

6.0 ASSESSMENT OF SIGNIFICANCE

6.1 Introduction

An assessment of cultural significance or heritage significance seeks to understand and establish the importance or value that a place, site or item may have to select communities and the general community at large. The Australian ICOMOS *Charter for the Conservation of Places of Cultural Significance* (the *Burra Charter* 1979, most recently revised in 1999), is the standard adopted by most heritage practitioners in Australia when assessing significance. It defines cultural significance as:

*“Aesthetic, historic, scientific or social value for past, present or future generations.”*⁶³

This value may be contained in the fabric of the item, its setting and relationship to other items, the response that the item stimulates in those who value it now, or the meaning of that item to contemporary society.

Accurate assessment of the cultural significance of sites, places and items is an essential component of the NSW heritage assessment and planning process. A clear determination of a site's significance allows informed planning decisions to be made for place, in addition to ensuring that their heritage values are maintained, enhanced, or at least minimally affected by development.

Assessments of significance are made by applying standard evaluation criteria:

European Cultural Heritage Significance Criteria (NSW Heritage Office Guidelines)

- a. *An item is important in the course or pattern of NSW's cultural or natural **history** (or the cultural or natural history of the local area);*
- b. *An item has strong or special **associations with the life or works of a person, or group of persons, of importance in NSW' cultural or natural history** (or the cultural or natural history of the local area);*
- c. *An item is important in demonstrating **aesthetic characteristics** and/or a high degree of **creative or technical achievement** in NSW (or the local area);*
- d. *An item has strong or special **associations with a particular community or cultural group** in NSW (or the local area) **for social, cultural or spiritual reasons**;*
- e. *An item has **potential to yield information** that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);*
- f. *An item possesses **uncommon, rare or endangered** aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);*
- g. *An item is important in **demonstrating the principal characteristics of a class of NSW's cultural or natural places**; or cultural and natural environments.*⁶⁴

6.2 Evaluation

The cultural heritage significance of the wharves built at Windsor and the punt crossing are assessed below as two separate listings. The following evaluations provide the cultural heritage significance of the wharves at Windsor and the punt using the criteria presented in Section 6.1.

⁶³ Australia ICOMOS Inc. (1999) *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance*. Article 1.2.

⁶⁴ NSW Heritage Office & Department of Urban Affairs & Planning [2001] *NSW Heritage Manual – Assessing Heritage Significance*

6.2.1 Windsor Wharf (1795 – ca. 1800 and ca. 1814 – ca. 1940)

Criterion a) *An item is important in the **course or pattern** of NSW's **cultural or natural history** (or the cultural or natural history of the local area)*

The construction of a wharf at Windsor was an integral part of the establishment and development of firstly dispersed frontier farming and then the township. The first wharf constructed in 1795 was used to supply the military garrison and first store built in the location of Thompson Square. By this time the surrounding area was being used for farming purposes, and the wharf was likely used to transport crops out to the settlement in Sydney. This mode of transport was likely faster than the overland route that was not formally established until 1816.

The construction of both wharves at Windsor are associated with the survival of the early colony, providing a means of transporting agricultural crops out of the greater Windsor area back to the main settlement at Port Jackson.

Both of the wharves built at Windsor (1795 and ca.1814) are considered to be **State significant** under this criterion on the basis they formed part of critical transport and trade infrastructure for one of the earliest European settlements in Australia, a settlement which was important for the survival of Sydney as a viable colony.

Criterion b) *An item has strong or special **associations with the life or works of a person, or group of persons, of importance in NSW' cultural or natural history** (or the cultural or natural history of the local area);*

The second wharf at Windsor in ca.1814 was associated with Governor Macquarie who commissioned its construction in 1814. Three years earlier Macquarie developed a plan for formation of a township at Windsor, as well as four other townships on the Hawkesbury River. While it was not in the original plan for the establishment of a formal town, the need for adequate loading facilities on the river was later identified and endorsed by Governor Macquarie. The wharf was built by John Howe and James McGrath, both early land grantees at Mulgrave (Windsor), who also improved the road from Parramatta to Windsor and searched for an overland route to the Hunter River. After the wharf was damaged in a flood in 1816, Macquarie ensured the survival of the wharf by granting further funding to complete the wharf.

The second wharf at Windsor has a strong association with Governor Macquarie, who is an important figure in the history of NSW, and as such the wharves built at Windsor are considered to be **State significant** under this criterion.

Criterion c) *An item is important in demonstrating aesthetic **characteristics** and / or a high degree of **creative or technical achievement** in NSW (or the local area);*

Limited archaeological remains associated with the ca.1814 wharf are visible from the current road bridge or via boat. These remains are limited to the lower support components of the wharf, such as bracing and deck beams, and are not considered to be aesthetic characteristics or show a creative or technical achievement. As much of the former wharf site is likely only to exist within the archaeological record, including on and below the riverbed, the former wharves are not considered to meet the requirements of this criterion.

Criterion d) *An item has strong or special **associations with a particular community or cultural group** in NSW (or the local area) for **social, cultural or spiritual reasons**;*

The presence of a wharf at Windsor, in 1795 and the later ca.1814 wharf was used for the supply of the early land grants and later formal settlement at Windsor, as well as to assist in transporting agricultural crops out to the settlement at Parramatta and Sydney. The evolution of the wharf from a major transportation hub for cargo and passengers continued until the early twentieth century. Although the wharf was used by the larger community for transportation needs, there were no single particular community or cultural groups who can be associated with either of the wharves built at Windsor. As such the wharves built at Windsor are not considered to meet the requirements of this criterion.

Criterion e) *An item has **potential to yield information** that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);*

Archaeological potential relating to the construction and use of both the 1795 and ca. 1814 wharf is expected to exist on site. Limited historical information exists to the construction of both wharves built at Windsor that can be answered from potential structural remains. Physical evidence that has survived in the archaeological record has the potential to provide new information relating to construction techniques and material that were used, specifically in relation to types of wood used, fastenings, bracing and pile information as well as quality of workmanship and materials. Information relating to repair work to the wharf can also be determined from the remains in the archaeological record on wharf sites, such as from the driving in of repair "sister" piles or the addition of extra bracing or fastenings.

Artefacts discarded, accidentally or deliberately, from the wharf and vessels moored alongside can contribute towards knowledge of the variety of traffic and goods that passed through this portal between Windsor and Sydney over time.

The archaeological site associated with the former wharves built at Windsor, both above and below the low water line has the potential to contribute to a greater understanding of settlement before and during the Macquarie era. As such, the archaeological site associated with both former wharves built at Windsor is considered to be **State significant** under this criterion.

Criterion f) *An item possesses **uncommon, rare or endangered** aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);*

The archaeological site associated with the former Windsor wharves is considered to be a rare and endangered archaeological resource. Wharf redevelopment within major ports and harbours has occurred continuously as required to maintain the function of the port area. Through this process infrastructure is updated and wharves are demolished and rebuilt. Wharf sites along major rivers and secondary ports are likely to exist, both intact and as an archaeological resource, as redevelopment of these sites is less likely to occur over the development of other transportation advances, such as rail or road infrastructure. Aspects of the wharf that are present in and behind the riverbank at Windsor are likely to be intact, and relate to design and construction techniques that relate directly to the early settlement of NSW that have since evolved.

The physical and archaeological remains of the former wharves built at Windsor are considered to be **State significant** under this criterion.

Criterion g) *An item is important in **demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural and natural environments.***

The site of the former wharves at Windsor are represented by fragmentary remains that can be seen from certain vantage points, such as on the river, the primary remains of the wharves likely to be present within the archaeological record. As such, the site is not considered to retain the principal characteristics of its type or design. As such, the wharves at Windsor are not considered to meet the standards of this criterion.

Statement of cultural significance

The presence of a wharf at Windsor was an important infrastructure development that was part of the early settlement and development of the township. The construction of the first wharf in 1795 allowed for supplies to be unloaded safely at the early store and military garrison, while allowing for farm crops to be exported out. The construction of a more substantial wharf in ca.1814 as part of the formalisation and development of the Macquarie town reinforced the importance of the settlement and the need for maritime infrastructure as part of that plan. The wharf was an integral part of the Windsor township until the expansion of rail to Windsor and larger maritime infrastructure at Brooklyn on the Hawkesbury River meant the use of the wharf was likely limited to public recreational uses. The archaeological resource present on the site is considered to be a rare and endangered resource that can provide new information into the design and construction types of wharves in the early settlement of NSW, and Australia.

6.2.2 Punt Crossing

Criterion a) *An item is important in the **course or pattern** of NSW's **cultural or natural history** (or the cultural or natural history of the local area);*

A crossing of the Hawkesbury River at Windsor is likely to have begun as an informal crossing before 1795 when the first Government store and military garrison were built in the area now known as Thompson Square. The construction of a wharf at this time also created a focal point where crossings from the southern side of the river could be made by boat. This allowed supplies to be taken to the agricultural farms on the northern side of the Hawkesbury River, while also sending crops to the southern side to be transported out via the wharf.

A formal punt was also established in ca.1814 with the formal laying out of the township of Windsor and the construction of a new wharf. The punt used the wharf on the southern side of the river, as well as the adjacent banks to help load supplies and unload agricultural goods to be loaded onto larger boats at the wharf. The wharf would have been the focal point for transportation in and out of Windsor, as the punt allowed for local transportation of people and goods within the greater local area. Other punts were present on the Hawkesbury River, namely at Pitt Town (1812) and North Richmond (1821); which meant the punt was used primarily by local residents.

The punt service ceased operation after the construction of the Hawkesbury River Bridge in 1874. The punt crossing of the Hawkesbury River at Windsor is considered to be of **Local significance** under this criterion on the basis that it serviced the local economy throughout most of the 19th century.

Criterion b) *An item has strong or special **associations with the life or works of a person, or group of persons, of importance in NSW' cultural or natural history (or the cultural or natural history of the local area);***

The punt crossing at Windsor on the Hawkesbury River was established at the same time as the construction of the second wharf. Operating for the greater local patronage between Pitt Town and Richmond, the wharf was used by local farmers wanting to access the main township or the wharf. The punt crossings are not considered to have a special association with a particular person or group of persons of importance in NSW's history or the local area, and therefore are not considered to meet the requirements of this criterion.

Criterion c) *An item is important in demonstrating aesthetic **characteristics** and / or a high degree of **creative or technical achievement** in NSW (or the local area);*

The remaining elements of the operation of a punt at Windsor are restricted to the potential archaeological resource present on the northern and southern banks of the Hawkesbury River. As such, the punt is not considered to meet the requirements of this criterion.

Criterion d) *An item has strong or special **associations with a particular community or cultural group** in NSW (or the local area) for **social, cultural or spiritual reasons**;*

The presence of an operating punt at Windsor from ca.1814 to 1874 was used by the inhabitants of Windsor and the greater agricultural community between Pitt Town and Richmond. Prior to the construction of a bridge across the Hawkesbury and other than private boat landing on the banks of the river, the punt was the only formal crossing. Used to transport people, supplies and farming produce, the punt at Windsor was integral for local transport.

The punt crossing of the Hawkesbury River at Windsor is considered to be of **Local significance** under this criterion.

Criterion e) *An item has **potential to yield information** that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);*

Archaeological potential relating to the landing areas of the punt crossings is likely to be present on site. There is limited historical information relating to the operation of the punt that archaeological evidence may be able to supplement. The archaeological information, however, is likely to be limited to the landing features at one or both sides of the river. The exact location of the northern landing is unknown from the historical record that could be answered from the archaeological record. Infrastructure required for the punt was minimal as the punt was propelled by oars and poles not via windless cable system.

The punt crossing of the Hawkesbury River at Windsor is considered to be of **Local significance** under this criterion.

Criterion f) *An item possesses **uncommon, rare or endangered** aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);*

The archaeological remains associated with the former punt operation at Windsor would be considered a rare archaeological resource. The archaeological remains associated with a punt crossing, however, are considered to be limited, relating to the landings and associated infrastructure at either end. The information that would be gathered from archaeological remains of the punt would mostly relate to the cultural heritage of the local area only. As such, the archaeological remains associated with the former punts at Windsor are considered to be of **Local significance** under this criterion.

Criterion g) *An item is important in **demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural and natural environments.***

The sites of the former punt crossing at Windsor are likely to be represented by remains present in the archaeological record. As such, the site is not considered to retain the principal characteristics of its type or design, and the former punt at Windsor is not considered to meet the standards of this criterion.

Statement of cultural significance

The former punt crossing at Windsor on the Hawkesbury River was established in 1816 at the same time as the second wharf. The punt operated in an area opened up for agricultural settlement in 1795 and a formal township in 1812. The punt serviced an area between the Pitt Town punt (1812) and the North Richmond punt (1821) and allowed for residents on the northern side of the Hawkesbury River to access the township, the road to Parramatta, as well as the wharf for bringing our exporting agricultural materials to and from Sydney. Replaced by the bridge built across the river at Windsor in 1874, the punt was a vital piece of maritime transport infrastructure for the greater local area.

7.0 IMPACT ASSESSMENT

The following section identifies the impact of the project on the cultural heritage significance of the archaeological remains within the study area.

In particular the assessment focused on the impact the project would have on the known and potential archaeological remains associated with the former wharves, punt crossing and other associated cultural material.

Specifically the proposed works would involve (see Figure 65 to Figure 68):

- 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 non-Aboriginal 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.

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.

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.

Pedestrian and cyclist 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.

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 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.

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.

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.

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.

Construction works*Temporary construction and compound sites*

There would be two main construction and compound sites required for the duration of the project (about 18 months, excluding pre-construction and early works). One of these sites

would be located within the turf farm between the Hawkesbury River and Wilberforce Road (Lot 2 DP 1096472 and Lot 2 DP65136); while the other would be sited on land between Old Bridge Street and Windsor Wharf (refer to Figure 1-1). The majority of the construction activity would be concentrated on the northern bank as this would be the location of casting yard for the incrementally launched bridge and would be the location where access to the river would predominately occur.

The construction compound on the southern bank would be located in the car parks and grassed areas and would support the construction of the southern approach road and other minor works.

Offices may be leased near Thompson Square for construction personnel.

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 18 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 2. 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 be undertaken outside normal working hours. Low noise activities may also be undertaken outside of normal working hours to optimise construction efficiency.

Table 2 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.

7.1 Potential Impact

The project would impact on known and potential archaeological remains within the project area.

Construction of the replacement bridge would directly impact on known and potential archaeological remains associated with the former wharf on the southern side of the river, specifically from the installation of the first in-water pier on the southern side of the river; retaining wall associated with the scour protection; immediately in front of the southern bank of the river and associated rock armor for scour protection.

Proposed filling, landscaping and installation of rock armor on the upstream and northern side of the existing bridge may expose and impact cuttings made into the natural sandstone for the approach to the northern punt landing.

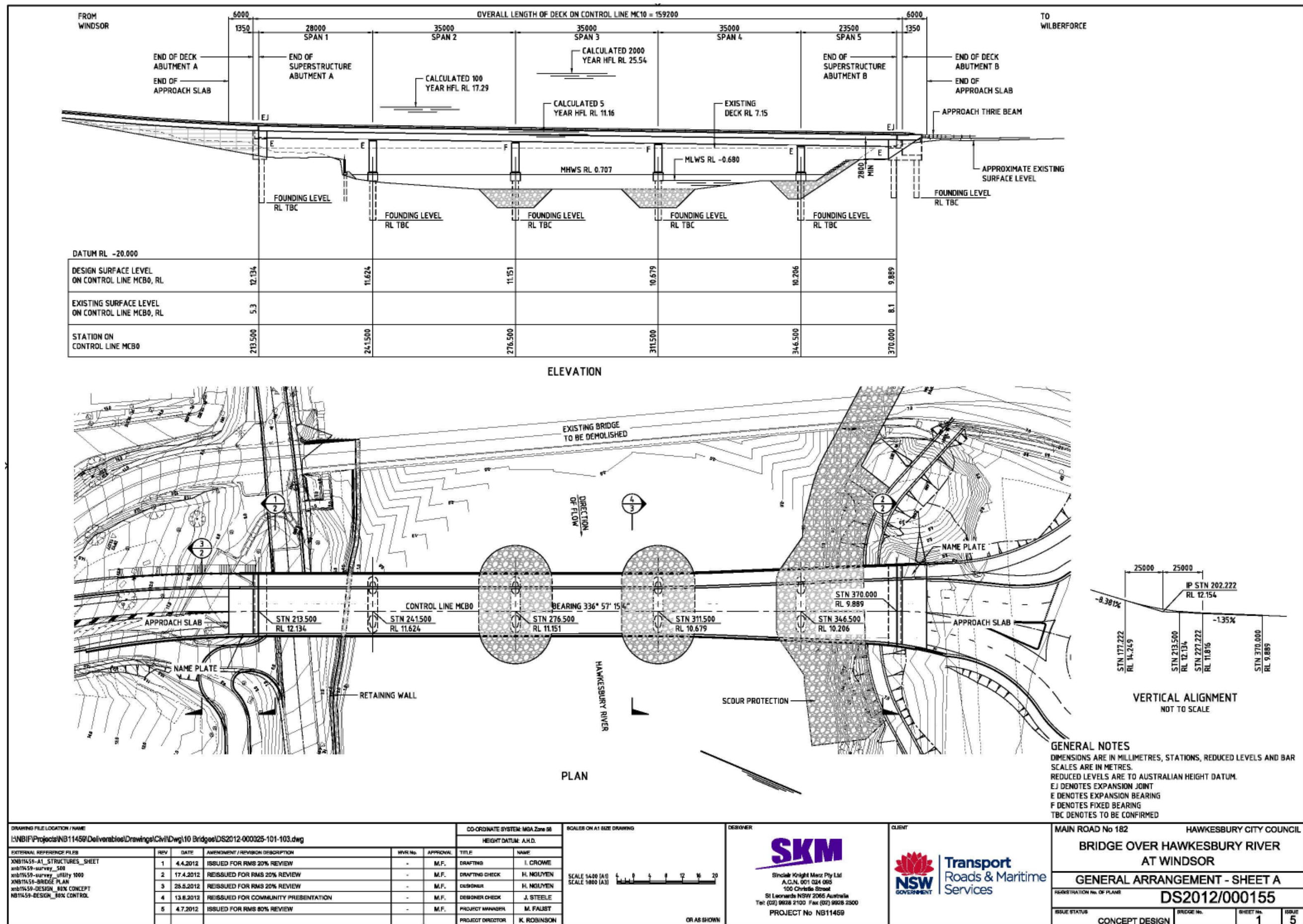


Figure 65: General Design layout of the Bridge crossing across the Hawkesbury River at Windsor (Source SKM).

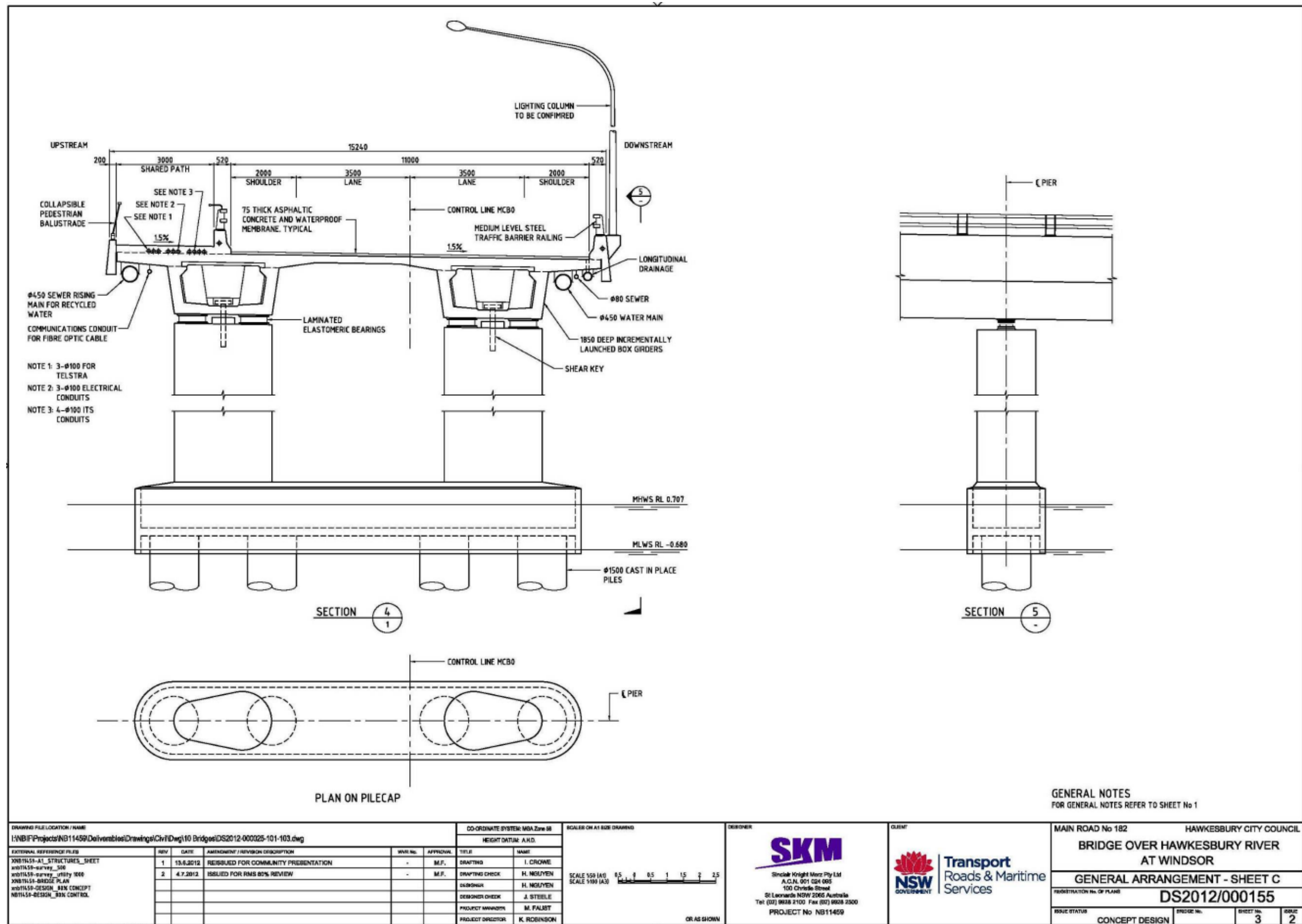


Figure 66: Pier design for the new Hawkesbury River Bridge crossing at Windsor, NSW (Source SKM).

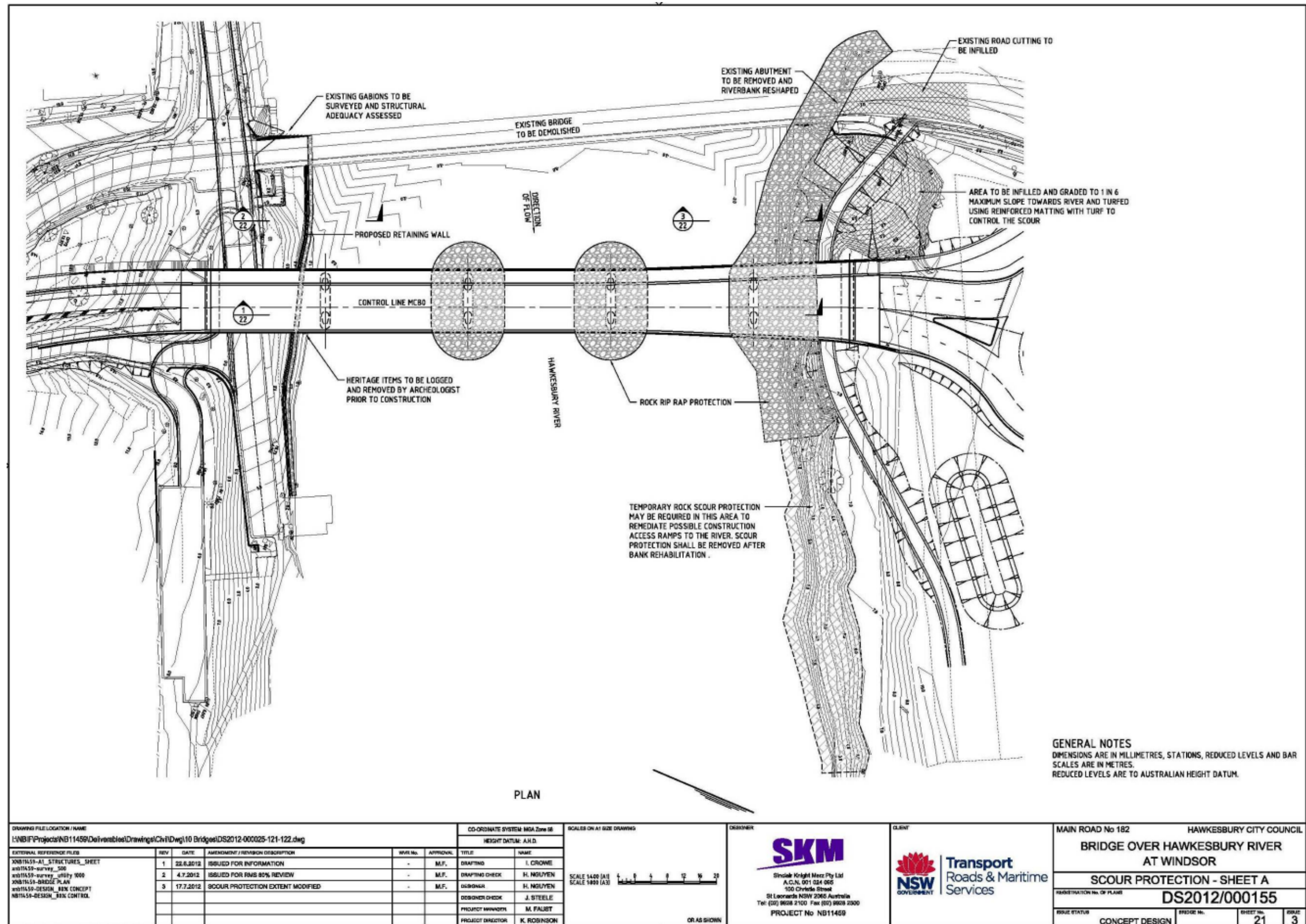


Figure 67: Design of the new Bridge crossing across the Hawkesbury River at Windsor showing the rock armour and protection (Source SKM).

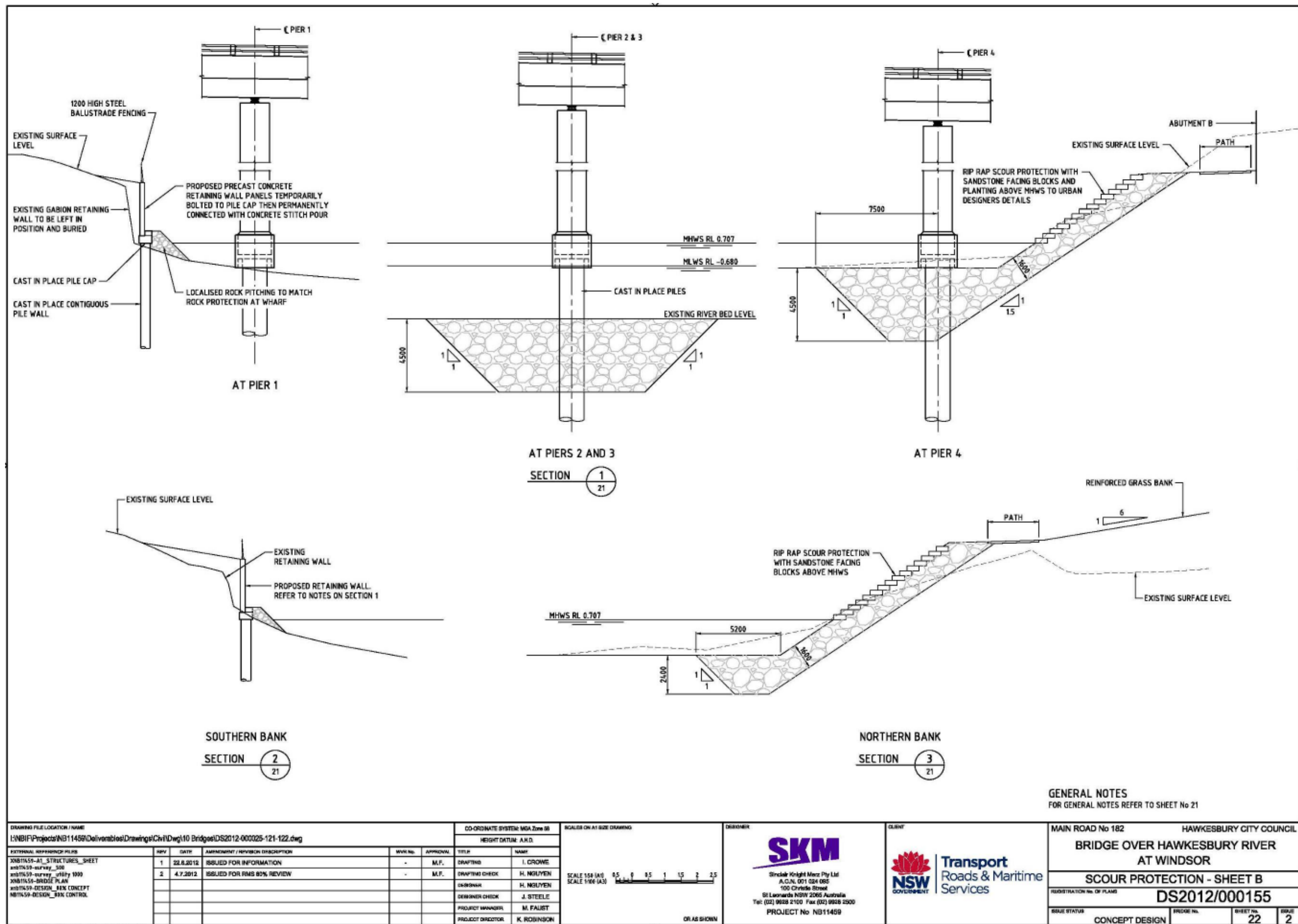


Figure 68: Design plan of the piers, rock armour scour protection and retaining walls. Note: The proposed retaining wall and rock protection is present on the two images on the left of the image. (Source: SKM).

Based on the NSW Heritage Office and Department of Urban Affairs & Planning publication for *Statements of Heritage Impact*, a Statement of Heritage Impact must address a number of questions relevant to the proposed works with regards to items of cultural significance identified to be within the study area. These questions help to ascertain whether all options have been explored prior to the proposed works or actions taking place, and to determine how the heritage value of an item can be conserved, or preferably enhanced, by the proposed development.

The types of questions that are relevant to the project include:

- 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?
- Have the consultant's recommendations been implemented? If not, why not?

Below is a statement answering the relevant questions required for this statement of heritage impact statement for the proposed bridge crossing.

7.2 New Bridge Crossing

Options for retention and adaptive re-use

The design of the project has been undertaken in consultation with the maritime archaeological consultants (Cosmos Archaeology). There are no options that will allow for retention of the maritime archaeological remains present within the study area, particularly within the vicinity of the ca.1814 wharf remains. This is due to engineering design requirements for the bridge and the site. A bridge designed with piers immediately behind the southern bank of the river behind the known and potential archaeological remains would require scour stabilisation work along the front of the southern bank of the river. A pier placed further out into the river in front of the known and potential archaeological remains would not have a direct impact to the known archaeological remains, however, the pier and riverbank would create a funnel that would result in an increase in water velocity and create localised scouring in the vicinity of the archaeological remains. As a result this area would also require scour protection through the installation of rock armour.

The creation of a protective barrier over the top of the known and potential archaeological remains associated with the ca.1814 second wharf is also not possible. A protective rock armour layer, as required for the scour protection works, over the top of the site, comprising of large sandstone boulders, would likely damage or destroy the site as soft silts are present below the rubble ballast remains associated with the former ca.1814 wharf.

Retention of significant elements through relocation of new bridge⁶⁵

The current alignment for the new bridge crossing was chosen from 10 options that included the 'do nothing' option, refurbishment of the existing bridge, bypass of Windsor and replacement of the existing bridge. Ten alternate options were proposed and a feasibility study was undertaken in July 2009. Project objectives were developed that allowed for the assessment of each option. This included location, performance,

⁶⁵ Cosmos Archaeology was not directly involved with the selection process or final design decision, however, the results of the maritime archaeological survey completed in 2008-9 were used in the reporting process.

potential environment impacts and cost/benefit analysis of each option. Based on preliminary assessments and feedback from the consultation process on each option, RMS shortlisted three options for further assessment, these were:

1. Option 1 - Replacement high-level bridge via Old Bridge Street, Windsor.
2. Option 2 - Replacement low-level bridge via Old Bridge Street, Windsor.
3. Option 6 - Bypass of Windsor via a new bridge parallel to Palmer Street, Windsor and new bridge over South Creek.

The selection of the preferred option by RMS was based on consideration of transport needs, heritage impacts, environmental impacts, safety and engineering and cost constraints. Each of the 10 options was identified to have varying levels of impact to known and potential heritage and archaeological items. The decision on the preferred option was made by considering:

- The performance of each option against the project objectives.
- The relative advantages and disadvantages of each option.
- Information on the potential impact of each option, including biophysical, heritage, community and socio-economic impacts.
- Community and government agency issues, as identified in community and agency consultation.

RMS identified Option 1 (new high-level downstream bridge) as the preferred option for the project. This option was found to perform best in terms of value for money and would perform well in relation to most of the project objectives.

Once this decision was made, RMS engaged consultants to prepare specialist studies required for this stage of the project. The potential to relocate the bridge after completing the earlier investigation is now not an option.

Is demolition essential or can it be postponed?

Impact to the archaeological remains cannot be avoided. The alternate designs for the bridge along the current alignment has attempted to relocate piers, both in-water and immediately behind the southern bank of the river, in an attempt not to impact known and potential archaeological remains. Choosing the option with the least impact to the known archaeological remains associated with the former wharf would still have a substantial impact on archaeological remains. As such, the significance and archaeological research potential for the site would likely be removed from the remainder of the site.

Have the consultant's recommendations been implemented?

Consultation regarding the maritime archaeological potential on the site began in February 2012 and has been included in all design meetings and strategies since. This consultation included discussing options and constraints for the location of piers and associated infrastructure for the new bridge. These meetings have been based on the desire to preserve the known archaeological remains present within the maritime study area as the first priority, which lead to looking at possible design modifications. At the final stage, when it was clear that impacts could not be entirely

avoided, it was recommended that an archaeological salvage excavation of the site would be required as the only alternative to a complete engineered redesign that ensured the archaeological site would not be impacted. Archaeological Recording and salvage of the maritime archaeological sites is considered the only appropriate mitigation measure for the level of impact the project will have to the former wharf remains within the study area.

The recommendations presented in this report have been formulated over the course of this project, including the consultation process with RMS, and have been agreed on by RMS.

7.3 Punt Crossing

Options for retention?

The impacts to potential archaeological remains associated with the former punt crossing are confined to the post ca. 1835 crossing of the river when the punt crossing was relocated upstream and a cable system was installed. Photographic evidence suggests there is potential for infrastructural remains associated with the cable system to be present in the vicinity of the northern landing. Also present is a cutting or former road surface associated with the former approach to the northern landing.

It is unclear if any structural or artefact remains are still present in this area as previous flood events have scoured and eroded this area; however cuttings made into the sandstone in this area are likely to have survived.

The proposed works in this area would include the filling of the area for landscaping purposes, but also may require the excavation of areas where rock armour would be placed. This work is likely to expose any cuttings made for the approaches for the road. As such, the works are not likely to remove this feature, but expose and then cover over as required for the filling and subsequent landscaping of the area.

Retention of significant elements through relocation of works?

Any archaeological remains, such as relics associated with the former cabling system are not expected to be present as the area has previously been exposed during flood events and none were observed. The nature of the works, including the removal of current vegetation, infilling the area and landscaping is not likely to remove any significance intact elements.

Is demolition essential or can it be postponed?

It is not expected that archaeological remains are present associated with the former punt crossing. Landscape features, such as the cuttings and approaches to the punt crossing are expected to be present. These items are not expected to be demolished or removed as part of the fill and landscape works.

Have the consultant's recommendations been implemented?

Consultation regarding the maritime archaeological potential on the site began in February 2012 and included potential archaeological remains associated with the former punt crossing. The archaeological remains that are expected to be present are limited to the northern landing, and features made into the sandstone present on the northern bank. Relics are not expected to be present; however, archaeological work in this area has been discussed and agreed to by RMS.

8.0 Summary and Recommendations

8.1 Summary

The key findings of this assessment are:

Historical findings

- A wharf was first constructed at the initial settlement at Windsor in 1795.
- The wharf supplied the early store and military garrison and also provided transportation for crops from the surrounding farms.
- A second wharf was built at Windsor in ca.1814 and repaired in 1820 under the direction of Governor Macquarie.
- A private punt service also started in 1815 using the wharf as the southern landing.
- In 1832 the punt was taken over and operated by the Government.
- In c.1835 the location of the punt moved upstream and a cabling system was installed for the crossing.
- The bridge across the Hawkesbury River was built in 1874 with the punt service ceasing soon after.
- A temporary bridge was constructed in 1896 for the raising of the main bridge across the Hawkesbury River.
- The temporary bridge was built in six weeks, although, no other details relating to the location of the bridge is known. It is believed to be located on the upstream side of the current bridge.
- The second wharf was present on the site until the late 1930s or early 1940s.

Archaeological Investigations and archaeological potential

- A maritime archaeological survey on the site of the former wharf in 2008 identified above and below water structural remains present on the site *in situ*.
- The archaeological potential at the wharf site is considered to be high in the location of the rock ballast, and moderate for an area up to 5 m around the boundary of the ballast.
- There is likely to be structural remains associated with the wharf and artefact deposits associated with the functioning of the structure, located behind the southern riverbank.
- There is considered to be moderate potential for archaeological remains associated with the punt landing on the northern side of the river on the upstream side of the current bridge associated with the relocation of the punt service in ca.1835; but a low archaeological potential along the route of the punt across the river.
- A second maritime archaeological survey was conducted in 2012 on seven anomalies identified from a side scan sonar survey of the project area and the post 1835 southern punt landing;
- The survey located timber structural remains located on the northern side of the river, close to the bank on the eastern (downstream) side of the current bridge location, possibly relating ca.1950 mooring posts or a retaining wall built in the area;
- The timber remains are not considered to have archaeological or research value;

- Four other anomalies within the river were surveyed and were either found to be sterile or continuing modern material;
- A natural sandstone rock shelf was located in the location of the southern punt landing location. This shelf was located 15 m into the river and was not considered to be part of the landing area.

Heritage significance

- The archaeological remains associated with the former ca.1814 wharf have been assessed as being of State significance.
- The significance of the archaeological remains associated with the former punt has been assessed as being of local significance.

Impact Assessment

- The project would have both a direct and indirect impact on known and potential archaeological remains associated with the former wharves and punt crossing from the placement of in-water piers and retaining walls.
- Redesigning elements of the bridge that would allow for the retention and protection of the known and potential archaeological remains has been investigated; however, impacts cannot be avoided.

8.2 Recommendations

Based on an understanding of the development history of Windsor, the stratigraphy of the river sediment and previous maritime archaeological survey completed in the vicinity of the former wharf site, the following actions are recommended to progress the maritime archaeological cultural heritage component of the project.

Recommendation 1

An above and below water maritime archaeological salvage excavation should be undertaken within the area assessed to have high archaeological potential relating to the remains associated with the former ca.1814 wharf. This includes the area immediately behind the southern bank of the river that may contain land ties (also known as deadman anchors) and other structural remains.

As the project is being assessed under Section 5.1 of the EP&A Act, no permits under the NSW Heritage Act (1979) are required for the project. The excavation should, however, be conducted by a qualified maritime archaeologist after the preparation of a research design. The research design should include, as a minimum, an excavation methodology, research questions and provisions for an artefact analysis at the conclusion of the excavation phase of the project.

Excavation and other on-site investigation should be coordinated with the Aboriginal and non-Aboriginal archaeological investigations as part of a single coordinated process of examining the human history of Windsor.

An archaeological excavation report should be prepared at the conclusion of the excavation, and the report submitted to the Office of Environment and Heritage for their records.

The results of the excavation and artefact analysis should be used in on-site interpretation of the maritime history and heritage of the Windsor area, where appropriate.

Recommendation 2

Archaeological monitoring works should be undertaken as part of the early site works on the northern side of the existing bridge in the general location of the northern punt landing. This archaeological monitoring should occur during early site preparation works to record any remaining archaeological remains, relics or landscape features that remain of the former crossing.

This work should be done by a qualified archaeologist and an archaeological monitoring report should be prepared at the end of the monitoring works and submitted to the Office of Environment and Heritage for their records.

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