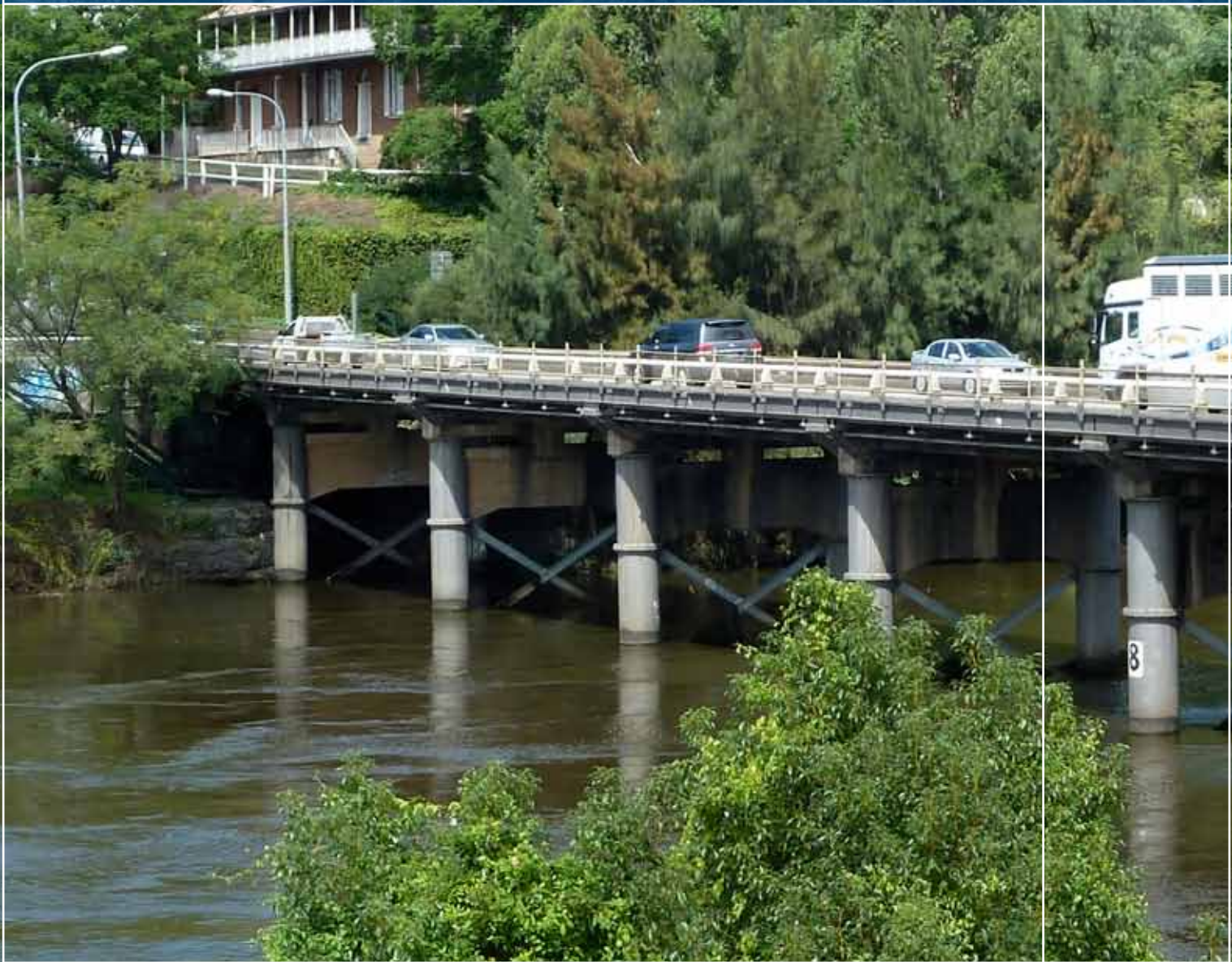




Transport
Roads & Traffic
Authority



Windsor Bridge over the Hawkesbury River

Landscape and visual investigation for bridge
options at Windsor

PUBLISHED AUGUST 2011

LANDSCAPE AND VISUAL INVESTIGATION FOR BRIDGE OPTIONS AT WINDSOR

STAGE 2 REPORT

PREPARED: DECEMBER 2009

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Prepared for the Roads and Traffic Authority

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1. INTRODUCTION

The historic Windsor Bridge no longer meets safety and functional requirements. The bridge requires significant maintenance and capital investment to meet current standards and even if the structural issues are addressed it has a number of other shortcomings that cannot be readily remedied:

- It is considered too narrow (no breakdown lanes are provided).
- The current alignment is not optimal from both approaches.
- Traffic congestion at the AM and PM peaks causes queuing and traffic delays on the north and south approaches to the bridge.
- At its current level it is impacted by the 1 in 2 year flood event.

In June 2008 the NSW Government committed \$25 million to replace Windsor Bridge.

The RTA is investigating the options to provide a safe and reliable crossing of the Hawkesbury River at Windsor.

- Preliminary investigations
- Engineering considerations to identify 9 options
- Community workshop and submission
- Preferred options identified
- The next steps will be to undertake an environmental assessment and seek project approval, followed by detailed design and construction.

The RTA briefed the Government Architects Office (GAO) in 2009 to carry out an investigation of visual impacts and urban design issues to help develop the preferred option and to develop an urban design strategy for the ongoing development of the design for the new Windsor Bridge and approaches.

The objectives of the urban design strategy were to:

- Protect the built heritage of the town and its setting.
- Maintain and enhance the special qualities of the public open space.
- Protect the amenity of private properties.

The purpose of this strategy is to help the RTA develop an urban design outcome that sensitively fits into its built, natural and community context; provide a well designed piece of road infrastructure; and avoid and minimise adverse impacts.

This report represents stage 2 of the study, an investigation of the visual impacts of two options – option 1 and option 6, identified for further investigation following the Options Review workshop in September 2009.

2. OPTIONS UNDER CONSIDERATION

OPTION 1

Option 1 is a high level bridge approximately 35 metres downstream of the existing bridge, aligned with Old Bridge Street.



Figure 1 Option1

OPTION 6

This option begins at a new signalised intersection on Windsor Road, north of Pitt Town Road, travels east by a new bridge/viaduct across South Creek to run parallel to the east of Palmer Street, proceeding to a new bridge over the Hawkesbury River.



Figure 2 Option 6

3. LANDSCAPE CHARACTER AND VISUAL IMPACTS

The landscape character is based on desktop and field analysis as identified on the previous page.

Discussion of the analysis has been structured into the categories of;

- The river
- Historic context
- Settlement pattern, urban structure and public open space
- Transport corridors, vehicular and pedestrian access and movement
- Topography
- Land use
- Views

The purpose of this section is to provide preliminary assessment advice, with more detailed evaluation to be undertaken as part of environmental assessment on a preferred option.

The impact of each issue identified in section 3 has been assessed in terms of very high, high, medium and low scale and magnitude.

The following ranges have been used:

- Very high
- High
- Medium
- Low

3.1 THE RIVER

The Hawkesbury River has played an important part in the development of Windsor and the surrounding farming communities of Wilberforce and Pitt Town. The river is prone to frequent flooding that periodically closes the bridge. The Windsor Bridge is not only the oldest crossing of the Hawkesbury River still operating and linking the communities on either side of the river, but also has been an important through route for the greater Sydney region. More recently, with the expansion of Sydney's metropolitan area to the north west, the pressure on Windsor Bridge has increased to an unsustainable level.

The series of major alterations to the existing bridge structure since its construction highlight the continuing difficulties of negotiating a crossing of this major waterway with its frequent floods in this location and the increased traffic flow.



Figure 3 Looking towards Windsor Bridge

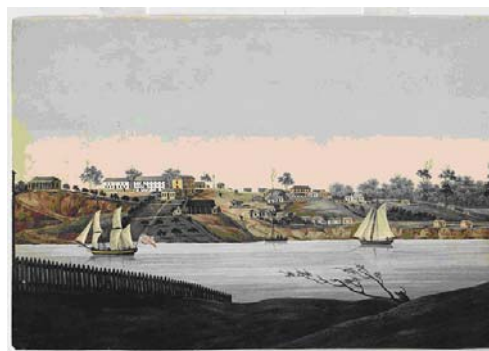


Figure 4 1809 River Drawing

Source 1809 River Drawing; Settlement on the Green Hills [now Windsor], Hawksburgh [Hawkesbury] River NSW, 1809. Lewin, J. W. (John William), 1770-1819 SLNSW Call No.: PXD 388 Digital Order No.: a1313052.

3.2 HISTORIC CONTEXT

The town of Windsor is one of the State's pre-eminent historic towns. It has high heritage significance.

The following plan shows options 1 and 6 in relation to individually listed items on the Hawkesbury Local Environment Plan.



Figure 5 Heritage Items listed on Hawkesbury Local Environment Plan

KEY

- Heritage zone
- Heritage item listed

OPTION 1

Option 1 southern approach passes through one of the few conservation areas listed on the NSW State Heritage Register. The original alignment of the approach road was down Old Bridge St, the existing approach road has been aligned to accommodate vehicle gradients; it has been cut into Thompson Square. Thompson Square and the buildings in the immediate environs of the bridge approach are also individually listed on the Hawkesbury Local Environment Plan. The broad carriageway would have significant physical and visual impact on the nineteenth century scale of heritage fabric of the precinct.

Thompson Square is one of the oldest public squares in Australia and notable for the large number of Colonial Georgian buildings which surround it. It is the only public space remaining from the original town and has played an important part in the history of the town. It is the only remaining civic space as laid out by Governor Macquarie and is a vital precinct in the preservation of the early Colonial character of Windsor. The Square reflects Macquarie's visionary schemes for town planning excellence in the infant colony (Sheedy 1975).

The existing Windsor Bridge is also highly significant and is individually listed on the Hawkesbury Local Environment Plan and on the RTA s170 Register. The RTA statement of significance reads:

It has a high level of historic, technical, aesthetic and social significance as an important historical and physical landmark in one of the State's pre-eminent historic towns, and in the wider Sydney region. It is the oldest extant crossing of the Hawkesbury River. Together with the successive crossings upstream at Richmond, this bridge has played a major role in shaping the history of the Hawkesbury area, functioning for well over a century as an all important link between the communities on either side of the River and as an essential component in a through route of importance in the development of the Sydney region. The series of major alterations to the structure since its construction articulate the continuing difficulties of negotiating a crossing of this major waterway with its frequent floods.

The Windsor Bridge has landmark qualities as one of only two bridge crossings of the Hawkesbury River in the Hawkesbury area and as such it defines the surrounding network of roads. It is a large structure, and although simple in appearance, impressive. The bridge represents a major engineering project in the State for its time. The addition of a reinforced concrete beam deck to replace the timber deck in the 1920s is a relatively early use of this technology. The River and this crossing of it has defined the life of several generations of local inhabitants on both sides of the River. As the suburban outskirts of Sydney widen and come closer to the still distinct and distinctive Macquarie towns, the rich history of the area and its physical remains become increasingly important to the community's sense of identity. The Windsor Bridge is thus an important part of Windsor's history and identity.

Items listed on the Hawkesbury Local Environment Plan that may be impacted by option 1 include;

Thompson Square Conservation Area (item 273) including "The Doctor's House", 1-3 Thompson Sq, lot B, DP 161643 and lot 1, DP 196531, No 5, Thompson Sq, lot 1, DP 745036, Museum, No 7, Thompson Sq, lot 1, DP 60716, Thompson Square, part George St, part The Terrace, and part Bridge

St, Macquarie Arms Hotel, lot 1, DP 864088, Public Reserve, Thompson Square, lot 345, DP 752061, House No 4, Bridge St, lot 10, DP 666894, House No 10, Bridge St, corner part lot A, DP 381403, Former School of Arts, Bridge Street, Lot C, DP 379996, lot 10, Section 10, DP 759096 and lot 1, DP 996417, No 17, Bridge St, part lot 1, DP 555685, Nos 65-68 George St, lots 1 and 2, DP 555685 and unnumbered lot. Nos 70-72, George St, lot a DP 87241, "AC Stearn Building", No 74, George St, lots 1 and 2, DP 630209, Shops, NOs 80-82 George St, lot 10, DP 630209, No 88, George St, lots 1 and 2, DP 233433 and Nos 92-98 George St, lot 1, 730435 and part lot 2, DP 730435.



Figure 6 Thompson Square



Figure 7 The Doctor's House

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Historic	The proposal would have a high impact on the integrity of Thompson Square historic precinct.	Very high

OPTION 6

Items listed on the Hawesbury Local Environment Plan which may be impacted by option 6 include;

Palmer St; "Peninsula House" and Observatory, lot 1, DP 731655 (item 254).

Peninsula House is a two storey Georgian style house of sandstock brick. The main roof and verandah are slate, the latter supported on delicate cast iron columns, the centre bay marked with a simple pediment. (Sheedy 1975)

There are two brick observatories in the old garden. The smaller one is circular with a segmental flat iron pitched roof. The larger one is also face brick with sandstone quoins, classical pediment over a porch and dentilled cornice to the roof parapet.

Peninsula House and the observatory sit on a rise with significant views to and from the buildings. Any road upgrade options would need to take the site curtilage into consideration. Option 6 has been aligned to minimise impacts of the curtilage of Peninsular House.



Figure 8 Observatory



Figure 9 Peninsula House

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Historic	The proposed road is close to the 'Peninsula House' and Observatory, lot 1, DP 731655 (heritage item 254) and would impact the outlook and potentially cartilage of this building.	High

3.3 SETTLEMENT PATTERN, URBAN STRUCTURE AND PUBLIC OPEN SPACE

The town of Windsor is a typical early colonial grid pattern but overlaid over a distinct topography that provides its picturesque qualities. The characteristic ridge street forms the High Street and is crossed by a regular pattern of steep secondary streets that terminate with views to the river.

In contrast to many towns of this era, rather than turning its back to the river Windsor has a foreshore street, The Terrace, with properties addressing the riverfront (and open space along the foreshore).

Also unique to Windsor is Thompson Square, a distinctly urban open space located at the gateway to the town, connecting the river and main street. There is no other civic space like this remaining from the Macquarie era.

OPTION 1

Option 1 provides opportunity to unify a larger usable space of Thompson Square. The bridge approach would be higher and closer to buildings on the east of the square would increase the negative impacts of the road to these heritage buildings. Furthermore the scale of the new roadway is at odds with the finer grain nineteenth century scale urban structure.

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Settlement Pattern, Urban Structure an Public Open Space	<p>The proposal creates an opportunity to improve pedestrian and cycle connections along the riverfront by allowing for continuous pedestrian cycle link along the foreshore underneath the proposed bridge.</p> <p>Spatial qualities of Thompson Square would be diminished by the new roadway width and bridge approach.</p> <p>The proposal would affect the continuous public open space on both sides of the river, particularly on the northern river front.</p>	Medium

OPTION 6

Option 6 skirts the eastern edge of town potentially mitigating impacts on the existing settlement pattern, structure and public open space.

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Settlement Pattern, Urban Structure an Public Open Space	The proposal removes traffic from the town centre and maintains the existing urban fabric.	Medium

3.4 VIEWS

Close and more distant views of the existing bridge are fairly limited due to the steep topography of the riverbank, the dense planting along the shoreline and the low level of the bridge. The bridge is more visible from the north side due to the open landscape.

The existing bridge is low key and is understated in its form and expression and as such fits comfortably and discreetly into its historic setting.

OPTION 1

Option 1 would have a negative visual impact on the immediate views to and from the historic centre of Windsor particularly around Thompson Square due to the elevated road approach to the bridge and the related road works in the immediate environs.

From a distance the new bridge being higher and broader should also have a greater impact on the views up and down the river.



Figure 10 Looking towards existing Windsor Bridge from Governor Phillip Park



Figure 11 Close views from Thompson Square Street onto the Square

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Views	<p>The proposed bridge being higher and broader than the existing bridge would be visible from a distance, particularly on the north side due to the open landscape.</p> <p>The proposal would affect the address and outlook of properties on Old Bridge Street and Thompson Square Street.</p>	Very high

OPTION 6

Option 6 would have an impact on the historic views from Peninsula House and the Observatory and negatively impact on farmland vistas.



Figure 12 Farmland vistas



Figure 13 View from Peninsular House Gates

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Views	The proposal would affect the address and outlook of properties on Palmer Street. The bridge would be visible from Macquarie Park	High

3.5 LANDUSE

All properties on the approach roads would experience increased noise and traffic volumes.

OPTION 1

Land uses on the south side of the river are predominantly mixed uses including residential, commercial, professional rooms framing Thompson Square. The Square links to the open space system along the river. The north side of the river is open farmland, two dwellings are located close to the bridge approach.

The pattern of uses adjoining Bridge Street, while appropriate to the original setting, are now severely compromised in terms of their amenity by the volume of traffic passing through the area in terms of heavy traffic noise, access and visual impact.

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Landuse	Residential, commercial and office uses would be detrimentally impacted. The amenity of the public open space could be reduced. The proposal would increase traffic noise on both sides of the river.	Very high

OPTION 6

Residential properties would experience increased noise and traffic volume.

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Landuse	Residential properties would be impacted by increased noise.	High

3.6 TRANSPORT CORRIDORS, VEHICULAR ACCESS AND MOVEMENT

Windsor Road and Wilberforce Roads are the primary feeders to the existing Windsor Bridge. In addition to serving the town centre of Windsor these major regional roads force through-traffic into the heart of this historic town. Access onto this route from secondary streets is difficult and often hazardous due to the speed of the through traffic particularly at Freeman's Reach Road and George Street.

Pedestrian movement and safety across Bridge and George Streets and Wilberforce Road in the vicinity of the bridge is perilous due to the speed and volume of traffic. Pedestrian amenity is also impacted by the traffic noise and pollution.

OPTION 1

A new bridge with increased capacity should help reduce banking up of traffic during AM and PM peaks and reduce the number of flood events when the bridge is closed. However locating the bridge within the town would exacerbate the effects and impacts of local traffic on pedestrian and cyclist amenity close to the town centre. The addition of traffic lights at the intersection of George and Bridge Street would assist in the management of local traffic, cycle and pedestrian.

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Vehicular, Pedestrian, Cycle Assess and Movement	The proposal would potentially exacerbate through traffic. The traffic signals should improve pedestrian and cyclist amenity in the heart of the town.	High

OPTION 6

Option 6 skirts the eastern edge of town, potentially mitigating the potential impacts of traffic within the town centre and minimising the potential impacts on pedestrians and cyclists.

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Vehicular, Pedestrian, Cycle Assess and Movement	The proposal reduces through traffic from the town centre.	Low

3.7 TOPOGRAPHY

The existing bridge approach through Thompson Square descends steeply from George Street to the river. To accommodate the existing bridge approach and vehicle gradient the road has been cut into the hill creating a distinctive and defined transition from the township to the bridge. The north approach is less distinct being almost level with the bridge.

Because of the steep banks and heavy vegetation on the south side the bridge and approaches are not highly prominent from the surrounding area only the immediate environs.

OPTION 1

The steep banks and relatively constrained location make the proposed bridge approaches through Thompson Square adverse to the spatial, historic and scenic qualities of the site.

Option 1 offers an opportunity to unify a larger usable space of Thompson Square. However the bridge approach would be higher and closer to buildings on the east of the Square would increase the negative impacts on these heritage buildings.

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Topography	The approach descends steeply from George Street to the river. The southern approach would have a high visual impact to the immediate surrounds because of the required spring point location. The proposed northern approach descends more gradually.	Very high

OPTION 6

This option requires the road to be raised to mitigate flood impacts.

The slope from Palmer Street to the river is fairly gentle. Option 6 would have less visual impact on the natural topography as it requires less intervention in the natural terrain.

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Topography	Palmer Street is located on low lying land. The new road would be higher than Palmer Street.	Medium

3.8 VEGETATION

OPTION 1

Option 1 passes through Thompson Square, which is a broad grassed open space characterised by established trees informally laid out in a parkland setting. Thompson Square is the only remaining civic space laid out by Governor Macquarie and is a crucial precinct in the preservation of the early colonial character of Windsor. The mature trees that define Thompson Square are a vital part of the character of this precinct. A number of existing trees would have to be removed to accommodate the new roadway.



Figure 14 Thompson Square



Figure 15 Thompson Square

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Vegetation	The proposal would require the removal of a number of significant trees within Thompson Square which would detrimentally impact the space.	Very high

OPTION 6

There are notable mature trees within the Riverside Park that may be impacted by option 6.

In both options the northern side of the river is characterised by open pasture. There is no notable planting introduced or indigenous on the north side of the river.



Figure 16 Vegetation in Macquarie Park

POTENTIAL ISSUE	COMMENT	POTENTIAL SCALE/ MAGNITUDE OF IMPACT (VH-L)
Vegetation	Vegetation removal and construction of a second bridge over Second Creek is required.	High

4. URBAN DESIGN STRATEGY

In order to address the visual impacts the following objectives and principles were developed.

URBAN DESIGN OBJECTIVES

- 1) Protect the built heritage of the town and its setting.
- 2) Maintain and enhance the special qualities of the public open space.
- 3) Protect the amenity of private properties.

GENERAL PRINCIPLES

- 1) Design of bridge to be streamlined and lightweight in appearance.
- 2) Limit the width of the bridge and approach roads.
- 3) Approach roads to be sympathetic with existing topography.
- 4) Roadway no longer required to be removed and landscape reinstated.
- 5) Re-vegetate disturbed riverbanks.
- 6) Horizontal bridge alignment is optimal to fit within the context of strong horizontal lines of landscape, the horizon and waterline.

SPECIFIC PRINCIPLES APPLICABLE TO OPTION 1

- 7) Reinstatement of Thompson Square by removing existing roadway cutting and grading to the foreshore.
- 8) Provide new street tree planting sympathetic with parkland setting.
- 9) Provide interpretation of the historic Windsor Bridge.
- 10) Connect Windsor Terrace Road underneath the bridge to Ferry and car-park.

SPECIFIC PRINCIPLES APPLICABLE TO OPTION 6

- 11) Provide different landscape treatments to distinguish diverse elements of the landscape such as; the town from the rural character, the entry to Peninsular House and Observatory and South Creek. Different landscape treatments such as avenue tree planting can also potentially warn of a speed changes ahead.
- 12) Provide screening and noise mitigation through landscape works for Palmer Street residents.

CONCEPT PLAN

The following plans have been generated in response to the visual assessment and contextual analysis and are aimed at guiding RTA's bridge design. They meet the specific needs of the objectives and principles developed.

OPTION 1

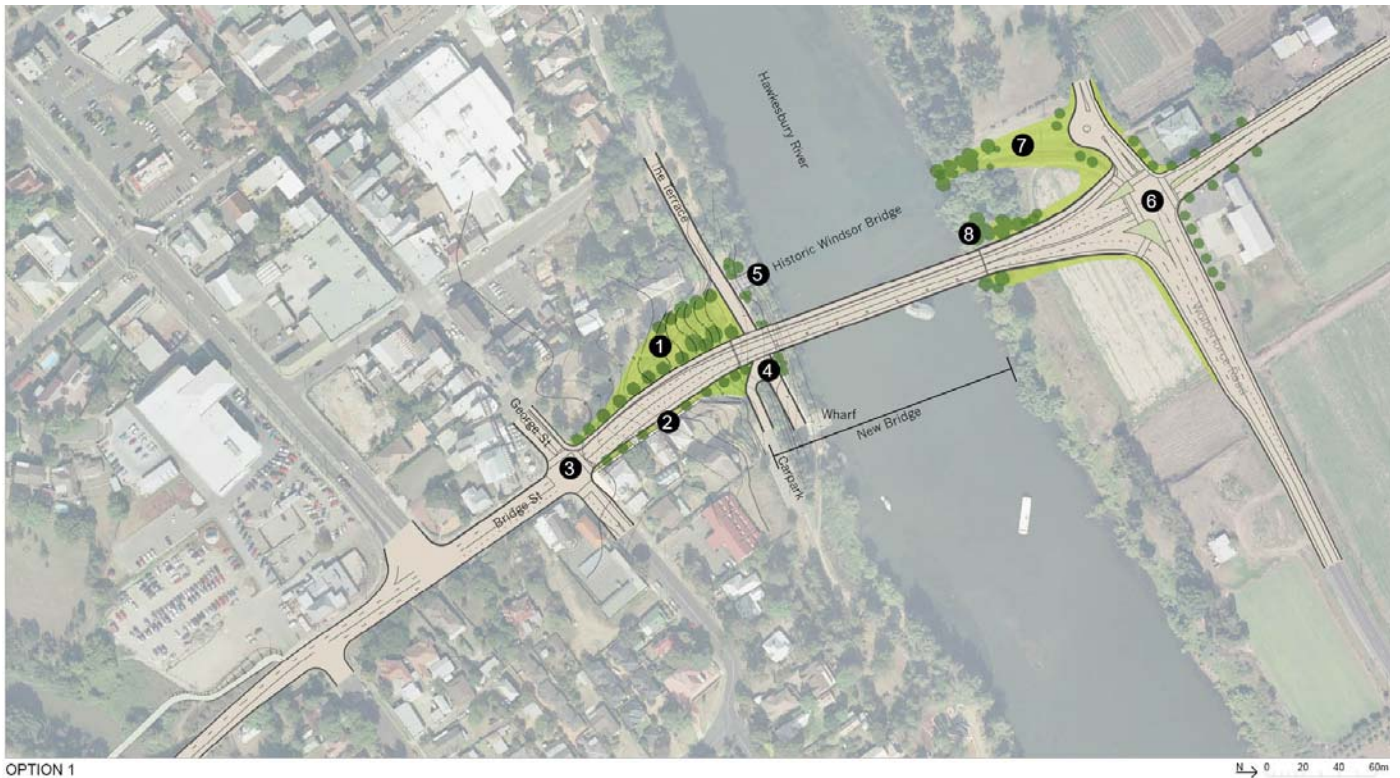


Figure 17 Option One

Option 1 provides opportunity for increased usable public open space and improves pedestrian access along the foreshore and over the river. It should be noted that if noise mitigation is required it should be incorporated within the fabric of the existing buildings through insulation and appropriate glazing of windows rather than road based noise barriers that would have an unacceptable visual impact.

DESIGN DESCRIPTION

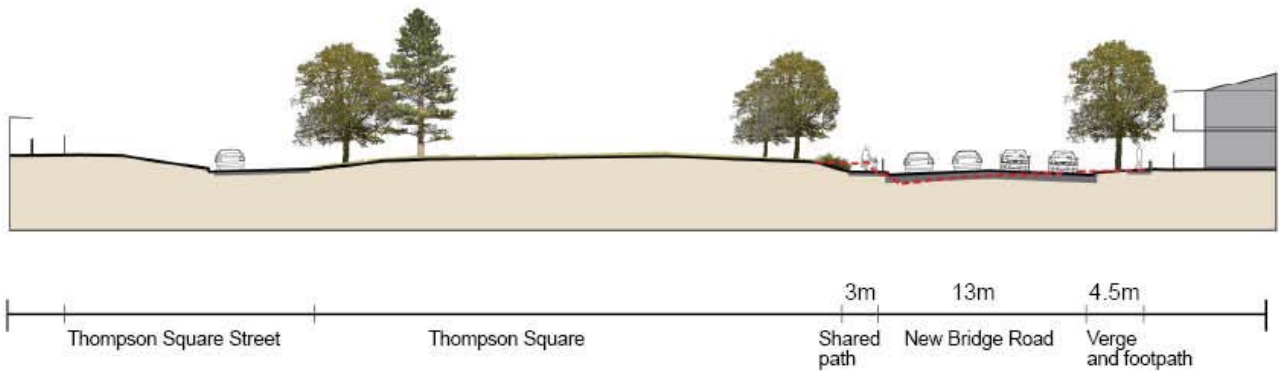
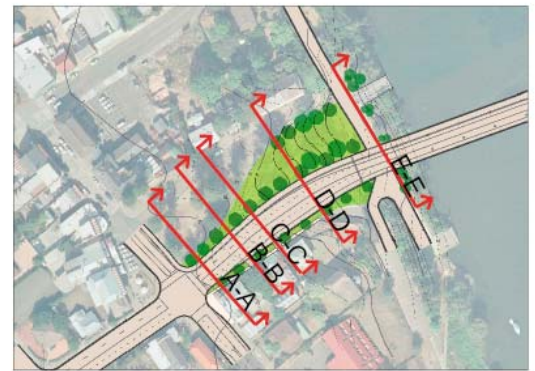
1. Reinstall Thompson Square by removing existing roadway and re-grading to the foreshore. Remove existing fencing.
2. New street tree planting, footpath (1.5m) and driveway crossings.
3. New signalised intersection (3 and 6).
4. Connect Windsor Terrace Road underneath the bridge to Ferry and carpark.

5. Historic Windsor Bridge removed, viewing platform retained.

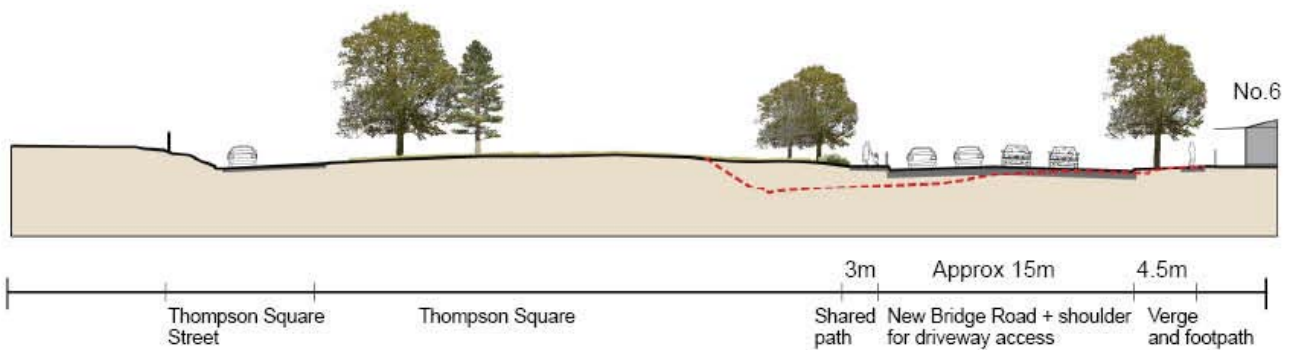
Retention of the old bridge should be considered for use as a pedestrian/cycle connection. Re-use heritage infrastructure links us with our past and retains character in a contemporary context.

6. Remove existing road and reinstate landscape
7. Re-vegetate the river edge.

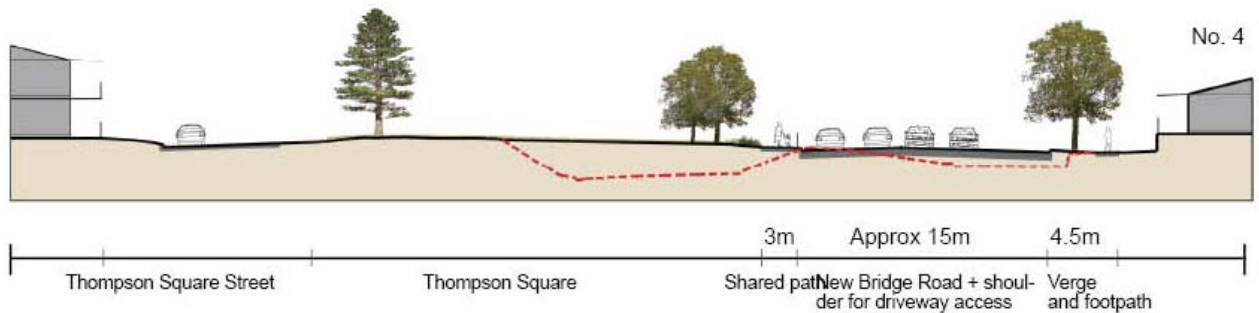
The following sections demonstrate the benefits of street tree planting for amenity of the surrounding properties and public open space and the benefits of reinstating Thompson Square by removing the existing roadway and grading to the foreshore.



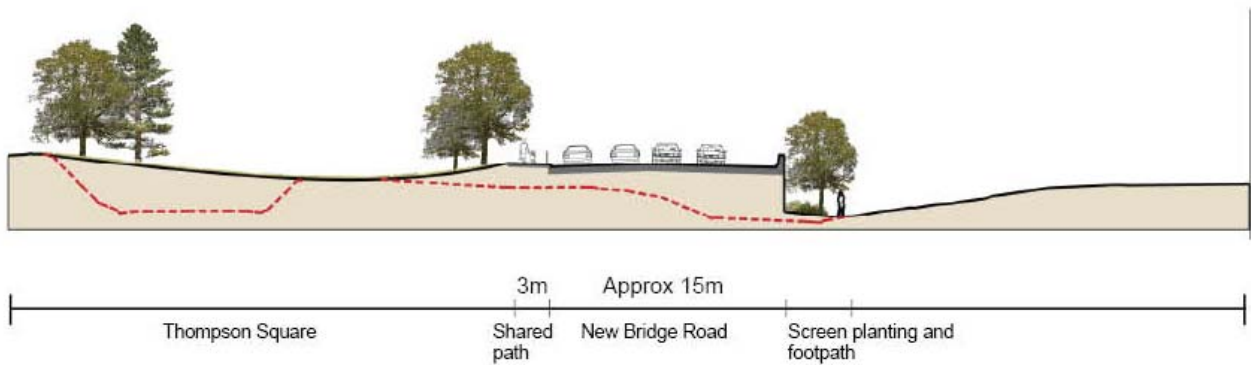
SECTION A-A



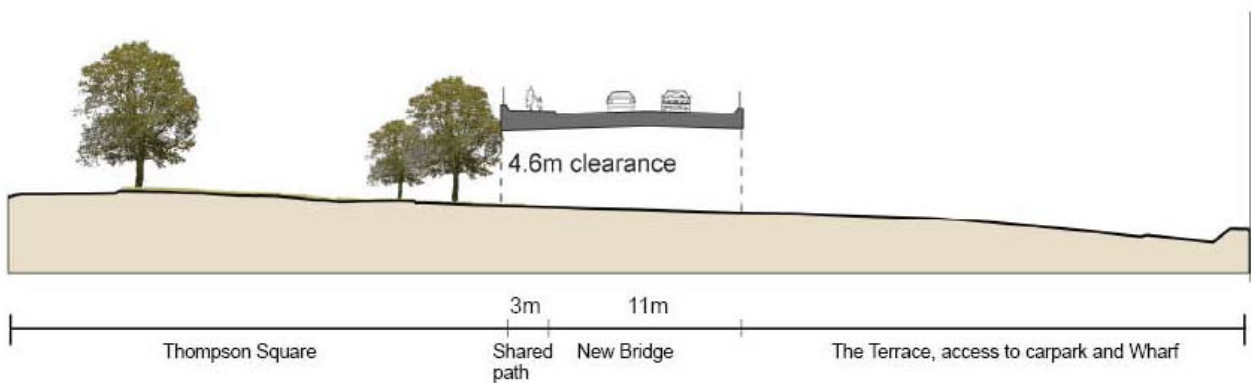
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E

OPTION 6



Figure 18 Option 6

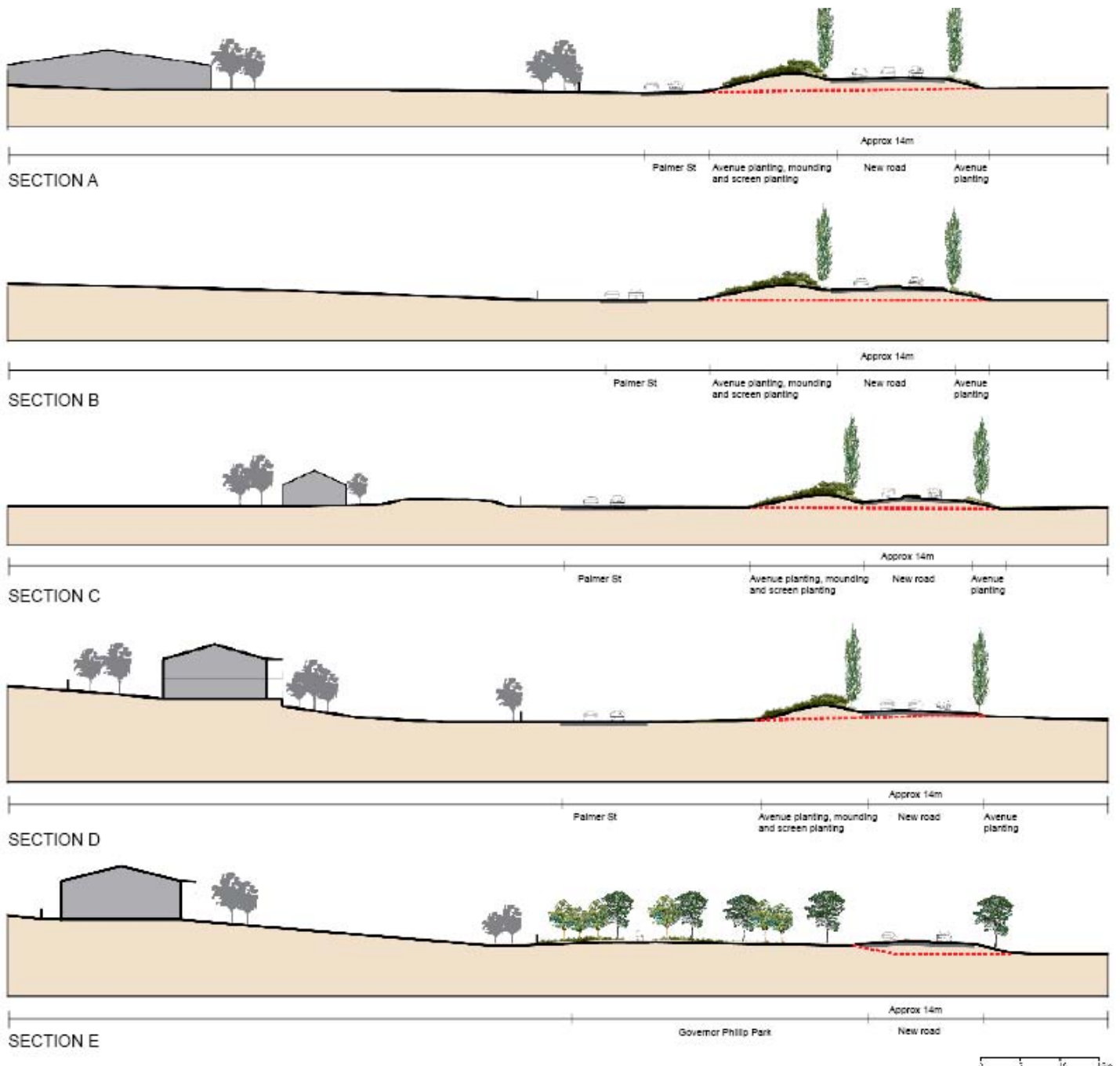
Option 6 offers many benefits to Windsor township and provides an opportunity to develop a road that fits sympathetically into the landscape.

DESIGN DESCRIPTION

1. New signalised intersection and road widening on Windsor Road
2. New bridge crossing and native re-vegetation of South Creek.
3. Formal planting to delineate the bend in the road and entrance to Tebbutts Observatory.
4. The section of road between George Street and North St is to be marked with Avenue planting, such as poplars, to help differentiate the town from the rural character and potentially warn of a speed change ahead. A slight mounding adjacent to the road also provides opportunity for planted screening for noise attenuation.
5. Native re vegetation on the western portion of Governor Phillip Park will provide screening and a pleasant pedestrian experience.
6. New signalised intersection and road widening on Wilberforce Road.
7. Native re vegetation on the river edge.



OPTION 6 KEY PLAN



5. RECOMMENDATION

The bridge design must ensure that; the built heritage of the town and its setting is protected, the spatial qualities of public open space and surrounds are maintained and the amenity of private properties upheld.

While Option 6 is preferred from an urban design point of view both options are considered tenable provided that substantial landscape treatments are included as part of the project, particularly option 1, where reinstatement of Thompson Square is required.

Landscaping should include interpretation of the historic bridge, river as a transport route and focus of town life.