to the landscape.*
2. *Ensure that the landscape scheme for the Thompson Square parkland area retains its informal character. Refer also to section 11.8.5.*
3. *Investigate the possibility of further reducing the size of the roundabout at Freemans Reach Road and Wilberforce Road.*
4. *Investigate opportunities to relocate above-ground utilities underground so that they do not pose a visual impediment to the resulting cultural landscape.*
5. *Include the existing cultural landscape in all archival recording activities undertaken for the project.*

11.8.2 Prior to and during construction

Safeguards will be required in the area of construction to avoid inadvertent impacts to heritage items and significant trees (refer to the landscape assessment report) within or adjacent to the project area.

6. *Prior to construction:*
    a. *prepare dilapidation reports for heritage items in the immediate vicinity of the project area and ensure that appropriate safeguards against vibration and accidental impacts are in place. Items identified for dilapidation assessment are:*

- *"Bridgeview", 27 Freemans Reach Road*
- *4 Bridge Street, the brick retaining wall in the backyard*
- *6 (8) Bridge Street*
- *"House and Outbuildings", 10 Bridge Street*
- *62 George Street, single-storey building of the former Hawkesbury Stores*
- *"The Macquarie Arms Hotel", 81 George Street and surrounding brick wall*
- *"The Doctors House" 1 – 3 Thompson Square*
- *Other heritage items if the requirement is identified during construction*

b. *Ensure that all personnel working on site undergo a heritage induction to clearly identify the value of the place and how to avoid inadvertent impacts.*

7. *Identify heritage items in the project area to ensure that inadvertent impacts do not occur.*
8. *Monitor heritage items during construction for construction-related impacts as described in the Noise and Vibration working paper.*
9. *Ensure that architectural noise mitigation measures proposed to minimise traffic noise on heritage listed residential properties are developed by a suitably qualified professional. Refer to advice prepared by City Plan Heritage (9 August 2012).*
10. *Ensure that installation of noise mitigating systems is undertaken by a suitably qualified professional.*

11.8.3 Archaeological management

This section should be read in conjunction with section 11.5.5 *Principles to Guide Future Archaeological Investigation.* The loss of information through the anticipated construction-related excavation requires careful management. Open area excavation would require a combination of mechanical and manual excavation undertaken by professional archaeologists in association with an experienced excavator operator. All professional standards of excavation, recording and artefact curation must be adhered to and a comprehensive report and interpretation of the work prepared at the conclusion of site works. As the history of Windsor goes back further than two centuries, it must be designed to meet best practice standards for the recovery of both Aboriginal and historical archaeology, conducted as a single investigative process.

Impacts are also predicted where it is proposed that utilities will be installed along Bridge Street from Macquarie Street to the George Street intersection. Installation is likely to be by one of two methods: directional drilling or open trenching. Consideration has been given in these recommendations for managing impacts deriving from the installation of services along Bridge Street by minimising impacts.

Archaeological research design

11. *Develop an integrated archaeological project (terrestrial, maritime and Aboriginal) and research design in conjunction with heritage agency stakeholders. The research design should seek to investigate the project area and realise its archaeological potential. The archaeological project and research design will set out in detail the archaeological program, the research objectives and questions, and methods of analysis and dissemination of the results. The points identified in the discussion of archaeological resources should be considered when developing the archaeological program.*

11.8.4 Archival recording

The changes to the surrounding landscape that will result from the project will be extensive. Therefore prior to commencing works, an archival record of the project area and the immediate vicinity should be undertaken in accordance with Heritage Council guidelines for items of State significance. Prior to starting any work associated with archival recording, it would be prudent to discuss the range and level of documentation with the Heritage Branch and the Hawkesbury Museum.

Following the record of the project area and surrounds prior to works commencing, include a photographic record of the project in progress, including the large scale works such as the

construction of the replacement bridge, a photographic record of the demolition of the Windsor Bridge and other major events during the project.

Consideration should also be given to making a social record before, during and after the project that captures intangible aspects of the project area's significance and community esteem.

Any archaeological program includes an archival record of the process and findings as part of the methodology.

12. *Consult with the Heritage Branch (on behalf of the Heritage Council) and the Hawkesbury Museum regarding the level of archival recording appropriate for the site.*
13. *At a minimum undertake archival recording in accordance with the Heritage Council guidelines for recording items of State significance prior to any further works.*
14. *Continue the archival record during construction of the replacement bridge.*
15. *Prepare an archival record of the Windsor Bridge prior to, and during, its demolition.*
16. *Prepare a final archival record of the project area and its immediate vicinity promptly once the project works have been completed.*
17. *RMS to develop a social record of Thompson Square and the building of the replacement bridge in conjunction with the Hawkesbury Museum and potentially other partners to capture community views on this change to their environment.*

11.8.5 Post-construction landscaping

Landscaping and urban design principles of the project area and Thompson Square have been addressed in the *Urban Design and Landscape Concept Report* (2012) prepared by Spackman Mossop and Michaels and Hill Thalis Architecture + Urban Projects for RMS. It is essential that during the landscaping process for this project and any future project, due consideration is given to the archaeological potential of the project area, in particular Thompson Square and the immediate waterfront. Until an extensive archaeological excavation program is complete and the interpretation of the data has been prepared, the area within and surrounding Thompson Square, including the foreshore, must be considered to be archaeologically sensitive. In the first instance, any potential archaeological resource should be treated as if it is of state significance until additional investigation is undertaken.

The preferred landscape design would be one that interprets significant aspects of Thompson Square and enables it to be interpreted as a historical civic space. One of the most significant aspects of Thompson Square is its setting, and the views and vistas to and from it. Historical views that are documented in Appendix 1 of this technical paper provide the basis for both reinforcing the historical structure of the project area and addressing change and evolution within the open space and riverside settings. Whether directly alluded to through pictorial reminders, or just enhanced by vegetation reduction, the visual curtilage will become one of the strongest passive interpretative measures that can be applied.

From the 1880s Thompson Square has been subject to informal landscaping with the planting of trees, the erection of a pavilion, which was removed in the early twentieth century and arris rail fencing. The asymmetry and unstructured look of Thompson Square reinforced the informal design. More recently, the Pioneers Memorial and other features such as picnic tables and chairs were added.

The *Urban Design and Landscape Concept Report,* prepared for this project respects the historical development of Thompson Square by promoting an informal landscape scheme that maintains the current character of the square and maintains the unstructured character of the parkland areas. The signature species suggested in the Urban Design Landscape Plan of native and exotic trees and their placement continues the tradition of deliberately planted trees in a naturalistic fashion. There are no straight lines of trees and a mix of species. Other than the retaining wall of the approach road and the stairs, there are few hard edges shown and a high degree of grassed areas. The terraced section, as shown in the long section (Plate 121), undulates gently to The Terrace. The concept for the future landscape plan is for an informal scheme; it is strongly recommended that the notion of the informal landscape scheme is carried through to the final landscape plan.

The landscape on the northern side of the project area is currently open farmland and a small number of buildings. The proposal on this side of the river is for the construction of a roundabout, shared pedestrian/cycle ways and a water quality basin. The recommendations of the *Urban Design and Landscape Concept Report* is for a planting scheme comprising of a mixture of trees, grass and garden beds on the relatively level section before it drops toward the river. A shared pathway over a retaining wall marks the extent of the level area, which then drops away to the river. Where the landscape drops to the river the concept suggests that the river bank is revegetated with riparian (river) species and at the bank/water interface, the project construct riprap scour protection. This scour protection should be constructed of roughly dimensioned sandstone blocks, which would be loosely coursed with the gaps in between planted with sedges to provide a more naturalistic finish than basic concrete scour protection (refer to Figures 6.8, 6.15 and plan on page 90 of the SMM/HT report).

18. *Prepare an urban design landscape plan to guide the rehabilitation of Thompson Square following replacement bridge construction that takes its cue from the concept design prepared for the project (SMM and Hills Thalis 2012). Further works must consider the need for further assessment of the archaeological and built heritage values of the area to be landscaped or potentially impacted.*
19. *Post-construction landscaping should be prioritised where it would provide residences and businesses with a buffer to the completed project. The items that have been identified include:*
    a. *Bridgeview at 27 Wilberforce Road Freemans Reach*
    b. *4 Bridge Street Windsor*
    c. *6 Bridge Street Windsor*
    d. *"House and outbuildings", 10 Bridge Street Windsor*
    e. *"The former Hawkesbury Stores", 62 – 68 George Street Windsor*
    f. *"The Macquarie Arms Hotel", 81 George Street Windsor*
    g. *"The Hawkesbury Museum", 7 Thompson Square Windsor*
    h. *"House and outbuildings", 5 Thompson Square Windsor*
    i. *"The Doctors House", 1 – 3 Thompson Square Windsor*
20. *Ensure that any future landscape plan retains the informal scheme that characterises Thompson Square. That is, a minimum of hard-paved areas including pathways and retaining walls, maximise grassed areas, employ an informal planting scheme and a gently terraced ground plan down to the river.*
21. *The preferred landscape design would be that Thompson Square retains the sense of open space and its setting and enhances its significant aspects, particularly those historical views that have contributed to the sense of place and access to the river bank.*
22. *Consult with the Heritage Council in the preparation of the urban design and landscape plan.*
23. *Ensure that the landscape plan integrates with the Aboriginal, historical and maritime archaeology assessments.*

11.8.6 Interpretation

The Windsor Bridge Replacement Project has provided the opportunity to carry out interpretive projects to enhance the community's knowledge about the history of Windsor. The heritage reports prepared for this project, that is, the Aboriginal, historical and maritime archaeological assessments as well as the results of archaeological excavations, would provide good quality data for interpretive displays in and around Thompson Square. Without limiting the scope of potential interpretation of heritage values, some ideas that have been successfully tried in other places are as follows:

- An interpretation strategy within the archaeological project plan and research design, would identify opportunities for public understanding and engagement with the archaeological

investigation process. This would assess and recommend strategies such as those listed below which can be done prior to completion of the interpretation plan.

- Provide guided tours during archaeological excavations
- Have elements of the post-excavation archaeological analysis such as artefact sorting take place in the Museum environment, potentially with public involvement
- Identify particular vistas of historical significance or interest in the urban design and landscape plan and ensure these are maintained
- Consider incorporating interpretation about Thompson Square, Windsor Bridge and Freemans Reach into the Great River Walk. For instance, historic views to Thompson Square from Freemans Reach could be included as a numbered interpretive display that incorporates historic Windsor and Green Hills into a leg of the Great River Walk. This way, the replacement bridge is crossed and becomes part of the story of Windsor.
- Temporary and permanent interpretive displays in the Hawkesbury Museum that incorporate the pre-colonial landscape, the historic landscape, the environmental history such as floods and their effect on the geology and history of the place, based on the results of excavation.
- Artefacts from the historical archaeological excavation can be used for future workshops at the Hawkesbury Museum.
- Papers on aspects of the investigations and their results in magazines and journals to a range of different audiences
- A virtual reality walk through the project alignment at different periods of time.
- Heritage-based interpretative ideas have also been expressed in the landscape plan, including reflecting the river connection, incorporating shells and flood levels in finishes to the abutments.

24. *Prepare an Interpretation Strategy as part of the Archaeological research design and project plan to maximise opportunities for people to visit and understand the process of archaeology and witness revelation of the site's significance during the archaeological excavation programs.*

25. *Prepare an interpretation plan drawing on all of the heritage assessments to provide a framework for making information about the site's significance publicly accessible. Include provision for interpretation as follows:*

    a. *Undertake interpretation prior to, during and after the Windsor Bridge Replacement Project to ensure that the community is kept informed of progress, can participate in the act of revealing information about and understands the historical context of the project area.*

    b. *Ensure that the interpretation plan provides a framework for a sustainable permanent interpretive legacy for the project.*

    c. *Explore ways of communicating the significance of the project area to the broadest possible audience.*

    d. *Consider naming the replacement bridge to reflect a particular aspect of its significance or the history of the site.*

11.8.7 Re-use

The Windsor Bridge will be dismantled as part of the replacement project. Kerb stones, soil, historic fills and other material will also be recovered during construction. Consistent with RMS' sustainability objectives consideration should be given to how those materials with heritage association may be given a second life. Some of the items will be able to be re-used within the project. The interpretation plan and the sustainability component of the construction environment management plan should address the re-use, transfer or disposal of all items with a heritage provenance.

26. *If possible, removed fabric such as the iron piers on the existing Windsor Bridge, should be re-used within the project. Ensure that all components are properly labelled with provenance to assist with re-use elsewhere.*

27. *If re-use is not possible within the project, explore re-use elsewhere rather than be discarded. Ensure that all components are properly labelled with provenance to assist with re-use elsewhere.*

12 REFERENCES

Primary Works

Australian Convict Transport Register 1789-1790 and Michael Flynn (2001); The Second Fleet: 609

Evidence of John Howe to the Bigge Commission of Enquiry: 15 December 1820. Bigge Report Bonwick Transcripts Box 2: 48981-2

Views in New South Wales 1813-1814 and Historical Account of the Colony of New South Wales 1820-1821 (ML PX*D 65)

Hawkesbury Council Minutes 1889 – 1902

Hawkesbury Local Studies Collection Reel HAW 28

Hawkesbury Local Environmental Plan 2012

Hawkesbury Local Environmental Plan (draft) 2011

Hawkesbury Local Environmental Plan 1898

Journal of a Tour of Governor Macquarie's first Inspection of the Interior of the Colony, Commencing on Tuesday the 6th of Novr. 1810. Online transcript, The ALL Project, Macquarie University.

Wollondilly Council Local Environmental Plan 2011

Technical Reports

Austral Archaeology Pty Ltd. 2009. *Built Heritage & Archaeological Landscape Investigation: Windsor Bridge Options, Preliminary Environmental Investigation*. For Roads and Traffic Authority.

Chambers, D., 1997. "Timber Bridges Study" – Unpublished report and individual bridge citations prepared for National Trust of Australia, (Victoria) Bridges advisory committee.

Clive Lucas, Stapleton & Partners. (August) 2005. *Windsor Road and Old Windsor Road Conservation Management Plan*, prepared for NSW Roads and Traffic Authority.

Commercial Diving Solutions Pty Ltd, 2011.*Underwater Bridge Inspection Contract 10.2535.0889 B 415 Windsor Bridge 9.5.2011 to 20.5.2011*, report prepared for the RTA.

Cosmos Archaeology Pty Ltd. 2011. *Windsor Bridge over the Hawkesbury River Punt and Wharf Sites Maritime Archaeological Inspection.* For Roads Transport ad Traffic Authority

Cosmos Archaeology Pty Ltd. 2012 (October), *Proposed Windsor Bridge Replacement Windsor, NSW*. Report prepared for Roads and Maritime Services.

CTI, 2005. *Underwater Graphitisation Survey. Bridge at Windsor* (BN 415). Report prepared for RTA Bridge Section.

Cultural Resources Management (W.Thorp). 1984. *Heritage Study of the North Western Sector of Sydney; Archaeological Assessment.* Department of Environment and Planning

Edward Higginbotham. 1986. *Historical and Archaeological Investigation of Thompson's Square Windsor NSW* For Hawkesbury Shire Council

Fisher C & C Kent. (June) 1999. *Two Depressions, One Banking Collapse: Research Discussion Paper 1999-06.*Report for the System Stability Department of the Reserve Bank of Australia.

Fisher, L. 1975. *Thompson Square Windsor A Concept Plan for Future Development.* For Windsor Municipal Council

Geoarchaeology and Prospection. 2011. *Exploratory Ground Penetrating Radar Survey at Thompson's Square Windsor*

Heritage Concepts. 2008. *Statement of Heritage Impact Hawkesbury River Bridge (RTA 415) Windsor NSW.* For NSW Roads and Traffic Authority Environmental Services

Kass T. 2006. *RTA Thematic History: A Component of the RTA Heritage and Conservation Register, 2nd Edition*

McMillan Britton and Kell. 1998. *Timber Truss Bridges: Study of Relative Heritage Significance of All Timber Truss Road Bridges in NSW*. Report to NSW Roads and Traffic Authority

Morris, C., G Britton,G., and Jack, I. 2004. *McQuade (Windsor) Park Conservation Management Plan*

Otto Cserhalmi + Partners PL. 2002. *Eveleigh Carriageworks: Conservation Management Plan Volume 1*. Report prepared for the State Rail Authority.

Pont, R. ND. *Restoration Proposals Thompson Square Windsor.* For Hawkesbury City Council

RTA 2006, *Bridge Types in NSW: Historical overviews*. Compilation of various studies of bridges in NSW including:

- Berger Ian, 2005, *Masonry Bridges: Heritage Study of Masonry Bridges in NSW*
- Cardno MBK, 2000, *Historical Overview of Bridge Types in NSW: Extract form the Study of Relative Heritage Significance of RTA Controlled Timber Beam Road Bridges in NSW,* (October).
- McMillan Britton & Kell, 1998, *Timber Truss Bridges: Study of Relative Heritage Significance of All Timber Truss Road Bridges in NSW* (December).
- Cardno MBK, 2001 (February), *Pre-1930 Metal Bridges: Study of the Heritage Significance of Pre-1930 RTA Controlled Metal Road Bridges in NSW*, (1998)
- Burns Roe Worley & Heritage Assessment and History, *Concrete Beam Bridges: Heritage Study of Pre-1948 Concrete Beam Bridges (Sydney, South West and Southern Regions);* (January)
- Burns Roe Worley & Heritage Assessment and History, 2004, *Concrete Slab and Arch Bridges: Heritage Study of Pre-1948 Concrete Slab and Arch Road Bridges;* (February)

RTA 2002, *Timber Bridge Management*, Roads and Traffic Authority of NSW (January).

Vines G. 2010. *National Trust Study of Victoria's Concrete Road Bridges*. Report for the National Trust of Australia (Victoria), funded by VicRoads and Heritage Victoria.

Secondary Works

Barkley, J and Nichols, M .1994. *Hawkesbury 1794-1994 The First 200 years of the Second Colonisation.* Hawkesbury City Council

Barkley-Jack, J. 2012 *The History of Thompson Square* Unpublished MSS

Barkley-Jack, J. 2009 *Hawkesbury Settlement Revealed A New Look at Australia's Third Mainland Settlement 1793-1802* Rosenberg Publishing

Benson and Howell (1995) *Taken for Granted: The Bushland and its Suburbs* Kangaroo Press

Bowd, D.G. 1982 *Macquarie Country A History of the Hawkesbury* Library of Australian History 1

Bowd, D. G. 1986. *Hawkesbury Journey Up the Windsor Road from Baulkham Hills* Library of Australian History 1

Burat, A. 1858-1859, *Géologie appliquée ou Traité de la recherche et de l'exploitation des Mines*, Paris

Chapman, D. 1986. 1788 *The People of the First Fleet* Doubleday

Dharug and Lower Hawkesbury Historical Society, 1987. *The Ferry The Branch The Creek Aspects of Hawkesbury History*

Harris. 2006. *"Lewis Bolt."* McGraw-Hill Dictionary of Scientific and Technical Terms. McGraw-Hill Companies, Inc.

Jack, I. 2010. *Macquarie's Towns* Heritage Council NSW, LPI

Jenkin, H.C.F. 1878. *Bridges: an elementary treatise on their construction and history*. Adam and Charles Black, Edinburgh (Reprinted from Encyclopedia Britannica)

Karskens, G. 2009. *The Colony A History of Early Sydney* Allen and Unwin

Nichols, M. 2004. *Pictorial History Hawkesbury* Kingsclear Books

O'Connor, C. 1985. *Spanning Two Centuries: Historic Bridges of Australia*. University of Queensland Press: St Lucia

Powell, J.R. (Editor) 1997. *Cross Currents Historical Studies of the Hawkesbury* Deerubbin Press

Powell, J.R. and Banks, L. 1990. *Hawkesbury River History Governor Phillip, Exploration and Early Settlement.* Dharug and Lower Hawkesbury Historical Society

Rosen, S. 1995. *Losing Ground: An Environmental History of the Hawkesbury-Nepean Catchment*

Hale and Iroemonger

Steele, J. (1916) *Early Days of Windsor N.S. Wales*, Tyrrell's Ltd, Sydney.

Diaries, Journals, Correspondence

4 October 1803; HRNSW Volume 5: 230-231

David Collins. 1798 *Account of the English Colony in New South Wales Volume 1*

Reprint A H and A W Reed 1975

Return of Public Works October 1796 to September 1800

HRA Series 1 Volume 2: 560-561

J.C. L Fitzpatrick 1909 *When We Were Boys Together Reminiscences of the Hawkesbury District*

F. Campbell printer; reprinted 2004

Lachlan Macquarie *Journal of His Torus in New South Wales and Van Dieman's Land 1810-1822*

Facsimile Edition (1979) Library of Australian History

Property Records

4 Bridge Street

LPI, CT Volume 459 Folio 32

LPI, CT Volume 1482 Folio 183

6 Bridge Street

LPI, CT Volume 2757 Folio 234

LPI, CT Volume 3889 Folio 62

LPI, Volume 2889 Folio 234

LPI, Volume 6651 Folio 199

Northern side of the river

Land Grants Register Book 1A

LPI, CT Volume 3512 Folio 239

LPI, CT Volume 2456 Folio 199

Primary Application 18115

Land Grants Register Book 1, 133

Land Grants Register Book 2, 172

Land Grants Register Book 2 No 320

Colonial Secretary Special Bundles

SRO 9/2731; 84-5

1835-1840 survey showing the stream running through the western side of the allotments and emptying into the river SRO Map 5968

Newspapers and News Articles

Australian Town and Country Journal, Saturday 22 August 1874

Australian Town and Country Journal, Saturday 3 April 1897

The Dubbo Liberal and Macquarie Advocate. Friday 6th November 1914

The Daily Advertiser. March 24 2012 (Wagga Wagga)

Nepean Times, Saturday 18 July 1914: 3.

Hawkesbury Courier and Agricultural and General Advertiser 13 February 1845; 2

Sydney Gazette 30 August 1817; 1

Sydney Gazette 15 April 1830; 3

Sydney Gazette 21 March 1835; 4

"Low Level Bridge at Windsor: To the Editor of the Herald", *Sydney Morning Herald* 1871 Saturday 17 June.

"Low Level Bridge at Windsor: To the Editor of the Herald", *Sydney Morning Herald* 1871 Wednesday 28 June.

"The Proposed New Bridge at Windsor: To the Editor of the Herald", *Sydney Morning Herald*

1871Saturday 1 July 1871.

Sydney Morning Herald 1895

The Empire 12 August 1871; 2

Windsor and Richmond Gazette, Wednesday 3 September 1980

Windsor and Richmond Gazette, Friday 11 January 1935

Windsor and Richmond Gazette, 4 January 1934

Windsor and Richmond Gazette, Saturday 23 January 1909

Windsor and Richmond Gazette, 3 April 1897

Windsor and Richmond Gazette, 1895 (g)

Sydney Gazette 11 March 1804; 2

"Sale of Estate of Andrew Thompson", *Sydney Gazette,* 22 December 1810; 3

"Advertisement for John Howe's House", *Sydney Gazette,* 31 October 1812; 2

"Debts of Mary Anne Whitton", *Sydney Gazette,* 7 November 1812

"Payments for Wharf", *Sydney Gazette,* 4 November 1815; 2

"Payment for Square", *Sydney Gazette,* 5 August 1815; 2

"Payment for wharf", *Sydney Gazette,* 11 May 1816; 2

"Payment for wharf", *Sydney Gazette,* 8 February 1817; 2

"Payment for wharf", *Sydney Gazette,* 29 July 1820; 2

"Sale of Whitton's farm", *Sydney Gazette*, 23 June 1821

"Auction of House at the Bell Post", *Sydney Gazette,* 24 November 1821; 2

"Auction sales at the Bell Post", *Sydney Gazette,* 9 August 1822; 1; 21 May, 1822: 1

"Prisoner to stand in Square", *Sydney Gazette,* 3 May 1822; 2

"Second auction of Whitton's farm", *Sydney Gazette* 8 April 1824

"Sale of Horses at the Bell Post", *Sydney Gazette,* 1 February 1842; 3

"Property Sold at the Bell Post", *The Australian,* 14 May 1830; 5

"Market in Square", *The Australian,* 7 December 1832
"Howe's House for Let", *Sydney Herald,* 27 March 1837; 3
"Howe's House for Let", *Sydney Herald,* 24 June 1839; 3
"O'Connell Inn for Let", *Sydney Herald,* 18 April 1844; 3
"O'Connell Inn for let", *Sydney Herald,* 25 June 1849; 4
"Marriages", *Sydney Morning Herald*, Friday 29 June 1855, p 8.
"Sale of Lots Government Domain", *Sydney Morning Herald*, 24 December 1855; 3
"New House for Sale", *Sydney Morning Herald,* 23 December 1857; 7
"Burke's Buildings", *Sydney Morning Herald,* 15 December 1858; 7
"Dowe's House to Let", *Sydney Morning Herald,* 27 June 1860; 10
"Royal Oak Inn to Let", *Sydney Morning Herald,* 25 February 1860; 11
"Hawkesbury Hotel for sale", *Sydney Morning Herald,* 19 April 1867; 7
"Floods", *Sydney Morning Herald,* 14 January 1867;2
"Flood", *Sydney Morning Herald,* 18 May 1870; 7
"Investing Land in Council", *Sydney Morning Herald,* 21 March 1874; 3
"Deaths", *Sydney Morning Herald*, Tuesday 15 February 1876, p 1.
"Call to fence the Square", *Sydney Morning Herald*, 19 August 1878; 3
"Tenders for Fencing", *Sydney Morning Herald,* 2 August 1878; 6
"Man charged with supplying rum to Aboriginal men", *Sydney Morning Herald,* 15 March 1890; 12
"Fire in Stearn's Shop", *Sydney Morning Herald*, 10 August 1905; 9
"Historic Windsor Smugglers Cave and Old Houses", *Sydney Morning Herald,* 22 June 1931: 8
"Letters to the Editor Old Windsor", *Sydney Morning Herald,* 4 July 1931: 7
"Calls for lighting", *Hawkesbury Chronicle,* 22 July 1882; 2
"Donation of lighting", *Hawkesbury Chronicle,* 2 September 1882; 2
"Kerbing on Thompson's Square", *Hawkesbury Chronicle,* 18 August 1883; 2
"Leveling the streets", *Hawkesbury Chronicle,* 6 June 1885; 2
"Roads in the square", *Hawkesbury Chronicle,* 14 August 1886; 2
"Tenders Called for removal of pavilion", *Hawkesbury Chronicle,* 9 February 1900; 4
"Removal of pavilion", *Hawkesbury Advocate,* 23 February 1900; 4
"More property owners in square restoration project", *Hawkesbury Gazette*, 30 May 1988; 3
"Historic Thompson Square", *Hawkesbury Gazette,* 20 April 1988
"Subscriptions for Improvements", *Hawkesbury Advertiser,* 21 March 1874; 2
"Notice Placed on the Bell Post", *Hawkesbury Courier,* 9 January 1845; 2
"Hawkesbury Stores for Sale", *Hawkesbury Courier,* 3 July 1845; 3
"Site of stocks", *Hawkesbury Courier,* 29 August 1844
"Thompson Square Open at Last", *Hawkesbury Courier*, 28 April 1988; 3
"Reticulated Water", *Windsor and Richmond Gazette,* 5 October 1889; 4
"Agistment", *Windsor and Richmond Gazette,* 20 April 1889; 3
"Bad state of road", *Windsor and Richmond Gazette*, 16 August 1890; 3
"Dedication for a town hall", *Windsor and Richmond Gazette*, 2 August 1890; 3

"Valuable building site", *Windsor and Richmond Gazette*, 13 September 1890; 4
"New Market", *Windsor and Richmond Gazette,* 17 June 1891; 3
"Ladies Camped on the Square", *Windsor and Richmond Gazette,* 22 August 1891; 4
"Meeting Place", *Windsor and Richmond Gazette,* 10 September 1892; 3
"Removal of the pavilion", *Windsor and Richmond Gazette,* 20 February 1892; 3
"The Good Old Days Prisoners and Punishment", *Windsor and Richmond Gazette*, 5 August 1893; 8
"Repairs as depression works", *Windsor and Richmond Gazette,* 4 November 1893; 3
"Proposal to move pavilion", *Windsor and Richmond Gazette,* 8 September 1894; 10
"Proposal for market", *Windsor and Richmond Gazette,* 27 October 1894; 3
"Removal of the summerhouse", *Windsor and Richmond Gazette,* 28 July 1894; 3
"Dedication as a recreation ground", *Windsor and Richmond Gazette*, 20 October 1894; 10
"Future use of the square", *Windsor and Richmond Gazette,* 26 January 1895; 3
"Bridge materials in the square", *Windsor and Richmond Gazette,* 1 June 1895; 3
"Old Windsor A Reverie", *Windsor and Richmond Gazette,* 12 December 1896; 19
"Temporary Bridge", *Windsor and Richmond Gazette,* 9 September 1896
"Changes to the Roads due to the bridge", *Windsor and Richmond Gazette,* 15 February 1896; 3
"Seats Repaired", *Windsor and Richmond Gazette,* 9 May 1896; 3
"Windsor Bridge", *Windsor and Richmond Gazette*, 3 April 1897; 6
"Improvement of the small reserve", *Windsor and Richmond Gazette*, 27 February 1897; 3
"Trees in the reserve", *Windsor and Richmond Gazette,* 4 September 1897; 3
"Trees in the Reserve", *Windsor and Richmond Gazette*, 18 September 1897; 3
"Kerbing and Guttering", *Windsor and Richmond Gazette*, 14 August 1897; 4
"Fencing around the square", *Windsor and Richmond Gazette*, 23 July 1898; 3
"Dirty State of park", *Windsor and Richmond Gazette,* 29 April 1899; 3
"Things we would like to see", *Windsor and Richmond Gazette*, 15 June 1901; 9
"Sewers near punt house", *Windsor and Richmond Gazette*, 30 March 1895; 9
"The Squatters Arms", *Windsor and Richmond Gazette,* 10 September 1904; 1
"Chinese market garden", *Windsor and Richmond Gazette,* 9 January 1931
"The old punt house", *Windsor and Richmond Gazette,* 3 September 1904; 3
"Poor sanitation", *Windsor and Richmond Gazette*, 29 June 1895; 3
"New approach to bridge", *Windsor and Richmond Gazette,* 27 February 1904; 3
"Road to the bridge", *Sydney Morning Herald,* 29 December 1855; 3
"Temporary bridge", *Windsor and Richmond Gazette,* 3 April 1897; 6
"Contract for piles temporary bridge", *Windsor and Richmond Gazette,* 29 August 1896; 3
"Demolition of temporary bridge", *Windsor and Richmond Gazette,* 27 March 1897; 3
"Timbers from the temporary bridge", *Windsor and Richmond Gazette,* 5 March 1898;3
"Work commences temporary bridge", *Windsor and Richmond Gazette,* 26 September 1896; 3
"Council given timber from bridge", *Windsor and Richmond Gazette,* 5 June 1897;3
"Removing the temporary bridge", *Windsor and Richmond Gazette,* 20 February 1897; 3
"Contract for piles", *Windsor and Richmond Gazette,* 11 July 1896;3

"Work on the bridge", *Windsor and Richmond Gazette,* 10 October 1896; 4

"Work on the bridge", *Windsor and Richmond Gazette,* 24 October 1896; 3

"Punt hill*", Windsor and Richmond Gazette,* 26 September 1903; 4

"New road through reserve", *Windsor and Richmond Gazette,* 2 August 1932; 7

"New road in the reserve", *Windsor and Richmond Gazette,* 3 November 1935; 8

"Beautification of Thompson Square", *Windsor and Richmond Gazette,* 3 November 1935; 8

"Beautification of Thompson Square", *Windsor and Richmond Gazette*, 16 July 1937; 1

"Japanese laundryman", *Windsor and Richmond Gazette,* 10 September 1937; 5

"Dilapidation", *Windsor and Richmond Gazette,* 14 March 1941; 12

"Remains of Ryans hotel", *Windsor and Richmond Gazette,* 26 August 1893; 6

"Town Talk", *The Australian, Windsor, Richmond, and Hawkesbury Advertiser*, Saturday 25 October 1873, 2.

"Funds for fencing and kerbing", *The Australian Windsor Richmond and Hawkesbury Advertiser,* 9 October 1880; 2

"More funds for Thompson Square roads", *The Australian Windsor Richmond and Hawkesbury Advertiser*, 25 September 1880; 2

"Works on the street from the Bridge to George Street", *The Australian Windsor Richmond and Hawkesbury Advertiser*, 6 November 1880; 2

"Calls for fencing the square", *The Australian Windsor Richmond and Hawkesbury Advertiser*, 1 January 1881;2

"Leasing the Lower Reserve", *The Australian Windsor Richmond and Hawkesbury Advertiser,* 8 January 1881;2

"Gravelling roads", *The Australian Windsor Richmond and Hawkesbury Advertiser*, 26 March 1881;3

"The impact of roads", *The Australian Windsor Richmond and Hawkesbury Advertiser,* 7 May 1881;2

"Renaming the Square", *The Australian Windsor Richmond and Hawkesbury Advertiser,* 28 May 1881;2

"The Lower Portland Tribe and Blanket Day", *The Australian Windsor Richmond and Hawkesbury Advertiser,* 28 May 1881;2

"The pavilion", The Australian Windsor Richmond and Hawkesbury Advertiser, 4 March 1882; 2

"Improving the pavilion", *The Australian Windsor Richmond and Hawkesbury Advertiser*, 4 November 1882; 2

"Vote for a summer house", *The Australian Windsor Richmond and Hawkesbury Advertiser,* 25 March 1882;2

"Footpath asphalting", *The Australian Windsor Richmond and Hawkesbury Advertiser,* 26 January 1889; 2

"Sale of Lots in Government Domain", *The Empire,* 13 December 1855; 7

"The Dora Dora Blacks. The Chase Continued. The £5 Note Identified. The Money Of The Murdered Man", *The Brisbane Courier*, Friday 16 December 1892, p 6

"The Town of Windsor", *Australia's Chronicle*, 29 September 1840; 3

"Whittons farm", *The Australian*, 27 April 1839; 4

Journal Articles

Allan P. 1924. 'Highway Bridge Construction: The Practice in New South Wales' in *Industrial Australian and Mining Standard* August 14.

Australian Town and Country Journal, 22 August 1874; 9

Byrnes, J.V. " Andrew Thompson 1773 – 1810 Part 1 to the Arrival of Macquarie",

Journal of the Royal Australian Historical Society Volume 48: 105 – 140

Byrnes, J.V. " Andrew Thompson 1773 – 1810 Part 2 Macquarie and the Thompson Legacy"

Journal of the Royal Australian Historical Society Volume 48: 160-207

Fraser D. J, 1986, "The First Sixty Years of Metal Bridges in New South Wales", *Mulit-disciplinary Engineering Transactions, 1986.*

Fraser, D.J. 1990, 'Bridging the Barrier' in *Transactions of the Institution of Engineers, Australia, Civil Engineering* Volume GE 14 (2).

McLean, I W, (March) 1997, *Recovery from the 1890s Depression: Australia in an Argentine Mirror*. CIES Seminar Paper 97-05. Paper presented at ALL-UC Economic History Conference, University of California at Los Angeles, June 1996.

O'Grady,V. "the Development of the Bridge in Australian Road Construction", *Journal of Royal Australian Historical Society,* Vol 66, part 4 pp273 - 286.

Maps and Plans

Parish Map of Windsor (Undated)

SRO Map SZ 527)

James Meehan, Windsor in 1812 north end (SRO Map SZ 529)

Map of the Town of Windsor 1827

SRO Map SZ 526

Sketch shewing the Land Applied for by Mr McBryde1831

SRO Map 1816

Plan of Thompson Square at Windsor 1894

LPI 1009-3000

Plan of the Town of Windsor showing the proposed subdivision and the buildings as they then existed in 1848 (Crown Plan 22-873).

Plan of part of the Hawkesbury River At Windsor 1890. (Source State Archives of NSW X1080- 74/12)

Proposed plan for the new (upgraded) bridge across the Hawkesbury River at Windsor showing a proposed temporary bridge located on the upstream side of the existing bridge (Source Crown Plan 80/385).

Harper of Sydney, Map Showing Macquarie Park and its relationship with Old Government House and the foreshore in 1822 (Source: Heritage Inventory Sheet. Database Number 5053111 File Number: S90/05437, H04/00091/8 (ICONS))

Images

"Ferry across the Hawkesbury River, Windsor to Wilberforce prior to the construction of the Windsor Bridge in 1874" ca.1860-70 (Source Hawkesbury City Council Library Service).

Photograph of the first bridge across the Hawkesbury River at Windsor, 1874. (Source Hawkesbury City Council Library Service).

Windsor 1807 ML SPF (not reproduced in this report due to copyright reasons)

Undated panorama showing Thompson Square in the later part of the nineteenth century ML SPF

Opening of the New Bridge Over the Hawkesbury, at Windsor, N. S. W. (Source: Windsor Municipal Council 1979)

George William Evans 1809 Watercolour Windsor ML PXD 388 V3 Folio 7

George William Evans c.1811 Head of Navigation Hawkesbury River ML SVIB/Wind/6

J. Lewin, c.1813 A View of the Banks of the Hawkesbury in New South Wales by H. Preston from a Painting in the Possession of His Excellency Governor Macquarie, engraving by Absolom West Engraving: ML V*/EXPL/1

Phillip Slaeger, c. 1813 A view of Part of the Town of Windsor in New South Wales Taken from the Banks of the River Hawkesbury Drawn and Engraved by P. Slaeger Sydney Ml DL F81/21 pl.19

Captain Wallis 1821, Hawkesbury and the Blue Mountains in Views in New South Wales and Historical Account of the Colony of New South Wales (ML PX*D)

M. J. MacNally, (1931) Watercolour, Old Buildings in Thompson Square ML VIB/Wind/2

Andrew Williams , 1883 Windsor Bridge Watercolour ML SVIB /WIND/7

James Mills, 1888 Photograph, image of the square ML At Work and Play Image 04405

A view of Bridge Street Windsor in Flood Photograph: ML SPF Windsor

Windsor Bridge Approach from the East 1934 Photograph: ML GPO I-01880

Southern end Thompson Square Undated image MLd1-06257

Undated image of the School of Arts Photograph: ML GPO 1-06260

View of street works in 1938 close the square, Photograph:ML GPO 1-32538

Henry Grant Lloyd, (signed 1863) On the Hawkesbury Windsor ML SPF Windsor

Thompson Square in 1929 before the final changes were made to the roads (JHHS 2011 No 2: 21).

The SHR boundary of Wilberforce Park showing the location and modern context (Source: Pl)

SHR boundary of Richmond Park (Source: SHR "Richmond Park")

The SHR boundary of McQuade Park in Windsor (Source: SHR "McQuade Park)

The SHR plan of the Thompson Square conservation Area (Source: SHR Thompson Square conservation area)

W. Preston from an Original Drawing by Cap.t Wallis C. 1818.. A View of Hawkesbury, and the Blue Mountains. / New South Wales. Printed beneath the image is "Engrav'd by 46th Reg.t". A watercolor drawing titled "Hawkesbury & Blue Mountains, / from Windsor"

Photograph of the Windsor Bridge from the southern side of the Hawkesbury River dated between 1874 and 1896. Source: State Library of NSW

The wharf beside the Windsor Bridge (no date). (Source: Mitchell Library Small Picture File – Windsor).

Zoomed image of the wharf beside the Windsor Bridge (no Date). (Source: Mitchell Library Small Picture File – Windsor).

"Wharf at Windsor on the Hawkesbury River near Windsor Bridge" (ca.1890 to ca.1900). (Source: Hawkesbury City Council Library Service).

Zoomed section of "*Bridge Across the Hawkesbury River, Windsor, New South Wales, ca. 1935*." The ca.1814 wharf can be seen clearly still present on the site (Source National Library of Australia http://nla.gov.au/nla.pic-vn4655530)

Flood damage after the motor boat regatta, Windsor, Hawkesbury River, NSW, 1949 (Source NLA http://nla.gov.au/nla.pic-vn4654154).

Photograph of Windsor Bridge looking onto the south bank 1888. The wharf is clearly shown on the left. (Source Hawkesbury Council)

Files and Plans

RMS files 91.1526.1, 2 and 3. 'Windsor Bridge'

RMS Files 05m726.1 and 2 'Windsor Bridge'

RMS plans folder (.pdf) 0182 492 BC 0104

State Records Series 12412 Container 2/896B 'Special Bundles [Public Works]

State Records Series 12647 Container 21/13530 'Correspondence relating to bridges'

State Records Series 12638 Container 3/886 'Index of Public Works and Main Roads Board bridges and public ferries and punts '

E-Resources

Stubbs, R. 'Windsor's Rum Smugglers Tunnel' - www.hawkesbury hitory.org.au/stubbs/tunnel.html

Society of Australian Genealogists, 'Pubs and Publicans Database'

Australian Convict Transportation Registers 1787-1788 - www.ancestry.com

Australian Convict Registers of Conditional and Absolute Pardons 1791-1867 - www.ancestry.com

Member profiles of Edward Whitton, Ann Slator, William Baker – www.ancestry.com

http://www.baseline.nsw.gov.au/exhibitions/macquaries-towns/hawkesbury.html

http://cawb.weebly.com/

Explore the Hawkesbury at:
http://www.hawkesbury.nsw.gov.au/__data/assets/pdf_file/0008/19970/B_WMAPD_WindsorHeritageWalk_ThePeninsulaPrecinct.pdf

http://haveyoursay.nsw.gov.au/windsorbridge

Old Windsor Road and Windsor Road Heritage Precincts, Item Number 4301011 from the RMS Heritage and Conservation Register.

ozroads history: Old Windsor Road and Windsor Road www.ozroads.com.au

Penrith City Council - http://www.penrithcity.nsw.gov.au/index.asp?id=289

Penrith City Council - http://www.penrithcity.nsw.gov.au/index.asp?id=458

Register of Town Purchases 1854 and CT Volume 2757 Folio 234

UNESCO http://whc.unesco.org/en/culturallandscape/#1