Transport for NSW

New Richmond Bridge and traffic improvements Revised Preferred Option Report

December 2022

Australian Government

NSW GOVERNMENT

Acknowledgement of Country

Transport for NSW acknowledges the traditional custodians of the land on which we work and live.

We pay our respects to Elders past and present and celebrate the diversity of Aboriginal people and their ongoing cultures and connections to the lands and waters of NSW.

Many of the transport routes we use today – from rail lines, to roads, to water crossings – follow the traditional Songlines, trade routes and ceremonial paths in Country that our nation's First Peoples followed for tens of thousands of years.

Transport for NSW is committed to honouring Aboriginal peoples' cultural and spiritual connections to the lands, waters and seas and their rich contribution to society.

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Document control

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Versions

Version	Amendment notes
0.1	Draft for review
0.2	Revised version with Transport comments included
0.3	Revised version with Transport and Federal Government comments included

1. Definitions

Term	Definition
Afflux	Flow of water.
Average Exceedance Probability (AEP)	The probability that a given flood level will be exceeded in any one year
Australian Height Datum (AHD)	The Australian Height Datum is the official vertical datum for Australia and serves as the benchmark to which all height measurements are referred.
Banks	The terrain alongside the bed of a river, creek, or stream.
Benefit Cost Ratio (BCR)	A ratio of benefits compared to costs. A BCR of one or greater indicates that the benefits of a project exceed total project construction costs.
Compensatory cut and fill	Excavation of ground levels within a site to offset the fill for embankments.
Cost Benefit Analysis (CBA)	A way to compare the costs and benefits of a project, where both are expressed in monetary terms
Floodplain	A floodplain is a generally flat area of land next to a river or stream.
Flood storage	An area that retains flood waters, for example a floodplain.
Hydraulic	The science that deals with practical applications (such as the transmission of energy or the effects of flow) of liquid (such as water) in motion.
Hydrology	Hydrology is the scientific study of the movement, distribution, and management of water on Earth, including the water cycle, water resources, and environmental watershed sustainability.
Inundation	Flooding.
Local Government Area (LGA)	An administrative division of a country that a local government is responsible for
Topography	The natural and artificial features of an area.
Traffic Modelling	A process that predicts future traffic volumes based on trip generation, destination attractiveness and geographic options to make those trips.
Value Management (VM) workshop	A workshop where options are assessed based on how they perform against a set of criteria or values to determine a preferred option

Term	Definition
Velocity	Speed that water is moving.
Vehicle Hours Travelled (VHT)	Total travel time for all trips in the network.
Vehicle Kilometres Travelled (VKT)	Total kilometres travelled by vehicles within a network.
Vehicle Operating Costs (VOC)	Refers to the variable costs incurred to operate a vehicle including fuel, maintenance, repairs, depreciation and other additional running costs.

2. Supporting information

More information on the project including community updates, environmental reports and other project related documents can be found on the project website at New Richmond Bridge improvements - Richmond area projects - Projects - Roads and Waterways – Transport for NSW

3. Executive Summary

3.1 Purpose

The purpose of this report is to provide an update on the preferred option for the new Richmond Bridge crossing between Richmond and North Richmond. A preferred option which bypassed North Richmond to the north and Richmond to the south (the Green Option) was displayed for community feedback from 7 June to 17 September 2021. Following feedback received during the display period, additional work has been completed. This report describes the options considered, community engagement undertaken, and outcomes of engineering and environmental investigations which led to the selection of a revised preferred option.

3.2 A new Richmond bridge

The Australian Government and the NSW Government are funding traffic improvements including a new bridge over the Hawkesbury River between Richmond and North Richmond.

The Richmond Road corridor connects the Hawkesbury region to Blacktown, the M7 Motorway, and the Central West region of NSW. These connections are made via Blacktown Road, Kurrajong Road and Bells Line of Road. The corridor includes Richmond Bridge.

Richmond Bridge provides a vital link between Richmond and North Richmond – two major residential and commercial hubs of the Hawkesbury area.

In 2013, Transport for NSW (Transport) prepared the Richmond Bridge and Approaches Congestion Study: preferred short-term and long-term options report. The study identified the need for additional bridge capacity and three intersection upgrades to improve travel times and journey time reliability and provide for future growth.

So far, Transport has:

- upgraded the intersection of Kurrajong Road and Old Kurrajong Road
- upgraded the intersection of Bells Line of Road and Grose Vale Road
- upgraded the intersection of March Street and Bosworth Street.

The bridge between Richmond and North Richmond carries an average of 31,000 vehicles per day with a single lane in each direction. Without further improvements to the road network, a journey in the morning peak from North Richmond to Richmond would increase by ten minutes by 2026 compared with travel times in 2019.

Building a new bridge to provide additional capacity over the Hawkesbury River, bypassing Richmond town centre and upgrading other major intersections will reduce congestion, improve connectivity, reduce crash rates, improve flood resilience, and support Hawkesbury City Council's long-term vision for both Richmond and North Richmond town centres.

3.3 Revised preferred option

Following consultation on the previously displayed preferred option (Green) from 7 June 2021 to 17 September 2021, Transport undertook further investigations to help determine a preferred option for a new Richmond Bridge. These investigations included:

- flooding and hydrology
- urban design
- traffic
- cost and economic assessment

- business impact assessment.

The outcomes of these investigations provided input into an evaluation workshop which evaluated three options:

- Green option: this was the previously displayed preferred option at 1 in 5 chance per year flood resilience
- Hybrid option: with a 1 in 20 chance per year flood resilience and improvements to North Richmond traffic signals
- Hybrid flyover option: with a 1 in 20 chance per year flood resilience, improvements to North Richmond traffic signals and a flyover of Kurrajong Road.

The Green option with a 1 in 20 chance per year flood resilience was considered but discounted on the basis that it would exceed project funding.

The evaluation workshop determined that the Hybrid Option with a 1 in 20 chance per year flood resilience was the option to be taken forward as it:

- delivers similar traffic benefits to the Green and Hybrid flyover options
- delivers 1 in 20 chance per year flood resilience
- reduces property impacts including acquisition, noise and visual impacts
- supports businesses in North Richmond town centre by maintaining passing trade
- provides a direct active transport route
- can be delivered within the available funding.

The revised preferred option is shown in **Figure 1.**

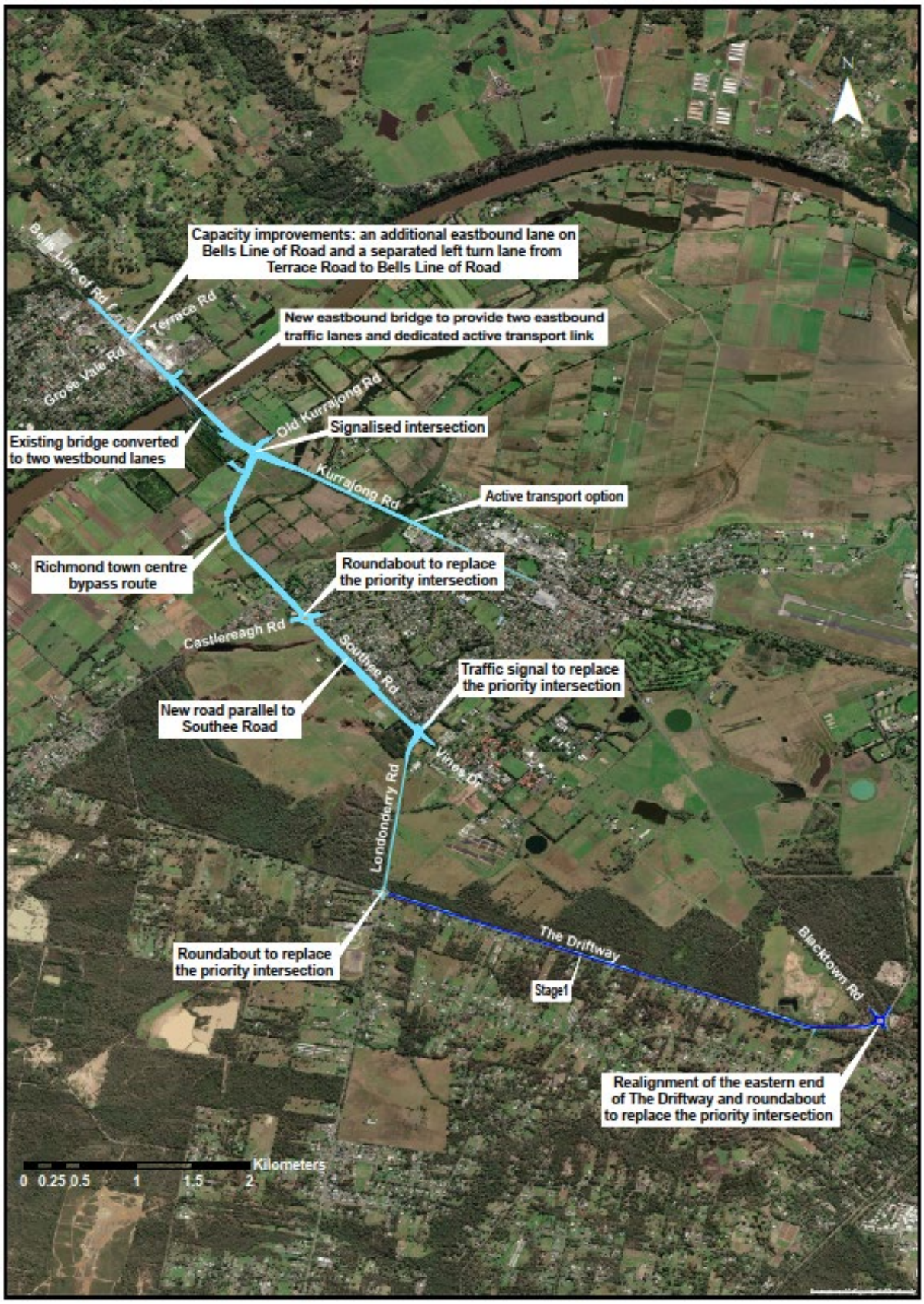
Key features of the revised preferred option include:

- capacity improvements to the intersection of Bells Line of Road / Grose Vale Road / Terrace Road including an additional eastbound lane on Bells Line of Road and a separated left turn lane from Terrace Road to Bells Line of Road
- relocation of on-street parking spaces from Bells Line of Road to Beaumont Avenue
- a new two lane bridge 30 - 70 metres down-stream of the existing bridge for eastbound traffic with a shared path. The new bridge would have 1 in 20 chance per year flood resilience. The shared path would connect the Richmond and North Richmond town centres
- the existing Richmond Bridge would be converted to two lanes for westbound traffic only
- during flood events when the existing Richmond Bridge is closed, the new bridge would be converted to two-way traffic
- a new signalised intersection at the intersection of Kurrajong Road / Old Kurrajong Road and the bypass
- a bypass of the Richmond town centre connecting from Kurrajong Road to Inalls Lane with 1 in 20 chance per year flood resilience. The bypass includes two floodplain bridges and a series of culverts to allow water to flow during flood events.
- a roundabout to replace the priority intersection of Castlereagh Road / Southee Road / Inalls Lane
- a new road parallel to Southee Road

- traffic signals to replace the priority intersections of Londonderry Road with Southee Road and Vines Drive
- a roundabout to replace the priority intersection of Londonderry Road / The Driftway
- pavement and drainage improvements to The Driftway
- realignment of the eastern end of The Driftway to create a four leg roundabout to replace the priority intersections of Blacktown Road with The Driftway and Racecourse Road.

Improvements to The Driftway are proposed as part of Stage 1 to deliver early safety benefits to the community. The remainder of the project would be delivered in Stage 2.

Figure 1 Revised preferred option



3.4 Next steps

Transport will commence development of the concept design for the new Richmond Bridge. This design would include enough detail to enable an environmental assessment to be undertaken. The concept design and environmental assessment will be placed on public display and the community will be invited to provide feedback.

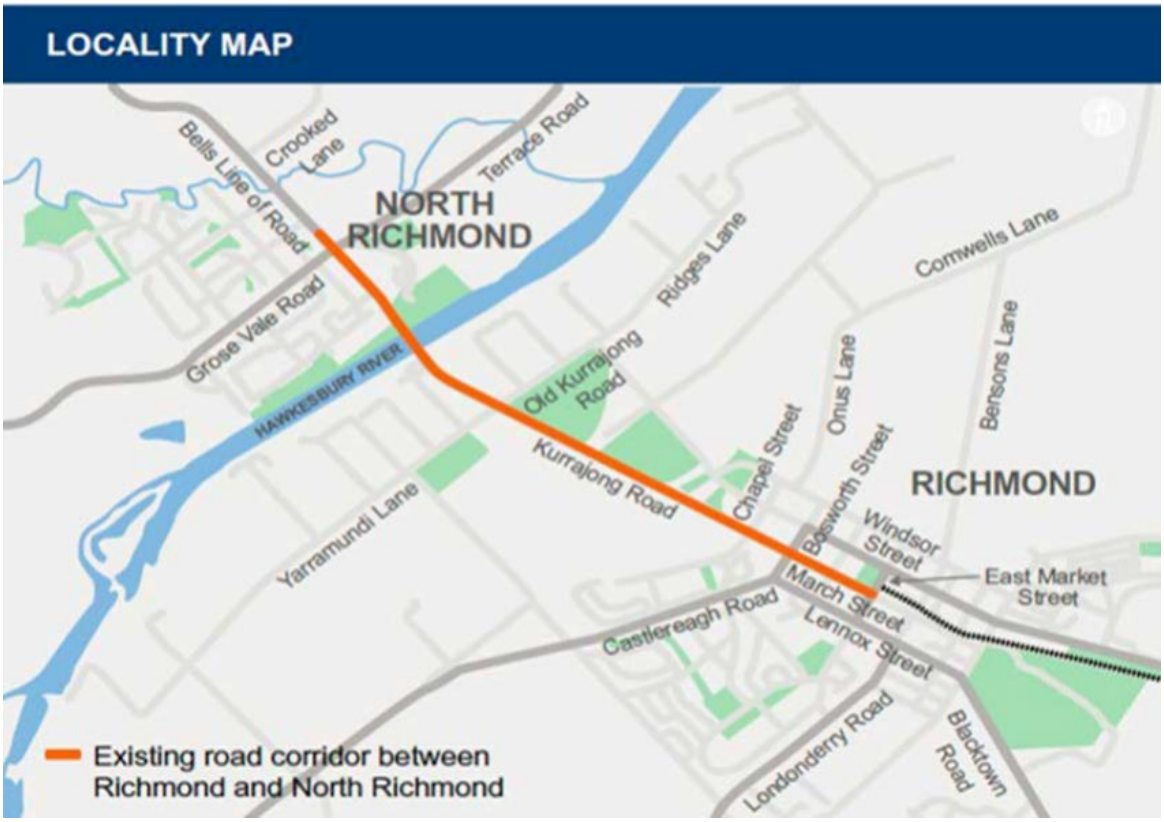
Transport will keep the community informed during the environmental assessment and approval process.

4. Context

4.1 Background

The Richmond Road corridor is an arterial road that connects the Hawkesbury Region to Blacktown, the M7 and the Central West region of NSW via Blacktown Road, Kurrajong Road and Bells Line of Road. Within the Bells Line of Road section of this corridor is Richmond Bridge, which provides a vital link between Richmond and North Richmond -- two major residential and commercial hubs of the Hawkesbury area.

Figure 2 Project locality



The Richmond Bridge and Approaches Congestion Study: preferred short-term and long-term options report (2013), identified that during peak periods, the operation of Richmond Bridge is adversely affected by key approach intersections on Bells Line of Road and Kurrajong Road. This highlighted the need for intersection improvements to manage short-term traffic requirements and bridge duplication to manage long-term traffic demand. Since the study, a number of intersection upgrades have been delivered by the NSW and Australian Governments.

So far, Transport has:

- upgraded the intersection of Kurrajong Road and Old Kurrajong Road
- upgraded the intersection of Bells Line of Road and Grose Vale Road
- upgraded the intersection of March Street and Bosworth Street.

Richmond Bridge is currently a single lane in both directions carrying an average of over 31,000 vehicles per weekday, with 44 per cent of these trips occurring during peak periods. The Richmond Road corridor is classified as a secondary freight route, is part of the Higher Mass Limit road network and is suitable for use by B-doubles up to Redbank Road. Due to the challenging topography, Bells Line of Road is not suitable for B-Doubles west of Redbank Road

and is therefore unlikely to become a major freight route to the Central West of NSW. Between Richmond and North Richmond, heavy vehicles account for about eight per cent of the traffic stream with B-doubles accounting for less than one per cent.

Traffic demand in the study area during peak periods is expected to increase significantly in the coming years, with a forecast 2,000 additional dwellings west of the Hawkesbury River, which will further increase congestion and travel times.

In addition to network congestion and connectivity issues, there are injury crash clusters on the approaches to Richmond Bridge, in Richmond town centre, and at key intersections along The Driftway.

The existing Richmond Bridge is built below the 1 in 2 chance per year flood level and is closed in moderate flood events when flood levels reach about 8 metres Australian Height Datum (AHD). Prior to 2020, Richmond Bridge had not closed due to flooding since 1992. Since 2020, Richmond Bridge has closed five times due to flooding with flood levels reaching up to 14.4 metres in March 2021. While the bridge is not part of flood evacuation routes, there is an opportunity to improve road network resilience.

The new bridge and associated road infrastructure upgrades would address traffic congestion between Richmond and North Richmond, cater for future growth and improve flood resilience.

4.2 Project objectives

The objectives of the New Richmond Bridge and traffic improvements project (the project) are shown in **Figure 3**.

Figure 3 Objectives of the New Richmond Bridge and traffic improvements project

	Improve travel times, journey time reliability, and cater for future demand for private, public, active and freight transport between North Richmond, Richmond and the connecting arterial road network.
	Improve connectivity between Bells Line of Road and Sydney's arterial road network.
	Reduce the frequency and severity of crashes on key road corridors between Richmond and North Richmond.
	Improve flood resilience.
	Support economic development, liveability, and Council's strategic vision for the town centres of Richmond and North Richmond.

In doing this, Transport will build a road corridor that also aims to:

- improve connections to the Central West of NSW as the alternative connection to the Great Western Highway
- maintain the historical significance of the area

- best fit in with the built fabric and natural patterns of the area.

4.3 Purpose of this report

The purpose of this report is to provide an update on the preferred option determination process. Specifically, this report:

- outlines the revised preferred option for the new Richmond Bridge
- describes the approach to determining the revised preferred option
- provides a summary on the outcomes of community consultation, and additional investigations undertaken in response to the community feedback received on the announced preferred option in 2021
- outlines the options evaluated and the outcome of the evaluation workshop
- informs about the next steps in the project.

5. Options considered

5.1 Approach to identify a preferred option

The approach to identify a preferred option is summarised in **Figure 4** and the sections below.

Figure 4 Approach to identify a preferred option

2019		**Richmond bridge options** Community and stakeholder feedback, traffic studies, future growth and road management over time, helped identify options to improve traffic flow in the area. A Community Working Group was formed and helped develop potential options. More than eight options were initially identified within five investigation routes (**Figure 5**) and displayed for feedback. $250 million was announced to deliver the project in April 2019.
November 2019		**Consultation on shortlisted options** Following feedback on the investigation routes, four options (**Figure 6**) were shortlisted for further assessment. Feedback showed a preference for a bypass of both town centres.
March 2020		**Hybrid option** An evaluation workshop, which considered project objectives, constraints and feedback, determined the Hybrid option at 1 in 5 chance per year flood resilience as the preferred option. A constraint was the $250 million funding. A bypass of North Richmond and flood resilience greater than 1 in 5 chance per year could not be delivered within the available funding.
2020-2021		**Additional funding** To deliver a bypass of both town centres, additional funding increased the budget to $500 million ($400 million was from the Australian Government). The Green option (1 in 5 chance per year flood resilience), **Figure 7**, was recommended to bypass both town centres.
June – September 2021		**Green option** Feedback on the preferred Green option highlighted concerns with property impacts of the bypass of North Richmond and the proposed 1 in 5 chance per year flood resilience.
2021 – 2022		**Preferred option review** Further investigations and consultation were undertaken following concerns raised on the Green option. Investigations focused on improvements to the Hybrid option for comparison against the Green option.
Late 2022		**Revised Preferred option** A workshop assessed four options including the Green option at 1 in 5 and 1 in 20 chance per year flood resilience, the revised Hybrid and Hybrid flyover options, both at 1 in 20 chance per year flood resilience. The Hybrid 1 in 20 chance pet year flood resilience option was recommended as the revised preferred option.

Ongoing		**Concept design and environmental assessment** The revised preferred option will progress to concept design and environmental assessment. Transport will keep the community updated on the progress of the project.

5.2 Options considered

5.2.1 Options development and assessment

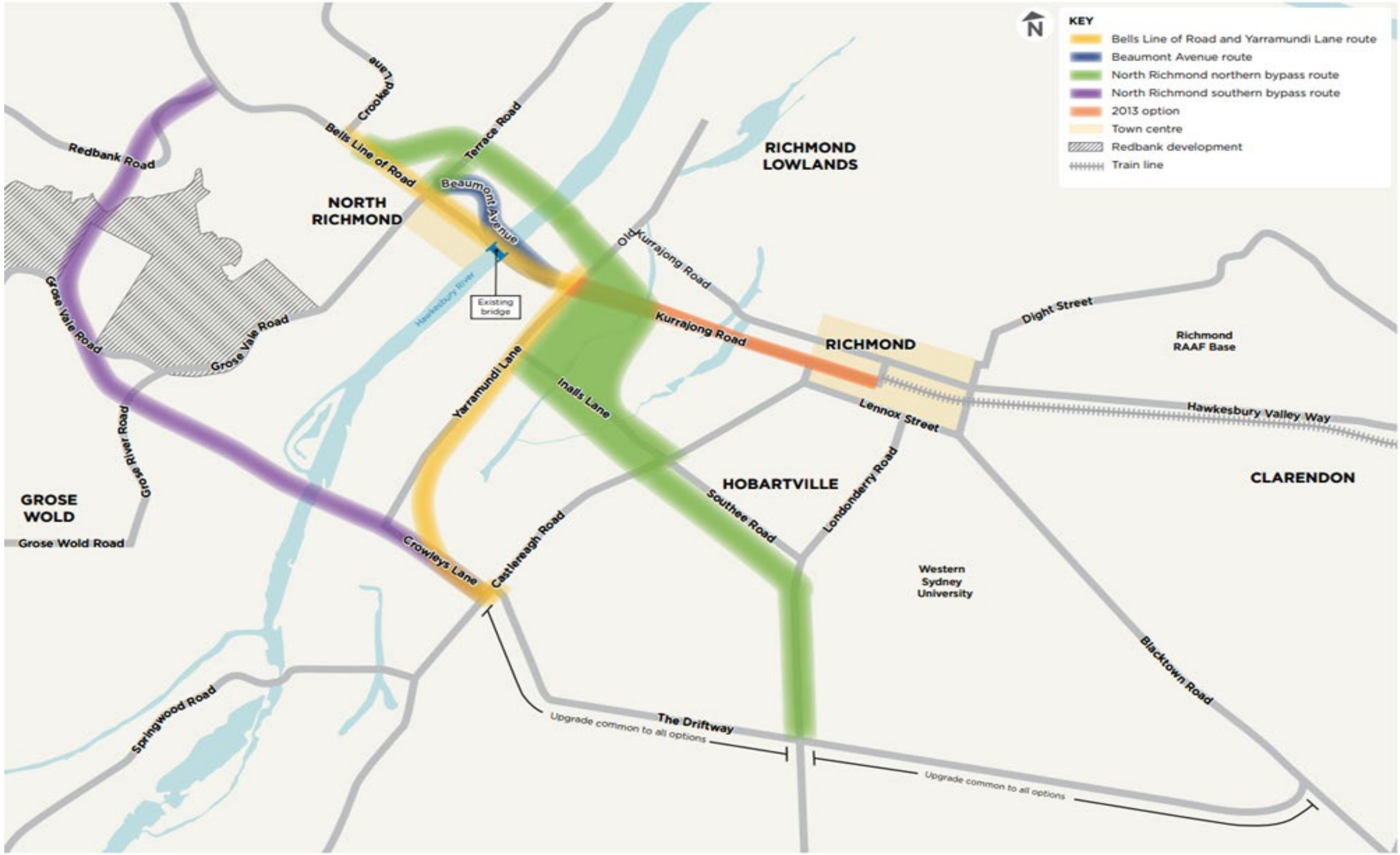
In 2019, Transport formed a Community Working Group made up of local community, business, environmental, heritage and flood advisory groups to play a key role in providing local knowledge to assist in developing a range of potential routes for the project. The group was identified from key stakeholders within the community, and made up of local community, business, environmental, heritage and flood advisory groups.

Key constraints taken into consideration when looking at routes included:

- biodiversity, including Endangered Ecological Communities (ECCs) and coastal wetlands
- Aboriginal and non-Aboriginal heritage
- property ownership
- sporting fields
- flooding and hydrology
- visual amenity.

In collaboration with the Community Working Group more than eight options for the project were initially identified within five investigation routes **Figure 5**. These were put on display for community and stakeholder feedback in late 2019.

Figure 5 Route options developed with the Community Working Group



5.2.2 Shortlisted options

Following feedback, Transport narrowed down the options to a shortlist of four options: Yellow, Green, Purple and a Hybrid option which is a combination of sections of the Yellow and Green options (**Figure 6**).

The options assessment process was based on:

- traffic modelling, focusing on projected traffic performance
- preliminary heritage and environmental investigations
- collaboration with a stakeholder and community working group made up of key community, business, emergency services and environmental groups.

Transport assessed the four shortlisted options at a value management workshop in March 2020. Each option was assessed on:

- performance against the project objectives
- travel savings achieved between 2026 and 2046
- the overall cost for the option and whether it delivers value for money
- impacts on identified constraints.

A summary of the options assessment is provided in **Table 1**.

Figure 6 Shortlisted options

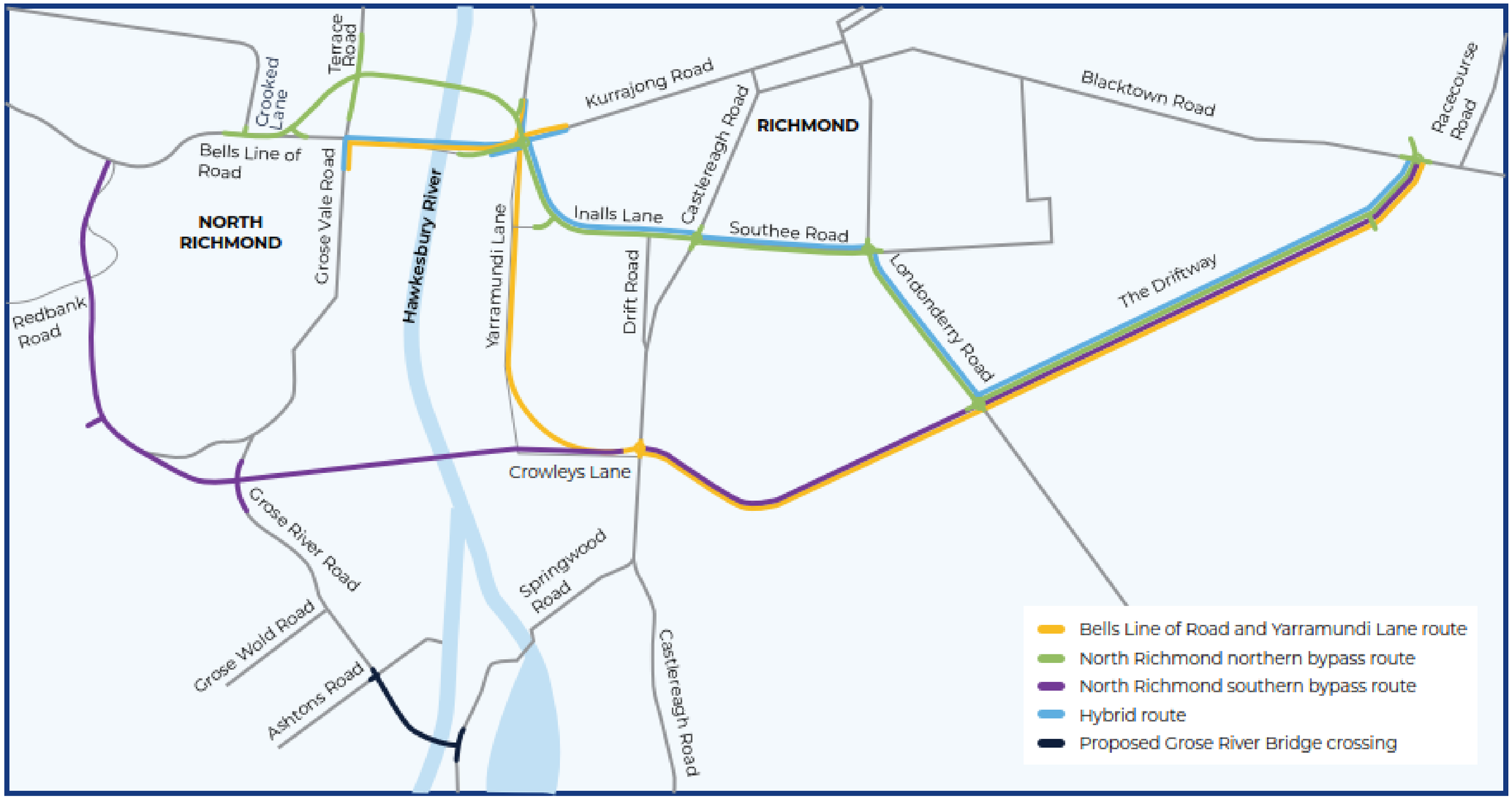


Table 1 Summary of options assessment on shortlisted options

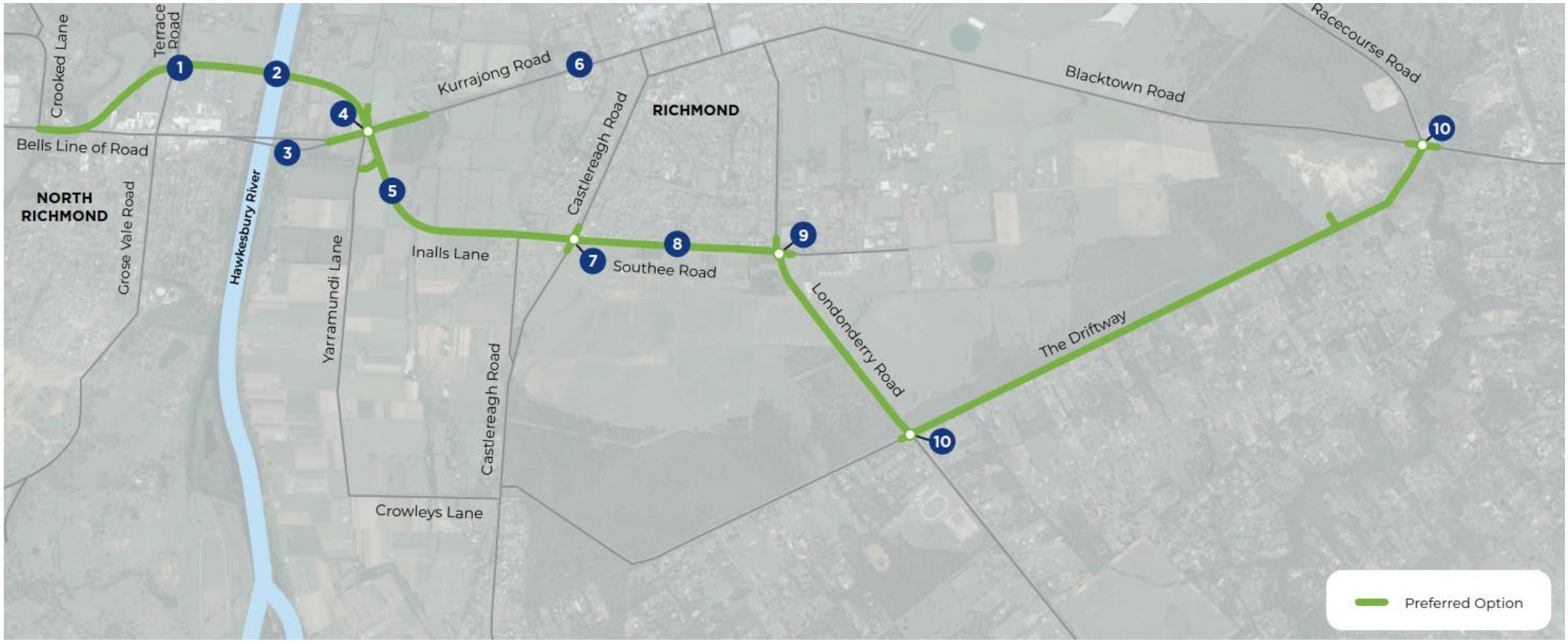
Option	Yellow	Green	Purple	Hybrid
Route length (kilometres)	13.7	12.3	13.6	12.0
2026 Travel time saving (peak hours)	7 minutes	8 minutes	8 minutes	8 minutes
2046 Travel time saving (peak hours)	14 minutes	19 minutes	17 minutes	16 minutes
Bypasses town centre **North Richmond** **Richmond**	 No Yes	 Yes Yes	 Yes Yes	 No Yes
Benefit Cost Ratio (BCR)*	3.4	3.1	2.6	3.7
Impacts on constraints	4 minor 5 moderate 3 major	4 minor 5 moderate 2 major	4 minor 3 moderate 4 major	4 minor 7 moderate 1 major

* A project is generally considered economically viable when the value of the project exceeds the cost and BCR is greater than 1.

The value management workshop identified that the Hybrid option was the option that best achieved the project objectives within the $250 million funding available (as at March 2020) and on balance minimised impacts on constraints including heritage, property acquisition, and biodiversity.

Consultation with the community and stakeholders identified a preference for a bypass of both town centres to provide a long-term solution to traffic congestion and a platform for potential amenity improvements and revitalisation of the town centres. Investigations determined that additional funding would be required to achieve this outcome. From the outcomes of the value management workshop and consultation, the Green option, shown in **Figure 7**, was identified as the preferred option to deliver a bypass of both town centres as it would achieve the highest travel time savings of all options, and the lowest environmental and property impacts of the options which would bypass both town centres. Further detail on the options assessment can be found in the Preferred Option Report (2021) on the project website (https://roads-waterways.transport.nsw.gov.au/projects/01documents/richmond-area-projects/richmond-bridge-preferred-options-report-2021-06.pdf).

Figure 7 Green option

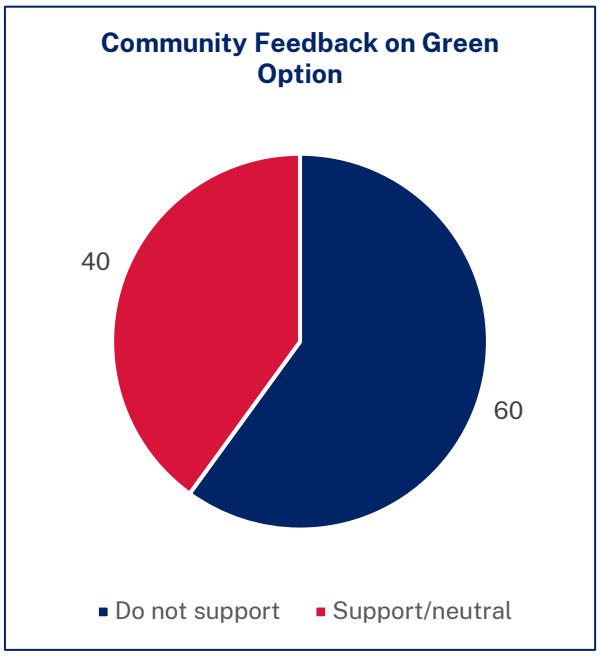


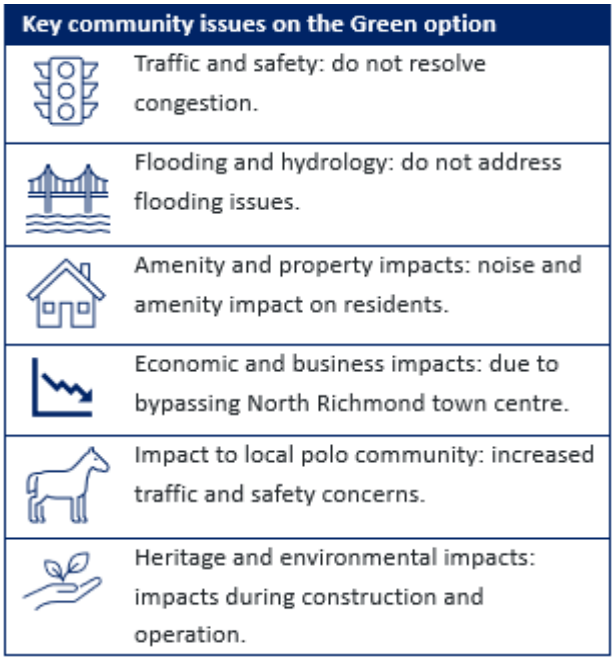
5.2.3 Feedback on the Green option

Transport consulted with the community and stakeholders on the preferred option (Green), shown in **Figure 7**, from 7 June 2021 to 17 September 2021. During the consultation period 244 submissions were received via email, feedback form, letter or phone and 1,477 responses to the online survey were received.

Overall, there was support for an additional crossing of the Hawkesbury River, however, as shown in **Figure 8**, respondents were divided in their opinions on the preferred option, with around 60 per cent not supporting the preferred option, and around 40 per cent supporting it or indifferent. Several respondents provided feedback on the other route options that had been consulted on in 2019-2020.

Figure 8 Community survey results on the Green





Key issues on the Green option included:

- **traffic and safety:** in response to community requests, Transport provided additional information about traffic modelling during the consultation period. Many in the community considered that the Green option would not solve traffic issues, only move congestion to new locations. Feedback suggested that the available funding could be used to improve the safety and efficiency of the road network on other options.
- **flooding and hydrology:** a key issue was that the community and stakeholders want the project to increase flood resilience for the area. The community felt the Green option did not adequately address flooding issues and the available funding could be used differently to improve flood resilience on other options.
- **amenity and property impacts**: there were concerns with amenity impacts particularly for residents in Norfolk Place, Inalls Lane and Southee Road and it was suggested that the proposed roads be moved further away from properties to reduce impacts. Concerns regarding noise wall design and graffiti protection were raised and to avoid impact to mature vegetation, particularly the pecan trees along Southee Road.
- **bypassing North Richmond and potential impact to businesses:** while some feedback suggested that a bypass of both town centres would free up access to both North

Richmond and Richmond shops and relieve congestion in those towns, it was also raised that the Green option could have negative economic impacts on the shops in North Richmond, which benefit from passing trade, and more analysis was needed on this issue.

- **impact to the local polo community**: the importance of the local polo community was raised and that it contributes greatly to the Richmond area and surrounds. Concerns included the potential for increased traffic on Old Kurrajong Road and potential safety issues with vehicles interacting with horses. There was also concern about the separation and loss of polo fields and the potential flow on impacts to the polo community.
- **general heritage and environmental impacts:** including maintaining the local character and heritage, impacts to heritage properties, potential impacts due to construction vibration and impacts to views.

Further details on the consultation are provided in Appendix A. In response to the feedback received on the Green option, Transport undertook further investigations to address the matters raised on the Green option and to help determine a final preferred option that delivers the greatest community benefits within the allocated funding budget for the project.

6. Additional investigations

The additional investigations undertaken to address community and stakeholder concerns and determine a final preferred option included:

- flooding and hydrology
- traffic
- economic
- business
- North Richmond town centre urban design.

The above investigations were completed on the options shown in **Figure 9** and described below:

- Green option: this was the previously displayed preferred option at 1 in 5 chance per year flood resilience
- Hybrid option: with a 1 in 20 chance per year flood resilience and improvements to North Richmond traffic signals
- Hybrid flyover option: with a 1 in 20 chance per year flood resilience, improvements to North Richmond traffic signals and a flyover of Kurrajong Road.

The Purple option cannot be delivered within the available funding, does not adequately achieve the traffic objectives of the project and has the highest impacts to property, biodiversity and Aboriginal heritage. The Yellow option takes a longer route to cross the floodplain so would cost substantially more to improve flood resilience and is also less efficient for traffic. The Purple and Yellow options were therefore not considered further, and additional investigations focussed on the Green and Hybrid options.

A summary of the investigations and outcomes is provided in the following sections.

Figure 9 Options assessed in additional investigations

6.1 Flooding and hydrology

6.1.1 Study area and existing bridge flood resilience

Richmond Bridge and Kurrajong Road cross the Hawkesbury River; the largest river in the Hawkesbury-Nepean catchment. The catchment has an area of approximately 22,000 km^2, extends from Goulburn in the south to the mouth of the Hawkesbury River at Broken Bay, and includes major tributaries which drain from several high rainfall areas creating a unique flooding environment. The topography of the Hawkesbury-Nepean valley significantly effects flooding in the valley coming from a narrow gorge to downstream of Wallacia where the valley widens to form the floodplain between Penrith and Castlereagh, and at Yarramundi the valley opens to form a further major floodplain in the area of North Richmond, Richmond, Windsor and Wilberforce. Downstream of this area, a topographic confinement around Sackville acts as a control and can cause high flood levels upstream on the floodplain. This process varies with the type and severity of the flood event and results in a more complex range of flooding behaviour than may be expected.

The floodplain between Richmond and North Richmond, known as the Richmond Lowlands, experiences frequent flood events, with flooding on Kurrajong Road and Richmond Bridge.

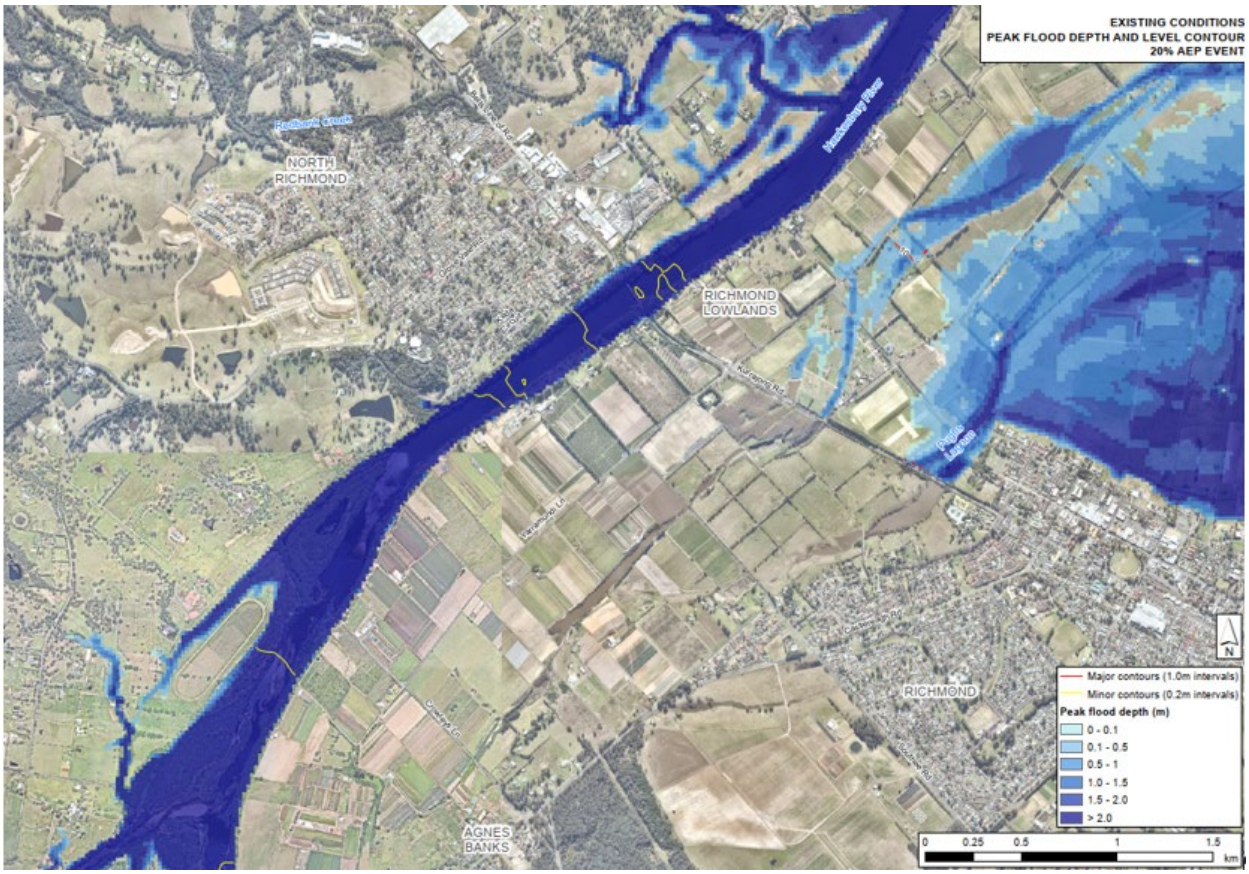
Richmond Bridge is at a lower elevation than the floodplain and so is overtopped in relatively frequent flood events. Richmond Bridge is built below the 1 in 2 chance per year flood level and is closed when flood levels reach about eight metres. Prior to 2020, Richmond Bridge had not closed due to flooding since 1992. Since 2020, Richmond Bridge has closed five times due to flooding with flood levels reaching up to 14.4 metres AHD in March 2021. While the bridge is not part of flood evacuation routes, there is an opportunity to improve road network resilience.

6.1.2 Existing flood behaviour

The following section discusses flood behaviour and levels in the study area for various flood scenarios.

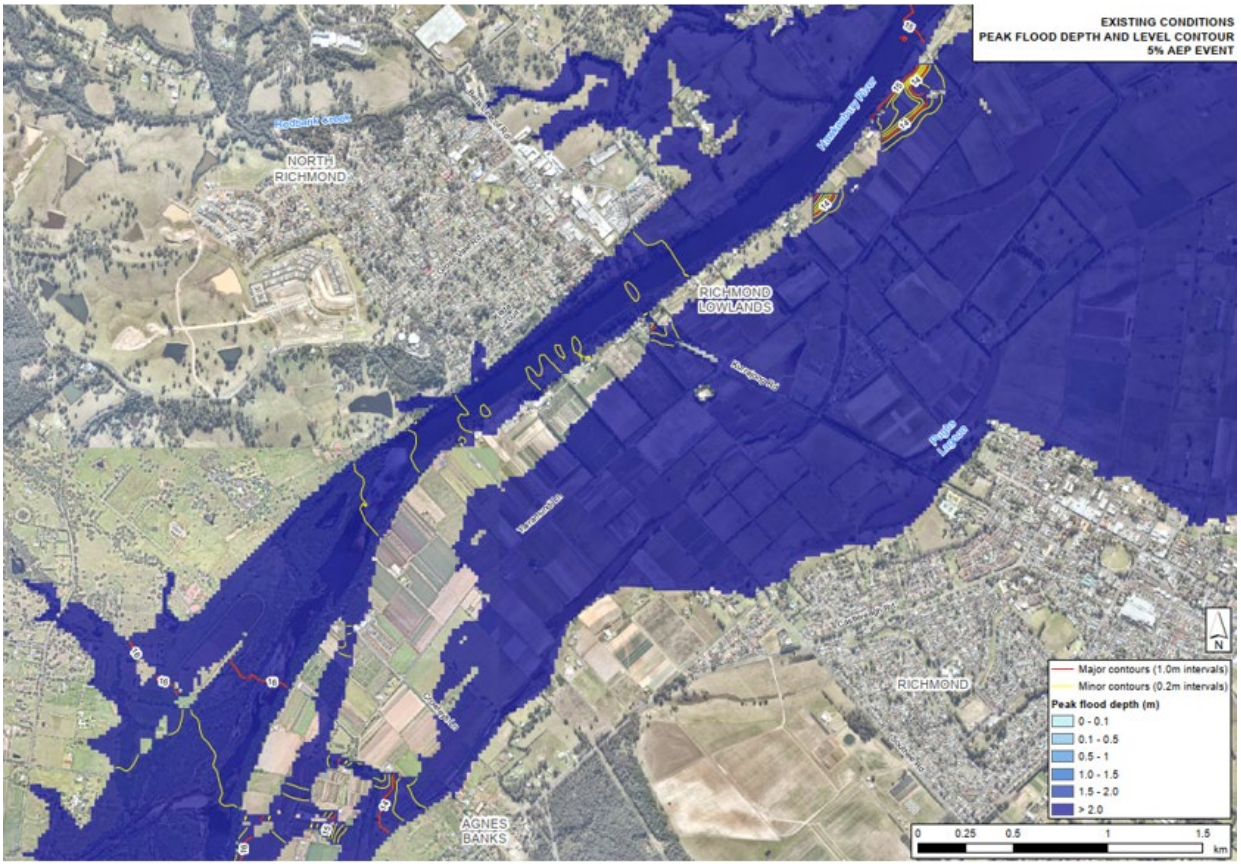
- **1 in 5 chance per year flood:** flow is generally confined to the channel of the Hawkesbury River. Flood levels at Richmond Bridge are around 12.2 metres (**Figure 10**).

Figure 10 **Existing peak flood depth and level for 1 in 5 chance per year flood**



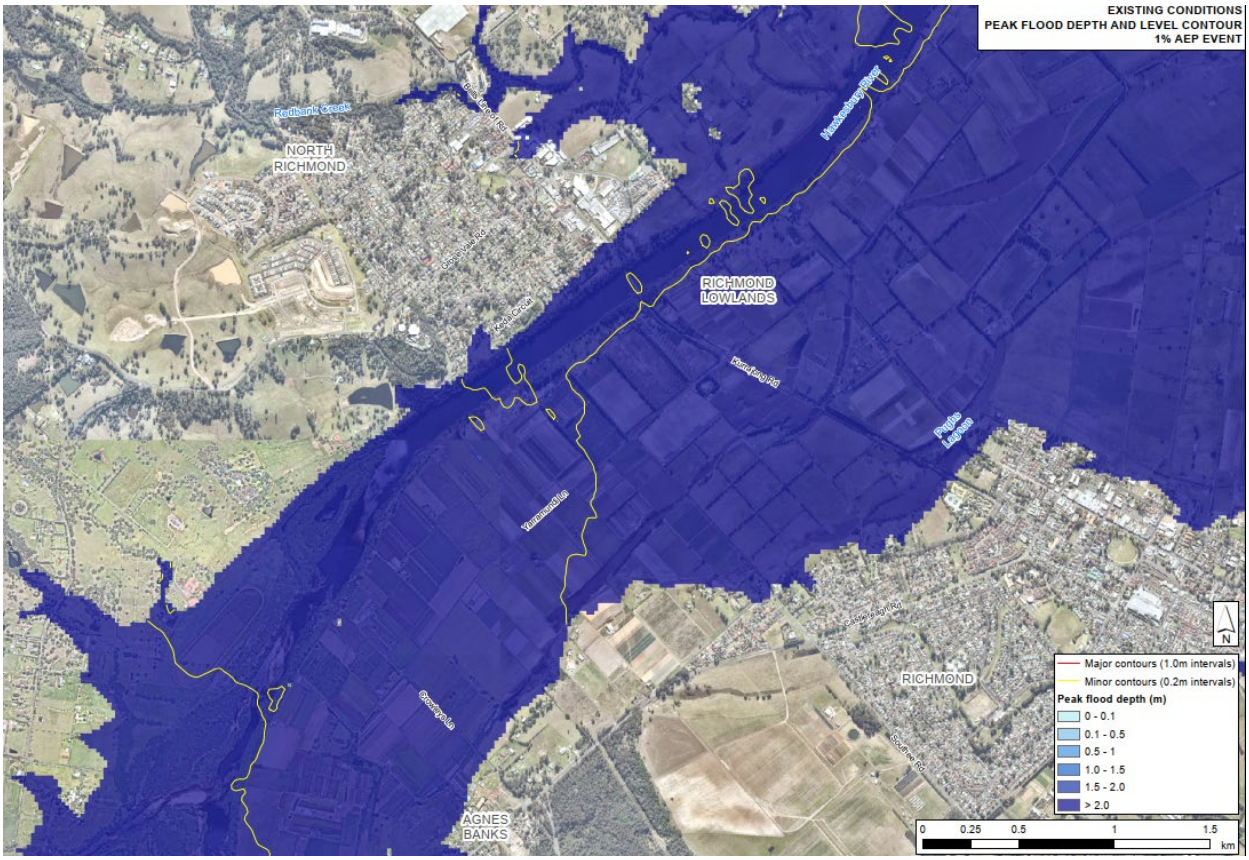
- **1 in 20 chance per year flood:** This is a notable event with inundation of the Richmond Lowlands and flow breaks out of the Hawkesbury River near Yarramundi, and at various low points along the bank with one location being along Kurrajong Road at the existing Richmond bridge. While the Hawkesbury River is still the primary conveyance of floodwater, the floodplain experiences high water flow. Flood depths in the floodplain are greater than four metres and the peak flood level at Richmond Bridge is around 15.3 metres (**Figure 11**).

Figure 11 Existing peak flood depth and level for 1 in 20 chance per year flood



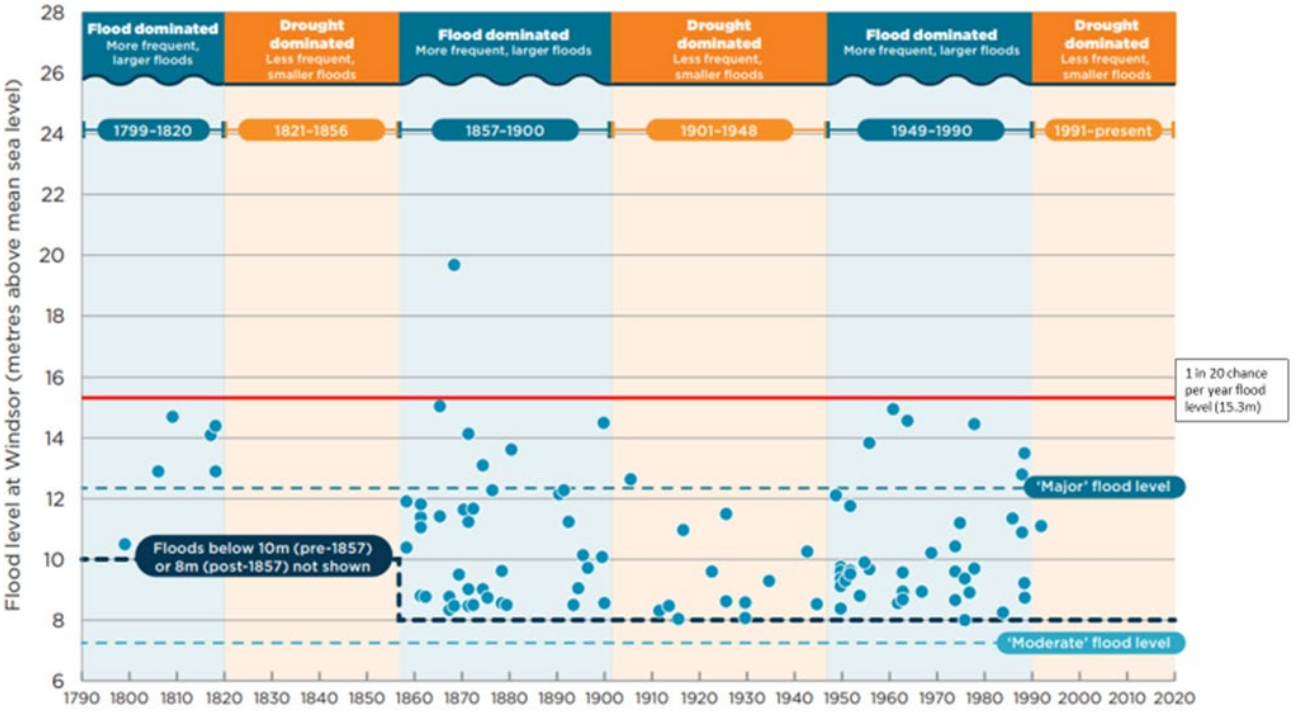
- **1 in 100 chance per year flood:** during this flood event the Hawkesbury River completely breaks its banks and water flows in a north easterly direction across the floodplain. The majority of the flow is through the river, however the floodplain receives approximately 40 per cent of the flow that is directed along the river. The peak flood level at Richmond Bridge is 17.4 metres (refer to **Figure 12**) with peak flood depths in the floodplain around seven metres.

Figure 12 Existing peak flood depth and level for a 1 in 100 chance per year flood



Historical flood levels for the for Hawkesbury – Nepean at Windsor are shown in **Figure 13**.

Figure 13 Hawkesbury - Nepean floods at Windsor 1790 to 2019



Source: Infrastructure NSW

6.1.3 Assessment objective

The objective of the flooding and hydrology assessment was to identify the afflux impact of each option and the mitigation measures required to reduce any flood impact. The flooding and hydrology assessment was based on existing hydrologic and hydraulic models and terrain information. Following selection of the final preferred option, ground survey and site inspections would be undertaken to identity potential property impacts and the need for additional mitigation measures during the next phase of design.

6.1.4 Options impact on hydrology

The hydrology assessment identified that increasing embankment height to improve flood resilience would result in increased need for flood mitigation measures such as floodplain bridges and culverts to reduce impacts on flooding.

The Green Option at 1 in 5 chance per year flood resilience would have the least impact on flood behaviour as embankment heights across the floodplain are relatively small. The total waterway opening requirements for this option (including river and floodplain structures) would be 517 metres.

The two hybrid options considered were both designed at 1 in 20 chance per year flood resilience. The Hybrid 1 in 20 chance per year option had a total waterway opening requirement of 582 metres while the Hybrid flyover option had a total waterway opening of 1017 metres. The increased waterway opening associated with the flyover option was primarily a function of the bridge requirement to fly over Kurrajong Road rather than to minimise flood impacts.

During a 1 in 5 chance per year flood event, maximum increases in flood levels of 0.03 metres were observed in the model across the options. This increase was identified within the river immediately upstream of the existing bridge.

During a 1 in 20 chance per year flood event, maximum increases in flood levels of 0.07 metres were observed in the model across the options. This increase was identified within the river immediately upstream of the existing bridge. A maximum increase of 0.06 metres was observed on the floodplain south-west of the Kurrajong Road and Yarramundi Lane intersection. The increases in flood levels are greatest in the 1 in 20 chance per year flood event as the bridge and road embankments are not overtopped by flood waters.

During a 1 in 100 chance per year flood event, maximum increases in flood levels of 0.04 metres were observed both within the river and floodplain. Maximum increases in flood levels are lower than the 1 in 20 chance per year flood event as the bridge and road embankments would be overtopped.

The new Richmond Bridge and the route between Richmond and North Richmond are proposed to be built above the 1 in 20 chance per year flood level of 15.3 metres. Historical flood records for Windsor dating back to 1790 show only one flood has exceeded this level during that period. Historical records for Richmond going back to the 1980's show no floods have exceeded this level including the recent floods from 2020 to 2022.

6.1.5 Mitigation for change in flood levels

The following criteria have been adopted by the NSW Department of Planning and Environment for assessing the impacts of proposals. "The proposal must be designed and constructed to limit impacts on flooding characteristics in areas outside the road corridor during any flood event up to and including the 1 per cent AEP flood event (1 in 100 chance per year) to the following:

a) a maximum increase in inundation time of one hour

b) a maximum increase of 10 millimetres in above-floor inundation to habitable rooms where floor levels are currently exceeded

c) no above-floor inundation of habitable rooms which are currently not inundated

d) a maximum increase of 50 millimetres in inundation of land zoned as residential, industrial or commercial

e) a maximum increase of 100 millimetres in inundation of land zoned as rural, primary production, environment zone or public recreation

f) no significant increase in the flood hazard or risk to life

g) maximum relative increase in velocity of 10 per cent, where the resulting velocity is greater than 1 metre per second, unless adequate scour protection measures are implemented and/or the velocity increases do not exacerbate erosion as demonstrated through site-specific risk of scour or geomorphological assessments."

The current flood assessment shows that the flood impacts of the options are within the acceptable limits.

Compensatory cut or compensation for lost floodplain storage is a common technique for managing impacts within a floodplain. This approach is useful on smaller creeks and in flood storage areas where each piece of fill raises flood levels affecting everybody.

The Windsor floodplain that includes South, Eastern and Rickabys Creek is a flood storage area while the river at Penrith is floodway. The river crossing for the North Richmond bridge is mainly floodway and the storage that is lost from the embankment is compensated by the small upstream afflux. Creating compensatory storage in this area would not change flood levels as this afflux is also required to push floodwater through the river and floodplain bridges. In this

location compensatory floodplain storage would simply slow down the filling of the floodplain metres below the peak. Compensatory cut is therefore not proposed as this would result in higher property impacts for little benefit.

Further design, ground survey, site inspections and hydrology assessment would be undertaken during the next phase of design to identity potential property impacts and the need for additional mitigation measures if required.

6.2 Traffic assessment

The objective of the traffic assessment was to look at traffic performance for future years, which included 2026, 2036 and 2046, for the three options.

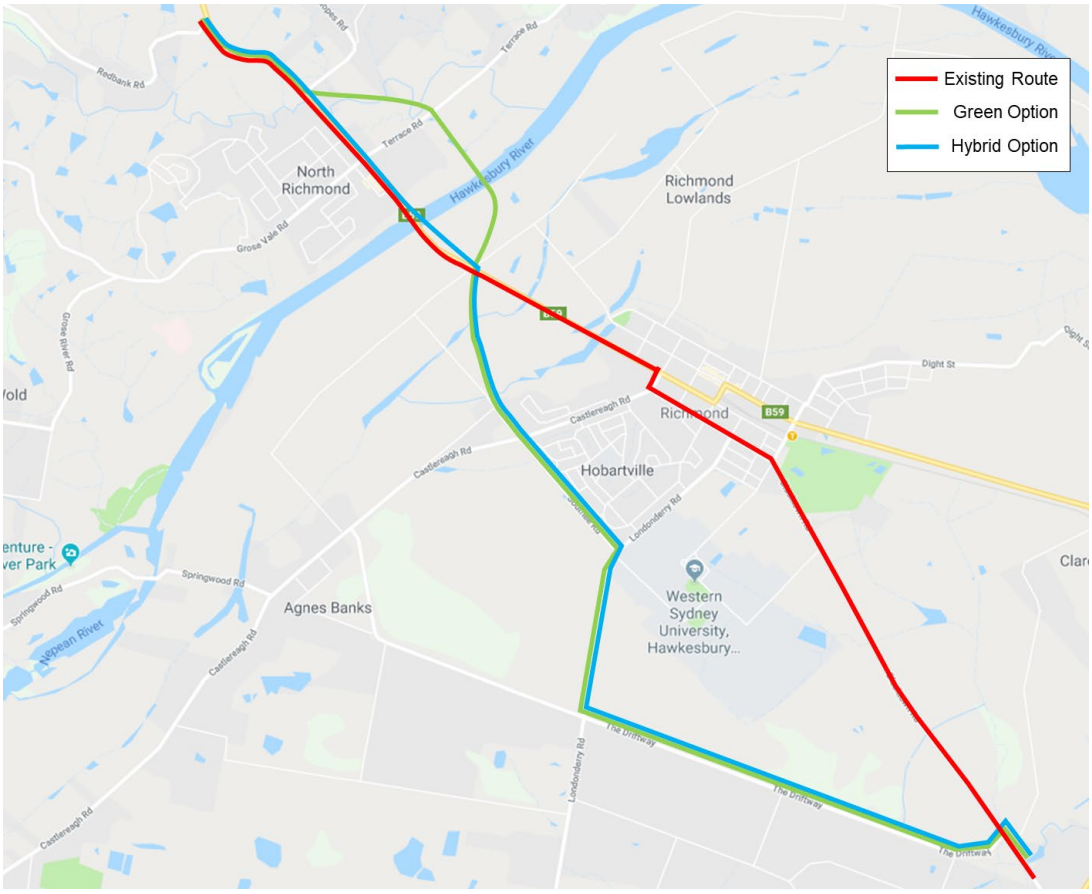
6.2.1 Assessment methodology

The options were modelled in 2026, 2036 and 2046 to determine their traffic performance compared to the Do Minimum (Do Min) scenario which includes the three short term intersection improvements identified in the Richmond Bridge and Approaches Congestion Study (2013) and the Grose River Bridge (Do Min GRB). The outcomes of the traffic modelling are summarised below in terms of travel time savings on key routes, overall reduction in vehicle hours travelled in the study area road network, and effectiveness of routes in redistributing traffic.

An assessment of travel time savings has been undertaken for two key routes (**Figure 14** and **Figure 15**) in the study area reported in the peak direction of travel in both the AM and PM peak. For example, in the AM peak, travel times are reported in a southeast direction and in the PM peak, travel times are reported in the northwest direction.

Figure 14 Existing Route 1 from Bells Line of Road, North Richmond to Windsor Street Richmond

Figure 15 Options routes from the intersection of Redbank Road and Bells Line of Road to intersection of Blacktown and The Driftway



The lengths of the options routes and the existing route are:

- Existing Route: 10.7 kilometres
- Green: 12.3 kilometres
- Hybrid: 12.0 kilometres.

6.2.2 2026

Table 2 and **Table 3** show the travel times for each route for each option in the AM and PM peaks respectively. All options show substantial travel time savings, particularly in the AM peak with travel time savings of 11-13 minutes and four to five minutes in the PM peak. These travel time savings would be realised by private vehicles, buses, and freight.

The Hybrid Flyover Option was shown to have a higher travel time to the Hybrid Option along both routes in the AM southbound direction because of a scenario testing the closure of Old Kurrajong Road to eastbound traffic. This closure was not implemented in the Hybrid Option. During the PM northbound direction along the Option Route the Hybrid Option was shown to have a quicker travel time to the Hybrid Flyover Option and Green Option due to the inclusions of a left turn slip lane on the south approach of the Southee Road / Londonderry Road / Vine Drive intersection, relieving delays experienced on the approach.

Table 2 AM peak options travel time

AM Peak Travel time (minutes) - southbound				
Route	**Do Min GRB**	**Green Option**	**Hybrid Flyover Option**	**Hybrid Option**
Route 1	23:15	11:30	11:15	11:00
Options Route	25:45	13:00	14:15	13:30

Table 3 PM peak options travel time

PM Peak Travel time (minutes) - northbound				
Route	**Do Min GRB**	**Green Option**	**Hybrid Flyover Option**	**Hybrid Option**
Route 1	12:30	11:00	10:15	11:00
Options Route	17:45	12:45	13:30	13:15

Table 4 and **Table 5** show the reduction in vehicle hours travelled (VHT) in the AM and PM peaks respectively across the study area road network. All options show a reduction in VHT in the AM peak ranging from 19-23 per cent and from 13-16 per cent in the PM peak.

Table 4 AM peak option VHT

AM Peak (VHT)							
Route	**Do Min GRB**	**Green Option**		**Hybrid Flyover Option**		**Hybrid Option**	
Traffic Demand	26283	26204	0%	26268	0%	26266	0%
VHT	3857	2980	-23%	3115	-19%	3083	-20%

Table 5 PM peak options VHT

PM Peak (VHT)							
Route	**Do Min GRB**	**Green Option**		**Hybrid Flyover Option**		**Hybrid Option**	
Traffic Demand	26239	26033	-1%	25995	-1%	26039	-0.8%
VHT	3212	2693	-16%	2716	-15%	2780	-13%

Another measure of the effectiveness of each route option is how much traffic uses the new route compared to existing routes, due to travel time savings. **Table 6** shows the percentage of traffic using different routes after crossing and to access the Richmond Bridge and Bypass Bridge. During the AM the usage of the Bypass is shown to be 34-42 per cent, while during the PM the Bypass usage is shown to be 47-48 per cent. The remaining traffic will travel through Richmond town centre to reach their destination, including in Richmond CBD, Hawkesbury Valley Way and Blacktown Road.

Table 6 Percentage of traffic to Richmond and Bypass

Route	Green Option		Hybrid Flyover Option		Hybrid Option	
	AM	PM	AM	PM	AM	PM
To / From Richmond	66%	53%	58%	53%	62%	52%
To / From Bypass	34%	47%	42%	47%	38%	48%

6.2.3 2036

Table 7 and **Table 8** show the travel times for each route for each option in the AM and PM peaks respectively. All options show substantial travel time with travel time savings of 13-15 minutes in the AM and 12-13 minutes in the PM peak. These travel time savings would be realised by private vehicles, buses, and freight.

The Hybrid Flyover Option was shown to have a higher travel time to the Hybrid Option along both routes in the AM southbound direction because of the implementation of traffic management along Old Kurrajong Road in the eastbound direction. This policy was not implemented during the Hybrid Option. During the PM northbound direction along the Option Route the Hybrid Option was shown to have a quicker travel time to the Hybrid Flyover Option and Green Option due to the inclusions of a left turn slip lane on the south approach of the Southee Road / Londonderry Road / Vine Drive intersection, relieving delays experienced on the approach.

Table 7 AM peak options travel time

AM Peak Travel time (minutes) - southbound				
Route	**Do Min**	**Green Option**	**Hybrid Flyover Option**	**Hybrid Option**
Route 1	25:30	11:45	11:30	11:00
Options Route	28:15	14:00	14:15	14:30

Table 8 PM peak options travel time

AM Peak Travel time (minutes) - northbound				
Route	**Do Min**	**Green Option**	**Hybrid Flyover Option**	**Hybrid Option**
Route 1	18:00	11:15	10:45	11:30
Options Route	26:00	13:00	13:45	13:30

Table 9 and **Table 10** show the reduction in vehicle hours travelled (VHT) in the AM and PM peaks respectively across the study area road network. All options show a reduction in VHT in the AM peak ranging from 26-28 per cent and from 26-27 per cent in the PM peak.

Table 9 AM peak options VHT

AM Peak (VHT)							
Route	**Do Min**	**Green Option**		**Hybrid Flyover Option**		**Hybrid Option**	
Traffic Demand	28528	28449	0%	28502	0%	28505	0%
VHT	4671	3361	-28%	3444	-26%	3403	-27%

Table 10 PM peak options VHT

PM Peak (VHT)							
Route	**Do Min**	**Green Option**		**Hybrid Flyover Option**		**Hybrid Option**	
Traffic Demand	28086	27953	0%	27961	0%	27963	0%
VHT	4671	3361	-28%	3444	-26%	3403	-27%

Another measure of the effectiveness of each route option is how much traffic uses the new route compared to existing routes. **Table 11** shows the percentage of traffic travelling along Richmond Bridge or the Bypass Bridge and utilising the Bypass is around 40 per cent during the AM peak in all Options and around 50 per cent during the PM peak for all Options. The remaining traffic will travel through Richmond town centre to reach their destination, including in Richmond CBD, Hawkesbury Valley Way and Blacktown Road.

Table 11 Percentage of traffic to Richmond and Bypass

Route	Green Option		Hybrid Flyover Option		Hybrid Option	
	AM	PM	AM	PM	AM	PM
To / From Richmond	62%	53%	58%	52%	60%	53%
To / From Bypass	38%	47%	42%	48%	40%	47%

6.2.4 2046

Table 12 and **Table 13** show the travel times for each route for each option in the AM and PM peaks respectively. All options show substantial travel time with travel time savings of 16-18 minutes in the AM and 18-21 minutes in the PM peak. These travel time savings would be realised by private vehicles, buses, and freight

The Hybrid Flyover Option was shown to have a higher travel time to the Hybrid Option along both routes in the AM southbound direction because of the implementation of traffic management along Old Kurrajong Road in the eastbound direction. This policy was not implemented during the Hybrid Option. During the PM northbound direction along the Option Route the Hybrid Option was shown to have a quicker travel time to the Hybrid Flyover Option and Green Option due to the inclusions of a left turn slip lane on the south approach of the Southee Road / Londonderry Road / Vine Drive intersection, relieving delays experienced on the approach.

Table 12 AM peak options travel time

AM Peak Travel time (minutes) -southbound				
Route	**Do Min**	**Green Option**	**Hybrid Flyover Option**	**Hybrid Option**
Route 1	29:15	12:30	13:45	12:15
Options Route	32:15	15:45	15:00	14:45

Table 13 PM peak options travel time

PM Peak Travel time (minutes) -northbound				
Route	**Do Min**	**Green Option**	**Hybrid Flyover Option**	**Hybrid Option**
Route 1	28:30	12:15	11:30	12:00
Options Route	34:15	13:45	15:45	15:30

Table 14 and **Table 15** show the reduction in vehicle hours travelled (VHT) in the AM and PM peaks respectively across the study area road network. All options show a reduction in VHT in the AM peak ranging from 40-42 per cent and a reduction of 54 per cent in the PM peak.

Table 14 AM peak options VHT

AM Peak (VHT)							
Route	**Do Min**	**Green Option**		**Hybrid Flyover Option**		**Hybrid Option**	
Traffic Demand	33332	33238	0%	33267	0%	33245	0%
VHT	7422	4319	-42%	4469	-40%	4369	-41%

Table 15 PM peak options VHT

PM Peak (VHT)							
Route	**Do Min**	**Green Option**		**Hybrid Flyover Option**		**Hybrid Option**	
Traffic Demand	32887	32600	-1%	32570	-1%	32603	-1%
VHT	8377	3884	-54%	3885	-54%	3883	-54%

Another measure of the effectiveness of each route option is how much traffic uses the new route compared to existing routes. **Table 16** shows the percentage of traffic using different routes which also travel along Richmond Bridge or the Bypass Bridge. The results show that all Options move around 50 per cent of the traffic to the Bypass, south of Richmond, and do not travel through Richmond Town Centre.

Table 16 Percentage of traffic to Richmond and Bypass

Route	Green Option		Hybrid Flyover Option		Hybrid Option	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**
To / From Richmond	56%	51%	49%	49%	52%	47%
To / From Bypass	44%	49%	51%	51%	48%	53%

6.2.5 Traffic Assessment Summary

All the preferred options were shown to provide substantial travel time savings and improvements to VHT, with up to 21 minutes along the Options Route during 2046. All three options were shown to move around 50 per cent of traffic, which uses Richmond Bridge, along the Bypass avoiding the Richmond Town centre during 2046. The Green Option was shown to provide the best overall improvements to travel time as a result of the Bypass Bridge which bypasses North Richmond. The Hybrid Option and Hybrid Flyover Option both provided better

usage of the Bypass south of Richmond Town centre compared to the Green Option, with additional improvement having been provided.

6.3 Economic assessment

6.3.1 Overview

A Cost Benefit Analysis (CBA) was undertaken to assess the economic feasibility of each option. CBA is an economic framework that is used to assess the economic value of project options in a like-for-like way.

6.3.2 Methodology

The economic appraisal has been carried out in line with the Transport for New South Wales *Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives, June 2018.* All economic parameters used in the appraisal are consistent with updated Transport for NSW *Economic Parameter Values (September 2019)* unless otherwise noted.

The CBA model developed for this evaluation incorporates:

- traffic modelling inputs, including vehicle kilometres travelled (VKT), vehicle hours travelled (VHT) and average network speed (ANS) for the base case and all project options for three years (2026, 2036, 2046)
- Data and information provided by Transport, including maintenance costs
- modelling inputs and parameter values from the Transport Economic Parameter Values (June 2020, v2).

The CBA considers whether the economic benefits of project options will exceed the whole-of-life cost of project options.

Benefits are generally the result of traffic moving more freely within the operating road environment, or because of more direct routes. They are expected to comprise:

- savings in travel time costs
- savings in vehicle operating costs (VOC)
- savings in crash costs as a result of reduced VKT, or as a result of safer road operating environments (e.g. reduced chance of head-on collisions)
- avoided external environmental costs, such as reduced greenhouse gas emissions or reduced noise pollution
- reduced network severance compared with the existing bridge.

Project costs include capital and operational expenditure associated with project options that are higher than the costs associated with the base case. In addition, the residual value of the project option asset at the end of the appraisal period will be accounted for as a negative cost (benefit) to the project in the final year of benefits.

6.3.3 Value of benefits

All project options are expected to generate substantial benefits to both local and regional road users, particularly through savings in travel time. As part of the economic appraisal, the potential

benefits of each option were quantitatively evaluated against a base case. Benefits quantified include:

- vehicle travel time savings
- vehicle operating cost savings
- environmental externalities
- crash cost reduction
- flood detour savings
- active transport savings
- residual asset value, which reflects the value of the asset at the end of the assessed period.

The results of the analysis suggest that each of the options assessed will provide a comparable level of benefits, with the benefits provided by the Hybrid Option marginally lower than what is estimated for the Green and Hybrid Flyover options.

6.3.4 Economic appraisal results of options

Projects with a benefit cost ratio (BCR) above one are considered to be economically viable projects as the economic benefits exceed the economic costs of the project. As shown in the table below, all options are economically viable, however the analysis suggests that the Hybrid Option would provide the greatest return on investment with a BCR of 3.3, compared to 3.0 for the Green Option and 2.8 for the Hybrid Flyover Option.

Table 17 Economic appraisal results by options (at seven per cent discount rate, $m, $2023 P50)

	Green Option	Hybrid Option	Hybrid Flyover Option
BCR	3.0	3.3	2.8

6.4 Business impact assessment

6.4.1 The North Richmond Town Centre

The North Richmond town centre comprises approximately 4.7 hectares of B1 – Neighbourhood Centre zoned land within North Richmond suburb. Specifically, the town centre extends along Bells Line of Road with the North Richmond Village shops on the southwestern side and commercial/industrial businesses on the north eastern side. (**Figure 16**). The centre has carparks for more than 400 vehicles with direct access from Bells Line Road and Gross Vale Road. The draft Hawkesbury employment land strategy (ELS) 2020 notes that retail uses include a Coles, ALDI, and other population-serving shops and services and in total retail uses, occupy around 10,000 square metres of space.

The town centre contains around 72 businesses (Google business place data) and retail businesses such as the bakery, cafe, restaurant, supermarket and meal takeaway premises would have a higher reliance on passing trade and hence be more sensitive to any reductions in traffic volumes.

Figure 16 North Richmond town centre landscape pattern

6.4.2 Assessment objectives

HillPDA was engaged by Transport to undertake a business impact assessment of the Green and Hybrid options, that is options to bypass North Richmond versus upgrade Bells Line of Road in North Richmond. The objective of the assessment was to assess existing and forecast spending patterns in the North Richmond town centre and to identify the potential impacts or benefits to retailers in the North Richmond town centre as a result of options to upgrade Bells Line of Road through North Richmond or bypass the town centre.

6.4.3 Assessment methodology

To estimate the likely impacts of each option against a do-nothing or business as usual scenario (referred to as the Base Case), the following steps were undertaken:

- a business survey was sent to businesses within the town centre to identify the key likely perceived impacts associated with the project from local businesses. The survey methodology was developed in conjunction with Transport and Hawkesbury City Council. A total of 70 businesses were identified to participate in the survey.

  Businesses were sent, either via mail and/or email, a description of the project, an invitation to participate in a survey and a link to the online survey. The survey encompassed a range of questions relating to the respondents' trade catchment, level of trade captured from passing traffic and the likely perceived impacts of the project on the business. The surveys were sent in early December 2021 with responses collected until late January 2022.

- Spendmapp data was analysed to determine the amount of expenditure sourced from tourists and visitors and the capture of resident expenditure across Hawkesbury LGA. Spendmapp uses real, continuous and comprehensive bank transaction data to create a

moving picture of Hawkesbury's resident and visitor expenditure patterns. Spendmapp provides expenditure data across 14 categories. For this assessment, eight retail categories were analysed:

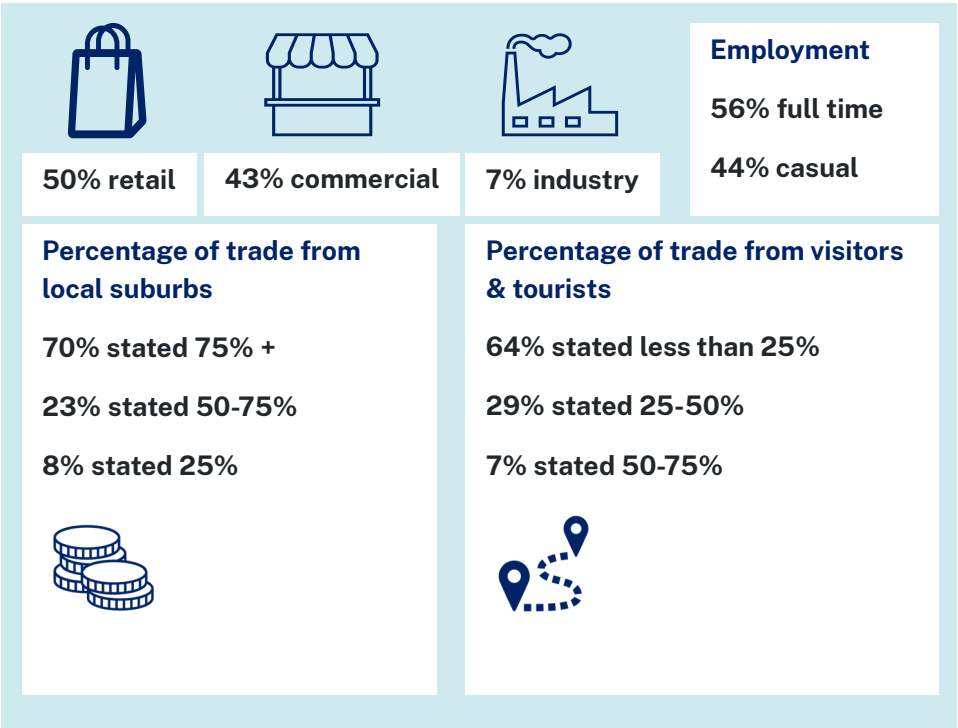
- bulky goods
- department stores and clothing stores
- dining and entertainment
- furniture and other household goods
- grocery stores and supermarkets
- personal services
- specialised food retailing
- specialised and luxury goods retailing

- the likely impact in trade captured by retailers in the town centre was estimated based on forecast traffic volume changes under each scenario, capture rates derived from Spendmapp, NSW Department of Planning and Environment population projections and HillPDA's bespoke expenditure model.
- best practices initiatives were considered to create a more vibrant and sustainable centre.

6.4.4 Summary of survey findings

A snapshot of survey responses on business type, employment at the North Richmond town centre and source of trade is provided in **Figure 17**.

Figure 17 Business type and employment source of trade snapshot



The survey results show that all types of business were of the view that trade sourced from surrounding suburbs was their main source of revenue. While less trade comes from visitors and

tourists travelling along Bells Line of Road, respondents indicated that retailers would be impacted more from any reduction in traffic volumes when compared to commercial and industrial respondents.

Respondents were also asked for their perceived impact on trade, amenity, business exposure, and customer parking of the Green option and the Hybrid option. The responses are summarised in **Table 18** and **Table 19**.

Table 18 Responses relating to impacts on trade - Green option

Impact Category	Positive*	Neutral	Negative+
Impact on trade	21%	29%	50%
Amenity impacts	7%	57%	36%
Business exposure	21%	29%	50%
Customer parking availability	21%	57%	21%

Notes: * includes slightly positive and very positive responses, + includes slightly negative and very negative responses.

Table 19 Responses relating to impacts on trade –Hybrid option

Impact Category	Positive*	Neutral	Negative+
Impact on trade	42%	29%	28%
Amenity impacts	21%	36%	43%
Business exposure	50%	21%	28%
Customer parking availability	21%	50%	28%

Notes: * includes slightly positive and very positive responses, + includes slightly negative and very negative responses.

From the survey results it can be concluded that in general, business owners preferred an option to upgrade through North Richmond rather than a bypass of the town centre. This was likely due to the perception that a bypass would reduce the potential for capturing passing trade from residents and tourists and visitors.

6.4.5 Summary of impacts assessment findings

Table 20 shows traffic forecasts on Richmond Bridge for both options between the peak hours of 8am-9am and 4pm-5pm under both options.

Table 20 Change in traffic on Richmond Bridge and Bells Line of Road under each option (volumes 8am-9am and 4pm-5pm)

	2019	2026	2046				
Crossing option	Base Case (do nothing)	Base Case (do nothing)	North Richmond bypass – Green option	Bells Line of Road Duplication –Hybrid option	Base Case (do nothing)	North Richmond bypass – Green option	Bells Line of Road Duplication –Hybrid option
Richmond Bridge	4,640	4,790	2,470	5,430	5,220	3,010	6,750
Bypass Bridge	0	0	2,930	0	0	4,050	0
Total	4,640	4,790	5,400	5,430	5,220	7,060	6,750
% change crossing Richmond Bridge compared to Base Case	**0%**	**0%**	**-48%**	**+13%**	**0%**	**-42%**	**+29%**

Source: HillPDA

The proportional changes in traffic volumes under each option, when compared to the Base Case, form the basis for assessing the likely impacts upon the amount of trade sourced from tourists and visitors to North Richmond town centre.

Under the duplication option, the increased capacity would reduce travel times and congestion. This would likely lead to an increased proportion of residents using the route. To minimise the potential for the double-counting of residents, it is assumed that the passing trade impact from tourists and visitors is half that of the proportional uplift in traffic volumes over the Base Case.

The trade impact of each option is summarised below.

- **Base Case**: Based on Spendmapp data and the bespoke expenditure model, it is estimated that North Richmond town centre captured around $124 million in expenditure as of 2021. Of this $104 million was sourced from residents with the remaining $20 million was sourced from tourists and visitors. Over a 25-year period to 2046, expenditure captured in the town centre is forecast to increase by $64 million to a total of around $187 million. Over this period, expenditure sourced from residents are forecast to increase by just under $54 million, reaching $158 million while tourist and visitor expenditure increases by $10 million to around $30 million.

Table 21 Base case expenditure forecasts for North Richmond town centre 2021 - 2046 ($million)

Customer Segment	2021	2026	2031	2036	2041	2046	Change
Resident expenditure	103.9	111.9	126.7	134.3	145.4	157.7	53.8
Tourist and visitor expenditure	19.8	21.2	24.0	25.4	27.4	29.4	9.9
Total expenditure	**123.7**	**133.1**	**150.7**	**159.7**	**172.8**	**187.4**	**63.7**

Source: HillPDA

- **Green option – expenditure impact results (Table 22):** Applying the proportional reduction in traffic volumes crossing Richmond Bridge under the Green option, it is

forecast that expenditure captured by the town centre would increase by $51 million, from $124 million in 2021 to $175 million by 2046. Compared to the Base Case, the proportional loss in total trade in 2026 is around 7.7 per cent. This level of impact is considered low to moderate. It should be noted however that growth in the trade area and growth in tourism generally reduces that immediate impact over time. After the opening of the Green option total retail sales in North Richmond is forecast to reach $139 million by 2031. This is $15.7 million (12.7 per cent) increase from 2021 notwithstanding the immediate impact of the bypass.

Table 22 Impact of the Green option on North Richmond town centre expenditure ($million)

Customer segment	2021	2026	2031	2036	2041	2046	Change
Resident expenditure	103.9	111.9	126.7	134.3	145.4	157.7	53.8
Tourist and visitor expenditure	19.8	10.9	12.7	13.8	15.4	17.1	-2.7
Total expenditure	**123.7**	**122.8**	**139.4**	**148.2**	**160.8**	**174.8**	**51.2**
Total difference to Base Case	**0.0**	**-10.3**	**-11.2**	**-11.5**	**-12.0**	**-12.6**	**-12.6**
% change in trade to Base Case	**0.0%**	**-7.7%**	**-7.5%**	**-7.2%**	**-7.0%**	**-6.7%**	

Source: HillPDA

- **Hybrid option – expenditure impact results (Table 23):** Applying the proportional increase in traffic volumes crossing Richmond Bridge under Hybrid option, it is forecast that trade captured in the centre would increase by $68 million over the 25-year period from $124 million in 2021 to $192 million by 2046. Total expenditure captured in 2026 is estimated at $135 million. This is around 1.1 per cent greater than that estimated under the Base Case. This proportional difference increases to around 2.3 per cent (+$4.3 million) by 2046. Due to the increase in trade, the Hybrid option seems to be the preferable option. However, the slight increase in trade should be seen in the context of increasing traffic volumes travelling along Bells Line Road and the adverse impact this may have upon the amenity and urban design outcome opportunities for the town centre. Careful consideration of urban design outcomes for the town centre would be required to manage these potential impacts.

Table 23 Hybrid option - impact on North Richmond town centre expenditure ($million)

Customer segment	2021	2026	2031	2036	2041	2046	Change
Resident expenditure	103.9	111.9	126.7	134.3	145.4	157.7	53.8
Tourist and visitor expenditure	19.8	22.6	26.1	28.1	30.9	34.0	14.2
Total expenditure	**123.7**	**134.5**	**152.7**	**162.4**	**176.3**	**191.7**	**68.0**
Total difference to Base Case	**0.0**	**1.4**	**2.1**	**2.7**	**3.5**	**4.3**	**4.3**

Customer segment	2021	2026	2031	2036	2041	2046	Change
% change in trade to Base Case	**0.0%**	**1.1%**	**1.4%**	**1.7%**	**2.0%**	**2.3%**	

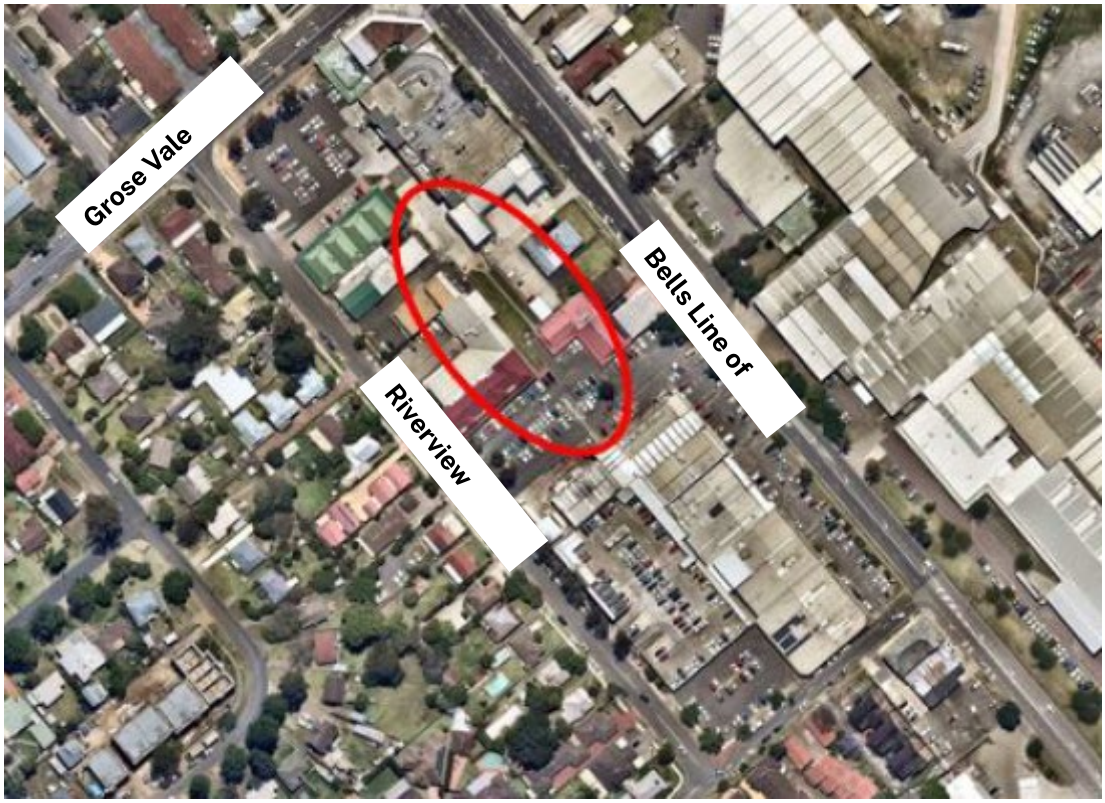
Source: HillPDA

6.4.6 Activation opportunities

The following best practice initiatives have been identified to create a more vibrant and sustainable centre at North Richmond which could be implemented by Council and local businesses with either road upgrade option:

- **Activate the centre though special events**: use of the North Richmond town centre to host events that would raise its profile and increase visitations throughout the year. Events could include outdoor food markets, open air cinema or a music/local artist event. These events would be more beneficial if held in proximity to the centre with strong links to existing retailers.
- **Implement an improved street frontage program**: an active retail frontage improvement program for less active street frontages, like that initiated by Parramatta City Council which assisted commercial property owners to enhance the visual appearance and quality of their building facade, shopfront, and awning to encourage people to live, work, and do business in the centre. This program could also reinvigorate the existing heritage characteristics.
- **Create activity cluster(s) such as an "Eat Street":** North Richmond town centre has an opportunity to create an "eat street" and a possible location is shown in **Figure 18**. An eat street in this location could be achieved through incentivising redevelopment in this location with a focus on active street frontages and outdoor dining along the existing walkway. This would also contribute to improved movement and way finding, street frontages, and night time economy.

Figure 18 Improved vibrancy and "eat street" opportunity



Source: HillPDA

- **Increase resident density within a walkable catchment:** encouraging a balance of commercial and residential densities in and around a centre can enhance activation both day and night. Over the period 2021-41, the Hawkesbury local government area population is forecast to increase by over 12,600. The current B1 – neighbourhood centre zoning of North Richmond town centre allows for shop top housing, this coupled with medium density zoned land around the centre has the capacity and opportunity to increase the resident density surrounding the town centre. An increased residential density within a walking catchment of the centre would increase the activeness and vibrancy of the town centre, increase the demand for additional retail floorspace and have other positive economic flow-on effects.
- **Initiate a Business Improvement District program**: encouraging the refurbishment of existing commercial and retail stock would enhance the look and feel of the town centre and attract new tenants and further investment. This could be done through Council grants or through a Business Improvement District (BID) program.

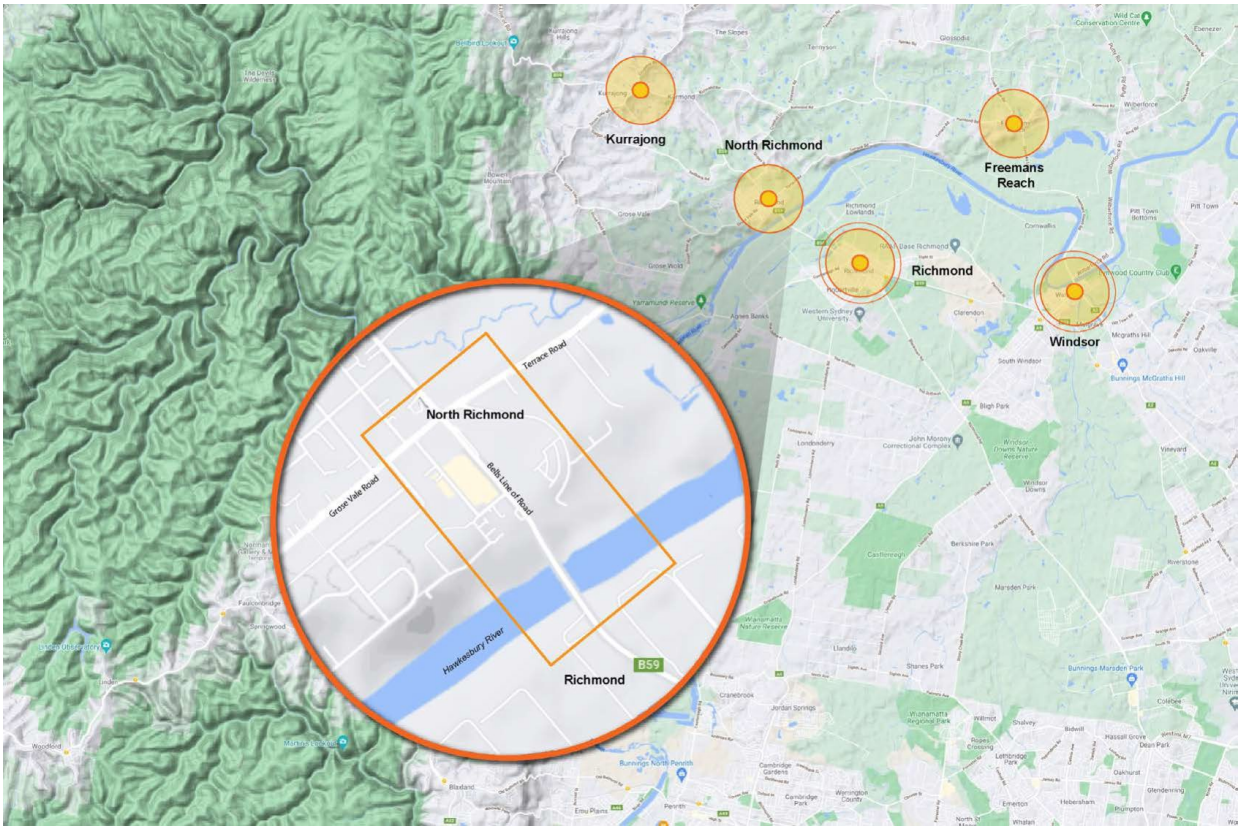
6.5 Urban design assessment

An urban design assessment was undertaken by KI Studios on the North Richmond town centre to consider and compare the urban design impacts, mitigation measures, and opportunities for the Green and Hybrid options.

6.5.1 Local and regional context

North Richmond is a semi-rural suburb of the Hawkesbury local government area, located about 70 kilometres northwest of Sydney's central business district. North Richmond is one of several regional centres in the general area (**Figure 19**). Its location to the northwest, together with Kurrajong services the areas west of the Hawkesbury River up to and beyond the foothills of the Blue Mountains.

Figure 19 North Richmond suburb and surrounding suburbs and regions



Source: KI Studio

North Richmond township interface with Bells Line of Road

Bells Line of Road functions as North Richmond's high-street interfacing along the northern edge of the township. Although the majority of North Richmond including its town centre was developed to the south of Bells Line of Road due to the flood prone lands just to the north, retail and commercial properties also line the northern side of the road corridor. Just to the north of these commercial properties is a small pocket of residential development.

With Grose Vale Road being the only main north-south through road and very limited right-hand turn options along Bells Line of Road due to high traffic volumes, the northern side of the corridor is quite disconnected from the remainder of the town to the south. This disconnection is further emphasised by the large commercial properties dominating the northern side of the road and providing limited access points to Bells Line of Road.

Existing access and connectivity

The main town centre is situated directly south of Bells Line of Road and is relatively easily accessed by through-traffic and the local community. On the northern side of Bells Line of Road are large industrial estates and business enterprises. These business enterprises cater for several specialist products and equipment supplies, and generally tend to have a smaller patronage target. As a result, the more visited and active area of the town centre is to the south of the Bells Line of Road. The main access points to the town centre include Bells Line of Road, Pitt Lane, Grose Vale Road and Riverview Street.

The commercial properties along the northern side of Bells Line of Road are predominantly accessed from Bells Line of Road.

6.5.2 Existing biodiversity and opportunities

Hawkesbury Council's Biodiversity map (**Figure 20**) shows the large areas of significant vegetation in the area, mostly east (of the Hawkesbury River) and west of the project site (the adjacent ranges). The lack of tree canopy and ecological habitat for wildlife, especially birds, has been identified and there is the opportunity to improve the future links of biodiversity for North Richmond through:

- providing additional areas for biodiversity rejuvenation in existing open space areas
- establish a street tree planting strategy using indigenous trees from the area along the main streets to link significant vegetation areas and also to provide microclimate/ increased tree canopy to the urban areas
- transforming existing surface carpark areas within the proposed town centre to public open space/park spaces
- green roofs on new building complexes within the new town centre "hub" to attract more bees to inner city life.

These opportunities would be further explored in consultation with Hawkesbury City Council.

Figure 20 Biodiversity map of North Richmond town centre

Source: KI Studio

6.5.3 Summary of options comparison

Table 24 summaries the benefits, constraints, threats and opportunities of each option from an urban design perspective.

Table 24 Urban design advantages and disadvantages of options

	North Richmond bypass option – Green option	Bells Line of Road option –Hybrid option
Advantages	**Strengths**	
	• reduces traffic volumes through town centre area, including heavy vehicles • provides flexibility on how the future town centre develops • avoids the need for further upgrade to Grose Vale Road/Terrace Road traffic signals and the widening of Bells Line of Road • includes a purpose-built separated cycle and pedestrian paths (upgraded pedestrian and cycling paths are common to both options).	• utilises and upgrades the existing road corridor • exposure to commercial properties and businesses through the town centre • limits environmental impacts and has lower carbon footprint • property impacts are lower than the Bypass and predominantly affect commercial properties • less cost • consolidates the retail/civic hub (enhancing its attractiveness as a destination).
	Opportunities	
	• better entry into North Richmond through enhanced streetscape • enhance connectivity to the riverside • Bells Line of Road could become a main street for the town centre, including possible traffic and reduced speeding • make the town centre less car oriented • redefine the sense of place of the town centre (quieter local centre).	• project could support the rejuvenation of the town centre • redefine the sense of place of the town centre • improve amenity of town and the town centre • enhanced streetscape through North Richmond as part of the project • enhance connectivity to the riverside • improve pedestrian crossing opportunities

	North Richmond bypass option – Green option	Bells Line of Road option –Hybrid option
		• provide ease of parking to make it more attractive as an alternative hub compared to Richmond.
Disadvantages	**Weaknesses**	
	• higher cost for construction and property acquisition, reducing availability of funding to deliver other benefits • higher environmental impacts including landscape character • visual and noise impacts to residents of Norfolk Place • additional impacts to Endangered Ecological Communities • requires acquisition of four homes and six partial acquisitions • impacts to Polo Club property including homes and a partial acquisition of adjoining property • development of a new road corridor.	• impacts access to some commercial properties • constrains the urban planning of the town centre/civic hub (predominantly allowing its expansion to the south of Bells Line of Road) • further accentuates the sense of separation created by Bells Line of Road between the northern and southern sides of town (note: most of the town is to the south of Bells Line of Road, hence limited impact) • retains the existing Bells Line of Road corridor as the main through route, including its general traffic and heavy vehicle dominated character.
	Threats	
	• reduce number of through traffic visitors to the town centre • less sustainable and higher carbon footprint • could splinter the commercial hub with businesses establishing along the new bypass (though re-zoning required) • impacts additional areas of Aboriginal Heritage sensitivity.	• may require re-configuration of access for some commercial properties.

The key negative issues with the Bells Line of Road – Hybrid option can generally be addressed in a more effective way compared to the North Richmond Bypass – Green option, particularly in relation to cost efficiencies, environmental and potential economic impacts.

6.5.4 Urban design and amenity considerations

North Richmond town centre and "hub"

The town centre has the opportunity in both the mid and long term to be oriented towards the south and west, providing a stronger link with the local community. Opportunities that could be explored by Transport for NSW, Hawkesbury City Council and/or developers could include:

- balancing mass and void space through the town centre to assist accentuating the historic elements and assist in wayfinding
- re-zoning the riverfront, north of Bells Line of Road, as public recreation
- improving pedestrian and cycle connectivity
- rationalising vehicle entry to the town centre to allow Bells Line of Road to function and to minimise impacts to local streets
- enhancing green spaces and laneways spaces
- a plan that allows for incremental growth in the town centre
- a design that allows meeting places for the community at all levels.

The hub concept focuses on increasing the built form density of the town centre to allow the introduction of multi-level parking and enhancing the ground level with green spaces and pedestrian friendly public domain areas. Hybrid building types are an opportunity to integrate retail at ground level, entertainment venues on roof tops and car parking in between. Critical to the success of hub is limiting vehicular access towards the perimeter and converting existing car park areas into pedestrian friendly areas. The key design elements are listed below and shown in **Figure 21**:

- two-way re-configuration of Pitt Lane for access to Bells Line of Road
- legible main pedestrian axis within the town centre and parallel to Bells Line of Road that acts as a substitute for pedestrian traffic along the road
- staged development flexibility
- activation of the ground plane and top stories of carparks
- concept for sustainable, green roofs to new carpark/ building blocks
- top floor set-backs to limit overshadowing
- introduction of mixed use to enhance the vibrancy of the town centre and support it vitality.

Figure 21 Hub concept design elements

¶

Source: KI Studio

Links and active transport connectivity

Section 6.5.2 outlines that areas of "greening" are not linked and that the North Richmond town centre has an absence of open spaces and a lack of connectivity to the river, and to the surrounding areas. Upgrading the Bells Line of Road corridor presents the opportunity to initiate greater open space connectivity and links within North Richmond and to strengthen the links between the biodiversity areas identified on Council's mapping, that is between the river and the mountains. The key opportunities are listed below and shown in **Figure 22**:

- increasing open space areas within the North Richmond town centre - positioning them in key areas to "mark" the hub area, link to desire lines and to create meeting places
- providing a pedestrian and cycling path on the northern verge of Bells Line of Road to enable east-west connectivity through the town centre area and to link to the river
- widening the pavement on the southern verge of Bells Line of Road, adjacent to a potential rejuvenated town centre "hub" area
- creating pedestrian priority links through a new town centre "hub" - linking east-west and north - south
- improving pedestrian movement both around and within the town centre and to link the river to the town
- changing the area on the north-west section of the river from "Rural" land use to "recreation/open space".

Figure 22 Open space connectivity opportunities

Source: KI Studio

Based on the high-level urban design study, an upgrade through the town centre could deliver positive urban design outcomes for the town centre regarding its functioning and visual integration while allowing for the rejuvenation of the town centre hub. Upgrading through North Richmond is a lower cost option that provides the opportunity to deliver other benefits for the community. The urban design assessment indicates that improvements to the overall experience and amenity of the town centre can be made regardless of whether of a bypass or the upgrade of Bells Line of Road.

Artist impressions of the new bridge

Artist impressions of the new Richmond Bridge viewed from Hanna Park, near the North Richmond town centre, and from the existing bridge are shown in **Figure 23** and **Figure 24** respectively. Careful consideration of bridge and pier forms will be important during the next phase of design due to the relative height of the proposed new bridge compared with the existing heritage listed bridge.

Figure 23 View of new Richmond Bridge from Hanna Park – artist impression

Source: Tract

Figure 24 View of new Richmond Bridge from existing bridge

Source: Tract

Southee Road

Community feedback identified that views from residences on Southee Road and maintaining the pecan trees along Southee Road are important to the community and the landscape character. Transport proposes to retain the Pecan trees fronting Southee Road and to build a noise wall behind these pecan trees which would be hidden by a hedge to address graffiti concerns. The noise wall is required due to the limited space between the Pecan trees and important experiments that occur on Western Sydney University land.

Where more space is available, west of the Pecan trees, Transport will investigate the possibility of a vegetated noise mound, rather than a noise wall, to address visual impact concerns associated with noise walls. An artist impression of Southee Road following construction is shown in **Figure 25**.

Further consultation with residents on Southee Road will occur during the next phase of design to confirm noise and visual treatments.

Figure 25 Southee Road aerial view artist impression

Source: Tract

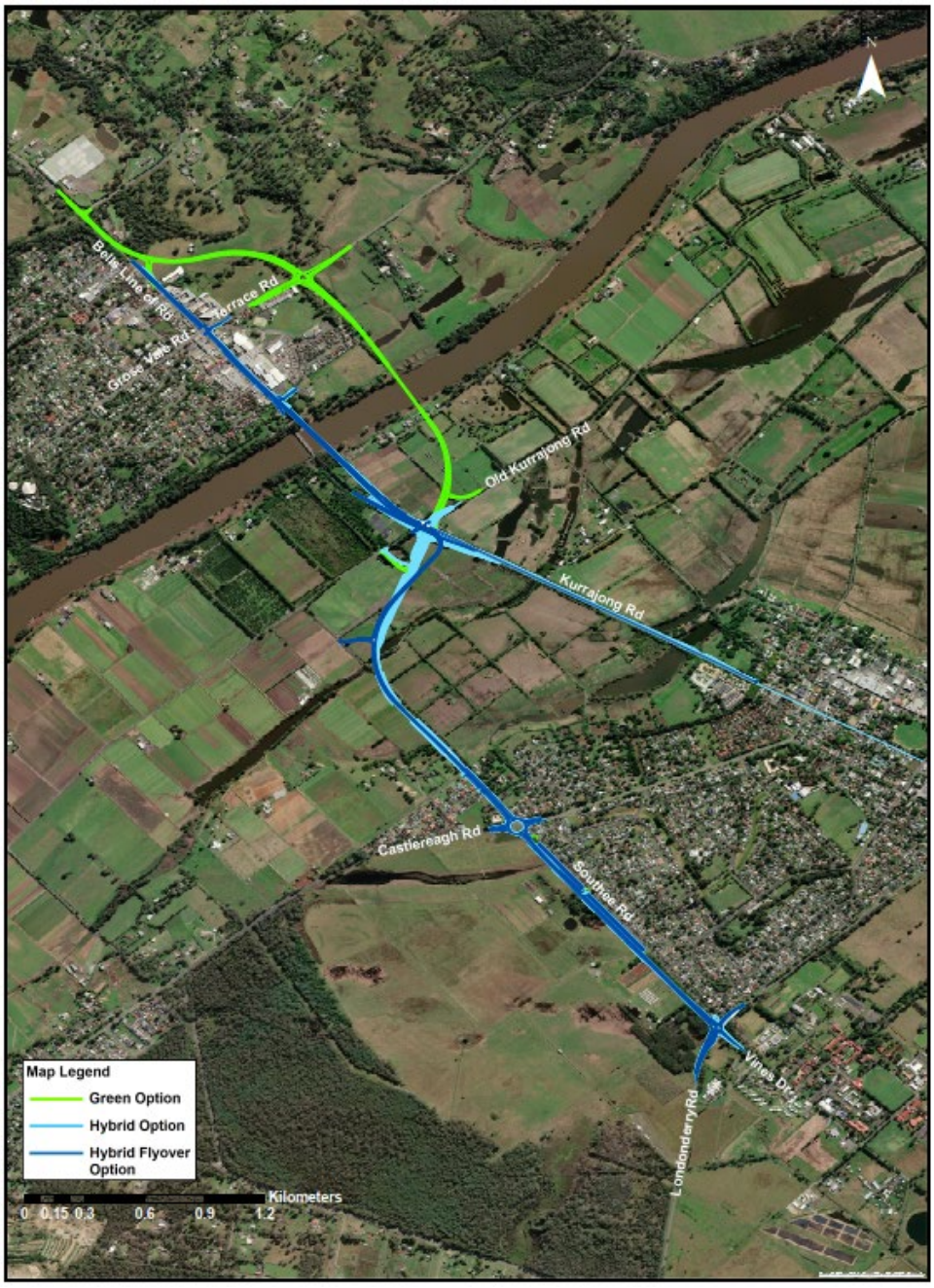
7. Revised Preferred Option Selection

7.1 Evaluation of revised options

Based on feedback received on the Green option, four options were assessed with an aim to improve traffic flow, reduce impacts on property, and improve flood resilience within the available $500 million funding for the project. The options are shown in **Figure 26** and included:

- Green option: the previously displayed preferred option at 1 in 5 chance per year flood resilience
- Hybrid option 1: with a 20 chance per year flood resilience and includes improvements to North Richmond traffic signals
- Hybrid flyover option: with 1 in 20 chance per year flood resilience and includes improvements to North Richmond traffic signals and a flyover of Kurrajong Road.

Figure 26 Options assessed following additional investigations



The Green option with a 1 in 20 chance per year flood resilience was discounted on the basis that it greatly exceeded allocated funding. It was however included in the evaluation process for comparison reasons only.

The four options outlined above were evaluated during a Value Management (VM) workshop which was convened on 29 April 2022 and attended by key project stakeholders. The objective of the workshop was to review and assess the four options with the aim of arriving at a final preferred option.

The workshop incorporated a systematic evaluation of each option against agreed project objectives (**Table 25**) and constraints (**Table 26**) to inform the selection of a final preferred option.

The performance of options against the objectives was based on a scale of 1 to 5, with the best option scoring a 5. The scale of scores below 5 was based on the relative performance compared to the best performing option.

Table 25 Evaluation of options against project objectives

Objective	Description	Green 1 in 5	Green 1 in 20	Hybrid 1 in 20	Hybrid Flyover	Comments
Maximise travel time savings and travel time reliability	The option should minimise travel time for all road users (private, public, freight).	**5.0**	**5.0**	**4.5**	**5.0**	All options achieved substantial travel time savings, however the Hybrid 1 in 20 was marginally lower than the other options.
Maximise safety improvements	The option should maximise crash cost savings.	**4.5**	**4.5**	**4.5**	**5.0**	The Hybrid flyover eliminates conflicts at Kurrajong Road/the bypass so performs best. The Green options introduce a new intersection however reduce traffic flow in North Richmond town centre.
Maximising flood resilience	Aim is to achieve 1 in 20 chance per year flood resilience.	**2.0**	**5.0**	**4.5**	**4.5**	Green 1 in 20 performs slightly better than other 1 in 20 options as no contra-flow is required. The Green 1 in 5 scores lowest as it would be closed more frequently and for longer periods.
Maximise Active Transport	The option should maximise active transport connections by providing direct desire line links between Richmond and North Richmond.	**4.0**	**4.0**	**5.0**	**5.0**	All options provide an active transport connection between Richmond and North Richmond however Hybrid options provide a more direct active transport connection between the town centres.
Minimise negative impacts on local businesses	The option should minimise impacts from loss of passing trade in North Richmond. Options bypassing Richmond should remove more traffic from Richmond to provide opportunities for revitalisation.	**3.0**	**3.0**	**5.0**	**5.0**	The Green option is forecast to result in a loss of passing trade for local businesses.
Maximise Benefit Cost Ratio	Provides greatest economic outcome.	**4.5**	**3.5**	**5.0**	**4**	The Hybrid 1 in 20 option provides a BCR of 3.3. The Green 1 in 5 option provides a BCR of 3.0. The Hybrid Flyover option provides a BCR of 2.8. The Green 1 in 20 option BCR was not calculated but is expected to have a lower BCR than the other options.
	Totals	**23**	**25**	**28.5**	**28.5**	

Options were also assessed on the impact to identified project constraints using the colour coding below and the outcome is shown in **Table 26**. **Table 27** shows the summary score for each option evaluated.

Colour Code	Level of impact
	Least impact
	Moderate impact
	Greatest impact
	Cannot be delivered

Based on the evaluation of options against the project objectives and constraints the Hybrid 1 in 20 chance per year flood resilience option was recommended as the revised preferred option. As the Hybrid Flyover and Green 1 in 20 cannot be delivered within the available funding they are not considered viable options.

Table 26 Assessment of options against project constraints

Constraint	Description	Green 1 in 5	Green 1 in 20	Hybrid 1 in 20	Hybrid Flyover	Comments
Utilities	Minimise impact to existing utilities					Hybrid options through North Richmond increase utility risk/cost
Biodiversity	Minimise impacts to endangered ecological communities, coastal wetlands					All options have relatively low impacts to biodiversity when compared with previously assessed Yellow and Purple options
Noise	Minimise noise impacts to residential areas					Green options introduce new noise impacts around Norfolk Place which would increase with height of embankments.
Property impacts						
*Private**	Minimise Impact to properties. Full or Partial acquisition					Green options require additional acquisition for the bypass of North Richmond
Sporting facilities*	Polo club, soccer club					Green options have additional impacts to polo fields
*High capability land**	Minimise impacts to high capability land that could be used for agriculture					Green options impact on more productive agricultural land
Aboriginal Heritage	Minimise impact on Aboriginal sites					Green options impact on 6 areas of Aboriginal Heritage sensitivity compared with 2 for Hybrid options
Non-Aboriginal Heritage	Minimise heritage impacts (particularly state heritage items, existing bridge, Hobartville)					All options avoid direct impacts to heritage items. Hybrid options are closer to existing bridge so need to consider height and scale relationship
Urban design	improves amenity, fits within built fabric and natural patterns					Green options introduce new road corridor with impacts to residents and floodplain. Flyover creates large structure in floodplain with visual impacts.
Constructability	Minimise constructability risks – interaction with live traffic, utilities, length of work in floodplain					Green options present less risk constructing through town centre.
Available funding	Project to be delivered within $500M					Hybrid flyover and Green 1 in 20 chance per year estimates over $500M. Green 1 in 5 chance per year has increased risk of costing over $500M. Hybrid 1 in 20 chance per year estimates below $500M

Table 27 Summary of score for each option

Summary of scores	Green 1 in 5	Green 1 in 20	Hybrid 1 in 20	Hybrid Flyover
Number of green	4	3	7	6
Number of yellow	5	5	3	2
Number of red	2	2	1	2
Number of black	0	1	0	1

7.2 Selected preferred option

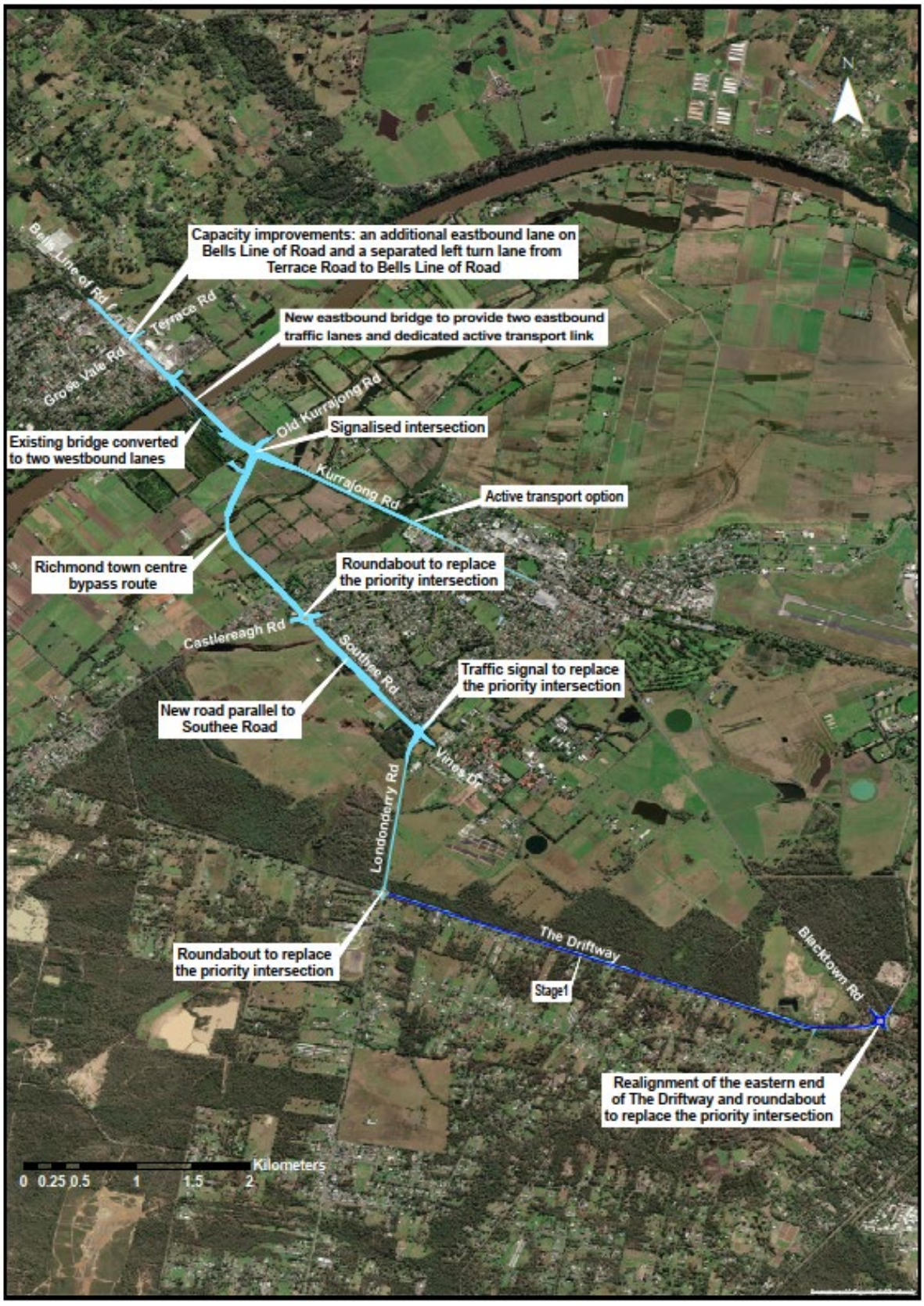
Based on the evaluation of the options against the project objectives and constraints the Hybrid 1 in 20 chance per year flood resilience option was recommended as the revised preferred option as it:

- delivers similar traffic benefits to the Green and Hybrid flyover options
- delivers 1 in 20 chance per year flood resilience
- reduces property impacts including acquisition, noise and visual impacts
- supports businesses in North Richmond town centre by maintaining passing trade
- provides a direct active transport route
- can be delivered within the available funding

Key characteristics of the revised preferred option are shown in **Figure 27** and include:

- capacity improvements to the intersection of Bells Line of Road / Grose Vale Road / Terrace Road including an additional eastbound lane on Bells Line of Road and a separated left turn lane from Terrace Road to Bells Line of Road.
- relocation of on-street parking spaces from Bells Line of Road to Beaumont Avenue
- a new two lane bridge 30 - 70 metres down-stream of the existing bridge for eastbound traffic with a shared path. The new bridge would have 1 in 20 chance per year flood resilience. The shared path would connect the Richmond and North Richmond town centres.
- the existing Richmond Bridge would be converted to two lanes for westbound traffic only
- during flood events when the existing Richmond Bridge is closed, the new bridge would be converted to two-way traffic.
- a new signalised intersection at the intersection of Kurrajong Road / Old Kurrajong Road
- a bypass of the Richmond town centre connecting from Kurrajong Road to Inalls Lane with 1 in 20 chance per year flood resilience
- a roundabout to replace the priority intersection of Castlereagh Road / Southee Road / Inalls Lane
- a new road parallel to Southee Road
- traffic signals to replace the priority intersections of Londonderry Road with Southee Road and Vines Drive
- a roundabout to replace the priority intersection of Londonderry Road / The Driftway
- pavement and drainage improvements to The Driftway
- realignment of the eastern end of The Driftway to create a four leg roundabout to replace the priority intersections of Blacktown Road with The Driftway and Racecourse Road.

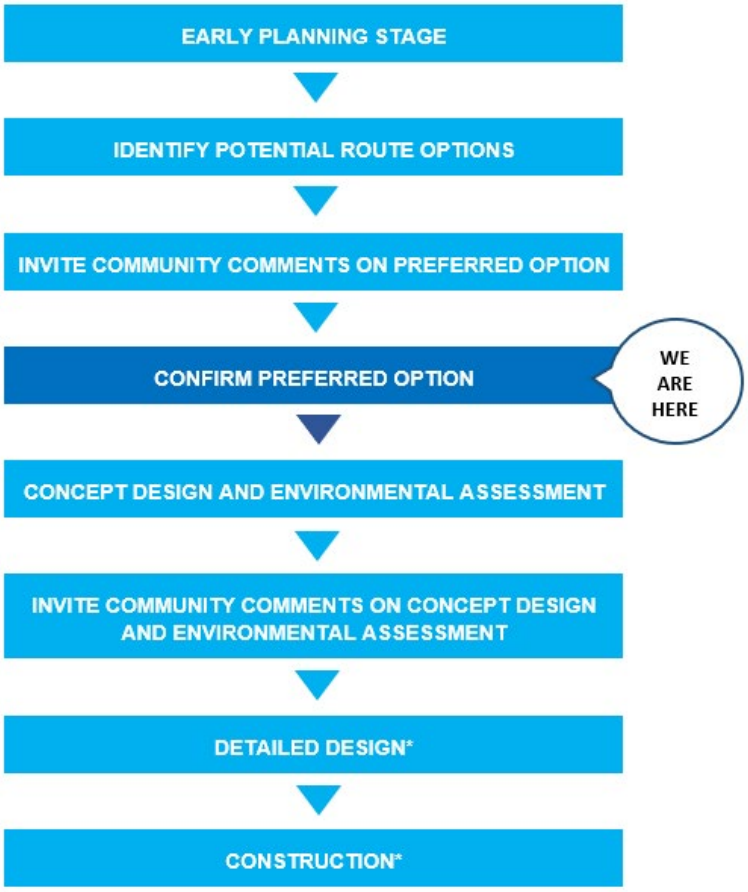
Figure 27 Hybrid 1 in 20 chance per year flood resilience option



8. Next steps

The next steps for the project are shown in **Figure 28**. Transport will develop the concept design for the new Richmond Bridge. This design would include enough detail to enable an assessment of the likely environmental, social and economic impacts and mitigation measures.

Figure 28 Project steps for the new Richmond bridge



The following studies will form part of the environmental assessment:

- water (hydrology and quality).
- biodiversity
- noise and vibration
- flooding
- design, place and movement
- air quality
- business, land use and property
- climate change risk
- heritage (Aboriginal and non-Aboriginal)
- protected and sensitive lands
- social

- soils and contamination
- sustainability
- transport and traffic
- waste.

The environmental assessment will be placed on public display and the community will be invited to make formal submissions on the environmental assessment.

Transport will continue to keep the community informed and will continue to provide regular updates during the environmental assessment and approval process.

NSW GOVERNMENT

TRANSPORT

New Richmond Bridge and traffic improvements

Consultation Report

October 2022

transport.nsw.gov.au

Australian Government

NSW GOVERNMENT

Table of Contents

Executive Summary

The Australian Government and NSW Government are funding traffic improvements including a new bridge over the Hawkesbury River between Richmond and North Richmond.

The Richmond Road corridor connects the Hawkesbury region to Blacktown, the M7 Motorway, and the Central West Region of NSW. These connections are made via Blacktown Road, Kurrajong Road and Bells Line of Road. The corridor includes Richmond Bridge.

Richmond Bridge provides a vital link between Richmond and North Richmond – two major residential and commercial hubs of the Hawkesbury area.

In 2013, Transport prepared the Richmond Bridge and approaches congestion study: Preferred short-term and long-term options report. The study identified the need for additional bridge capacity and three intersection upgrades to improve travel times and journey time reliability and provide for future growth.

So far, we have:

- upgraded the intersection of Kurrajong Road and Old Kurrajong Road
- upgraded the intersection of Bells Line of Road and Grose Vale Road
- upgraded the intersection of March Street and Bosworth Street.

Building a new bridge to provide additional capacity over the Hawkesbury River, bypassing Richmond town centre and upgrading other major intersections will reduce congestion, improve connectivity, reduce crash rates, improve flood resilience and support Council's long-term vision for Richmond and North Richmond town centres.

Background

The bridge between Richmond and North Richmond provides a vital crossing of the Hawkesbury River and carries an average of 31,000 vehicles per day with a single lane in each direction. Without further improvements to the road network, a journey in the morning peak from North Richmond to Richmond would increase by ten minutes by 2026 compared with travel times in 2019.

Community feedback, traffic studies, future growth and road management over time have allowed us to understand the pressure points in the road network. Using this information, we have investigated options to improve traffic flow in the area.

The key objective of this project is to reduce congestion between Richmond and North Richmond and build for future growth. We also aim to improve:

- journey time reliability
- connectivity between Bells Line of Road and the main road network
- flood resilience
- amenity and support economic development and Council's long term vision for the town centres of Richmond and North Richmond
- safety along road corridors between Richmond and North Richmond
- public and active transport connections.

The preferred option will provide up to 12 minute travel time savings in peak hours between Richmond and North Richmond

- More reliable travel times
- Catering for where people travel to and from the most
- Giving the streets around Richmond and North Richmond town centres back to locals, preserving the peaceful local area
- Giving traffic the option to bypass Richmond town centre, providing more direct access to Kurrajong, Windsor and North Richmond
- Improve connections to the Bells Line of Road
- Cater for congestion ahead of Richmond's growth, future-proofing the area
- Improve road safety by reducing crashes
- Improved local intersections
- Stage 1 would provide early safety benefits by upgrading The Driftway and roundabout intersections at Londonderry Road and Blacktown Road.

Consultation Approach

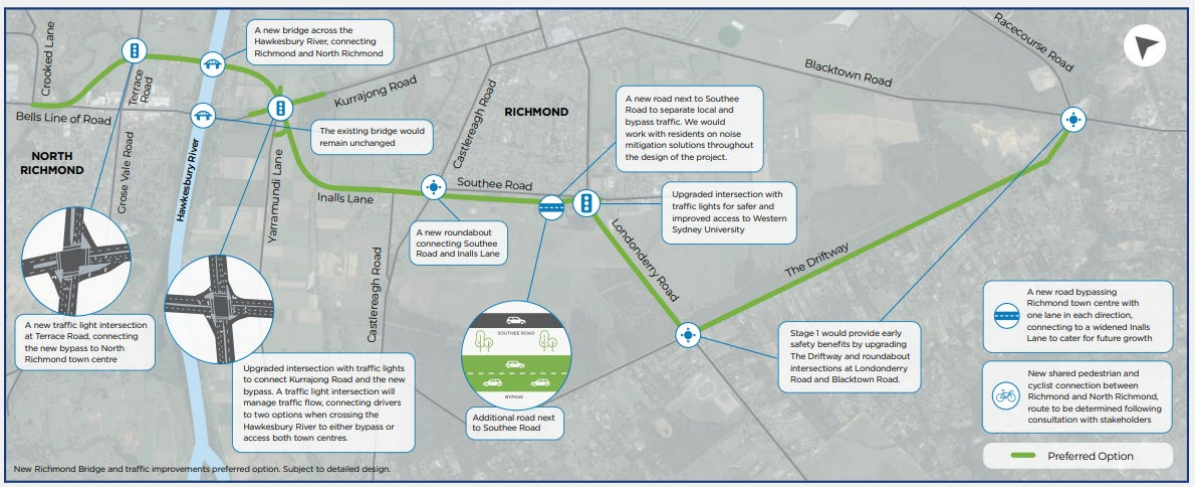
The aim of the consultation was to seek feedback on Transport's preferred route from the community and our stakeholders. The feedback has helped the project team understand what is important to transport customers, stakeholders and the broader community.

Community responses make an important contribution to the decision on a preferred route option for the project. Other factors are also considered, including transport and road network integration, traffic modelling, flooding, maintenance, customer experience, environment, sustainability, and heritage.

Community consultation on the New Richmond Bridge and traffic improvements project was carried out in two phases in 2019 and 2021.

In November 2019, our stakeholders and community were invited to provide feedback on the five route options being investigated. A community update was distributed to 14,000 homes in the community surrounding the project. As a result of feedback received, Transport developed a preferred route for the project. Feedback from the community, stakeholder groups and residents helped to progress a preferred option.

From June to September 2021, Transport invited the community and stakeholders to provide feedback on the preferred option.



Method of Consultation

Engagement with the community and stakeholders has been ongoing for several years on potential routes for the New Richmond Bridge and traffic improvements project.

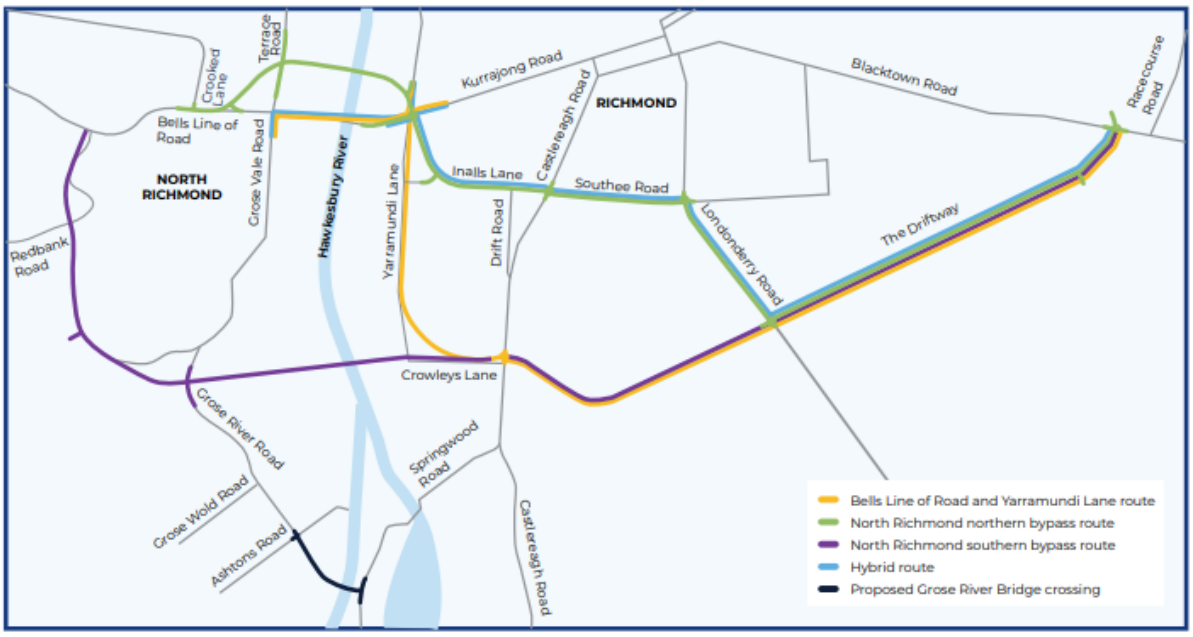
The community and key stakeholder groups were initially asked to provide feedback on five shortlisted routes.

In March 2020, Transport held a value management workshop involving key stakeholders to assess how project objectives were being achieved by each option. The workshop aimed to help inform the preferred option.

The values assessed in the workshop included:

- Maximise travel time savings and travel time reliability
- Cater for future traffic demand
- Improve connectivity between Bells Line of Road and Sydney's arterial road network
- Maximise active transport options
- Minimise negative impacts on local businesses and improves the amenities of Richmond and North Richmond town centres
- Maximise safety improvements
- Maximise flood resilience

The Hybrid option was assessed as preferred initially based on the funding constraints, then based on feedback for a bypass of both town centres we sought additional funding. In June 2021 the $500M funding was announced with the Green option as preferred.



Shortlisted route options for assessment during 2020

From June to September 2021, Transport consulted with the community and stakeholders on a preferred option for the New Richmond Bridge and traffic improvements project.

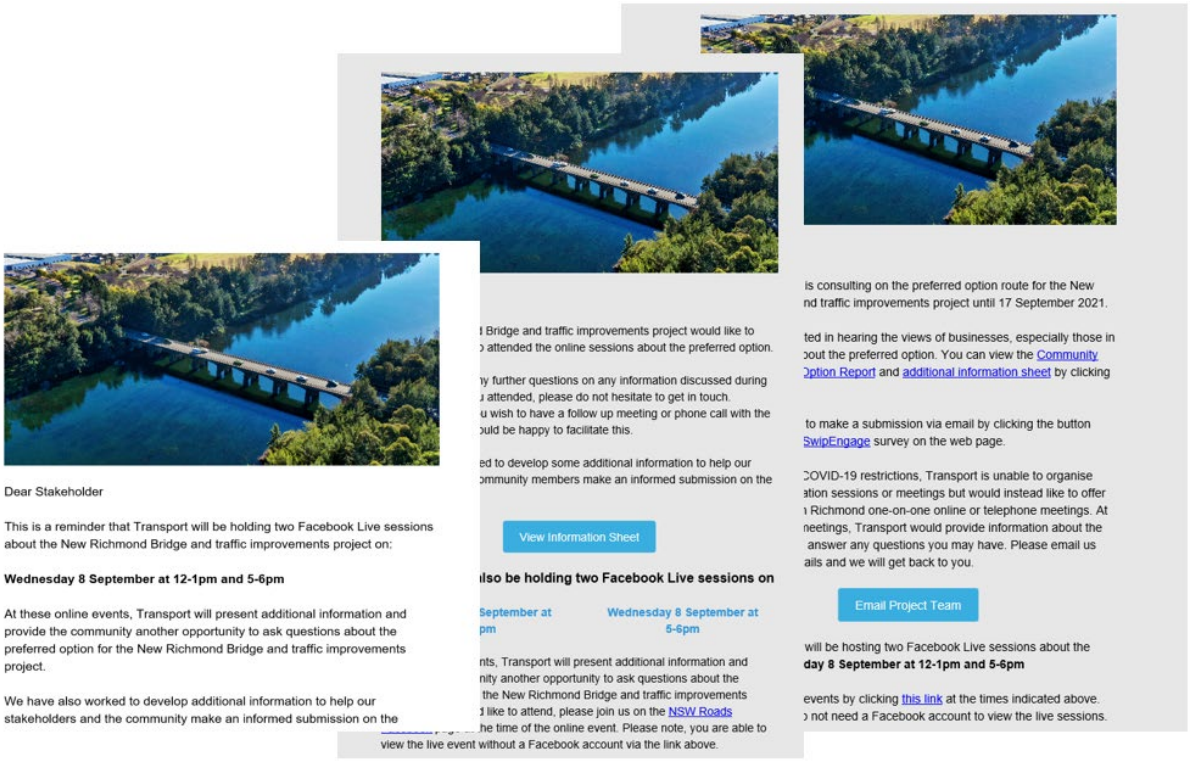
During Transport's consultation with the community and stakeholders on the preferred option, the COVID-19 pandemic had developed, and restrictions were in place from July 2021. As such, Transport was unable to facilitate further face-to-face consultation, moving our activities online.

Transport also extended consultation on the preferred option to allow the community and stakeholders more time to have their say during the COVID-19 restrictions.

Submissions from the community were being accepted by Transport by email, phone call or by survey.

We used social media, emails to our email subscribers and our websites, which included our interactive portal, Have your Say page and our project website to encourage the community to make a submission.

Our social media campaign for the preferred option consultation included 12 ads over 11 weeks, with an average reach of 100,000 people.



Dear Stakeholder

This is a reminder that Transport will be holding two Facebook Live sessions about the New Richmond Bridge and traffic improvements project on:

Wednesday 8 September at 12-1pm and 5-6pm

At these online events, Transport will present additional information and provide the community another opportunity to ask questions about the preferred option for the New Richmond Bridge and traffic improvements project.

We have also worked to develop additional information to help our stakeholders and the community make an informed submission on the

Bridge and traffic improvements project would like to attended the online sessions about the preferred option.

further questions on any information discussed during attended, please do not hesitate to get in touch. wish to have a follow up meeting or phone call with the ould be happy to facilitate this.

ed to develop some additional information to help our mmunity members make an informed submission on the

View Information Sheet

lso be holding two Facebook Live sessions on

September at pm

Wednesday 8 September at 5-6pm

nts, Transport will present additional information and nity another opportunity to ask questions about the the New Richmond Bridge and traffic improvements like to attend, please join us on the NSW Roads he time of the online event. Please note, you are able to view the live event without a Facebook account via the link above.

is consulting on the preferred option route for the New nd traffic improvements project until 17 September 2021.

ted in hearing the views of businesses, especially those in out the preferred option. You can view the Community Option Report and additional information sheet by clicking

to make a submission via email by clicking the button SwipEngage survey on the web page.

COVID-19 restrictions, Transport is unable to organise ation sessions or meetings but would instead like to offer Richmond one-on-one online or telephone meetings. At neetings, Transport would provide information about the answer any questions you may have. Please email us ails and we will get back to you.

Email Project Team

will be hosting two Facebook Live sessions about the **day 8 September at 12-1pm and 5-6pm**

events by clicking this link at the times indicated above. not need a Facebook account to view the live sessions.

We sent regular updates and reminders to our stakeholders regarding lodging submissions as well as information on our Facebook Live information sessions.

June 2021

Face-to-face community information session	Over 200 people in attendance
Facebook Live public broadcast and Q&A sessions	11,722 people viewed the Facebook Live information sessions
Community Update	Distributed to 14,000 homes in the Richmond community and surrounds
Community Working Group (CWG) meeting	13 representatives in attendance
Door knocks to property owners	13 households
Meetings with property owners	University of Western Sydney Killarney Polo Club Sydney Polo Wheen Bee Foundation Mandalup Investments Pty Ltd
Email Campaign – Community Update, Have Your Say	272 stakeholders
Email Campaign – Extension of consultation date and invite to online Community information sessions	452 stakeholders

July 2021

Briefing to Hawkesbury City Council	21 July
Community Update	Distributed to 14,000 homes in the Richmond community and surrounds
Door knocks to property owners	1 household
Letters to residents	390 households
Meetings with stakeholder	Hawkesbury City Council

August 2021

Online targeted information sessions with residents of Southee Road, The Driftway and Inalls Lane	11 households attended Southee Road sessions, 9 households attended Inalls Lane session, 2 households attended The Driftway sessions
Meetings with stakeholders	Local MP Kurrajong Forum Hawkesbury City Council
Detailed plans and additional information based on community feedback so far was provided to the community	New Richmond Bridge and traffic improvements project website nswroads.work/richmond-bridge and interactive portal
Community Working Group (CWG) meeting	10 representatives in attendance

September 2021

Targeted online resident information session with residents of Norfolk Place	11 households attended the Norfolk Place online session
Two additional Facebook Live public broadcasts with Q&A	Approximately 260 people viewed the September Facebook Live information sessions
Online meeting / briefing with key stakeholder groups	NSW Polo Association and Australian Polo Federation Bicycle NSW Penrith City Council Local MP
Engagement with North Richmond businesses	Feature in Hawkesbury Council's September business newsletter, direct calls to businesses in North Richmond and targeted email campaign

Consultation 2021 response summary

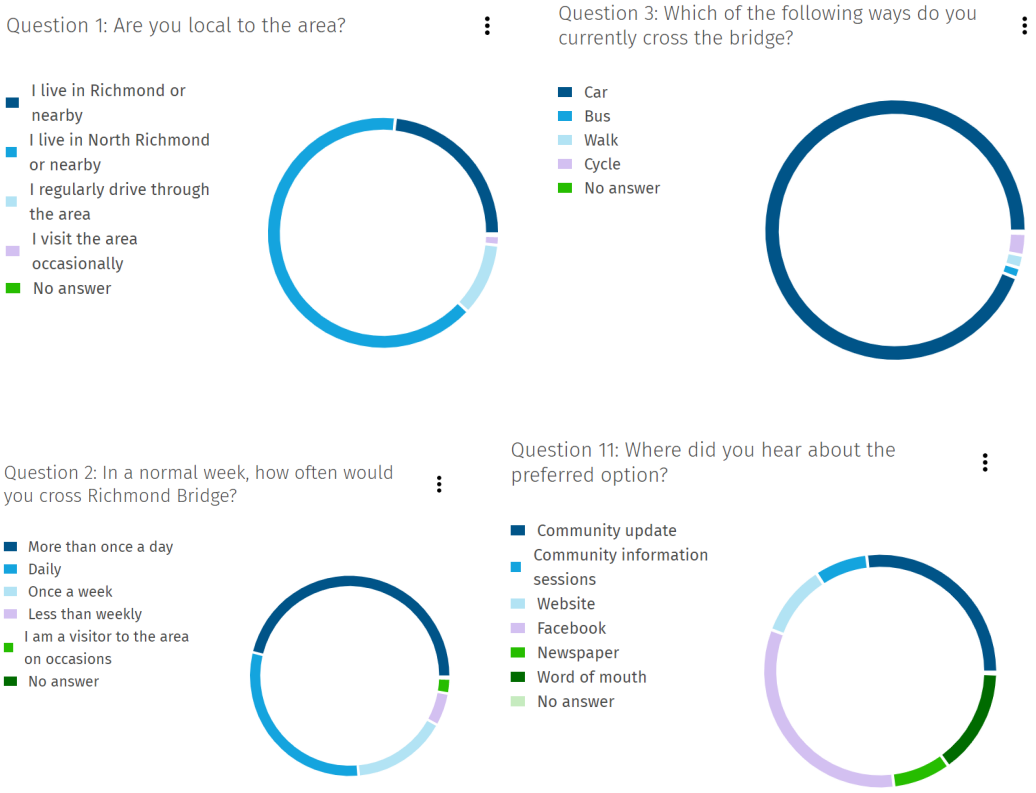
We received **244** email, form, letter, and phone submissions.

- 212 unique submitters

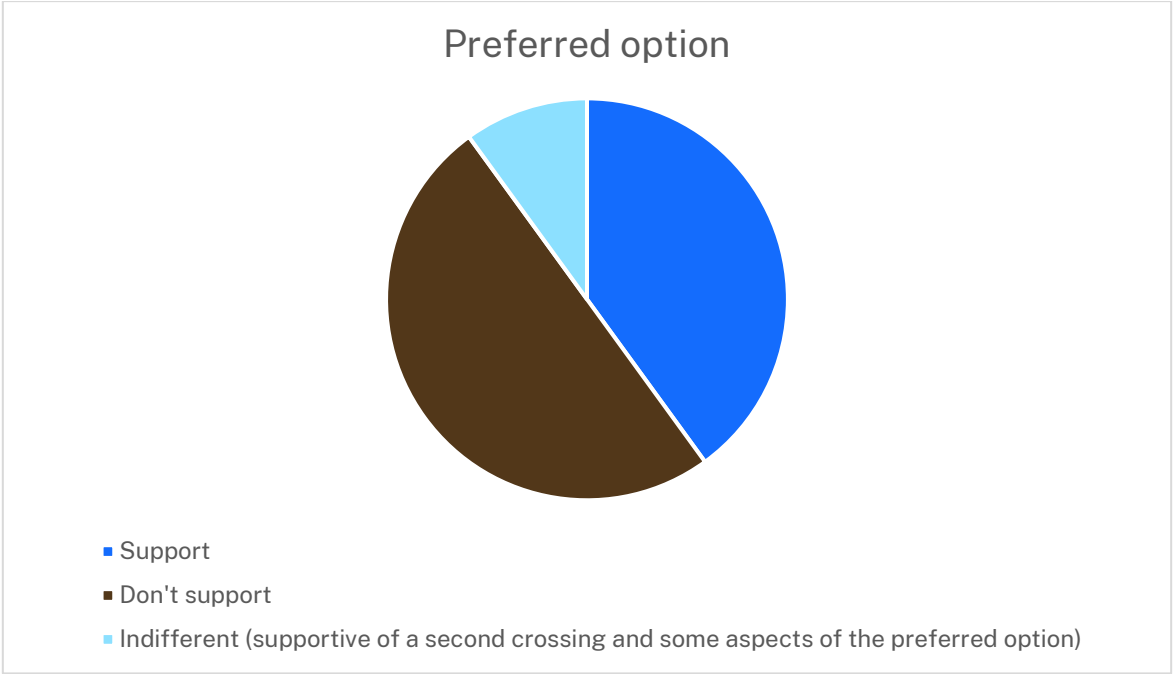
We received **1,477** responses via our survey.

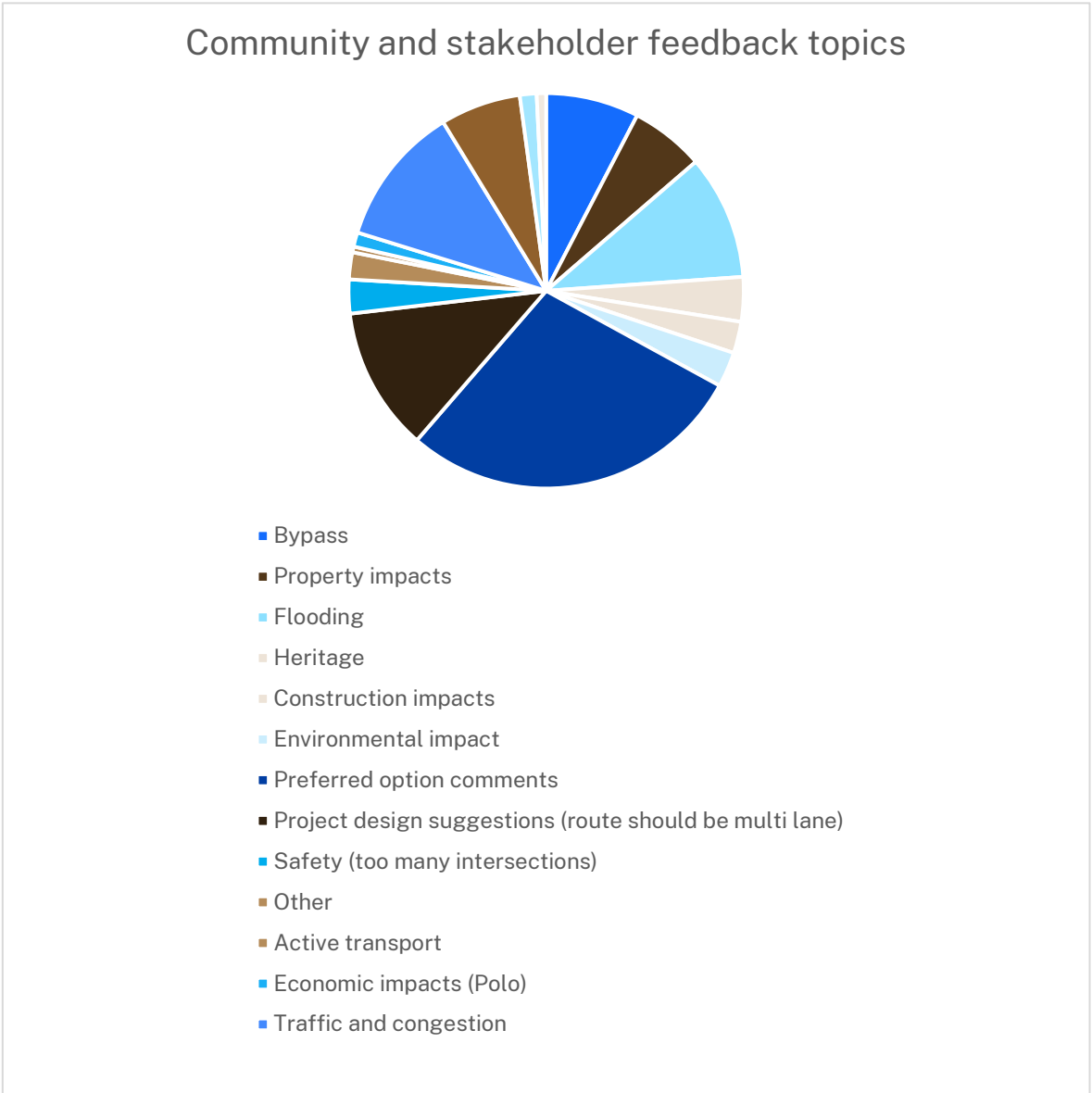
- The survey allowed multiple survey responses from the same stakeholder
- 704 survey respondents did not include contact details
- Of the remaining 760, 45 known/ obvious duplicates were found (identical email addresses)
- It appears that several stakeholders used multiple email addresses (email addresses with very similar names, but different domain names) to submit survey responses

Submissions from our survey on the preferred option indicated:



The following themes were prominent throughout the survey responses and associated written feedback received.


Preferred option
Support
Don't support
Indifferent (supportive of a second crossing and some aspects of the preferred option)


Community and stakeholder feedback topics
Bypass
Property impacts
Flooding
Heritage
Construction impacts
Environmental impact
Preferred option comments
Project design suggestions (route should be multi lane)
Safety (too many intersections)
Other
Active transport
Economic impacts (Polo)
Traffic and congestion

Consultation 2022 response summary

February 2022

Meeting with Council and Community Working Group	14 representatives in attendance
Targeted online resident information session with residents of Inalls Lane, Southee Road and Norfolk Place	25 households attended across the three sessions
Meeting with NSW Polo Association	5 Polo representatives attended

Outcome of further investigations and assessments

Following the close of consultation in September 2021 we have been analysing all community submissions. The key feedback on the displayed preferred option showed us that the community's major concerns related to amenity and property impacts, flood resilience, business, and economic impacts, impacts to the local polo community, and traffic. Transport for NSW thanks everyone who provided feedback to the consultation.

Further engagement was undertaken in early 2022 with community groups and other key stakeholders. Following this, Transport undertook additional investigations to determine a revised preferred option that would deliver the best community outcome within the allocated funding for the project.

Further investigations focused on the Hybrid option (Blue) which would upgrade through North Richmond to compare against the displayed preferred option to bypass North Richmond (Green). The Hybrid option would reduce property impacts and takes a shorter route to cross the floodplain so provides a more economical opportunity to improve flood resilience within the available funding and delivers greater traffic benefits.

The additional investigations on the Hybrid option included:

- traffic improvements in North Richmond and a potential flyover at Kurrajong Road
- improved flood resilience design
- a town centre business and economic impact analysis including urban design considerations
- a revised design to minimise noise and visual impacts on Southee Road and
- high level cost estimates of design changes to assess whether they could be delivered within available funding.

Why purple and yellow options did not meet project objectives and could not be delivered within allocated budget

The Purple option does not adequately achieve the traffic objectives of the project and has the highest impacts to property, biodiversity and Aboriginal heritage. In addition, it cannot be delivered within the available funding. The Yellow option takes a longer route to cross the floodplain. Therefore, this alignment would cost substantially more to improve flood resilience and would be less efficient for traffic.

The Revised Preferred Option

The Hybrid option was recommended as the revised preferred option as it:

- delivers similar traffic benefits to other options
- delivers 1 in 20 flood resilience
- reduces property impacts including acquisition, noise and visual
- supports businesses in North Richmond town centre by maintaining passing trade
- can be delivered within the available funding.

The full revised preferred option report is available for viewing on the website https://nswroads.work/NewRichmondBridge

Consolidated feedback and responses

Community feedback	**Transport for NSW response**
General community feedback indicates that there is acknowledgement and understanding that congestion in the Richmond area needs to be addressed, and that the project aims to do this. There is some acknowledgement that the preferred option has the least impact to property, environment, and heritage of options that bypass both town centres. There is also a wide range of support for an additional crossing over the Hawkesbury River. There are some varying ideas about the location of the new bridge, and overall, there is support for some aspects of the project but not in its entirety. Feedback suggests that community understand the need for the project, and that the preferred option is an improvement to the existing situation. There was also a portion of the feedback which requested further information about why the preferred option was chosen by Transport for NSW.	Transport held several additional community information sessions and targeted stakeholder sessions to provide further information on the preferred option, the assessment process and responded to community questions.
Bypassing Richmond and North Richmond town centres	
There is a portion of community members who support the Purple option, mainly from those who do not support the preferred option. Some feedback suggested that a bypass of both town centres will free up access to both North Richmond and Richmond shops, and bypasses towns which are already congested. Some feedback however highlighted concern about the economic impacts of a bypass on North Richmond businesses.	The Purple option does not adequately achieve the traffic objectives of the project and has the highest impacts to property, biodiversity and Aboriginal heritage. In addition, it cannot be delivered within the available funding. While a bypass of North Richmond would reduce traffic on Bells Line of Road, improving access to shops for locals, the reduction in traffic would also likely result in a loss of passing trade and revenue for businesses in the town centre. The revised preferred option includes improvements to the traffic signals in North Richmond to reduce congestion and includes mid-block pedestrian signals to improve connectivity across Bells Line of Road.
Traffic and safety	
Among the feedback, there was a general sentiment that the traffic modelling carried out to inform the selection of the preferred option was inaccurate. There was a significant portion of feedback that was supportive of a multi lane in each direction road to cater for future growth in the area. This includes the new bridge and the surrounding roads.	Traffic modelling has been completed in accordance with Transport for NSW modelling guidelines based on detailed traffic data collected and future land use projections that have been verified against Hawkesbury City Council's development pipeline. Traffic modelling indicates that the proposed traffic signals at the intersection of Kurrajong

Feedback indicated that the intersection of Kurrajong Road and the bypass seemed complex and that it would develop a bottle neck of congested traffic. It is suggested that this intersection would create limited access to the new bridge due to congestion and that an overpass would help improve traffic conditions. There was general support for safety improvement upgrades for the intersection of The Driftway at Londonderry Road and Blacktown Road.	Road and the bypass would operate satisfactorily beyond 2046 for both the Green Option and the Hybrid Option. While a flyover would improve traffic flow at this location, it is not needed from a traffic perspective and cannot be delivered within the available funding. Further information can be found in the revised preferred option report. Safety improvements along The Driftway will be delivered as Stage 1 of this project to deliver early safety benefits to the community.
Property impacts	
Some feedback states that the impacts of the preferred option on existing communities such as those on Southee Road and Inalls Lane, should be limited as much as possible. This includes visual amenity impacts, particularly to these residential areas. Feedback also highlighted concerns with the property impacts associated with the bypass of North Richmond. These include property acquisition and noise and visual impacts for properties near the proposed bypass. Sentiment among the feedback also suggests support for appropriate and adequate compensation for property owners where acquisition is required.	We appreciate that the new road could increase traffic noise for Southee Road and Inalls Lane residents. During the next stage of design, Transport for NSW would work with residents, Western Sydney University and Hawkesbury City Council to identify noise mitigation measures. We would also seek to identify ways to manage the visual impacts of the new road. Following feedback received during the display of the preferred option in 2021, we propose to retain mature vegetation on Southee Road where possible and where space provides, use vegetated noise mounds rather than noise walls to manage noise impacts. Further design and consultation will occur during the next phase of the project. Further details can be found in the revised preferred option report. Following feedback received regarding the property impacts associated with the bypass of North Richmond, Transport has revised the preferred option to upgrade Bells Line of Road through North Richmond instead. As the project progresses, there will be a need for Transport to acquire some properties. This would include both full and partial acquisitions. Transport for NSW understands property acquisition is difficult for people impacted, and we are committed to ensuring any person impacted by property acquisition because of our projects has full personal support at all times. A Transport for NSW Personal Manager Acquisitions will be available to affected property owners to help them with their specific needs as the proposal progresses.
Flooding and flood resilience	**Transport for NSW response**
Overall, there is a community preference for a route that is flood proof, rather than flood resilient. There is a concern that the preferred option does not solve flooding issues in the Richmond area. There is a preference for the new bridge to be built higher to achieve a flood proof solution that will cater for not only the future, but a flood free future. Feedback also emphasised the need for the entire route to be flood free, specifically feeder roads to be raised along with the increased bridge height.	The primary objective of the Richmond Bridge duplication and traffic improvements project is to reduce congestion between Richmond and North Richmond and cater for future traffic growth. We recognise that the Hawkesbury Nepean Valley has a high risk of flooding with a history of flood events, most recently in July 2022, which can result in road closures and disruption for residents. The existing Richmond Bridge is built below the 1 in 2 chance per year probability flood event level and is closed in moderate flood events. The new bridge and approaches are proposed to be built above this with a minimum road level of 15.6 metres. This would result in lower risk of the bridge being overtopped, resulting in reduced closure times during flood events, with the entire

	route between Richmond and North Richmond achieving a minimum 1 in 20 chance per year flood resilience. The February 2020 flood was around a 1 in 5 chance per year flood, while floods in March 2021 and March, April and July 2022 were between a 1 in 10 and a 1 in 20 chance per year flood reaching peak flood levels of 14.4 metres. The revised preferred option would have remained open during all of these recent flood events.
Urban design, local character and heritage, visual amenity	
The need for good urban design and visual amenity was an area of focus for many respondents, expressed in various ways. Key considerations by respondents included ensuring the local character was maintained and views were not disrupted where possible. There was a theme around ensuring designs for any noise walls or mitigation measures, particularly close to Southee Road, is protected from graffiti. Respondents are also conscious about ensuring the project design is in line with preserving the visual amenity, local semi-rural character and heritage aspects that are part of what makes this area unique. Heritage was seen by the local community as contributing significantly to the local character particularly of Richmond and was widely valued.	Landscape character, visual impact assessment, urban design strategy and heritage assessments will be prepared during the next phase of design. Where space allows, Transport proposes to use vegetated noise mounds rather than noise walls to mitigate noise. Where space is restricted, Transport will consider hedges to shield noise walls and reduce the risk of graffiti. Protecting heritage was an important aspect of the project's design and Transport has selected an option that has no direct impacts on any heritage listed properties.
Environment	
Impacts to mature vegetation, including Pecan trees along Southee Road, were mentioned throughout the feedback received. Impacts to trees and vegetation that are listed as part of the Cumberland Plain along The Driftway to be minimised. The community have also expressed a preference for the protection of the Polo industry and acknowledge that this industry contributes greatly to the Richmond area and surrounds. There was also feedback around minimising impacts to the Colo Soccer Club and fields.	Transport for NSW will carry out an environmental assessment on the design that will include analysis of the project's potential biodiversity, noise, Aboriginal heritage, non-Aboriginal heritage, socio economic, air quality, flooding and traffic impacts, including proposed mitigation of any potential negative impacts. We will continue tokeep the community updated as the project progresses. The community will have an opportunity to provide feedback on the concept design and environmental assessment before the project proceeds to detailed design and construction. The pecan trees fronting Southee Road are intended to be retained as part of the design however some pecan trees further into Western Sydney University property would need to be removed as part of the road construction. Following feedback, Transport has selected a revised preferred option which reduces impacts to the Polo community and will continue working with those that are still affected to manage impacts. Transport has also been engaging with the Colo Soccer Club since 2019 to manage potential impacts to fields as a result of the proposal.

Way forward

Minister's Office Announcement

Media Release

Community update – print and distribution

Community update – email campaign

Webpage update

Social Media

NSW GOVERNMENT