



Transport  
Roads & Maritime  
Services

# Windsor Bridge replacement project

LAND USE, PROPERTY & SOCIO-ECONOMIC PAPER – WORKING PAPER 9  
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## Roads and Maritime Services

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### Windsor Bridge Replacement

Land use, property and socio-economic working paper – working paper 9

November 2012



Prepared by Sinclair Knight Merz for Roads and Maritime Services  
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# Contents

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Executive Summary .....	i
1 Introduction .....	1
1.1 Overview .....	1
1.2 Project description: .....	1
1.3 Study objectives and scope .....	8
2 Assessment methodology .....	11
2.1 Assessment approach .....	11
2.2 Data sources .....	12
2.3 Community and stakeholder consultation .....	13
3 Existing environment .....	15
3.1 Legislative and policy context .....	15
3.2 Existing land use, property and socio-economic context .....	19
3.3 Business and industry .....	30
3.4 Access and connectivity .....	36
3.5 Social infrastructure and services .....	39
3.6 Community values .....	41
4 Land use, property and socio-economic impacts .....	45
4.1 Property and land use impacts .....	45
4.2 Local amenity .....	49
4.3 Access and connectivity .....	52
4.4 Local business .....	54
4.5 Local and regional industry .....	59
4.6 Impact on recreational uses .....	66
4.7 Social infrastructure .....	67
4.8 Community values .....	68
5 Environmental management measures .....	71
5.1 Overview .....	71
5.2 Construction .....	72
5.3 Operation .....	74
6 Conclusion .....	76
6.1 Key findings of the assessment .....	77
7 References .....	82
Appendix A Additional baseline data .....	85
Appendix B Economic modelling results .....	89

# Glossary of terms and abbreviations

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Term	Meaning
ANZECC	Australia and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
DECC	Department of Environment and Climate Change (now Office of Environment and Heritage)
DGRs	Director General's Environmental Assessment Requirements
EIS	Environmental Impact Statement
ESCP	Erosion and Sediment Control Plan
GPT	Gross Pollutant Trap
HRC	Healthy Rivers Commission
NSW	New South Wales
NTU	Nephelometric Turbidity Unit
RMS	Roads and Maritime Services
RTA	Roads and Traffic Authority (now Roads and Maritime Services)
SCA	Sydney Catchment Authority

# Executive Summary

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The objective of this report is to provide an assessment of the potential land use, property and socio-economic impacts on local and regional communities associated with the Roads and Maritime Services (RMS) proposed Windsor Bridge Replacement project (the project). Where relevant, the report also identifies the requirements for environmental management. The study has been carried out to address the Director General's environmental assessment requirements including:

- Impacts on directly affected properties and land uses, including impacts related to access, land use, property acquisition and amenity related changes.
- Impacts of the project on tourist and recreational uses of Thompson Square, the town centre, and the Hawkesbury River and its foreshores.
- Social and economic impacts to the Windsor town centre businesses and the community associated with traffic, access, property, public domain and amenity related changes.

Regionally, the study area for the project comprises the Hawkesbury local government area. Locally, the assessment focuses on the town of Windsor.

## Existing environment

A review of the existing land use, property and socio-economic environment of the study area has been conducted. The key characteristics of the study area are summarised in the following paragraphs.

In 2011, Windsor's population was 1,803 people. The Hawkesbury local government area had population of 62,353 persons in 2011. Between 2006 and 2011, Windsor had relatively high population growth compared with the Hawkesbury local government area and NSW as a whole. A sharp rise in population growth is projected for Hawkesbury between 2016 and 2036 (compared to the state average).

The town has a strong sense of identity and is valued by the local community for its heritage character, views over the Hawkesbury River and rural amenity. Key occupations in the Hawkesbury local government area include technicians and trade workers, clerical and administrative workers, professionals and managers. In Windsor, professionals are more predominant than in the Hawkesbury local government area, as are labourers, machinery operators and drivers.

A diverse range of industry opportunities in the Hawkesbury Region has led to a relatively high level of employment self sufficiency, with the unemployment rate in the Hawkesbury local government area consistently lower than the state average between 2006 and 2011 inclusive. Lower unemployment rates indicate that surplus labour supply is likely limited compared to the state average – this is reflected in higher median incomes in the Hawkesbury local government area. However, Windsor recorded a lower median income comparable to the Hawkesbury local government area, and this is reflected in areas of lower socio-economic status within the Windsor town centre. Windsor also had a greater number of people in need of assistance compared to the wider Hawkesbury local government area and New South Wales (NSW) as a whole, which may be related to the ageing population in Windsor.

Key employing industries throughout the Hawkesbury local government area include construction, manufacturing, public administration, safety and retail trade, as well as tourism and recreation services. The Windsor and Richmond town centres are the primary retail and commercial centres within the Hawkesbury local government area. Retail trade floorspace comprises approximately 56 per cent of total business floorspace in the Windsor town centre. Other dominant industries in the Windsor town centre include services based sectors.

In the Hawkesbury region more broadly, extensive amounts of pastoral and agricultural land are important, containing 16 per cent of vegetable and other crop establishments in the Sydney Basin (ABS, 2006, cited in SGS Economic Planning). This land provides a substantial resource base for the Sydney basin. In 2006, crops producing vegetables for human consumption were the most important crop in the Hawkesbury local government area. Adjacent to the project area, agricultural land includes a number of turf farms. The rural and agricultural amenity of the area is also highly valued by the community.

The importance of tourism and recreation services in the Hawkesbury local government area is particularly prevalent in Windsor, where employment in the accommodation as well as arts and recreational services are close to the state average. This is due to a diverse range of tourist attractions including areas of significant Aboriginal and non-Aboriginal heritage, natural attractions, cultural facilities and touring routes. Recreational, sporting, and leisure facilities and clubs are offered in Windsor which cater for local and regional communities, and include facilities for organised sporting activities, as well as informal recreation and leisure pursuits. The Hawkesbury River serves as a base for a number of tourist and recreational activities such as the Hawkesbury Paddle Wheeler, the Hawkesbury Canoe Classic, the Bridge to Bridge Power Boat Race and the Bridge to Bridge Water Ski Classic from Brooklyn to Windsor. These generate substantial financial income for locals (RTA, 2011).

Windsor is well serviced by a range of transport services, particularly road and rail. Other transport options include numerous bus services, active transport and river transport (particularly for tourists). The Windsor Bridge forms a vital connection over the Hawkesbury River for private and public transport.

Road infrastructure in Windsor provides an important connection to surrounding townships and Sydney, and residents within the Hawkesbury local government area rely on the motor car for transport, with 84 per cent of trips undertaken by car as either driver or passenger. Travellers in the Hawkesbury local government area spend more time driving for passenger service, social/recreation purposes and shopping than for work related business and commuter travel.

Community values include preservation of local amenity, character and heritage, the natural environment, access and connectivity, and the continued viability of the local economy. Key contributors to Windsor's amenity and lifestyle are the Hawkesbury River and its foreshores, Thompson Square and areas of natural bushland. Good quality road connections are also valued by residents, in addition to road and pedestrian safety, flood mitigation strategies and connectivity to surrounding towns within and outside of the Hawkesbury local government area. Residents see preserving the character of the Windsor town centre and tourist opportunities as important for economic viability.



## Potential impacts

The project's design, construction and operation are expected to induce a range of potential impacts, both beneficial and adverse, for the land use, property and socio-economic environment in the local and regional communities. Broadly, project impacts include impacts on private properties and crown land, impacts on amenity and changes in access and connectivity. An overview of these changes including other resulting impacts is provided below. Regional output and employment benefits provided by the project during the construction and operation phases are also discussed.

### *Property and land use*

On the northern side of the river, there would be a need for full acquisition of two lots and partial acquisition of two additional lots of private rural land currently used for turf farming. The acquisition of this land is not expected to have a significant impact on turf farming or other rural industries given the relatively small area of land involved, the flood prone nature of the affected land (which limits its value and future use potential) and the abundance of other nearby areas that are suitable for turf farming.

Some of the land that is acquired for the project on the northern bank of the river would only be required for the construction period. The future use of this land would be determined during detailed design in consultation with Hawkesbury City Council and rehabilitated accordingly. Land that falls within this category includes that which currently comprises the northern approach road to the existing bridge. It is likely that any excess acquired land and the land comprising the existing northern approach road would be converted to public open space, which would result in an overall increase in the area of public open space on the northern river bank.

On the southern side of the river, full acquisition of two parcels of Crown land would be required. This would affect the lower parkland area of Thompson Square and the council carpark and foreshore area adjacent to Windsor wharf and The Terrace. Only small parts of these crown land parcels would be required to accommodate the new road and bridge infrastructure, with the remaining areas required only for construction purposes. The areas required only for construction would be rehabilitated and returned to public use at the end of the construction period. The southern approach road to the existing bridge would also be rehabilitated and incorporated into the Thompson Square parkland area in consultation with Council. Overall, the project would result in an increase in the area of public open space parkland within Thompson Square.

The two Crown land lots to be acquired for the project are currently subject to native title claim under NSW legislation by the Deerubbin Aboriginal Land Council. These claims will be determined before the planned start date of construction (should the project be approved). While the outcome of the native title claim cannot be predicted at this stage, claims are generally not granted where they affect land that is used, or may be used, for an essential public purpose. The project would be defined as an essential public purpose.

All acquisition of land will be undertaken in accordance with the RMS (2012) *Land Acquisition Guide*, RMS' acquisition policy, and the *Land Acquisition (Just Terms) Compensation Act 1991* to provide for proper compensation of affected land owners. Timely consultation with affected and potentially affected property owners and businesses will also be undertaken to remove any uncertainties about the details and timing of the acquisition process. Overall the impacts of the project on land use would be positive due to the increase in the area and accessibility of public open space.

## *Amenity*

During construction, there would be temporary adverse impacts on the amenity of properties and land uses close to construction sites as a result of noise, dust and the visible presence of construction activities. Construction activities may also cause some disruptions to traffic flows and require temporary changes to traffic routes. While these impacts would be minimised wherever possible, they cannot be avoided entirely. In particular, there are likely to be some periods when construction noise impacts are substantial and the visible presence of construction activities would impact views from and to the foreshore area and the existing bridge.

The proposed locations for the main construction sites and compound areas would minimise impacts on the commercial centre of Windsor and the upper parkland area of Thompson Square. The sequential staging of the construction and commissioning of the replacement bridge prior to demolition of the existing bridge would also minimise impacts on local and regional traffic movements, including access to the Windsor commercial centre and Thompson Square. The land uses and properties that would experience the most significant amenity impacts would be the three properties on Old Bridge Street and the property at the corner of Freemans Reach Road and Wilberforce Road. Amenity impacts on other properties and land uses are unlikely to be significant given their distance from construction areas.

During operation, the main amenity impact of the project would be associated with changes to heritage vistas, in particular the changes in the heritage vistas and views from and to Thompson Square. Impacts on heritage vistas would be greatest at the Doctors House and number 4 Old Bridge Street adjacent to Thompson Square. The existing bridge, approach road and associated traffic are generally not visible from these properties. By contrast, the replacement bridge and southern approach road would be highly visible from these properties and would place an essentially modern structure within a heritage vista. This may result in a reduction in the values of these properties.

The operational noise from the project would have only a minor impact on local amenity. While the operational road traffic noise generated by the project would not be significantly different from that generated by the existing bridge and approach roads, the existing traffic noise levels are high and the proposed redevelopment of the road corridor triggers the need to consider noise mitigation requirements. The results of this assessment indicate the need to provide architectural treatments to three properties on Old Bridge Street to mitigate noise impacts. Properties on the southern and western side of Thompson Square and the parkland area within Thompson Square would experience little change in traffic noise impacts as a result of the project and do not require architectural treatments for noise mitigation.

## *Access and connectivity*

During construction, temporary changes to local road and property access may occur as a result of the presence of construction traffic and activities, and the associated need for temporary traffic diversions and access restrictions. If not appropriately managed, these temporary changes and restrictions have the potential to result in reduced patronage of local businesses. Management measures will be applied during the construction period to minimise traffic delays and provide alternative access arrangements and traffic routes, where required, to keep potential impacts on businesses to a minimum.

Specific impacts on access during the construction period would include:

- Short-term restrictions in vehicle access to numbers 4 and 6 Old Bridge Street during construction of the new southern approach road.
- Loss of public vehicle access to Windsor Wharf.
- Loss of access to the lower parkland of Thompson Square and the eastern portion of The Terrace during construction of the replacement bridge and approach roads and during the subsequent restoration and landscaping works.
- Loss of access to the upper parkland of Thompson Square during the infilling of the existing Bridge Street cutting and during the subsequent restoration and landscaping works within the parkland.

Pedestrian access to the wharf and all properties would be maintained throughout the construction period. Pedestrian and cyclist access near the construction works, including along The Terrace and the riverbank would be maintained where possible, although access may be restricted during certain periods to maintain public safety. Access across the existing Windsor bridge would be maintained until commissioning of the replacement bridge. After the replacement bridge is commissioned, access to the existing bridge would be removed and the bridge would be demolished.

In Thompson Square, access to the upper parkland area would generally remain available throughout the construction period until the start of the restoration and landscaping works. Loss of access to the upper parkland area during the restoration and landscaping works would be short-term and would be minimised as far as practicable.

There would be no substantial impacts on access to Windsor town centre, Macquarie Park, the Hawkesbury Visitor Centre, Hawkesbury Regional Museum or short term accommodation businesses during construction of the project. The temporary loss of vehicle access to Windsor wharf is not expected to significantly impact the operation of the Hawkesbury Paddle Wheeler as pedestrian access to the wharf would be maintained and parking would be available in nearby streets.

The community and affected property owners would be consulted well in advance and kept fully informed of all access changes. Overall impacts on access and connectivity during the construction period would be minor.

During operation, the project is expected to improve local and regional access and connectivity as a result of safer operating conditions and improved traffic flow. The project would reduce traffic delays associated with the existing bridge crossing and improve the flood immunity of the crossing, which would improve access between the north and south sides of the river. This would have potential flow-on benefits to local and regional businesses and industries. The project would also improve access and connectivity for pedestrians and cyclists, including access and connectivity between key areas of Windsor and between the north and south sides of the river.

There would be three minor permanent changes in traffic access arrangements as a result of the project. Firstly, traffic coming from the south on Bridge Street would no longer be able to turn right into George Street. This means that drivers accessing properties on the eastern side of George Street and areas such as Governor Phillip Park would need to turn right at Court Street. This would affect only a small number of motorists and would be well signposted. Secondly, access to properties at numbers 4 and 6 Old Bridge Street would be left-in, left-out only. This means that drivers coming from the south would need to first cross the bridge to the new roundabout at the intersection of Wilberforce and Freemans Reach roads then re-cross the bridge to make a left turn into these properties.

Similarly, drivers heading north from these properties would need to first head south then turn right on either George Street or Macquarie Street before making their way back to the northbound lane of the new southern approach road to the bridge. Finally, at some point in the future, when traffic levels increase, southbound traffic (coming from the north side of the river) would no longer be allowed to turn right into George Street during the afternoon peak. This is not expected to have a significant impact on any properties or businesses given that alternative right turn access is available via Macquarie Street and only a relatively small number of vehicles perform this movement in the afternoon peak.

### *Recreation and tourism*

The potential adverse impacts of the project on recreation and tourism during the construction period would be largely associated with the impacts on amenity and access. In particular, the proximity of construction activities to Thompson Square and the river foreshore, and the corresponding potential for loss of amenity in these areas, may result in a temporary reduction in patronage of recreation and tourist sites and facilities. The location of the main construction site and compound areas away from the centre of Windsor and the upper parkland area of Thompson Square would mean, however, that many areas would have only minor adverse impacts. In particular, the Hawkesbury Visitor Centre, Hawkesbury Regional Museum, short-term accommodation businesses and the Macquarie Arms Hotel are unlikely to be adversely affected, and the impacts on the upper part of the Thompson Square parkland would be limited to the later part of the construction period. Construction activity on weekends (the peak period for visiting day trippers) would also be limited to Saturday mornings, meaning that adverse impacts on amenity would be reduced during peak visitor periods. It is also possible that tourists may visit the town centre to view the bridge construction process, further contributing to tourist numbers.

Construction may have a minor impact boating activities on the river due to the presence of temporary exclusion zones around pier construction areas, although the river would generally remain open to passage by water vessels. An exception to this would be during the demolition of the existing bridge, when access to the area of the river in the immediate vicinity of the bridge would be restricted for safety reasons.

Once construction and rehabilitation of Thompson Square and other areas have been completed, there would be an overall increase in area of usable public space both on the northern and southern side of the river. On the northern side of the river, there would be around 1400 square metres of additional accessible usable open space directly adjacent to Macquarie Park. On the southern side of the river, there would be about 1400 square metres of additional accessible usable open space within Thompson Square parkland. The Terrace would also be re-connected, providing continuous access along the foreshore, and the foreshore area around Windsor wharf would be reopened to public access. Improved pedestrian and cycling facilities will also improve the amenity and connectivity of the Thompson Square and foreshore areas, which may make the area more attractive for visitors. The project would also enhance opportunities for river-based tourism by increasing the navigation clearance on the Hawkesbury River, allowing more water traffic to access waters upstream of Windsor.

Baseline tourism data for the region indicates that, for over one third of domestic visitors, the primary purpose of the visit is to see family members. These visitors would not be expected to reduce the frequency or duration of their visits to the town centre as a result of changes in urban design. The adverse impacts on tourism during operation are therefore expected to be minimal.

## *Socio-economic impacts*

The project is not expected to have a significant adverse impact on local businesses or industries during either construction or operation. Factors that have the potential to reduce patronage of businesses, such as adverse impacts on amenity and changes to vehicle access, would be minor and largely restricted to the construction period. It is also anticipated that any adverse impacts on the patronage of local businesses during the construction period would be offset to some degree by the influx of project construction workers, who are likely to patronise hotels, restaurants and retail outlets during and after work hours. As noted above, it is also possible that tourists may visit the town centre to view the bridge construction process.

Input- output modelling conducted as part of the economic impact assessment indicates that construction of the project would also have significant socio-economic benefits. Specifically, it is estimated that construction of the project will:

- Contribute \$7.8 million to household income in north western Sydney and another \$7.8 million to household income in the rest of NSW.
- Provide \$12.9 million in value added benefits to the north western Sydney region and another \$13.5 million in value added benefits to the rest of NSW.
- Create 242 full-time equivalent jobs (including 108 jobs in the north western Sydney region, 125 jobs in the rest of NSW and nine jobs in the rest of Australia).

The main potential adverse socio-economic impact of the project would be associated with the changes to the heritage vistas of Windsor and Thompson Square. While the change in vistas would impact the heritage values and landscape of the Thompson Square area, it is unlikely that visitors and tourists would decide not to go Windsor because of the impacts of the project. There are many factors that influence the attraction and experience of visitors to Windsor, including the historic buildings surrounding Thompson Square, the many tourist orientated retail, accommodation and food outlets, the proximity of the river and foreshore areas, and the presence of the Thompson Square open space and the community events held there. These elements would be largely unaffected by the project and would continue to draw visitors to the area.

The potential adverse socio-economic impacts associated with changes in heritage vistas would also be offset to some degree by the following benefits of the project:

- Improved vehicle, bicycle and pedestrian access in the following areas:
  - Across the river
  - To/from Macquarie Park
  - Between the foreshore and Windsor town centre via Thompson Square.
  - Along the southern foreshore.
- Improved amenity and safety of pedestrian and cyclist access within and around Thompson Square.
- Consolidation of the existing fragmented parkland area within Thompson Square, resulting in an overall increase in the amount of usable parkland area and the amenity of the parkland area.
- More public open space on the northern side of the river.
- Improved navigational clearance beneath the new Windsor bridge, enhancing recreational opportunities on the Hawkesbury River.
- Reduced traffic delays and congestion in peak periods.
- Improved flood immunity of the river crossing.

In the long-term, improved access and connectivity, including safety and flood immunity benefits, are expected to benefit planned industry development in Wilberforce. Improved flood immunity would also benefit local businesses by reducing the frequency of spending reallocation to neighbouring town centres during floods.

### *Community values*

The local community values the heritage character of the town, including the heritage items in and around Thompson Square and the heritage buildings on Bridge Street. Changes to Thompson Square to accommodate the replacement bridge would result in significant physical and visual impacts on Thompson Square, including changes to archaeological resources, views, vistas and the general landscape setting.

The design of the bridge approach roads and the replacement bridge has been informed by landscape character and visual impact assessment to minimise impacts on areas of heritage value wherever possible. In addition, the proposed bridge would provide improved connectivity and access over the Hawkesbury River. It would also result in the amalgamation of the upper and lower parkland areas of Thompson Square, connection of The Terrace, and improved pedestrian and cycling facilities, creating a larger and more usable area of public open space in the central historic area of Windsor.

### **Environmental management measures**

This paper outlines a range of measures for managing, avoiding or mitigating potential land use, property and socio-economic impacts and maximising or enhancing the project's benefits. The concept design for the project has been developed using an iterative approach based on the findings of the impact assessment, including the results of specialist studies. As a result, a number of measures for avoiding and minimising adverse impacts have already been incorporated into the concept design. Additionally, RMS has already commenced community and stakeholder engagement on a number of matters and will continue to consult, as required, during the detailed design and construction phases of the project (should the project be approved).

# 1 Introduction

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## 1.1 Overview

NSW Road and Maritime Services (RMS) are proposing to construct a new bridge across the Hawkesbury River at Windsor to replace the existing bridge, which has exceeded its economic life. The economic life of an asset indicates the period in which it is expected to be useable (with normal repairs and maintenance) for its purpose.

This socio-economic and land use assessment has been prepared as a specialist component of the Environmental Impact Statement (EIS) for the Windsor bridge replacement project under Part 5.1 of the *Environmental Planning and Assessment Act 1979*. This assessment identifies and evaluates the impacts of the project on social, economic and land use aspects of the area and develops mitigation measures to avoid or minimise impacts on biodiversity.

## 1.2 Project description:

### 1.2.1 Overview

The project would comprise:

- Construction of a new 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 new 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 new 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.
- Flood mitigation works at individual properties.
- 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 **Figure 1-1** the main elements of the project are shown including the construction zone and project boundary.

In addition to the above-listed work elements, early works for further identification, salvage, recording and protection of Aboriginal and historic 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.
- Excavation, 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.

### 1.2.2 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 event, the replacement bridge is predicted to remain above water for the one in two year flood event 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.

### 1.2.3 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.

### 1.2.4 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.

### 1.2.5 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.

### 1.2.6 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 millimeters) 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.

### 1.2.7 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.

### 1.2.8 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 may 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.

### **1.2.9 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 lower Thompson Square parkland would also be closed to public access and used to provide access for the construction of the southern abutment and approach road. 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 1-1**. 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 1-1 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.

## 1.3 Study objectives and scope

### 1.3.1 Objectives

The overall objective of the land use, property and socio-economic working paper is to assess the impacts of the project's design, construction and operation on land use, property and the socio-economic environment of local and regional communities. Specific objectives include:

- Assess impacts of the project's design, construction and operation on existing and proposed future land use and planning, within the Windsor town centre and regionally within the Hawkesbury local government area.
- Assess impacts on property, including impacts due to property acquisition and changes to property access.
- Assess potential impacts on local and regional communities, including social infrastructure and community values.
- Assess potential impacts on the local and regional economies, including business and industry.

### 1.3.2 Scope of work

The assessment involved:

- Describing existing land use, property and socio-economic conditions of local and regional communities likely to experience change due to the project's construction and operation. This provides a baseline for assessing likely changes as a result of the project.
- Identifying and assessing the likely benefits and impacts of the project, including direct and indirect benefits for local and regional communities.
- Identifying mitigation measures to enhance the project's benefits and avoid, manage or mitigate its potential impacts.

### 1.3.3 Study requirements

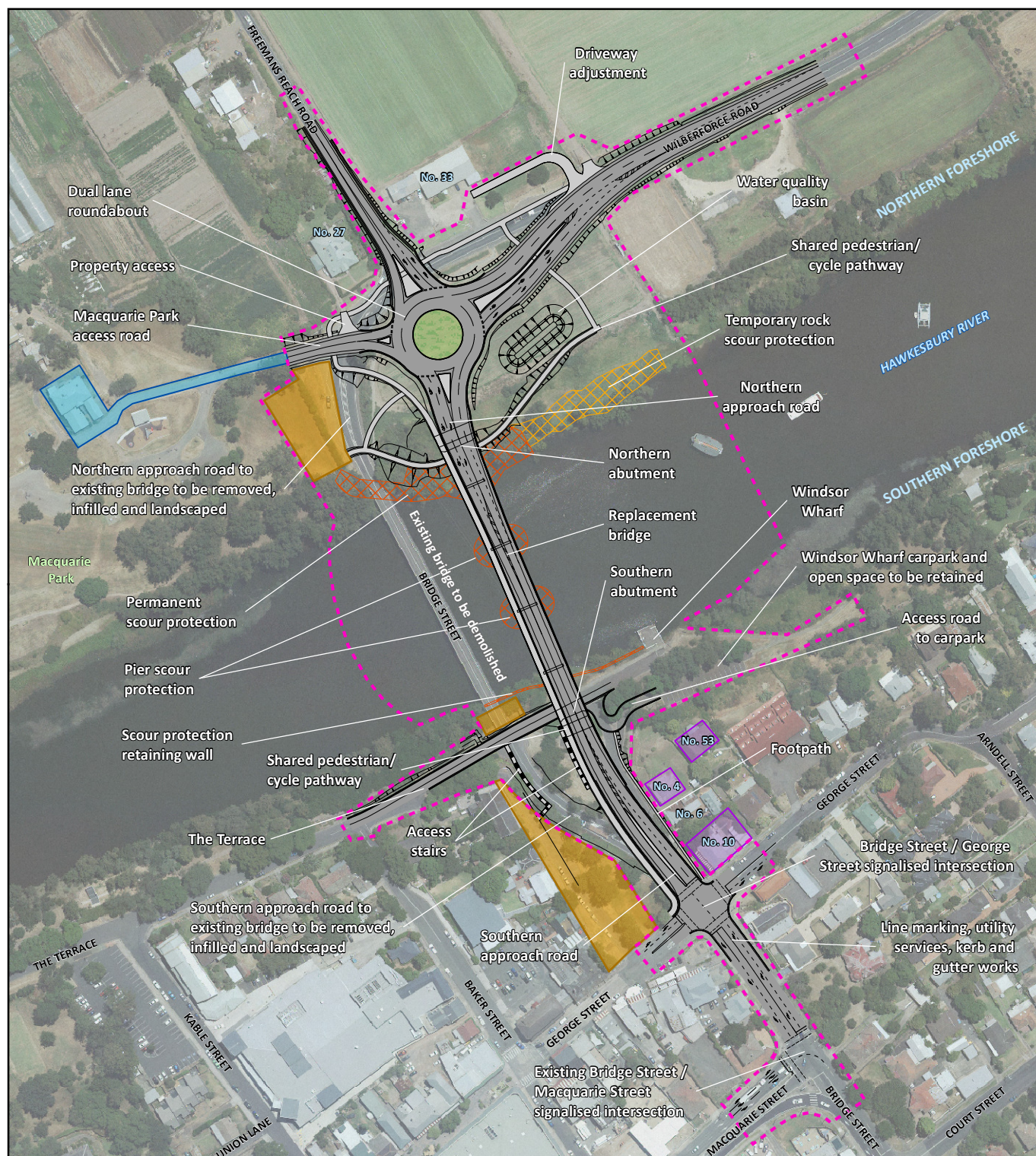
The Director General's Environmental Assessment Requirements relevant to the land use, property and socio-economic assessment are outlined in **Table 1-2**.

**Table 1-2 Director General's Environmental Assessment Requirements**

Requirements	Where addressed
Impacts on directly affected properties and land uses, including impacts related to access, land use, property acquisition and amenity related changes.	Sections 4.1, 4.2 and 4.3.
Impacts of the project on tourist and recreational uses of Thompson Square, the town centre and the Hawkesbury River and its foreshores.	Sections 4.4 and 4.5
Social and economic impacts to the Windsor town centre businesses and the community associated with traffic, access, property, public domain and amenity related changes.	Sections 4.4 and 4.5



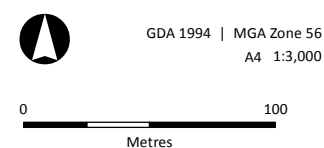
Figure 1-1 | Key project elements



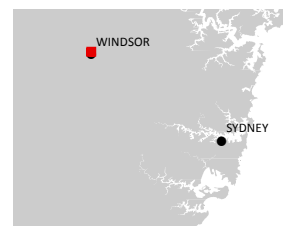
#### LEGEND

- Concept design
- Construction work zone
- Permanent rock scour protection (if required)
- Temporary rock scour protection (if required)
- 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 council and stakeholder consultation

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Indicative only – subject to detailed design



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## 2 Assessment methodology

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### 2.1 Assessment approach

This section provides an overview of the approach used to assess potential land use, property and socio-economic impacts associated with the design, construction and operation of the project.

#### 2.1.1 Scoping of issues

The scoping of issues involved consideration of the range of potential land use, property and socio-economic impacts of the project. The range of potential impacts considered was informed by:

- The Director General's environmental assessment requirements.
- Previous land use, property and socio-economic assessments undertaken for the project.
- Socio-economic impact assessments undertaken during the options analysis and for road projects elsewhere.
- Observations of the project site and surrounding area, including a visual survey of land uses and businesses near to the existing bridge.
- Consultation undertaken for the project, including during the options analysis phase and as part of the preparation of this EIS, particularly feedback on the preferred option.

#### 2.1.2 Existing land use, property and socio-economic environment

The description of the existing land use, property and socio-economic environment provides a baseline from which impacts of the project can be assessed. It included both qualitative and quantitative analysis, including:

- A review of relevant social, economic, land use and planning policies and strategies, including local and state government strategies and policies.
- Review of existing and proposed future land uses.
- Analysis of key population and demographic indicators, to identify those groups within the community that may be vulnerable to changes brought about by the project, due to such things as their level of economic resources, age, need for assistance and cultural background.
- Review of economic data, including that relating to employment, income and local business and industry indicators; housing costs and dwelling characteristics.
- A visual site analysis of local businesses, including the nature and types of businesses directly adjacent to the project and Thompson Square.
- Identification of tourist and recreational uses new to the project, including key tourist destinations and facilities.
- Analysis of existing transport and access, including journey to work data; freight forecasts; local and regional road network; and public transport, walking and cycling facilities.
- Review of existing and planned social infrastructure, including open space and community services and facilities closest to the project.

- Identification of existing community values, including those relating to local amenity and character, local access and connectivity, community cohesion and environmental values. This was informed by existing local and state government social policies, outcomes of community consultation, observations from the site visit and desktop data analysis.

### 2.1.3 Impact assessment and management

Potential benefits for and impacts on local and regional land use, property and the socio-economic environment were identified and evaluated. This included an assessment of direct and indirect impacts associated with the project's design, construction and operation, including:

- Property impacts, such as impacts of property acquisition and changes to access.
- Impacts on local amenity, including the public domain, social infrastructure, open space and local business.
- Changes to local and regional access and connectivity, including for properties in the vicinity of the project.
- Land use impacts, such as changes to existing land use and implications of future development.
- Impacts on the local and regional economy, including an assessment of the project's contribution to the regional economy during construction and operation and the economic benefits from improved access and connectivity across the region.
- Impacts on local business including potential changes to business income/turnover and sustainability and impacts on local employment. This included consideration of factors such as changes to passing traffic, accessibility, visibility and amenity.
- Opportunities and impacts for regional industry including through economic benefits from improved access and connectivity in the region.
- Potential impacts and opportunities for tourist and recreational access and uses in Windsor specifically, the town centre, Thompson Square, and the Hawkesbury River and its foreshores.
- Impacts on community values due to the construction and operation of the project.
- Potential impacts on social infrastructure, including both direct and indirect impacts on local, district and regional level community services and facilities.
- Based on the assessment of potential impacts, mitigation and management measures were identified to enhance project benefits and avoid or reduce potential adverse impacts of construction and operation.

## 2.2 Data sources

This assessment considers at the potential benefits and impacts of the project's planning, construction and operation on local and regional communities. The study area for this assessment includes the Hawkesbury local government area and the Australian Bureau of Statistics (ABS) defined Windsor state suburb.

These demographic areas are shown in **Figure 2-1**.

This report mainly presents data for the Windsor state suburb. Where data is not available at the state suburb level, data is presented for the Hawkesbury local government area, it is assumed that this data is reflective of the existing environment within the Windsor state suburb and is supported by other statistics where the data is available. Data is also provided for NSW to provide a comparison to trends, where relevant.

The description of the existing environment has been based on the 2011 ABS Census of Population and Housing. Where data from the 2011 Census is not available, data from the 2006 Census has been used. Data may not be available as 2011 census data is being released in stages and was not publicly available in entirety at the time of preparation. **Table 2-1** specifies which data presented in the report was obtained from the 2011 or 2006 Census.

**Table 2-1 Data used from 2011 and 2006 Census**

2011 Census Data	2006 Census Data
<ul style="list-style-type: none"> <li>• Population</li> <li>• Age</li> <li>• Indigenous status</li> <li>• Overseas born</li> <li>• Speaks language other than English at home</li> <li>• Need for assistance</li> <li>• Income</li> </ul>	<ul style="list-style-type: none"> <li>• Socio-economic index for areas</li> <li>• Occupation</li> <li>• Industry of employment</li> <li>• Unemployment</li> <li>• Labour force participation</li> </ul>

*Source: 2006 and 2011 ABS Census of Population and Housing.*

The baseline review also draws from the following data sources:

- The ABS, on National Regional Profiles and counts of Australian businesses.
- The Department of Education, Employment and Workplace Relations, on unemployment.
- Space Time Research Pty Ltd, including on employment forecasts by industry.
- Transport and Infrastructure, Transport Data Centre; including transport indicators for the Hawkesbury local government area.
- A survey of pedestrian and cyclist movements conducted by Skyhigh Data Australia Pty Ltd in late 2009, at Bridge and Macquarie streets; Bridge and George streets; Bridge Street and Wilberforce Road; and Palmer and George streets.

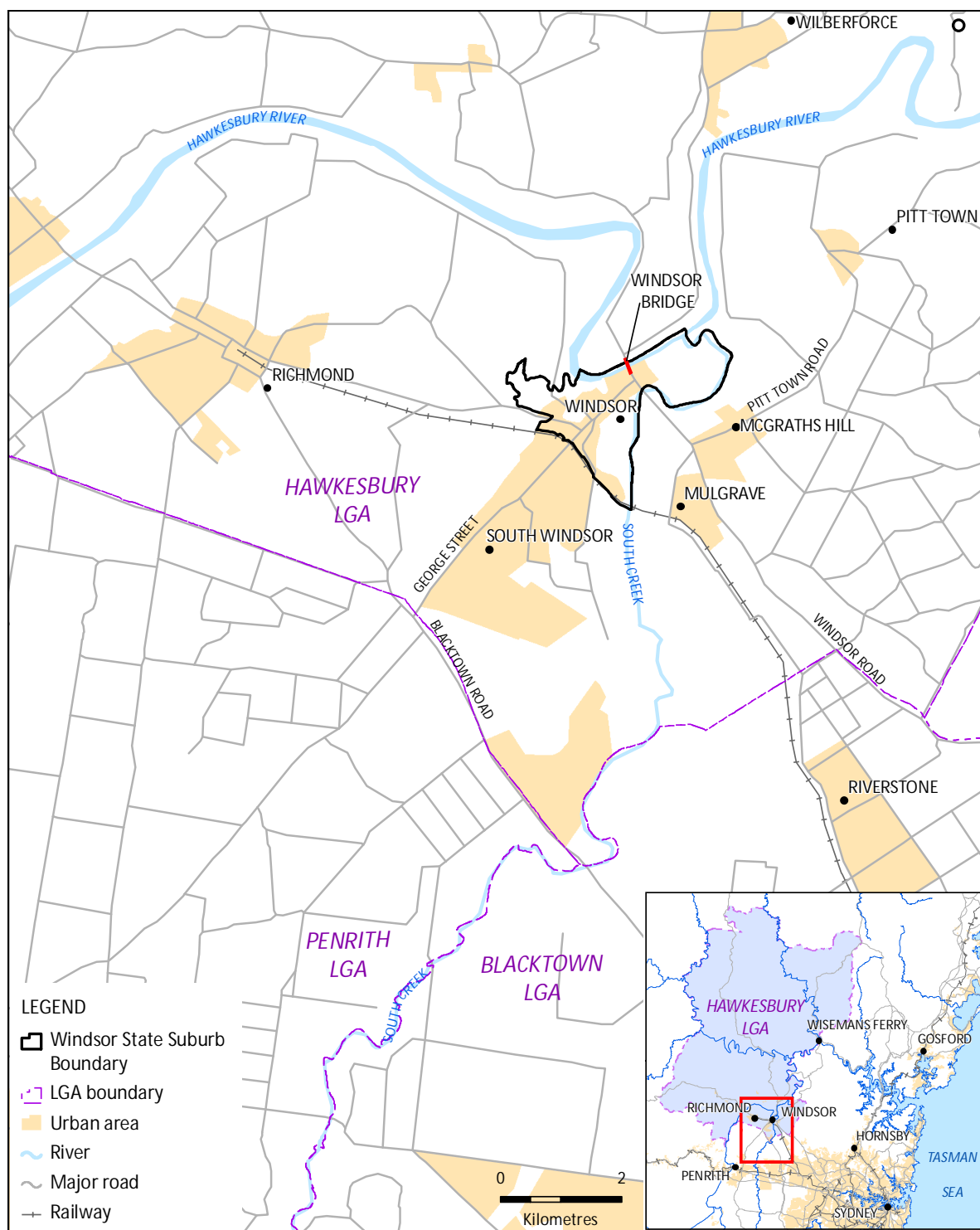
## 2.3 Community and stakeholder consultation

This assessment has been informed by the outcomes of community and stakeholder consultation undertaken by RMS for the project. This includes consultation undertaken for:

- The selection of a preferred option, undertaken in July and August 2009.
- The preferred option, undertaken in August and September 2011.
- Further development of the project including potential types of replacement bridge and potential urban design options for Thompson Square from September 2011 to June 2012.

In addition, this assessment has been informed by surveys of local businesses and business patrons in the Windsor town centre undertaken in December 2009. The purpose of these surveys were to collect information about the current function of the Windsor town centre and potential impacts of the two bridge replacement options on the existing town centre. Specifically, information was sought about the level of trade attributed to passing traffic; customer origin and travel patterns; the purpose of visit; and reasons for visiting the Windsor town centre over other centres.

The business survey involved 55 businesses within the town centre, while the survey of patrons included 254 respondents. A summary of key findings from the survey, relevant to this assessment, is provided in **Appendix A**.



**Figure 2-1 Demographic areas of assessment**

## 3 Existing environment

This chapter provides an overview of existing land use, planning and socio-economic conditions, including key demographic and economic indicators, along with an overview of the local and regional policy context. Additional demographic information is also provided in **Appendix A**.

### 3.1 Legislative and policy context

#### 3.1.1 Legislative context

##### **Environmental Planning and Assessment Act 1979**

The *Environmental Planning and Assessment Act 1979* is the primary legislation governing land use and development in NSW. It provides the framework for assessment of RMS activities through the process of undertaking an environmental impact assessment. For this project an Environmental Impact Statement (EIS) prepared and determined under Part 5.1 is required, of which this report is part. This project is declared as State significant infrastructure under section 115U of the Act, and is to be determined by the NSW Minister for Planning and Infrastructure.

The objectives of the *Environmental Planning and Assessment Act* include the promotion of the social and economic welfare of the community and to provide increased opportunity for public involvement and participation in environmental planning and assessment.

#### 3.1.2 Local and regional policy context

##### **Draft North West Sub-regional Strategy 2007**

The draft North West Sub-regional Strategy was released by the NSW Government in December 2007. It covers the Baulkham Hills, Blacktown, Blue Mountains, Hawkesbury and Penrith local government areas. The strategy identifies a number of town centres, including Windsor and Richmond (located approximately 7 kilometres from the project site), which play an important role in serving the surrounding catchments.

The project supports the objectives of the strategy and the ongoing role of Windsor as a retail, commercial and community centre serving a regional catchment through the provision of improved access and connectivity for communities of the Hawkesbury River. The actions identified in the strategy relevant to the project are listed in **Table 3-1**.

**Table 3-1 Relevant actions – Draft North West Sub-regional Strategy**

Theme	Action	Project relevance
Centres and Corridors	<ul style="list-style-type: none"><li>• Use government assets and investment to support centres.</li><li>• Support centres with transport infrastructure and service</li></ul>	<ul style="list-style-type: none"><li>• The project would improve local transport infrastructure.</li></ul>
Transport	<ul style="list-style-type: none"><li>• Improve operational management of existing transport networks.</li><li>• Improve local and regional walking and cycling networks.</li></ul>	<ul style="list-style-type: none"><li>• The project would improve the operation and capacity of existing transport networks and improve walking and cycling networks.</li></ul>

Theme	Action	Project relevance
Parks, public places and culture	<ul style="list-style-type: none"> <li>Improve access to waterways and links between bushland, parks and centres.</li> </ul>	<ul style="list-style-type: none"> <li>The reconfiguration of the Thompson Square would improve pedestrian and vehicular access and connections to the Hawkesbury River from the Windsor town centre.</li> </ul>

Source: Draft North West Subregional Strategy, 2007.

### Hawkesbury Community Strategic Plan 2010-2030

The Hawkesbury Community Strategic Plan 2010-2030 was adopted by the Hawkesbury City Council in October 2009. The plan sets out the key community aspirations for the community under five vision statements. Themes and selected directions in the plan of relevance to this investigation are outlined in **Table 3-2**.

**Table 3-2 Relevant strategies – Hawkesbury City Council Community Strategic Plan**

Vision	Strategies	Project relevance
Looking after people and place	<ul style="list-style-type: none"> <li>(Ensure) population growth is matched with the provision of infrastructure and is sympathetic to the rural, environmental, heritage values and character of the Hawkesbury local government area.</li> </ul>	<p>The project provides improved transport infrastructure to support the existing and future population in Windsor and surrounding areas.</p> <p>The project will have both positive and negative impacts on heritage listed Thompson Square; however the design of the bridge and rehabilitation of the square considers the heritage and aesthetic context.</p>
Caring for our environment	<ul style="list-style-type: none"> <li>Be a place where we value, protect, and enhance the cultural and environmental character of Hawkesbury's towns, villages and rural landscapes.</li> <li>Look after our cultural and environmental assets for future generations so that they too can enjoy and benefit from a clean river and natural eco-systems, rural and cultural landscapes.</li> </ul>	<p>Parts of the project area are located in State heritage-listed Thompson Square, an area highly valued for its contribution to the Windsor character and landscape. The bridge crosses the Hawkesbury River, an environmental asset highly valued by the local and regional community. A primary project objective is to minimise the project's impact on the heritage elements and character of the town. This aligns with the strategic plan strategy to value and protect and look after the cultural heritage of the area. The project also aims to meet the long term community needs through the provision of a safe and efficient transport connection.</p>

Vision	Strategies	Project relevance
Linking the Hawkesbury	<ul style="list-style-type: none"> <li>Have a comprehensive system of transport connections which link people and products across the Hawkesbury local government area and with surrounding regions.</li> <li>Have a comprehensive system of well maintained local and regional roads to serve the needs of the community.</li> <li>Plan for, maintain and renew our physical infrastructure and community services, facilities and communication connections for the benefit of residents, visitors and businesses.</li> </ul>	The project provides improved movement of traffic through Windsor and accessibility of the Windsor town centre and surrounding towns.
Supporting business and local jobs	<ul style="list-style-type: none"> <li>Help create thriving town centres, each with its own character that attracts residents, visitors and businesses</li> </ul>	The project allows safe and efficient access to the Windsor town centre.

Source: Hawkesbury Community Strategic Plan, 2010.

### Hawkesbury Employment Lands Strategy (2008)

The Hawkesbury Employment Lands Strategy 2008 provides a framework to support and enhance the Hawkesbury region's competitiveness. The Windsor town centre serves as the Hawkesbury local government area's traditional retail main street centre.

The strategy found the Windsor town centre is performing well, with no additional floor space capacity and few vacant properties. Proposed strategies outlined in the Hawkesbury Employment Lands Strategy relevant to the project are outlined in **Table 3-3**.

**Table 3-3 Relevant strategies – Hawkesbury Employment Lands Strategy**

Strategy	Project relevance
Capitalise on existing transport infrastructure and lobby for improved service.	The project would improve connections to existing road infrastructure locally and regionally, through safer access, improved traffic flow and improved flood immunity.
Support specialised industry sectors including agriculture.	The project would facilitate reduced freight transport costs potentially improving the efficiency of existing agricultural industries.

Source: Hawkesbury Employment Lands Strategy, 2008.

## Hawkesbury Residential Lands Strategy

The Hawkesbury Residential Land Strategy was released in 2011. The objectives of the strategy were to:

- Accommodate between 5,000 and 6,000 additional dwellings by 2031, primarily within the existing urban areas identified in the Department of Planning's North West Sub-regional Strategy.
- Preserve the unique and high quality natural environment of the local government area.
- Accommodate changing population, which presents new demands in terms of housing, services and access.
- Identify ongoing development pressures to expand into natural and rural areas, as well as new development both in and around existing centres.
- Identify physical constraints of flood, native vegetation and bushfire risk.

The strategy identified a number of key issues. Those key issues relevant to the project are outlined in **Table 3-4**.

**Table 3-4 Key issues – Hawkesbury Residential Lands Strategy**

Key Issues	Project relevance
Flooding - The Hawkesbury local government area is dominated by several river systems which are prone to flooding, including the Windsor Bridge. The corridor of high urban development within Windsor and Bligh Park requires resolution of flood constraints.	The Windsor Bridge replacement will be designed to achieve a higher flood immunity than the existing bridge and similar to the existing regional road network.
The strategy recognises the reliance on the private motor car due to limited public transport services. Windsor Road is highlighted as a key road providing access to Hawkesbury local government area.	The project improves road access for residents, visitors and business between the Hawkesbury local government area and surrounding regions. Improved road access was identified by local residents in a community survey conducted by Hawkesbury City Council along with improving local roads.
Development in close proximity to heritage items should be assessed for its impact on the heritage environment with the urban design of the heritage item treated sensitively.	The project is located in Thompson Square, which is a significant heritage place in Windsor. The project is undergoing a comprehensive EIS process which includes detailed heritage assessments.  Appropriate measures should be implemented to mitigate construction impacts. During operation, rehabilitation of Thompson Square and bridge design considers the heritage and aesthetic importance, and provides improved access to the waterfront.
Future urban development should be located within existing or proposed centres to maximise co-location with employment centres in the local government area.	The project provides improved regional transport linkages, and supports industry growth through lowered cost of transport.

Source: *Hawkesbury Residential Lands Strategy, 2011.*



## **Hawkesbury Local Environmental Plan 2012**

Land use and development within Windsor is primarily controlled through the zoning provisions of *Hawkesbury Local Environmental Plan 2012*. The project generally aligns with the objectives of the local environmental plan.

### **3.2 Existing land use, property and socio-economic context**

This section describes the existing land use, property and socio-economic conditions of Windsor and the Hawkesbury local government area. It includes an overview of local and regional communities, existing land uses, key population and demographic characteristics, employment and industry data, social infrastructure and likely community values.

#### **3.2.1 Existing land uses**

##### **Regional land use**

Land use in the Hawkesbury local government area is generally characterised by pastoral and agricultural lands, business and industry, residential and tourism and recreational uses. Key characteristics of land use and development in the Hawkesbury local government area include:

- The primary retail and commercial centres within the local government area are located in Windsor and Richmond, with these providing a range of facilities for local residents and businesses, including supermarkets, community facilities, medical centres, schools and other key infrastructure services.
- Important government and community facilities such as the combined Hawkesbury District Health Service and Hawkesbury Private Hospital, located one kilometre from the Windsor town centre on Macquarie Street, and the Richmond RAAF base, located on the Hawkesbury Valley Highway at Richmond. The University of Western Sydney (located in Richmond) is a key contributor to employment and tertiary education in the region.
- Agricultural land in the region provides a substantial resource base for the Sydney basin, including dairy farming and food production. The Hawkesbury River estuary supports the second largest commercial coastal fishery of estuary prawns and fish in NSW with a wholesale value of \$6.3 million annually (<http://www.hn.cma.nsw.gov.au/>). Large turf farms are located adjacent to the project area and within the Hawkesbury local government area.
- Tourism is a key industry for the region, building on the area's European and Indigenous heritage and natural values. The area around the project includes a number of tourist uses and attractions, such as the Hawkesbury Paddle Wheeler and the Hawkesbury Regional Gallery.
- The Hawkesbury River, which provides important environmental, amenity and recreational values, and which supports a range of tourist and primary industry uses. Recreational uses include the Bridge to Bridge Power Boat Race and the Bridge to Bridge Water Ski Classic held annually in Windsor.
- Cultural facilities in the region comprise gallery and visual arts, performing arts, writers' facilities and major museum and/or heritage facilities such as the Hawkesbury Regional Museum and Hawkesbury Regional Gallery.
- Environmental features, such as the Hawkesbury River, Windsor Downs Nature Reserve, Scheyville National Park, Cattai National Park and access to the Blue Mountains National Park.

- The potential for urban growth is constrained by the area's built and natural environment, including location of national parks, bushfire prone areas, flooding along the Hawkesbury River, limited development capacity within existing centres, high value agricultural land and the Richmond RAAF base.

### **Windsor town centre**

The Windsor town centre is located in the Hawkesbury local government area, about 57 kilometres northwest of Sydney. Nearby centres include the Richmond town centre and the villages of North Richmond and Wilberforce within the Hawkesbury local government area and Riverstone in the Blacktown local government area.

The Windsor town centre and the surrounding areas lie within the floodplains of the Hawkesbury River. The town centre is located on a small ridge above the Hawkesbury River on its southern bank, and is surrounded by a semi-rural landscape. The landscape character, including several heritage listed buildings and spaces, as well as the rural amenity of the Windsor are important local values and contribute to the identity of the town and sense of place. Employment in the town centre is focused on local retail and service functions. The public domain is characterised by heritage buildings, particularly around Thompson Square.

Key land uses within the town centre include:

- Residential uses, primarily comprising detached dwellings and rural residential living and farming properties.
- Commercial / industrial uses at Windsor and South Windsor, which support a broad mix of industrial uses.
- Education, health and community services and retail uses, which provide the region with a high level of employment self containment.
- Pastoral / agricultural uses located north and south of the Windsor town centre, extending to Ebenezer in the north, and Marsden Park in the south.
- Heritage buildings and spaces, including Thompson Square, which is valued as the last remaining town square from the original five towns planned and designed by Governor Macquarie. The square originated in 1795 and has undergone a number of changes over time. It serves as an important area of open space linking the Windsor town centre to the Hawkesbury River.

The existing Windsor Bridge is located adjacent to the town centre, crossing the Hawkesbury River to Freemans Reach Road and Wilberforce Road on the north bank of the river. The bridge currently carries around 19,000 vehicles per day, of which about seven per cent comprise heavy vehicles. The bridge approach (Bridge Street) runs through the Windsor town centre, with the current alignment diagonally traversing Thompson Square. Community members identified that disruption to access across the bridge due to flooding had occurred on at least 59 occasions over the past 100 years. The nearest alternative bridge crossing of the Hawkesbury River is located at Richmond. The existing bridge is valued by the local community for its heritage character, and the role it played in the development of Windsor. In particular, the bridge provided road connection to Sydney and supported the agricultural role of Windsor and the surrounding areas. The bridge is also seen to demonstrate the changing economy, political concerns of different periods and general progress of the region, as discussed in the Non-Aboriginal Cultural Heritage Working Paper.

Land uses on the southern side of Windsor Bridge include residential, commercial, retail and professional uses. Land to the south and south-west of the bridge mainly comprises urban residences. Residential uses are more sparsely located on the northern side of the bridge, consisting mostly of open farmland and rural-residential dwellings. Two detached residential dwellings are located within the immediate vicinity of the project site, on either side of the bridge. Additionally, two residential units are located above the music shop on Bridge Street. Residential uses are more sparsely located on the northern side of the bridge, with most residents living on farming properties. Businesses directly adjacent to the proposed replacement bridge alignment include a hotel, music shop and solicitors office.

### 3.2.2 Population and age

#### Population and growth

In 2011, Windsor had a population of 1,803 people. At the same time, the Hawkesbury local government area had a population of 62,353 people (ABS, 2012). **Table 3-5** shows population growth for Windsor the Hawkesbury local government area and NSW between 2006 and 2011. Annual population growth in the Hawkesbury local government area was below the rate of growth for NSW during this time, while average annual population growth in Windsor exceeded the state average.

**Table 3-5 Population growth 2006-2011**

Region	Population	Average annual population growth 2006-2011 (percent)
Windsor	1,803	1.58
Hawkesbury local government area	62,353	0.08
NSW	7,300,000	1.13

Source: ABS (2006) Census of Population and Housing and ABS (2011) Census of Population and Housing.

The population of the Hawkesbury local government area is projected to increase to 90,083 people by 2036, an average of 1.5 per cent annually. Over the same period, average rate of population growth in NSW is projected to be lower, at 1.1 per cent annually.

Projected population growth for the Hawkesbury local government area and NSW between 2006 and 2036 are shown in **Table 3-6**.

**Table 3-6 Population growth, 2006-2036**

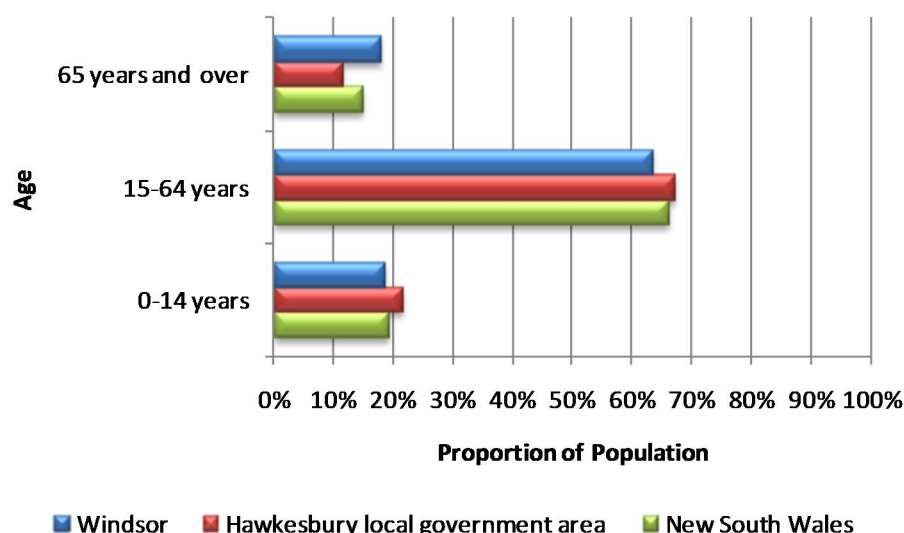
Region	2006	2016	2026	2036	Average annual growth rate per cent
Hawkesbury LGA	62,105	67,222	77,877	90,083	1.5
NSW	6,816,100	7,559,600	8,322,800	9,066,100	1.1

Source: NSW Department of Planning and Infrastructure, local area population projects, 2010

#### Age profile

In 2011, Windsor had an older age profile compared to the Hawkesbury local government area and NSW, with higher proportions of people aged 65 years and over. At the same time, Windsor also had lower proportions of people aged 0-14 and 15-64 compared to the Hawkesbury local government area and NSW.

However, the Hawkesbury local government area had a higher proportion of working aged people (aged 15 to 64 years) compared to NSW as a whole.



**Figure 3-1 Age distribution – 2011**

Source: ABS, 2011 Census Community Profiles

### 3.2.3 Cultural Diversity

Windsor generally had lower levels of cultural diversity in 2011 compared to NSW, with lower proportions of people born overseas and people who spoke a language other than English at home.

However, Windsor demonstrated greater cultural diversity compared to the wider Hawkesbury local government area, with higher proportions of Indigenous peoples, overseas born persons and persons who spoke a language other than English at home. Windsor had also had a significantly higher proportion of Indigenous peoples compared to NSW as a whole, at 4.8% of the population in Windsor compared to 2.5% of the population in NSW.

Cultural diversity indicators, including Indigenous persons, overseas born persons and persons who speak a language other than English at home are shown in **Table 3-7**.

**Table 3-7 Cultural diversity, 2011**

Locality	Indigenous people (per cent)	Overseas born (per cent)	Speaks language other than English at home (per cent)
Windsor	4.8	14.1	5.9
Hawkesbury LGA	2.6	12.6	5.3
NSW	2.5	25.7	22.5

Source: ABS Population Census, 2011.

### 3.2.4 Levels of disadvantage and need for assistance

#### **Socio-economic index for areas (SEIFA)**

The ABS produces a number of socio-economic indices that identify areas of relative advantage and disadvantage. The index of relative socio-economic advantage/disadvantage is a continuum of advantage to disadvantage. It considers indicators relating to family income, education, occupation type, wealth and living conditions to determine the relative level of advantage or disadvantage an area may experience relative to all other areas in Australia. While a score in the fifth or sixth decile<sup>1</sup> is average, a higher score indicates a relative lack of disadvantage and greater advantage in general, reflecting many households with high incomes, or many people in skilled occupations and few households with low incomes or few people in unskilled occupations (ABS, 2006).

Information on levels of advantage/disadvantage is available from the 2006 Census data and is presented at the census collector district level. Levels of advantage/disadvantage varied across the local government area, with some census collector districts demonstrating high levels of disadvantage (within the bottom three deciles), while others demonstrated relatively low levels of disadvantage (within deciles eight to ten).

The census collection districts covering the Windsor town centre had a score of four, indicating a level of relative disadvantage. **Figure 3-2** shows the index of relative socio-economic advantage/disadvantage by Census collector district for the Hawkesbury local government area.

The index of economic resources reflects the economic resources of households, based on indicators such as income, expenditure and assets including wages and rental costs for families, and variables that reflect wealth (eg dwelling size). Income variables are also specified by family structure, as this affects disposable income. Higher deciles indicate an area generally has a greater proportion of high-income families or owner occupied houses. Lower deciles indicate communities that are considered to have less financial resources, reflecting many households with low incomes or paying low rent, and few households with high incomes (ABS, 2006).

**Figure 3-3** provides an overview of socio-economic indices for areas in the Hawkesbury local government area. Households in the wider Hawkesbury local government area generally demonstrated higher levels of economic resources. However, households in the Windsor town centre generally had access to fewer economic resources, with the Census collector districts recording scores within the fourth and fifth deciles.

#### **Need for assistance**

Windsor has relatively high levels of people in need of assistance compared to NSW.

In 2011, 6.7 per cent of people in Windsor needed assistance in one or more of the three core activity areas of self-help, mobility or communication due to disability, a long term health condition or old age. This is compared to 4.9 per cent in NSW (**Table 3-8**). This statistic is likely to reflect the older population within Windsor.

The proportion of people in need of assistance in the Hawkesbury local government area was lower than the state average.

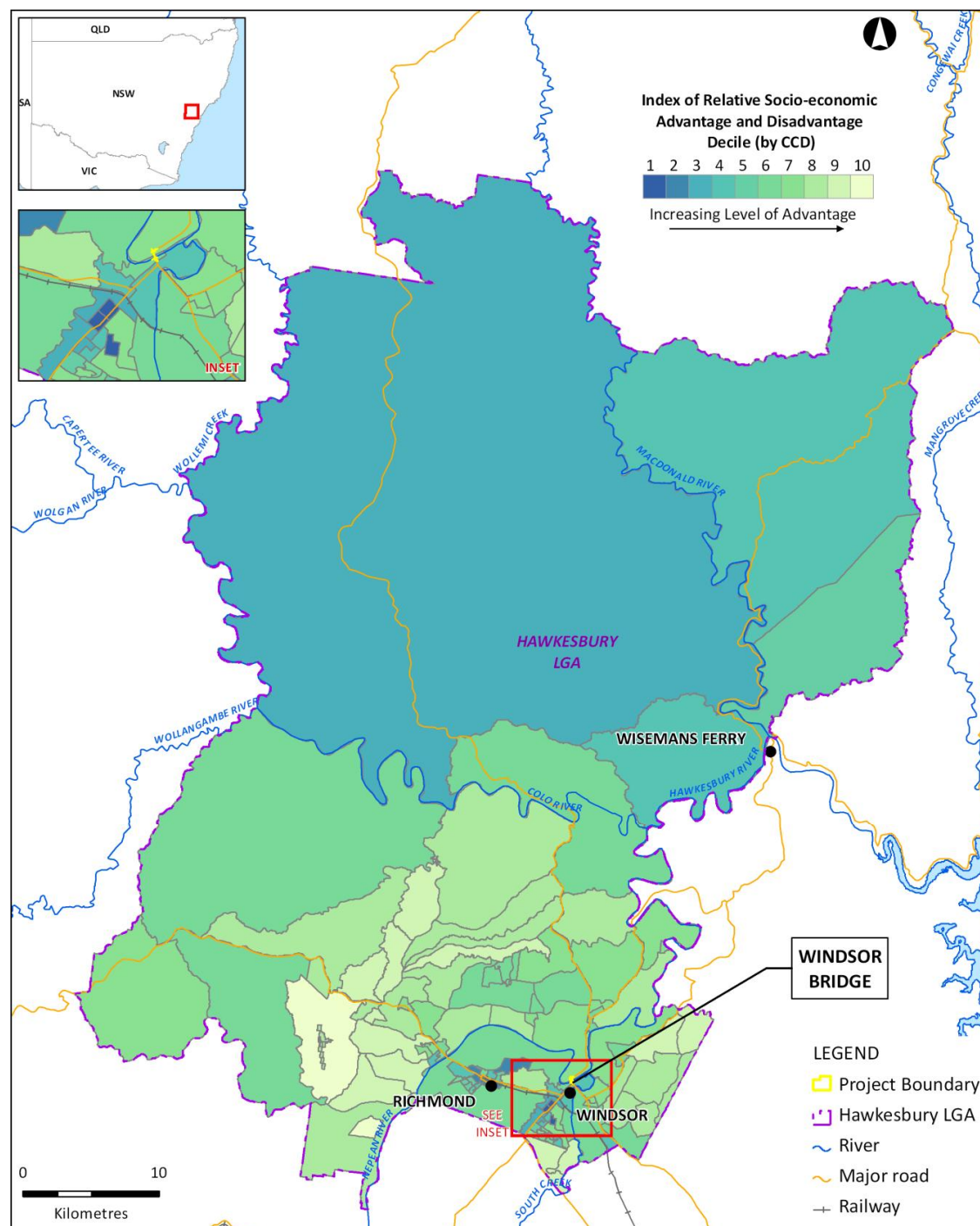
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<sup>1</sup> Deciles divide a distribution into ten equal groups. The lowest scoring 10 per cent of areas are given a decile number of one, the second-lowest 10 per cent of areas are given a decile number of two, up to the highest 10 per cent of areas that are given a decile number of 10 (ABS, 2006a).

**Table 3-8 Need for assistance, 2011**

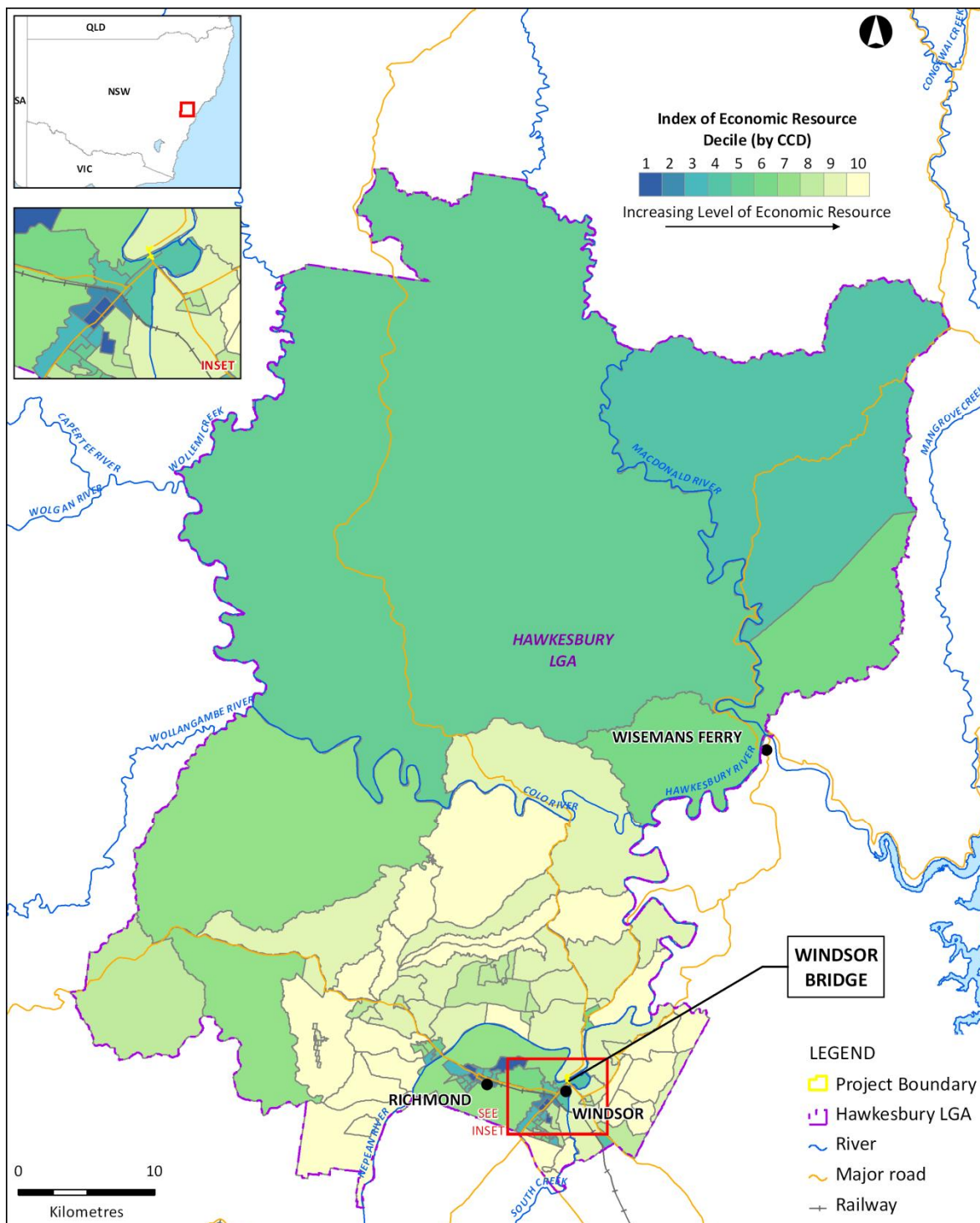
Locality	Need for assistance (per cent)
Windsor	6.7
Hawkesbury local government area	4.0
NSW	4.9

Source: ABS Population Census, 2011.



Source: ABS, Socio-economic indices for areas, 2006.

**Figure 3-2 Index of relative advantage and disadvantage**



Source: ABS, Socio-economic indices for areas, 2006.

**Figure 3-3 Index of economic resources**

### 3.2.5 Labour force, employment and income

#### Occupations and industry of employment

Windsor has a similar workforce to the Hawkesbury local government area, with technicians and trade workers, clerical and administrative workers, professionals and managers being key occupations. In Windsor, professionals comprise the largest occupation group, followed by labourers and machinery operators and drivers. **Table 3-9** provides wage and salary earners by occupation.

**Table 3-9 Wage and salary earners by occupation, 2006**

Occupation	Windsor (per cent)	Hawkesbury LGA (per cent)	NSW (per cent)
Managers	13.2	13.2	13.6
Professionals	16.7	15.2	21.2
Technicians and Trade Workers	14.2	18.7	13.6
Community and Personal Service Workers	9.3	8.8	8.6
Clerical and Administrative Workers	15.5	15.5	15.4
Sales Workers	8.2	8.6	9.7
Machinery Operators and Drivers	7.7	8.2	6.4
Labourers	11.7	10.0	9.5
Inadequately described/not stated	3.5	1.8	0.0

*Source: ABS, 2006 Census community profiles, released 25/10/2007.*

Key employers include manufacturing, construction, retail trade, public administration and safety.

Manufacturing was the largest employing industry in Windsor (11.4 per cent), followed by retail trade (11.0 per cent). The proportion of people employed in retail in Windsor was higher than the Hawkesbury local government area as a whole. The construction industry was the largest employing industry in the Hawkesbury local government area, at 11.6 per cent, followed by manufacturing at 11.3 per cent. The large proportion of people working in the construction industry in the wider region provides opportunities for infrastructure projects to source a predominately local workforce. **Table 3-10** provides an overview of industry of employment.

**Table 3-10 Industry of employment, 2006**

Industry	Windsor (per cent)	Hawkesbury LGA (per cent)	NSW (per cent)
Agriculture, forestry & fishing	2.1	3.2	2.7
Mining	0.8	0.2	0.7
Manufacturing	11.4	11.3	9.6
Electricity, gas, water & waste services	0.4	1.0	1.0
Construction	8.2	11.6	7.3
Wholesale trade	5.4	5.0	4.7
Retail trade	11.0	10.4	11.1



Industry	Windsor (per cent)	Hawkesbury LGA (per cent)	NSW (per cent)
Accommodation & food services	5.8	5.2	6.5
Transport, postal & warehousing	5.4	5.1	5.0
Information media & telecommunications	1.1	1.8	2.4
Financial & insurance services	3.2	2.4	5.0
Rental, hiring & real estate services	1.5	1.6	1.7
Professional, scientific & technical services	5.2	4.7	7.3
Administrative & support services	3.8	2.5	3.1
Public administration & safety	7.9	8.8	6.0
Education & training	7.0	7.7	7.6
Health care & social assistance	9.9	8.7	10.5
Arts & recreation services	1.9	1.4	1.4
Other services	4.9	4.6	3.8
Inadequately described/not stated	2.9	2.7	2.7

Source: ABS, 2006 Census community profiles, released 25/10/2007.

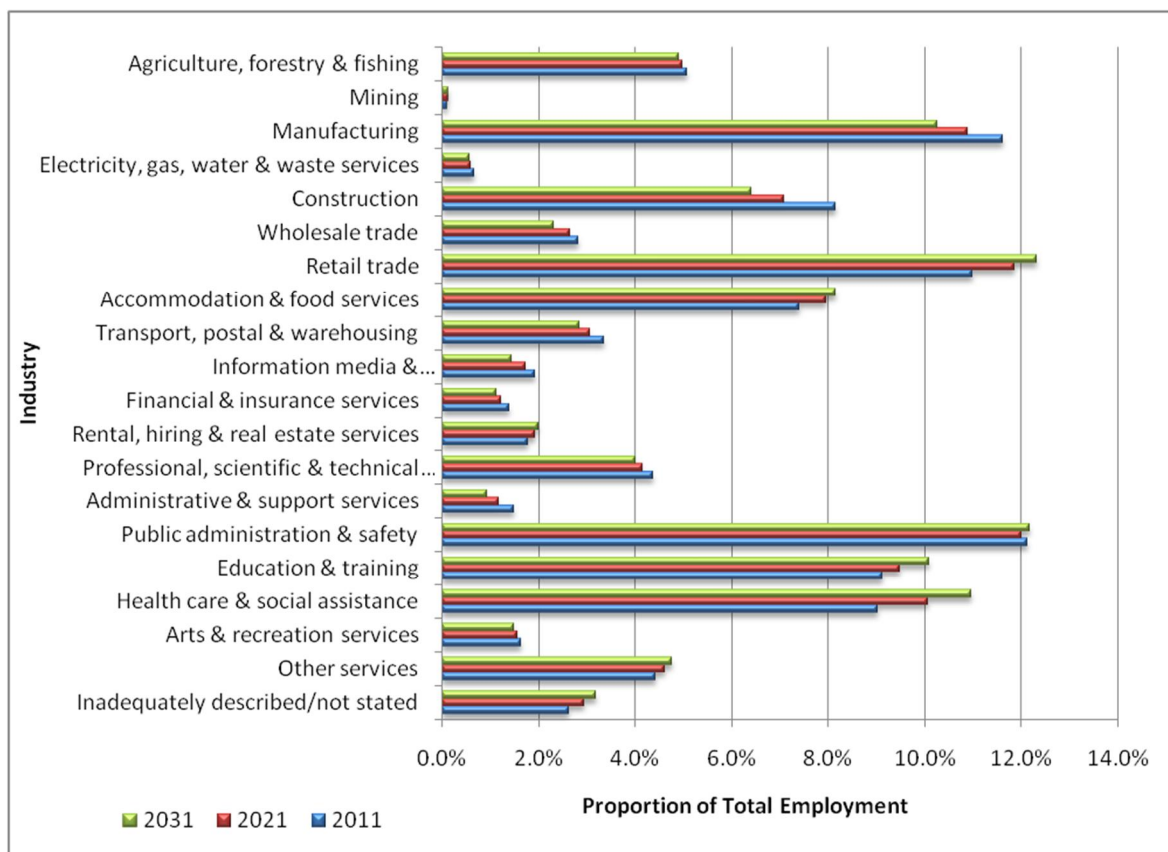
Employment in accommodation and food services industry as well as arts and recreation services, reflects the level of tourism and recreational employment in the Hawkesbury local government area. In 2006, employment in the accommodation and food services industry was slightly below the state average, at 5.8 per cent in Windsor, compared to 6.5 per cent in NSW. The arts and recreation services industry employed a greater proportion of the total workforce in Windsor (at 1.9 per cent), compared to the state average, at 1.4 per cent. Regionally, employment in arts and recreation services is consistent with the state average.

All of these industries are dependent on an efficient transport network, including for freight as well as leisure traffic.

### Employment forecasts

**Figure 3-4** shows industry of employment forecasts for the Hawkesbury local government area. The manufacturing industry is forecast to experience the largest reduction in contribution to employment (2.5 per cent), followed by the construction industry, which is forecast to decline by 2.3 per cent. However, these industries are expected to remain key employers in the region.

Health care and social assistance is forecast as increasingly important in the Hawkesbury local government area to 2031, consistent with the ageing population. These industries strengthen the role of Windsor in providing health and community services and facilities to surrounding communities. Retail trade as well as accommodation and food services are also forecast to increase in terms of contribution to employment, while employment for the arts and recreation services industry is expected to remain stable.



Source: Space Time Research Pty Ltd (October 2009 Release) Employment Forecast: Industry by local government area.

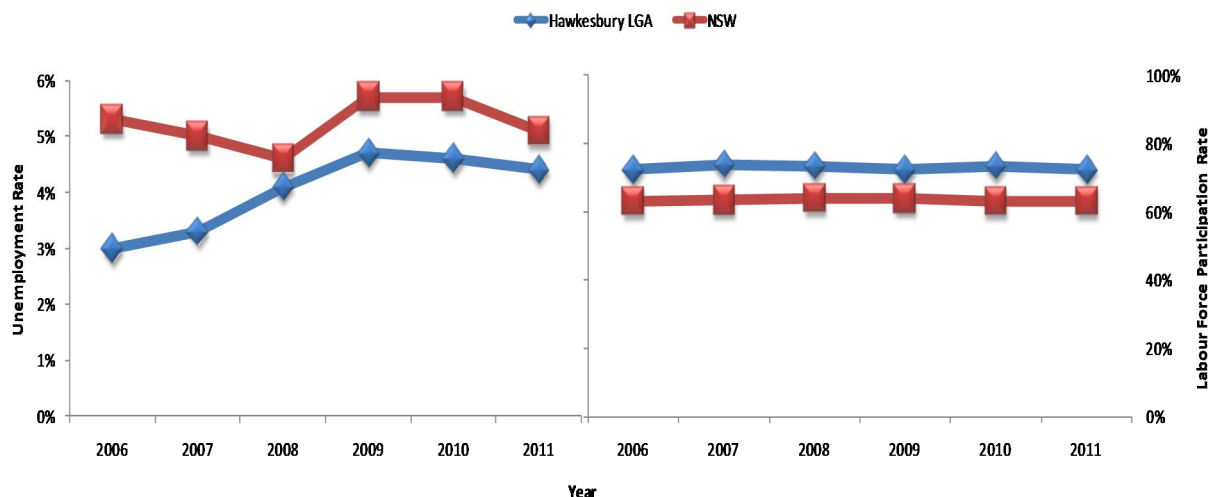
**Figure 3-4 Industry of employment forecasts, Hawkesbury local government area**

Infrastructure and planning required to support forecast industry growth include an efficient road and rail network, as well as potential land re-zoning for commercial activities, due to limited capacity in some parts of the Hawkesbury local government area (SGS Economic Planning, 2008).

## Unemployment

**Figure 3-5** shows labour force participation and unemployment in the Hawkesbury local government area between 2006 and 2011. Labour force participation measures the number of people currently employed or actively seeking employment. The unemployment rate measures the total unemployment relative to workforce participation.

Between 2006 and 2011, unemployment in the Hawkesbury local government area was consistently lower than NSW. At the same time, the labour force participation was consistently higher in the Hawkesbury local government area relative to NSW. This indicates that the economy in the Hawkesbury local government area is comparatively more self-sufficient with regards to employment opportunities relative to the size of the labour force. Potentially adverse implications from a generally low unemployment rate across the Hawkesbury local government area may include regional skills shortages which may reduce the employment capacity in the Hawkesbury local government area, particularly in the construction industry.



Source: ABS (2006-2010) *National Regional Profile* and Department of Education, Employment and Workplace Relations (2011) *Small Area Labour Markets*.

**Figure 3-5 Unemployment and labour force participation trends, 2006-2011**

Between 2008 and 2011, unemployment in the Hawkesbury local government area exhibited trends similar to the state average. An increase in the rate of unemployment was recorded between 2008 and 2009. During this time, the increase in the unemployment rate of the local government area did not lag compared to the state average as would be expected, suggesting that businesses in the Hawkesbury local government area predicted the economic downturn. This is likely due to the importance of the construction industry in the region.

Between 2009 and 2011, the unemployment rate generally recovered. The similarities in employment trends in the Hawkesbury local government area compared to the state average indicates that the economy is not immune to shocks from the wider NSW economy, for both a decline and increase in demand. This is particularly relevant for agricultural industries in the Hawkesbury local government area, since forecast increasing demand for food production from wider NSW will rely on low transport costs to service the Sydney basin (SGS Economic Planning, 2008).

## Income

Windsor had lower levels of median individual income and median family income compared to the Hawkesbury local government area and NSW as a whole.

However, median weekly incomes in the Hawkesbury local government area were higher than the state average in 2011, reflecting the relatively lower levels of unemployment in the Hawkesbury local government area.

**Table 3-11 Median weekly incomes, 2011**

Region	Median individual income (\$)	Median family income (\$)
Windsor	539	1,231
Hawkesbury LGA	622	1,598
NSW	561	1,477

Source: ABS, 2011 Census community profiles, released 21/06/2012.

### 3.3 Business and industry

This section provides an overview of business and industry.

#### 3.3.1 Key industries

The industries which contribute most significantly to employment self-containment in the Hawkesbury local government area include manufacturing, retail trade, education and health and community services and government administration and defence. Key industries which have been identified as potentially impacted by the project, either positively or adversely, include manufacturing, retail trade, agriculture, construction, and tourism.

#### **Manufacturing**

Manufacturing is a key employer in the Hawkesbury local government area. Publishing is a key manufacturing employer, with Rural Press contributing 11 per cent of manufacturing jobs. Other key manufacturers include other transport equipment manufacturing, which contributed 11 per cent of manufacturing jobs, and other wood product manufacturing, which contributed 7 per cent of manufacturing jobs. In Windsor, manufacturing land use is primarily located outside the Windsor town centre in South Windsor (SGS Economic Planning, 2009).

#### **Retail trade**

Retail trade is a key contributor in the Hawkesbury local government area both in terms of employment as well as business turnover (refer to **Appendix Table 2**). Employment forecasts indicate increasing importance, with retail trade expected to be the key employer in the Hawkesbury local government area in 2031. In the Windsor town centre, retail trade comprises the majority of floor space used by business (55.8 per cent). A number of retail establishments are located on George Street within walking distance to the bridge approach (Bridge Street).

#### **Agriculture**

The Hawkesbury region is characterised by an extensive amount of pastoral and agricultural land, containing 16 per cent of vegetable and other crop establishments in the Sydney Basin (ABS, 2006, cited in SGS Economic Planning). This land provides a substantial resource base for the Sydney basin. In 2006, crops producing vegetables for human consumption were the most important crop in the Hawkesbury local government area.

Mushroom farming is one of the key local agricultural sectors. Mushrooms are the second most valuable fresh vegetable crop in Australia, with the Hawkesbury local government area providing almost a quarter of Australian supply. Growth in demand (both domestic and international) for boutique/niche food products has been supported by the success of the Hawkesbury Harvest Farm Gate Trail.

The land immediately north of the Windsor Bridge primarily consists of agricultural uses, including a turf farm on Wilberforce Road. There is no agricultural land located immediately south of the project site.

Dairy farming and commercial fishing comprise the primary agricultural activities around Windsor. The Hawkesbury River estuary supports the second largest commercial coastal fishery of estuary prawns and fish in NSW with a wholesale value of \$6.3 million annually. The productive lower estuary is located approximately 70 kilometres downstream of Windsor. Flows reaching this area are highly reduced due to a number of upstream weirs and reservoirs.

The construction of the bridge may temporarily impact the water quality around Windsor, particularly due to the disruption of sediment. However, the water quality around the estuary is not expected to be impacted. ([www.hn.cma.nsw.gov.au](http://www.hn.cma.nsw.gov.au)).

As well as being an important industry base, the existing agricultural and rural properties in and around the Hawkesbury local government area are important to the local identity of the region.

Challenges for the region's agricultural industry include competition for agricultural land from a number of sectors including residential development and other ancillary uses, as well as water sources for irrigation. With increases in the cost of living, low transport costs associated with food supply are also becoming increasingly important. The Hawkesbury local government area's proximity to metropolitan Sydney helps in minimising transport costs. However adequate road infrastructure is required to sustain lower costs. Management of Hawkesbury's agricultural lands and transport network is gaining increased importance as the issue of food security and food prices are becoming more prominent, representing an economic opportunity for Hawkesbury to continue supplying the Sydney region. **Table 3-12** provides an overview of agricultural commodities including gross value of agricultural production, within the Hawkesbury local government area.

**Table 3-12 Agricultural commodities and gross value of agricultural production, 2006**

Summary characteristic	Hawkesbury local government area	NSW
<b>Agricultural commodities</b>		
Area of holding (hectares)	26 322.2	62 119 244.6
Cereals for grain (hectares)	40.6	5 715 963.8
Vegetables for human consumption (hectares)	1 141.6	19 675.7
Orchard trees (including nuts) (hectares)	383.5	48 830.4
All fruit (excluding grapes) (hectares)	394.6	51 515.7
Non-cereal broadacre crops (hectares)	22.7	726 379.2
Sheep and lambs (number)	606.0	32 145 630
Milk cattle (excluding house cows) (number)	2 033	349 214
Meat cattle (number)	7 242	5 861 972
Pigs (number)	57.0	655 117
<b>Gross value of agricultural production</b>		
Gross value of crops (\$m)	98.5	5 068.4
Gross value of livestock slaughterings (\$m)	6.3	2 762.1
Gross value of livestock products (\$m)	6.5	1 211.0
Total gross value of agricultural production (\$m)	111.3	9 041.5

Source: ABS (2006-2010) National Regional Profile, released 04/11/11.

## Construction

Construction is a key employing industry in the Hawkesbury local government area, and is also a key contributor to jobs in Windsor. Construction businesses also represent the largest number of businesses in the Hawkesbury local government area (refer **Appendix Table 2**).

Sub-sectors which contribute to the strength of the construction sector servicing outer western Sydney include:

- Building construction.
- Non-building construction.
- Site preparation services.
- Building structure services.
- Installation trade services.
- Building completion services.
- Other construction services (SGS Economic Planning, 2009).

## Tourism

Tourism is an important industry for Windsor and the wider Hawkesbury local government area. Between September 2008 and September 2011, an average of 795,000 people visited the Hawkesbury region annually, of which over 80 per cent were day trippers. Key trends include:

- Almost 18 per cent of domestic visitors stayed overnight in the Hawkesbury local government area, with an average length of stay just under three nights.
- The majority of domestic visitors to the Hawkesbury local government area were from NSW (83 per cent), followed by visitors from the Australian Capital Territory (5.7 per cent) and Queensland (4.6 per cent).
- The primary reasons for visiting the Hawkesbury region were for holidays (50.5 per cent) or to visit friends and relatives (32.5 per cent).
- Overnight visitors generally chose to stay with friends or relatives (46.2 per cent), while 11.8 per cent of visitors stayed in hotels, motels and motor inns. .

**Table 3-13** shows key tourist statistics for the Hawkesbury local government area. The data below presents the four year average annual to September 2011.

**Table 3-13 Average annual visitors to the Hawkesbury local government area, 2008 to 2011**

Tourism indicator	Number
Total Visitors ('000)	795
Domestic Daytrip Visitors ('000)	648
Domestic Overnight Visitors	141
Total nights ('000)	495
Average length of stay (nights)	2.8

*Source: Destination NSW, 2011.*

Tourist facilities within the Windsor town centre include:

- Cultural and arts facilities, including the Hawkesbury Museum and Tourist Centre, the Hawkesbury Regional Gallery and the Thompson Square precinct.
- Natural attractions such as the Hawkesbury River and its foreshores and the Windsor Downs Nature Reserve.
- Windsor Wharf, which supports river based tourism operations such as the Hawkesbury Paddle Wheeler.
- Touring routes, trails and heritage walks, see **Table 3-14**.
- Tourist accommodation uses, including caravan parks, hotels and motels and bed and breakfasts.

Tourist facilities located nearest to the project include:

- Thompson Square precinct.
- Macquarie Park.
- Governor Philip Park and a public boat ramp.
- Windsor Wharf.
- The Windsor Motel and the Windsor Terrace Motel, which are located within 200 metres of the project.

Several tourist attractions also contribute to the overall landscape character and heritage value of the Windsor township. For example, Thompson Square, the Hawkesbury Museum and Tourist centre and surrounding buildings are listed on several local and state heritage registers. These buildings contribute to the overall amenity and heritage character of Windsor and are valued by the local community.

**Table 3-14 Key tourist drives and walks in and around Windsor**

Trail or drive	Route
Trails	<ul style="list-style-type: none"> <li>• The Macquarie Trail (Clarendon-Richmond-Windsor-Wilberforce-Pitt Town).</li> <li>• The Harvest Farm Gate Trail.</li> <li>• The Great River Walk.</li> </ul>
Tourist Drives	<ul style="list-style-type: none"> <li>• Greater Blue Mountains Drive.</li> <li>• Bells Line of Road.</li> <li>• Historic Tour of the Hawkesbury River Lowlands.</li> <li>• Scenic Route to Kurrajong.</li> <li>• Circular Drive around the townships of Windsor and Richmond.</li> </ul>
Heritage Walks	<ul style="list-style-type: none"> <li>• Thompson Square precinct.</li> <li>• McQuade Park precinct.</li> </ul>

*Source: Hawkesbury Tourism, 2006, [www.hawkesburytourism.com.au](http://www.hawkesburytourism.com.au).*

Access and connectivity to the region is important in supporting day trippers and overnight visitors, particularly those from the Sydney region. The existing Windsor Bridge also supports access to regional facilities, surrounding tourist regions, and to various tourist drives, heritage walks and trails promoted in the area.

### 3.3.2 Business counts: employment size and turnover

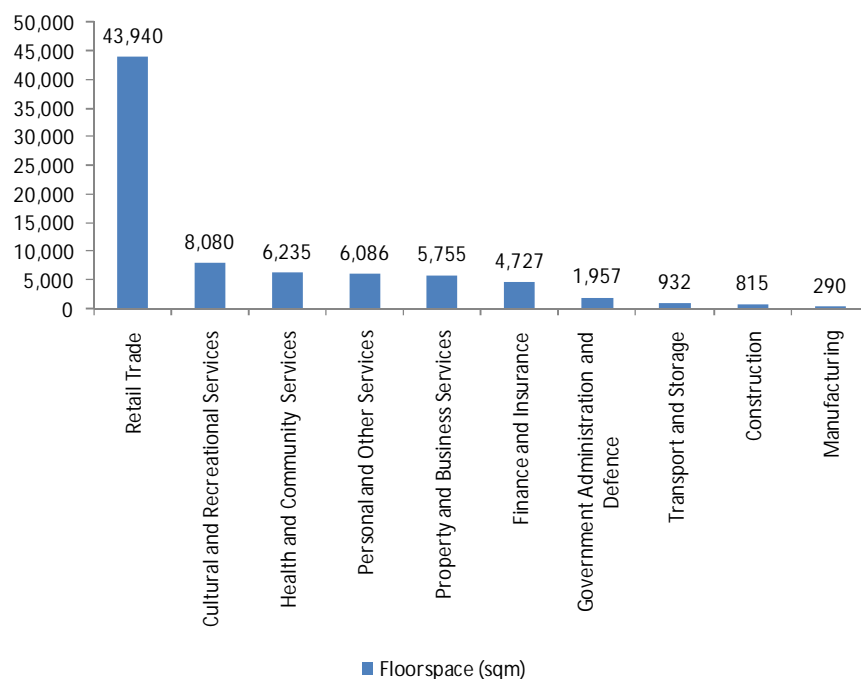
The majority of businesses in the Hawkesbury local government area are non-employing businesses (59.5 per cent). Of employing businesses, most are small businesses employing between one and four people (60.4 per cent).

The majority of businesses are in the construction industry, of which most are non-employing. As discrete categories, most businesses turn over between two hundred thousand to five hundred thousand dollars annually. The majority of these businesses are in the construction industry, as well as the transport, postal and warehousing industry (refer **Appendix Table 2**).

Further information on the number of businesses by industry and employment size in the Hawkesbury local government area is provided in **Appendix A**.

### 3.3.3 Windsor town centre

**Figure 3-6** provides an overview of industry land use in the Windsor town centre. Retail trade comprises the majority of floor space within the town centre, with approximately 43,940 square metres identified for this use.



Source: SGS, 2009, cited in SGS, 2010, p25

**Figure 3-6 Floorspace by Industry, Windsor Town Centre**

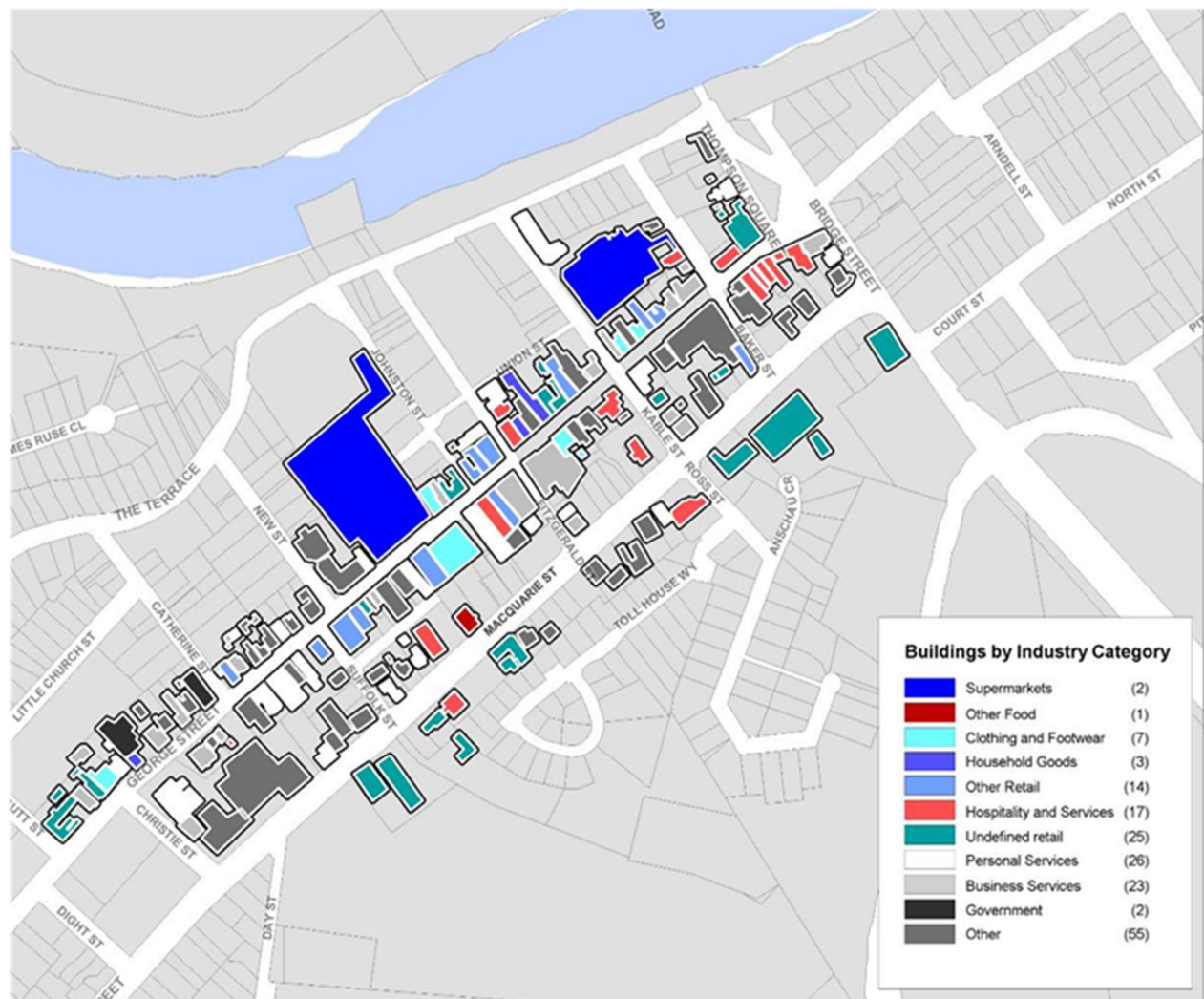
Other dominant industries in terms of floorspace in the town centre indicate a concentration of services based sectors including:

- Cultural and recreational services.
- Health and community services.
- Personal and other services.
- Property and business services.
- Finance and insurance services.



**Figure 3-7** shows the spatial distribution of industries<sup>2</sup> in the Windsor town centre. The majority of retail activity and services in the town centre are clustered on or around George Street, while hospitality businesses are mostly located around Thompson Square.

Businesses within the immediate vicinity of the project include the Windsor Motel, River Music Shop and the Lawyer's House (solicitor's office). The Macquarie Arms Hotel also overlooks Thompson Square.



Source: SGS, 2009, cited in SGS, 2010

**Figure 3-7 Spatial distribution of industries in Windsor town centre**

<sup>2</sup> Industry sectors are described using the Australian and New Zealand Standard Industrial Classification (ANZSIC) system. The ANZSIC has a structure comprising categories at four levels, namely Divisions (the broadest level – also known as 1-digit level), Subdivisions (also known as 2-digit level), Groups (also known as 3-digit level) and Classes (the finest level- also known as 4-digit level) (SGS, 2009, cited in SGS, 2010, p25).

### 3.4 Access and connectivity

Windsor is well serviced by a range of transport services, particularly road and rail. This section provides an overview of access and connectivity within Windsor, with a particular focus on the road network, public transport services and walking and cycling paths.

Further information on key transport indicators is also provided in **Appendix A**.

#### 3.4.1 Road network

Road infrastructure in Windsor provides an important connection to surrounding townships and Sydney.

Residents within the Hawkesbury local government area rely on the motor car for transport, with 84 per cent of trips undertaken by car as either driver or passenger. Public transport use comprises a small amount of travel.

Residents in the Hawkesbury local government area spend more time driving for passenger service, social/recreation purposes and shopping than for work related business and commuter travel. The average work trip duration in the Hawkesbury local government area is 36 minutes, indicating that residents live reasonably close to employment sources but not directly adjacent. The high reliance on vehicle travel for personal and work purposes indicates a reliance on the existing transport network, with local and regional residents likely to experience disadvantage without a functional and efficient road network.

Additional information on the predicted growth in traffic use for the replacement bridge is presented in the Traffic and Transport Working Paper.

The Windsor Bridge crosses the Hawkesbury River at Bridge Street and is a key connection within Windsor and to surrounding towns. Other key roads include:

- Windsor Road and Old Windsor Road in the east, which provides the primary route between Parramatta, greater metropolitan Sydney and the Hawkesbury Region.
- Old Windsor Road, which provides access to the M4 Western Motorway and City West Link Road to Sydney City via Cumberland Highway or James Ruse Drive.
- George Street and the Northern Road, which provide access to South Windsor and Bligh Park directly to the south, and Parramatta and southern New South Wales in the wider region.
- Richmond Road and the Hawkesbury Valley Way, which provide connect Richmond and Windsor.

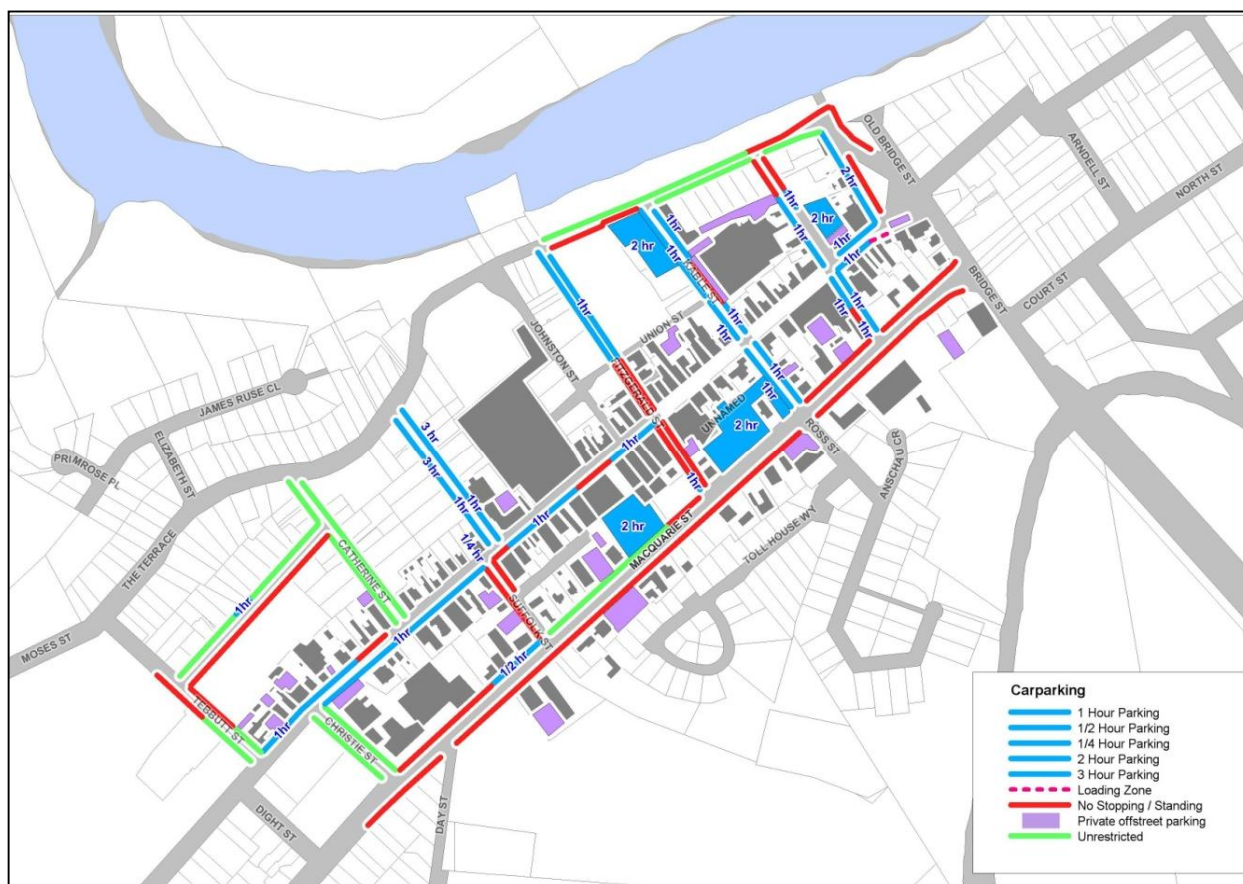
The Windsor town centre is provided with a range of on-street parking options, as shown in **Figure 3-8**. The majority of parking is located on George Street and on side streets. This includes two hour street car parking areas located near the supermarkets and one hour parking on side streets. The survey of business patrons indicated that parking is primarily obtained within 200 metres of the final destination.

#### 3.4.2 Public transport

Windsor is served by both bus and rail public transport options. Bus services are operated by the Hawkesbury Valley Buses and West Buses and Busway seven days a week while school bus services are run on school days in Windsor and the surrounding areas. Frequent services are available between Richmond, Windsor, surrounding towns within Hawkesbury, neighbouring local government areas (ie Penrith) and Sydney.

Numerous bus routes connect Windsor via the Windsor Bridge to areas north of the river, including Wilberforce and Sackville. At least five school bus routes also use the Windsor Bridge.

Windsor train station is located along the North Shore and Western train line and has regular services to Richmond and Sydney.



Source: SGS, 2009, cited in SGS, 2010

**Figure 3-8 Car parking arrangement in Windsor town centre**

### 3.4.3 Active transport

Both off-road and on-road cycleway networks are provided across the Hawkesbury region, although pedestrian and cycleways are generally limited to townships such as Windsor and Richmond.

Key active transport facilities include:

- An on-road cycleway connecting Windsor to Richmond, North Richmond and Kurmond to the west.
- An off-road pedestrian and cycle network, which extends south beyond South Windsor and north to Wilberforce, via the Windsor Bridge.
- Off-road pedestrian and cycleways, between Windsor and Richmond, including along the Hawkesbury River.

The existing Windsor Bridge has a narrow 1.6 metre wide pedestrian/cycleway and it does not meet modern safety codes for protection of pedestrians and cyclists.

The Bike Plan in the Hawkesbury Mobility Plan, identifies that the existing Windsor bridge as a section of on road cycleway that has inadequate lane and shoulder width for cyclists. It was also identified as a major constraint in improving the safety and continuity of the cycleways to north of the river.

The survey of pedestrians and cyclists within the Windsor town centre found that the most significant flows occur at the intersections of Bridge and Macquarie Street, Bridge and George Street, and along George and Macquarie Street with pedestrians and cyclists accessing local businesses (SGS Economics 2009).

Future cycleways are planned to connect Windsor and Pitt Town, and Wilberforce with Freemans Reach (Hawkesbury City Council 2011). The timing of construction for this section of the cycleway is not known at this time. The Windsor Bridge forms an important connection in these planned routes providing access to nearby towns and the Hawkesbury river foreshores.

#### 3.4.4 River transport

The Hawkesbury River is navigable from Windsor to the sea. The river plays an important role in tourist related transport, with the Hawkesbury Riverboat Cruises operating from the Windsor wharf at Governor Phillip Park throughout the year, while houseboats also operate on the Hawkesbury River, including around Windsor.

The villages of Brooklyn, Spencer, and Berowra are located in the lower reaches of the river. The river remains the only form of access to a number of isolated homes, shops and tourist facilities in these communities (Hawkesbury Cruises 2011).

The RMS operates vehicle ferries in the Hawkesbury region, including the Sackville ferry, Webbs Creek ferry and the Wisemans ferry crossing. The Sackville ferry crosses the Hawkesbury River approximately 15 kilometres north of Windsor. This ferry connects the roads linking Windsor and Wisemans Ferry (RMS website 2011).

#### 3.4.5 Freight forecasts

**Table 3-15** shows freight forecasts for the Hawkesbury region to 2036. Articulated trucks are forecast to have the most significant growth in trips, growing by an average of 2.3 per cent annually. Annual growth in rigid truck and light commercial vehicle trips are forecast to be lower, at 1.7 per cent and 1.0 per cent respectively.

The number of freight trips as well as growth in destination trips is forecast as be very similar to origin trips, suggesting freight vehicles are servicing the local area.

**Table 3-15 Freight forecasts, Hawkesbury, 2006 to 2036**

Year	2006	2036	Average annual growth rate (per cent)
<b>Origin</b>			
Articulated truck trips	1130	1925	2.3
Rigid truck trips	4611	6954	1.7
Light commercial vehicle trips	13488	17526	1.0
<b>Destination</b>			
Articulated truck trips	1194	2041	2.4
Rigid truck trips	4431	6680	1.7
Light commercial vehicle trips	14827	18224	0.8

Source: *Transport and Infrastructure, Transport Data Centre (2009) Key Transport Indicators by Local Government Area of Residence (Local Government Area, 2007)*

### 3.5 Social infrastructure and services

Social infrastructure refers to community facilities, services and networks which help individuals, families, groups and communities meet their social needs, maximise their potential for development and enhance community well-being. It includes community support, education and training, sport and recreation, cultural, health, and emergency facilities and services.

Within the Hawkesbury local government area, social infrastructure is generally focussed in the towns of Windsor and Richmond, and to a lesser extent in Wilberforce. There are limited facilities in surrounding towns and villages, including Freemans Reach, Cattai and Pitt Town.

Windsor provides access to a range of local and regional facilities to cater for the needs of local residents, as well as the regional community. These include:

- Education facilities, including Windsor Park Public School (primary school), Windsor Public School (primary school), Windsor South Public School (primary school) and Windsor High School (secondary school).
- Child care services, including long day care, after-school and vacation care and kindergarten / preschool services.
- Health facilities, including the Hawkesbury District Health Service and Hawkesbury Community Health Centre, as well as aged care facilities.
- Emergency services, including police, fire brigade and ambulance.
- Cultural facilities, including the Hawkesbury Regional Museum and the Hawkesbury Regional Gallery, as well public library services.
- Community support services, including youth services, mental health services and preventative health and education.

#### 3.5.1 Recreation and sporting facilities

Windsor offers a diverse range of recreational, sporting, and leisure facilities and clubs, that cater for local and regional communities. These include facilities catering for organised sporting activities, as well as informal recreation and leisure pursuits.

There are five parks located in Windsor, including Thompson Square. Thompson Square is located in the centre of the Windsor town centre and consists of open space, picnic tables, gardens, and connected colonial buildings surrounding it. Thompson Square forms a key part of many Windsor Historical and walking tours. Macquarie Park is located adjacent to the bridge on the northern side of the river and is a popular park for swimming, picnicking and organised events.

The Hawkesbury River is used for many aquatic activities including boating, fishing, water skiing, and swimming with public access to the river for boats available from the Windsor Wharf and a boat ramp at Governor Phillip Park. The Hawkesbury River is one of the most popular waterways for the use of power vessels in NSW (RTA, 2011). As well as general water sports and nature based activities, the river is extensively used by recreational boaters engaging in high speed water skiing and racing, and the area immediately downstream of the existing Windsor Bridge is used by local boating clubs for racing. As well as providing a range of sporting and recreation opportunities, the Hawkesbury River is highly valued by the local community for its history in providing a connection to Sydney and for its amenity.

Key events on the river include the Hawkesbury Canoe Classic, the Bridge to Bridge Power Boat Race and Bridge to Bridge Water Ski Classic from Brooklyn to Windsor; and generate substantial financial income for locals (RTA, 2011). The river also serves as a base for a number of tourist activities including the Hawkesbury Paddle Wheeler, and the recently constructed pontoon, including a main jetty and intermediate landing at the Hawkesbury Wharf, which is expected to further enhance recreation (and tourism) opportunities.

Sporting grounds are located in Windsor, South Windsor and Richmond and cater to local and regional communities. Sporting grounds accommodate organised summer and winter sports including cricket, soccer, athletics, and netball. Two golf courses, a netball centre and ten pin bowling centre and lawn bowls are also located in Windsor and South Windsor. Many surrounding communities access the regional sporting facilities, including the golf courses, located in Windsor.

### 3.5.2 Social infrastructure and tourist accommodation near the project

Social infrastructure and tourist facilities located near the project are listed in **Table 3-16**.

**Table 3-16 Social infrastructure near the project**

Name	Proximity to project	Location
Thompson Square	Adjacent to southern end	Corner Bridge Street and George Street
Windsor Motel	Adjacent to southern end	47 - 53 George Street
Macquarie Park	Adjacent to northern end	Corner Bridge Street and Wilberforce Street
Governor Philip Park	Within 200 metres	George Street
Windsor Terrace Motel	Within 200 metres	28 George Street
Hawkesbury Museum and Tourist Centre	Within 200 metres	Thompson Square
Old Government House	Within 200 metres	37 George Street
Hawkesbury Regional Gallery	Within 200 metres	300 George Street
Windsor Wharf	Within 200 metres	The Terrace

Source: Hawkesbury City Council 2011, [www.hawkesbury.NSW.gov.au](http://www.hawkesbury.NSW.gov.au).



## 3.6 Community values

Community values are those elements considered to be important to quality of life and well-being. They include tangible (physical) elements such as parks, buildings, and landscape, and intangible (social) elements such as sense of belonging and community diversity.

This section describes the community values important to residents, business owners and visitors to the Hawkesbury local government area. These have been informed by consultation with local residents undertaken for the project, local government strategies and a review of literature. Generally, these values can be categorised as:

- Local amenity, character and heritage.
- Natural environment.
- Access and connectivity.
- Local economy.

### 3.6.1 Local amenity, character and heritage

The rural character and built and natural heritage are key contributors to the Hawkesbury region's lifestyle and amenity, with the amenity, village 'feel' and heritage character of the town of Windsor identified as key community values during consultation for the project. Key contributors to Windsor's amenity and lifestyle are the Hawkesbury River and its foreshores, Thompson Square and areas of natural bushland. Protection of these characteristics is important to local communities.

In particular, the town's historic buildings are important to the amenity and character of the study area, and provide a connection to the region's early lifestyles. The Windsor town centre is valued by the Heritage Council of NSW as an early Australian town that has retained much of its original layout and many historic buildings within a rural setting (AboutNSW, Powerhouse Museum, available [www.about.nsw.gov.au](http://www.about.nsw.gov.au)). Key elements of the town centre, including Thompson Square, are listed on the NSW Heritage Register. Thompson Square and the existing Windsor Bridge also contribute to the amenity and character of the study area, with both rating high in social significance to the local community. The heritage values held by the community are demonstrated in the number of heritage listed items in and around the project. The Windsor Bridge itself is listed as being of state significance, as well as being recognised in the Hawkesbury Planning Scheme. Views to the bridge are also identified in the local planning scheme, demonstrating the local significance of the bridge and associated views. Thompson Square, including the roads in and around the square, the upper parkland area and the lower parkland area, is listed in numerous state and local heritage registers.

Several other buildings around the project site, including the Doctor's House, Hawkesbury Museum and Tourist Information Centre, Macquarie Arms Hotel, several residences and shops in nearby streets, are also listed on local and state heritage registers. These heritage buildings create a significant cultural and social landscape that is highly valued by the local community.

Thompson Square has landmark qualities on the approach to Windsor from the Freemans Reach. The Square is valued for retaining much of its historical landscape character over time. It is focal point of the town and communicates arrival to Windsor on the approach over the George Street ridge. The buildings in Thompson Square are also significant in that they form a distinctive frame around the reserves and are distinctive elements of the place in their own right. These views and vistas are valued by the local community<sup>3</sup>.

The existing Windsor bridge is also an important structure culturally and socially. The original road bridge was completed in 1874 and has a history of modification and adaptation. The bridge is seen by many to represent the changes in government and political priorities over time, as well as the role of Windsor in the regional context. The social and cultural significance of the bridge structure is discussed in the Windsor Bridge Replacement Project Non-Aboriginal Heritage Assessment and Statement of Heritage Impact.

The Hawkesbury Cultural Plan 2006-2011 was developed by the Hawkesbury City Council in consultation with the community and identifies areas of value regarding the cultural landscape, heritage, history and the area's identity and sense of place. The Hawkesbury River and surrounding historical areas such as Thompson Square are identified in the plan as of significant value to the local community.

Additional information on the existing heritage aspects of the study area and the potential impacts of the replacement bridge on non-indigenous heritage is presented in the Non-Aboriginal Heritage Working Paper.

The rural and agricultural amenity of the area is also highly valued. This is demonstrated in the Hawkesbury Cultural Plan which articulates the rural amenity, lifestyle and the friendliness of the people as key to the area's identity and sense of place (Hawkesbury Cultural Plan 2006-2011). The Hawkesbury region was originally settled in the late 18th century as a source of food for the colony of NSW and the Hawkesbury Region today remains characterised by an extensive amount of pastoral and agricultural land. Hawkesbury River also forms an important part of the local character of Hawkesbury, and is used for recreation, commercial fishing and boating. As discussed in **Sections 3.4** and **3.5.1**, the Hawkesbury River is also used for several sporting competitions and races, as well as for river transport to some remote communities downstream of Windsor.

### 3.6.2 Natural environment

Communities in the Hawkesbury local government area value the quality of the natural environment and landscapes. Of the almost 2800 square kilometres of land within the Hawkesbury local government area, 71 per cent is contained within national parks, nature reserves and state recreation areas. The Hawkesbury River has a major physical and social significance within the region, offering a range of environmental, landscape, amenity and recreational values. It is also a breeding ground for fish species and important commercial and recreational fishery.

The Hawkesbury Community Strategic Plan 2010-2030, developed in consultation with the community, articulates the key community aspirations. Environmental principles form an important part of the plan. In particular, the community vision for the Hawkesbury local government area is for a place *'where we value, protect, and enhance the cultural and environmental character'* of the towns and rural landscapes (Community Strategic Plan 2010-2030, p4).

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<sup>3</sup> Windsor Bridge Replacement Project, Non-Aboriginal Assessment and Statement of Heritage Impact, Biosis, 2012



The Hawkesbury River is valued as an environmental asset to be enjoyed by current and future generations, with enjoyment derived from a clean river, natural eco-systems, rural and cultural landscapes. Protection of the environment is therefore important to local residents. Improving the flood protection of Windsor was also identified as a priority for the community during consultation for the strategic plan.

### 3.6.3 Access and connectivity

The Windsor Bridge forms an important link connecting Windsor and beyond to Sydney, with areas in north of the Hawkesbury River. Local and regional communities also have a strong reliance on the private car as the primary mode of transport. As such, good quality road connections are considered important, particularly between local towns within the Hawkesbury local government area.

Key values relating to access and connectivity relate to:

- Road and pedestrian safety – road safety was identified during consultation for the project as a key issue for residents in Windsor. Issues with motorist safety were identified as particularly prevalent travelling southbound from Freemans Reach and Wilberforce Road. The steep incline on Bridge Street and pedestrian safety in Windsor were also identified as concerns.
- Flood access – Windsor is located on the floodplains of the Hawkesbury River and flooding has shaped the nature and structure of local communities across the regional area. The local economy and environment are dependent on the continuation of adequate floodplain management and the local community places a high emphasis on the role that flooding plays in their lives. The existing Windsor Bridge currently only provides flood immunity for a one in two year flood event. During floods the bridge is cut by floodwaters, restricting access to Windsor town centre and southern urban areas from the north. During consultation for the project, the community suggested designing the bridge to remain above flood waters for much larger flood events.
- Connectivity – the Hawkesbury community values well maintained roads and access transport systems which connect with surrounding regions. Windsor is a regional hub for surrounding communities, providing a range of commercial, business and employment facilities, as well as community, health and medical services and facilities. Safe and efficient transport connections and routes linking Windsor with the outlying communities is essential to the function of Windsor and the surrounding villages.

### 3.6.4 Local economy

Protection of existing businesses within the Windsor town centre and overall town viability were seen as important to the community,

The Windsor town centre was identified during consultation for the project as an important local business centre with its own unique character. Continued and improved economic viability of the town centre was seen as an important goal by the community. Tourism is also valued by the local community, with tourists attracted to the region for its natural environment and features, lifestyle and heritage. Consultation with business owners for the project identified the need to capitalise on Windsor's tourism opportunities for further development.

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## 4 Land use, property and socio-economic impacts

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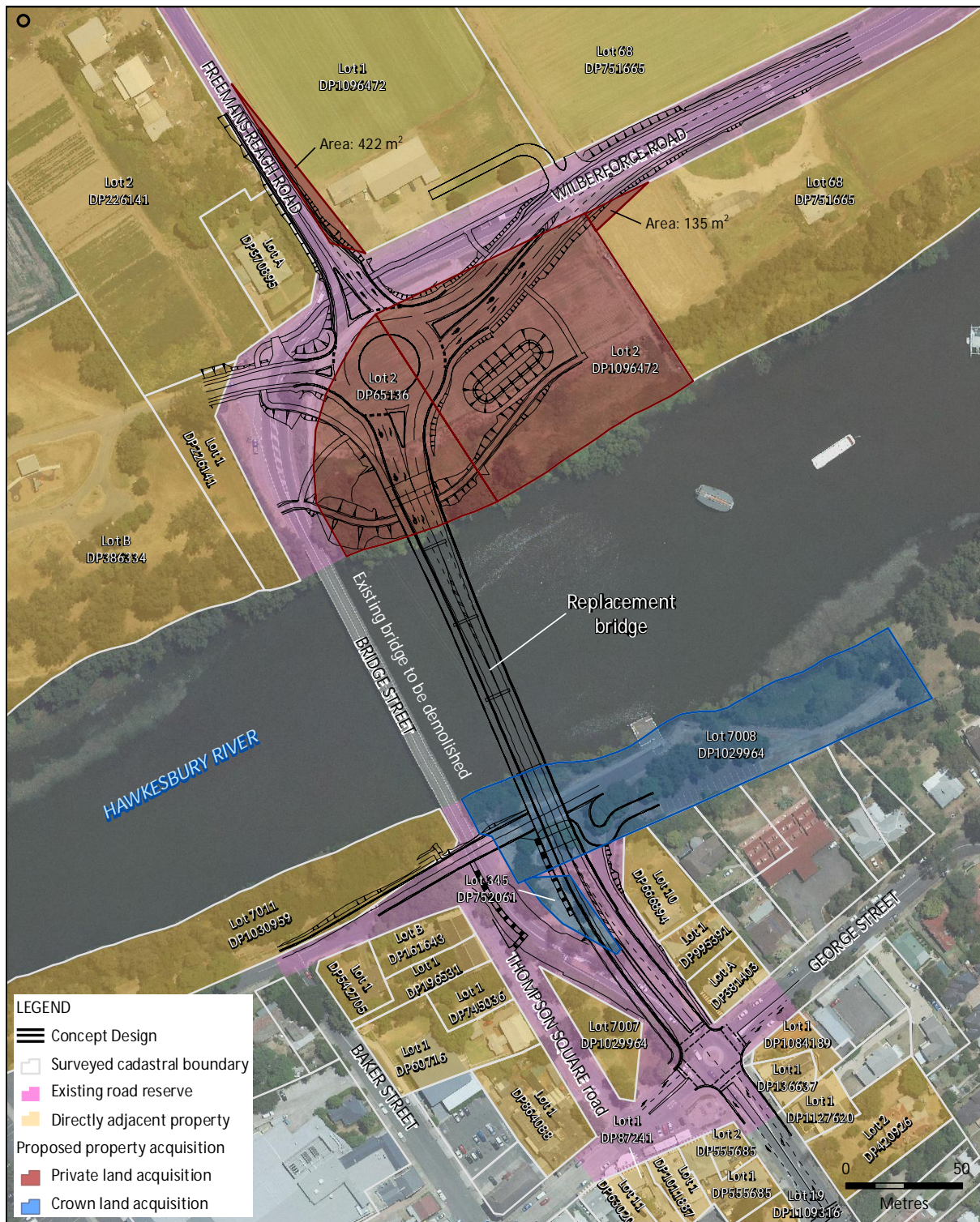
This section provides an assessment of the potential land use, property and socio-economic impacts of the project's construction and operation. The impact assessment considers:

- Property impacts including identification of adjacent properties, impacts on property values and land acquisitions.
- Changes in local amenity.
- Changes in access and connectivity.
- Local business (including employment) impacts.
- Local and regional industry impacts (including impacts on the tourism industry), and associated employment impacts.
- Recreational impacts.
- Impacts on social infrastructure.
- Impacts on community values.

### 4.1 Property and land use impacts

#### 4.1.1 Properties adjacent to the project

**Figure 4-1** shows properties adjacent to the project area and areas of private and Crown land that will need to be acquired. Properties adjacent to the existing road alignment or the proposed road alignment are also listed in **Table 4-1**. These properties have the potential to experience impacts on amenity, particularly during construction.



### Figure 4-1 Adjacent properties

**Table 4-1 Adjacent properties**

Property	Land use
Lot 10 DP666894	Residential housing
Lot 1 DP995391	Residential housing
Lot 0 A DP381403	Residential housing
Lot 1 DP136637	Residential housing
Lot 19 DP1109316	Business general
Lot 2 DP420926	Residential housing
Lot 1 DP112760	Residential housing
Lot 2 DP226141	Environmental protection (agriculture)
Lot 2 DP555685	Business general
Lot 1 DP555685	Business general
Lot 1 DP1011887	Business general
Lot 1 DP87241	Business general
Lot11 DP630209	Business general
Lot 1 DP864088	Business general
Lot 1 DP1084189	Residential housing
Lot 7011 DP103959	Open space (existing recreation)
Lot 1 DP542705	Residential housing
Lot 0 DP161643	Business general
Lot 1 DP196531	Business general
Lot 1 DP745036	Business general
Lot 1 DP60716	Business general
Lot 1 DP60716	Special uses
Lot 7007 DP 1029964	Open space (existing recreation)
Lot 0 DP386334	Open space (existing recreation)
Lot 0 DP370895	Environmental protection (agriculture)
Lot 1 DP226141	Environmental protection (agriculture)

#### 4.1.2 Property acquisitions

The land acquisition requirements for the project are detailed in **Table 4-2**. Total acquisition of two rural commercial properties and partial acquisition of two additional rural commercial properties on the northern bank of the river would be required. These properties are currently used for turf farming, a common activity in the region. While the turf farm could also be suitable for a higher value horticultural enterprise (eg. vegetable production), it's close proximity to the river would make the risks and consequent losses associated with this activity higher due to the higher likelihood of flooding. The acquisition of the turf farm land would be expected to have a minor impact on land use in the region given:

- The area of land acquired would be relatively small.
- There are other opportunities for turf farming and horticulture in the region.

- The land is flood prone (below the level of the three year flood event), which limits its potential uses and value to agricultural and horticultural enterprises.

Some of the land that is acquired for the project on the northern bank of the river would only be required for the construction period. The future use of this land would be determined during detailed design in consultation with Hawkesbury City Council and rehabilitated accordingly. Land that falls within this category includes that which currently comprises the northern approach road to the existing bridge. It is likely that any excess acquired land and the land comprising the existing northern approach road would be converted to public open space, which would result in an overall increase in the area of public open space on the northern river bank.

On the southern side of the river, full acquisition of two parcels of Crown land would be required, coinciding with the lower parkland area of Thompson Square and the council carpark and foreshore area adjacent to Windsor wharf and The Terrace. Parts of these land parcels would be required to make space for the new southern approach road, while the remaining parts would be required only for construction (refer to **Table 4-2**). Specifically, 338 square metres would need to be permanently acquired from the lower parkland of Thompson Square (amounting to 65 per cent of the total 524 square metre area of the lower parkland) and 334 square metres would need to be permanently acquired from the council carpark and foreshore area (amounting to 4.7 per cent of the total 7089 square metre area). The remaining part of the lower Thompson Square parkland and around 60 per cent of the council carpark and foreshore area adjacent to the wharf would be used for a temporary construction compound. These areas would be rehabilitated and returned to public use at the end of the construction period. The existing southern approach road that currently dissects Thompson Square parkland would also be rehabilitated and incorporated into the parkland area in consultation with Council. Overall, the project would result in an increase in the area of public open space within Thompson Square.

In addition to the above-mentioned parcels of Crown land, Old Bridge Street would need to be acquired from Hawkesbury City Council to allow construction of the southern approach road to the new bridge.

The two Crown land lots to be acquired for the project are currently subject to native title claim under NSW legislation by the Deerubbin Aboriginal Land Council. These claims will be determined before the planned start date of construction (should the project be approved). While the outcome of the native title claim cannot be predicted at this stage, claims are generally not granted where they affect land that is used, or may be used, for an essential public purpose. The project would be defined as an essential public purpose.

All acquisition of land will be undertaken in accordance with the RMS (2012) *Land Acquisition Guide*, RMS' acquisition policy, and the *Land Acquisition (Just Terms) Compensation Act 1991* to provide for proper compensation of affected land owners. Timely consultation with affected and potentially affected property owners and businesses will also be undertaken to remove any uncertainties about the details and timing of the acquisition process. Overall the impacts of the project on land use would be positive due to the increase in the area and accessibility of public open space.

**Table 4-2 Land acquisition and use during construction**

Property	Tenure	Existing land use	Impact
<b>Northern bank</b>			
Lot 2 DP1096472	Private	Commercial – turf farm	Total acquisition of 8960 m <sup>2</sup> of which about 40% would be within the project footprint and the remainder would be used for construction facilities.
Lot 2 DP65136	Private	Commercial – turf farm	Total acquisition of 4650 m <sup>2</sup> of which about 70% would be within the project footprint and the remainder would be used for construction facilities.
Lot 1 DP1096472	Private	Residential/ commercial – turf farm	Partial acquisition (422 m <sup>2</sup> of 4770 m <sup>2</sup> ).
Lot 68 DP751665	Private	Commercial – turf farm	Partial acquisition (135 m <sup>2</sup> of 139,600 m <sup>2</sup> ).
<b>Southern bank</b>			
Lot 345 DP752061	Crown land	Thompson Square	Total acquisition – 338 m <sup>2</sup> of the 524 m <sup>2</sup> lot area would be in the operational project footprint and the remainder would be used only for construction facilities.
Lot 7008 DP1029964	Crown land	Park, car parking and Windsor Wharf	Total acquisition – 334 m <sup>2</sup> of the 7089 m <sup>2</sup> lot area would be in the operational project footprint and about 60% of remainder would be used only for construction facilities.

#### 4.1.3 Property values

Construction impacts for adjacent properties will be limited to the construction period. Property values are therefore not expected to be significantly impacted as investors or property buyers would base their decision on long term outcomes rather than short term situations. Any reduction in property values associated with property acquisitions would be compensated for through land purchase and in accordance with the *Land Acquisition (Just Terms) Compensation Act 1991*.

During operation, changes in access to properties at numbers 4 and 6 Old Bridge Street, and changes in heritage vistas from the properties on the eastern side of Thompson Square may have some adverse impacts on property value.

#### 4.2 Local amenity

The following provides an assessment of the potential for adjacent properties to experience impacts on amenity as a result of construction and operation of the project. Local amenity refers to the suitability or desirability of an area for a particular purpose, and is influenced by factors such as noise, air quality, visual effects and traffic and access.



#### 4.2.1 Construction

During construction, there would be temporary adverse impacts on the amenity of properties and land uses close to construction sites as a result of noise, dust and the visible presence of construction activities. Construction activities may also cause some disruptions to traffic flows and require temporary changes to traffic routes. While these impacts would be minimised wherever possible, they cannot be avoided entirely. In particular, there are likely to be some periods when construction noise impacts are substantial and the visible presence of construction activities would impact views from and to the foreshore area and the existing bridge. Potential dust impacts would be managed and mitigated with suitable dust control measures and practices.

The proposed locations for the main construction sites and compound areas would minimise impacts on the commercial centre of Windsor and the upper parkland area of Thompson Square. The sequential staging of the construction and commissioning of the replacement bridge prior to demolition of the existing bridge would also minimise impacts on local and regional traffic movements, including access to the Windsor commercial centre and Thompson Square. The land uses and properties that would experience the most significant amenity impacts would be the three properties on Old Bridge Street and the property at the corner of Freemans Reach Road and Wilberforce Road. Amenity impacts on other properties and land uses are unlikely to be significant given their distance from construction areas.

The majority of works would be undertaken within the standard hours of 7am to 6pm Monday to Friday, and 8am to 1pm on Saturdays. However, as with any construction project, some construction activities would need to be undertaken outside of the standard construction hours due to safety issues, engineering practicalities and timetable feasibility. Although some out of hours construction work may be required, the RMS is committed to minimising the potential impacts associated with out of hours activities as far as practical.

Once the construction hours and activities are confirmed, relevant and specific mitigation measures can be prepared to minimise impacts on the community. Prior to the start of construction, a Construction Noise and Vibration Management Plan will be prepared and adopted with the aim of mitigating identified construction noise impacts.

Ongoing consultation and communication with local residents and business owners close to the construction works will help to reduce adverse impacts on local amenity. This will be particularly important prior to undertaking any out-of-hours works.

#### 4.2.2 Operation

During operation, the main amenity impact of the project would be associated with changes to heritage vistas, in particular the changes in the heritage vistas and views from and to Thompson Square. Impacts on heritage vistas would be greatest at the Doctors House and number 4 Old Bridge Street adjacent to Thompson Square. The existing bridge, approach road and associated traffic are generally not visible from these properties. By contrast, the replacement bridge and southern approach road would be highly visible from these properties and would place an essentially modern structure within a heritage vista. This may result in a reduction in the values of these properties.

The operational noise from the project would have only a minor impact on local amenity. While the operational road traffic noise generated by the project would not be significantly different from that generated by the existing bridge and approach roads, the existing traffic noise levels are high and the proposed redevelopment of the road corridor triggers the need to consider noise mitigation requirements.



The results of this assessment indicate the need to provide architectural treatments to three residential properties on Old Bridge Street to mitigate noise impacts. Properties on the southern and western side of Thompson Square and the parkland area within Thompson Square would experience little change in traffic noise impacts as a result of the project and do not require architectural treatments for noise mitigation.

Changes in visual amenity would occur during operation as a result of the change in location and new design of the bridge and approach roads. The existing Bridge Street alignment would be removed, with the cutting filled, re-graded and landscaped. Old Bridge Street would become the approach road to the replacement bridge. This road would remain at the same level and gradient as the adjacent parkland and buildings at the northern end of Thompson Square, before transitioning to the abutments which would match the approximate height of the existing retaining wall on the western side of Thompson Square. The overall footprint and scale of the new road infrastructure would be more physically and visually apparent than the existing road, despite the removal of other road infrastructure. The increased width of the new approach road would also further separate the buildings on Old Bridge Street from the Thompson Square parkland.

The Urban Design and Landscape Concept Report Working Paper (Volume 3, Working Paper 5) determined that the elevated approach road abutment and bridge over The Terrace would present a large physical and visual barrier between Thompson Square and the parkland adjacent to the wharf. The works raise the height of the approach road to the replacement bridge through the construction of abutment walls and physically and visually separate the lower section of Thompson Square and Windsor Wharf. The overall footprint and scale of the new approach road and its height at the abutment is out of scale with the adjoining roads, and existing bridge, considerably changing the character of this area. The movement of traffic along the approach road and replacement bridge would be a dominant physical presence, particularly during peak periods.

The impact on heritage vistas and visual amenity would be highest at the Doctors House and in the centre of Thompson Square, primarily due to the larger scale and height of the proposed bridge compared to the existing bridge. The adverse nature of this impact would, however, be offset to some degree by the consolidation of open space within Thompson Square, improved direct access to the river bank, and the connection of The Terrace connection. The findings of the Urban Design and Landscape Concept Report Working Paper have been incorporated into the project concept design to minimise visual and landscape character impacts as far as practicable.

Changes to heritage vistas would be less significant for areas on the western and south western side of Thompson Square, including the Macquarie Arms Hotel. Vehicles using the new approach road would be more visible from these areas as a result of the project, although the works would not substantially alter the existing view.

Properties close to the project footprint on Old Bridge Street and Wilberforce Road may experience amenity impacts as a result of street lighting on the new bridge approach roads. Consideration of sensitive receptors in the design of lighting on the bridge approach roads would help to minimise these impacts. Overall, the impacts of street lighting would be minor.

## 4.3 Access and connectivity

### 4.3.1 Construction

During construction, temporary changes to local road and property access may occur as a result of the presence of construction traffic and activities, and the associated need for temporary traffic diversions and access restrictions. If not appropriately managed, these temporary changes and restrictions have the potential to result in reduced patronage of local businesses. Management measures will be applied during the construction period to minimise traffic delays and provide alternative access arrangements and traffic routes, where required, to keep potential impacts on businesses to a minimum.

Specific impacts on access during the construction period would include:

- Short-term restrictions in vehicle access to numbers 4 and 6 Old Bridge Street during construction of the new southern approach road.
- Loss of public vehicle access to Windsor Wharf.
- Loss of access to the lower parkland of Thompson Square and the eastern portion of The Terrace during construction of the replacement bridge and approach roads and during the subsequent restoration and landscaping works.
- Loss of access to the upper parkland of Thompson Square during the infilling of the existing Bridge Street cutting and during the subsequent restoration and landscaping works within the parkland.

Pedestrian access to the wharf and all properties would be maintained throughout the construction period. Pedestrian and cyclist access near the construction works, including along The Terrace and the riverbank would be maintained where possible, although access may be restricted during certain periods to maintain public safety. Access across the existing Windsor bridge would be maintained until commissioning of the replacement bridge. After the replacement bridge is commissioned, access to the existing bridge would be removed and the bridge would be demolished. Vehicle access to properties along The Terrace would continue to be provided via Baker Street.

In Thompson Square, access to the upper parkland area would generally remain available throughout the construction period until the start of the restoration and landscaping works. Loss of access to the upper parkland area during the restoration and landscaping works would be short-term and would be minimised as far as practicable.

There would be no substantial impacts on access to Windsor town centre, Macquarie Park, the Hawkesbury Visitor Centre, Hawkesbury Regional Museum or short term accommodation businesses during construction of the project. The temporary loss of vehicle access to Windsor wharf is not expected to significantly impact the operation of the Hawkesbury Paddle Wheeler as pedestrian access to the wharf would be maintained and parking would be available in nearby streets. Consultation with the Hawkesbury Paddle Wheeler and River Boat Cruise operators would be undertaken throughout the construction period to ensure that bridge launching operations take place at times when there would be minimal impacts on commercial operations.

The impacts on traffic would also generally be minor, as construction would generally be undertaken clear of existing traffic and the type of activities involved in construction would not generate large numbers of heavy vehicle movements. Temporary traffic management arrangements would be in place to maintain traffic operation on local and through roads and minimise traffic delays.

The construction activity would not have any impact on emergency vehicles, as vehicular access along all roads impacted by the work would be maintained. Wherever practical, removals and deliveries of materials and plant would be timed to occur outside of the peak traffic periods. Designated access routes for construction vehicles would be along the arterial road network where practicable, reducing potential impacts on travel times and safety.

Parking for construction workers would be provided within the nominated construction compounds where possible, with only limited parking provided on the southern bank and a larger parking area on the northern bank. Preliminary discussions have been held with Hawkesbury City Council on the use of an area of Macquarie Park for overflow parking for construction workers and this would be the likely solution for construction worker's parking. As construction works on the weekend would be limited, it is unlikely that the project would require overflow parking in Macquarie Park during the weekend, which is the period of higher usage of the park.

The community and affected property owners would be consulted well in advance and kept fully informed of all access changes. Overall impacts on access and connectivity during the construction period would be minor.

#### 4.3.2 Operation

During operation, the project is expected to improve local and regional access and connectivity as a result of safer operating conditions and improved traffic flow. The project would maintain access to the town centre and improve road access for vehicles bypassing the town centre. Specifically, the project would reduce traffic delays associated with the existing bridge crossing and improve the flood immunity of the crossing, improving access between the north and south sides of the river. Vehicle access to Macquarie Park and the Hawkesbury River north foreshore would also be improved through the northern intersection roundabout and the upgrade of Macquarie Park access road. The project would also improve access and connectivity for pedestrians and cyclists, including access and connectivity between key areas of Windsor, through and around Thompson Square and between the north and south sides of the river. These improvements are expected to have flow-on benefits to local and regional businesses and industries.

Redevelopment of The Terrace would occur as part of the project, providing improved vehicle, cyclist and pedestrian access beneath the new bridge and to the wharf. The new bridge would have sufficient clearance to allow service vehicles, including small coaches, to drive underneath the bridge along The Terrace to the wharf. The height of boats able to access areas upstream of the bridge would also increase.

Specific additional improvements for pedestrians and cyclists would include a new, wide shared path across the bridge, a new shared path on the north eastern side of Thompson Square linking to the replacement bridge and Macquarie Park, and connection of the upper and lower parkland areas of Thompson Square to provide uninterrupted parkland access between George Street and the river foreshore. The project also includes the addition 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, connecting to the path across the replacement bridge. This shared pedestrian and cyclist path would end at a point near the entrance to Macquarie Park.

In addition, signalised intersection crossings would be provided at the intersection of Bridge and George Streets. This would provide a safe pedestrian link from the eastern side of Windsor to the Windsor town centre, facilitating improved access for local residents. Improved access for pedestrians are also expected to benefit tourists, since a number of

hotel accommodation establishments are located on the eastern side of Windsor including the Windsor Motel and the Windsor Terrace Motel.

There would be three minor permanent changes in traffic access arrangements as a result of the project. Firstly, traffic coming from the south on Bridge Street would no longer be able to turn right into George Street. This means that drivers accessing properties on the eastern side of George Street and areas such as Governor Phillip Park would need to turn right at Court Street. This would affect only a small number of motorists and would be well signposted. Secondly, access to properties at numbers 4 and 6 Old Bridge Street would be left-in, left-out only. This means that drivers coming from the south would need to first cross the bridge to the new roundabout at the intersection of Wilberforce and Freemans Reach roads then re-cross the bridge to make a left turn into these properties. Similarly, drivers heading north from these properties would need to first head south then turn right on either George Street or Macquarie Street before making their way back to the northbound lane of the new southern approach road to the bridge. Finally, at some point in the future, when traffic levels increase, southbound traffic (coming from the north side of the river) would no longer be allowed to turn right into George Street during the afternoon peak. This is not expected to have a significant impact on any properties or businesses given that alternative right turn access is available via Macquarie Street and only a relatively small number of vehicles perform this movement in the afternoon peak.

The project would result in changes to car parking arrangements within the Windsor town centre, due to permanent removal of an existing car park located west of Old Bridge Street, adjacent to Thompson Square. Retention of suitable parking would be important since 96 per cent of customers travel to the Windsor town centre by car (SGS, 2010). However, although there is a high proportion of car use, more than half of customers surveyed during the impact assessment indicated that changes to parking provisions would not impact their decision to visit the Windsor town centre.

#### 4.4 Local business

This section provides an overview of impacts on local businesses during construction and operation of the project. Impacts are considered based on patrons that currently visit the Windsor town centre and/or live in the area, as well as consideration of the construction workers using the town businesses. An assessment of the impacts for local businesses associated with potential disruptions to the tourism industry is provided in **Section 4.5.1**.

Impacts on local businesses are established considering the following key drivers:

- Changes in local amenity.
- Changes in access and connectivity.
- Changes in business visibility.
- Increase in workers during the construction period.

Impacts for local businesses are assessed based on the desirability and ability for customers to continue to visit the Windsor town centre. This has been informed by the outcomes of the survey of business owners and patrons undertaken in December 2009 (SGS Economic Planning, 2010), as well as a visual site survey. Impacts are generally dependent on:

- Patrons' reasons for visiting businesses in the Windsor town centre.
- Distance/proximity to other towns/alternative businesses.

Any reductions in patronage for businesses would result in a loss of income for business owners, potentially impacting business viability. Beneficial impacts represent increased patronage and income for business owners in some circumstances.

#### 4.4.1 Construction

##### **Local amenity**

During construction, changes in local amenity within the town centre and for businesses nearest to the project may result in some users diverting spending to the Richmond town centre. In particular, the desire of customers to access businesses closest to the construction site (particularly southwest of the project site), such as eat-in and takeaway restaurants on George Street may be impacted by dust and noise, as well as visual impacts from construction machinery. Dust impacts would be managed and mitigated with suitable dust control measures and practices, therefore temporary dust impacts associated with construction and demolition works would be considered minor provided adequate control measures to manage dust impacts are implemented.

The short separation distance between the existing and new road alignment of Bridge Street and the nearby businesses means that the potential for noise and vibration as well as visual impacts would be high. However, the nature of the project in terms of the scale of road construction limits the amount of plant and activities that can be undertaken simultaneously, therefore reducing this impact. The actual noise levels associated with the construction works would vary on an hour to hour basis due to the inconsistent and intermittent nature of construction works.

Based on the predictions outlined in the Noise and Vibration Working Paper (SKM, 2012) noise associated with a number of the construction activities would exceed the project noise management level at a number of the receivers in and around the project. Generally, the high construction noise levels are a result of the close proximity of the construction area and sensitive receivers and not necessarily as a result of excessively noisy plant or unreasonable working methods.

While some impacts may occur, it is expected that these would mostly be constrained to the hospitality businesses on George Street, near the roundabout with Bridge Street. The majority of local businesses would not be expected to incur any major adverse impacts from changes to local amenity (including visual impacts), since most of business patrons surveyed indicated that the primary reason for visiting the Windsor town centre was for a particular product or service. This is contrary to the assumption of business owners who considered character as a more important factor. Consultation with local business owners would assist in mitigating these concerns; however some temporary impacts from noise and dust would still be expected for some businesses.

A Construction Noise and Vibration Management Plan will be prepared for the project upon approval, and will include measures to address increased noise levels for local businesses (SKM, 2012). This is expected to significantly mitigate potential impacts on hospitality businesses.

##### **Access and connectivity**

Traffic impacts during construction would have the potential to impact patronage in the town centre. Although nearly half of patrons surveyed indicated that traffic does not impact their desire to visit the town centre, at the same time, the survey of business patrons also indicated that there would be some reduced patronage if the journey took an extra 10 minutes or more (both those who travel by car and foot/cycle). Therefore, given the proximity of other towns, particularly Richmond, some minor reduction in patronage for local businesses in the Windsor town centre may result should delays exceed 10 minutes.

Any road closures during the day would impact patronage to directly adjacent businesses on the eastern side of Old Bridge Street, due to minimal alternative access points. However, the need for road closures would be minimised and the majority of works requiring road closures would be scheduled out of business hours. Parking restraints during construction are not expected to impact on patronage due to the significant amount of alternative parking available. In addition, more than half of patrons surveyed indicated in that changing car parking arrangements would not impact their desire to visit the town centre (SGS, 2010).

Vehicle access to one commercial office (Lot 1 DP995391) directly adjacent to new alignment on Bridge Street may be impacted by construction activities. Works would be undertaken to maintain vehicle access to this property, however, there may be short periods of time when vehicle access may be restricted. Appropriate consultation and management measures would be implemented to minimise access impacts on this property. Restricted access would not be expected to impact commercial operations due to the nature of the business (a solicitors' office) given availability of electronic communication mediums, as well as alternative parking options.

Temporary restrictions to the larger car park at Windsor Wharf during the construction period may affect access to businesses around Thompson Square and Bridge Street, although there are other parking areas nearby (refer **Figure 3-8**) and any impacts would be minor. Although there will be some periods where vehicle access to the wharf will not be possible, operation of the Hawkesbury Paddle Wheeler and other planned river-based events are not expected to be impacted. This is due to planned consultation with business owners to limit closures to times where operation would not be impacted. Where this is unavoidable, alternative temporary arrangements (including temporary parking and safe pedestrian access) would be established.

Road access to businesses on Thompson Square would be maintained and therefore no impacts to these businesses associated with access and connectivity during construction are expected.

### **Visibility of local businesses**

It is unlikely that visibility of local businesses in the town centre or directly adjacent businesses would be adversely impacted by construction activities, including placement of construction machinery and stockpiles. In the event that visibility may be impacted, it is unlikely to adversely impact business patronage since around 84 per cent of survey respondents indicated that their visits were planned as opposed to spontaneous. Appropriate signage would assist in mitigating any potential visibility impacts if required.

### **Increase in workers**

A potential influx of workers associated with construction would have positive impacts for local businesses, such as increased patronage, particularly for convenience services (i.e. takeaway and eat-in food establishments, banks and grocery stores). This would reduce any potentially adverse impacts to some extent.

The project would not increase accommodation demand for workers. Given the proximity of the area to Sydney (a 45 minute drive), the importance of the construction industry in the regional area, and the short construction timeframe, it would be likely project construction workers would drive in daily from surrounding areas.

## Summary

Overall, adverse impacts on local businesses during construction are not expected to be significant. Where there is risk of some impacts, it is expected that these would be appropriately managed through the maintenance of access and connectivity during business hours, as well as the implementation of environmental management measures relating to dust and noise. Minimising the length of traffic delays and road closures during peak business hours would also help to mitigate potential impacts. Where an impact on the visibility of local businesses would be unavoidable, appropriate signage would be provided.

Ongoing consultation and communication with business owners, including the operators of the Hawkesbury Paddle Wheeler and other event organisers on the Hawkesbury River, about the duration and potential impacts of construction activities (including planning for wharf and river closures), would also be undertaken.

Significant impacts on employment in the Windsor town centre would not be expected as a result of construction of the project for two reasons:

- 1) Significant adverse impacts on trade would not be expected.
- 2) Where small impacts on trade may occur, it is unlikely that businesses would terminate employment since the majority of businesses in the town centre are non-employing/sole trader or small businesses (one to four employees). Any adverse impacts on employment would more likely comprise a reduction in hours rather than termination of employment (since this would mean ceasing trade or a significant reduction in staff).

### 4.4.2 Operation

#### Local amenity

Changes in local amenity during operation are not expected to impact the trade of local businesses. The project would provide improvements to the landscape of Thompson Square which would improve amenity in the longer term, and may entice some increased patronage to adjacent businesses.

Changes in operational noise levels as a result of the project would be negligible. In addition, the magnitude of operational vibration would be similar to the existing environment and below perceptible levels at the closest receivers (SKM, 2012). The project is not expected to result in increased traffic growth and would therefore have no significant impacts on air quality.

Although the project is expected to have a significant impact on local heritage, this is not expected to result in adverse impacts for local businesses, since the majority of patrons choose to visit the town centre for convenience or for a specific product or service, rather than for the character of the town. Tourism impacts associated with local heritage are not expected and would therefore not impact local businesses. Refer to **Section 4.5.1** for more detail.

## Access and connectivity

Local businesses within the Windsor town centre would be likely to benefit from improvements in access and amenity for cyclists and pedestrians. Further, the improved flood immunity of the bridge crossing would reduce the adverse impacts on businesses that are currently experienced during flood events. Currently, many patrons can only access Windsor town centre through Richmond during flood events, which would be likely to divert trade to that centre. Improved flood immunity would therefore decrease the frequency of planned expenditure being diverted from the Windsor town centre to neighbouring town centres.

Permanent changes in access to the commercial offices on Old Bridge Street (Lot A DP 381403 and Lot 1 DP995391) during operation (limited to a left-in, left-out turn only) would not be expected to impact on operations due to the specialised nature of services.

The ban on right hand turns from Bridge Street to George Street during peak periods would not be expected to impact on local businesses given the proximity of alternative access via Macquarie Street and since 84 per cent of business patrons indicated that their visit was planned as opposed to spontaneous and therefore would likely seek alternative entry.

The loss of five parking spaces near Windsor Wharf is not expected to impact local businesses, as it expected these spaces would be absorbed by the existing larger car parks and on-street parking in the town centre (refer **Figure 3-8**).

Increased traffic as a result of the project is not expected, therefore significant delays from congestion are not likely.

## Visibility

During operation, visibility impacts may result from changes to the approach road and bridge alignment (see **Section 4.2.2**). However, the visibility of local businesses is not expected to change significantly from the existing situation, given the location of the new alignment in relation to the existing alignment. Any potential reductions in visibility would be mitigated through appropriate signage.

## Summary

During operation, adverse impacts on local businesses are not expected. Traffic would be monitored as part of congestion analysis to determine if growth exceeds forecast rates. During this time, the need for noise or additional safety measures should be assessed.

Measures to reduce visual amenity impacts during operation include urban design treatments such as tree planting on Thompson Square. Any visibility impacts if they occur could be managed through increased signage to attract passing travellers. For visitors of the town centre, parking within 200 metres would be maintained where possible. This is particularly important given the high reliance on private vehicle transport.

Impacts on employment during operation would not be expected since adverse impacts to business are not expected. Increased spending from improved flood immunity would not be considered significant enough to warrant employment generation, particularly given the irregularity of occurrence.



## 4.5 Local and regional industry

### 4.5.1 Impact on tourism

#### **Construction**

Noise, dust and visual amenity impacts during construction may reduce tourists' desire to visit the Windsor town centre. The extent of this impact would be dependent on tourists' prior knowledge of construction activities. In any case, on arrival it is possible that visitors to the area would choose to transfer to surrounding towns due to visual amenity impacts on heritage areas such as Thompson Square (a key tourist attraction in Windsor). Restricted access to Thompson Square during this time may also impact on tourism in the area. This would adversely impact business in the Windsor town centre, including retail and accommodation/hospitality establishments.

Visitors may still choose to stay in the Windsor town centre however given Windsor's proximity to tourist attractions in the wider Hawkesbury local government area, and it is noted that access to most tourist establishments would be maintained. Additionally, some people may choose to visit the town centre to view demolition and/or construction of the existing/new bridge; however this impact is expected to be minimal.

Limited access to Windsor Wharf may impact on tourism in the local area if closures are not sensitive to event timeframes. Potentially impacted events include; the Hawkesbury Canoe Classic, the Bridge to Bridge Power Boat Race and the Bridge to Bridge Water Ski Classic. If these events do not go ahead, some impacts on local businesses from reduced spending in the town centre would be expected, particularly for hospitality establishments including accommodation and food services. This would translate to reduced income for business owners and potentially impact employment. Therefore, consultation with event organisers should be undertaken to determine appropriate timeframes for wharf and/or river closures (if required).

As discussed, impacts on operation of the Hawkesbury Paddle Wheeler are not expected, since alternative access will be provided in the event that closures coincide with business operations.

Overall, impacts to local and regional tourism during the construction phase of the project would be expected to be minimal and temporary in nature, given the limited duration of the construction period (18 months) and overall containment of the works to the bridge and bridge approaches. Consultation with local tourism business owners, including operators of the Hawkesbury Paddle Wheeler and local accommodation providers, would assist in managing potential impacts for individual businesses.

#### **Operation**

The main potential adverse impact of the project of relevance to tourism would be associated with the changes to the heritage vistas of Windsor and Thompson Square. While the change in vistas would impact the heritage values and landscape of the Thompson Square area, it is unlikely that visitors and tourists would decide not to go Windsor because of the impacts of the project. There are many factors that influence the attraction and experience of visitors to Windsor, including the historic buildings surrounding Thompson Square, the many tourist orientated retail, accommodation and food outlets, the proximity of the river and foreshore areas, and the presence of the Thompson Square open space and the community events held there. These elements would be largely unaffected by the project and would continue to draw visitors to the area.

The potential adverse socio-economic impacts associated with changes in heritage vistas would also be offset to some degree by the following benefits of the project:

- Improved vehicle, bicycle and pedestrian access in the following areas:
  - Across the river
  - To/from Macquarie Park
  - Between the southern foreshore and Windsor town centre via Thompson Square.
  - Along the southern foreshore.
- Improved amenity and safety of pedestrian and cyclist access within and around Thompson Square.
- Consolidation of the existing fragmented parkland area within Thompson Square, resulting in an overall increase in the amount of usable parkland area and the amenity of the parkland area.
- More public open space on the northern side of the river.
- Improved navigational clearance beneath the new Windsor bridge, enhancing recreational opportunities on the Hawkesbury River.
- Reduced traffic delays and congestion in peak periods.
- Improved flood immunity of the river crossing.

The consolidation of the lower and upper parkland areas of Thompson Square as a result of the project would increase the amount of continuous, useable green space for the community and visitors and provide improved access to the foreshore. This, combined with the improvements in pedestrian and cycling facilities, will strengthen the recreation values of Windsor in the long term and may provide a space that is more favourable for visitors. Furthermore, the road and bridge design, as well as the final design for modifications to Thompson Square, has been developed with the aim of minimising adverse impacts on the visual and heritage character of the town..

Baseline tourism data for the region indicates that, for over one third of domestic visitors, the primary purpose of the visit is to see family members. These visitors would not be expected to reduce the frequency or duration of their visits to the town centre as a result of changes in urban design. The adverse impacts on tourism during operation are therefore expected to be minimal.

#### 4.5.2 Industry expansion from improved access and connectivity

The expected improvements in access and connectivity during operation would support industry expansion locally and regionally. The majority of these benefits would accrue to industries heavily reliant on freight transport which currently experience constraints to travel on the existing bridge. These constraints include slower operating speeds, safety concerns and restricted access during flooding. The new bridge would improve access for existing 19 metre semi trailers, as well as safer and more efficient operating conditions for 23 metre and 26 metre semi-trailers and B-doubles (including 25 metre).

Industries in the region most likely to benefit from improved access and connectivity would be agriculture, manufacturing, construction and transport<sup>4</sup>. This would be particularly true for freight and goods movements from Wilberforce to central and western NSW via the Bells Line of Road, as well as to Sydney via the Westlink M7 and Motorway M2. Improved access in this region aligns with the Hawkesbury Employment Strategy (2009), which identifies a general industrial zone in Wilberforce, providing industrial land uses such as warehousing, transport, freight and logistics, and large scale manufacturing that require large land areas and good road access. All of these industries would be expected to receive a similar proportion of benefits since they would likely use similar vehicle types.

Regionally, transport efficiency improvements would be expected to have some impact on employment through increased working hours or hiring of new staff. This may have benefits for industry growth. The project's impact on employment in isolation would be difficult to measure, and it is more appropriate to assume that transport improvements would be consistent with planned regional economic development strategies.

It is recommended that RMS consult with local government and relevant state government agencies about improvements in accessibility for regional freight movements which would support local and regional industry, particularly for planned development in Wilberforce.

#### 4.5.3 Impact of project expenditure

This section outlines the economic impact of expenditure required for construction and operation of the project, specifically the project's contribution to economic output, employment and household income. Detailed results of the modelling are provided in **Appendix B**.

The link between industry and economy, employment and income, as well as households and spending can be analysed by examination of input output multipliers. Using data from the ABS (2007), the multipliers capture the effects of economic stimulus in terms of output, employment and household income. Given the economic impacts of project expenditure would be unlikely to be entirely localised to the regional area, input output tables have been developed for NSW and the north western Sydney region. **Table 4-3** outlines the multipliers that have been calculated for the 111 industries defined by the ABS.

**Table 4-3 Multiplier interpretation**

Multiplier type	Description
Value added multipliers	Valued-added multipliers measure the impact of the project on the size of the economy. Nationally, the size of the economy is referred to as Gross Domestic Product. Regionally, it is referred to as Gross Regional Product.
Employment multipliers	Employment multipliers measure the supported or additional employment (in number of persons employed) associated with production of additional output in the economy, required for project construction and operation.
Household income multipliers	Household income multipliers measure expected additional household income through wages and salary which results from additional output in the economy required for project construction and operation.

The total impact on output, employment and household income includes direct, indirect and induced impacts. **Table 4-4** provides an interpretation of these impacts.

**Table 4-4 Impact interpretation**

Impact type	Description
Direct impacts	Initial economic impact from spending required for constructing or operating the project.
Indirect impacts	Impacts which result from 'second round' demand for industries that supply initially impacted industries. Initially impacted industries constitute the direct impact.
Induced impacts	The changes in consumption by the household sector in response to changes in income from the demand associated with direct and indirect impacts.

### Modelling inputs – project expenditure

Construction cost estimates for the project would be about \$49 million including contingency in real terms (exclusive of inflation) (as provided by the RMS). The cost of acquiring property has not been included in the analysis since this value would not represent additional economic output.

Operating expenditure would be over 30 years and is estimated at \$1.65 million per year (RMS). This includes annual routine corridor maintenance and periodic pavement rehabilitation every 10 years. It is anticipated that 100 per cent of operation expenditure would be allocated to the north western Sydney region.

Industry allocation of construction expenditure including regional proportions is provided in **Table 4-5**. An analysis of baseline employment and industry data in the Hawkesbury local government area supports these estimates.

**Table 4-5 Allocation of construction expenditure**

<b>Industry</b>	<b>Total expenditure (\$m)</b>	<b>North western Sydney (per cent)</b>	<b>Rest of NSW (per cent)</b>	<b>Rest of Australia (per cent)</b>
Construction Services	6.20	19.1	74.9	6.0
Non-Residential Property Operators and Real Estate Services	0.10	41.8	4.4	53.8
Heavy and Civil Engineering Construction	36.64	100.0	0.0	0.0
Insurance and Superannuation Funds	0.20	2.7	81.1	16.2
Public Administration and Regulatory Services	5.95	26.1	70.7	3.2

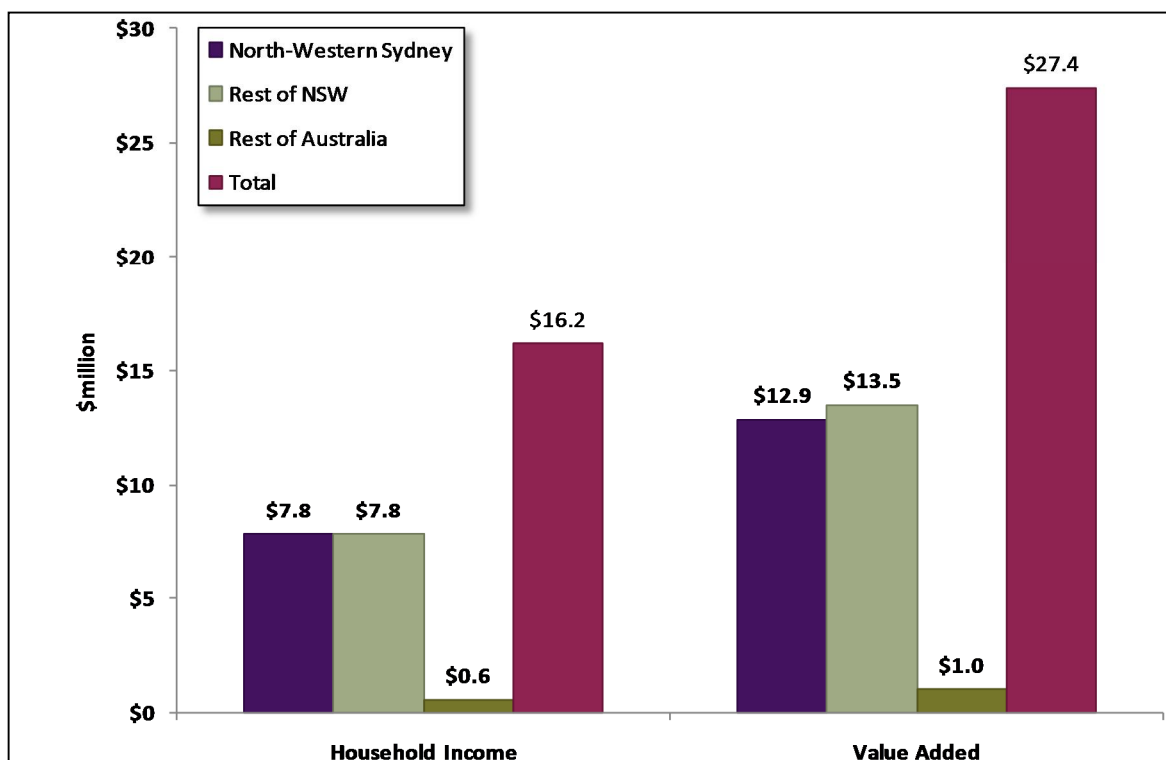
## Modelling results

This section presents the modelling results for construction and operation of the project, specifically the project's contribution to economic output (measured as the size of the economy through value added multipliers), employment and household income. The data is presented as total impacts, which include direct, indirect and induced impacts.

### *Construction*

The economic modelling indicates that a significant proportion of household income and value added benefits would be distributed to NSW including the north western Sydney region. The project would contribute about \$7.8 million to household income in both north western Sydney and the rest of NSW (a total of \$15.6 million in NSW), while only \$0.6 million of household income benefits would be expected to be distributed to the rest of Australia.

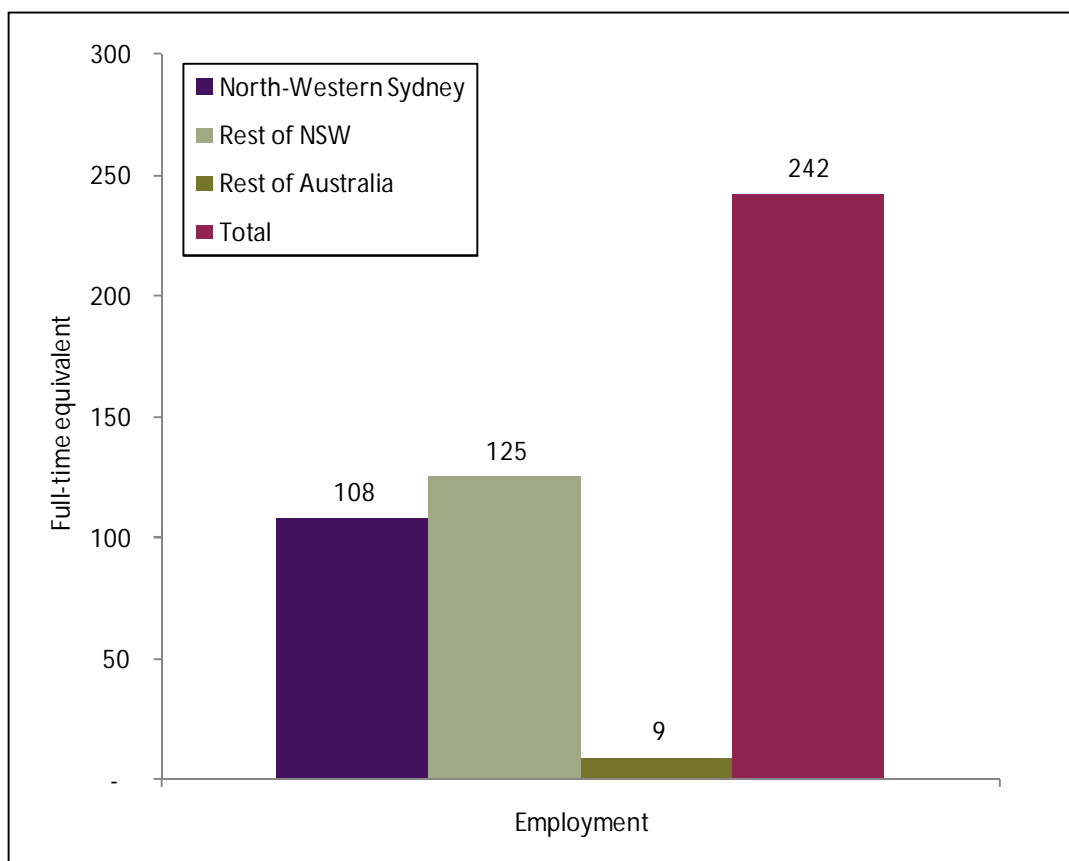
Similarly, the majority of value added impacts would accrue to NSW, \$26 million compared to \$1.0 million in the rest of Australia. Of the impacts to NSW, \$12.9 million would be accrued to the north western Sydney region and \$13.5 million would be accrued to the rest of NSW.



**Figure 4-2 Household income and value added benefits, construction**

The estimated employment impact from project construction, including direct, indirect and induced impacts, are shown in **Figure 4-3**. The economic modelling indicates there would be a direct employment impact for the project's construction of 96 full-time equivalent jobs, including construction workers, managers, engineers, surveyors and other specialist advisors, as well as management and administration staff.

The total impact on employment for a 12 month construction period would be at 108 full-time equivalent jobs in the wider north western Sydney region, 125 full-time equivalent jobs in the rest of NSW and nine full-time equivalent jobs in the rest of Australia (a total of 242 full-time equivalent jobs). This number includes off site workers and as such is larger than site workforce projections of 110 workers and construction personnel.



**Figure 4-3 Total employment benefits, construction**

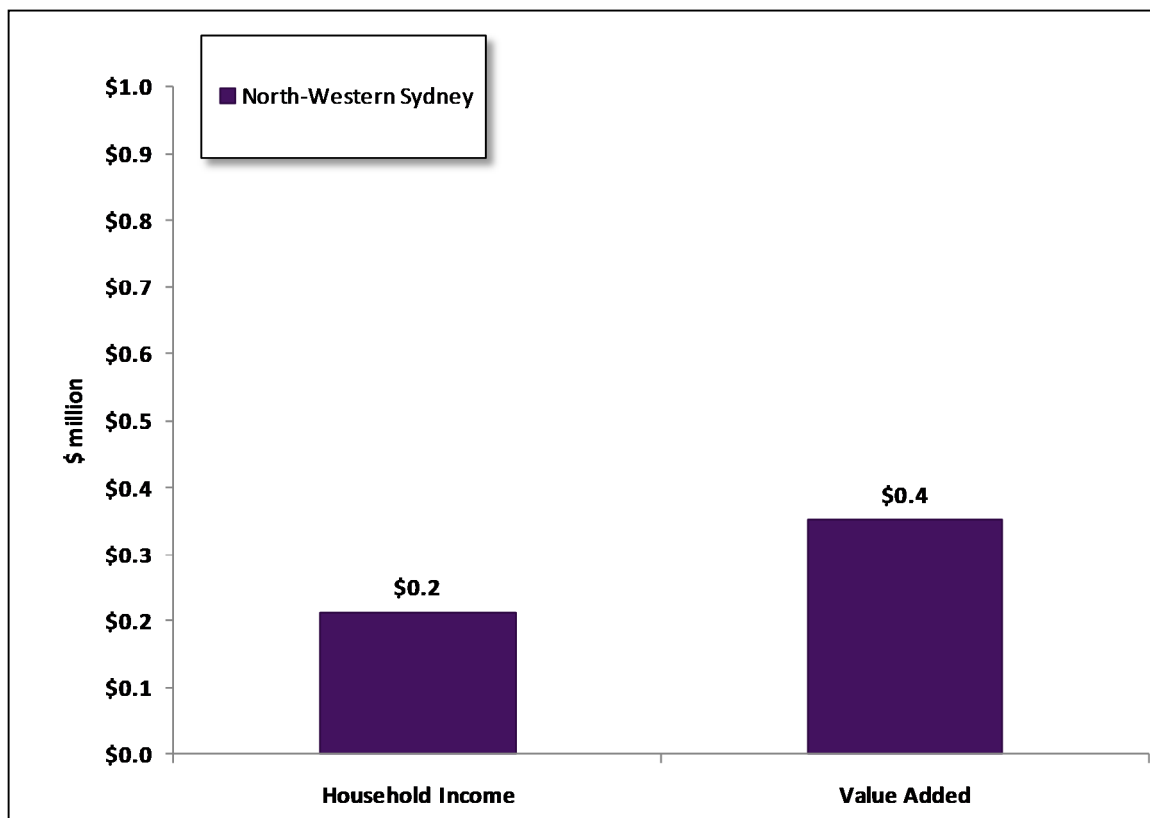
The industries that would most likely benefit from increased output associated with the project's construction include those industries outlined in **Table 4-5**, as well as indirect impacts to supporting industries such as manufacturing and professional, scientific and technical services. Induced benefits would most likely impact consumption industries.

In order to maximise the benefit to the local economy or regionally within north western Sydney, labour and materials would be sourced locally where possible.

#### *Operation*

**Figure 4-4** presents the results of the economic modelling for the project's contribution to household income and value added during operation. The evaluation period for the impact assessment is 30 years, in line with Australian Transport Council National Guidelines for Transport System Management (2006). However, it is noted that the design life will likely exceed this period, particularly for the bridge structure.

It is expected that all of the economic benefits during operation would accrue to the wider north western Sydney region, equal to \$0.2 million in household income benefits and \$0.4 million in value added benefits.



**Figure 4-4 Household income and value added benefits, operation**

The total impact on employment during operation of the project would be about 3 full time equivalents in north western Sydney. While this value may seem low, it is emphasised that this estimate represents full time hours per employee, and it would be unlikely that maintenance and rehabilitation would require a full time workload each year, therefore this value is appropriate.

Industries that would experience the most significant benefits include construction services and cement, lime and ready-mixed concrete manufacturing. As with construction, materials and labour would be sourced locally where possible to enhance economic benefits to the region.

## 4.6 Impact on recreational uses

### 4.6.1 Construction

The potential adverse impacts of the project on recreational land uses during the construction period would be largely associated with the impacts on amenity and access. In particular, the proximity of construction activities to Thompson Square and the river foreshore, and the corresponding potential for loss of amenity in these areas, may result in a temporary reduction in patronage of recreation and tourist sites and facilities. The location of the main construction site and compound areas away from the centre of Windsor and the upper parkland area of Thompson Square would mean, however, that many areas would have only minor adverse impacts. In particular, the Hawkesbury Visitor Centre, Hawkesbury Regional Museum, short-term accommodation businesses and the Macquarie Arms Hotel are unlikely to be adversely affected, and the impacts on the upper part of the Thompson Square parkland would be limited to the later part of the construction period.



Construction activity on weekends (the peak period for visiting day trippers) would also be limited to Saturday mornings, meaning that adverse impacts on amenity would be reduced during peak visitor periods. It is also possible that tourists may visit the town centre to view the bridge construction process, further contributing to tourist numbers.

Construction may have a minor impact boating activities on the river due to the presence of temporary exclusion zones around pier construction areas, although the river would generally remain open to passage by water vessels. An exception to this would be during the demolition of the existing bridge, when access to the area of the river in the immediate vicinity of the bridge would be restricted for safety reasons.

During construction there would be a temporary loss of access to recreational land on the southern bank of the river, although other land uses would not be affected. Pedestrian access to Windsor Wharf would be maintained at all times throughout the construction period.

#### 4.6.2 Operation

Once construction and rehabilitation of Thompson Square and other areas have been completed, there would be an overall increase in area of usable public space both on the northern and southern side of the river. On the northern side of the river, there would be around 1400 square metres of additional accessible usable open space directly adjacent to Macquarie Park. On the southern side of the river, there would be about 1400 square metres of additional accessible usable open space within Thompson Square parkland. The Terrace would also be re-connected, providing continuous access along the foreshore, and the foreshore area around Windsor wharf would be reopened to public access. Improved pedestrian and cycling facilities will also improve the amenity and connectivity of the Thompson Square and foreshore areas, which may make the area more attractive for visitors. The project would also enhance opportunities for river-based tourism by increasing the navigation clearance on the Hawkesbury River, allowing more water traffic to access waters upstream of Windsor.

The consolidation of the lower and upper parkland areas of Thompson Square as a result of the project would increase the amount of continuous, useable green space for the community and provide improved access to the foreshore. This, combined with the improvements in pedestrian and cycling facilities, will strengthen the recreation values of Windsor in the long term.

### 4.7 Social infrastructure

The area near the project site includes a wide range of local and regional level community services and facilities to service the needs of residents and visitors. Some of these services and facilities would be affected by the construction and operation of the project, either beneficially or adversely, including directly through partial property acquisition of Thompson Square or indirectly through such things as changes in amenity or access.

#### 4.7.1 Construction

During construction, direct and indirect impacts on the existing social infrastructure in and around the project site could result from:

- Restricted access to social infrastructure.
- Reduced local access, impacting emergency services.
- Increased noise, dust and construction traffic during the construction phase, potentially impacting on the amenity of some users of community services and facilities.

Potential access and connectivity constraints during construction may impact social infrastructure close to the project site, including delays in travel to community services such as schools, sport and recreation and medical and health care. Access to the Hawkesbury Visitor Centre and the Hawkesbury Regional Museum would not be impacted.

Emergency vehicle access and their ability to reach destinations in a timely manner may be restricted during diversions or traffic delays. Maintaining access for emergency services to service the north and south banks of the river would be important to avoid impacts on response times for emergency services.

Temporary amenity impacts may result in reduced use of parks and open space areas. In particular, Thompson Square and Windsor Wharf and the nearby grassed area and carpark will be the focus of a large amount of construction works and materials. However, these impacts will be temporary in nature. In addition, the implementation of appropriate environmental management measures (such as dust suppression and noise management) and safety and traffic management measures would help to minimise potential impacts on social infrastructure near the bridge.

#### 4.7.2 Operation

During operation, improvements in access and connectivity, particularly a reduction in disruptions from flood events would provide benefits for social infrastructure use in the local area. Emergency vehicles in particular would be expected to benefit from reduced disruptions. Social infrastructure in and around Thompson Square and Windsor Wharf will be returned to their original use as public open space.

### 4.8 Community values

Community values in the Hawkesbury region have been identified across three key areas:

- Preservation of local amenity, character and heritage.
- Improvement in access and connectivity.
- Preservation of the natural environment.

This assessment has determined a number of potential impacts on the above during construction and operation, including changes in amenity, use of recreational and tourist facilities, impacts on access and connectivity and impacts on local businesses.

Overall, it is concluded that there would be some impacts on community values associated with the project, particularly as a result of impacts on heritage. The impacts of the project on heritage have been the subject of community concern for quite some time as Thompson Square and the Windsor Bridge hold a considerable amount of social significance to the community.

It is recognised that some members of the community are strongly opposed to the project. In particular, cultural heritage concerns associated with the alignment of the project were identified during consultation for the project. Concerns included the potential disturbance of Aboriginal and non-Aboriginal artefacts, damage to heritage buildings from the construction activities, potential negative impacts on surrounding heritage buildings as a result of construction dust, noise and vibration and changes in visual amenity. These concerns have been further emphasised by formation of a community group called 'Community Action for Windsor Bridge'. Some residents are also concerned that removal of the existing bridge and replacement with a solid structure would detract from heritage values. In addition, the Non-Aboriginal Heritage Assessment and Statement of Heritage Impact report identifies the project would have an impact on State significant relics, elements, views, vistas and the setting of Thompson Square (Biosis, 2012).

However, it is recognised that the proposed design of the replacement bridge would be necessary to comply with modern safety and operational standards. As part of the project, the existing Windsor bridge would be demolished and replaced with a new bridge. The scale, height and footprint of the bridge would be greater than that of the existing bridge, making it a more dominant structure in the landscape, both physically and visually. The existing bridge dates from 1896 and sits comfortably within the scale of the landscape. The modern design, and larger scale and height of the proposed bridge is likely to cause concerns for community members who value the cultural heritage aspects of the existing bridge and the views and vistas to and from the existing bridge.

Changes to Thompson Square will also occur as a result of the project and are likely to impact on community values regarding cultural heritage, community identity and access to recreation and cultural facilities. In particular, the total acquisition of Thompson Square and significant physical changes to lot are proposed. The existing Bridge Street alignment would be removed, with the cutting filled or partially filled, regrade and landscaped. Old Bridge Street would become the approach road to the replacement bridge. It would remain at the same level and gradient as the adjacent parkland and buildings at the northern end of Thompson Square, before transitioning to the abutments which would match the approximate height of the existing retaining wall on the western side of Thompson Square.

As a result, the overall project footprint and scale will result in the road infrastructure becoming more physically and visually dominant in and around Thompson Square, compared to the existing road infrastructure. The increased width of the new approach road would further separate the buildings on Old Bridge Street from the parkland. The elevated approach road abutment, and bridge over The Terrace would present a large physical and visual barrier between Thompson Square and the parkland adjacent to the wharf. The movement of traffic along the approach road and replacement bridge would be a dominant physical presence particularly during the morning and afternoon peak periods.

While the project will cause irreversible changes to Thompson Square, including changes to its layout, character and heritage vistas, these adverse impacts would be offset to some extent by improvements to public open space and recreational land uses. These improvements have been discussed in previous sections. Specifically, the reunification of upper and lower parkland areas of Thompson Square would create a continuous, evenly graded, green open space from George Street to The Terrace, providing improved amenity for users and potentially an increased range and frequency of use. While the upper parkland area would remain the major recreation area of Thompson Square, the removal of the existing Bridge Street cutting would allow easier access to the lower parkland area and river. In addition, a key outcome of the project will be an increase in public open space on both the northern and southern sides of the river, resulting in additional public open space available for recreational activities or events.

Long term impacts on the economic viability in the town centre are not be expected. To the contrary, the project is expected to contribute to the local economy through expenditure required for construction and operation, and facilitation of planned industry growth.

Some impacts on the natural environment are expected as a result of the project, although adverse impacts would be unlikely. The project incorporates scour protection works 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. 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. This will result in changes to the natural environment along the river bank in the long term. However, the proposed filling of the gaps in the rocks with soil, and planting with sedges, would, over time, reduce the dominant hard edge to the river bank. The existing river banks are affected by erosion and extensive weed growth and the scour protection works would not have any adverse impacts on habitat or other aspects of the natural environment.

Overall, the proposed works would have an impact on community values, particularly those related to the heritage and landscape character of Windsor, impacts to Thompson Square, access and connectivity and changes to the natural environment. This is largely due to the sensitivity of the setting and its low ability to absorb change, particularly in areas of historical significance and in areas that are important to the local community. However, impacts have been mitigated to some degree through the continued refinement of the project concept design. In addition, the consolidation of the open space within Thompson Square provides long term community benefits, including a more usable civic space, direct access to the river bank and connections to The Terrace. The improved access and connectivity in and around the Windsor Bridge also provides long term community benefits. It is expected that community values will change over time and the overall value of the proposed bridge in providing improved access and connectivity to local and regional communities is likely to gain importance with the local community once operational.

## 5 Environmental management measures

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This section outlines a range of measures for managing, avoiding or mitigating potential land use, property and socio-economic impacts and maximising or enhancing the project's benefits. The project has adopted an iterative approach to finalising the concept design which has enabled the bridge design to incorporate findings regarding the heritage, visual and landscape character in and around the project. As a result, the concept design already reflects several of the mitigation and management strategies identified below. In addition, the RMS has already commenced community and stakeholder engagement on a number of matters and will continue to do so as required during the construction of the project.

### 5.1 Overview

#### 5.1.1 Broad objectives

The broad objectives of the project are designed to manage any residual impacts on land use, property and the socioeconomic environment as far as practical. Mitigation strategies include:

- Avoiding or minimising impacts on land use and property.
- Avoiding or minimising impacts on amenity, local character, access and connectivity for local communities.
- Avoiding or minimising impacts on industry and local businesses.
- Avoiding or minimising impacts on social infrastructure.

These strategies, including recommended community consultation activities are outlined below.

#### 5.1.2 Community consultation

Community participation in the ongoing planning, environmental management, and monitoring of the project would help to avoid or minimise potential land use, property and socio-economic impacts. A range of consultation tools and activities are currently being used by the RMS to inform local and broader communities of project activities, including timing and duration, and potential impacts. Community consultation will continue as appropriate during the planning and construction of the project, including through:

- A dedicated web page on the RMS website.
- A free-call 1800 number for ongoing enquiries.
- A dedicated email address for email contact.
- A stakeholder database to capture issues raised by the community and other stakeholders.
- Consultation and review period of the environmental assessment reports for the Windsor Bridge Replacement Project.
- Ongoing community updates to provide information about project progress, explain the environmental assessment process, provide contact details for further enquiries and explain the next steps in the planning process.

## 5.2 Construction

Recommended strategies to manage potential land use, property and socio-economic impacts during construction are outlined in this section.

### 5.2.1 Property acquisitions

- Provide appropriate compensation in accordance with the Land Acquisition (Just Terms Compensation) Act 1991 for all property acquisition.
- Ongoing consultation regarding project timing with affected owners can assist in reducing uncertainty and stress (including uncertainty about business investment).
- Ongoing consultation with the community regarding the return of Lot 345 on DP752061 (Thompson Square) and Lot 7008 DP1029964 (Windsor Wharf, car park and park) to be used as a public open space can assist in reducing impacts on community values, amenity and recreation.

### 5.2.2 Local amenity

Temporary local amenity impacts would occur during construction, however these would be minimised wherever possible through the implementation of appropriate mitigation measures. The air quality, noise and vibration, and urban design sections of the EIS contain detailed management measures to address these impacts.

### 5.2.3 Access and connectivity

Temporary access and connectivity impacts would occur during construction, however these would be minimised wherever possible through the implementation of appropriate management measures. The traffic and transport section of the EIS contains detailed management measures to address these impacts.

### 5.2.4 Local business

Temporary access and amenity impacts would occur during construction and these may impact local business. These impacts would be minimised through the implementation of appropriate management measures. The air quality, noise and vibration, urban design, and traffic and transport sections of the EIS contain detailed management measures to address these impacts. Early and ongoing consultation with local business owners directly affected by the project should be conducted in determining appropriate measures to manage potential impacts.

### 5.2.5 Local and regional economy

Temporary access and amenity impacts would be minimised wherever possible through the implementation of appropriate management measures. The air quality, noise and vibration, urban design, and traffic and transport sections of the EIS contain detailed management measures to address these impacts.

Other management measures would include:

- Consult with potentially impacted tourist business owners to determine the magnitude of potential impacts.
- Consult with owners of the Hawkesbury Paddle Wheeler, as well as organisers of river-based recreational events to determine the most appropriate timeframe for wharf closures. Where suitable timeframes cannot be established, alternative access would be provided.
- Maintain visibility of the town centre and directly adjacent businesses through careful placement of machinery and additional signage where necessary.

- To maximise the positive impact of project expenditure, labour and materials would be sourced locally where possible.

#### 5.2.6 Recreational uses

Temporary access and amenity impacts would occur during construction and these may impact upon recreational use. However these would be minimised wherever possible through the implementation of appropriate management. The air quality, noise and vibration, urban design, and traffic and transport sections of the EIS contain detailed management measures to address these impacts.

Other management measures would include:

- Consultation should be conducted to assist in maintaining access to planned events on the Hawkesbury River.
- Ongoing consultation and communication with the managers of recreation facilities and local communities, including appropriate signage, about potential changes to the use of these facilities would be important in managing potential impacts.
- Ongoing consultation with the community regarding the return of Lot 345 on DP752061 (Thompson Square) and Lot 7008 DP1029964 (Windsor Wharf, car park and park) to be used as a public open space can assist in reducing impacts on community values, amenity and recreation.

#### 5.2.7 Social Infrastructure

Management measures to minimise impacts on social infrastructure would include:

- Undertake early and ongoing communication and consultation with community services and facilities near to the proposed works, to ensure that potential impacts would be appropriately managed. As a minimum, consult with:
  - Wilberforce State Emergency Service.
  - NSW Police Service Windsor.
  - NSW Ambulance Service Windsor.
  - Hawkesbury Museum and Tourist Centre.
  - Thompson Square (Hawkesbury City Council).
  - Macquarie Park (Hawkesbury City Council).
  - Governor Phillip Park (Hawkesbury City Council).
  - Windsor Wharf.
  - Windsor Terrace Motel.
  - Windsor Motel.
  - Old Government House.
  - Hawkesbury Regional Gallery.
- Maintain access for emergency services to the north and south banks of the river to avoid impacts on response times.

#### 5.2.8 Community values

Temporary access and amenity impacts would occur during construction and these may impact upon community values. These impacts would be minimised wherever possible through the implementation of appropriate management measures. The air quality, noise and vibration, urban design, and traffic and transport sections of the EIS contain detailed management measures to address these impacts.

Other management measures would include:

- Protect items of heritage value during construction to avoid damage.
- Reinstate disturbed areas as soon as possible following construction.
- Continue ongoing communication with interested and affected residents, business owners and business groups to invite input into the planning and design process, and to maintain communication on upcoming construction activities.

## 5.3 Operation

### 5.3.1 Amenity

Generally, the measures to minimise impacts on amenity during operation have been incorporated into the concept design. These measures include:

- Incorporation of urban design, landscape character and visual impact assessment findings into the project concept design and construction.
- Maintaining views to the Hawkesbury River and Thompson Square where possible.
- Consideration of local sensitive receptors in the design of lighting to minimise impacts at residential properties.
- Reinstating areas of high amenity, such as Thompson Square and the foreshore, as soon as possible following construction.

### 5.3.2 Access and connectivity

The management measures for access and connectivity would be addressed in the design and would include consulting with Hawkesbury City Council and emergency services to ensure that their requirements are considered.

### 5.3.3 Local business

Generally, the management measures for local business would be included in the design of the project. These include:

- Measures to reduce visual impacts during operation include urban design treatments such as tree planting on Thompson Square.
- Traffic noise levels should be monitored as part of congestion and safety monitoring to determine if noise attenuation measures are required.
- For visitors of the town centre, parking within 200 metres would be maintained where possible.

### 5.3.4 Local and regional industry

For local and regional industry, the following management measures would be implemented for operation:

- It is recommended that RMS consult with local business owners (particularly hospitality establishments) during the first two years of operation to determine if tourist numbers are declining. Management measures should adverse impacts occur may include re-visiting local amenity/urban design treatments. Caution should be applied in interpreting visitor numbers in conjunction with market conditions at a given time.



### 5.3.5 Recreational uses

Generally, the management measures for recreational uses would be included in the design of the project. These would include:

- Continue with ongoing consultation with local business owners and the general community regarding the design and landscaping design of Thompson Square, and the project progress, including the tenure and status of Thompson Square and the Windsor Wharf areas.
- Urban design should consider the local character and heritage.
- Improve amenity, access and connectivity of recreational areas.

### 5.3.6 Social infrastructure

Generally, the management measures for social infrastructure would be included in the design of the project. These would include:

- Consult with emergency services to discuss changes in access during operation including turning bans.

### 5.3.7 Community values

- Continue project communications with business owners, stakeholders and the wider community to provide information on project progress, timing, milestones and upcoming activities. Conduct consultation to promote the benefits of the project, particularly in regards to improved access and connectivity during flood events.

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## 6 Conclusion

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### 6.1 Key findings of the assessment

This report has provided an assessment of potential land use, property and socio-economic impacts relating to the design, construction and operation of the Windsor Bridge Replacement Project, both beneficial and adverse, and considering local and regional communities. The assessment of land use, property and socio-economic impacts included:

- Scoping the range of issues relevant to the social and economic environment of local and regional communities in accordance with the Director General's Environmental Assessment Requirements.
- Describing existing land use, property and socio-economic conditions, including the baseline conditions of potentially affected groups or communities, to provide a baseline from which impacts of the project can be assessed.
- Impact assessment, including identifying and analysing the likely benefits or adverse impacts of the project and assessing the magnitude, duration and likelihood of identified benefits and impacts.
- Identifying management measures, including measures to enhance the project's benefits and avoid, manage or mitigate its potential impacts.

Although some limited adverse impacts would be associated with the project, the analysis has indicated that the project would provide a number of benefits for the local and regional communities during construction and operation as outlined below.

#### 6.1.1 Property and land use

The project would not be expected to impact on the value of the majority of properties in the local area. Impacts on property values for directly adjacent properties associated with acquisition of land would be compensated through the acquisition process. Some property acquisitions would be required which would change the existing land use to road transport use. This change in land use would be acceptable considering the proximity of the project to the existing road. The total acquisition of two parcels of Crown land (Thompson Square and Windsor Wharf, car park and grassed area), will have some temporary impacts to the use, amenity and access arrangements to these areas. However, these lots will be returned to the Crown following the construction phase of the project, and will return to their original use as public space. As result, property impacts as a result of the Crown acquisitions will be temporary in nature and managed through a range of construction management plans. Acquisition of private property would be undertaken in accordance with the Land Acquisition Information Guide (RMS, 2012) and RMS acquisition policy to reduce any potential impacts on property owners and residents.

#### 6.1.2 Local amenity

- Local amenity impacts occur from short term changes to the physical and visual amenity of the public domain and key recreation areas, including Thompson Square, Windsor Wharf, Governor Phillip Park and Macquarie Park, from noise, dust and vibration of construction works would be expected, which may impact on trade at local businesses and the use and enjoyment of recreation areas.
- Short term changes to the physical and visual amenity of the public domain and key recreation areas, including Thompson Square, Windsor Wharf, Governor Phillip Park and Macquarie Park, from noise, dust and vibration of construction works would be expected, which may impact on trade at local businesses and the use and enjoyment of recreation areas.

- Long term changes due to the increased scale and height of the replacement bridge are expected at Thompson Square and some vantage points along the river, considerably changing the character of these areas. The scale, height and footprint of the bridge would be greater than that of the existing bridge, making it a more dominant structure in the landscape, both physically and visually. This impact has been mitigated to some degree, particularly due to consolidation of open space within Thompson Square, direct access to the river bank and the renewal of The Terrace connection.
- A range of management plans including a noise and vibration management plan and traffic control plan would be implemented to minimise impacts on nearby properties.
- The majority of construction works would occur between 7am and 6pm Monday to Friday, and 8am to 1pm on Saturdays.
- The operation of the project would generally result in no significant change in traffic noise levels for residential and commercial properties in close proximity to the project excluding two properties on Bridge Street. Noise levels affecting the property on the corner of Wilberforce and Freemans Reach Roads would remain the same.
- Some amenity impacts for residents on northern side of the bridge would be experienced, due to the installation of an intersection at the corner of Wilberforce and Freemans Reach Road and street lighting on the bridge and approach roads. However, appropriate design of the roundabout and lighting would minimise any potential impacts.
- A range of management plans including a Construction Noise and Vibration Management Plan and traffic control plan would be implemented to minimise impacts on nearby properties.
- The majority of construction works would occur between 7am and 6pm Monday to Friday, and 8am to 1pm on Saturdays.
- The operation of the project would generally result in no significant change in traffic noise levels for residential and commercial properties in close proximity to the project excluding two properties on Bridge Street. Noise levels affecting the property on the corner of Wilberforce and Freemans Reach Roads would remain the same.
- The scale, height and footprint of the bridge would be greater than that of the existing bridge, making it a more dominant structure in the landscape, both physically and visually.
- Some amenity impacts for residents on northern side of the bridge would be experienced, due to the installation of an intersection at the corner of Wilberforce and Freemans Reach Road and street lighting on the bridge and approach roads. However, appropriate design of the roundabout and lighting would minimise any potential impacts.

### 6.1.3 Access and connectivity

- Restricted access to recreation areas including Thompson Square, Windsor Wharf and some areas of the foreshore and the Hawkesbury River would occur over the construction period.
- Permanent changes to property access on Bridge Street associated with implementation of a left-in, left-out turn only.

- A ban on right hand turns to George Street for southbound travellers. Access to Number 33 Wilberforce Road would also be altered under the new traffic arrangements. For safety reasons, vehicles would no longer be able to turn right into (or out of) the access at No. 33 Wilberforce Road. However, a 3 metre wide section of road reserve would be utilised to allow the driveway access to No. 33 Wilberforce Road to be extended further north (away from the proposed dual lane roundabout) to a point where all turning movements onto and off Wilberforce Road could be maintained.
- Reconstructing The Terrace to provide both light vehicle and pedestrian access underneath the new bridge (including provision for emergency vehicle access).
- Reshaping access arrangements to the existing wharf and associated car parking area.
- The project would incorporate facilities for pedestrians and cyclists including a shared pedestrian/cycle pathway running from Wilberforce Road and Macquarie Park, across the western side of the bridge and southern approach road (to the corner of George and Bridge Street). Pedestrian and cyclist access along the southern bank of the river would also be improved with the connection and redevelopment of The Terrace.

#### 6.1.4 Local business and industry

Local business impacts are not expected to be significant during both construction and operation of the project, since the majority of patrons visit the town centre for convenience and for a particular product or service. Since the project is not expected to significantly alter these factors, minimal impacts are expected.

Some minor impacts to trade during construction may occur for hospitality businesses close to the project site; however these are expected to be mitigated through appropriate environmental measures including dust and noise/vibration management.

Additional impacts include:

- Potential increases in local business trade (particularly for food and beverage/hospitality services) during construction from an increase in the number of workers in the area.
- Contribution to local and regional economic output (measured as gross value added), household income and employment from construction and operation expenditure.
- Facilitation of planned industry expansion in the wider Hawkesbury local government area, particularly in Wilberforce, from safer operating conditions for freight vehicles as well as improved flood immunity. Improved flood immunity would benefit local businesses through increased trade, although this is not expected to be significant.

#### 6.1.5 Recreation and social infrastructure

Some temporary disruption to recreation areas would be experienced during the construction period, including restricted access to Windsor Wharf for a short time, changed pedestrian and access routes to Thompson Square and noise and amenity impacts.

The project would generally result in improved access and connectivity to public spaces, local businesses and recreation facilities during operation including:

- Redevelopment of The Terrace to provide vehicle and pedestrian access underneath the new bridge and reshaping access arrangements to the wharf and car parking area.
- Upgrade of the entrance road to Macquarie Park.
- Improved pedestrian and cyclist paths, including construction of a shared pedestrian and cyclist path along the bridge crossing and approach roads, including through Thompson Square and the provision of wider shoulders along the bridge to improve safety for cyclists.

- Improved navigation clearance and access along the Hawkesbury River beyond Windsor, potentially facilitating growth in commercial (including tourist) uses. Improved usability and greater area of Thompson Square, by consolidating two separate open spaces into one larger rectangular square and rehabilitation of the existing southern access road. The reshaped square will be more suitable for large gatherings and events.

The project will cause significant changes to Thompson Square. The overall footprint and scale of the new road infrastructure will be more physically and visually apparent than the existing road. The increased width of the new approach road would further separate the buildings on Old Bridge Street from the parkland.

The project will also result in an increase in public open space on the northern and southern side of the Hawkesbury River, providing additional area for recreational activities and events.

#### 6.1.6 Community values

Thompson Square, Windsor Bridge and the Hawkesbury River have a high level of social significance to the community. The proposed project is likely to impact on these areas through changes to Thompson Square and the replacement of the existing bridge with a modern bridge. In particular, the project would impact on the layout of Thompson Square, changing its character that is highly valued. The project is also located in an area that is highly sensitive to change, due to its historical significance as well as the social, cultural and recreational values placed on it by the local community. As a result, the project is likely to cause changes to the heritage character of the area, including vistas to and from heritage buildings, during construction and from the increased height and scale of the proposed bridge. Ongoing consultation with the local residents and community groups will help to minimise potential impacts to community values.

The replacement bridge has been designed to consider these sensitivities wherever possible. In addition, impacts to areas of community value have been mitigated to some degree by the consolidation of open space, direct access to the river bank, and the renewal of The Terrace connection. With time, it is expected these benefits will also be valued by the community.

#### 6.1.7 During operation

Overall, potentially adverse impacts would be primarily associated with construction activities, and therefore limited to 18 months in duration. Impacts during operation are primarily beneficial, and these impacts are expected to occur indefinitely. However, permanent changes to Thompson Square are noted. The Crown land acquired for the project will also be returned to its original use as public open space. Management measures for potentially adverse impacts include:

- Early and ongoing consultation with affected property owners, businesses and communities as well as community participation in the ongoing planning, environmental management.
- Maintaining access to local business during business hours.
- Minimising delays from construction traffic.
- Where required, noise attenuation measures to minimise construction impacts for impacted residents. Measures for maximising project benefits include sourcing materials and labour locally where possible for construction and operation works.

#### 6.1.8 Concluding statement

Overall, the project would be beneficial for land use, property and socio-economic impacts. The project is not expected to impact on the value of the majority of properties in the local area. Properties directly adjacent to the project would be compensated through the acquisition process. Short term local amenity impacts associated with noise, dust and vibration would occur during construction. Long term amenity impacts associated with the increased scale and height of the replacement bridge are expected at Thompson Square and other vantage points along the river. Access to recreation areas would be restricted during construction and there would be permanent changes to property access on Bridge Street and at 33 Wilberforce Road. Local business and industry are not expected to be impacted significantly during construction and operation. There would be temporary disruption to the recreation areas of Windsor Wharf and Thompson Square during construction. Changes to the layout of Thompson Square and the replacement of the existing bridge are likely to impact community values and social significance through changes to the historical significance. Overall, potentially adverse impacts would be primarily associated with construction activities.

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## Appendix A Additional baseline data

Appendix Table 1 Business counts by employment size ranges, Hawkesbury local government area, 2007-2009

Industry	Non employing	1-4	5-19	20-49	50-99	100-199	200+	Total
Agriculture, Forestry and Fishing	375	83	22	12	3	0	0	495
Mining	6	3	0	0	0	0	0	9
Manufacturing	165	105	70	21	6	0	3	370
Electricity, Gas, Water and Waste Services	9	15	3	0	0	0	0	27
Construction	903	596	156	27	9	0	0	1691
Wholesale Trade	150	87	42	9	6	0	0	294
Retail Trade	175	102	66	21	6	0	0	370
Accommodation and Food Services	42	45	35	15	3	3	3	146
Transport, Postal and Warehousing	241	192	34	3	0	0	0	470
Information Media and Telecommunications	24	9	0	0	0	0	0	33
Financial and Insurance Services	224	62	9	0	0	0	0	295
Rental, Hiring and Real Estate Services	505	45	29	9	0	0	0	588
Professional, Scientific and Technical Services	320	161	86	3	3	0	0	573
Administrative and Support Services	104	72	18	3	6	0	3	206
Public Administration and Safety	15	15	3	6	0	0	0	39
Education and Training	31	18	24	3	0	0	0	76
Health Care and Social Assistance	93	56	27	9	0	3	3	191
Arts and Recreation Services	37	24	21	6	3	0	0	91
Other Services	150	162	41	0	0	0	0	353
<b>Total</b>	<b>1,054,478</b>	<b>434,039</b>	<b>200,819</b>	<b>53,380</b>	<b>16,303</b>	<b>7,386</b>	<b>6,103</b>	<b>1,772,508</b>

Source: ABS, Counts of Australian Businesses, including Entries and Exits, Jun 2007 to Jun 2009, released 16/02/2011, Businesses by Industry Division by Statistical Local Area by Employment Size Ranges, June 2009

Appendix Table 2 Business counts by turnover size range, Hawkesbury, 2007-2009

Industry	Zero to less than \$25k	\$25k to less than \$50k	\$50k to less than \$75K	\$75k to less than \$100k	\$100k to less than \$150k	\$150k to less than \$200k	\$200k to less than \$500k	\$500k to less than \$1m	\$1m to less than \$2m	\$2m to less than \$5m	\$5m +	Total
Agriculture, Forestry and Fishing	146	114	24	27	38	40	41	35	15	12	3	495
Mining	0	0	0	0	3	3	3	0	0	0	0	9
Manufacturing	57	27	27	24	45	9	72	37	27	24	21	370
Electricity, Gas, Water and Waste Services	6	0	3	3	0	3	6	6	0	0	0	27
Construction	158	145	212	182	203	144	372	156	78	23	18	1691
Wholesale Trade	48	27	21	21	24	6	39	51	27	9	21	294
Retail Trade	43	28	21	19	18	27	76	51	39	30	18	370
Accommodation and Food Services	3	18	6	3	15	18	47	9	9	12	6	146
Transport, Postal and Warehousing	43	34	45	29	75	71	120	30	17	6	0	470
Information Media and Telecommunications	3	6	3	6	3	6	6	0	0	0	0	33
Financial and Insurance Services	96	47	36	12	29	15	34	14	12	0	0	295
Rental, Hiring and Real Estate Services	109	96	81	65	67	36	81	32	15	3	3	588
Professional, Scientific and Technical Services	132	73	64	51	50	42	84	35	27	12	3	573
Administrative and Support Services	31	34	21	30	21	12	33	3	12	6	3	206
Public Administration and Safety	6	3	6	0	9	0	9	3	0	3	0	39
Education and Training	13	6	3	9	18	0	15	9	0	3	0	76
Health Care and Social Assistance	27	18	12	12	18	15	54	23	6	3	3	191
Arts and Recreation Services	10	6	9	9	3	12	24	18	0	0	0	91
Other Services	26	28	45	29	63	35	86	24	10	7	0	353
<b>Total</b>	<b>982</b>	<b>741</b>	<b>642</b>	<b>540</b>	<b>708</b>	<b>512</b>	<b>1211</b>	<b>536</b>	<b>294</b>	<b>153</b>	<b>99</b>	<b>6418</b>

Source: ABS, Counts of Australian Businesses, including Entries and Exits, Jun 2007 to Jun 2009, Businesses by Industry Division by Statistical Local Area by Turnover Size Ranges, June 2009, released 16/02/2011

**Appendix Table 3 Transport purpose and modes, Hawkesbury local government area, 2007**

<b>Total travel (trips)</b>			Trips av. weekday	233,000
			Trips av. weekend day	183,000
			Trips per person - weekday	3.8
			Trips per person - weekend	3
			Trips per household - weekday	10.7
			Trips per household - weekend	8.4
<b>Distance</b>			Total travel (kms)	3,344,000
			Total travel per person (kms)	54.5
			Av. trip length (kms)	14.4
			Vehicle kilometres travelled (VKT)	2,321,000
<b>Travel time</b>			VKT per person	37.9
			Av. work trip duration (mins)	36
			Av. non-work trip duration (mins)	19
			Av. Trip duration (mins) -- all purposes	23
			Daily travel time per person (mins)	86
<b>Reason for travel (trips)</b>			Commuter	30,000
			Work related business	33,000
			Education/child care	20,000
			Shopping	34,000
			Personal business	19,000
			Social/recreation	45,000
			Serve passenger	47,000
			Other	4,000
			Total	233,000
<b>Mode of travel</b>			Vehicle driver	144,000
			Vehicle passenger	57,000
			Train	5,000
			Bus	8,000
			Walk only	21,000

<b>Reason for Travel</b>	Other modes	5,000	2
	Total	<b>240,000</b>	<b>100</b>
	Commute	806,000	24
	Work related business	665,000	20
	Education/childcare	208,000	6
	Shopping	408,000	12
	Personal business	192,000	6
	Social/recreation	625,000	19%
	Serve passenger	402,000	12%
	Other	38,000	1%
	Total	<b>3,344,000</b>	<b>100%</b>
<b>Mode of Travel</b>	Vehicle driver	2,321,000	69%
	Vehicle passenger	713,000	21%
	Train	193,000	6%
	Bus	75,000	2%
	Walk only	20,000	1%
	Walk linked (e)	7,000	0%
	Other modes	13,000	0%
	Total	<b>3,344,000</b>	<b>100%</b>
<b>Vehicles per household</b>		2.05	

Source: Transport and Infrastructure, Transport Data Centre (2009) Key Transport Indicators by Local Government Area of Residence (Local Government Area), 2007.

## Appendix B Economic modelling results

The following tables provide more detailed results of the economic modelling to determine the project's impact on household income, gross value added and employment. Specifically, the breakdown of direct, indirect and induced impacts during construction and operation is provided.

**Appendix Table 4** provides income, value added and employment benefits for the North-Western Sydney region, the rest of NSW and the rest of Australia from construction of the project. The modelling indicates that most of the household income benefits accrue to the North-Western Sydney region, 48.3 per cent of the total. However a significant number of household income benefits also accrue to the rest of NSW, 48.2 per cent. The majority of household income benefits in the North-Western Sydney region are comprised of indirect benefits; production induced benefits from supporting industries. In the rest of NSW however, induced impacts from household consumption comprise the most significant portion of household income benefits.

The most significant proportion of value added benefits from construction accrue to the rest of NSW, 49.3 per cent compared to 47.0 per cent in the North-Western Sydney region and 3.7 per cent in the rest of Australia. Similarly to household income benefits, the majority of value added benefits in the North-Western Sydney region are comprised of indirect benefits to supporting industries; this is intuitive since increased output translates to increased income. Similarly, in the rest of NSW, induced benefits from household consumption comprise the most significant amount of value added benefits.

The majority of employment benefits are accrued to the rest of NSW, 51.7 percent compared to 44.6 percent in the North-Western Sydney region and 3.7 percent in the rest of Australia. Employment benefits follow the same pattern as value added and household income benefits, with the majority of employment benefits arising from indirect benefits to supporting industries in North-Western Sydney and the majority of employment benefits in the rest of NSW comprising of induced impacts from household consumption.

**Appendix Table 4 Construction impact summary**

Region	Impact	Direct	Indirect	Induced	Total
North-Western Sydney					
	Household income (\$)	\$2,951,000	\$3,593,510	\$1,283,900	\$7,828,440
	Value Added (\$)	\$3,958,300	\$6,029,850	\$2,879,990	\$12,868,150
	Employment (FTEs)	44	45	19	108
Rest of New South Wales					
	Household income (\$)	\$2,648,100	\$2,231,800	\$2,930,900	\$7,810,900
	Value Added (\$)	\$3,809,700	\$3,621,400	\$6,079,000	\$13,510,100
	Employment (FTEs)	49	30	47	125
Rest of Australia					
	Household income (\$)	\$190,600	\$166,600	\$200,300	\$557,500
	Value Added (\$)	\$309,700	\$285,400	\$419,100	\$1,014,200
	Employment (FTEs)	3	2	3	9
Total					

Region	Impact	Direct	Indirect	Induced	Total
	Household income (\$)	\$5,789,700	\$5,991,910	\$4,415,100	\$16,196,840
	Value Added (\$)	\$8,077,700	\$9,936,650	\$9,378,090	\$27,392,450
	Employment (FTEs)	96	77	69	242

**Appendix Table 5** provides household income, value added and employment benefits from operation of the project, including direct, indirect and induced impacts. During operation, all benefits are expected to accrue to the North-Western Sydney region. Like construction impacts, the most significant proportion of all benefits occurs from indirect benefits to supporting industries.

**Appendix Table 5 Operational impact summary**

Region	Impact	Direct	Indirect	Induced	Total
North-Western Sydney					
	Household income (\$)	\$76,300	\$101,800	\$35,000	\$213,100
	Value Added (\$)	\$101,700	\$171,800	\$78,400	\$351,900
	Employment (FTEs)	1	1	1	3
Total					
	Household income (\$)	\$76,300	\$101,800	\$35,000	\$213,100
	Value Added (\$)	\$101,700	\$171,800	\$78,400	\$351,900
	Employment (FTEs)	1	1	1	3

As the input output analysis is based on a number of assumptions, the model results do have a level of uncertainty. Therefore, it is important to note that economic impacts are not a specific forecast. Rather, they provide a picture of the impact of the project on the region and Australian economy as a whole, based on the most current and readily available data. Key constraints are highlighted in **Appendix Table 6**.

**Appendix Table 6 Modelling constraints**

Constraint	Description
Constant prices	The input output model assumed 2007 prices. While it is likely that prices have inflated since the initial input output tables were created and that additional demand may cause a shortage of commodities and labour which would cause prices to increase, the input output model assumes that regardless of the stimulus, the impact on prices is negligible.
Fixed technology	Similar to the price assumption, assuming fixed technology means that the inputs and outputs from a particular industry remain the same and that consumption preferences do not change. While this adjustment clearly happens in the long run, changes in technology and spending preferences usually occur over a multi-year period and are considered negligible in the short term.
Fixed import shares	This assumes that local resources have not been exhausted, or new local production has not been established, if oil were to now to be refined locally instead of being imported for example.
Unlimited supplies of all resources, including labour and capital	Output is not constrained and if the project needed more construction workers or concrete, it is readily available in the local market or readily available for import.



Constraint	Description
A fixed relationship between income and private consumption	Consumptions patterns do not change, even with increasing income.

