New Richmond Bridge and traffic improvements – Stage 1 The Driftway

Submissions report

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Transport for NSW

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Submissions report

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Executive summary

The proposal

Transport for NSW propose to upgrade about 3.6 kilometres of The Driftway between Londonderry Road and Blacktown Road (the proposal). The proposal is located in the suburbs of Richmond, Londonderry and South Windsor, NSW. The upgrade to The Driftway forms Stage 1 of the New Richmond Bridge and traffic improvements.

Stage 2 would include a new bridge over the Hawkesbury River and associated traffic improvements around Richmond and North Richmond. Stage 2 would be subject to a future, separate environmental approval assessment and is not included in this review of environmental factors (REF).

Key features of Stage 1 of the proposal would include:

- Upgrade of the intersection of Londonderry Road / The Driftway to a roundabout
- Upgrade of The Driftway intersections with Luxford Road and Reynolds Road to channelised right turn T-junctions
- Realignment of 230 metres of The Driftway at its eastern extent to create a four-leg roundabout with Blacktown Road and Racecourse Road
- A new 24 metre long bridge over a tributary of Rickabys Creek
- A new 30 metre long retaining wall along the north western corner of Racecourse Road and Blacktown Road
- Pavement improvements to 3.6 kilometres of The Driftway, including widening both shoulders to 1.5 metres
- Modifications to driveways and property adjustment works
- Removal of the redundant section of The Driftway and its intersection with Blacktown Road. Reshaping of this area for flood storage capacity
- Drainage improvements along The Driftway
- Relocation and/or adjustments to public utilities and street lighting
- Ancillary work including safety barriers, signage, line marking and environmental protection work
- Landscaping and rehabilitation work
- Temporary ancillary construction facility and laydown areas.

Display of the Review of Environmental Factors

Transport for NSW prepared a review of environmental factors (REF) for the New Richmond bridge and traffic improvements - Stage 1 The Driftway. The REF was publicly displayed between 15 November 2021 and 10 December 2021 on the Transport for NSW website and made available for download. Printed and electronic copies were also available by contacting the New Richmond bridge proposal team.

In-person community sessions were not held due to COVID-19 restrictions. As an alternative, two online community information sessions were held on 24 November 2021 and 25 November 2021 to offer the community a chance to learn more about the proposal, ask questions and provide comments.

Summary of issues and responses

Public display of the REF and the supporting consultation resulted in a total of nine submissions. Of these submissions, six were from the general community and three were from government agencies. Two of the submissions objected to the proposal and two were conditionally neutral, the remaining offered no position on whether they supported or objected to the proposal, however, raised questions and concerns to be addressed.

The main issues raised are summarised below:

- One submission stated that support for the proposal would be contingent on the reclassification of the Driftway, between Londonderry Road and Blacktown Road, as a State road under the care, control, and responsibility of Transport for NSW
- Three submissions questioned whether the improvements to The Driftway would cater for cyclists and form part of the Principal Bike Network route. Several of the submissions also emphasised the importance of enhancing road safety for active transport users through a dedicated separated cycleway from the pedestrian path and traffic lanes as part of the overall design
- Four submissions expressed concern over the potential for increased flood levels and impacts to identified properties along The Driftway as a result of the proposal
- Most of the issues raised were related to aspects of the proposal design, including drainage and driveway modifications and design criteria clarifications.

Changes to the proposal

Transport for NSW acknowledges all of the issues raised in submissions to the REF for the New Richmond Bridge and traffic improvements – Stage 1 The Driftway. As a result, Transport has revised the proposal design to address some of the feedback received in submissions in regard to aspects of the proposal design. At this time, Transport for NSW propose the following design revisions:

- The existing pavement surface would be stabilised and strengthened to achieve a 40 year design life, rather than a 20 year design life as stated in the REF
- Batters forming the drainage on the southern side of The Driftway are 6:1 on the road side with 2:1 on the property side. Where space permits and within the assessed proposal footprint, 2:1 batters would be revised in the design to 4:1
- Minor property access adjustments to five private properties, including four private residences located along the southern side of The Driftway and the Hawkesbury Waste Management Facility to accommodate revised road levels, drainage design and vehicle access.

Additional assessment

Environmental Planning & Assessment Regulation 2021

The *Environmental Planning and Assessment Regulations 2021* (2021 Regulation) came into effect on 01 March 2022 and superseded the *Environmental Planning and Assessment Regulation 2000*. Two new provisions have been added to clause 228(2) and require consideration under what is now referred to as section 171(2) of the 2021 Regulation:

(q) applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1

(r) other relevant environmental factors.

The new section 171(2) provisions have been considered in Section 4.1.1 of this report.

Design changes environmental assessment

The potential for environmental impact as a result of the design revisions are consistent with the potential impacts described in the REF. There would be no additional impacts as a result the proposed revisions.

Further contamination and waste classification

A detailed site investigation and preliminary (in-situ) waste classification were undertaken during September and December 2021 by Jacobs within the proposal area. The objective of the assessment was to gather analytical data at previously identified potential areas of environmental concern (AEC) as detailed in the *Richmond Bridge Duplication Phase 1 Desktop Contamination Study for Option Assessment* (PSI) (AECOM, 2020) and in accordance with the *Sampling, Analysis and Quality Plan* (SAQP) (Jacobs, 2021).

The assessment identified potential exposure risks to construction workers from contamination (if any) in soils, sediment, surface water and ground gases (vapour). The assessment also provided preliminary in-situ waste classification data to support decisions relating to the fate and possible reuse of excavated material within the proposal area during construction. The assessment resulted in additional safeguards including:

- An Asbestos Management Plan (AMP) which would be implemented inclusive of an 'Unexpected finds' protocol within the Construction Environmental Management Plan (CEMP) to plan for and accommodate confirmed/potential Asbestos Containing Material (ACM) or other waste identified during the construction phase
- If groundwater is encountered during excavations and / or installation of deep ground structures, such as footings and pilings, further assessment may be considered to determine durability impacts on construction materials (asphalt, steel and concrete) durability.

Next steps

Transport for NSW, as the determining authority, will consider the information in the REF and this submissions report and plan whether or not to proceed with the proposal.

Transport for NSW will inform the community and stakeholders of this decision and where a decision is made to proceed, will continue to consult with the community and stakeholders prior to and during the construction phase.

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1 Introduction and background

1.1 The proposal

Transport for NSW propose to upgrade about 3.6 kilometres of The Driftway between Londonderry Road and Blacktown Road (the proposal). The proposal is located in the suburbs of Richmond, Londonderry and South Windsor, NSW. The upgrade to The Driftway forms Stage 1 of the New Richmond Bridge and traffic improvements.

Stage 2 would include a new bridge over the Hawkesbury River and associated traffic improvements. Stage 2 would be subject to a future, separate environmental approval assessment.

Key features of Stage 1 of the proposal would include:

- Upgrade of the intersection of Londonderry Road / The Driftway to a roundabout
- Upgrade of The Driftway intersections with Luxford Road and Reynolds Road to channelised right turn T-junctions
- Realignment of 230 metres of The Driftway at its eastern extent to create a four-leg roundabout with Blacktown Road and Racecourse Road
- A new 24 metre long bridge over a tributary of Rickabys Creek
- A new 30 metre long retaining wall along the north western corner of Racecourse Rd and Blacktown Road
- Pavement improvements to 3.6 kilometres of The Driftway including widening both shoulders to 1.5 metres
- Modifications to driveways and property adjustment works
- Removal of the redundant section of The Driftway and its intersection with Blacktown Road. Reshaping of this area for flood storage capacity
- Drainage improvements along The Driftway
- Relocation and/or adjustments to public utilities and street lighting
- Ancillary work including safety barriers, signage, line marking and environmental protection work
- Landscaping and rehabilitation work
- Temporary ancillary construction facility and laydown areas.

The location of the proposal is provided in Figure 1.1 and the key features of the proposal are provided in Figure 1.2.

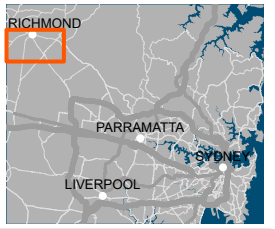
A more detailed description of the proposal is provided in the New Richmond Bridge and traffic improvements – Stage 1 The Driftway Review of Environmental Factors (REF) prepared by Transport for NSW in November 2021.

Legend

- Modified REF footprint
- Potential temporary ancillary facility
- NPWS reserves
- Local Government Area
- Watercourse
- Waterbody

0 200400 m

GDA2020 MGA Zone 56



Data sources

Jacobs 2021
NSW Spatial Services 2021

Figure 1.1 Location of the Proposal

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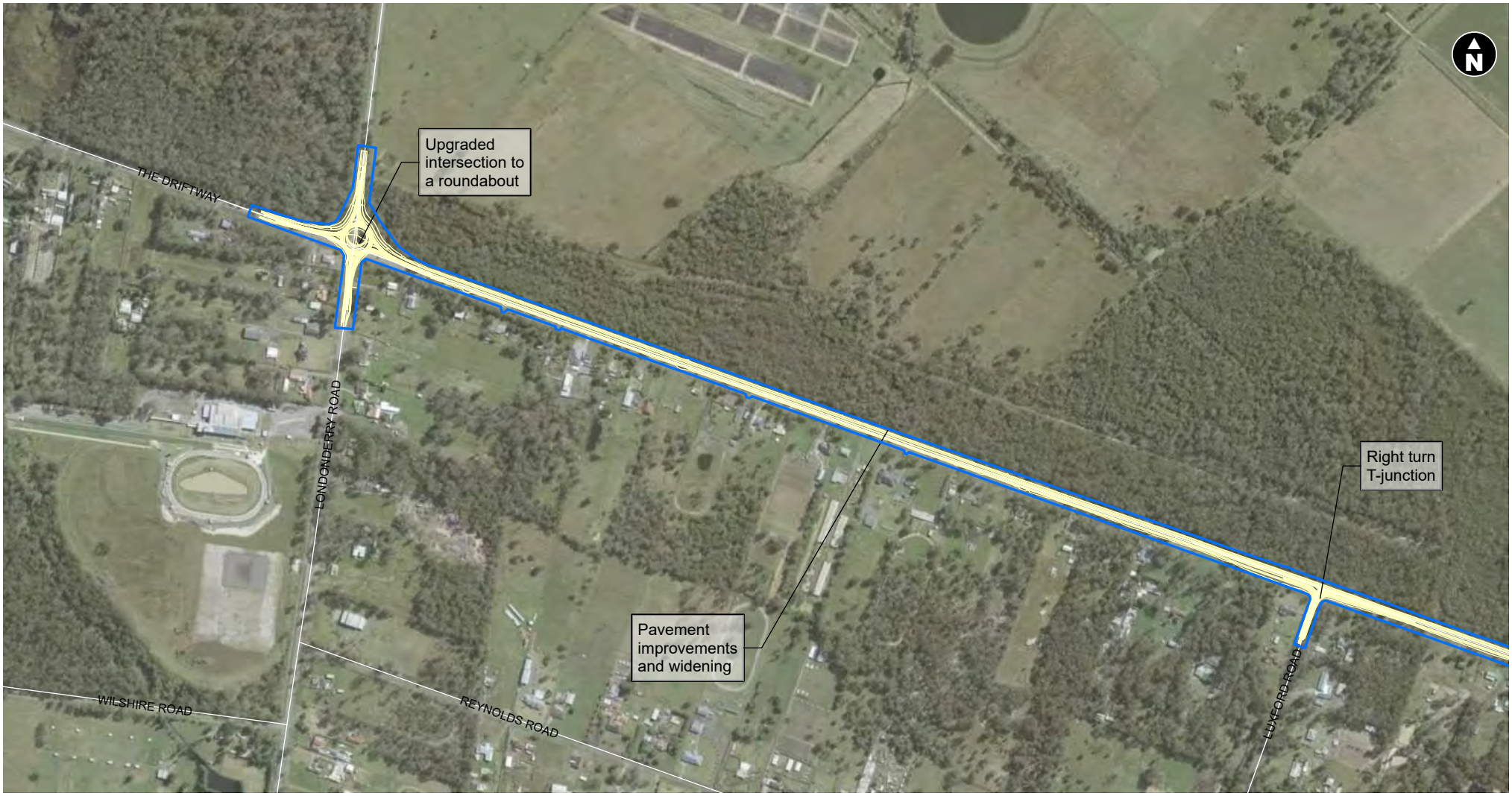
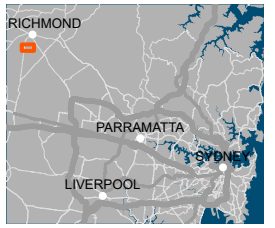


Legend

- The Driftway design
- Potential temporary ancillary facility
- Modified REF footprint

0 0 1 km

GDA2020 MGA Zone 56



Data sources1

Jacobs 2021
NSW Spatial Services 2021

Figure 1.2 Key features of the proposal (western)

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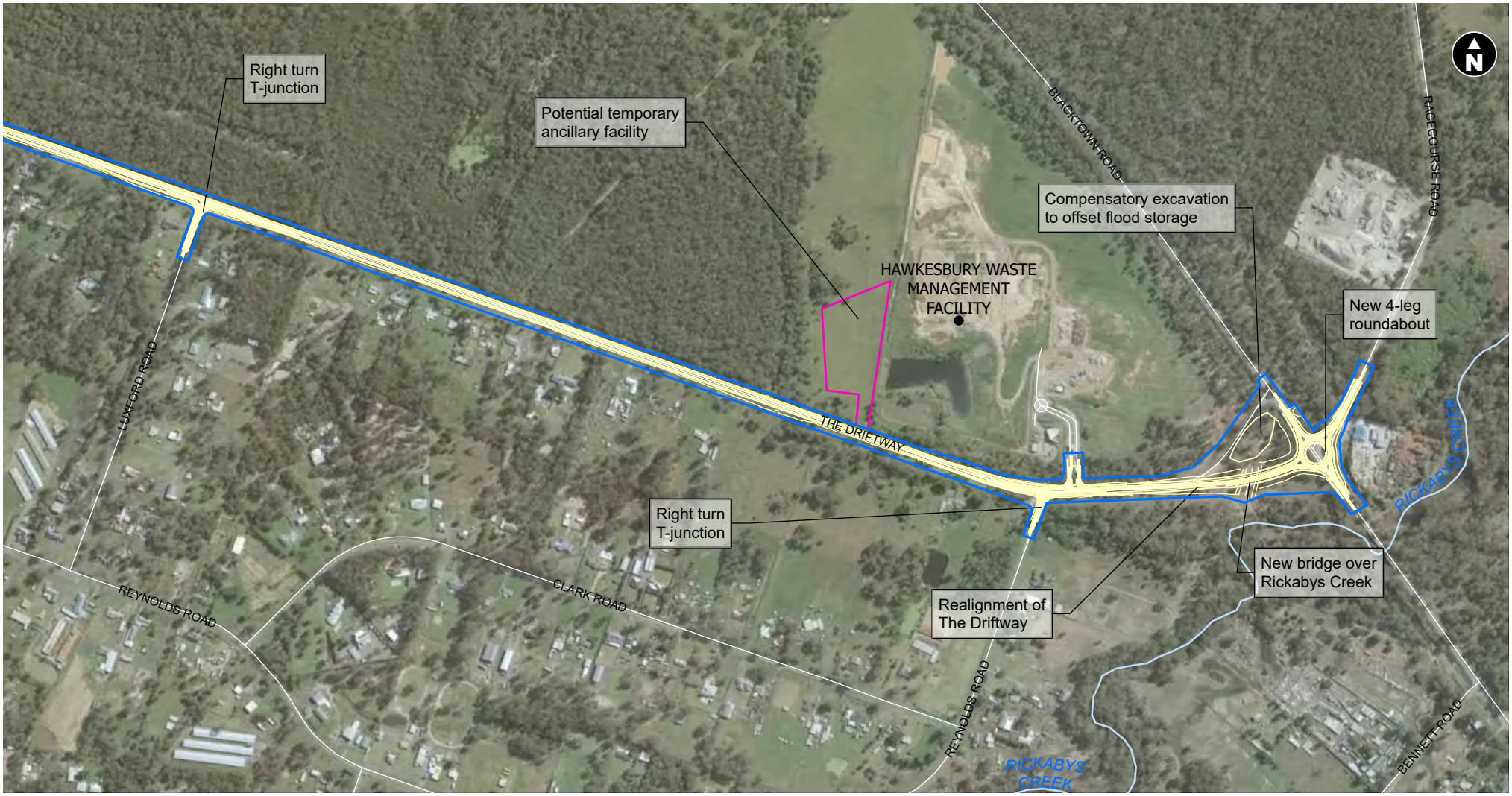
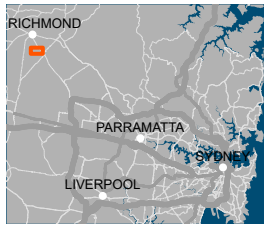


Legend

- The Driftway design
- Potential temporary ancillary facility
- Modified REF footprint

0 0 1 km

GDA2020 MGA Zone 56



Data sources2

Jacobs 2021
NSW Spatial Services 2021

Figure 1.2 Key features of the proposal (western)

Date: 5/04/2022 Path: \\ausyd0vs01\GISWork\NSW_IS374500_TheDriftway\Geospatial\Apps\ArcPro\Figures\REF\IS374500_REF_Figures.aprx
Created by : AA | QA by : DW

1.2 REF public display

Transport for NSW prepared a REF to assess the potential environmental impacts of the proposed works. The REF was publicly displayed for comment between 15 November 2021 and 10 December 2021. Community updates were sent to 450 properties within the vicinity of The Driftway and emails were sent to 540 registered stakeholders advising that the REF was on display.

The REF was published on the Transport for NSW website and made available for download at nswroads.work/Richmond-bridge. During this time, Transport for NSW invited the public to provide feedback by contacting the proposal team on 1800 370 778 or by email at: richmondbridge@transport.nsw.gov.au.

The proposal team was also available between 9 AM and 6 PM, Tuesday 30 November to Thursday 2 December 2021, for meetings with stakeholders directly impacted by The Driftway upgrade.

To limit the spread of COVID-19, in-person community consultation sessions were not held during the REF public display period. As an alternative, two online community information sessions were held over two days:

- 24 November 2021 from 6-7 PM
- 25 November 2021 from 12-1 PM.

A total of 38 people registered and attended these sessions.

1.3 Purpose of the report

This submissions report relates to the REF prepared for the New Richmond Bridge and traffic improvements - Stage 1 The Driftway and should be read in conjunction with the REF document.

The REF was placed on public display and submissions relating to the proposal and the REF were received by Transport for NSW. This submissions report addresses the submissions made during the exhibition period of the REF. Each of the issues raised have been responded to and specific issues have been combined by topic area (Chapter 2). It details any changes to the proposal and investigations carried out since finalisation of the REF (Chapter 3 and Chapter 4), and reaffirms the environmental management measures, including any revised or changed management measures (Chapter 5).

2 Response to issues

A total of six submissions were received by Transport for NSW, accepted until 10 December 2021. An additional three submissions were received outside of the exhibition period, raising new issues and therefore have been included.

In total, the nine submissions have been considered in this submissions report. Table 2-1 details the respondent type and each respondent's allocated submission number. The table also indicates where the issues from each submission have been addressed in Chapter 2 of this report.

Table 2-1: Respondents

Respondent	Submission No.	Section number where issues are addressed
Individual	01	2.3.2
Individual	02	2.7.2
Individual	03	2.3.2, 2.5.1, 2.6.1, 2.6.2, 2.6.3, 2.7.2, 2.8.2, 2.10.1, 2.11.1, 2.12.1
Individual	04	2.3.1, 2.3.4
Individual	05	2.2.1, 2.3.2, 2.8.3, 2.15.1
Penrith City Council	06	2.3.3, 2.4.1, 2.6.1, 2.6.2, 2.6.3, 2.6.4, 2.7.1, 2.8.1, 2.9.1, 2.10.1, 2.13.1, 2.14.1, 2.15.1
Sydney Water Corporation	07	No response required as no issues were raised
Individual	08	2.6.2
Hawkesbury City Council	09	2.2.1, 2.3.2, 2.4.1, 2.8.3, 2.9.2

2.1 Overview of issues raised

A total of nine submissions were received via email in response to the display of the REF. Three of the submissions were from government agencies and six were from the community. Each submission has been examined individually to understand the issues being raised.

The issues raised in each submission have been extracted and collated, and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, only one response has been provided. The issues raised and Transport for NSW response to these issues forms the basis of this chapter.

The nine submissions can be summarised as follows, in terms of their overall response to the proposal:

- None of the submissions offered absolute support for the proposal, two of the submissions objected, two of the submissions were conditionally neutral and the remaining offered no position on whether they supported or objected to the proposal
- One submission stated that support for the proposal would be contingent on the reclassification of the Driftway, between Londonderry Road and Blacktown Road, as a State road under the care, control, and responsibility of Transport for NSW

- Three submissions questioned whether the improvements to The Driftway would cater for cyclists and form part of the Principal Bike Network route. Several of the submissions also emphasised the importance of enhancing road safety for active transport users through a dedicated separated cycleway from the pedestrian path and traffic lanes as part of the overall design
- Four submissions expressed concern over the potential for increased flood levels and impacts to identified properties along The Driftway as a result of the proposal
- Most of the issues raised were related to aspects of the proposal design, including drainage and driveway modifications and design criteria clarifications.

Submissions from the community included concerns primarily related to the overall consultation process, the potential for environmental and social impact and change to the streetscape character of The Driftway.

2.2 Needs and options considered

2.2.1 Strategic need for the proposal

Submission number(s)

05 and 09

Issue description

The submitters raised the following issues:

Waste of public money

- The New Richmond Bridge and traffic improvements proposal is a waste of public money

The Driftway alignment

- The alignment and turns along The Driftway are undesirable and do not follow general traffic desire lines, specifically at the intersections of the Driftway and Richmond and Londonderry Roads.

Response

Waste of public money

Several alternatives and options for a new bridge over the Hawkesbury River and improvements to the surrounding road network, including improvements to The Driftway, were identified and considered in developing the proposal and recommending a preferred option.

As part of the preferred option assessment, Transport for NSW evaluated the economic viability of each route option by calculating a Benefit-Cost Ratio (BCR) for each identified option. A BCR is the ratio of the option's benefits compared to the option's costs. Cost and benefits are calculated over a 30-year period. The options are compared against the costs and operational performance of the 'do minimum' scenario.

A BCR of one or greater indicates that the benefits of an option exceed total project construction costs, inclusive of the capital as well as the operation and maintenance costs. The benefits of the proposal include:

- Vehicle travel time savings

- Vehicle operating cost savings
- Crash cost reduction
- Asset residual benefits, which reflects the value of the asset at the end of the assessed period.

The BCR for all route options ranged from between 2.6 and 3.7, meaning that all of the route options are economically viable and would deliver long term positive benefits which outweigh the costs of construction and maintenance. The Driftway, as Stage 1, forms part of the bypass of Richmond town centre assisting in achieving the economic benefits of the overall proposal.

The Driftway alignment

While a final preferred option for Stage 2 of the proposal is yet to be confirmed, the *Richmond Bridge duplication and traffic improvements, preferred option report* (AECOM 2021) identified that routes via Londonderry Road (Green and Hybrid Options) were shorter, more efficient and therefore would attract more traffic when compared to routes that would continue straight on the Driftway (Yellow and Purple Options). The realignment of the eastern portion of The Driftway and the upgrade of key intersections would cater for safe and efficient turning movements along the route.

2.3 Description of the proposal

2.3.1 The proposal

Submission number(s)

04

Issue description

The submitter raised the following issue:

- Clarification was requested in regard to the boundaries of Stage 1, the number of stages included in the New Richmond Bridge and traffic improvements proposal and the expected timeframe to complete each stage.

Response

The upgrade of The Driftway forms Stage 1 of the New Richmond Bridge and traffic improvements, with the remainder of the proposal to be delivered in Stage 2 including a new bridge over the Hawkesbury River and associated traffic improvements. Stage 1 would encompass about 3.6 kilometres of The Driftway, spanning from Londonderry Road to Blacktown Road (refer to Figure 1.2) and is expected to take 18 months to complete. The delivery timeframe for Stage 2 would be confirmed following the determination of a preferred option.

2.3.2 Design

Submission number(s)

01, 03, 05, 06 and 09

Issue description

The submitters raised the following issues:

Condition of The Driftway

- The condition of The Driftway is consistently poor

- The design improvements along The Driftway would not improve flood resilience
- The proposal has been designed for a minimum 1 in 15 chance per year flood resilience.

Cyclists and pedestrians

- Several submissions questioned whether the improvements to The Driftway would cater to cyclists and form part of the Principal Bike Network route and recommended a dedicated separate cycleway from the pedestrian path to enhance safety for active transport users
- Londonderry Road is identified as an active transport corridor in Council's Green Grid Strategy and should be included as part of that strategy
- The proposal design needs to consider pedestrians and the movement of horses, due to the importance of horse riding as an activity within the local area.

Stormwater drainage

- The design plans provide minimum detail on the road drainage, a more detailed, comprehensive stormwater drainage plan is required
- Stormwater treatment measures for the road improvements should be sufficient to demonstrate compliance with Council's Water Sensitive Urban Design (WSUD) Policy. Additional details are required to demonstrate compliance and landscape plans should be provided to include details of the proposed swales.

Driveway modifications

- The proposed driveway modifications would complicate access and egress for residents along The Driveway
- Forecasted increases in traffic and the reduction in the width between property boundaries and the road would result in road obstructions and safety issues for residents when entering and exiting their properties
- Would the road access from The Driftway into the Hawkesbury Waste Management Facility be upgraded to provide easier access and egress now and in future.

Design criteria

- The speed limit of The Driftway should be reduced to 70 kilometres per hour
- The lanes on the proposed bridge crossing should be a minimum of 3.5 metre wide, and include a two metre wide raised central median with shoulders widened to a minimum of four metres to cater for breakdowns and four lanes, should the Driftway require widening in the future.
- All lanes should be a minimum of 3.5 metres wide and shoulders should be a minimum two metres wide with a minimum shoulder seal of one metre
- The cross sections provided in the REF should clearly indicate all property boundaries in order to properly consider the horizontal alignment of the road
- 2:1 batters from the road are difficult to maintain and should be reduced to maximum 4:1 batters.

Response

Condition of The Driftway

The Driftway is primarily a level road for the majority of its length with limited drainage causing water to regularly pond adjacent to the roadway. The improvements to The Driftway would include an upgrade to the overall condition of the Driftway and while this section of The Driftway does not form part of the flood evacuation network, the upgrade proposes to improve flood resilience.

Drainage upgrades along the length of The Driftway would improve the durability and quality of the pavement by reducing water ponding adjacent to the roadway. The existing pavement surface would be stabilised and strengthened by overlaying 210 millimetres of asphalt to achieve a 40-year design life. The eastern end of The Driftway would be raised by 3.4 metres to improve the road network resilience which will achieve between 1 in 10 and 1 in 20 year chance per year flood resilience. This is an improvement on the existing situation which is less than 1 in 5 chance per year flood resilience.

Several property accesses would require driveway modifications and five properties would require minor adjustments to accommodate the new drainage and pavement improvements, providing further benefits and flood resilience.

Cyclists and pedestrians

The Driftway is not a part of the Principal Bike Network however the proposed upgrades to The Driftway would improve comfort and safety for active transport users, including:

- Along the existing alignment of The Driftway the shoulders would be widened to 1.5 metres with a two metre verge on the northern side and 0.5 metre verge on the southern side
- On the realigned section of The Driftway the shoulders would have a minimum width of 2.5 metres
- The roundabouts at The Driftway and Blacktown / Londonderry Road intersections and the bridge over a tributary of Rickabys Creek would have a 3.6 metre wide shared path for cyclists and pedestrian safe passage (refer to Section 3.2.3 of the REF).

Due to the presence of existing utility poles and the need for improved drainage to manage existing ponding issues which affect pavement durability, there is not sufficient space within the road reserve for a shared path or separated bicycle and pedestrian path along the length of The Driftway. The above improvements are considered appropriate for the semi-rural nature of The Driftway and the relatively low volumes of pedestrians and cyclists. Adequate space would be retained in the road reserve, clear of traffic lanes for pedestrians and the movement of horses within the grassed nature strip.

Active transport connections for the remainder of Londonderry Road would be considered during the New Richmond Bridge and traffic improvements - Stage 2.

Stormwater drainage

The proposal would incorporate drainage to control road runoff including permanent grass-lined swales that would be constructed along sections of The Driftway to reduce pollutant loads and improve water quality prior to reaching downstream receiving watercourses. The landscape and concept design strategy, provided in Appendix G of the REF, would inform the final landscape and detailed design development and would include details of the proposed grass-lined swales.

Detailed comprehensive stormwater drainage plans would be further developed and incorporated into the detailed design to mitigate potential impacts during construction and operation. All stormwater treatment measures would be in accordance with Transport for NSW *Water sensitive urban design guideline* (2017).

Driveway modifications

Modifications to driveways would be designed to cater to the size of the vehicles currently accessing properties (refer to Section 3.2.3 of the REF), including horse floats

and heavy vehicles where appropriate. Transport will work with property owners during the next phase of design to confirm driveway design requirements prior to construction.

While traffic is forecast to increase there would still be adequate gaps for residents to safely enter and exit their driveways with minimal delays.

The property access of the Hawkesbury Waste Management Facility would be upgraded to provide a channelised right turn bay and widened to cater for the turning paths of a 26 metre B-Double in accordance with the *Austroads Guide to Road Design* (Austroads, 2009) and Transport for NSW supplements to the Austroads Guide standards.

To cater for the turning path of a 26 metre B-Double, a minor property adjustment to the fence would be required. The horizontal and vertical alignment of The Driftway at this location would also be modified to improve sight distance to the west. The modifications would improve safety and ease of access to the Hawkesbury Waste Management Facility and were not included in the design criteria provided in the REF. Changes to the proposal design are provided in Section 4.2.

Design criteria

The proposed upgrade of The Driftway has been designed to cater to a speed of 90 kilometres per hour and a posted speed of 80 kilometres per hour. The *NSW Speed Zoning Guidelines* (Roads and Traffic Authority, 2011) identifies 80 kilometres per hour as suitable for undivided arterial and sub-arterial roads on the fringes of urban areas, 70 kilometres per hour should only be used in locations that do not meet the standard of 80 kilometres per hour speed limit. The semi-rural, flat and straight alignment of The Driftway means it would remain suitable for a posted speed limit of 80 kilometres per hour.

As detailed in Section 3.2.3 of the REF, a major design feature of the proposal is a new 24 metre long, two lane bridge, over the existing water course which flows to Rickabys Creek. The bridge would be required to accommodate the realignment of The Driftway near the intersection with Blacktown Road.

The bridge configuration would consist of a 3.6 metre wide shoulder on the eastbound side, two 3.7 metre wide lanes, a one metre wide painted median, a three metre wide shoulder on the westbound side and a 3.6 metre wide footway to make allowance for a shared path on the southern side. The bridge cross section is considered adequate for purpose and would allow for future widening to four lanes to provide more capacity for future intersection upgrades if required.

As detailed in Table 3-1 of the REF, existing lane widths are proposed to be retained where upgrades to the existing Driftway alignment would occur and shoulder widths would be widened to 1.5 metres sealed with a two metre wide verge on the northern side and 0.5 metres on the southern side to improve safety. With the exception of intersections, The Driftway is a straight and flat road with no recent crash history. The proposed improvements to the shoulders and verge are considered appropriate to improve safety while minimising impacts to drainage and endangered ecological communities. The realigned section of The Driftway would have 3.5 metre lane widths, 2.5 metre shoulder widths with lane widening at curves (see Figure 3-4 of the REF).

Transport for NSW has revised the design of the batters from what was proposed in Section 3.2.1 of the REF. New design plans have been prepared with cross sections including property boundaries and are provided in Appendix A. Changes to the proposal are identified in Section 4.2. The following batters would be implemented along The Driftway:

- 2:1 batters have been designed where there are constraints such as property boundaries, utilities, endangered ecological communities, and drainage channels that would be impacted
- Batters forming the drainage on the southern side of The Driftway between Londonderry Road and Reynolds Road were designed as 6:1 on the road side with 2:1 on the property side. Where space permits and within the assessed footprint, 2:1 batters would be revised in the design to 4:1 with localised steepening to avoid constraints
- On the northern side of The Driftway, 2:1 batters have been designed due to their low height; however, shallower batter angles would extend into the drain reducing its capacity and impact on endangered ecological communities
- On the realigned section of The Driftway, 2:1 batters have been designed as shallower batter angles would extend into adjacent property which is subject to an Aboriginal Land Claim. In addition, a shallower batter angle would require additional imported fill within the floodplain
- Where batters steeper than 4:1 are proposed, there would be further consideration during detailed design, including a risk assessment which considers maintenance, work health and safety, cost and environmental impacts and the design revised where possible.

2.3.3 Construction activities

Submission number(s)

06

Issue description

The submitter raised the following issue:

- Additional information regarding the frequency and duration of night-time works and the proposed mitigation measures.

Response

Section 3.3.3 of the REF details the proposals expected construction hours of work and the weekly duration for construction phases which require night time work (refer to Table 3-5 of the REF). Night time work is undertaken to minimise disruption to local traffic along key roads during construction, in response to an emergency or potential impact, or on a case by case basis.

Night time work would occur during intersection improvements which tie into existing roads, during the construction of median islands, where drainage improvements are required to cross beneath the road and during the placement of the final pavement layer. Specific night time construction noise mitigation measures would be dependent on the construction activity and would be in accordance with Transport for NSW *Construction Noise and Vibration Guideline* (CNVG) (2016). Transport will engage with residents prior to any night-time work occurring.

Transport for NSW CNVG (2016) contains ‘standard mitigation measures’ for managing construction impacts. Where noise impacts remain after the use of ‘standard mitigation measures’, the CNVG requires the use of ‘additional mitigation measures’ where feasible and reasonable. The ‘additional mitigation measures’ are determined on the basis of the exceedance of the appropriate management levels.

The requirement for 'additional mitigation measures' would be further evaluated as the proposal progresses and detailed construction scheduling information becomes available and would be based on the CNVG definition of how 'additional mitigation measures' are applied to airborne noise impacts. A final Operational Noise Mitigation strategy for the proposal would be determined during detailed design and would consider community preference where appropriate.

2.3.4 Property acquisition

Submission number(s)

06

Issue description

The submitter raised the following issue:

- The acquisition of council land for road widening, or a site compound must be in early consultation with council's property team and be in accordance with *Land Acquisition Act 1991*.

Response

As detailed in Section 3.6 of the REF, most of the proposal is located within the existing road reserve, with only minor partial property acquisitions required. The proposal would require partial acquisition and lease over land owned by the State of NSW and occupied by Western Sydney University. Engagement with Western Sydney University regarding the proposal has been ongoing since 2019.

All partial acquisitions and associated property adjustments would be carried out in accordance with the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991* and in consultation with affected parties throughout the development of the proposal.

2.4 Statutory planning framework

2.4.1 Other relevant NSW legislation

Submission number(s)

06 and 09

Issue *description*

The submitters raised the following issues:

- Support for the proposal would be contingent on the reclassification of the Driftway, between Londonderry Road and Blacktown Road, as State road under the care, control, and responsibility of Transport for NSW
- Would The Driftway be reclassified as a State road under the care and control of Transport for NSW?

Response

In February 2019, the NSW Government announced the initiation of a Road Classification Review to ensure the road classification framework is still fit for purpose and that roads across NSW are appropriately classified. An Independent Panel has been established to make recommendations for consideration by the NSW

Government. The Independent Panel is currently considering applications from stakeholders, including councils and Transport for NSW. Any reclassification of The Driftway resulting from this process is expected to be announced in mid-2022.

2.5 Consultation

2.5.1 Community involvement

Submission number(s)

03

Issue description

The submitter raised the following issues:

- The consultation process has been unfair, as online community and stakeholder engagement has not been available to everyone
- Community feedback has not been adequately considered.

Response

Consultation for Stage 1 has been undertaken in parallel with consultation for the overall New Richmond Bridge and traffic improvements proposal and has been ongoing since 2018. Over this time a range of engagement tools have been implemented by Transport for NSW, including community information sessions, numerous in-person meetings with community groups, distribution of community updates to households in the area and a number of online sessions. A summary of the communication and engagement tools which have been made available to the public and stakeholders for the duration of the proposal is provided in Table 2-2.

The REF for Stage 1 was displayed for public feedback from November 15 to December 10, 2021, however, due to COVID-19 restrictions face to face community consultation could not be undertaken during this time. Transport for NSW responded by providing online community information sessions, letter box drops to residents around the proposal area, and provided a proposal team contact phone number and email address for stakeholders who were unable to access the online sessions.

Community feedback is valued, and the public are encouraged to provide submissions. Each submission that is received during the public display of the REF is collated and considered by Transport for NSW. After this consideration, it is determined whether or not the proposal should proceed as proposed and the community and stakeholders informed of the decision. If the proposal does proceed, Transport for NSW would continue consultation throughout the construction of the proposal with all stakeholders directly impacted by The Driftway upgrade. Further information on the future consultation process is provided in Section 5.8 of the REF.

Table 2-2: Summary of the consultation undertaken for the proposal

Consultation tool	Consultation process
Web page	A dedicated web page was established on the Transport for NSW's website as a source of information about the proposal. This webpage has been, and would continue to be, updated regularly throughout the proposal's life cycle: http://nswroads.work/richmond-bridge

Consultation tool	Consultation process
Information phone line	A telephone information line, 1800 370 778, was established for the duration of the proposal as a direct communication channel for community members and stakeholders to contact the proposal team.
Email address	Community members and stakeholders were invited to provide their comments or questions via the proposal email address: richmondbridge@transport.nsw.gov.au The email address will remain for the length of the proposal lifecycle as a channel for formal submissions to be made during public display periods as well as a direct communication channel for general community enquiries outside of the display period
Meetings and briefings	Transport for NSW has consulted on an ongoing basis with key State and local government agencies, utility providers, local property owners and other stakeholders in the proposal area during the development of the options and the proposal process.
Workshops	Workshops were held by Transport for NSW and attended by the Community Working Group, which was comprised of local representatives from key stakeholder groups. These workshops were undertaken throughout 2019 to 2021. The workshops focused on collaborating ideas, objectives and potential options for future local traffic improvements.
Public display	• The options report was publicly displayed for comment between June and September 2021 • The REF was publicly displayed for comment between 15 November 2021 and 10 December 2021.
Online community consultation (in response to COVID-19)	To limit the spread of COVID-19, in-person community consultation sessions were not held, as an alternative, two online community information sessions were held on: • 24 November 2021 from 6-7 PM • 25 November 2021 from 12-1 PM. A total of 38 people registered and attended these sessions.

2.6 Biodiversity

2.6.1 Methodology

Submission number(s)

03 and 06

Issue description

The submitters raised the following issues:

- The REF did not include maps showing the threatened flora transects
- Additional survey information is requested to identify hollow bearing trees and the impact on hollow dependent fauna
- The recommended survey period for *Pultenaea parviflora* is September to November, with the flowers generally appearing in August. Known 'reference sites' of the species should be checked to ensure the species is flowering and additional targeted surveys on the northern side of The Driftway should be undertaken during the recommended survey period.

Response

As detailed in Appendix C of the REF, two separate field surveys were carried out over four days on 22 April 2021 and between the 21 and 24 June 2021 to ground-truth the results of the desktop assessment, conduct targeted flora surveys and habitat assessments, including nest tree and hollow bearing tree searches, throughout the proposal area. Threatened flora transect locations are shown on Figure 3-4 Recorded threatened species provided in Appendix C of the REF.

No hollow bearing trees or breeding habitat was identified within the proposal footprint. Impacts to hollow dependent fauna as a result of the proposal are limited to the loss of potential foraging habitat. Assessments of significance undertaken in accordance with State and Federal legislation for hollow dependent fauna determined the potential for impacts as minimal and not significant.

While the recommended months of survey for *Pultenaea parviflora*, a listed endangered species under the *Biodiversity Conservation Act 2016* (BC Act) and vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), are described in the Threatened Biodiversity Data Collection (TBDC) as September - November, the species can be identified year round. Targeted surveys undertaken in potential habitat (PCT 724 PCT 725 and PCT 883) are considered adequate to have identified individuals, if present, within the proposal area.

Assessments of significance undertaken for the species in accordance with the BC Act and the EPBC Act both determined that the removal of 1.88 hectares of potential low to moderate quality habitat for the species is unlikely to have a significant impact. Suitable more high quality potential habitat occurs within the land adjoining the north of The Driftway and is reserved as a Biodiversity Stewardship Site, which would see the conservation of potential habitat for the species in perpetuity.

Preclearance surveys would be undertaken prior to any vegetation clearing works. If a hollow bearing tree or threatened biota are identified during construction, all works would cease, and the unexpected species find procedure under the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA, 2011) would be followed. No additional targeted surveys are considered to be required at this time.

2.6.2 Potential impacts

Submission number(s)

03, 06 and 08

Issue description

The submitters raised the following issues:

Flora

- The removal of vegetation should be minimised where possible and the revegetation of disturbed areas should be undertaken with appropriate species.

Fauna

- The proposed realignment of The Driftway and new intersection with Blacktown and Racecourse Road would impact on local Green and Golden Bell Frog habitat, a listed endangered species under the BC Act and a listed vulnerable species under the EPBC Act
- The northern side of The Driftway may provide potential habitat for several threatened and migratory bird species, especially during heavy rain events which cause flooding in the area.

Response

Flora

The removal of native vegetation has been minimised as much as possible through the proposal design (refer to Section 2.5 of the REF). The native vegetation to be cleared totals 5.66 hectares and borders the existing road which is subject to ongoing indirect disturbance and maintains a high level of weed invasion.

Revegetation efforts would be in accordance with the landscape strategy (refer to Appendix F of the REF) and would be implemented progressively to minimise visual impact and reduce soil erosion. Species proposed for revegetation would be from local provenance material and would match existing vegetation communities to facilitate the integration of planted species with the surrounding environment where possible. The redundant section of The Driftway is proposed to be removed and the area rehabilitated and revegetated.

Additional compensation for impacts to threatened biodiversity and ecological communities would be provided in the form of biodiversity offsets, in accordance with Transport for NSW *Guideline for Biodiversity Offsets* (RMS 2016). Suitable offsets would be determined during detailed design and the development of the offset package.

Fauna

As detailed in Appendix C of the REF, a habitat assessment was undertaken within the proposal area to address the list of threatened flora and fauna species known or predicted to occur within a ten kilometre radius of the proposal area. A comparison of the preferred habitat features for identified species with the type and quality of the habitats present within the proposal area was undertaken. The assessment was then used to inform the likelihood of species being present (subject species) and to identify species requiring targeted survey.

The Green and Golden Bell Frog (*Litoria aurea*), a listed endangered species under the BC Act and a listed vulnerable species under the EPBC Act, was considered to have a low likelihood of being present within the proposal area due to the absence of preferred habitat for the species. A search of the BioNet – Atlas of NSW Wildlife, identified only one record for the species within the ten kilometre search radius. The record is from 1969 and is located on the western side of Londonderry Road within the Western Sydney University lands. The area of vegetation proposed to be removed for the proposal, inclusive of the area of vegetation between The Driftway/Blacktown /Racecourse Road is not considered potential habitat for the Green and Golden Bell Frog.

Overall, the habitats within the proposal area are generally moderate to low quality and do not possess the features required for many threatened and migratory bird species. The proposal would result in the removal of potential foraging habitat only, as no breeding habitat was identified during survey. Potential impacts to threatened and migratory birds are considered minor to negligible. More suitable potential habitat for threatened and migratory fauna species is available directly north of the proposal area and in the nearby Castlereagh Nature Reserve. The land to the north is owned by the Western Sydney University and would be retained and managed in perpetuity within a Biodiversity Stewardship Site and would not be directly impacted by the proposal.

2.6.3 Biodiversity offsets

Submission number(s)

03 and 06

Issue description

The submitters raised the following issues:

- The BC Act listed critically endangered ecological community Cumberland Plain Woodland located in the Western Sydney University land adjacent to The Driftway northern boundary
- The biodiversity offset strategy should look for offsets within the Penrith and/or Hawkesbury Local Government Area (LGA).

Response

The proposal would impact and would require the acquisition of 0.16 hectares of Western Sydney University land within the north east corner of The Driftway and Londonderry Road intersection to accommodate a new roundabout. The land is comprised of moderate condition Cumberland Plain Woodland, a listed critically endangered ecological community (CEEC) under the BC Act and is to form part of land conserved under the Western Sydney University Biodiversity Stewardship Agreement.

An additional 0.29 hectares of moderate condition and 2.96 hectares of low condition Cumberland Plain Woodland CEEC, outside of the university lands, would be impacted by the proposal. Several options were considered to minimise impact to the Cumberland Plain Woodland CEEC and Western Sydney University land (see Section 2.6.4 of the REF), including modifying the dimensions of the proposed roundabout by reducing the radius from 22 metres to 20 metres. While all options had some impact to the CEEC, the chosen option had the lowest impact while providing the greatest safety benefits.

Appropriate compensation for biodiversity impacts to the CEEC would be provided in accordance with Section 5.16 of the BC Act and *Transports Guideline for Biodiversity Offsets* (Roads and Maritime, 2016). Consultation with the university would be ongoing throughout the offset process and during the development of the final offset package. The final offset requirement for the proposal would be determined during detailed design and development of the offset package. Suitable offsets would likely be within the Cumberland sub-region of the Sydney Basin Bioregion.

2.6.4 Safeguards and management measures

Submission number(s)

06

Issue description

The submitter raised the following issues:

Tree protection and retention

- The exact number of mature and small endemic trees removed for the proposal should be quantified and the replacement trees should be planted at a ratio of 3:1, should be endemic and reach a mature height of at least 15 metres
- Retained trees are to be protected in accordance with Councils Street and Park Tree Management plan, *AS 4970-2009 Protection of trees on development sites and industry standards* (Standards Australia, 2009).

Translocation of threatened plants

- A Threatened Flora Salvage and Translocation Plan would be required for *Dillwynia tenuifolia* and any other threatened flora in consultation with Australia Botanic Gardens at Mount Annan, and in accordance with available guidelines for the Translocation of Threatened Plants.

Additional biodiversity mitigation

- Consultation with Western Sydney University – Hawkesbury, Penrith City Council, Hawkesbury City Council, NSW National Parks and Wildlife Service (Cumberland Region) and/or local nurseries to collect seed prior to works commencing to stockpile, germinate and grow seed to use in future regeneration/revegetation projects to increase genetic diversity, species diversity and leaf litter cover in bushland reserves and National Parks
- Appropriate fencing to ensure clear demarcation of the works area, reduce the risk of accidental clearing of native vegetation, rubbish dumping and trampling of adjacent vegetation
- Consideration should be given to the time of year when removing vegetation to avoid destruction of nesting sites and fauna injury
- Qualified and experienced bush regenerators should be engaged to undertake weed control works within a 20metre buffer of adjoining vegetation from the northern extent of the works prior to clearing, to reduce the risk of weeds spreading into adjoining areas of quality vegetation due to increased light penetration.

Response

Tree protection and retention

Native vegetation that is removed would be offset in accordance with Transport's *Guideline for Biodiversity Offsets* (Transport 2016).

Where revegetation is proposed it would be re-established in accordance with *Guide 3: Re-establishment of native vegetation* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA, 2011) and in accordance with the landscape strategy, urban design objectives and principles (see Appendix F of the REF). Species proposed for revegetation would match the existing vegetation communities where appropriate.

The proposal would avoid impact to prominent trees and vegetation communities where possible. Exclusion zones will be clearly defined to protect retained vegetation and in accordance with *Guide 2: Exclusion zones* of the *Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011) which is in accordance with industry standards.

Translocation of threatened plants

The proposal footprint is estimated to contain 5,000 *Dillwynia tenuifolia* individuals with an estimated area of occupancy of 1.3 hectares. While the local population located mostly in the Western Sydney University land to the north of The Driftway, is estimated to contain over 100,000 individuals with an estimated area of occupancy of 67 hectares - based on the data from BioNet (DPIE, 2021), Niche (2021) and site observations. The university land is a Biodiversity Stewardship Site, which will see the conservation of about 95 percent of the local population in perpetuity.

Transport for NSW understand that the individuals that would be cleared have a potential resource function to conservation groups. Prior to construction Transport for

NSW would contact local conservation groups such as the Royal Botanic Garden at Mt Annan, Landcare and Greening Australia. If they are interested in salvaging any of the individuals or collecting the seed, Transport would commit to facilitating this activity.

Rather than implementing a Translocation Plan, Transport for NSW would be compensating for impacts to threatened biodiversity and ecological communities through biodiversity offsets, in accordance with *Transports Guideline for Biodiversity Offsets* (Roads and Maritime, 2016) as discussed above. Suitable offsets would be determined during detailed design and the development of the offset package and in consultation with relevant authorities.

Additional biodiversity mitigation

Transport for NSW would continue consultation with effected stakeholders throughout construction and ongoing where required. Appropriate biodiversity mitigation is summarised in Section 7.2 and detailed in Appendix C of the REF and would be implemented in accordance with *Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011) and as part of the Construction Environmental Management Plan (CEMP).

Habitat would be replaced or re-instated in accordance with *Guide 5: Re-use of woody debris and bush rock and Guide 8: Nest boxes of the Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011). Appropriate weed management, pre-clearance fauna surveys, the demarcation of exclusion zones and revegetation efforts would be undertaken by qualified and experienced personnel and in accordance with applicable standards.

2.7 Flooding, drainage, and surface water

2.7.1 Methodology

Submission number(s)

06

Issue description

The submitter raised the following issue:

- The criteria adopted to assess potential flood level impacts (reference to M12) is not acceptable, as some of the criteria allow more than Council's adopted limits and would potentially cause adverse flooding.

Response

The criteria adopted for assessing the longitudinal and transverse drainage requirements for the proposal which were recently adopted for the M12 Motorway project were developed by Transport for NSW in close consultation with the Department of Planning and Environment (DPE, formerly DPIE) and its flooding expert and were subject to a robust Environmental Impact Statement assessment process. The criteria are considered appropriate for this proposal.

2.7.2 Potential impacts

Submission number(s)

02, 03 and 06

Issue description

The submitters raised the following issues:

Flooding and drainage

- Concern that the improvements to The Driftway would increase flood levels, causing damage to private residences along The Driftway
- The potential flood level increases, which range from 22 to 62 millimetres in a 1 in 100 year flood event, to six private residential properties is unacceptable. The submission also noted a lack of support for the proposal due to the unacceptable adverse flood impacts to private properties and buildings
- Increased runoff from construction and operation of the proposal, without proper drainage, would cause an increase in pollution
- Table drains, and table drainage should be provided along both sides of the road to catch flows of the upgraded road.

Floodplain storage

- The impact of the loss of floodplain storage should be addressed by the Stage 1 REF and not within future Stage 2 works, as the individual impact of filling of 30,000 cubic metres could be minimal, however, the cumulative impact on the floodplain could be significant and should be avoided.

Response

Flooding and drainage

The drainage design would decrease the depth and duration of inundation of flood events for most residential properties along The Driftway, however an increase in the depth and duration of inundation would be experienced at some residential properties located along the southern side of The Driftway. Any increases to the depth and duration of flooding as a result of the proposal would be within the acceptable limits of the properties rural zoning and would not result in a significant increase in the flood hazard or risk to life.

Based on the flood modelling undertaken, it does not appear that there are any impacts to dwellings or buildings. Floor level surveys would be undertaken to confirm that increases in peak flood levels do not result in an increase in the depth of above-floor inundation. The results would inform the detailed design to determine additional drainage improvements if required and in consultation with affected residences.

Permanent catch and toe drains would be installed during the initial stages of the construction along the southern side of the Driftway, along accesses to driveways and private properties. The catch and toe drains would be augmented with temporary diversion drains in order to direct clean water runoff around the disturbed areas wherever feasible. Transverse drainage works would be carried out during the initial stages of the construction in order to allow the passage of clean water through the construction site.

The implementation of a network of new grass-lined catch drains in combination with the existing grass-lined engineered channel that presently runs along the northern side of The Driftway would result in an 88 per cent overall reduction in gross pollutants, a 78 per cent reduction in total suspended solids (TSS), a 51 per cent reduction in total

phosphorus (TP) and an 18 per cent reduction in total nitrogen (TN) discharging into the receiving drainage lines during operation (refer to Section 6.2.3 of the REF).

MUSIC modelling identified that a network of new grass-lined catch drains in combination with the existing grass-lined engineered channel that presently runs along the northern side of The Driftway, would result in suitable overall reductions in the pollutant load discharging to the receiving drainage lines under operational conditions.

Floodplain storage

The proposal would displace about 37,000 cubic metres of available floodplain storage, 7,000 cubic metres of which would be recaptured by removing the embankment associated with the section of The Driftway which would be abandoned near its intersection with Blacktown Road. The minor loss of floodplain storage associated with the proposal would not result in a significant impact on peak flood levels on the Hawkesbury-Nepean River floodplain. The benefits of improved road network resilience as a result of raising the eastern section of The Driftway is considered to outweigh any impacts associated with the minor loss of floodplain storage.

2.8 Traffic and transport

2.8.1 Methodology

Submission number(s)

06

Issue description

The submitter raised the following issue:

- Further analysis should be undertaken along The Driftway beyond 2036 and consideration should be given to other major infrastructure projects (Castlereagh Freeway and Outer Sydney Orbital), which may redistribute traffic in the proposal area during Stage 2.

Response

It is common practice for Transport for NSW to assess traffic and noise conditions in environmental assessments for the year the proposal is expected to be open to traffic, and ten years after the proposal is open to traffic, to account for growth and any changes in conditions.

The Castlereagh Freeway is a long-term initiative identified for investigation in the 20 plus year time horizon in the Transport for NSW *Future Transport Strategy 2056* (2018). Strategic modelling has identified that traffic volumes would decrease on this section of The Driftway in the future if the Castlereagh Freeway was implemented.

2.8.2 Existing environment

Submission number(s)

03

Issue description

The submitter raised the following issue:

- The Driftway is already unsafe and predicted traffic forecasts would further impact existing safety problems and the potential for animal strike which may lead to fatalities.

Response

Injury crash clusters and safety issues along The Driftway are primarily attributed to conflicts between through and right-turning traffic at key intersections, such as The Driftway with Blacktown Road and Londonderry Road. No mid-block crashes have been recorded on the proposal section of The Driftway in the previous five years.

The latest crash data was obtained for the period from August 2015 to June 2020 to estimate the recent accident patterns across the proposal area. All but one crash occurred at either Londonderry Road or Blacktown Road intersections with one crash occurring at the Reynolds Road intersection. The implementation of roundabouts at both key intersections would substantially improve safety and reduce the potential for crashes. Minor intersections of The Driftway with Luxford and Reynolds Roads are proposed to have right turn bays to improve safety also.

Animal strike causing crashes and fatalities are historically not evident along The Driftway. While traffic volumes are modelled to increase on The Driftway following the delivery of the bypass of the Richmond town centre in Stage 2 of the proposal, traffic volumes on The Driftway would remain lower than adjacent arterial roads and a significant increase in animal strike is unlikely to occur.

2.8.3 Potential impacts

Submission number(s)

05 and 09

Issue description

The submitters raised the following issues:

- Concern that the proposal would redirect traffic onto Richmond Road / Blacktown Road, significantly increasing traffic and failing to reduce afternoon peak travel times
- Concern the traffic volumes would increase along Richmond Road, between The Driftway and Marsden Park as a result of the proposal
- The proposal would lead to three roundabouts within one kilometre of each other on Blacktown Road / Richmond Road, causing gridlock at South Windsor and Richmond Road to the M7 Motorway
- Concern that the realignment of The Driftway to connect with Racecourse Road would increase northbound traffic along Racecourse Road changing its functionality and are there plans for its intersection with Hawkesbury Valley Way.

Response

Following the delivery of Stage 2, which would include a bypass of Richmond town centre, the route which people use to access Richmond Road would change; however, the proposal would not increase traffic volumes on Richmond Road. Traffic volumes on Richmond Road may however increase over time as a result of population growth and development.

Traffic modelling indicates (refer to Section 6.3.3 of the REF) that the upgrade of The Driftway / Blacktown Road intersection to a roundabout is necessary to effectively accommodate future traffic forecasts, and to improve safety by allowing traffic from The Driftway to turn onto Blacktown Road efficiently.

The new roundabout at the intersection of The Driftway and Blacktown Road would be located approximately 750 metres north of the existing roundabout at Blacktown Road / George Street and a further 250 metres north of the roundabout at Richmond Road /

The Northern Road. The distance between the new roundabout and existing roundabouts would be sufficient, ensuring that queues would not impact on the performance of each intersection.

Additionally, traffic modelling demonstrates that the realignment of The Driftway to Racecourse Road would result in a minor increase in traffic on Racecourse Road. The model provides two hour peak volumes, with the greatest increases modelled to occur in the PM peak with an additional 44 vehicles in 2026 and 68 vehicles in 2036 across the two hour peak period. This is not considered to change the functionality of Racecourse Road and no further improvements to its intersection with Hawkesbury Valley Way are proposed as part of this proposal.

Further upgrades to Richmond Road south of the proposed intersection improvements at The Driftway with Racecourse Road and Blacktown Road are outside the scope of this proposal.

2.9 Aboriginal and Non-Aboriginal heritage

2.9.1 Methodology

Submission number(s)

06 and 08

Issue description

The submitters raised the following issues:

- It is unclear whether the non-Aboriginal and Aboriginal assessments were undertaken by suitably qualified personnel and in accordance with best practice guidelines, policies and legislative requirements from both local council and Heritage NSW
- Concern that archaeological searches were not undertaken for the proposal
- Additional information is required to adequately address the potential for impacts to Non-Aboriginal and Aboriginal heritage within the proposal area. This includes a separate Statement of Heritage Impacts prepared by a suitably qualified heritage consultant which addresses:
    - Non-Aboriginal and Aboriginal heritage
    - Potential impacts to items of heritage value and the options and mitigation measures to prevent and minimise impacts
    - Detailed consultation with the community (including Aboriginal groups).

Response

As detailed in Section 6.6 and Section 6.7 of the REF, the Aboriginal cultural heritage and the Non-Aboriginal heritage of the proposal area have been assessed using best practice methodologies and in accordance with legislative obligations, policies and guidelines where applicable, by suitably qualified archaeologists.

Site surveys and desktop searches have identified a low probability of uncovering unexpected Heritage items based on the Aboriginal cultural heritage (Kelleher Nightingale Consulting (KNC) 2019, 2020 and 2021) and Non-Aboriginal heritage (Phillips Marler, 2019) assessment results.

A Statement of Heritage Impacts is not considered to be required due to the following:

- Three separate Aboriginal cultural heritage assessments were undertaken by KNC (2019, 2020 and 2021) to cover the entirety of the proposal area. The assessments determined that the construction and the operation of the

proposal, inclusive of the temporary ancillary site, are considered unlikely to impact on Aboriginal heritage artefacts, features or remains. The Aboriginal cultural heritage assessment undertaken by KNC in 2019 was undertaken in accordance with Stage 2 of the Transport for NSW Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (Roads and Maritime 2011) and the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (Office of Environment and Heritage, 2010). The PACHCI provides a consistent means of effective consultation with Aboriginal communities regarding activities which may impact on Aboriginal cultural heritage and a consistent assessment process.

- In accordance with the PACHCI, consultation was undertaken with the Deerubbin Local Aboriginal Land Council (DLALC) for the Richmond Bridge Duplication and Traffic Improvements –Options Assessment: Aboriginal Archaeological Survey Report-Stage 2 PACHCI by (KNC, 2019). No Native Title holders/ claimants were registered in the area.
- A Non-Aboriginal heritage assessment was undertaken by Phillips Marler (2019) over the proposal area. The assessment determined that the construction and the operation of the proposal are considered unlikely to impact on non-Aboriginal heritage items. The closest item identified, the Londonderry Cemetery, is located about 450 metres south of The Driftway.

As detailed in Section 6.6.4 and Section 6.7.4 of the REF, if Aboriginal and /or Non-Aboriginal heritage items are uncovered during the construction works, all works would cease, and the Transport for NSW Aboriginal Cultural Heritage advisor and the Environmental Manager would be contacted immediately. The steps in the Unexpected Heritage Items (RMS, 2015) would be followed.

2.10 Landscape character and visual amenity

2.10.1 Potential impacts

Submission number(s)

03 and 06

Issue description

The submitters raised the following issues:

- The removal of trees for the proposal will reduce the benefits provided by the established vegetation, including loss of character and amenity, increased temperatures and negative effects to the mental health and wellbeing of the local community
- It is unclear how the concept design achieves the nine urban design principles adopted from Beyond the Pavement as stated in the REF
- It is unclear whether the recommendations proposed in the Landscape Condition and Visual Impact Assessment report (Appendix F of the REF) to minimise impacts would be adopted as part of the proposal, specific urban design outcomes need to be committed to and delivered to minimise impacts.

Response

The Driftway has an established, attractive landscape character. The proposal will have some temporary and permanent impacts upon the existing character, primarily from the removal of established vegetation. However, the removal of large trees as part of the proposal comprises a small percentage of the overall tree cover within the proposal area.

In the short term, the increase in sealed surfaces and reduced vegetation is likely to result in visual changes to the streetscape character of The Driftway, and loss of shade immediately adjacent to the roadway. Over time as the new road corridor vegetation matures the streetscape character will return, albeit in a different form, and shading will return to road surfaces, minimising the heat island effect and providing user comfort.

To mitigate and manage the key issues of impact, the proposal has consciously adopted urban design principles, as defined in Transport for NSW urban design policy - *Beyond the Pavement* (2014), which would integrate the natural patterns and cultural environment of the local area.

As part of the development of the urban design for the proposal, a landscape strategy was developed, with the objective of retaining the landscape character along The Driftway by reinstating vegetation along the corridor edges. The urban design objectives would form the basis for progressing the detailed design, which would be developed in consultation with stakeholders. The urban design objectives for the proposal include:

- Contribute to the overall landscape structure and revitalisation of the region
- Respect the land uses and built form of the corridor
- Connecting modes and communities
- Fit the landform of the corridor
- Responding to natural pattern
- Achieving integrated and minimal maintenance design

The key mitigation strategies are detailed in Appendix F of the REF and are summarised below. The mitigation measures address both design and construction:

General Design Integration - standard project safeguards:

- Ongoing integrated project development will follow Transports integrated project development processes, urban designers will be part of the project team
- Transports Urban Design guidance (Beyond the Pavement)' and guidelines will be used to guide design development of the proposal
- The urban design objectives, principles and concept design strategy presented in the urban design report for the REF will form the basis for future design development and consultation with stakeholders

Earthworks:

- Integrate with adjoining landform through adoption of appropriate grades, avoiding sharp transition in profile
- Stabilise/revegetate as works progress to limit erosion and visual impacts through early integration with surrounding vegetation

Retention of existing vegetation:

- Design the proposal to avoid impact to prominent trees and vegetation communities where possible
- Existing threatened species will be retained and protected wherever possible
- Minimise clearance extent where possible
- Clearly define clearance limits and exclusion zones to protect vegetation cover

Revegetation:

- Vegetation communities to respond to existing communities and landscape character
- Utilise local provenance material
- Provide screen planting within corridor to limit visibility of the proposal from adjoining residential properties
- Progressively implement revegetation works to limit erosion and to establish vegetation
- Utilise cleared material as part of revegetation works

Minimise road furniture and signage:

- Provide minimum signage requirements and limit structural elements to provide and open and permeable setting
- Look for opportunities to minimise designed signage

Lighting:

- Limit extent of lighting and potential for light spill
- Limit night works and provide lighting which minimises spill

View management:

- Provide visual screening within the road corridor to limit the visual impact of the proposal in areas identified as moderate or high impact
- Provide sense of space and openness associated with the agricultural landscape
- Provide small tree planting where street trees have been removed as a result of modification to alignment or expansion in footprint where space permits
- Retain vegetation beyond the footprint to retain any existing screening

Ancillary Facilities:

- Set out compounds to limit impacts, consider screening and location of key structures which provide the greatest impact
- Maintain compound in a tidy and well-presented manner. Provide and maintain screening
- Progressively throughout the work, where feasible and reasonable, return ancillary facility sites to at least their pre-construction state.

2.11 Socio-economic

2.11.1 Potential impacts

Submission number(s)

03

Issue description

The submitter raised the following issue:

- The removal of trees for the proposal suggests that Transport for NSW has not adequately considered the proposals social and environmental impact on the community.

Response

The REF has been prepared in accordance with Section 5.5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and considers to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity. An assessment of potential environmental impacts has been undertaken in the context of clause 228(2) of the *Environmental Planning and Assessment Regulation 2000* and in the context of section 171(2) of the updated *Environmental Planning and Assessment Regulation 2021*(2021 Regulation*)* provided in Section 4.1 of this report.

Transport for NSW recognises the varied impacts of the proposal on the community and the environment. Mitigation measures and safeguards outlined in Chapter 7 of the REF and Section 4.5 of this report have been developed to minimise potential impacts where possible. Ongoing engagement with the community and the implementation of the urban design objectives, principles and the landscape strategy would continue to minimise and address impacts throughout construction and operation.

Once construction is complete, The Driftway as well as sections of Londonderry Road and Blacktown Road would be substantially improved. The improvement in safety, traffic congestion and flood resilience is ultimately expected to enhance community values.

2.12 Other impacts

Submission number(s)

03

Issue description

The submitter raised the following issue:

- The proposal would cause increased dust, air, noise, water and land pollution.

Response

The proposal would have some positive and adverse impacts during operation which would be managed by the implementation of mitigation measures and safeguards as described in Chapter 7 and associated technical reports provided in Appendices C, D, E and F of the REF, and Section 5.2 of this report. Specifically, in response to the issue raised, the following operation mitigation measures would be implemented:

- Operational dust and impacts to air quality would be monitored to ensure that air quality mitigation, suppression and management measures detailed in the Air Quality Management Plan (AQMP) have been applied and are effective
- Operational noise, exceeding the operational road traffic noise criteria increase of more than 2.0 dB, would potentially impact a total of 37 residential buildings. The 37 residential buildings would be eligible for consideration of additional noise mitigation. A final Operational Noise Mitigation Strategy for the proposal would be determined during detailed design and would consider community preference where appropriate
- Operational stormwater runoff would be managed through the implementation of a network of new grass-lined catch drains in combination with the existing grass-lined engineered channel which would further reduce the pollutant load from current levels discharging to the receiving drainage lines

- Operational impacts to land, including soil and drainage, would be managed by revegetating exposed soils and the implementation of operational water quality measures discussed above.

The benefits of improving road safety, traffic efficiency, and flood resilience are considered to outweigh the mostly temporary adverse impacts and risks associated with the operation of the proposal.

2.13 Cumulative impacts

Submission number(s)

06

Issue description

The submitter raised the following issue:

- A review of all infrastructure projects (planned and underway, public, and private) across the region should be undertaken to ensure a coordinated approach and to minimise cumulative impacts to road congestion, safety, urban amenity and communities.

Response

Under clause 228(2) of the *Environmental Planning and Assessment Regulation 2000*, Transport for NSW is required to consider the potential for cumulative impact. Locally occurring developments or activities (in progress, or likely to commence during the proposal's expected construction timeframe) were identified through a desktop search of publicly available information on the DPE major projects and strategic planning website and the potential for cumulative impact considered. Details of the assessment are provided in Section 6.12 of the REF.

In addition to clause 228(2), the likely impacts of the proposal on the natural and built environment have also been considered under section 171(2) of the updated *Environmental Planning and Assessment Regulation 2021.* Details of the assessment are provided in Section 4.1 of this report.

2.14 Environmental management

2.14.1 Safeguards and management measures

Submission number(s)

06

Issue description

The submitter raised the following issues:

- A Sediment and Erosion Control Plan should be prepared and implemented in accordance with the *NSW Government's Managing Urban Stormwater: Soils and construction*
- Dust and Pollution Management Plan be prepared and implemented on the site due to increased dust form trucks during construction
- A Construction Noise & Vibration Management Plan be prepared in consultation with council
- Consideration of circular economy principles should be undertaken when sourcing construction materials such as recycled glass, plastics and asphalt like

PolyPave, crushed recycled concrete and reuse of excavated materials onsite. Mulched vegetation removed onsite should be used for landscaped works.

Response

As summarised in Section 7.2 and detailed in the associated technical reports of the REF, the following management plans would be prepared and implemented as part of the CEMP:

- A site-specific Erosion and Sediment Control Plan/s (ESCP) would be prepared and implemented as part of the Soil and Water Management Plan. The plan would include arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather. Control measures to minimise the risk of water pollution would be included in the ESCP. Soil and water management measures would be identified in consultation with relevant government agencies and Councils. The plan would be consistent with the principles and practices detailed in *Managing Urban Stormwater: Soils and Construction* (2004) (known as the Blue Book)
- An Air Quality Management Plan (AQMP) would be prepared in accordance with relevant published Environment Protection Authority and/or Department of Planning and Environment (DPE) (formerly OEH and DPIE) guidelines. A monitoring program would be implemented to record whether the air quality mitigation, dust suppression and management measures have been applied and their effectiveness. Site planning and work practices would control dust emissions during construction activities and would be included in the AQMP.
- A Construction Noise and Vibration Management Plan (NVMP) would be prepared prior to work commencing and would detail the approach to providing noise and vibration mitigation during construction. Site specific Construction Noise and Vibration Impact Statements would also be completed for work that is required to be completed outside of Standard Construction Hours that has potential to impact sensitive receivers
- A Waste Management Plan (WMP) would be prepared and implemented prior to work commencing. Included in the WMP would be measures to avoid and minimise waste associated with the proposal and classification of wastes and management options (re-use, recycle, stockpile, disposal). The WMP would consider *the Environmental Procedure - Management of Wastes on Transport for NSW Land* (Transport for NSW, 2014) and relevant Transport for NSW Waste Fact Sheets. Transport for NSW has also incorporated several design options to use existing materials to minimise offsite disposal, reduce project costs and environmental impacts where feasible.

2.15 Out of scope

Submission number(s)

05 and 06

Issue description

The submitters raised the following issues:

- Concern that the proposal was proceeding rather than the Castlereagh Freeway Corridor
- Bus shelters and bus stops should be strategically located in consultation with relevant Councils and bus companies as part of Stage 2
- How would extra traffic from Springwood Road, Yarramundi would be reduced?

Response

The Castlereagh Freeway is part of a long-term strategy for Greater Sydney, as an initiative for investigation in the 20 plus year time horizon. This proposal is not replacing the Castlereagh Freeway Corridor proposal.

A new bridge over the Hawkesbury River between Richmond and North Richmond is required to address existing congestion issues and cater for future growth. Delivery of the Castlereagh Freeway would also not negate the need for a new bridge over the Hawkesbury River between Richmond and North Richmond.

Public transport access and infrastructure would be considered during the New Richmond Bridge and traffic improvements - Stage 2. The traffic on Springwood Road, Yarramundi is out of the scope of this proposal.

3 Changes to the proposal

Transport for NSW acknowledges all of the issues raised in submissions to the REF for the New Richmond Bridge and traffic improvements – Stage 1 The Driftway. In particular, Transport for NSW notes the level of interest expressed by the community and stakeholders in respect to aspects of the proposal design.

Transport for NSW has revised the proposal design to address some of the feedback received in submissions where possible. At this time, Transport for NSW proposes the following design revisions:

- The existing pavement surface would be stabilised and strengthened by overlaying 210 millimetres of asphalt to achieve a 40-year design life, rather than a 20-year design life, as detailed in the REF
- Batters forming the drainage on the southern side of The Driftway are 6:1 on the road side with 2:1 on the property side. Where space permits and within the assessed proposal footprint, 2:1 batters would be revised in the design to 4:1 with localised steepening to avoid constraints
- Minor property access adjustments to five private properties, including four private residences located along the southern side of The Driftway and the Hawkesbury Waste Management Facility to accommodate revised road levels, drainage design and vehicle access. This will result in an additional 0.01 hectares to be included in the proposal footprint. The changes are highlighted in Figure 3.1.

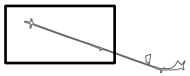
The changes represent a minor departure from the proposal which was the subject of the REF and this submissions report. Additional assessment in respect to the design changes and the potential for environmental impacts are considered in Chapter 4.

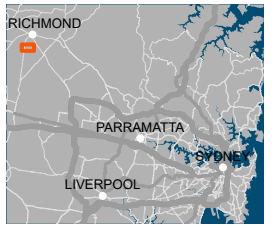
Legend

- Potential temporary ancillary facility
- REF Construction footprint
- Modified REF footprint
- Road design
- Cadastre

0 200 400 m

GDA2020 MGA Zone 56





Data sources1

Jacobs 2021
NSW Spatial Services 2021

Figure 3.1 Property access adjustments

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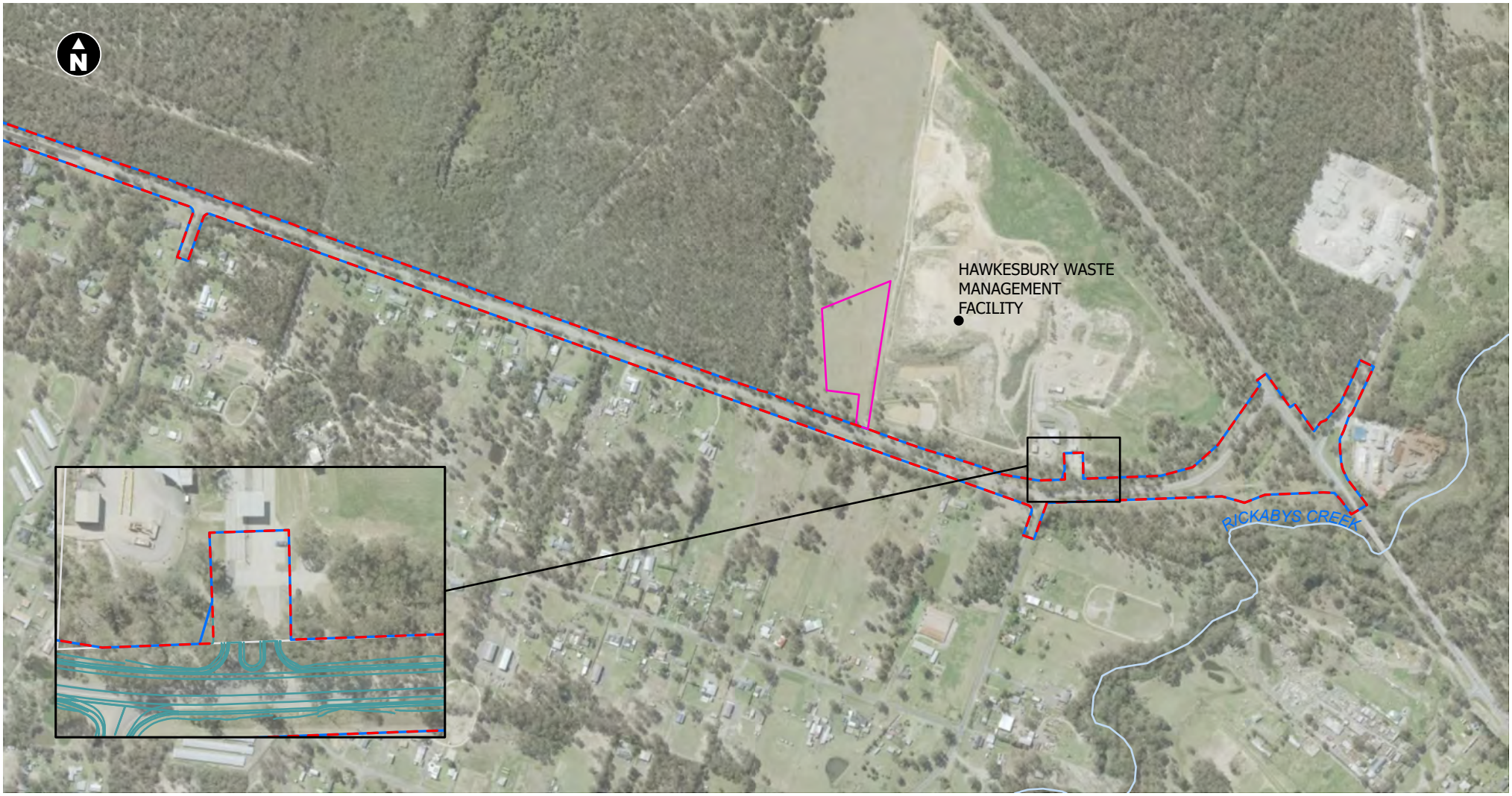
Created by : ASJ | QA by : AA



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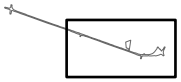

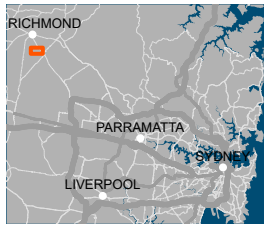

Data sources2

Jacobs 2021
NSW Spatial Services 2021

Figure 3.1 Property access adjustments

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4 Environmental assessment

Consistent with the REF, all aspects of the environment potentially impacted upon by the design changes are to be considered under the *Environmental Planning and Assessment Regulation 2000*. This regulation, has since been repealed, commencing 01 March 2022 and superseded by the *Environmental Planning and Assessment Regulation* 2021. The amendments to the new regulation, and any additional assessment, including the potential for environmental impacts associated with the design revisions are discussed in this chapter.

4.1 Environmental Planning and Assessment Regulation 2021

4.1.1 Section 171(2)

Clause 228(2) considerations under the former regulation have now been renamed under section 171(2) of the new regulation and two additional criteria have been added. The additional section 171(2) criteria are assessed in Table 4-1 below.

Table 4-1: Section 171(2) Checklist

Factor	Impact
(q) applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1	Long term, major, positive. The proposal, inclusive of the design revisions, is consistent with local and State strategic plans, which refer to the need to improve safety and efficiency of roads in the State. These plans are outlined in Section 2.2 of the REF.
(r) other relevant environmental factors	Short term, minor, negative. The proposal, inclusive of the design revisions, may result in some temporary, minor impacts to local traffic, biodiversity and local amenity. Impacts have been avoided, minimised or mitigated wherever possible through design and site-specific safeguards. Overall, the benefits to road safety, traffic and flood resilience are expected to outweigh the temporary adverse impacts from the construction and operation of the proposal.

4.2 Design revisions

The potential for environmental impacts associated with the construction and operation of the proposal design revisions are provided in Table 4-2 and are shown on Figure 3.1.

Table 4-2: Environmental assessment of design changes

Environmental Factor	Design Change		
	Design life	**Revised batters**	**Property access adjustments**
Biodiversity	The increase in design life of the pavement would result in no change to the pavement surface boundary or the proposal footprint. The increase in the design life of the Driftway would have no additional impacts to biodiversity as to what has been assessed in the REF.	Only where space permits and within the assessed proposal footprint would 2:1 batters be revised to 4:1 with localised steepening to avoid constraints. There would be no additional construction or operational impacts to biodiversity as to what has been assessed in the REF.	The property adjustments would result in minor changes to the proposal footprint to accommodate the new driveways, including an additional 0.01 hectares of disturbed and already cleared land adjacent to existing driveways. There would be no additional construction or operational impacts to biodiversity as to what has been assessed in the REF.
Flooding, drainage and surface water	The increase in design life of the pavement would result in no change to the pavement surface boundary or the proposal footprint. The increase in the design life of the Driftway would have no additional impacts to flooding, drainage and surface water as to what has been assessed in the REF.	Only where space permits and within the assessed proposal footprint would 2:1 batters be revised to 4:1 with localised steepening to avoid constraints. There would be no additional construction or operational impacts to flooding, drainage and surface water as to what has been assessed in the REF.	The property adjustments would result in minor changes to the proposal footprint to accommodate the new driveways. The potential impacts of the property adjustments have already been considered in the flooding, drainage and surface water assessment (Appendix D of the REF).
Traffic and transport	The increase in design life of the pavement would result in no change to the pavement surface boundary or the proposal footprint. The increase in the design life of the Driftway would have no additional impacts to traffic and transport as to what has been assessed in the REF.	Only where space permits and within the assessed proposal footprint would 2:1 batters be revised to 4:1 with localised steepening to avoid constraints. There would be no additional construction or operational impacts to traffic and transport as to what has been assessed in the REF.	The traffic and transport impacts resulting from the property adjustments works would be consistent with impacts assessed in the REF. There would be no additional construction or operational impacts to traffic and transport.

Environmental Factor	Design Change		
	Design life	**Revised batters**	**Property access adjustments**
Noise and vibration	The increase in design life of the pavement would result in no change to the pavement surface boundary or the proposal footprint. The increase in the design life of the Driftway would have no additional impacts to noise and vibration from what has been assessed in the REF.	Only where space permits and within the assessed proposal footprint would 2:1 batters be revised to 4:1 with localised steepening to avoid constraints. There would be no additional construction or operational impacts to noise and vibration as to what has been assessed in the REF.	The noise and vibration impact resulting from the property adjustment works would be consistent with the impacts assessed in the REF. There would be no additional construction or operational impacts to noise and vibration.
Soils and contamination	The increase in design life of the pavement would result in no change to the pavement surface boundary or the proposal footprint as to what has been assessed in the REF. No additional earthworks are required. The increase in the design life of the Driftway would have no additional impacts to soil and contamination.	Only where space permits and within the assessed proposal footprint would 2:1 batters be revised to 4:1 with localised steepening to avoid constraints. There would be no additional construction or operational impacts to soils and contamination as to what has been assessed in the REF.	The impact to soil and contamination resulting from the property adjustment works would be consistent with the impacts assessed in the REF. There would be no additional construction or operational impacts to soil and contamination.
Aboriginal cultural and non-Aboriginal heritage	The increase in design life of the pavement would result in no change to the pavement surface boundary or the proposal footprint. The increase in the design life of the Driftway would have no additional impacts to Aboriginal cultural and non-Aboriginal heritage from what has been assessed in the REF.	Only where space permits and within the assessed proposal footprint would 2:1 batters be revised to 4:1 with localised steepening to avoid constraints. The works would occur within the assessed proposal footprint. There would be no additional construction or operational impacts to Aboriginal cultural and non-Aboriginal heritage as to what has been assessed in the REF.	The property adjustments would result in minor changes to the proposal footprint to accommodate the new driveways including an additional 0.01 hectares of disturbed and already cleared land adjacent to existing driveways. There would be no additional impacts to Aboriginal cultural and non-Aboriginal heritage as to what has been assessed in the REF.

Environmental Factor	Design Change		
	Design life	**Revised batters**	**Property access adjustments**
Landscape character and visual impacts	The increase in design life of the pavement would result in no change to the pavement surface boundary or the proposal footprint as to what has been assessed in the REF. The increase in the design life of the Driftway would have no additional impacts to the landscape and visual character from what has been assessed in the REF.	Only where space permits and within the assessed proposal footprint would 2:1 batters be revised to 4:1 with localised steepening to avoid constraints. The works would occur within the assessed proposal footprint. There would be no additional construction or operational impacts to landscape or visual character as to what has been assessed in the REF.	The property access adjustment would result in a minor visual impact to the driveways of the impacted properties. The additional impact to 0.01 hectares of land would be a negligible to the overall landscape character of the Driftway. The property adjustments would result in new driveways for residence, visually improving access and egress to affected properties along The Driftway.
Air quality	The increase in design life of the pavement would result in no change to the pavement surface boundary or the proposal footprint as to what has been assessed in the REF. The increase in the design life of the Driftway would have no additional impacts to air quality from what has been assessed in the REF.	The work would occur within the assessed proposal footprint. There would be no additional construction or operational impacts to air quality as to what has been assessed in the REF.	The impact to air quality resulting from the property adjustment works would be consistent with the impacts assessed in the REF. There would be no additional construction or operational impacts to air quality.
Socio-economic	The increase in design life of the pavement would result in no change to the pavement surface boundary or the proposal footprint as to what has been assessed in the REF. The additional 20 years to the design life of the road would reduce the need for future works and ultimately enhance community values. The increase in the design life of the Driftway would have positive socio-economic impacts.	The work would occur within the assessed proposal footprint. There would be no additional construction or operational socio-economic impacts as to what has been assessed in the REF.	The property access adjustments would have a minor positive impact, improving safety and accessibility for the residents located on the southern side of The Driftway, and users of the Waste Management Facility. Overall, there would be a minor positive socio-economic impact.

Environmental Factor	Design Change		
	Design life	**Revised batters**	**Property access adjustments**
Other impacts	The increase in the design life of the Driftway would not result in any other additional impacts to what has been assessed in the REF.	The work would occur within the assessed proposal footprint. There would be no additional construction or operational impacts as to what has been assessed in the REF.	The impact resulting from the property adjustment works would be consistent with the additional impacts assessed in the REF. There would be no additional construction or operational impact.
Cumulative impacts	The increase in the design life of the Driftway would not result in any additional cumulative impacts to what has been assessed in the REF.	The work would occur within the assessed proposal footprint. There would be no additional construction or operational cumulative impacts as to what has been assessed in the REF.	There would be no additional cumulative impact resulting from the property adjustments.

4.3 Contamination and waste classification assessment

A detailed site investigation and preliminary (in-situ) waste classification were undertaken during September and December 2021 by Jacobs within the proposal area. The objective of the assessment was to gather analytical data at previously identified potential areas of environmental concern (AEC) as detailed in the *Richmond Bridge Duplication Phase 1 Desktop Contamination Study for Option Assessment* (PSI) (AECOM, 2020) and in accordance with the *Sampling, Analysis and Quality Plan* (SAQP) (Jacobs, 2021).

The assessment identified potential exposure risks to construction workers from contamination (if any) in soils, sediment, surface water and ground gases (vapour). The assessment also provided preliminary in-situ waste classification data to support decisions relating to the fate and possible reuse of excavated material within the proposal area during construction. A summary of the methodology and the potential for impacts are provided below and the report is provided in Appendix B.

4.3.1 Methodology

The soil and vapour field investigation for the assessment were undertaken by Jacobs environmental scientists between 14 and 17 September 2021 and involved:

- Soil sampling and analysis from 27 sample locations (TP01 – TP18, TP20 - TP21, TPX1 – TPX3, HA01, HA02) along the northern verge of The Driftway targeting the AECs
- Monitoring of soil vapour probes from 13 locations (VP01, VP03, VP05, VP07, VP09, VP11, VP13 – VP19) along the northern verge of The Driftway and within the proposed ancillary area in the grounds of Western Sydney University.

Remobilisation on the 9 December 2021 occurred in the eastern portion of the proposal area for completion of additional soil, sediment and surface water sample collection and analysis for Per- and Polyfluoroalkyl Substances (PFAS). Sampling works involved:

- Sampling and analysis from seven soil / sediment locations (SS01 – SSO7) and seven surface locations (W01 to W07) in proximity to the Rickabys Creek tributaries and the drainage channel along the south-eastern boundary of the Hawkesbury City Waste Management Facility.

4.3.2 Assessment results

The results of the assessment are summarised below:

- Soil encountered at the investigation locations within the proposal area to a maximum depth of 0.85 meters below ground level (mbgl) consisted of fill and natural soils composing primarily of silty and sandy clays, silty and clayey sands, clayey silts and some gravel. Aesthetic issues (presence of erroneous waste, odorous materials and visual indications of potential contamination) including building material and fly-tipped household waste were observed at several sampling locations. Building material and fly-tipped waste was also observed sporadically across the surface of the proposal area
- Selected soil samples were analysed for a range of common contaminants including but not limited to heavy metals, PFAS, E. coli and faecal coliforms and asbestos
- Chrysotile and amosite asbestos was identified in five bonded fibre cement sheeting samples collected from the ground surface locations near the entrance

of the Hawkesbury Waste Management Facility. No asbestos was identified in any of the soil samples collected from the surface soils or within excavated materials submitted for laboratory asbestos identification other than previously stated. No potential ACM was observed in the materials excavated at the investigation locations

- Analytical results from soil samples collected from the test pit and hand auger locations were below the adopted site assessment criteria (SAC) for commercial/industrial land use, however, visual observations indicate a high potential for other surficial asbestos and / or soil contamination to exist within other areas of the proposal area not assessed
- Fill materials sampled are classified as Special Waste-Asbestos in accordance with NSW EPA (2014) Waste Classification Guidelines should off-site disposal to a legally licensed waste facility be required
- Two locations sampled (VP03 and VP11) exceeded the carbon dioxide (CO2) threshold for sub-surface monitoring criterion. Methane (CH4) levels were not detected and no to negligible flow rates were recorded at the soil vapour monitoring locations. The CO2 and CH4 concentrations recorded as part of the assessment are considered to represent a 'low risk' to 'very low risk' to the proposed construction activities
- It is not expected that groundwater will be encountered during the proposed bulk excavation works. Analytical results generally reported concentrations of heavy metals, pesticides/herbicides, nutrients and organics in groundwater below the adopted SAC (Environmental Earth Sciences 2018-2020). No additional groundwater investigation was completed by Jacobs as part of this assessment
- PFAS is present in concentrations below the adopted health investigation levels and recreational water quality guidelines values as stipulated in the PFAS NEMP (2020) assigned to soil, sediment and surface water.

4.3.3 Potential impacts

Construction

Construction activities would have the following potential impacts on soils and contamination:

- Potential to uncover confirmed Bonded ACM (fibre cement sheeting and fragments) found within the proposal area or other waste identified during the construction phase
- Based on the semi-quantitative soil vapour monitoring completed and assessment criteria applied, Jacobs considers there is a low and unlikely risk of shallow soil vapour (<1 m) impacting worker/human health given construction works are unlikely to involve confined space entry and are understood to be mainly civil works. It is important to note that the locations sampled by Golder Associates (2021) and Jacobs that display CH4 and CO2 exceedances are limited to the western and southern boundaries of the Hawkesbury City Waste Management Facility, a limited area compared to the overall proposal area
- Based on the proposed construction activities and channel realignment works, there is a low and unlikely human health risk to workers upon incidental exposure to soil, sediment and surface water containing PFAS
- If groundwater is encountered during excavations and / or installation of deep ground structures, such as footings and pilings, further assessment may be considered to determine durability impacts on construction materials (asphalt, steel and concrete) durability.

4.3.4 Additional safeguards and management measures

Additional safeguards and management measures for soil and contamination are presented in Table 4-3.

Table 4-3: Safeguards and management measures – Soil and contamination

Impact	Environmental safeguard	Responsibility	Timing	Reference
Contaminated land	In consideration of the confirmed Bonded ACM (fibre cement sheeting and fragments) found within the proposal area and the construction activities to be undertaken, an Asbestos Management Plan (AMP) inclusive of an 'unexpected finds' protocol within the CEMP to plan for and accommodate confirmed/potential ACM or other waste identified during the construction phase. To fully characterise the soil materials for off-site disposal and / or beneficial re-use within the proposal area, further chemical and asbestos characterisation should be undertaken in accordance with *AS4481.1-2005, NEPM* (2013), NSW EPA (2014) and the *Western Australia Department of Health Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia, 2009* (updated 2021).	Contractor	Pre-construction/ construction	Section 4.2 of QA G36 Environment Protection
Durability impacts to construction materials	If groundwater is encountered during excavations and / or installation of deep ground structures, such as footings and pilings, further assessment may be considered to determine durability impacts on construction materials (asphalt, steel and concrete) durability.	Contractor	Pre-construction/ construction	Additional safeguard

4.3.5 Environmental management

The REF for the New Richmond Bridge and traffic improvements – Stage 1 The Driftway identified the framework for environmental management, including safeguards and management measures that would be adopted to avoid or reduce environmental impacts (Section 7.2 of the REF). Should the proposal proceed, environmental management will be guided by the framework measures outlined below.

4.4 Environmental management plans (or system)

A number of safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

As detailed in Section 2.12, a CEMP will be prepared to describe safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by the Transport for NSW Environment Officer, Greater Sydney Project Office, prior to the commencement of any on-site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the QA Specification G36 – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan), QA Specification G40 – Clearing and Grubbing and QA Specification G10 – Traffic Management.

4.5 Summary of safeguards and management measures

The REF identified a range of environmental outcomes and management measures that would be required to avoid or reduce the environmental impacts.

After consideration of the issues raised in the public submissions, the safeguards and management measures for the proposal (refer to Chapter 7 of the REF) have not required any changes or revisions, however additional safeguards have been added. Should the proposal proceed, the environmental management measures in Table 4-4 would guide the subsequent phases of the proposal.

Additional environmental safeguards and management measures to those presented in the REF have been underlined.

Table 4-4: Summary of environmental safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
GEN1	General - minimise environmental impacts during construction	A CEMP will be prepared and submitted for review and endorsement of the Transport for NSW Environment Manager prior to commencement of the activity. As a minimum, the CEMP will address the following: • Any requirements associated with statutory approvals • Details of how the proposal will implement the identified safeguards outlined in the REF • Issue-specific environmental management plans • Roles and responsibilities • Communication requirements • Induction and training requirements • Procedures for monitoring and evaluating environmental performance, and for corrective action • Reporting requirements and record-keeping • Procedures for emergency and incident management • Procedures for audit and review. The endorsed CEMP will be implemented during the undertaking of the activity.	Contractor / Transport for NSW project manager	Pre-construction / detailed design	Section 3 of QA G36 Environment Protection
GEN2	General - notification	All businesses, residential properties and other key stakeholders (schools, local councils) affected by the activity will be notified at least five days prior to commencement of the activity.	Contractor / Transport for NSW project manager	Pre-construction	Section 3.7.2 of QA G36 Environment Protection

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
GEN3	General – environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings. Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include: • Threatened species habitat • Adjoining residential areas requiring particular noise management measures.	Contractor / Transport for NSW project manager	Pre-construction / detailed design	Section 3.5 of QA G36 Environment Protection
Biodiversity					
B1	Removal of vegetation	A Flora and Fauna Management Plan will be prepared in accordance with *Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011) and implemented as part of the CEMP. It will include, but not be limited to: • Pre-clearing survey • Unexpected find procedure • Inductions • Vegetation removal protocols • Exclusion zones.	Contractor	Detailed design/pre construction	Section 4.8 of QA G36 Environment Protection
B2	Removal of vegetation	Native vegetation will be re-established in accordance with *Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011)	Contractor	Post construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
B3	Removal of vegetation	Vegetation removal will be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock* of the *Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011)	Contractor	Construction	Additional safeguard
B4	Removal of threatened species habitat and habitat features	Habitat will be replaced or re-instated in accordance with *Guide 5: Re-use of woody debris and bush rock and Guide 8: Nest boxes of the Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011)	Contractor	Construction/Post construction	Additional safeguard
B5	Unexpected finds	The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011) if Threatened Ecological Communities (TECs), threatened flora and fauna not assessed in the biodiversity assessment, are identified in the construction footprint	Contractor	Construction	Additional safeguard
B6	Induction	All personnel working on site will receive training to ensure awareness of requirements of the Flora and Fauna Management Plan and relevant statutory responsibilities during inductions. Site specific training will be given to personnel when working in the vicinity of areas with identified biodiversity values that are to be protected	Contractor	Detailed design/Preconstruction	Additional safeguard
B7	Pre-clearance surveys	Pre-clearance surveys will be undertaken in accordance with *Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011)	Contractor	Preconstruction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
B8	Exclusion zones	Exclusion zones will be set up at the limit of clearing the edge of the impact area) in accordance with *Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011)	Contractor	Construction	Additional safeguard
B9	Aquatic habitat	Aquatic habitat will be protected in accordance with *Guide 10: Aquatic habitats and riparian zones of the Biodiversity Guidelines* (RTA, 2011) and Section 3.3.2 *Standard precautions and mitigation measures of the Policy and guidelines for fish habitat conservation and management Update 2013* (DPI (Fisheries NSW) 2013)	Contractor	Construction	Additional safeguard
B10	Fauna injury	Fauna will be managed in accordance with *Guide 9: Fauna handling of the Biodiversity Guidelines* (RTA, 2011)	Contractor	Construction	Additional safeguard
B11	Weed and pathogens	Any soil or other materials imported to the site for use in restoration or rehabilitation will be certified free from weeds and pathogens or obtained from sources that demonstrate best practice management to minimise weed and pathogen risks	Contractor	Construction	Additional safeguard
B12	Weed and pathogens	Pathogens will be managed in accordance with *Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011)	Contractor	Construction	Additional safeguard
B13	Weed and pathogens	Weed species will be managed in accordance with *Guide 6: Weed management of the Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects* (RTA, 2011)	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
Soil and water					
SW1	Soil erosion and water pollution	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction.	Contractor	Preconstruction	Section 2.1 of QA G38 Soil and Water Management
SW2	Erosion and sediment	A site-specific Erosion and Sediment Control Plan/s (ESCP) will be prepared and implemented as part of the Soil and Water Management Plan. The Plan will include arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.	Contractor	Preconstruction	Section 2.2 of QA G38 Soil and Water Management
SW3	Contaminants entering receiving environments during construction	Control measures to minimise the risk of water pollution will be included in the ESCP. The following measures will be included to limit sediment and other contaminants entering receiving waterways: • No stockpiles of materials or storage of fuels or chemicals will be located adjacent to the existing culverts • Vehicles and machinery will be properly maintained to minimise the risk of fuel/oil leaks • Routine inspections of all construction vehicles and equipment will be undertaken for evidence of fuel/oil leaks. All fuels, chemicals and hazardous liquids will be stored within an impervious bunded area in accordance with Australian standards and NSW EPA Guidelines • All water discharges will be undertaken in accordance with Transport for NSW's *Water Discharge and Re-use Guideline*	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Emergency spill kits will be kept on-site at all times. All staff will be made aware of the location of the spill kit and be trained in its use • Construction plant, vehicles and equipment will be refuelled offsite, or in designated re-fuelling areas located at a minimum distance of 50 metres from drainage lines or waterways • Groundwater encountered during the construction of the proposal will be managed in accordance with the requirements of the *Waste Classification Guidelines* (DECCW 2009) and Transport for NSW's *Water Discharge and Re-use Guideline* • Stabilised surfaces will be reinstated as quickly as practicable after construction • Material transport from site to surrounding pavement surfaces will be minimised Soil and water management measures will be identified in consultation with relevant government agencies and Councils and will be consistent with the principles and practices detailed in *Managing Urban Stormwater: Soils and Construction* (2004) (known as the Blue Book).			

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
SW4	Flood management during construction	A Flood Management Plan will be prepared before construction. This plan will include: • Review and coordination with existing local flood plans and evacuation procedures • Flood emergency preparation, response, and recovery measures which will be implemented during construction • Procedure for daily review of the Bureau of Meteorology website • Site protection measures to be implemented before and in the event of flooding.	Contractor	Preconstruction/Construction	Additional safeguard
SW5	Increase the depth and duration of inundation on private properties	• During detailed design undertake floor level survey on private properties • Improved drainage design to avoid impacts to private properties in accordance with criteria identified in Appendix D.	Design and construction contractor	Preconstruction	Additional safeguard
Traffic and transport					
TT1	Traffic and transport	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Transport for NSW *Traffic Control at Work Sites Manual* (RTA, 2010) and *QA Specification G10 Control of Traffic* (Transport for NSW, 2008). The TMP will include: • Confirmation of haulage routes • Measures to maintain access to local roads and properties • Site specific traffic control measures (including signage) to manage and regulate traffic movement • Measures to maintain pedestrian and cyclist access • Requirements and methods to consult and inform the local community of impacts on the local road network	Contractor	Detailed design / Pre-construction	Section 4.8 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads. • A response plan for any construction traffic incident • Consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic monitoring, review and amendment mechanisms.			
TT2	Property access during construction	Access to properties will be maintained during construction. Where that is not feasible, temporary alternative access arrangements will be provided following consultation with affected landowners and the relevant local road authority. Any disruptions to property access and traffic will be notified to landowners at least seven days prior in accordance with the relevant community consultation processes outlined in the TMP.	Transport for NSW/Contractor	Construction	Additional safeguard
TT3	Reduce speeds, traffic delays and disruptions during construction	Road users and local communities will be provided with timely, accurate, relevant and accessible information about changed traffic arrangements and delays owing to construction activities	Transport for NSW/Contractor	Construction	Additional safeguard
TT4		Construction site traffic will be managed to minimise movements during peak periods	Transport for NSW/Contractor	Construction	Additional safeguard
TT5		Clear signage will be provided to direct and guide vehicles not related to the proposal during road construction work. This will be supplemented by variable message signs to advise drivers of traffic diversions, speed restrictions or alternative routes	Transport for NSW/Contractor	Construction	Additional safeguard
TT6	Impacts to the regional road network	If disruptive work is required (lane closures) would be carried out at night where practicable, to minimise potential impacts on the regional road network	Transport for NSW/Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
TT7	Parking	Parking will be provided on-site (ancillary site) and not on surrounding local streets	Transport for NSW/Contractor	Construction	Additional safeguard
TT8	Site access and egress	All vehicles will enter and exit construction sites in a forward direction, where feasible and reasonable	Transport for NSW/Contractor	Construction	Additional safeguard
Noise and vibration					
NV1	Noise and vibration	A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the Interim *Construction Noise Guideline* (ICNG) (DECC, 2009) and identify: • Identification of nearby sensitive receivers • Description of work, construction equipment and the hours work would be completed in • Criteria and mitigation measures for the proposal • Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures • Details of how respite would be applied where ongoing high impacts are seen at certain receivers.	Contactor	Detailed design/Pre-construction/Construction	Section 4.6 of QA G36 Environment Protection
NV2	Noise and vibration	All sensitive receivers (schools, local residents) likely to be affected will be notified at least seven days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of: • The project • The construction period and construction hours • Contact information for project management staff • Complaint and incident reporting • How to obtain further information.	Contactor	Detailed design / pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
NV3	Noise and vibration	Location and activity specific noise and vibration impact assessments should be carried out prior to (as a minimum) activities: • With the potential to result in noise levels above 75 dBA at any receiver • Required outside Standard Construction Hours likely to result in noise levels greater than relevant NMLs • With the potential to exceed relevant criteria for vibration. The assessments should confirm the predicted impacts at the relevant receivers in the vicinity of the activities to aid the selection of appropriate management measures, consistent with the requirements of the CNVG.	Transport for NSW	Pre-construction	Additional safeguard
NV4	Noise exceedances	Where noise intensive equipment is to be used near sensitive receivers, the work should be scheduled for Standard Construction Hours, where possible. If it is not possible to restrict the work to the daytime, then they should be completed as early as possible in each work shift. Appropriate respite should also be provided to affected receivers in accordance with the CNVG and/or the proposal's conditions of approval.	Contractor	Construction	Additional safeguard
NV5	Ancillary sites	Hoarding, or other shielding structures, should be used where receivers are impacted near compounds or fixed work areas with long durations. To provide effective noise mitigation, the barriers should break line-of-sight from the nearest receivers to the work and be of solid construction with minimal gaps.	Contractor	Construction	Additional safeguard
NV6	Noise and vibration monitoring	Monitoring should be carried out at the start of noise and/or vibration intensive activities to confirm that actual levels are consistent with the predictions and that appropriate mitigation measures from the CNVG have been implemented.	Transport for NSW	Pre-construction/ Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
NV7	Vibration	Where work is within the minimum working distances and considered likely to exceed the cosmetic damage criteria: • Different construction methods with lower source vibration levels should be investigated and implemented, where feasible • Attended vibration measurements should be undertaken at the start of the work to determine actual vibration levels at the item. Work should be ceased if the monitoring indicates vibration levels are likely to, or do, exceed the relevant criteria.	Contractor	Pre-construction	Additional safeguard
NV8	Building condition surveys	Building condition surveys should be completed before and after the work where buildings or structures are within the minimum working distances and considered likely to exceed the cosmetic damage criteria during the use of vibration intensive equipment.	Transport for NSW/Contractor	Pre-construction/Post-construction	Additional safeguard
Contamination					
C1	Soil	Management of impact to soils will be implemented as part of the CEMP. The CEMP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction.	Contractor	Detailed design /Preconstruction	Section 2.1 of QA G38 Soil and Water Management
C2	Soil	A site-specific Erosion and Sediment Control Plan/s will be prepared and implemented as part of the CEMP. The Plan will include arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.	Contractor	Detailed design / Preconstruction	Section 2.2 of QA G38 Soil and Water Management

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
C3	Contaminated land	A Contaminated Land Management Plan (CLMP) would be prepared in accordance with the *Guideline for the Management of Contamination* (Transport for NSW, 2013) and implemented as part of the CEMP. The plan will include, but not be limited to: • Capture and management of any surface runoff contaminated by exposure to the contaminated land • Further investigations required to determine the extent, concentration and type of contamination, as identified in the detailed site investigation (Phase 2) • Management of the remediation and subsequent validation of the contaminated land, including any certification required • Measures to ensure the safety of site personnel and local communities during construction.	Contractor	Detailed design / Preconstruction	Section 4.2 of QA G36 Environment Protection
C4	Contaminated land	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Transport for NSW Environment Manager and/or EPA.	Contractor	Detailed design / Preconstruction	Section 4.2 of QA G36 Environment Protection
C5	Accidental spill	A site-specific emergency spill plan will be developed and include spill management measures in accordance with the Transport for NSW Code of Practice for Water Management (RTA, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Transport for NSW and EPA officers).	Contractor	Detailed design/Preconstruction	Section 4.3 of QA G36 Environment Protection

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
C6	Contaminated land	In consideration of the confirmed Bonded ACM (fibre cement sheeting and fragments) found within the proposal area and the construction activities to be undertaken, an Asbestos Management Plan (AMP) should be implemented inclusive of an 'unexpected finds' protocol within a CEMP to plan for and accommodate confirmed/potential ACM or other waste identified during the construction phase. To fully characterise the soil materials for off-site disposal and / or beneficial re-use within the proposal area, further chemical and asbestos characterisation should be undertaken in accordance with *AS4481.1-2005*, *NEPM* (2013), NSW EPA (2014) and the *Western Australia Department of Health Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia, 2009* (updated 2021)	Contractor	Pre-construction/ construction	Section 4.2 of QA *G36 Environment Protection*
C7	Durability impacts to construction materials	If groundwater is encountered during excavations and / or installation of deep ground structures, such as footings and pilings, further assessment may be considered to determine durability impacts on construction materials (asphalt, steel and concrete) durability.	Contractor	Pre-construction/ construction	Additional safeguard
Aboriginal heritage					
AH2	Aboriginal heritage unexpected finds	*The Standard Management Procedure - Unexpected Heritage Items* (Transport for NSW, 2015) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Transport for NSW does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the Procedure) is not in place. Work will only re-commence once the requirements of that Procedure have been satisfied.	Contactor	Detailed design/Pre-construction	Section 4.9 of QA G36 Environment Protection

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
Non-Aboriginal heritage					
NAH1	Non-Aboriginal heritage unexpected finds	*The Standard Management Procedure - Unexpected Heritage Items* (Transport for NSW, 2015) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. Work will only re-commence once the requirements of that Procedure have been satisfied.	Contactor	Detailed design/Pre-construction	Section 4.10 of QA G36 Environment Protection
Landscape character and visual impacts					
LV1	Landscape character and visual impact	The landscape and concept design strategies *New Richmond Bridge - Stage 1 The Driftway Urban Design, Landscape Character and Visual Impact Assessment* prepared by Tract (2021) will form the basis of future landscape and detailed design development, providing integrated urban design and practical detail on the application of design principles and objectives identified in the environmental assessment. The Plan will include design treatments for: • Location and identification of existing vegetation and proposed landscaped areas, including species to be used • Built elements including retaining walls, bridges and noise walls • Pedestrian and cyclist elements including footpath location, paving types and pedestrian crossings • Fixtures such as lighting, fencing and signs • Details of the staging of landscape works taking account of related environmental controls such as erosion and sedimentation controls and drainage • Procedures for monitoring and maintaining landscaped or rehabilitated areas.	Contractor	Detailed design/Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
LV2	Removal of vegetation	• Avoid impact to prominent trees and vegetation communities where possible • Protect threatened species and retained habitat wherever possible • Minimise clearance extent where possible and mark exclusion zones.	Contractor	Preconstruction/Construction	Additional safeguard
LV3	Removal of vegetation	• Revegetation using local provenance material and match community and landscape character. Revegetation efforts should be implemented progressively to limit erosion and sedimentation • Provide screen planting within corridor to limit visibility to the landfill.	Contractor	Construction/Operation	Additional safeguard
LV4	Visual impact of work sites	• Project work sites, including construction areas and supporting facilities (such as storage compounds and offices) will be managed to minimise visual impacts, including appropriate fencing or screening (use of shade cloth), storage of equipment, parking, stockpile screening and arrangements for the storage and removal of rubbish and waste materials • Compound and ancillary facilities will be decommissioned, and the sites rehabilitated to their existing condition or as otherwise agreed with the landowner as soon as possible.	Contractor	Construction	Additional safeguard
LV5	Earthworks	• Integrate with adjoining landform through adoption of appropriate grades, avoiding sharp transition in profile where possible • Stabilise/revegetate as works progress to limit erosion and visual impacts through early integration with surrounding vegetation.	Construction	Detailed design/Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
Air quality					
AQ1	Air quality impacts during construction	An Air Quality Management Plan (AQMP) will be prepared and implemented as part of the CEMP. The AQMP will include, but not be limited to: • Potential sources of air pollution • Air quality management objectives consistent with any relevant published EPA and/or DPIE (formerly OEH) guidelines • Methods to manage works during strong winds or other adverse weather conditions • A progressive rehabilitation strategy for exposed surfaces • An assessment and responsibility delegation of the management of air quality suppression and management measures • A monitoring program to record whether the air quality mitigation, suppression and management measures have been applied and their effectiveness.	Contractor	Detailed design/Pre-construction	Section 4.4 of QA G36 Environment Protection
AQ2	Dust emissions during construction	Site planning and work practices: • Minimise the extent of disturbed and exposed areas and revegetate finished areas as soon as possible • Minimise the drop heights of materials • Review and, where necessary, modify or suspend activities during dry and windy weather and background air quality conditions • Cover or otherwise regularly stabilise (with water sprays or binders) stockpiles especially prior to any site shutdown periods • Regularly water haul routes and ensure that all loads are covered • Regularly inspect and remove debris from plant and equipment to avoid the tracking of materials on to the adjacent road network • To the extent practical, position ancillary sites and stockpiles away from nearby sensitive receivers.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
AQ3	Exhaust emissions from plant and equipment used during construction	Plant and equipment: • Inspect all plant and equipment before it is used on-site • Ensure all vehicles, plant, and equipment operate in a proper and efficient manner • Switch off all vehicles, plant and equipment when not in-use • Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	Contractor	Construction	Additional safeguard
AQ4	Odours and airborne hazardous substances from uncovered contaminated materials	Odour and airborne hazards: • Apply odour supressing agents to materials as necessary to minimise related impacts should any contaminated or hazardous materials be uncovered during the works • Adhere to relevant requirements for removal and disposal listed in the *Work Health and Safety Act 2011*, and *Work Health and Safety Regulation 2017*.	Contractor	Construction	Additional safeguard
Socio-economic					
SE1	Socio-economic	A Communication Plan (CP) will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP will include (as a minimum): • Mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions • Contact name and number for complaints. • How the community enquiry/complaint phone number will be managed The CP will be prepared in accordance with the *Community Involvement and Communications Resource Manual* (RTA, 2008).	Contactor	Detailed design/Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
SE2	Partial property acquisition and lease	All partial acquisitions and associated property adjustments will be carried out in accordance with the requirements of the *Land Acquisition (Just Terms Compensation) Act 1991* and Land acquisition Reform 2016 in consultation with landowners.	Transport for NSW	Pre-construction	Additional safeguard
Waste					
W1	Waste	A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to: • Measures to avoid and minimise waste associated with the project • Classification of wastes and management options (re-use, recycle, stockpile, disposal) • Statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • Procedures for storage, transport and disposal • monitoring, record keeping and reporting. The WMP will be prepared taking into account the *Environmental Procedure - Management of Wastes* on Transport for NSW Land (Transport for NSW, 2014) and relevant Transport for NSW Waste Fact Sheets.	Contactor	Detailed design/Pre-construction	Section 4.2 of QA G36 Environment Protection
Utilities					
U1	Utilities	Prior to the commencement of works: • The location of existing utilities and relocation details will be confirmed following consultation with the affected utility owners • If the scope or location of proposed utility relocation works falls outside of the assessed proposal scope and footprint, further assessment will be undertaken.	Contactor	Detailed design/Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
Hazards and risk management					
HZ1	Hazards	A Hazard and Risk Management Plan (HRMP) will be prepared and implemented as part of the CEMP. The HRMP will include, but not be limited to: • Details of hazards and risks associated with the activity • Measures to be implemented during construction to minimise these risks • Record keeping arrangements, including information on the materials present on the site, material safety data sheets, and personnel trained and authorised to use such materials • A monitoring program to assess performance in managing the identified risks Contingency measures to be implemented in the event of unexpected hazards or risks arising, including emergency situations. The HRMP will be prepared in accordance with relevant guidelines and standards, including relevant Safe Work Australia Codes of Practice, and EPA or Office of Environment and Heritage publications.	Contactor	Detailed design/Pre-construction	Additional safeguard

4.6 Licensing and approvals

The following legislation applies to the proposal and will necessitate approval, consultation and notification prior to the start of the activity.

Table 4-5: Summary of licensing and approvals required

Instrument	Requirement	Timing
Land Acquisition (Just Terms Compensation) Act 1991	The acquisition of land will be required to carry out the proposal and shall be undertaken in accordance with the Land Acquisition (Just Terms Compensation) Act 1991.	At least 90 days prior to acquisition, unless cl 13(2)(a) or (b) or 13(3) apply
Asbestos removal licence (Class B) SafeWork NSW	There is the potential to uncover confirmed Bonded ACM or other waste within the proposal area during construction. A Class B licence is required for removal of more than ten square metres of non-friable asbestos or ACM and asbestos contaminated dust (ACD) associated with the removal of non-friable asbestos or ACM.	Pre construction

5 References

AECOM (2020) *Richmond Bridge Duplication and Traffic Improvements - Options Assessment Report*

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Austroads (2009) *Austroads Road Safety Audit Manual*

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Department of Environment and Climate Change (DECC) (2008) *Soils and Construction – Managing Urban Stormwater Volume 2D – Main Roads*

Kelleher Nightingale Consulting Pty Ltd (KNC) (2019) *Richmond Bridge Duplication and Traffic Improvements –Options Assessment: Aboriginal Archaeological Survey Report-Stage 2 PACHCI*

Kelleher Nightingale Consulting Pty Ltd (KNC) (2020) *The Driftway Proposed Geotechnical Investigations Plan – Detailed Design Stage Assessment of Impact on Aboriginal Cultural Heritage*

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Landcom (2004) *Soils and Construction – Managing Urban Stormwater Volume 1*

RMS (2016) *Transports Guideline for Biodiversity Offsets*

Phillips M (2019) *Richmond Bridge (Hawkesbury River Bridge) Duplication and Traffic Improvements Heritage Impact Strategy*

Roads and Maritime (2014) *Beyond the Pavement – Urban Design Policy, Procedures and Design Principles*

Roads and Maritime Services (RMS) (2016) *Construction Noise and Vibration Guideline*

Roads and Traffic Authority (RTA) (2008) *Soils and Construction – Managing Urban Stormwater Transport - RTA Procedure PN 143P Erosion and Sedimentation Management Procedure*

RTA (2011) *Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects*

RTA (2011) *Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects*

Standards Australia (2009) *Councils Street and Park Tree Management plan, AS 4970-2009 Protection of trees on development sites and industry standards*

Transport for NSW (2018) *Future Transport Strategy 2056.* Future Transport Strategy | Future Transport (nsw.gov.au)

Transport for NSW (2020) *Soils and Construction – Managing Urban Stormwater Transport for NSW QA Specification G38*

Appendix A Design plans

Appendix B Contamination and waste classification assessment report