



NEW RICHMOND BRIDGE AND TRAFFIC IMPROVEMENTS - STAGE 2

RICHMOND AND NORTH RICHMOND, NSW

Urban design report including landscape
character and visual impact assessment

SD 24523

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scape DESIGN

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Cover page image

Richmond Bridge

Acknowledgement of Country

SCAPE Design acknowledge and respect Aboriginal and Torres Strait Islander Peoples across Australia as the Traditional Custodians of our lands, waters and skies.

We recognise their unique ability to care for Country and their deep spiritual connection with Country.

We honour Elders past, present and emerging, whose knowledge and wisdom would ensure the continuation of Aboriginal and Torres Strait Islander cultures, and the values which uphold them.

Existing site trees

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Abbreviations

Acronym	Description
AEP	Annual Exceedance Probability
BC Act	Biodiversity Conservation Act 2016
BFPV	Bush fire prone vegetation
C	Celsius
CBD	Central Business District
CCTV	Closed-circuit television
CPTED	Crime Prevention through Environmental Design
DPI	Department of Primary Industries
EP&A	Environmental Planning and Assessment Act 1998
ICOMOS	Australia International Council on Monuments and Sites
km	Kilometres
L	Litres
LCVIA	Landscape character and visual impact assessment
LCZ	Landscape character zone
LEP	Local Environmental Plan
LGA	Local Government Area
m	Metres
mm	Millimetres
NSW	New South Wales
PCT	Plant Community Types
RAAF	Royal Australian Air Force
REF	Review of Environmental Factors
NSW RFS	New South Wales Rural Fire Service
SHR	State Heritage Register
SUP	Shared user path
The Burra Charter	Charter for Conservation of Places of Cultural Significance 2013
Transport	Transport for NSW (formerly Roads and Maritime)
UHI	Urban Heat Island
WSUD	Water Sensitive Urban Design

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1 Introduction

1.1 Proposal identification

Transport for NSW (Transport) proposes to upgrade Bells Line of Road / Kurrajong Road between Crooked Lane, North Richmond and Old Kurrajong Road, Richmond and construct a new bypass south of Richmond town centre. This is known as New Richmond Bridge and traffic improvements – Stage 2 (the proposal). The new route between Richmond and North Richmond would provide a minimum five per cent annual exceedance probability (AEP) flood resilience (equivalent to the 1 in 20 chance per year flood event). The proposal is about 50 kilometres (km) north-west of the Sydney Central Business District (CBD) and about 33km north-west of Parramatta. It is in the Hawkesbury City Council local government area (LGA).

The proposal would be delivered in two stages, known as Stage 2A and Stage 2B. Should this REF be determined, and the already committed funding by the Australian Government and NSW Government released, Stage 2A would be constructed. This is expected to be complete by 2029. The timing of Stage 2B would be subject to available funding and Transport will continue to seek funding in upcoming State and Federal budgets to deliver the rest of the upgrades.

Stage 2A of the proposal includes a new four-lane bridge over the Hawkesbury River about 30 metres downstream of the existing Richmond Bridge, widening of Bells Line of Road through North Richmond to provide two lanes in each direction between the new bridge and the Terrace Road / Grose Vale Road intersection and a new bypass to the south of the Richmond town centre. The bypass would extend about 1.7 kilometres across the floodplain between the Kurrajong Road / Old Kurrajong Road intersection and Castlereagh Road / Inalls Lane / Southee Road intersection. Stage 2A of the proposal would also provide an active transport corridor between North Richmond and Richmond. This would include a new shared path on the southern side of Kurrajong Road between Old Kurrajong Road and Chapel Street and the conversion of the existing Richmond Bridge into an active transport connection across the Hawkesbury River.

Stage 2B of the proposal includes widening of Bells Line of Road between the Terrace Road / Grose Vale Road intersection and west of Charles Street and at its intersection with Crooked Lane. The bypass would also be extended 1.3 kilometres east from Castlereagh Road to Londonderry Road and would be a new road alignment to the south of Southee Road. Southee Road would connect to the bypass opposite Valder Place. The Londonderry Road / bypass / Vines Drive intersection would also be upgraded.

1.2 Proposal background

Richmond Bridge is currently operating at capacity during peak periods and future traffic demand in the

area will increase, driven by residential development west of the Hawkesbury River and background traffic growth. This is expected to further increase congestion and travel times along this arterial corridor.

Richmond Bridge is closed in moderate flood events when flood levels reach about eight metres Australian Height Datum (AHD), which is at about the 50 percent AEP flood level. Since 2020, Richmond Bridge has closed multiple times due to flooding. The closure of this bridge results in disruption to travel between North Richmond and Richmond and disrupts regional traffic using the Bells Line of Road corridor.

The Australian Government and NSW Government are funding traffic improvements between North Richmond and Richmond including a new bridge over the Hawkesbury River. This initiative is part of a wider program of traffic improvements between North Richmond and Richmond which includes previous intersection improvements at three key intersections on the approach to the existing Richmond Bridge, including Bells Line of Road / Gross Vale Road intersection in North Richmond as well as Kurrajong Road / Old Kurrajong Road intersection and March Street / Bosworth Street intersection in Richmond. The proposal builds on the previous intersection improvements and is being carried out as part of a wider program of traffic improvements between Richmond and North Richmond which is being delivered in two stages (Stage 1 and Stage 2). They are:

- Stage 1 involves upgrading The Driftway between Londonderry Road and Blacktown Road to improve safety and flood resilience. This project has been separately determined by Transport and is being delivered separately to the proposal.
- Stage 2 is the proposal and it aims to improve traffic efficiency, flood resilience, active transport connections and safety of the road network between Richmond and North Richmond.

1.3 Proposal overview

The key features of Stage 2A of the proposal would include:

- A new four-lane bridge over the Hawkesbury River (about 360 metres long) about 30 metres downstream of the existing bridge, with two eastbound and two westbound lanes and the road level at a height to provide a five per cent AEP flood immunity
- Widening of Bells Line of Road and Kurrajong Road to two lanes in each direction from the Terrace Road / Grose Vale Road intersection in North Richmond to just east of the Kurrajong Road / Old Kurrajong Road intersection in Richmond
- A new two-lane bypass south of Richmond town centre (one lane in each direction) between the Kurrajong Road / Old Kurrajong Road intersection and just east of the Castlereagh Road / Inalls Lane /

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Southee Road intersection, including:

- A three-way signalised intersection connecting Kurrajong Road and the new bypass, including closure of the existing northern and southern legs of Old Kurrajong Road at Kurrajong Road
 - A two-way gated emergency driveway access connecting the northern leg of Old Kurrajong Road and Kurrajong Road, to be opened during flood evacuation events
 - A 150-metre-long bridge over a tributary to Mareh-Mareh Lagoon (near Inalls Lane)
 - A 120-metre-long bridge over the floodplain parallel to Inalls Lane
 - A roundabout at the Castlereagh Road / Inalls Lane / bypass intersection, with a local road connection to Southee Road
 - Local road connections to Yarramundi Lane and Victoria Place from the bypass
 - Truncation of Inalls Lane near Mareh-Mareh Lagoon, with local road connections to Inalls Lane from the bypass via Yarramundi Lane and near Drift Road
 - Closure of the existing Drift Road intersection with Inalls Lane, with a new local road connection to Drift Road from the bypass
 - Footpaths along the southern side of the of the bypass between Drift Road and Castlereagh Road and on each side of the roundabout
- An upgraded active transport network between Richmond and North Richmond, including:
 - A new shared path along the southern side of Kurrajong Road between the existing Richmond Bridge and Chapel Street, Richmond, a distance of about two kilometres, connecting to existing paths along March Street, Richmond
 - Conversion of the existing Richmond Bridge and approaches into an active transport only connection
 - Active transport connections from the existing Richmond Bridge through Hanna Park to an upgraded shared path on the northern side of Bells Line of Road until east of the Bells Line of Road / Terrace Road / Grose Vale Road intersection
 - Retention of bus stops along Bells Line of Road and Kurrajong Road
 - New drainage infrastructure, including swales and water quality basins
 - Utilities connections and upgrades (including electrical, gas, water and telecommunications)
 - New intelligent transport systems including closed-circuit television (CCTV) cameras to monitor traffic flow and assist with emergency management
 - New maintenance access to the three new bridge structures
 - Permanent retaining walls near the approach to the new four-lane bridge in North Richmond and along Kurrajong Road near the new shared path
 - Driveway adjustments and tie-ins, including along Bells Line of Road, Beaumont Avenue, Kurrajong Road, Old Kurrajong Road, Inalls Lane, Drift Road and Castlereagh Road
 - Eight new parking spaces on the northern side of Beaumont Avenue, near its intersection with Terrace Road to replace parking spaces removed on Bells Line of Road
 - Finishing works, including kerb and gutters, signs, landscaping, lighting and line marking
 - Construction activities, including:
 - Early work, including the establishment of a new compliant handrail on the existing Richmond Bridge
 - Geotechnical, contamination and utility investigations which may be carried out as early work
 - A temporary roundabout at the Kurrajong Road / Chapel Street intersection
 - Civil earthworks, bridge structural works, retaining walls, drainage work, utilities relocations and tie-in work and adjustments to adjoining sections of road
 - Establishment of temporary ancillary facilities to support construction, including compound sites, site offices, stockpile and laydown locations, temporary access tracks and water quality devices
 - Demolition work for structures and property features that fall in the proposal area.

The key features of Stage 2B of the proposal would include:

- Localised widening of Bells Line of Road to provide a dedicated right-turn lane into Crooked Lane
- Widening of Bells Line of Road to two lanes in each direction from west of Charles Street to the Terrace Road / Grose Vale Road intersection in North Richmond
- Additional capacity improvements to the Bells Line of Road / Terrace Road / Grose Vale Road intersection, including an additional eastbound through lane at the intersection
- An upgraded shared path on the northern side of Bells Line of Road from west of Charles Street to the Terrace Road / Grose Vale Road intersection in North Richmond
- Extension of the bypass (one lane in each direction) between the Castlereagh Road roundabout and just south of the Londonderry Road / Southee Road intersection, including:
 - A new signalised intersection at the junction of Londonderry Road, the new bypass and Vines Drive
 - Closure of the Southee Road local road connection from Castlereagh Road and closure of Southee Road at Londonderry Road
 - A new local road connection to Southee Road opposite Valder Place, with left and right turn

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- lanes provided at this intersection.
- Two new bus stops along the bypass near Hill Avenue (one eastbound and one westbound), with a footpath connection to Southee Road
- Retention of bus stops along Bells Line of Road and Londonderry Road
- New drainage infrastructure, including swales and a water quality basin on Londonderry Road
- Noise screening mounds, walls and/or additional attenuation between the bypass and Southee Road along the extended section of the bypass between Castlereagh Road and Londonderry Road
- Utilities connections and upgrades (including electrical, gas, water and telecommunications)
- New intelligent transport systems at the Londonderry Road / bypass / Vines Drive intersection including closed-circuit television (CCTV) cameras to monitor traffic flow and assist with emergency management
- Driveway adjustments and tie-ins, including along Bells Line of Road, the bypass and Londonderry Road
- Finishing works, including kerb and gutters, signs, landscaping, lighting and line marking
- Construction activities, including:
 - Geotechnical, contamination and utility investigations which may be carried out as early work
 - Civil earthworks, retaining walls, drainage work, utilities relocations and tie-in work and adjustments to adjoining sections of road
 - Establishment of temporary ancillary facilities to support construction, including compound sites, site offices, stockpile and laydown locations, temporary access tracks and water quality devices
 - Demolition work for structures and property features that fall in the proposal area.

An overview of the proposal (Stage 2A and 2B) is provided in [Figure 1-1](#).

1.4 Purpose and scope of this report

Staging for this report

For the purpose of this report, the proposal is reviewed in landscape and urban design terms as the whole Stage 2 works (Stage 2A + Stage 2B), for all overview chapters (refer to Sections 1-6 and 8-9). Where applicable within each of these chapters, there are clarifications regarding staging. Exceptions to the above are:

1. For the Urban Design Concept chapter (refer to

Section 4), the extracts of the urban design concept drawings are attached as separate packages for each of Stage 2A and Stage 2B works.

2. For the Visual Impact Assessment chapter (Section 7), the viewpoints are assessed for Stage 2 as a whole, but the two viewpoints which are only related to the Stage 2B extent of works are noted specifically.

Purpose of this report

This report presents New Richmond Bridge Stage 2 proposal (Stage 2A + Stage 2B). The purpose of the report is to review and analyse the existing environment which helps to inform key design principles that form the basis of the urban design concept, these are then reviewed in landscape and visual impact terms for the proposal to determine specific mitigation measures that would help to minimise these impacts.

This report is based on the following key processes:

- Analysis of the existing environment which considers the wider and local context of the proposal through a range of physical, environment and urban factors including land use, land form and drainage, biodiversity, access and circulation, heritage, climate and bushfire prone land
- Formulation of a series of principles and objectives as an urban design strategy, formulated in response to the *Beyond the Pavement* (Transport) guidelines
- Development and illustration of the urban design concept, with a background discussion of design elements, precedents and design opportunities for further development at the detailed design stage
- Review of the landscape character and visual impacts of the proposal
- Preparation of a strategy to mitigate these impacts.

The report methodology and structure is explained in more detail in [on page 6](#).

The urban design strategy, whilst centered on the main engineering elements of the proposal, provides an unique opportunity for urban design improvements to the landscape and visual amenity of the proposal area.

Refer to [Section 3 on page 7](#) and [Section 4 on page 26](#) for detailed discussions.

This report is intended to inform the audience of the Review of Environmental Factors (REF) for the proposal of the potential landscape character and visual impacts, in accordance with the relevant environmental assessment requirements of Division 5.1 of the Environmental Planning and Assessment Act (EP&A Act) for the REF.

Refer to [Section 8 on page 122](#) of this report for a detailed description of the landscape character zone (LCZ) assessment and [Section 7 on page 90](#) for a detailed description of the visual impact assessment.

1 Introduction

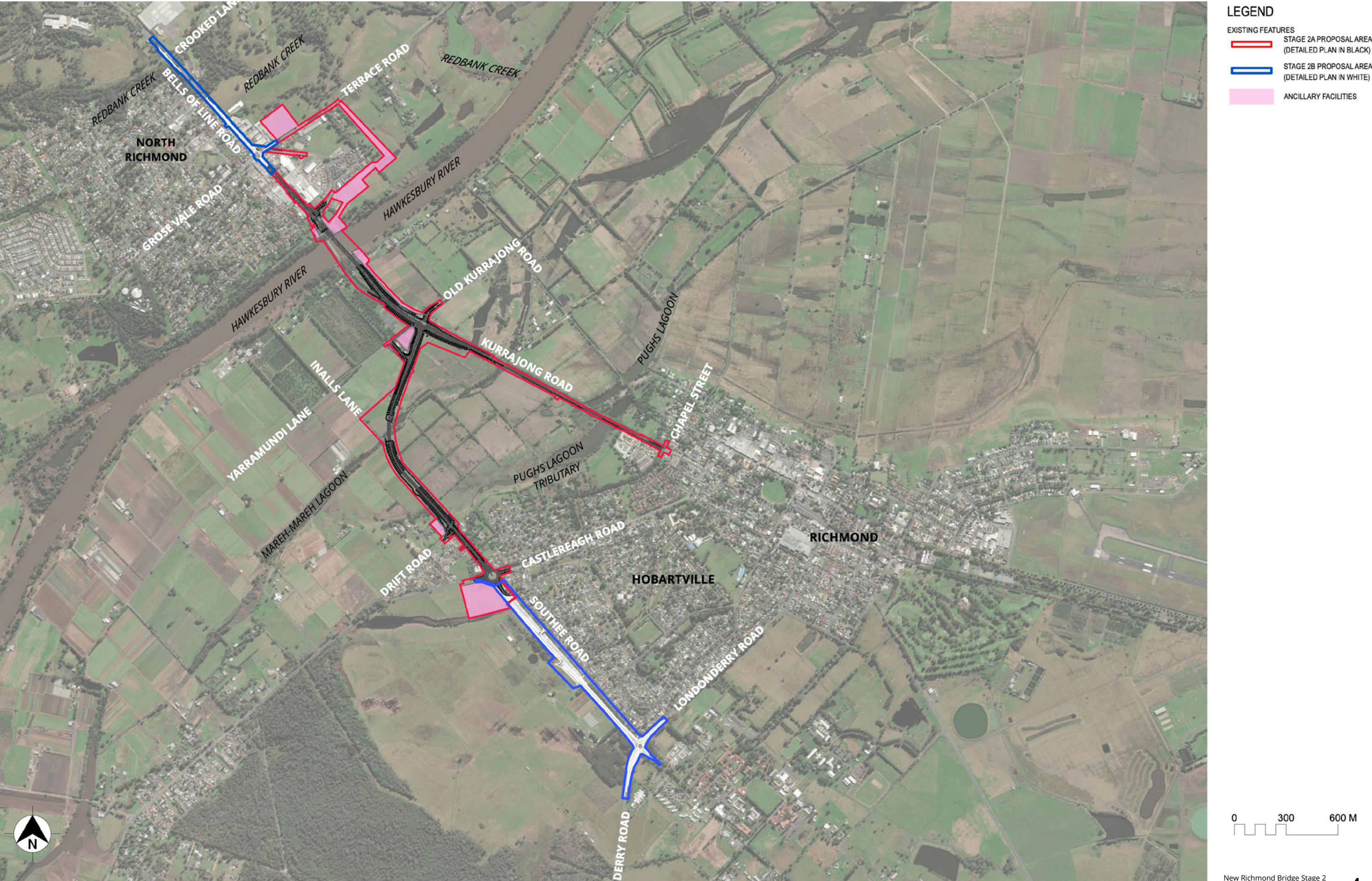


Figure 1-1: Staging of works

1 Introduction

1.5 Study area

Figure 1-2 illustrates the locality of the proposal area, including watercourses and lagoons. The area shown in all Figures in this report is referred to as the 'Proposal Area' and encompasses the area for both Stage 2A and Stage 2B extent of works. For larger scale Figures relating to more detailed urban design review, the relative delineation of these stages is illustrated.

The proposal area includes the Hawkesbury River, adjoining parks and the existing heritage Richmond Bridge. The main suburbs are North Richmond, Richmond and Hobartville. The northern portion of the proposal area runs from North Richmond over the Hawkesbury River towards Richmond. The southern portion runs along the southern border of the residential suburb of Hobartville.

The Hawkesbury River joins the Nepean River to the north west of the study area. The Hawkesbury River is the major watercourse running through the northern section of the proposal area, over which the existing Richmond Bridge is located. Pughs Lagoon and Mareh-Mareh Lagoon also intersect the proposal area. Agnes Banks Nature Reserve is located to the south west of the study area and Castlereagh Nature Reserve is to the south.

Two commercial activity hub locations are present within or adjoining the proposal area:

- North Richmond
- Richmond.

The North Richmond end of the study area is comprised largely of commercial and industrial properties, including Westrock, with residential properties set further back from the Bells Line of Road. The central portion of the proposal area, is largely rural in character with larger lots and adjoining commercial private properties such as soccer clubs. On the southern portion of the proposal area, there is a diverse range of housing typologies mixed with rural landscape character, which transitions to a more uniform residential character within the suburb of Hobartville. This southern most portion of the proposal area outlooks onto the open area currently leased by Western Sydney University for experimental agricultural practices.

Schools and universities in the study area are shown, with two higher education facilities located close to the proposal area, being TAFE NSW and Western Sydney University - agricultural campus.

Major open spaces areas and nature reserves within the region of the study area include:

- Hanna Park
- North Richmond Heritage Park
- Hawkesbury Park
- Cougar Park
- Yarramundi Reserve
- Windsor Downs Nature Reserve
- Windsor Beach
- Governor Phillip Park.

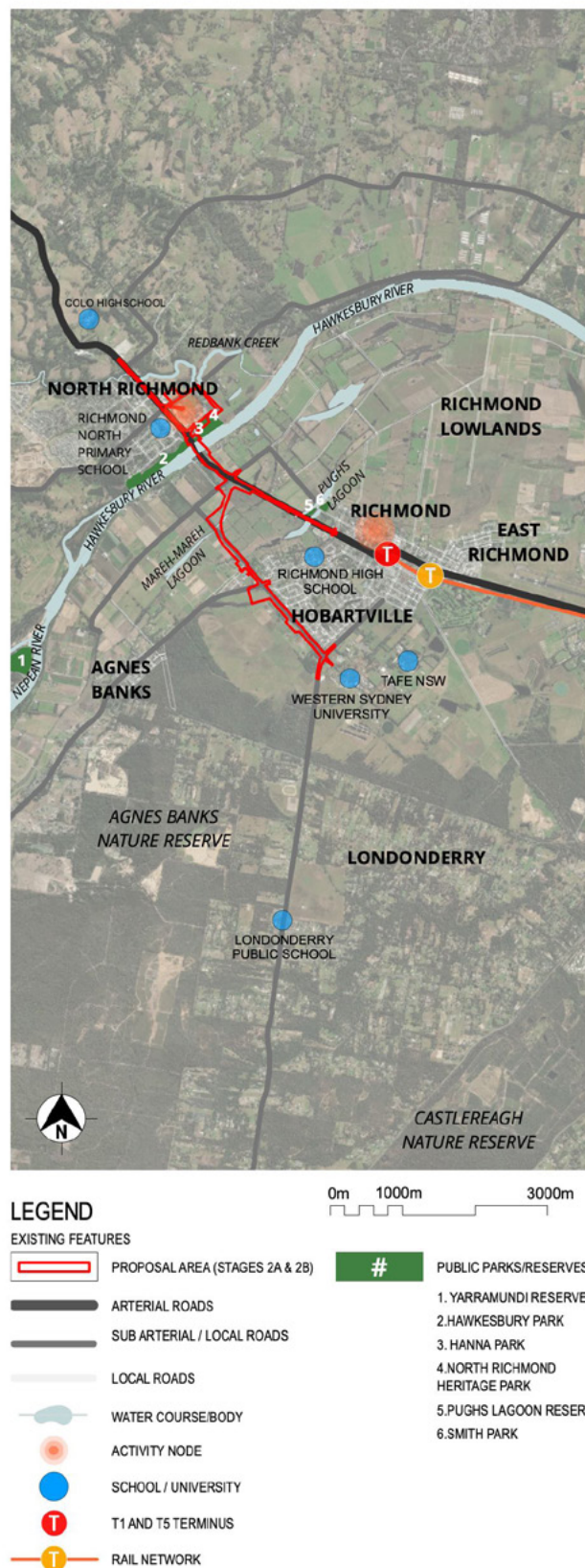


Figure 1-2: Study area

1 Introduction

1.6 References and methodology

Planning framework

The proposal is subject to environmental assessment under Division 5.1 of the EP&A Act which requires Transport to prepare a REF for the proposal.

Strategic planning policy context

A number of state wide legislative and policy guideline documents have been referred to in order to guide the proposal and these include:

- *A Plan for Growing Sydney, NSW Planning and Environment, December 2014*
- *Future Transport Strategy 2056*
- *NSW Freight and Ports Strategy, NSW Government, 2013*
- *NSW Infrastructure Strategy 2018-2038.*

Other documents that have provided background reference information for the study area include:

- *Australia International Council on Monuments and Sites (ICOMOS)*
- *Charter for Conservation of Places of Cultural Significance 2013 (The Burra Charter)*
- *State Environmental Planning Policy 2021*
- *Environmental Planning and Assessment Act 1979*
- *Biodiversity Conservation Act 2016.*

Urban design guidance

NSW guidance

The following guideline and policy documents define best practice for road infrastructure proposals across NSW, these documents include:

- *Beyond the Pavement*, Transport, 2023
- *Biodiversity Management Guideline*, Transport, 2024. To be read in conjunction with *Biodiversity Policy 2022*
- *Guideline for Better Surface Stabilisation using vegetation*, Roads and Maritime Services, 2015
- *Guidelines for landscape character and visual impact assessment*, Transport, 2023
- *Landscape Design Guideline*, Transport, 2023
- *Reconciliation Action Plan*, Transport, 2022-2025.
- *Water sensitive urban design guideline*, Transport, 2023.

Beyond the Pavement is Transport for NSW's urban design policy and guidance for road and maritime infrastructure projects ensuring that urban design is considered early, integrated from the initial phase and continued through to the finalisation and operation phases.

Table 3-1 on page 22 and the urban design strategy, objectives and principles, have been adapted from the following urban design objectives listed in *Beyond the Pavement*:

- Contributing to urban structure, urban quality & economy
- Fitting with the built fabric
- Connecting modes and communities and promoting active transport
- Fitting with the landform
- Contributing to green infrastructure and responding to natural systems
- Connecting with Country and incorporating heritage and cultural contexts into projects.

Reference documents

This report is to be read in conjunction with the following documents:

- Various environmental specialist sub-consultant reports prepared for the proposal
- Urban design drawing package.

Report methodology

Preparation of this urban design and LCVA report has been an iterative process with the whole design team. Urban design opportunities and constraints have been fed into the design development process to ensure integration and cost efficiencies, including:

- Visual inspection of the study area and surrounding broader context on 20 March 2023 and 03 November 2023 with photographic records
- Desktop studies of the regional context and site analysis of the local natural and built environment, human intervention and the shaping of the landscape and the interaction between place and community
- Desktop review of background reports and relevant planning policies
- Development of urban design vision and objectives and principles
- Development of the urban design concept
- Assessment of the potential landscape character impacts of the proposal
- Assessment of the potential visual impacts of the proposal
- Development of mitigation strategy, which includes principles and strategies to mitigate landscape character and visual impacts in the ongoing development of the design.

This process has occurred in collaboration with the proposal team and with Transport urban designers with the aim of achieving an integrated urban design and engineering outcome that realises the design outcomes described in Transport urban design guideline and policy documents listed in **Section 3 on page 21**.

1 Introduction

Report structure

The LCVIA report is structured into nine sections:

1. Introduction

Provides a brief overview, report purpose, assessment requirements, the legislative context, the report structure and our core values.

2. Existing environment

Describes the urban and landscape setting and character, and how they have informed the design and assessment process. Defines distinct landscape character zones according to topography, drainage and urban form etc.

3. Urban Design vision

Presents the urban design strategy for the proposal including an urban design vision, objectives and principles that are derived from the contextual analysis.

4. Urban Design concept

Describes the major elements of the proposal and offers design approaches for the future development of these elements.

5. Landscape character impact assessment

Assesses impacts from the proposal on the identified landscape character zones by analysing how well the proposal fits into the natural and built landscape.

6. Visibility of the proposal

Identifies the areas where the proposal would be visible, also known as the visual envelope and determines a range of representative viewpoints within that catchment.

7. Visual impact assessment

Assesses impacts of the proposal on each of the selected viewpoints and leads to the identification of mitigation measures.

8. Mitigation measures

Outlines recommended mitigation measures to be incorporated into future planning and design of the proposal. These measures would be discussed with the design team and would be integrated into future design stages.

9. Summary of Urban Design Findings

Provides a summary of the outcomes the community can expect including urban and landscape design outcomes, the likely level of landscape character and visual impacts, and how they can be further reduced through the application of mitigation measures in future stages.



View of Richmond Bridge from Hanna Park, North Richmond

2 Existing environment

2.1 Regional context

The following section of the report provides a summary of the existing landscape context and cultural influences on the study area. This background information has informed the development of the concept design and ultimately the mitigation measures that respond to any residual impacts. Further detail on each sub-section can be obtained by reviewing the relevant specialist reports provided in the appendix of the REF.

The wider area shown in the diagram below is referred to as the 'Study Area'. The proposal is located between North Richmond and Hobartville within the Hawkesbury City Council Local Government Area (LGA). The study area is approximately 33km north west of Parramatta.

The proposal extends between Crooked Lane in North Richmond to Londonderry Road in Hobartville.

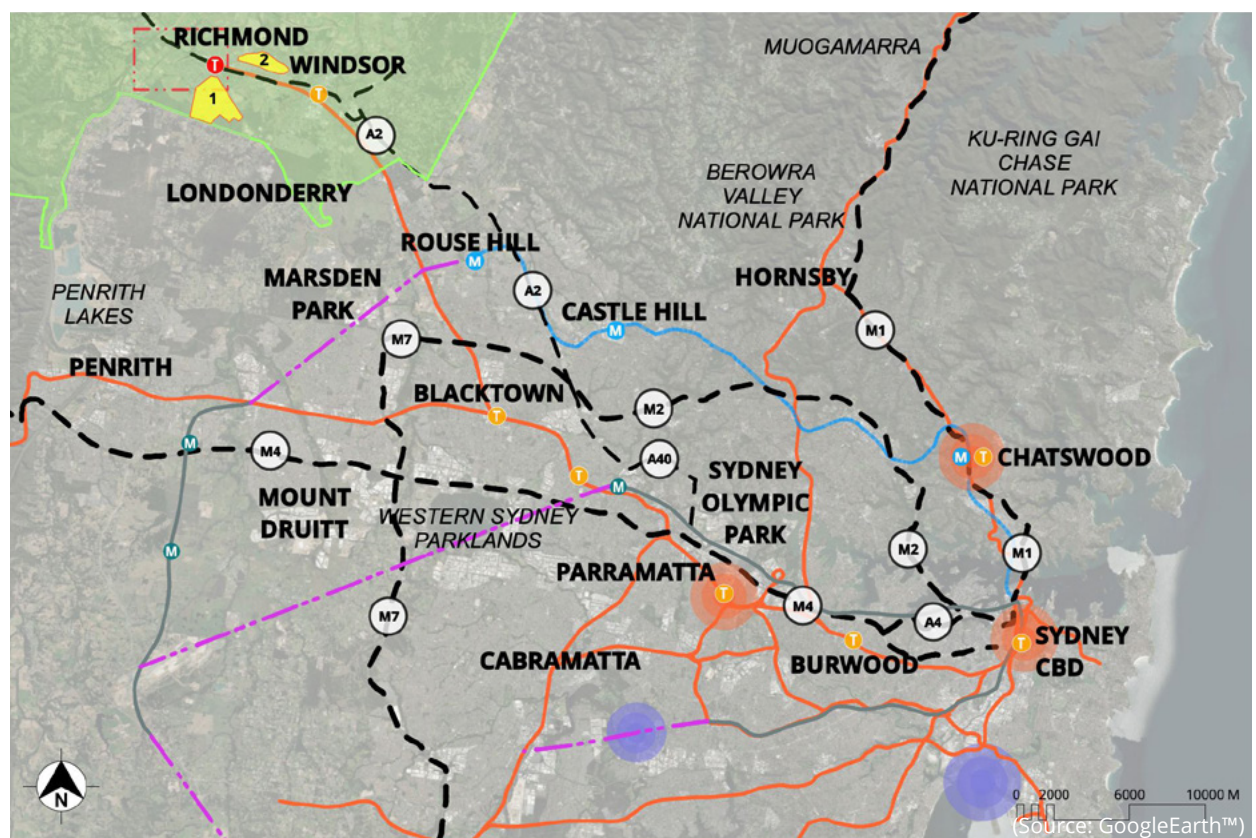
Bells Line of Road and Kurrajong Road within the study area form part of a road corridor that provides a connection between the Blue Mountains and Parramatta.

Southee Road (at the southern portion of the study area) provides a connection to Londonderry Road with links to Penrith and the M4, with further links to the Western Sydney Aerotropolis and Western Sydney Employment Area.

The study area is serviced by the T1 North Shore and Western and the T5 Cumberland train lines that terminate at Richmond.

Major regional development areas in the vicinity of the study area include:

- Western Sydney University
- RAAF base, Richmond.



LEGEND

EXISTING FEATURES

--- STUDY AREA

--- ARTERIAL ROADS
M1 - SYDNEY TO NEWCASTLE
M2 - SYDNEY TO WINDSOR
M4/A2 - SYDNEY TO BLUE MOUNTAINS
M4 - SYDNEY TO BLUE MOUNTAINS
M7 - CASULA TO BAULKAM HILLS
A40 - SYDNEY TO SEVEN HILLS

--- EXISTING METRO LINE
--- PROPOSED METRO LINE
--- FUTURE METRO LINE
T RAIL NETWORK

T TERMINUS OF T1 AND T5
--- EXISTING TRAIN LINKS
CITY CENTRES
AIRPORTS

1-WESTERN SYDNEY UNIVERSITY
2 - RAAF BASE RICHMOND
HAWKESBURY LGA BOUNDARY

Figure 2-1: Regional context of the proposal

2 Existing environment

2.2 Local context

The existing heritage listed Richmond Bridge, the Hawkesbury River, local parks and riverbank areas all form the local context of the central portion of the proposal area. To the north are the commercial, residential and industrial areas of North Richmond.

South of the Hawkesbury River, the rural areas of Kurrajong Road and Inalls Lane dominate the local context. Kurrajong Road transitions to the commercial hub of Richmond at the eastern portion of the proposal area. Inalls Lane transitions to the residential areas of Hobartville adjoining Southee Road and the termination of the proposal area at the intersection with Londonderry Road.

Figure 2-2 illustrates the location of the roads listed above and the terminus train station of Richmond. There are two commercial hubs located in North Richmond and Richmond. These include both commercial and light industrial premises in North Richmond, the largest being Westrock and commercial premises in Richmond.

The main existing bus stops located within the study area are shown in **Figure 2-2**, with Southee Road containing the largest concentration of existing bus stops.

Heritage areas are indicated within the study area. There are a number of Local Environmental Plan (LEP) heritage and State Heritage Register (SHR) properties within Richmond and North Richmond. Those found within or adjoining the proposal area are listed below:

- North Richmond
- Richmond Bridge (over the Hawkesbury River) (NSW Roads & Maritime Heritage and Conservation Register, item of State Significance)
 - St Phillip's Anglican Church and cemetery –church (LEP) - H1
 - 101A Bells Line of Road - house (LEP) - H2
 - 91 Bells Line of Road – house (LEP) - H3
 - Seventh Day Adventist Church - church (LEP) - H4
 - Police Station and residence (former) – police station (LEP) - H5
 - 'Sunnyside' (former O'Dea's dairy) - house (LEP)
 - 'Hill Crest' - house (LEP).

Richmond

- St Peter's Anglican Church Group (SHR) - H6
- St Peter's Anglican Church (LEP) - H6
- 'Hobartville', including outbuildings (SHR) - H7
- Grounds and landscaping surrounding 'Hobartville', 26-86 Inalls Lane, Chapel Street, Kurrajong Road (LEP) - H7
- 'Mountain View', 22 Inalls Lane / Dights Hill-Homestead complex (SHR) - H8
- 32 Inalls Lane - house (LEP) - H9
- McMahon homestead, 26 Drift Road - house (LEP)
- 'Bronte', 248 Castlereagh Road, Agnes Banks - house (LEP).

For the locations of the notable heritage items H1-H9, see **Figure 3-1** and **Figure 8-1**.

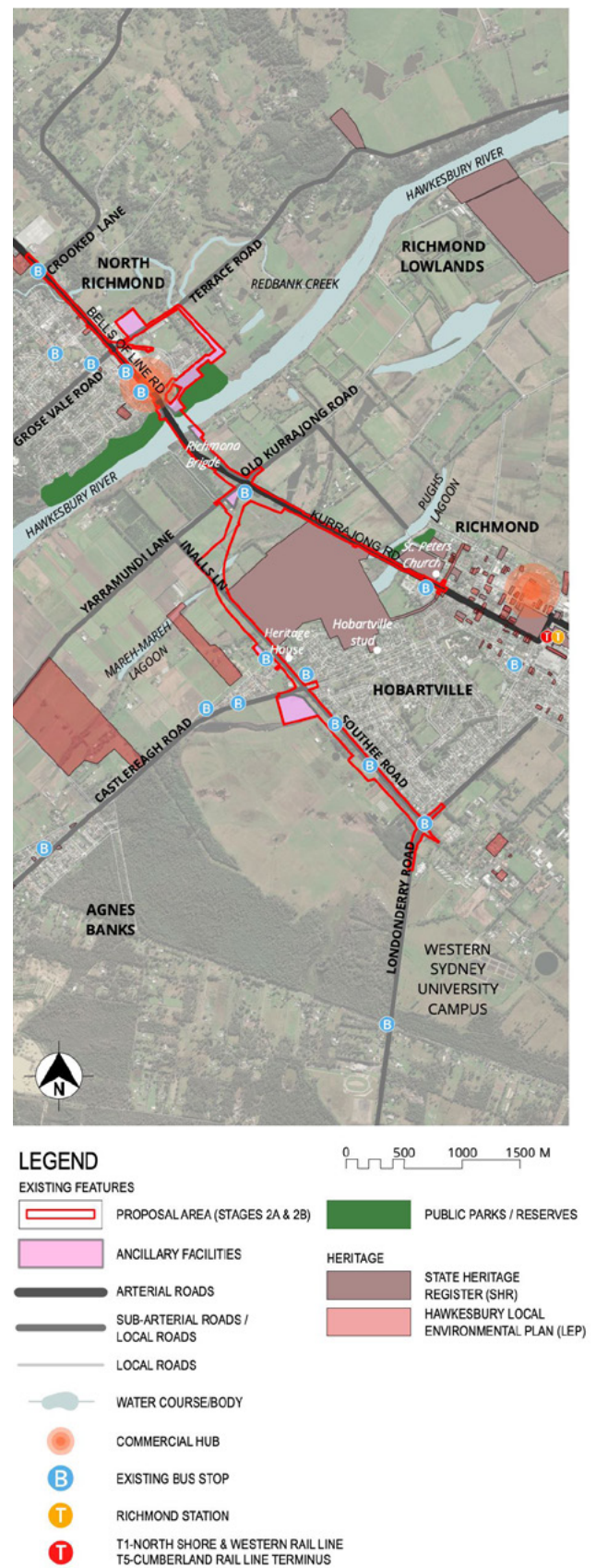


Figure 2-2: Local context

2 Existing environment

2.3 Land use

Existing urban form

Figure 2-3 illustrates the land use zones across the study area, which are regulated by Hawkesbury City Council through the Hawkesbury Local Environmental Plan 2012 (Hawkesbury LEP). Land use zones within the proposal area are:

- B1 Neighbourhood Centre
- B5 Business Development
- C2 Environmental Conservation
- IN2 Light Industrial
- RE1 Public Recreation
- R1 General Residential
- R2 Low Density Residential
- R5 Large Lot Residential
- RU 2 Rural Landscape
- RU 4 Primary Production Small Lots
- SP2 Infrastructure
- W1 Natural Waterways.

The majority of the central portion of the study area comprises rural landscape zoning. To the north, in North Richmond, the zoning is a mixture of commercial and industrial zoning adjacent to Bells Line of Road, with largely residential zoning beyond the initial buildings surrounding the road corridor. In Richmond, the zoning is predominantly residential, with an isolated hub of commercial zoning.

In the southern portion of the study area there is special activities zoning for education and agriculture. Currently the land to the western side of Southee Road is being used by Western Sydney University for experimental agricultural practices.

Examples of some of these land uses are illustrated by **Plate 2-1** to **Plate 2-4**.

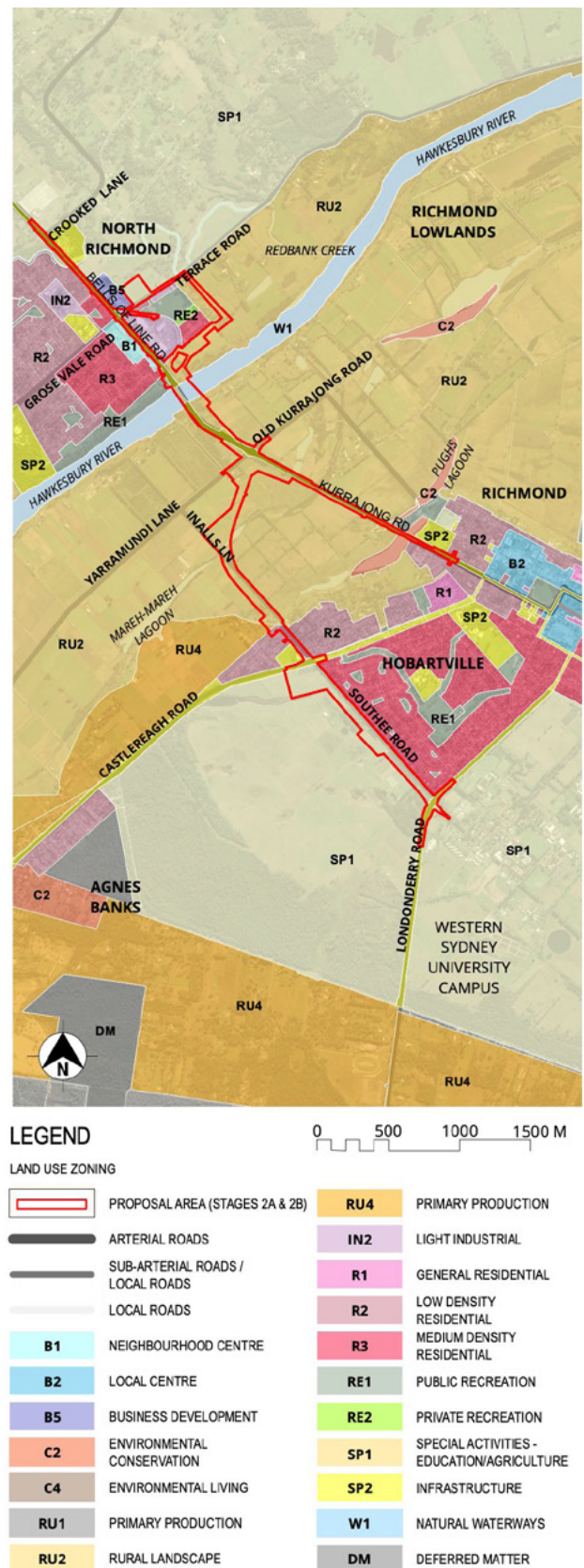


Figure 2-3: Land use diagram

2 Existing environment

2.4 Stakeholders

The following stakeholders have been identified as having a potential interest in the proposal:

- Bicycle NSW
- Deerubbin Local Aboriginal Land Council
- Department of Primary Industries (DPI)
- Hawkesbury City Council
- NSW Environment and Heritage
- Landowners, residents, and local businesses
- NSW Department of Climate Change, Energy, Environment and Water
- Utility providers
- Sydney Water
- Transport for NSW.

Co-ordination with some of the relevant stakeholders and the local community has been undertaken during the development of the proposal. Transport would review the feedback and consider any stakeholder concerns or suggestions in an aim to minimise the impacts on the surrounding community and environment where possible.

Considerations for the proposal

- In providing access across the corridor, it is important to align the proposal design with broader strategic planning aspirations such as cyclepath and Green Grid connectivity.



Plate 2-1: RU2 Rural landscape



Plate 2-2: R2 Low density residential



Plate 2-3: SP1 Special activities education agriculture



Plate 2-4: IN2 Light industrial

2 Existing environment

2.5 Land form and drainage

The topography of the study area is predominantly undulating low hills that slope towards broad river flats, either side of the Hawkesbury River. The proposal area is impacted by the surrounding drainage catchment of the Hawkesbury River and tributaries, found within the Hawkesbury City Council region.

The northern portion of the study area flows into Redbank Creek, and an unnamed tributary, and into the Hawkesbury River. The Hawkesbury River is a freshwater catchment which collects storm water and grey water run-off and is often inundated by heavy rainfall. The central portion of the study area, within Richmond, is located on low-lying floodplain, exposing the suburb to high flood risk. Excess water from heavy rainfall drains into a series of lagoons, including Pughs Lagoon. Although these lagoons are self-contained, they can be impacted by periods of high rainfall and flooding.

Geology and soils

The geology of the study area comprises Wianamatta Group shales in the northern portion and features Blacktown soils. The geology found within river flats and floodplain areas in proximity to Hawkesbury River catchment is quaternary alluvium which features Freemans reach soils. In the central portion of the study area, located within Richmond there are Richmond soils. These can be identified as poorly structured orange to red clay loams, clays and sands.

Considerations for the proposal

- Select appropriate plant species for areas of land exposed to higher flood risk and the rise of climatic conditions due to climate change
- Plant endemic species in response to the existing topography, geology and soils for greater success in vegetation canopy coverage and improvement of green corridors
- Seek sustainable and durable materials for all built structures to withstand exposure to increased climatic conditions
- Selection of structures in Hanna Park and on the new bridge to be resilient to flood damage.

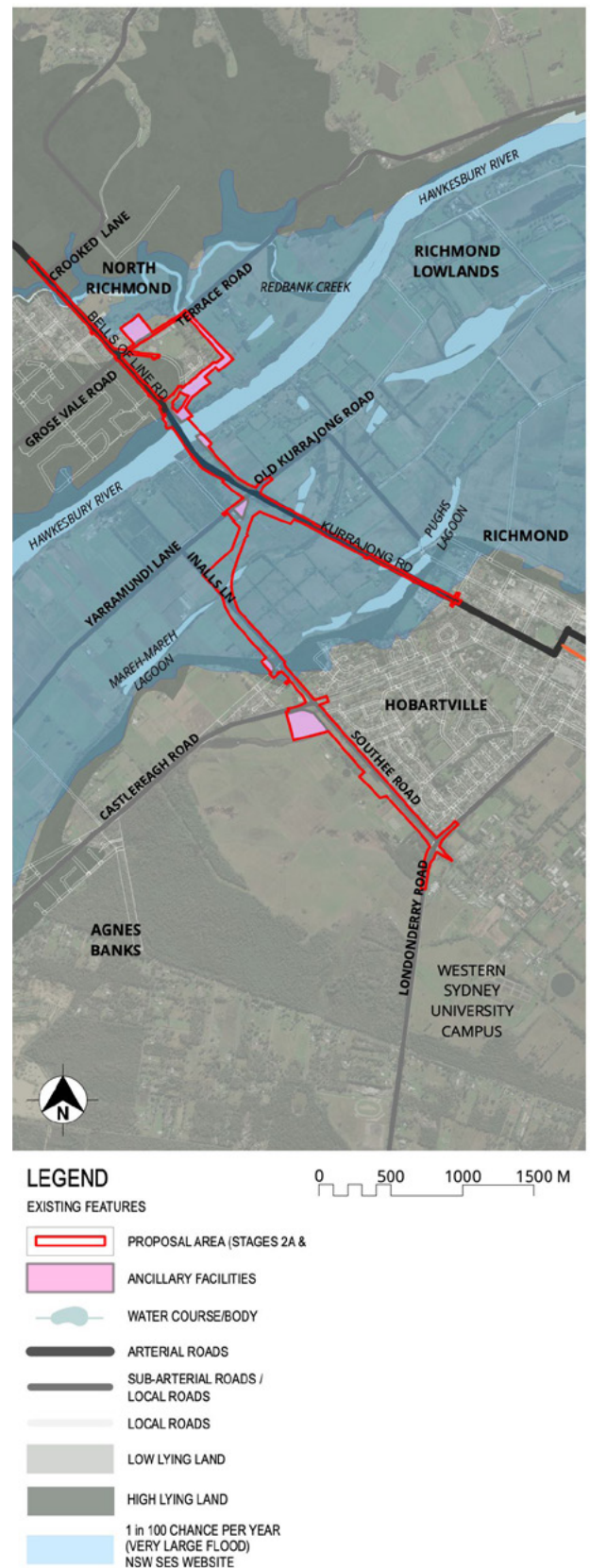


Figure 2-4: Landform and drainage diagram

2 Existing environment

2.6 Biodiversity

Vegetation communities

Based on the *Biodiversity assessment report for the review of environmental factors (REF)*, Wedgetail Project Consulting for Transport for NSW, 2023, there are six vegetation communities and three remnant plant community types (PCT's) within the proposal area. In addition, there is one planted native vegetation community and two exotic plant communities (one exotic trees and shrubs and one exotic grassland/pasture).

The three PCT's listed within the study area have also been categorised as threatened ecological communities. They are:

1. Cumberland Shale Plains Woodland – Critically endangered
2. Cumberland Red Gum Riverflat Forest – Endangered
3. Southern Lower Floodplain Freshwater – Endangered.

Approximately 60 threatened flora species were assessed for their occurrence within the proposal area, with none being found to occur during targeted surveys. The majority of the species recorded an 'unlikely' occurrence. Of the 10 species that recorded a 'low' likelihood of occurrence, a couple of these species are currently considered for incorporation into the proposed plant types for replanting within the proposal:

- *Grevillea juniperina subsp. juniperina* – Juniper-leaved grevillea
- *Eucalyptus benthamii* – Camden white gum.

The majority of the remaining potentially occurring species are considered too fragile or difficult to propagate.

Figure 2-5 illustrates remnant vegetation communities as sourced from NSW Government, SEED portal 2023.

Threatened fauna

Habitats within the proposal area were found to be highly modified. Since they are of moderate to low quality, they are not critical to threatened fauna.

There were no suitable habitats found for threatened marine or aquatic species, although some key Fish Habitats will be impacted.

There were five threatened fauna species recorded within the proposal area. All species are listed under the Biodiversity Conservation Act 2016 (BC Act) as Vulnerable:

- *Micronomus norfolkensis* - Eastern Coastal Free-tailed Bat
- *Miniopterus orianae oceanensis* - Large Bent-winged bat
- *Myotis Macropus* - Southern Myotis
- *Pteropus poliocephalus* - Grey-headed flying-fox
- *Scoteanax rueppellii* - Greater Broad-nosed Bat.

An Important Habitat for Swift Parrot ('Endangered' under BC Act) has also been mapped within the proposal area.

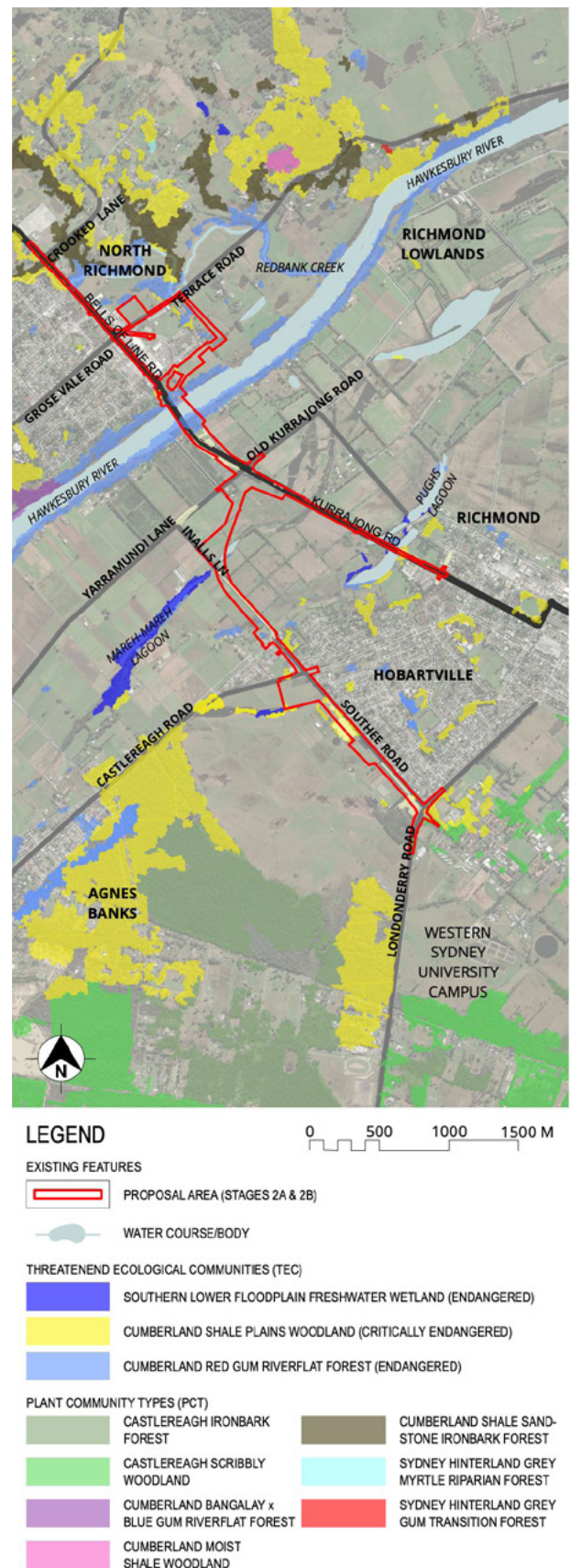


Figure 2-5: Vegetation communities diagram

2 Existing environment

2.7 Access and circulation

Figure 2-6 illustrates the study area access and circulation.

Arterial roads within the proposal area are:

- Bells Line of Road
- Kurrajong Road
- Old Kurrajong Road
- Castlereagh Road
- Londonderry Road.

The arterial roads are intersected by the following local and regional roads:

- Crooked Lane
- Terrace Road & Grose Vale Road
- Yarramundi Lane
- Inalls Lane
- Chapel Street
- Southee Road.

The signalised intersections within the study area are:

- Bells of Line Road, Gross Vale Road and Terrace Road, North Richmond
- March Street and Bosworth Street, Richmond.

Beyond the northern and southern ends of the proposal area and highlighted in green, is the proposed NSW green grid connection, a future NSW Government initiative to improve active transport connectivity.

Pedestrian and cyclist access

Currently, the existing footpath network within the study area is limited. There are existing footpaths along the east and westbound sides of Bells Line of Road, servicing the commercial hub, including an informal pedestrian refuge crossing from the Westrock industrial premises to the North Richmond Heritage Plaza. There is a section of existing footpath on the eastern side of Hawkesbury River, from Hanna Park/North Richmond Heritage Park, that connects to the existing Richmond bridge, but it does not extend further along Bells Line of Road.

At the end of the Richmond Bridge footpath (southern side of bridge) there is no dedicated footpath along either Bells Line of Road or Kurrajong Road, until it transitions into March Street, following the intersection of Kurrajong Road and Chapel Street. This dedicated footpath continues eastbound through Richmond town centre.

Public transport

The existing bus stops within and beyond the study area are shown in **Figure 2-6**, with Southee Road containing the largest concentration. The T1 North Shore and Western and the T5 Cumberland Land rail lines Richmond terminus station is also shown.

Considerations for the proposal

- Encourage increased use and improved connectivity of pedestrian and cyclist user-friendly paths between North Richmond and Richmond.

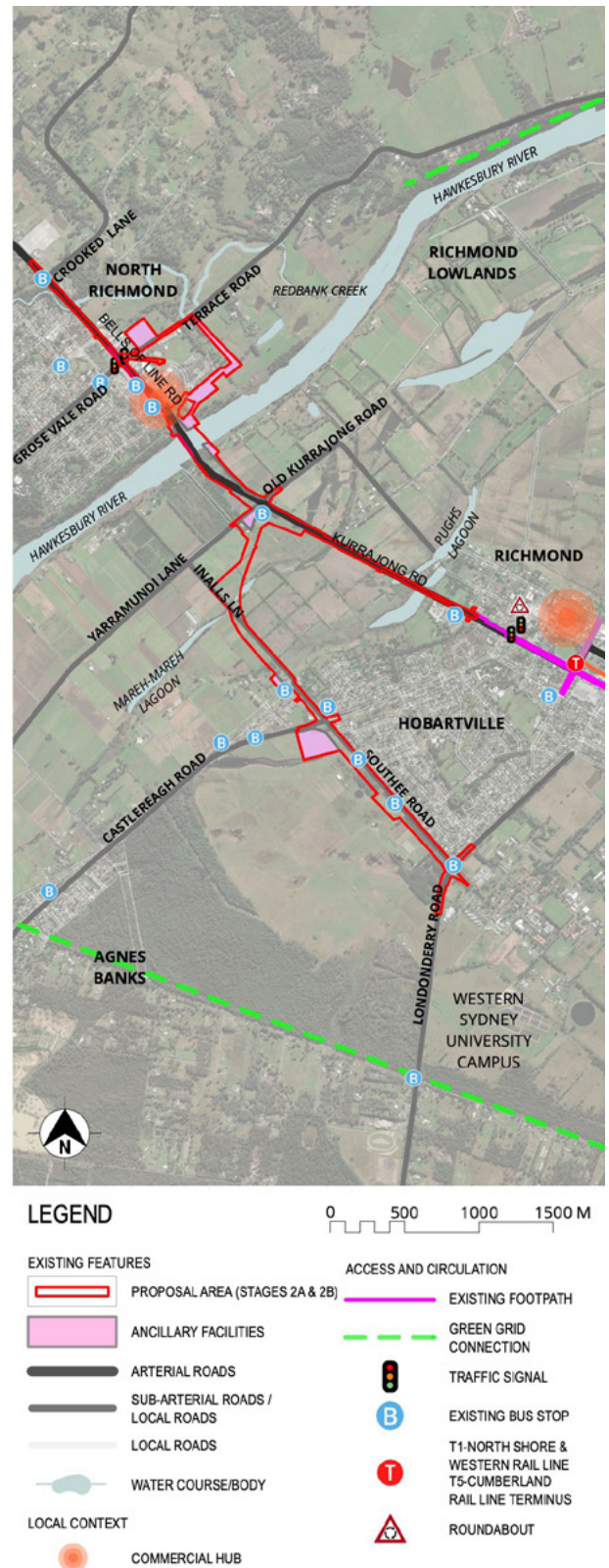


Figure 2-6: Access and circulation diagram

2 Existing environment

2.8 Heritage

The following reports were reviewed:

- *The Statement of Heritage Impact report*, Artefact Heritage (May 2024)
- *Richmond Bridge Duplication and Traffic Improvements Options Assessment - Aboriginal Archaeological Report Stage 2 PACHCI*, Kelleher Nightingale Consulting (October 2021)
- *New Richmond Bridge, Connecting with Country Report for Transport for NSW*, Murawin (August 2024).

Aboriginal cultural heritage

The area surrounding the proposal was occupied by Darug people, with Darkinjung people occupying the land north of Richmond. These clans called the Hawkesbury River 'Dyarubbin' (Deerubbin). The proposal area is now contained in Deerubbin Local Aboriginal Council managed land.

The *PACHCI Assessment* (Kelleher Nightingale, 2021) identifies seven sensitive Aboriginal archaeological sites along the study area. These sites include artefacts such as grinding stones in camping places, which clan members used to grind harvested yams. Portable grinding stones can be found over the wider area, now important landscape relics to Indigenous peoples. The report also notes the Kurrajong tree (*Brachychiton populneus*) as a tree species found within the study area. As such, it is recommended as a potential tree species for the proposal.

The *Connecting with Country Report* (Murawin, 2024) outlines the Aboriginal heritage findings for the study area. Through a four-phase approach; 'Earth' (Truth), 'Water' (Knowledge), 'Fire' (Transformation), and 'Sky' (Vision), the report provides a framework to ensure the proposed design respects its Aboriginal past.

Historically, the land alongside the Deerubbin was rich in vegetation, including coachwood (Boolo) trees, Port Jackson figs (Tamangoa), Native plum trees (Karowerry), and Soft corkwood (Booldoorra). This area provided an array of food supplies for Aboriginal people, including fish, eels, water, birds, turtle and mussels. The region also provided silcrete, stones and pebbles for tool making.

The first peoples of this land were called the Boorooberong people, and 'Yarramundi', the leader at the time, met with Governor Phillip in 1791 after the First Fleet arrival. Colonialisation, dispossession, smallpox, and the frontier wars led to the loss of huge numbers of the Boorooberong people.

The report highlights design opportunities that are to be explored for the new four-lane bridge and its surrounding areas to awaken people to Country. These opportunities would align with the four Guiding Principles for Connecting with Country: respecting, being, keeping and sharing' (referenced throughout this report as the guiding principles for Connecting with Country).

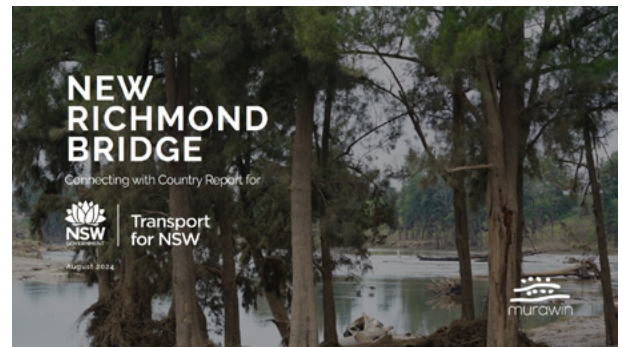


Plate 2-5: Connecting with Country report (Source: Murawin)



Plate 2-6: Report diagram (Source: Murawin)

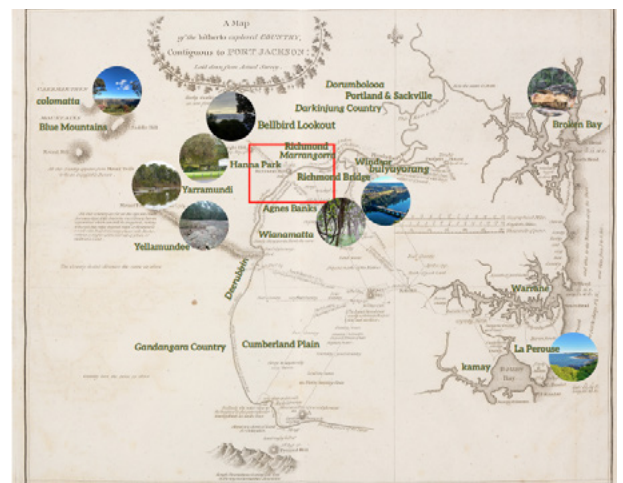


Plate 2-7: Map of the Country contiguous to Port Jackson (John Walker. Publisher G. Nichol. 1793. Source: Murawin)

2 Existing environment

Non-Aboriginal heritage

Richmond and North Richmond have non-Indigenous heritage from European settlement, when land grants were given for rural farming. Governor Phillip explored the study area in 1789, and in 1794, Lieutenant Governor Major Francis Grose made the first grants in Clarendon (present-day Richmond and Windsor) including a 400-acre grant for Edward Luttrell (1804) for 'Hobartville', dominating Richmond. Hawkesbury was named after Baron Hawkesbury in 1789 and the 5 towns (Richmond, Windsor, Wilberforce, Pitt Town and Castlereagh) were compiled by Governor Lachlan Macquarie in 1810, built on high ground to avoid flooding. North Richmond was called Enfield until 1925 and Hanna Park was known as North Richmond Park, containing a rail line between 1926-1956. In the 1960's, the park became a make-shift caravan park for seasonal farm workers. Bells Line of Road, marked by Archibald Bell in 1823, was built as a route to Bathurst (another route was developed with Aboriginal guides) and was formally opened in 1905.

The Hawkesbury River was first crossed at North Richmond by a punt wharf in 1821 and the original bridge was completed in 1860. After repeated flood damage, the current bridge was built in 1905 with a 13 span Monier concrete arch structure and deck 7m above normal flood level, being Australia's largest reinforced concrete arch bridge for 25 years. In 1926, a third column was attached to each pier, supporting two steel girders and the Richmond to Kurrajong railway line which ceased use in 1952 due to flood damage. In 1956, the tracks were replaced by an eastbound vehicular lane.

Considerations for the proposal

Design coordination with particular reference to:

- Alignment with the Connecting with Country guiding principles
- Location of previous timber supports to the original timber Richmond Bridge
- Limiting the removal of any existing trees to the Hobartville Stud property.



Plate 2-8: Richmond Bridge and remnants of former timber bridge



Plate 2-9: Existing Richmond Bridge



Plate 2-10: Durham Bowes (Mountain View), Richmond



Plate 2-11: Hobartville Stud

2 Existing environment

2.9 Climate

The Bureau of Meteorology data from the Richmond, Western Sydney University, Hawkesbury campus location, approximately 6km southeast of North Richmond town centre shows the total mean annual rainfall (as of September 2023) to be 802.5 millimetres (mm), with the highest mean monthly rainfall falling in the months of January, February & March (96.5, 94.5 & 94.0mm).

The mean maximum annual temperature (as of September 2023) has been logged as 29.4 degrees Celsius (C) with the hottest temperatures recorded during the months of December, January & February). The lowest mean annual temperature was 3.2 degrees recorded in July 2023.

These records are based on all the available data since 1881. Figures quoted are based on data accessed in September 2023.

Climate Risk workshop

The Climate Risk workshop carried out for this proposal (August 2023) identified the following key risks to the proposal:

- Extreme rainfall and the associated saturation of the soil - risk of settlement of soils to be taken into account during the design of bridge support foundations
- Short bursts of rainfall - risk of localised flooding to roads
- Extreme temperatures - risk of increased Urban Heat Island effect (UHI).

There were no direct Bushfire risks identified within the majority of the study area, notably Richmond & Hobartville. Refer to [Figure 2-7](#) for the Bushfire prone land diagram.

Considerations for the proposal

During the Climate Risk workshop a number of risks and potential adaptation measures were raised to be further investigated during the concept design of the proposal. Those measures particularly relevant to urban design include:

- Planting of trees to offset the UHI effect
- Drought tolerant species selection
- Passive irrigation possibilities
- Use of vegetation to reduce runoff and flood impacts along the river
- Channelling of water run-off through swales (and rain gardens)
- Re-purposing of the existing bridge to include 'fold-down' railings
- Consideration of more 'fixed' landscape elements and the use of established plantings in high risk flood impact areas.

2 Existing environment

2.10 Bushfire prone land

Areas within North Richmond, in the northern portion of the proposal area, and within the southern portion of the study area adjacent to Hobartville (approaching Londonderry Road), have been listed as bush fire prone land (BFPL) in data sourced by the SEED Dataset 'NSW Bush Fire Prone Lands'. These are areas of land that can support a bush fire or is likely to be subject to bush fire attack and are highlighted in **Figure 2-7**. There are three Bush Fire Prone Vegetation (BFPV) Categories;

BFPV Category 1

This BFPV Category is considered to have the highest risk for bush fire and is represented as red in **Figure 2-7**. This category has the highest combustibility and likelihood of forming fully developed fires, including heavy ember production.

BFPV Category 2

This BFPV Category is considered to be a lower bush fire risk the BFPV Category 1 and 3. This BFPV Category has lower combustibility and/or limited potential fire size due to the vegetation area shape and size, land geography and management practices.

BFPV Category 3

BFPV Category 3 comprises land with medium bush fire risk vegetation. It is at a higher risk than BFPV Category 2 but lower than BFPV Category 1.

Vegetation buffer

Figure 2-7 highlights the varying widths of BFPV buffers which are shown in green, as included on the SEED Dataset

- 100m external buffer for BFPV Category 1
- 30m external buffer for BFPV Category 2 and 3.

The SEED Dataset was prepared in accordance with the *Guide for Bush Fire Prone Land Mapping Version 5b* (November 2015), supplied by the NSW Rural Fire Service (NSW RFS) and certified by the Commissioner of the NSW RFS under section 146(2) of the EP&A 1979.

Considerations for the proposal

- Follow guidelines for the set out of plants to make sure both vertical and horizontal separation is maintainable. Providing maintenance access to bushfire prone land as a precaution
- Allow separation between canopy and shrub clusters so as to reduce the potential for fire to spread.

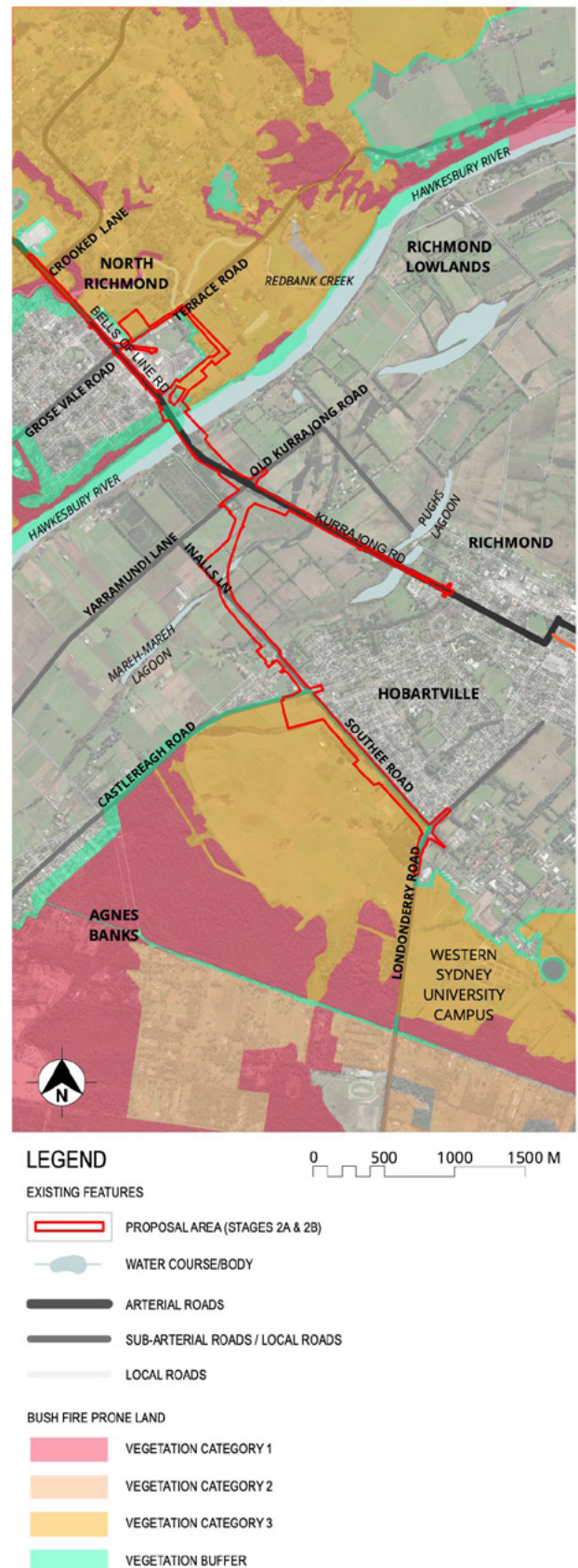


Figure 2-7: Bushfire prone land diagram



Hanna Park, North Richmond

New Richmond Bridge Stage 2
Urban Design Report & LCVIA, Issue 05, November 2024

3 Urban design strategy

Chapter overview

This chapter presents the urban design strategy for the proposal. It is summarised in an overarching urban design vision, complemented by an explanation of the experience of travelling along the New Richmond Bridge and traffic improvements - Stage 2 (Stage 2A and Stage 2B).

Urban design objectives and principles for the proposal have been derived from Commonwealth, State and local government policies as well as contextual analysis in [Section 2 on page 9](#). These objectives guide the proposal and address the areas of landscape and visual quality; design of the upgrade and its structures; cultural values and connectivity.

Urban design strategy

The New Richmond Bridge and traffic improvements - Stage 2 is largely designed to improve travel times between North Richmond and Richmond for motorists, cyclists and pedestrians. It is also designed to improve flood resilience.

The main engineered elements of the proposal are a new four-lane bridge across the Hawkesbury River, new Richmond Bypass (the bypass) with floodplain bridge structures and a shared user path (SUP) along Kurrajong Road, with associated retaining walls and boardwalk. The design of these elements provide a unique opportunity for the following urban design improvements to the landscape and visual amenity of the proposal area:

- Re-purposing of the existing Richmond Bridge (existing bridge) for active transport
- Re-design of the approaches to the existing bridge for seating and recreational uses
- Design of a new balustrade to the existing bridge
- Design of pedestrian and cyclist access (and associated landscape improvements) through Hanna Park to the existing bridge
- Design of the under-croft areas of the four-lane bridge
- Design refinements to the structure of the new four-lane bridge to reduce visual impact and increase visual amenity
- Replacement tree planting and additional park facilities to Hanna Park
- Street tree planting to Bells Line of Road (utilities and SUP permitting)
- Design of a vegetated noise mound and associated noise walls to Southee Road (Stage 2B)
- Urban design of bridges to the Richmond Bypass
- Landscape design of all embankments and swales
- Replacement and new tree planting to the proposal area.

[Section 4 on page 26](#) reviews these design opportunities in detail and focuses on the most significant 'design areas', listing them as they are encountered along the route from North Richmond to Richmond.

This chapter takes urban design principles from *Beyond the Pavement* (Transport guideline 2023) to formulate specific proposal principles and in turn opportunities and constraints.

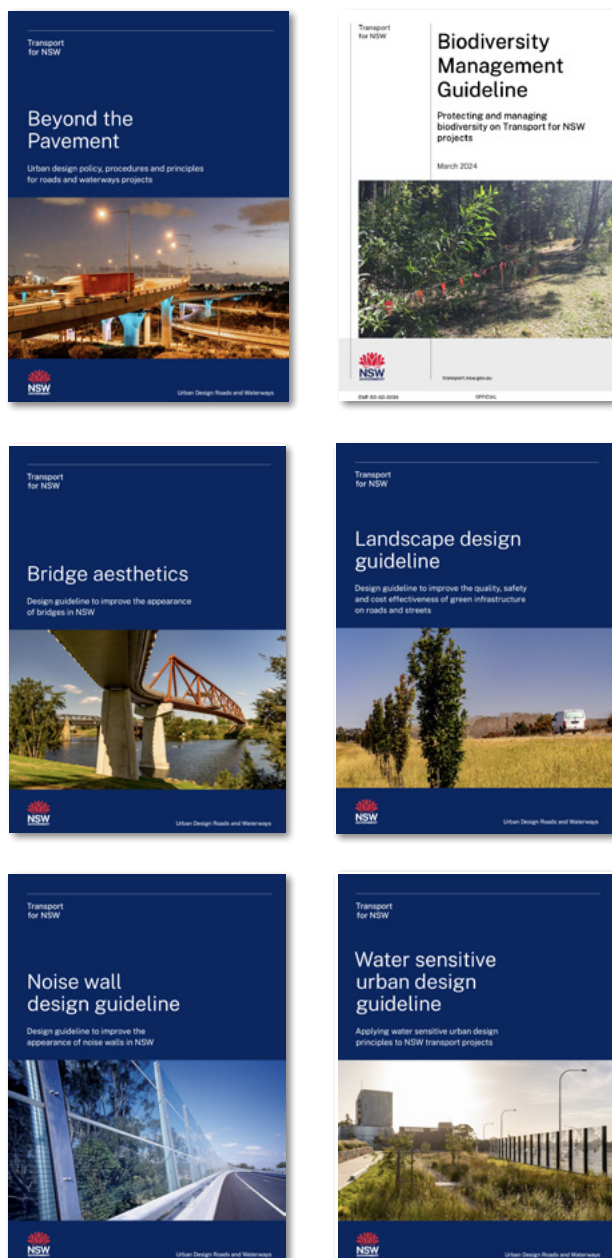


Plate 3-1: Urban design guideline documents - Transport

3 Urban design strategy

3.1 Proposal specific urban design objectives and principles

In order to ensure that both corridor wide and state wide expectations for the New Richmond Bridge and traffic improvements - Stage 2A and Stage 2B are met, a set of proposal specific urban design objectives and principles have been adapted, largely from the guideline document of *Beyond the Pavement* (Transport 2023).

These are listed below in [Table 3-1](#), and are based on an understanding of the unique existing landscape and urban values of the study area and the issues that affect, or are affected by, the proposal. These objectives and principles would continue to be used to guide the on-going development of the proposal in future stages. For clarification purposes, the applicable staging of these principles is indicated in the table below.

Objectives	Principles	Stage 2A	Stage 2B
1. Contributing to urban structure, urban quality, and the economy	1.1 Provide street tree planting to Bells Line of Road where possible to capitalise on the provision of a SUP to North Richmond (with better pedestrian connectivity) to increase commercial activity in North Richmond	✓	✓
	1.2 Provide noise attenuation measures for residential areas of Hobartville near to the new bypass, parallel to Southee Road		✓
	1.3 Re-purpose the existing bridge for active transport and remove existing pavements on approaches, replacing hard surfacing with tree planting (and seating for recreational purposes)	✓	
	1.4 Provide a better urban design experience for road users travelling between North Richmond and Hobartville (including southern & western Sydney), by-passing the current congestion of Richmond	✓	✓
2. Fitting with the built fabric	2.1 Provide tree planting to reduce the visual impact of the proposal	✓	✓
	2.2 Provide replacement tree planting for trees removed for the construction of the new four-lane bridge (including memorial trees), SUP installation to Kurrajong Road and the Richmond Bypass.	✓	
	2.3 Sensitively provide pedestrian & cyclist connectivity through the existing Hanna Park open space to the re-purposed existing Richmond Bridge	✓	
3. Connecting modes and communities and promoting active transport	3.1 Sensitively design a new elevated four-lane bridge to improve connectivity in times of flood (up to 1:20)	✓	
	3.2 Provide an accessible transport route between North Richmond & Richmond, retaining and re-purposing the existing bridge for active transport	✓	
	3.3 Improve connectivity through SUP & footpath access to relocated bus stops	✓	
	3.4 Enable pedestrian access to the new four-lane bridge, to allow connectivity between North Richmond and Richmond in times of flood (up to 1:20)	✓	
4. Fitting with the landform	4.1 Ensure the protection of the existing Coastal Wetlands endangered habitat	✓	
	4.2 Use predominantly endemic plant species for replacement planting to retain the local biodiversity of remnant bushland areas	✓	
	4.3 Provide planting to swales to increase biodiversity and better assimilate them into the natural landform	✓	✓
5. Contributing to green infrastructure and responding to natural systems	5.1 Provide a system of swales to increase the blue-green infrastructure	✓	✓
	5.2 Use planting to increase biodiversity and better assimilate the proposal into the natural landform	✓	✓
	5.3 Plant street trees to Bells Line of Road if possible to help reduce the urban heat island effect of the North Richmond commercial zone	✓	✓
	5.4 Provide SUP connectivity between North Richmond and Richmond to promote active transport use	✓	
6. Connecting to Country and Incorporating heritage and cultural contexts	6.1 Provide replacement tree planting to mature trees removed for the construction of the new four-lane bridge, especially important historical planting. Limit existing tree removal where possible	✓	
	6.2 Provide opportunities for incorporation of Connecting with Country themes, spaces and artworks throughout the proposal (Design opportunities to be explored to align with the guiding principles of the Connecting with Country Report.)	✓	✓

Table 3-1: Objectives and principles

3 Urban design strategy

3.2 Opportunities and constraints

Figure 3-1 on page 24 illustrates the potential opportunities and constraints across the study area, identified throughout the concept phase of the proposal and incorporated into the development of the urban design concept.

Note - Following Concept Design, the specific urban design objectives and principles and these opportunities are referenced for the mitigation measures outlined in Section 8 on page 122 of this report.

Table 3-2: Opportunities incorporated into the concept design

Opportunity #	Description of opportunity	Stage 2A	Stage 2B
01	Design of new four-lane bridge with urban design modifications	✓	
02	Provision of continuous pedestrian & bicycle routes (SUP) between North Richmond and Richmond	✓	
03	Re-purposing of the existing Richmond Bridge for active transport and recreation purposes	✓	
04	Urban and landscape design opportunities for improving recreational facilities to Hanna Park	✓	
05	Provision of tree planting to provide shading and to reduce the urban heat island effect	✓	✓
06	Provision of planting to SUP for shading and improvement of the user experience	✓	
07	Retention and supplementation of existing endemic planting	✓	✓
08	Streetscape improvements to Bells Line of Road (North Richmond)	✓	✓
09	Streetscape improvements to approaches of existing Richmond Bridge and associated recreational opportunities	✓	
10	Urban and landscape design opportunities for noise mound and noise wall, including potential collaboration with First Nations community & artists		✓
11	Replacement tree planting to Southee Road, Hobartville (adjoining to Richmond Bypass)		✓
12	Planting to embankments and swales to reduce the visual impact of the proposal and increase biodiversity	✓	✓

Table 3-3: Constraints incorporated into the concept design

Constraint #	Description of constraint	Stage 2A	Stage 2B
01	Coastal Wetland vegetation and the mapped Coastal Wetland areas	✓	
02	St Phillips Anglican Church & Heritage cemetery to Bells Line of Road (close to Crooked Lane) and other noted heritage items including Mountain View House (Inalls Lane)		✓
03	Heritage trees to Inalls Lane	✓	
04	Pecan trees to Southee Road, Hobartville		✓
05	Public open space of Hanna Park and North Richmond Heritage Park	✓	
06	Existing mature trees, notably to Hanna Park	✓	
07	Large land holdings to Southee Road (Hobartville)	✓	
08	Proximity to residential areas in Hobartville	✓	
09	Utility restrictions to tree planting (notably high voltage electricity) on Bells Line of Road (North Richmond) and Kurrajong Road (Richmond)	✓	✓

3 Urban design strategy

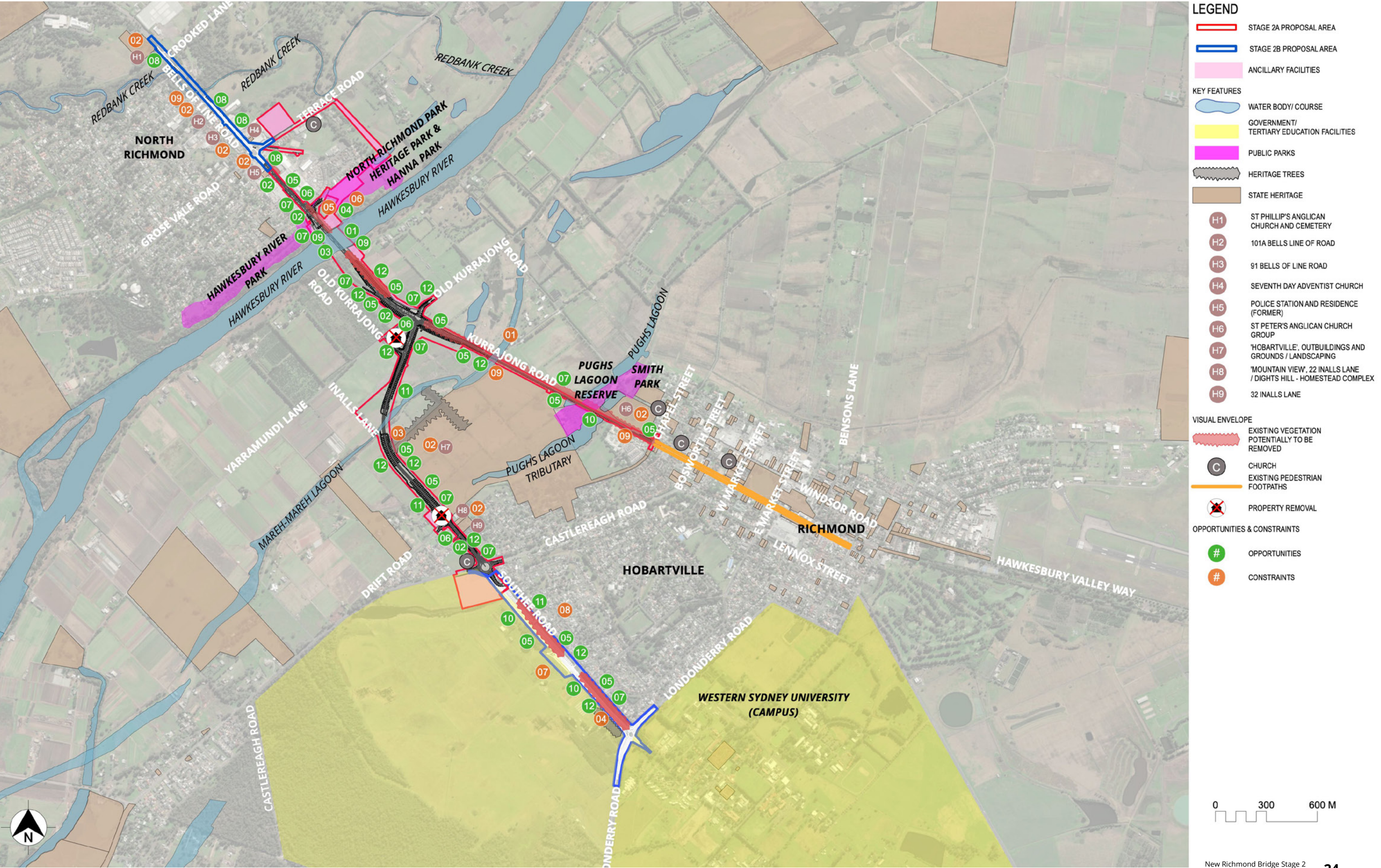


Figure 3-1: Opportunities and constraints



4 Urban design concept

4.1 Typical elements

This chapter describes and illustrates the design approach that responds to the urban design vision for the proposal.

Designed elements that were considered in order to achieve the urban design objectives include:

- Road design elements
- Structures
- Earthworks
- Road furniture
- Landscape treatments.

Road design elements

Shared user path / footpaths

New shared user paths (SUP's) are proposed on Bells Line of Road (including across the existing Richmond Bridge) and the southern side of Kurrajong Road to allow a continuous active transport route between North Richmond and Richmond.

Typically SUP's are proposed at a 3.5m width for this proposal, however in some instances on Bells Line of Road a reduced width of 2.5 - 3.0m may be considered if it allows for additional tree planting within the verge, where existing services would otherwise restrict this provision. Whilst a 4m width is optimal under Austroads guide, under this proposal space and the other limitations have resulted in lower SUP widths.

SUP alignments are designed to enhance pedestrian and cyclist connectivity in the local region and to create a comfortable journey that is protected and shaded (where possible) for active commuters or passive recreational users.

Design approach

- Design pedestrian and cycle connections to ensure pedestrian and cyclist safety
- Regular 'breakout' spaces and stopping points along the SUP should be considered during detailed design to provide respite, shade and a place to pause and meet.

Medians

A preliminary landscape design has been shown for the medians within the proposal.

Concrete medians are typically proposed where the following restrictions to planting apply:

- Sightlines at intersections and for traffic islands at the approach to roundabouts
- Sightlines for turning lanes
- A general planting exclusion of 20m from the median / crossing point.

In all other instances planting is proposed as follows:

- Low planting to medians (greater than 3m width) for approximately 10 metres in length from the end of the concrete extent of the median
- Low shrubs and low planting to medians (greater than 3m width) typically

Structures

The main elements are:

- The new four-lane bridge over the Hawkesbury River
- Two bridges on the Richmond Bypass over the floodplain.

Refer to [Section 4.2](#) for discussion of the new four-lane bridge elements & [Section 4.4](#) for indicative sections with some urban design modifications to both the new four-lane bridge and bridges to the bypass.

Earthworks

Fill embankments

Across the proposal, fill embankments are the most common type of embankment proposed.

Refer to typical sections, shown in [Figure 4-4 on page 49](#) to [Figure 4-20 on page 65](#).

Fill batters of 4H:1V are preferred for planting establishment, however planting on embankments of 2H:1V is more typical throughout the proposal.

Refer further below for discussions on planting.

Road furniture

Kerbside bus stops

Proposed relocated kerbside bus stops have been coordinated in detail at the concept design 80% stage.

The current concept design drawings indicate where existing bus stop locations potentially require relocation.

Replacement bus shelters would be provided for any existing bus shelters that require relocation.

Design approach

For relocated bus stops:

- Any footpath arrangement would be setback behind the bus shelter in order to reduce potential conflicts between all users
- Bus shelter style and configuration such as materiality and colour selections would be selected to reduce urban heat
- Ensure planting selection conforms to sight lines and clear zone requirements but provides as much shade as possible.

Safety barriers

Crash safety barriers would be installed where batters are steeper than 4H:1V; at culvert crossings; or where speed limits dictate. Refer to [Section 4.4](#) for indicative sections, showing locations.

Design approach

- Turf is typically proposed adjoining to safety barriers to prevent any overgrowth of vegetation.

4 Urban design concept

Lighting

Proposed new or relocated light poles are shown on the current urban design plans and sections. These proposed locations will be further coordinated with proposed tree planting locations at the detailed design stage.

For potential future detailed design lighting proposals for the existing re-purposed bridge, refer to [Section 4.2](#) design areas for further discussion.

Design approach

- Lighting in public places and intersections would be consistent in order to reduce the contrast between shadows and illuminated areas and not produce glare
- Lighting spillage onto neighbouring properties would be minimised as this can cause nuisance.

Landscape treatments

Replacement & Proposed Tree Planting

A desktop study has been carried out to provisionally determine the extent of trees to be removed and existing trees to be retained for the concept design stage, that forms the basis of this REF report.

This desktop study will be supplemented by a detailed survey at the detailed design stage.

Proposed trees have been shown on sections for all areas of the proposal, subject to further design development.

Embankment & Swale planting

Design approach

- Fill embankments:
 - Would have a soil and mulch layer for planting into
 - For embankments of 2H:1V or steeper stabilisation measures would be installed, such as mesh reinforcement
 - Plant types will vary according to the steepness of the slope and road planting clearance zones, however typically larger (mature height) trees and taller shrubs would be placed at the base of slopes, with smaller shrubs and native grasses at the top.
- Swales:
 - Swales would either be planted or turfed
 - It is typically proposed that the base of all swales will be turfed and where there is a turf verge, this would continue to the base of the swale
 - Planting of native grasses is proposed to the outer side of the swale (as opposed to the road side of the swale).

Refer to below for WSUD planting in general.

Water Sensitive Urban Design planting

Planting in WSUD features is designed to support the local ecology and biodiversity, minimise negative impacts on natural water cycles and integrate water into the landscape to enhance visual, social, cultural and ecological values.

Design approach

- Support the local ecology and biodiversity and contribute to the maintenance of existing natural hydrological processes
- Appropriate aquatic (macrophyte and sedge plants) within natural creek channels would be selected to ensure the construction impacts of the proposal are minimised
- Species would be selected to accommodate drought and flood conditions, ensuring greater resilience and adaptability
- Typically, 'no mow' grass species are proposed at the base of swales
- Planting would enhance biodiversity through developing habitat corridors and linkages to creek systems.

Make Good landscape works

The area between planted swales and embankments is proposed to be 'made good', to re-instate and reinforce the existing landscape.

Design approach

- Re-instatement and reinforcement of the existing landscape.

Lay down/ site compound areas / ancillary areas

Design approach

- Planting would aim to reinstate and reinforce the existing environment prior to use during the construction of the upgrade, similar to the 'make good' areas.

Plant species

Species selection is to be in accordance with the following:

- Transport *Landscape Design Guideline*
- Identified existing vegetation plant communities, as referenced by the biodiversity report and research
- Proposed plant type lists.

Typically, species would include low maintenance and drought tolerant plants in order to reduce maintenance requirements. The tree species and their location and function are outlined in [Table 4-1](#) to [Table 4-5](#).

Design approach

- Use of largely native plant species to reinforce the endemic plant communities of the area
- Replacement tree planting to off-set trees removed under the proposal, using species to match existing
- There may be isolated areas approaching intersections or adjoining to existing residential developments where the proposed landscape may include some feature tree or shrub species for visual or screening purposes, however the aim of the landscape proposals is for re-instatement and reinforcement of the existing landscape.

4 Urban design concept

4.2 Design areas

Staging

This section of the report outlines additional urban design elements, to the standard treatments (discussed in Section 4.1) and the proposed treatment of featured areas of the proposal.

The report refers to Stage 2 as a whole, which comprises the elements of Stage 2A and Stage 2B. Most of the featured areas would be part of either the Stage 2A concept designed works (refer [Section 4.4](#)) or the Stage 2B concept designed works (refer [Section 4.5](#)).

For Bells Line of Road, under Stage 2A, a reduced extent of work is proposed, however the most notable landscape improvements would be included in Stage 2A, in the vicinity of the WestRock development.

For Southee Road, the proposed extension of the bypass up to the intersection with Londonderry Road, would only be undertaken in the Stage 2B component of the Stage 2 proposal. If the Stage 2A component is constructed first, then the temporary exit at the Castlereagh roundabout would require removal and make good landscape works, prior to the construction of the Stage 2B element of works.

The following areas of urban design featured are listed in order of occurrence when travelling eastbound from the start of the proposal on Bells Line of Road, at the northern end of the study area, to the southern end of the proposal at the intersection of Southee Road with Londonderry Road.

- Bells Line of Road landscape areas (Stage 2A and Stage 2B)
- Hanna Park
- Existing Richmond Bridge over the Hawkesbury River
- New four-lane bridge
- Southee Road noise mounds and noise walls (Stage 2B).

Bells Line of Road

Existing character

Bells Line of Road is located within North Richmond. The portion of the proposal between Crooked Lane and Charles Street is bounded by stands of existing trees and residential areas. Between Charles Street and Terrace Road, it includes commercial properties, which increase in concentration along the road between Terrace Road and the approach to the new four-lane bridge. Commercial uses include petrol stations, retail outlets, the local Post Office and small businesses. The light industrial premises of WestRock are located at the southern portion of Bells Line of Road, on the approach to the bridge.

The existing landscape typically comprises isolated areas of low planting between the existing footpath and adjoining properties. Between Charles Street and Terrace Road there is available space for new planting, however overhead electricity power lines

present a height restriction to street tree planting. Between Terrace Road and the new four-lane bridge the electricity supply is underground, which presents a separation distance requirement for any street planting, but not a height restriction. The existing street trees on the eastbound side of Bells Line of Road are typically either palm trees or *Gleditsia tricanthos*, the latter is considered a 'weed' by Hawkesbury City Council.

A couple of feature buildings are located close to the intersection with Terrace Road - the former old church (now in private ownership) and the shelter at the old 'Water Filling Station'. The Water Filling Station is still apparently used in times of drought, but largely it forms part of a seating area with an old horse water trough, that potentially dates back to an old horse tram line running through this area. This area was developed as a Bicentennial initiative project, with associated landscape works and opened by a councillor in 1988.



Plate 4-1: Bells Line of Road: Charles Street - Terrace Road



Plate 4-2: Bells Line of Road: Terrace Road - WestRock



Plate 4-3: Bells Line of Road: WestRock

4 Urban design concept

Proposed design elements

The key elements of urban design proposed adjoining to the eastbound lane are:

- Shared user path (SUP)
- Potential street tree planting
- Low level planting in pockets for seating areas
- Amended parking layouts, to accommodate tree planting.

SUP

A SUP is proposed adjoining the eastbound lane of Bells Line of Road, with a minimum separation distance of 0.5 metres between the carriageway and the SUP, which is proposed to be hard landscaped with line marking or a change of material or colour oxide density.

The width of the SUP is proposed to be varied from a typical 3.5m width, where street tree planting is proposed between the SUP and the cadastral boundary, down to a minimum of 2.5m.

Street tree planting

Where there are no height restrictions from overhead electricity power lines, the proposed street trees would be the following (or similar, subject to consultation with Hawkesbury City Council at the detailed design stage)

- *Pyrus calleryana* "Capital"
- *Elaeocarpus reticulatus*.

In the section of Bells Line of Road between Terrace Road and Charles Street, the existing electrical power lines would result in any tree planting being restricted to small scale trees, 4-6m high, such as:

- *Magnolia grandiflora* 'Teddy Bear'

Any street tree planting is proposed to include the following (subject to consultation with Hawkesbury City Council at the detailed design stage)

- Strata-vault design to achieve the optimum root growth adjoining to pavements
- Stormwater collection for passive irrigation.

Low level planting

There are a few areas proposed to have new low-level planting of shrubs, grasses and groundcover plants, these area at:

- Bells Line of Road intersection with Terrace Road, adjacent to the eastbound carriageway – at the old 'Water Filling Station' (Stage 2B)
- Bells Line of Road intersection with Terrace Road, Southern side – in front of the Petrol station (Stage 2B)
- Adjoining the WestRock light commercial premises.

Amended parking layouts

Additional parking is proposed in the vicinity of Bells Line of Road at Beaumont Avenue, just beyond the intersection with Terrace Road and amended parking adjoining to the Westrock light industrial premises.

At these locations, notably the Westrock premises, tree planting is proposed to break up the car parking layout, to improve the visual appearance and provide shading to the parked cars.



Plate 4-4: Former Church



Plate 4-5: Shelter, Bells Line of Road



Plate 4-6: Existing Gleditsia trees



Plate 4-7: Existing palm trees



Plate 4-8: *Pyrus calleryana* 'Chanticleer'



Plate 4-9: *Magnolia grandiflora* 'Teddy Bear'



Plate 4-10: Typical landscape improvements

4 Urban design concept

Hanna Park

Existing character

The existing character of the park comprises a mix of passive recreation areas, such as footpaths and seating areas and active recreation areas, such as the skateboard park and playing fields.

The typical tree planting character is that of established mature stands of both exotic and native trees in isolated stands or avenues, reflecting the original design of the park which is displayed on an old sign board.

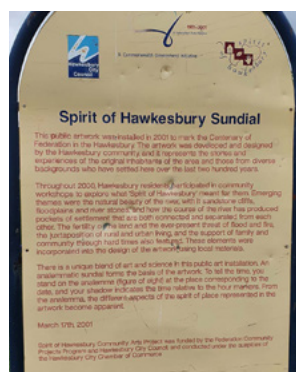
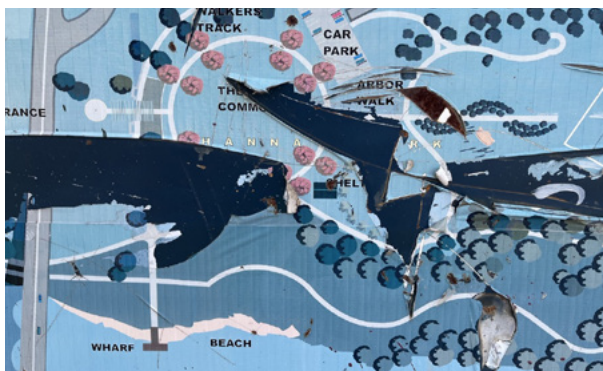


Plate 4-11: Hanna Park signs for original planting design and Park features

There are also two mature Hoop Pine trees that have accompanying plaques, that were planted for commemorative purposes.



Plate 4-12: View of existing Richmond Bridge



Plate 4-13: Existing play equipment



Plate 4-14: Existing skateboard park



Plate 4-15: Existing Hoop Pines

4 Urban design concept

Hanna Park

Proposed design elements

The following key elements are proposed:

- Replacement planting of the two memorial Hoop Pines
- Provision of bicycle parking facilities in conjunction with the new SUP through the park
- Potential upgrade to the existing seating area, adjoining the new proposed four-lane bridge, subject to discussions with Hawkesbury City Council at the Detailed Design Stage
- Consideration and discussions with Hawkesbury City Council at the Detailed Design stage on potential new fitness facilities and recreational facilities.

Hoop Pines

Replacement planting is proposed to be of a semi-mature 800L pot size for both *Araucaria cunninghamii* that will require removal as part of the proposal works. The proposed new tree positions (and associated re-located plaques) would be subject to agreement with Hawkesbury Council and the families of the original donors of the trees, at the detailed design stage. It is currently proposed that the new trees are planted in close proximity to the original tree positions and in symmetry with the initial axis design for tree layout in the park.

Upgraded seating area

There is potential to install new shelters to the existing seating areas where the new four-lane bridge would be in close proximity, subject to future discussions with Hawkesbury City Council.

As part of the proposal, there would be changes to the existing footpath network and the new SUP route would be close to this seating area. The addition of shelters would provide a shaded rest-stop for active transport users.

Bicycle parking

As part of the new SUP through the Park and the general improvements to the active transport connectivity of North Richmond and Richmond, it is proposed to provide areas of bicycle parking within Hanna Park to encourage cyclists to utilise the facilities of the park.

Fitness equipment and recreation facilities

In association with the new four-lane bridge routing through Hanna Park, it is proposed to potentially provide some additional recreational facilities as an opportunity to improve the facilities of the park

There is potential to utilise the under-croft areas to the new four-lane bridge with fitness equipment, sports & nature play facilities. These proposals would need to be developed in consultation with Hawkesbury City Council at the detailed design stage.

Refer to [Plate 4-17 to Plate 4-19](#) for concept elements and [Figure 4-1 on page 33](#) for an indicative potential design.



Plate 4-16: Proposed replacement Hoop Pines

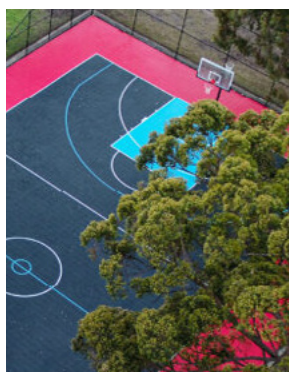


Plate 4-17: Potential sports facilities for under-croft

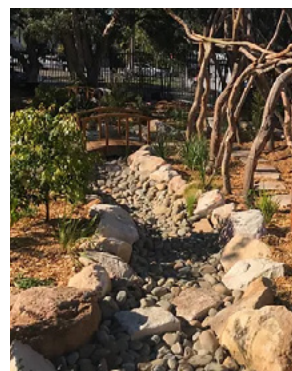


Plate 4-18: Potential nature play facilities for under-croft



Plate 4-19: Potential fitness equipment to under-croft

4 Urban design concept

Bridge under-croft

Proposed urban design elements

Bridge deck configuration

The new four-lane bridge is proposed to have the following configuration:

- Two eastbound lanes (of 3.5m width)
- Two westbound lanes (of 3.5m width)
- 1.2m shoulders to either side of the bridge
- A painted median to separate the eastbound and westbound carriageways of 1m width
- Traffic barriers to both edges of the bridge, with twin steel rails.

Bridge under-croft areas

It is important to consider the urban design of the under-croft areas for the new four-lane bridge, as they could provide valuable areas of public space. An indicative design for these areas has been formulated, however further design of these spaces would be needed to be carried out in consultation with the Council during the detailed design phase.

Key considerations for these areas are:

- The main function as an active transport connection across Hanna Park to the existing Richmond Bridge
- A secondary function to provide recreational uses, such as:
 - Landscape planting elements
 - Seating
 - Fitness and recreational facilities
- In addition, these areas would require design with reference to the follow requirements:
 - Lighting to ensure safe use of under-croft areas
 - Surveillance to prevent vandalism.

Urban design have investigated a number of design embellishments to the design of the bridge structure, that would be coordinated with the bridge designers and Council at further stages of the bridge design.

The refinements of the design of the bridge piers that would be developed further at the detailed design stage are illustrated in **Plate 4-21 to Plate 4-23**, and refinements to the design of the bridge are illustrated in **Plate 4-50 on page 41**.

An important opportunity exists for the incorporation of First Nations artwork to the surfacing of the under-croft or mural designs to the base of the concrete bridge pier pile cap support. In addition, artwork could be integrated into the paving design of the under-croft area or in the acrylic surfacing to any of the sports or fitness areas proposed for the under-croft. All such design opportunities to be explored to align with the guiding principles of the Connecting with Country Report. Refer to for concept elements and an indicative potential design.



Plate 4-20: Proposed four-lane bridge



Plate 4-21: Under-croft to Coburg & Moreland subway stations



Plate 4-22: Fitness and recreation to bridge under-croft



Plate 4-23: Bateman Bays Bridge mural

4 Urban design concept

Indicative under-croft design

An indicative urban design approach has been illustrated for the under-croft area in Hanna Park. As illustrated in the Stage 2A concept design drawing extracts, in particular, Plan extract 2 (refer [Section 4.4](#)).

The indicative concept design illustrates the following:

- Hoop Pine replacement tree planting and potential relocation of the ceremonial paved area and flag pole
- Upgrade to the existing seating area (adjacent to the existing Wisteria vine arbour), with potential new shelters
- Integration of rock pitching (to achieve rock scour protection to the bridge abutment) with planting and predominately turf
- Proposed use of turf for all swales.

Further consideration of the indicative under-croft design would be undertaken at the detailed design stage, and in consultation with Hawkesbury City Council. [Figure 4-1](#) below, brings together examples of features that could be developed. This includes the treatment of hard surfaces, with the potential for collaboration with First Nations artists. All such design opportunities to be explored to align with the guiding principles of the Connecting with Country Report. Treatments could include the acrylic surfacing to the basketball court, the colour oxide patterning to the concrete hard surfacing elements, and/ or patterning or murals to the concrete bridge piers.

Design elements which could be potentially provided under development of the indicative under-croft design include fitness equipment, a half-sized basketball court, table tennis tables, and nature play such as balancing logs and stepping stones set within mulch. Additionally, there are opportunities for seating including sandstone block elements and raised timber decking, and the relocation or addition of memorial elements, including a relocated paved area with new brick paving and curved seating and Hoop pines.

Finally, indicative planted elements are shown, such as turf swales to aid drainage to the north and south of the area, and a dry river creek bed comprised of stones and boulders set in concrete forming the swale to the eastern side of the area, which could also act as Nature Play. Planting is proposed with concrete edging to break up the space, provide visual amenity and reduce the hardscape elements where turf would not readily establish, and Turf is proposed where natural light conditions should permit establishment.

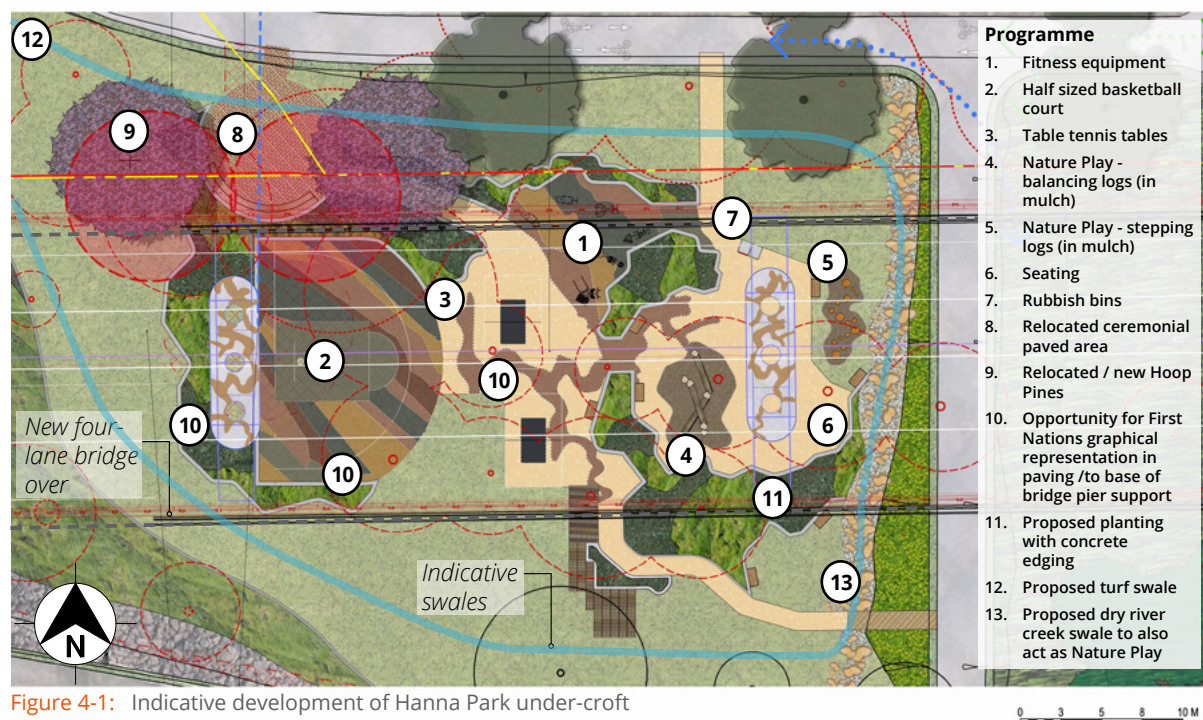


Figure 4-1: Indicative development of Hanna Park under-croft

4 Urban design concept

Existing Bridge

Existing character & description

The current reinforced concrete bridge structure was built in 1905, replacing the original timber bridge of 1860. It is one of the few concrete 'Monier' arch bridges in Australia. The bridge is referenced on the Roads and Maritime Heritage and Conservation Register as an item of State significance.

The existing bridge comprises a series of concrete arches that form its longitudinal elevation with concrete abutment structures at intervals across the Hawkesbury River. There is relatively minimal clearance between the underside of the bridge structure and the normal water level of the river, hence the bridge deck would be underwater in times of high-water levels (floods).

On the side of the bridge where the new four-lane bridge would be located, there is a secondary structure that supports a large water mains pipe off the side of each bridge abutment.

The bridge comprises a two-lane carriageway with a single eastbound and westbound lane and a pedestrian footpath adjoining to the westbound carriageway, separated from the bridge by an upstand rail and on the western side there is a pedestrian balustrade. This pedestrian balustrade is non-compliant with current regulations, including its height.

Proposed design elements

The concept design proposal has investigated options and considered various factors to determine the following:

- Re-purposing of the bridge for active transport
- Upgrade of the existing western pedestrian balustrade to be a compliant structure and replication of this structure on the eastern side of the bridge
- Provision of seating and rest areas on the bridge and approaches
- Redesign of the approaches to the bridge to accommodate seating, tree planting and other recreational uses.

Re-purposing of the bridge

The proposal to re-purpose the existing bridge would transform the bridge through the relocation of traffic to the new four-lane bridge. The existing bridge would become accessible only to pedestrians and cyclists and provide unique opportunities for the local community and visitors for a public accessible space to traverse and view the Hawkesbury River and landscape.

The following is proposed:

- Use of the existing bridge carriageway as an active transport route for pedestrians and cyclists, with either a broken line separation of pedestrians and cyclists, change of surfacing colour or change of material
- Re-surfacing of the existing bridge carriageways with a surface coating material application
- Retention of the existing raised pedestrian pathway on the bridge for maintenance purposes only.



Plate 4-24: Existing bridge - eastern elevation



Plate 4-25: Existing bridge - western elevation



Plate 4-26: Existing bridge - view towards North Richmond



Plate 4-27: Existing bridge - view towards Richmond

4 Urban design concept

Upgrade of the existing pedestrian balustrade

The current balustrade replaced the original handrail of the 1905 bridge. This handrail is of minimal design and does not meet current requirements for pedestrian or cyclist safety.

Transport have referenced the following urban design guidance principles for the balustrade upgrade:

- Beyond the Pavement, 2020
 - Principle six: *Connecting to Country and Incorporating heritage and cultural contexts*
 - Principle nine: *Achieving integrated and minimal maintenance design*
- Bridge Aesthetics, 2019
 - S.7.2: Modifications and additions to heritage bridges and bridges of cultural value.

Transport have reviewed the design of the original 1905 bridge from the drawing in [Plate 4-28](#) of the existing bridge and its balustrades, and concluded the following design element relevant for the upgrade design:

- Post spacing relates to the bridge piers as viewed in elevation, including a narrowed-spaced pair offset from the pier centrelines - this is the basis of the design concept in [Plate 4-32](#).

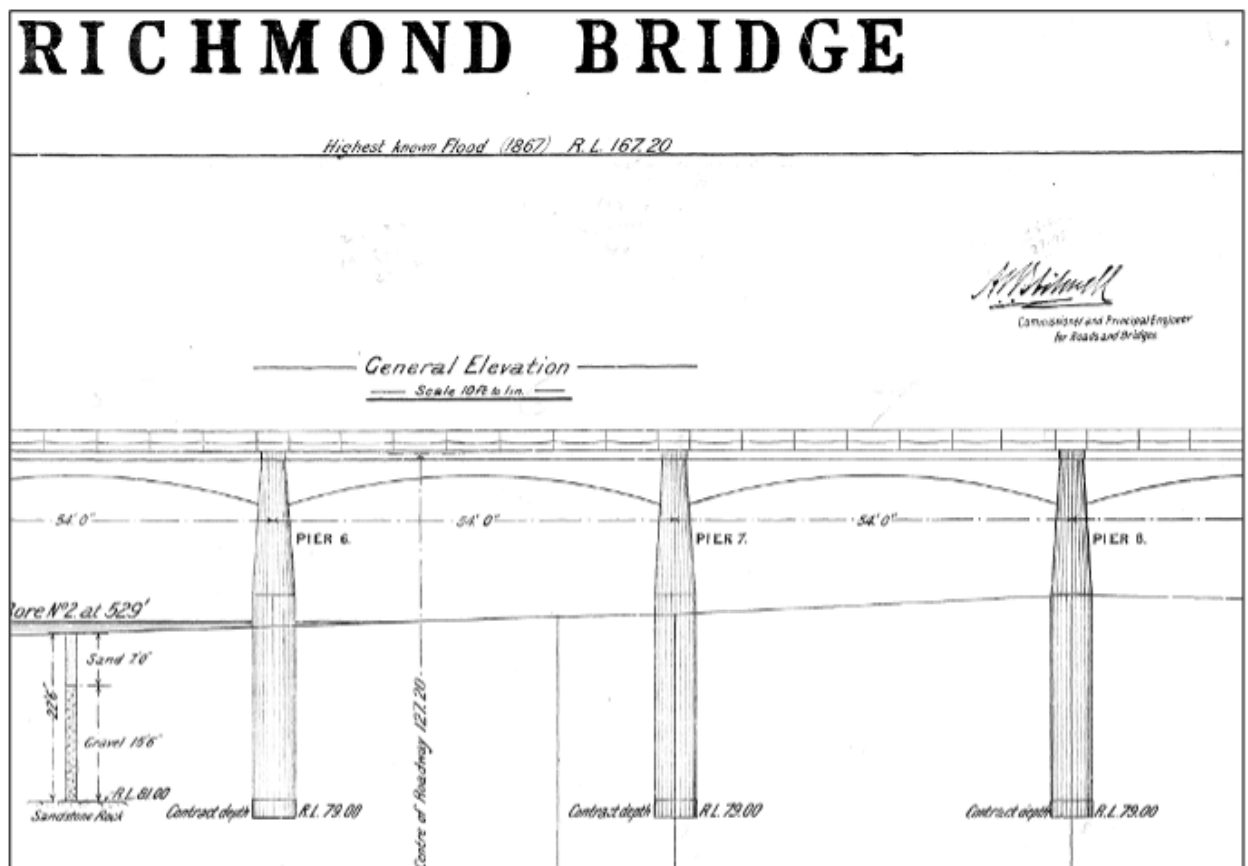
Design of the replacement balustrades requires a collaborative approach including heritage advice, urban design, structural and road design to ensure a successful and appropriate solution for this important state heritage-listed structure.

Transport have identified the following specific design requirements:

- New balustrades of a consistent form and detail are required along both sides of the existing bridge.
- Design of new balustrades to consider the form, character and details of the original 1905 bridge.
- Post spacing to be in response to existing bridge form, including bridge piers as viewed in elevation.
- Design to satisfy design standards for pedestrian and cyclist use.
- Design to satisfy standards for pedestrian loading.
- Designed to be collapsible in [direction of the river flow]
- Design and materials selection to maximise durability and ease of maintenance.

Precedents

The design of the existing Richmond Bridge was reviewed in conjunction with Sydney rail bridges of a similar era (1880's -1930's). This includes the John Whitton Bridge (1886), Central Station (1901-1932) and the Richmond Railway Bridge (1908). Refer [Plate 4-29 to Plate 4-31 on page 36](#).



[Plate 4-28](#): Existing bridge original 1905 drawing

4 Urban design concept

The John Whitton Bridge represents a classic steel railway bridge with lattice design, that suits the steelwork design of the bridge as a whole. Using a similar design on the North Richmond Bridge (existing bridge) does not appear appropriate.

The balustrade design of Central Station (Eddy Avenue) was considered a potential concept to follow for the design of the existing bridge, however after initial reviews, a less focused heritage design and simpler form was considered as a base for the preliminary concept design.

The Richmond Railway Bridge balustrade in principle would be the ideal concept design for the existing bridge to follow, based on the similarity in the shape of the existing bridge form and the simple horizontal balustrade design. This horizontal design is also similar to the handrail depicted in the original drawing of the existing bridge from 1905 (refer [Plate 4-28](#)).

The new balustrade to the existing bridge, must satisfy the following requirements:

- Balustrade must comply with safety standards for pedestrian and cyclist safety
- Balustrade must not encourage anti-social behaviour such as climbing.

As a concept, the horizontal design cannot be followed, but the simplicity and relationship to the Richmond Railway Bridge form should be matched where possible.

Instead, Transport have encouraged developing a concept that focuses on the following:

- Simple form that does not compete with the existing bridge concrete arch form
- Compliant vertical balustrade form
- Design to relate to concrete pier structures of the existing bridge.

This concept is illustrated by [Plate 4-32](#) and developed into a preliminary design concept design in [Plate 4-33](#), [Plate 4-34](#) and [Figure 4-2 on page 37](#)

Lighting

At this stage, lighting of the existing bridge does not form part of the proposal works. It is however proposed to investigate further the provision of lighting at the Detailed Design stage for the approaches to the bridge and also the bridge deck itself (part of the active transport route). Discussions would be required with Hawkesbury City Council and Transport .

Items to be considered for lighting of the bridge include:

- CPTED requirements
- Resilience to flooding
- Potential for a solar powered network for pedestrian lighting
- Heritage review of potential light fittings and poles.



Plate 4-29: John Whitton Bridge, Meadowbank



Plate 4-30: Central station Sydney



Plate 4-31: Richmond Railway Bridge

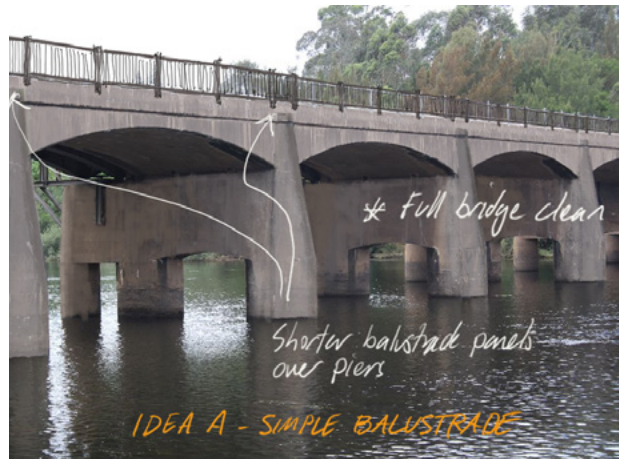


Plate 4-32: Preliminary sketch for new balustrade (Transport)

4 Urban design concept

Preliminary concept design

Plate 4-33, Plate 4-34 and Figure 4-2 illustrate the development of the concept through the following:

- Development of a narrow width balustrade panel at the location of the bridge pier supports
- Potential to highlight this design, with different grey colour paint colours.

The design of the balustrade and its functionality has been determined as follows:

- The balustrade design should enable the ability to fold-down balustrade panels (either manually or mechanically, depending on the weight of the panels).
 - Folding-down of balustrade panels would only take place when flood level warnings are in place
- The balustrade design should enable in-built failure of the balustrade fixing at floods greater than 1 in a 2 year flood occurrence level
 - This should involve shearing off of the balustrade fixing to prevent any damage to the concrete structure of the existing bridge.

In terms of the balustrade aesthetic design, this has been determined as follows:

- Provision of an elliptical top rail
- Blade profile galvanised metal frame supports
- Blade profile or square hollow section vertical balusters.

Subject to lane marking on the bridge, a cyclist protection rail is not considered necessary in the current concept design.

The preliminary balustrade concept design is being reviewed structurally to produce a basic design that can be developed into Detailed Design. Some of the modifications to the design shown in Figure 4-2 include moving the balustrade panel supports.

It is envisaged that the new balustrade design will be installed to the western side of the existing bridge (where there is an existing pedestrian path) by the end of 2025. The balustrade to the eastern side would be installed when the existing bridge is re-purposed to become an active transport route, under the Stage 2A works time frame. Details of this re-purposing are illustrated in Plate 4-35 to Plate 4-38 on page 38.

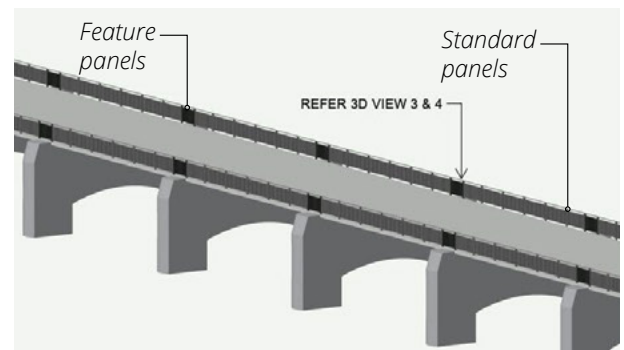


Plate 4-33: Concept balustrade design

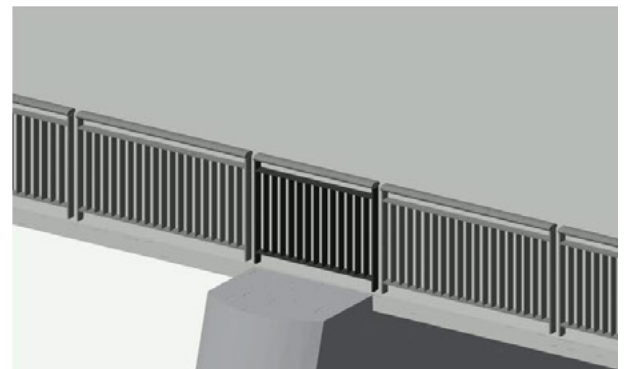


Plate 4-34: Feature panel locations at bridge piers

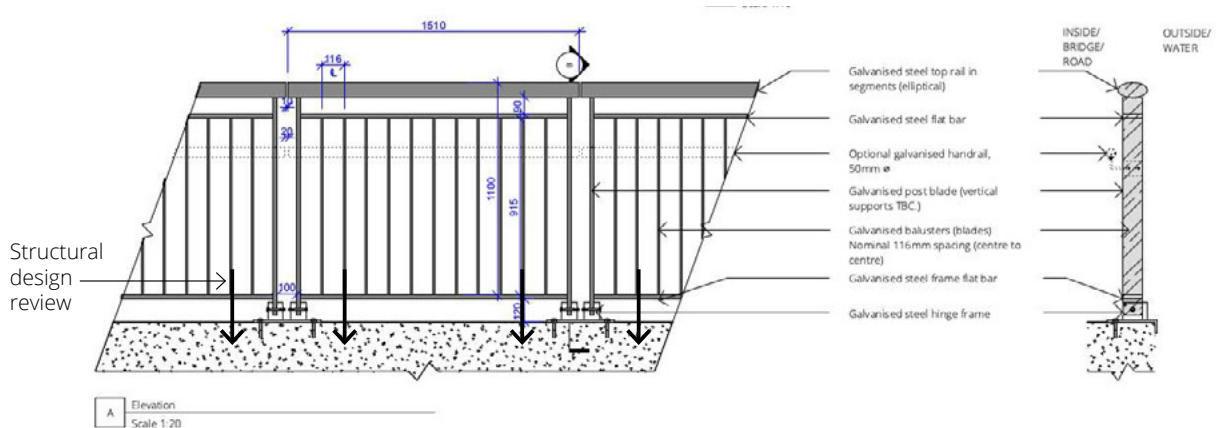


Figure 4-2: Balustrade concept design - feature panel

4 Urban design concept

Provision of seating and rest areas

The precedent images shown in [Plate 4-35](#) to [Plate 4-38](#) illustrate the following concepts that were explored for the re-purposing of the existing bridge and should be explored further at the Detailed Design stage:

- Informal separation of pedestrian and cyclists using colour change of materials ([Plate 4-35](#))
- Formalised segregation of pedestrians and cyclists using line marking ([Plate 4-36](#))
- Example bridge coloured surfacing ([Plate 4-37](#))
- Indicative example of coloured acrylic surface coating pattern (or similar) for the existing Richmond Bridge ([Plate 4-38](#)).

Whilst aesthetically, the informal separation is a good solution, functionally it can be dangerous, where cyclist traffic flows are high.

For the re-purposing of this bridge it is proposed to proceed with a line marking option to segregate pedestrian and cyclists.

In addition, the existing bridge currently has a raised pedestrian footpath on the western side of the bridge, alongside which the new balustrade is required. It is proposed to also line mark a dedicated pedestrian path on the eastern side of the bridge and install a similar pedestrian balustrade.

As part of the re-purposing of the bridge, it is proposed to make good any defects in the surfacing of the existing bridge and apply a new fine asphalt coating to the bridge, that can then take the application of line marking and any proposed graphics.

A patterning of different muted colours is currently shown to give an indication of what might be applied to the bridge. This could be in the form of an acrylic coating or similar. There is an opportunity for this graphic patterning to be produced in collaboration with a First Nations artist.

An example layout of indicative surfacing and seating areas is referenced in [Plate 4-39](#) and shown in more detail in [Plate 4-40](#) and [Plate 4-41](#). In this example, the following is proposed:

- Active transport bridge deck for cyclists and pedestrians
- Existing raised footpath on western side of the bridge to be retained for pedestrian only traffic or maintenance access
- 5 separate seating areas proposed along the length of the bridge with accessible ramp access between levels.

Redesign of the southern approach to the bridge

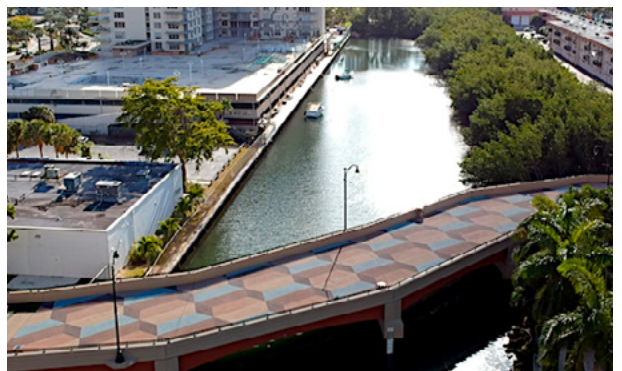
At the southern end of the existing bridge, it is proposed to remove some of the existing road surfacing on the approach to the existing bridge and install trees within turf (since a reduced width is only required for active transport). There may need to be some planter build-up to produce the soil depths required for trees. The whole redesign of the southern approach, would require discussions with Hawkesbury City Council at the Detailed Design stage.



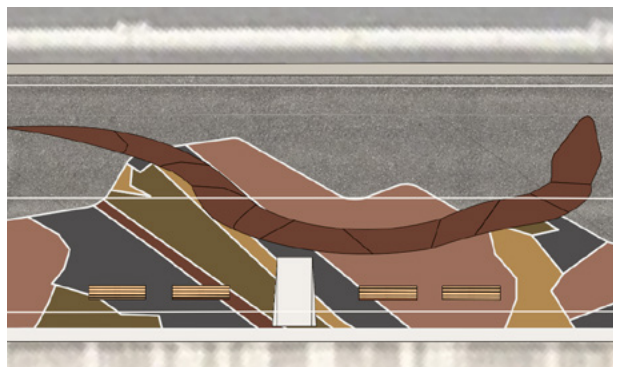
[Plate 4-35](#): Example of pedestrian & cyclist shared bridge



[Plate 4-36](#): Example of line marking segregation, Rozelle Parklands



[Plate 4-37](#): Example of bridge coloured surfacing



[Plate 4-38](#): Example of potential graphics for the bridge

4 Urban design concept

An indicative seating and rest area arrangement is illustrated in [Plate 4-40 to Plate 4-41](#). This is based on the outer zones of the existing bridge deck being line marked for pedestrian access and the inner area being marked for cyclist access on the eastern side and seating on the western side, with ramp access to the western side footpath.

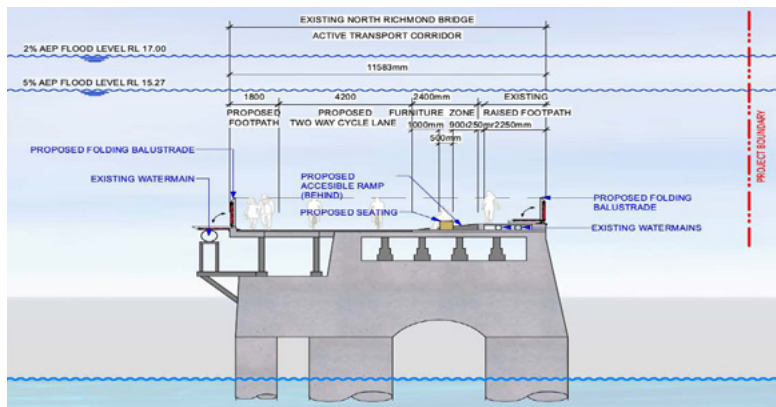
The seating is indicative only and would potentially be sandstone block seats fixed to the bridge deck.

[Plate 4-38](#) also illustrates in more detail the indicative patterning of coloured acrylic coating surfacing that

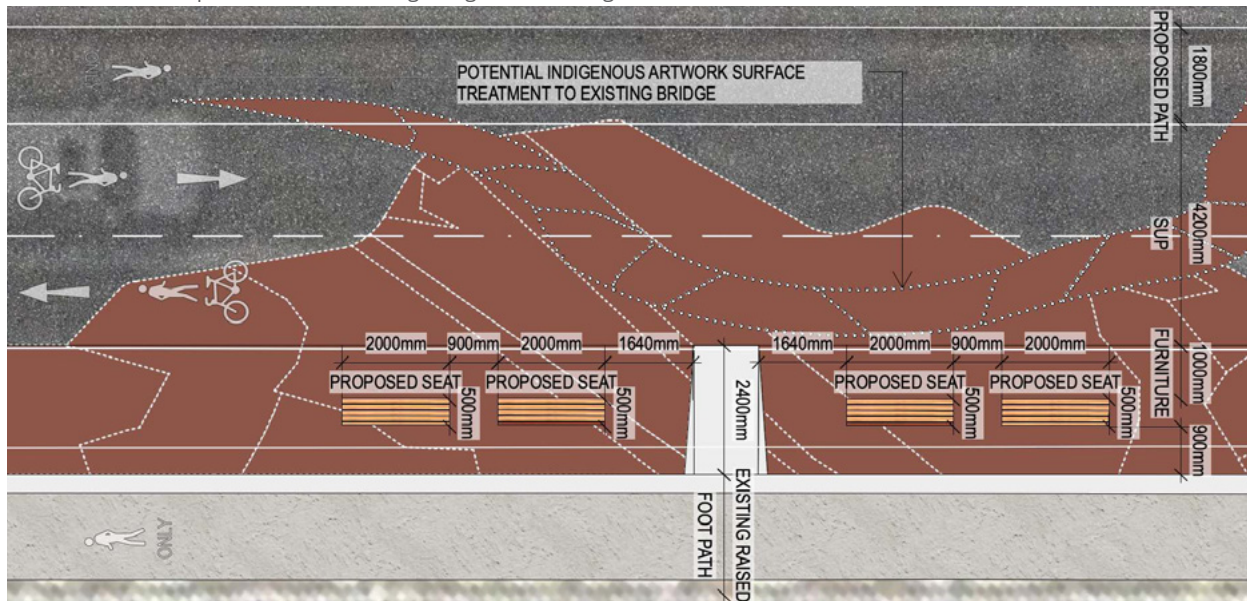
could be developed in consultation with a First Nations artist.

The developed existing bridge section ([Plate 4-39](#)) illustrates the location of the proposed seating area and also the new balustrades.

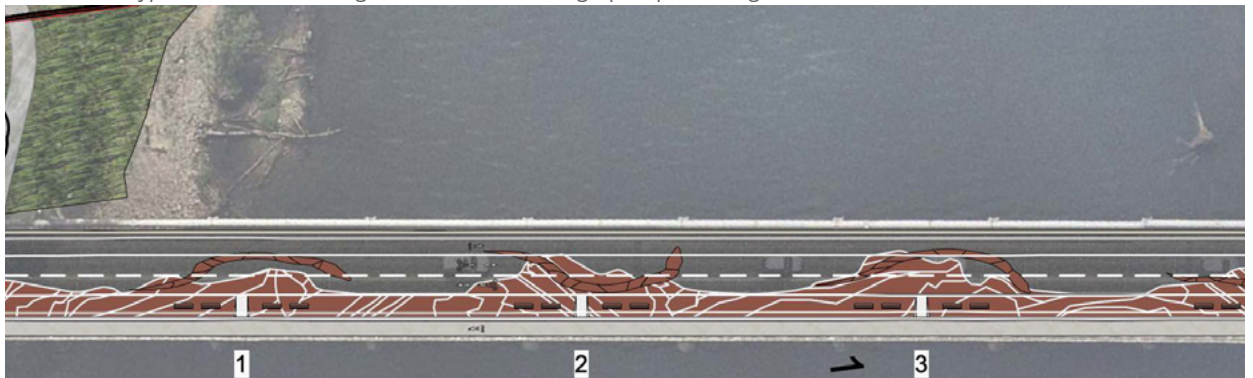
These indicative proposals would be developed to align with the guiding principles of the Connecting with Country Report, at the Detailed Design stage in consultation with Hawkesbury City Council and Transport.



[Plate 4-39](#): Developed section of existing bridge with seating areas



[Plate 4-40](#): Typical detail for seating areas and indicative graphic patterning



[Plate 4-41](#): Example layout of seating areas and surfacing

4 Urban design concept

New four-lane bridge

Structural design

Strategic design

The Strategic design report: *Richmond Bridge and Approaches Strategic Concept Options Study - Urban Design, Landscape Character, and Visual Assessment Report* (Tract 2019) identified a series of alternative bridge type designs for review of the potential visual impact of the new bridge when viewed from the existing Richmond Bridge.

These design options are illustrated in **Plate 4-42** to **Plate 4-45**. In urban design terms, the visual impact will be dependant on the number of pier, however if the pier forms are reviewed only as a single entity, then the 'T' pier or single pier is preferred, followed by the 'V' pier. These present the most slender structural forms. Structurally and for this proposal location over the river, the 'T' form is preferred, based on the reduced resistance to water flows.

Following a Value Management Workshop with Transport on 23 July 2023, the 'T' pier form was the form chosen for developing the concept design of the proposal.

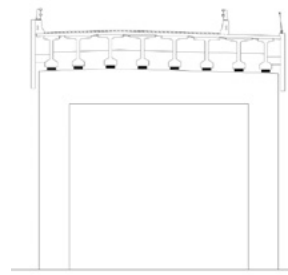


Plate 4-42: T bulb girder with Pants pier

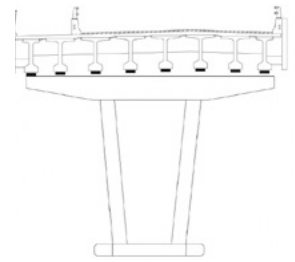


Plate 4-43: T bulb girder with T pier



Plate 4-44: T bulb girder with V pier

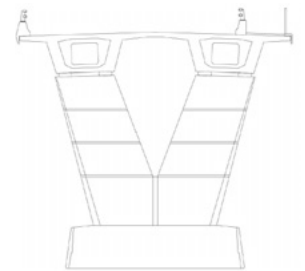


Plate 4-45: Box girder with V pier

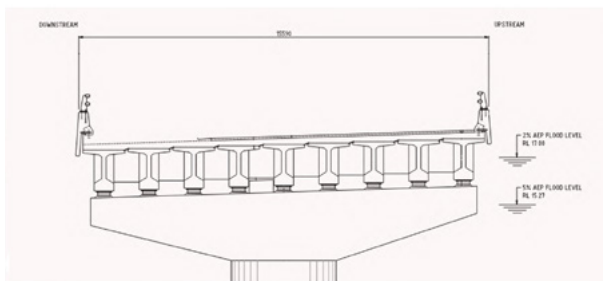


Plate 4-46: Bulb T option 1

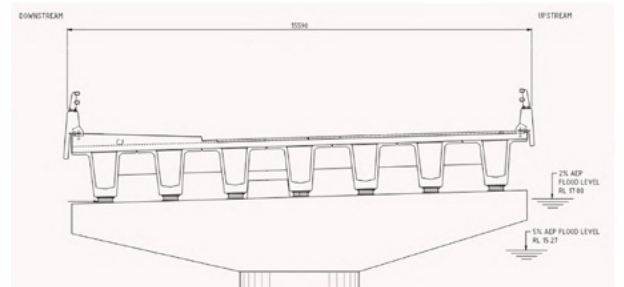


Plate 4-47: Super T option 2

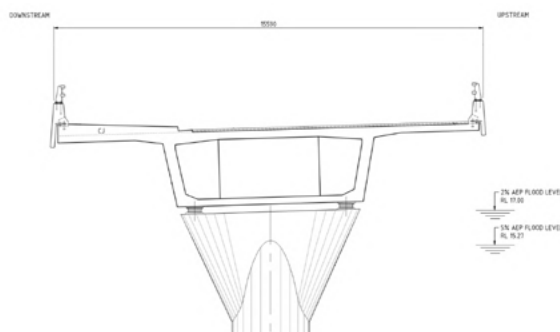


Plate 4-48: Single box girder option 3

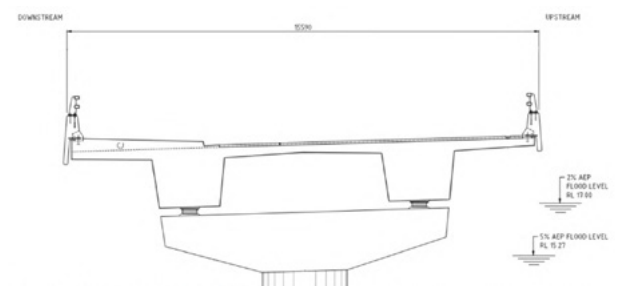


Plate 4-49: Twin concrete infill girders option 4

Concept options

As part of the Value Management Workshop with Transport noted above, bridge designs with different traffic flows were reviewed and assessed, with a conclusion to proceed with a four-lane bridge. Four Concept Design options were subsequently explored by Aurecon engineers and evaluated in the *Bridge*

Options Design Report - NRBS2-AURC-NWW-BR-RPT-000001 (August 2023).

The four concept options are illustrated above in **Plate 4-46** to **Plate 4-49**.

4 Urban design concept

Concept design

The Super 'T' option was adopted by Transport following structural review of the 4 concept options under the *Bridge Options Design Report*.

In urban design terms, the Super 'T' and 'Twin concrete infill girder' options are more preferable, given their more open structures, allowing more visibility through the bridge structure to the existing landscape.

Some preliminary design guidelines for the development of the bridge design at the Detailed Design stage have been outlined by the bridge designers as follows:

- A single pier column, rectangular in shape - to minimise the construction work over water
- Rectangular pier column with rounded edges - to minimise the cantilevering length of the headstock, thereby reducing the depth of the headstock and better for minimising impacts on hydraulic flows

- Rectangular column - to have additional capacity to resist the vessel collision load compared to circular columns that have the same diameter as the thickness of the rectangular column.
- A rectangular column - to compliment the existing bridge substructure.

As part of the urban design coordination, refinements have been proposed to the design of the new four-lane bridge as outlined in the *Design development* section of this report and illustrated in [Plate 4-46](#) to [Plate 4-49](#).

It is important that these modifications are developed with the structural designers of the bridge at the Detailed Design stage.

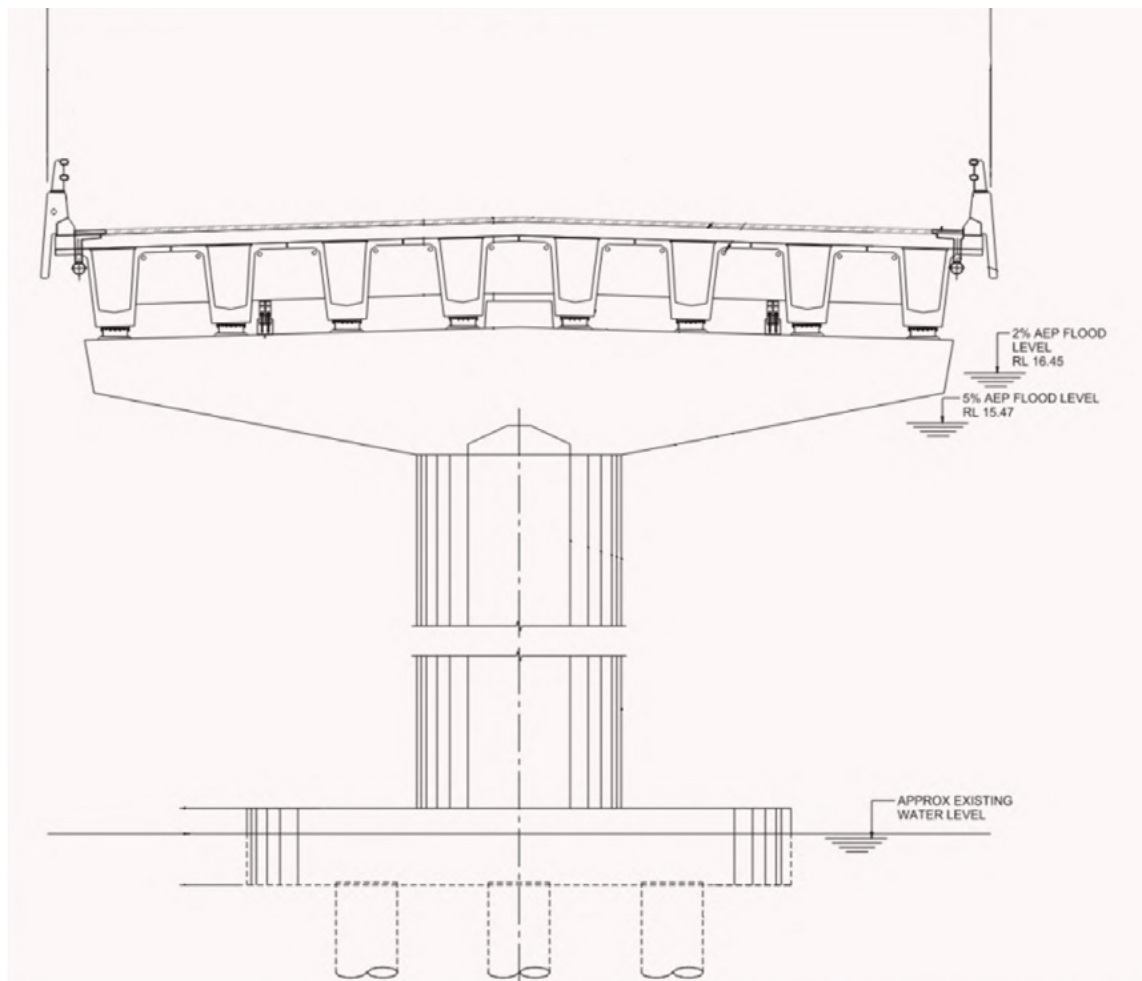


Plate 4-50: 80% concept design Super T

4 Urban design concept

Concept form

The concept design form of this proposal has been developed from the principle form of a single pier. The current design is that of a 'Super T'.

If this form was to be modified in any way at the Detailed Design stage, it should be based on the following key elements:

- Single piers with tapered headstocks
- Rounded headstock and pile cap

In visual appearance, it should be similar to the precedent images of the Sydney Gateway Bridge, being constructed by Transport for the new airport link road. Images are illustrated in [Plate 4-51](#) and [Plate 4-52](#).



Plate 4-51: Sydney Gateway Bridge simulation (Transport)



Plate 4-52: Precedent image single pier tapered headstock - Sydney Gateway Bridge (Transport)

Design development

During the development of the concept design of the new four lane bridge form, urban design worked collaboratively on the design of the structural form as illustrated in [Plate 4-53](#) and [Plate 4-54](#). The modifications included in the current concept design were:

- Tapered ends to the bridge headstock
- Rounding of pile caps ends
- Tapered inset junction of pier and headstock

At the Detailed Design stage it is envisaged that these modifications would be developed further and also the following opportunities:

- Provision of vertical grooves or rebates to the piers or textured finishes to provide shadow relief
- Incorporation of potential First Nations graphical representations or artwork in the form of a mural or etched concrete surface. Design opportunities to be explored to align with the guiding principles of the Connecting with Country Report.



Plate 4-53: Urban design review of bridge structure

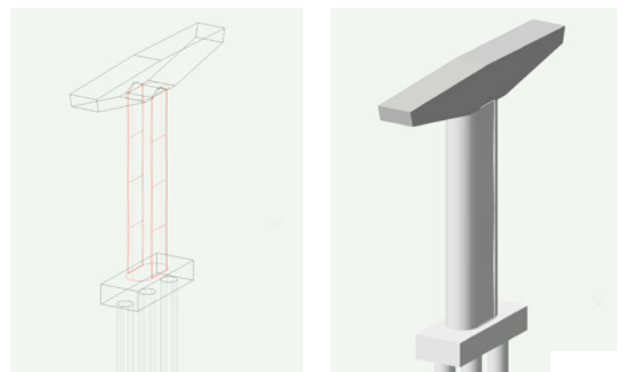


Plate 4-54: Vertical groove to provide shadow

4 Urban design concept

Bridge abutments and wall finishes

There are opportunities throughout the proposal to ensure that high quality finishes and design are incorporated into the bridge abutments and wall finishes.

At the southern end of the new four lane bridge at CH1740, it is proposed to incorporate rock pitching where the bridge approaches the existing ground level. At this location the road batters running parallel to the road, need to return under the bridge structure. To reduce the risk of erosion and given the steep gradient, rock pitching is proposed. An example of this arrangement is shown in **Plate 4-55**.

In addition, at the northern end of the existing bridge, rock pitching is proposed to the embankments to the side of the proposed pedestrian path, that leads onto the re-purposed existing bridge (for active transport).

In terms of wall abutment finishes to the new four lane bridge, the exact finish will need to be determined at the Detailed Design stage when the method of construction has been determined.

As a minimum, wall abutments should be one of the following:

- Pre-cast concrete panels with high quality finish
- Pre-cast concrete panels with textured finishes or embedded / etched graphics
- Off-form concrete with textured finish or embedded/ imprinted graphics .

Retaining walls

In addition, there are a number of locations where retaining walls are proposed.

At these locations, such as the eastern end of Kurrajong Road, close to Chapel Street the following finishes are proposed:

- Off-form concrete wall finishes, with either colouring (oxides), textures or textured graphics or imprints, featuring indigenous themes.



Plate 4-55: Example rock pitching (Hume highway)



Plate 4-56: Wall abutments (Kiama bypass)



Plate 4-57: Pre-cast panels



Plate 4-58: Textured finish



Plate 4-59: Imprinted pre-cast panels with First Nations artwork (Sydney Gateway)

4 Urban design concept

Southee Road

Proposed design elements

Noise walls (Stage 2B)

Noise walls are proposed in two main locations, as confirmed by a noise wall study:

- As free-standing elements (or fixed to a Type F kerb)
- In conjunction with a vegetated mound
- In both instances, the currently proposed material is that of an acrylic type panel (e.g. Plexiglas) that has the following benefits:
 - Panels can be made to have varying levels of transparency, this is ideal for the noise walls to the Richmond Bypass to Southee Road, to allow existing views from adjoining residential areas to be retained for upper sections of the panels while screening lower views of the bypass
 - Panels can be clear or a variety of colours (refer to [Plate 4-60](#))
 - Panels can incorporate 'bird guard' features (particularly important for transparent panels) and 'anti-glare' features.

Noise mound

The proposal would see a vegetated noise mound with an associated noise wall separating a section of the Richmond Bypass and the residential areas of Southee Road.

The height of the mound has been confirmed by a noise study that is currently under review.

It is proposed to plant the mound with a mix of native grasses at the upper levels of the mound with native shrubs to the base of the mound. The arrangement of this planting is proposed as an informal 'wave formation' to add visual interest to the mound and

soften hard structures.

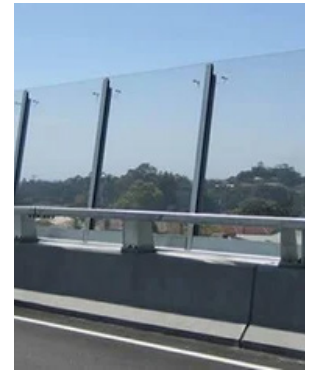
Pecan Trees

A line of Pecan trees (*Carya illinoensis*) is located adjoining to the westbound carriageway of Southee Road, between the intersection of Anderson Avenue and Londonderry Road. These trees are considered significant to retain.

It is proposed to locate the Richmond Bypass and any construction works at a sufficient distance away from these existing Pecan trees to enable their survival. This has been determined by an Arborist as a minimum distance of 8.5m.

A full-height stand-alone noise wall is proposed along the length of the existing Pecan trees with a transparent top section to maintain views from the existing residential properties on Southee Road.

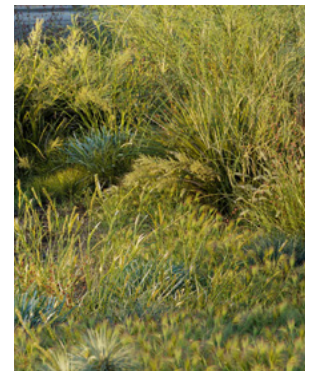
At the base of the noise wall, informal shrub planting and native grasses are proposed. The turf at the base of the existing trees is proposed to be retained to avoid disturbance to the existing Pecan tree roots. Refer to [Plate 4-63](#).



[Plate 4-60](#): Acrylic type noise wall panels



[Plate 4-61](#): Early visualisation for noise mound



[Plate 4-62](#): Typical planting proposals for noise mound



[Plate 4-63](#): Early visualisation for Pecan Trees

4 Urban design concept

4.3 Plant species

The following lists, contained in [Table 4-1](#) to [Table 4-5](#), represent various material sources as a basis for tree and plant species that may potentially be used throughout the proposal area.

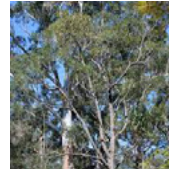
Table 4-1: Cumberland Shale Plains Woodland

Source:

*1 Biodiversity assessment report for review of environmental factors (REF)_December 2023, species present on site

*2 Typical Cumberland Plains Woodland species from Taken for Granted, Benson & Howell_1995

Plant Species	Common Name	Height	Spread
<i>Angophora floribunda</i> *1	Rough-barked Apple	20m	10m
<i>Eucalyptus moluccana</i> *1	Grey box	25m	12m
<i>Eucalyptus eugenoides</i> *1	Thin-leaved Stringybark	30m	25m
<i>Eucalyptus amplifolia</i> *1	Cabbage Gum	30m	12m
<i>Bursaria spinosa</i> *1	Sweet Bursaria	3m	3m
<i>Indigofera australis</i> *2	Austral Indigo	1.8m	1.8m
<i>Themeda australis</i> *2	Kangaroo Grass	1.5m	0.5m



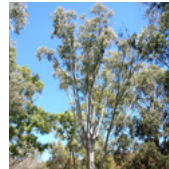
Angophora floribunda



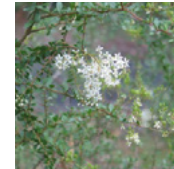
Eucalyptus moluccana



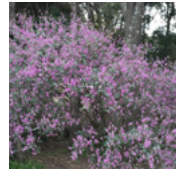
Eucalyptus eugenoides



Eucalyptus amplifolia



Bursaria spinosa



Indigofera australis

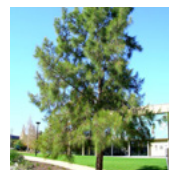


Themeda australis

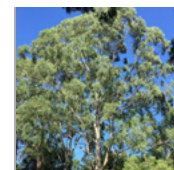
Table 4-2: Cumberland Red Gum River-flat Forest

Source: Biodiversity assessment report for review of environmental factors (REF)_December 2023, species present on site

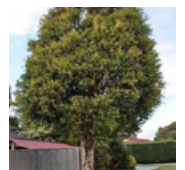
Plant Species	Common Name	Height	Spread
<i>Casuarina cunninghamiana</i>	River Oak	30m	12m
<i>Eucalyptus saligna</i>	Sydney Blue Gum	35m	25m
<i>Callistemon salignus</i>	Willow Bottlebrush	10m	5m
<i>Cynodon dactylon</i>	Bermuda Grass	0.3m	0.2m



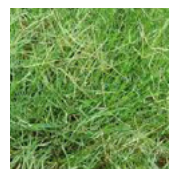
Casuarina cunninghamiana



Eucalyptus saligna



Callistemon salignus



Cynodon dactylon

4 Urban design concept

Table 4-3: Southern Lower Floodplain Freshwater Wetland and Hawkesbury Council Floodplain list

Source:

*1 Biodiversity assessment report for review of environmental factors (REF)_December 2023, species present on site

*2 Hawkesbury Catchment Species Selection Guide_Hawkesbury City Council (_Richmond-Windsor)

Plant Species	Common Name	Height	Spread
<i>Casuarina cunninghamiana</i> *2	River Oak	30m	12m
<i>Casuarina glauca</i> *2	Swamp She-oak	15m	10m
<i>Eucalyptus saligna</i> *2	Sydney Blue Gum	35m	25m
<i>Melaleuca linarlifolia</i> *2	Snow-in-summer	10m	8m
<i>Tristaniopsis laurina</i> *2	Water Gum	6m	3m
<i>Carex appressa</i> *1*2	Tall Sedge	1m	1m
<i>Juncus usitatus</i> *1*2	Common Rush	1.2m	0.5m
<i>Lomandra longifolia</i> *2	Spiny-head Mat-rush	0.6m	0.6m
<i>Microlaena stipoides</i> *2	Weeping grass	0.3m	0.2m



Casuarina cunninghamiana



Casuarina glauca



Eucalyptus saligna



Melaleuca linarlifolia



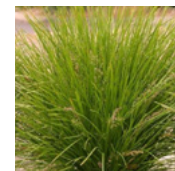
Tristaniopsis laurina



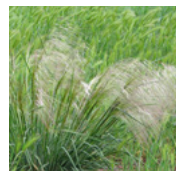
Carex appressa



Juncus usitatus



Lomandra longifolia



Microlaena stipoides

Table 4-4: Hanna Park - Existing trees

Source: Existing species on site

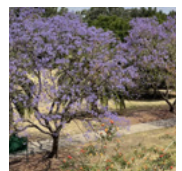
Plant Species	Common Name	Height	Spread
<i>Auracaria cunninghamil</i>	Hoop Pine	50m	20m
<i>Eucalyptus sp</i>	Gum Trees	35m	25m
<i>Jacaranda mimisofolia</i>	Fern Tree	10m	6m
<i>Lophostemon confertus</i>	Brush Box	10m	7m
<i>Melia azedarach</i>	White Cedar	10m	8m
<i>Phoenix canarensis</i>	Canary Island Date Palm	30m	15m



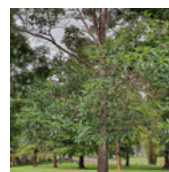
Auracaria cunninghamil



Eucalyptus sp



Jacaranda mimisofolia



Lophostemon confertus



Melia azedarach



Phoenix canarensis

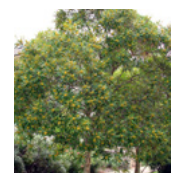
4 Urban design concept

Table 4-5: Hawkesbury area/ Penrith City Council - Street trees

Source:			
*1 Hawkesbury area native trees list			
*2 Penrith City Council tree list			
Plant Species	Common Name	Height	Spread
<i>Eucalyptus amplifolia</i> *1*2	Hoop Pine	50m	20m
<i>Tristaniaopsis laurina</i> *1*2	Water Gum	6m	3m
<i>Elaeocarpus reticulatus</i> *2	Blueberry Ash	6m	3m
<i>Fraxinus pennsylvanica</i> 'Urbanite'*2	Urbanite Green Ash	6m	3m
<i>Waterhousia floribunda</i> cultivars*2	Weeping Lilly Pilly	6m	3m



Eucalyptus amplifolia



Tristaniaopsis laurina



Elaeocarpus reticulatus



Fraxinus pennsylvanica 'Urbanite'



Waterhousia floribunda cultivars

The species contained in Table 4-1 to Table 4-5 form the basis of some of the key trees and plant species that are proposed to be used in various plant mixes, which will be continually developed through the detailed design stage and onto construction.

It should be noted that some species will be replaced by more commercially available species, or species frequently used on Transport infrastructure road projects, particularly for shrub, groundcover and grass species.

Some of the species proposed to be used are:

Trees

Feature trees

- *Auracaria cunninghamii* (Hoop Pine)
 - Proposed replacement of existing memorial trees, but also proposed feature trees to line of proposed four-lane bridge
- *Brachychiton populneus* (Kurrajong)
 - Identified as a local species under the Heritage report (SOHI), distinctive form for statement plantings e.g. Castlereagh roundabout
- *Melia azedarach* (White Cedar)
 - Key existing Hanna Park feature tree for new tree planting within Hanna Park
- *Livistonia australis* (Cabbage Tree Palm)
 - Distinctive form for statement plantings
- *Phoenix canarenis*
 - Key existing Hanna Park feature tree for new tree planting within Hanna Park.

Native trees

- *Angophora floribunda*
 - Cumberland Shale Plains Woodland species commonly occurring on site (Biodiversity report)
- *Eucalyptus benthamii*
 - Noted from Biodiversity report as threatened species, to be incorporated into replacement tree planting subject to commercial availability
- *Eucalyptus eugenoides*
 - Cumberland Shale Plains Woodland species occurring on site (Biodiversity report).

Riparian trees

- *Casuarina glauca*
 - A key riparian tree that usually performs well
- *Eucalyptus camaldulensis*
 - A nice eucalyptus that is proposed for the revegetation of Hanna Park, following the potential removal of a number of existing trees
- *Melaleuca linariifolia*
 - A typical Hawkesbury catchment floodplain species for riparian area planting.

Shrubs

- *Bursaria spinosa*
 - A typical Cumberland Plain Woodland species that usually performs well (height to 4m)
- *Indigofera australis*
 - A typical Cumberland Plain Woodland species that usually performs well (height to 2m)
- *Callistemon linearis*
 - A proven species of medium height (2m)
- *Kunzea ambigua*
 - A recommended species from the Hawkesbury DCP (height to 5m)

Grasses and Groundcovers

- *Carex appressa*
 - A wetland species proposed for use in swales
- *Juncus usitatus*
 - A wetland species proposed for use in swales
- *Dianella revoluta*
 - A Cumberland Plain Woodland species proposed for use on embankments
- *Lomandra longifolia*
 - A Cumberland Plain Woodland species proposed for use on embankments
- *Microlaena stipoides*
 - A species proposed for use on embankments.

4 Urban design concept

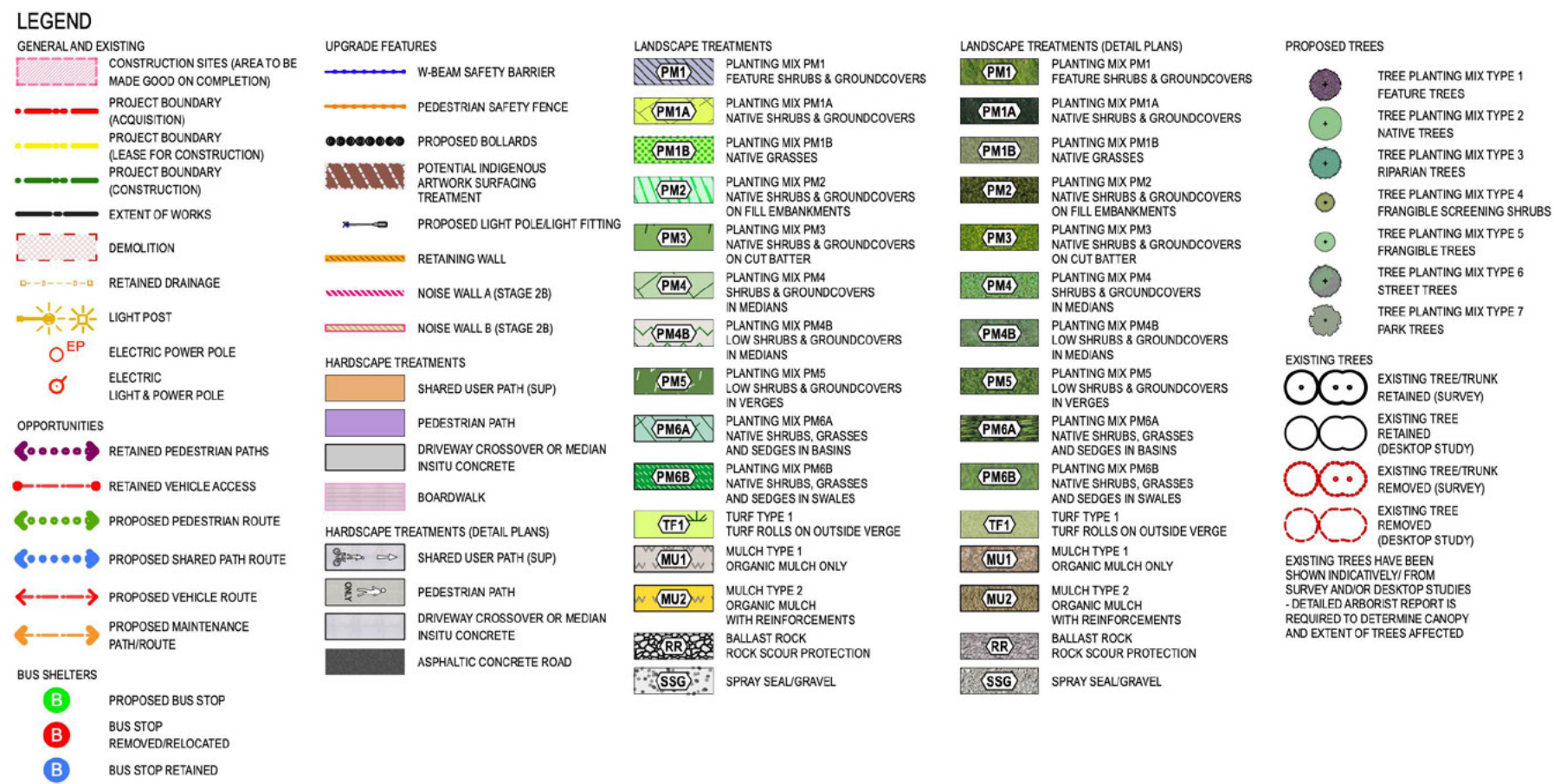
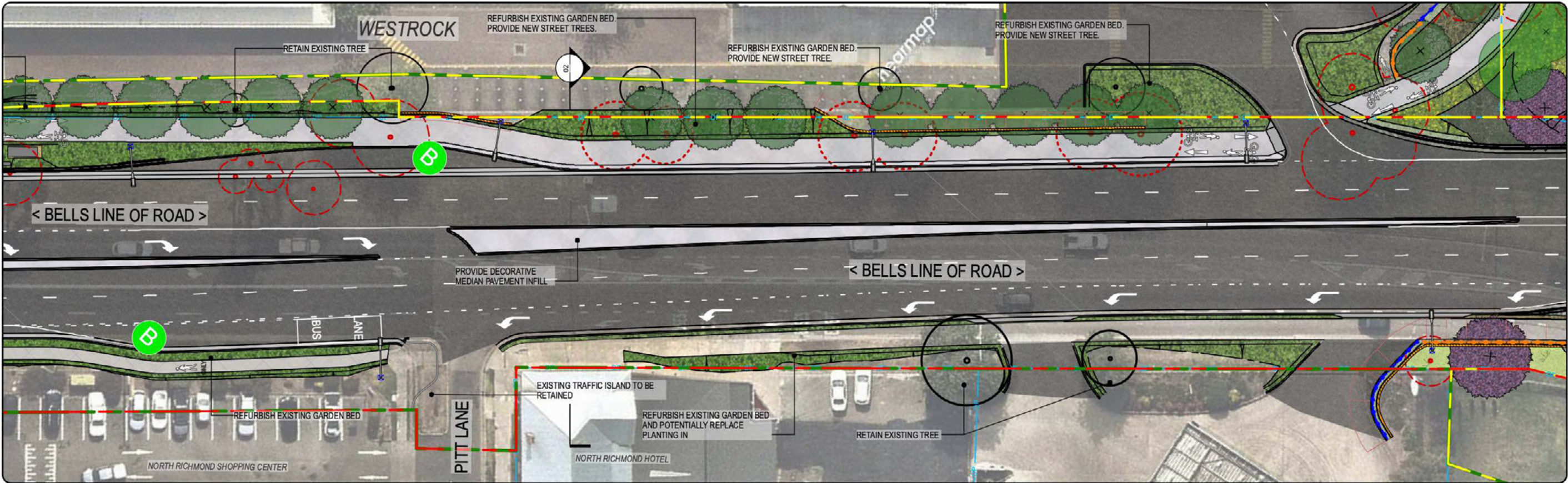


Figure 4-3: Urban design plans legend

4 Urban design concept

4.4 Stage 2A



01. BELLS LINE OF ROAD (CH 1175 - 1400) - 1:500



Figure 4-4: Stage 2A urban design plans - sheet 1 of 7

PROPOSED BOLLARDS
OPPORTUNITY FOR WAYFINDING SIGNAGE & BICYCLE PARKING
OPPORTUNITY TO COMPLETE MISSING PATH CONNECTIONS
PROPOSED FOOTPATH FOLLOWS EDGE OF DRIVEWAY PROVIDING DIRECT PEDESTRIAN ACCESS TO HANNA PARK NORTH

HANNA PARK

INDICATIVE AXIS FROM ORIGINAL PARK DESIGN
REPLACEMENT HOOP PINE TREE REPLANTING
NEW FORMAL PATH CONNECTION INCORPORATING RELOCATED MEMORIAL PLAQUE (PEDESTRIAN AND MAINTENANCE ACCESS ONLY)

PROPOSED TREE PLANTING
MATURE TREES TO BE RETAINED AND PROTECTED
PROPOSED ACCESSIBLE SHARED PATH CONNECTION TO ACTIVE TRANSPORT ROUTE AND EXISTING NORTH RICHMOND BRIDGE
NEW FOOTPATH TO TIE INTO EXISTING

EXISTING ARBOUR AND WISTERIA VINE TO BE PROTECTED AND RETAINED
EXISTING SHADED SEATING AREA TO BE RETAINED AND POTENTIALLY REFURBISHED
CEREMONIAL AREA & PLAQUE TO BE RELOCATED. FEATURE TREES TO BE REPLACED
OPPORTUNITY FOR FUTURE COMMUNITY FOCUSED UNDERCROFT SPACE UTILISING SHADE FRIENDLY ACTIVITIES, CLEAR SIGHTLINES AND HIGH QUALITY URBAN DESIGN FINISHES & AMENITY

INDICATIVE EXTENT OF REPLACEMENT AND SUPPLEMENTARY RIPARIAN ZONE PLANTING FOR AREAS DAMAGED DURING CONSTRUCTION

EXISTING WHARF

RECONSTRUCT EXISTING FOOTPATH TO RE-INSTATE EXISTING FOOTPATH CONNECTION TO EXISTING WHARF

EXISTING TREES TO BE REMOVED WITHIN THE PROPOSAL CONSTRUCTION ZONE. ARBORIST TO INSPECT INDIVIDUAL TREES AND ADVISE PRINCIPLES AS TO SUITABILITY FOR RETENTION DURING THE DETAILED DESIGN STAGE

SIGNAGE DIRECTING PEDESTRIANS AND CYCLISTS TO PROPOSED SUP ROUTE AND AWAY FROM NEW BRIDGE

MAX 1:40 CROSS FALL ON DRIVEWAY AT SHARED USER PATH CROSSING

WESTROCK LAND

1350

1400

1450

1500

1550

1600

1650

HAWKESBURY RIVER

< PROPOSED BRIDGE OVER HAWKESBURY RIVER >
ABOVE

POTENTIAL DELINEATION TO SEPERATE PEDESTRIANS

REMANANT BRIDGE ELEMENTS TO BE PROTECTED AND RETAINED

STEEP FOOTPATH GRADE UP TO 1:10 TO BE FURTHER INVESTIGATED IN DETAIL DESIGN STAGE
FOOTPATH CONNECTION TO ATC ON EXISTING RICHMOND BRIDGE

MAX 1:40 CROSS FALL ON PEDESTRIAN FOOTPATH (AT CROSSING)
DRIVEWAY RECONSTRUCTED AND REGRADED

SERVICE STATION

SYDNEY WATER PUMPING STATION

RETAIN VEHICULAR ACCESS TO SYDNEY WATER PUMPING STATION

REMOVE PAVEMENT & KERB AND CONVERT TO LANDSCAPE
SHARED ZONE TO ENABLE MAINTENANCE AND EVENT VEHICLE ACCESS

MAINTAIN EXISTING FOOTPATH CONNECTION TO BRIDGE FROM RIVER PARK

< EXISTING RICHMOND BRIDGE >

PROPOSED RECONSTRUCTION OF BALUSTRADE ON BOTH SIDES OF EXISTING BRIDGE
EXISTING FOOTPATH ON BRIDGE RETAINED
PROPOSED INDICATIVE RESURFACING OF EXISTING BRIDGE AS SHARED USER ZONE

PROPOSED SEATING AREA ON BRIDGE
PROPOSED ACCESSIBLE RAMP

FOOTPATH CONNECTION LINKING EXISTING FOOTPATH TO ATC

NORTH RICHMOND HERITAGE PARK

900

950

1000

1050

1100

1150

Figure 4-5: Stage 2A urban design plans - sheet 2 of 7

4 Urban design concept

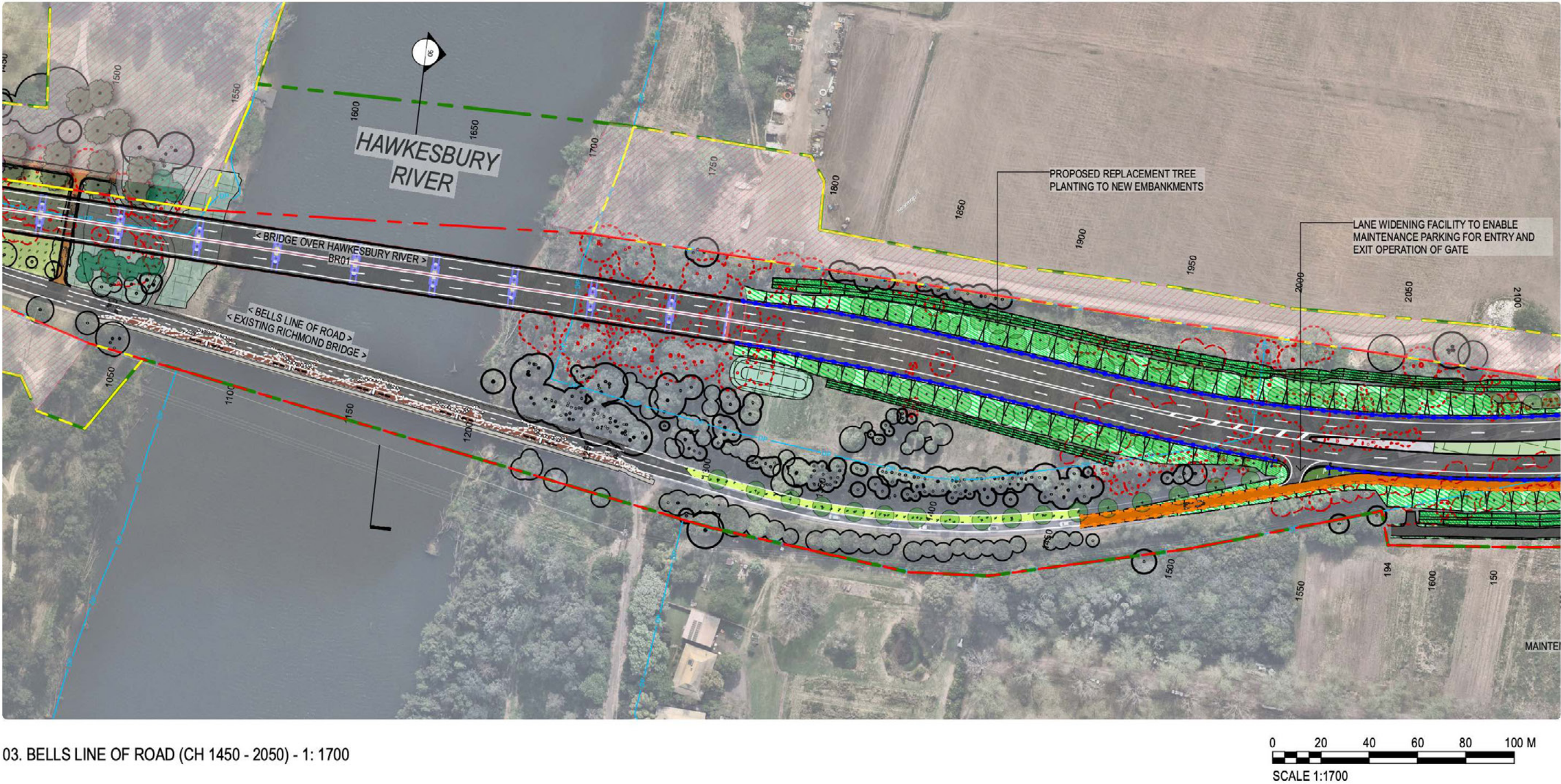


Figure 4-6: Stage 2A urban design plans - sheet 3 of 7

4 Urban design concept

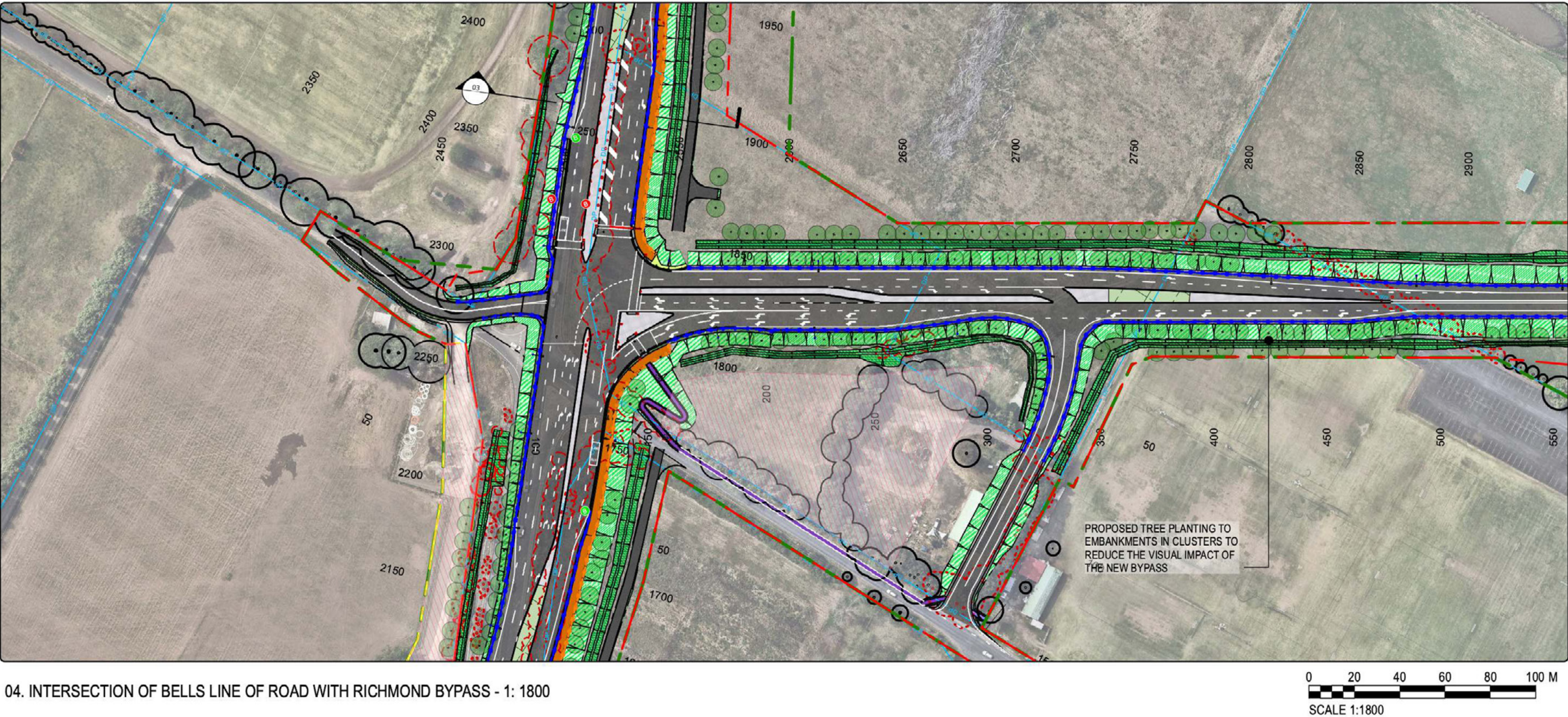
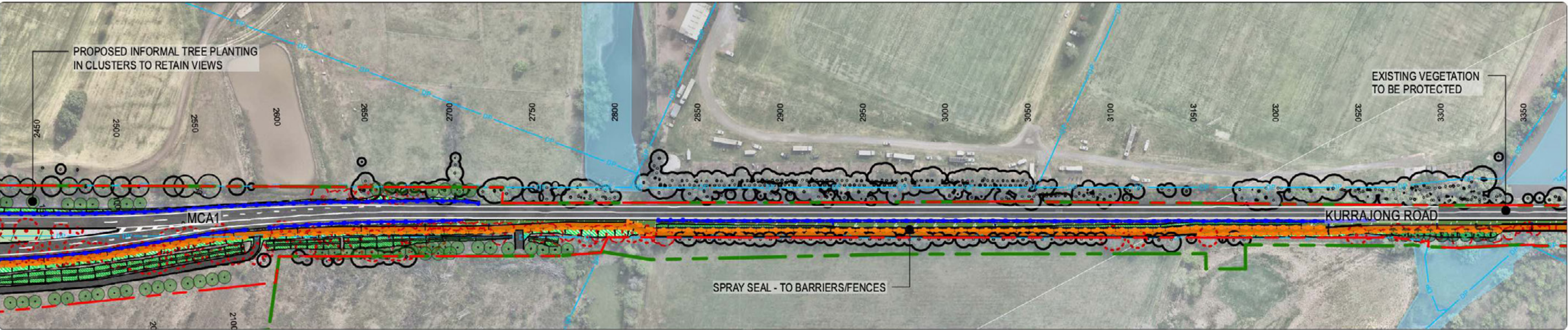
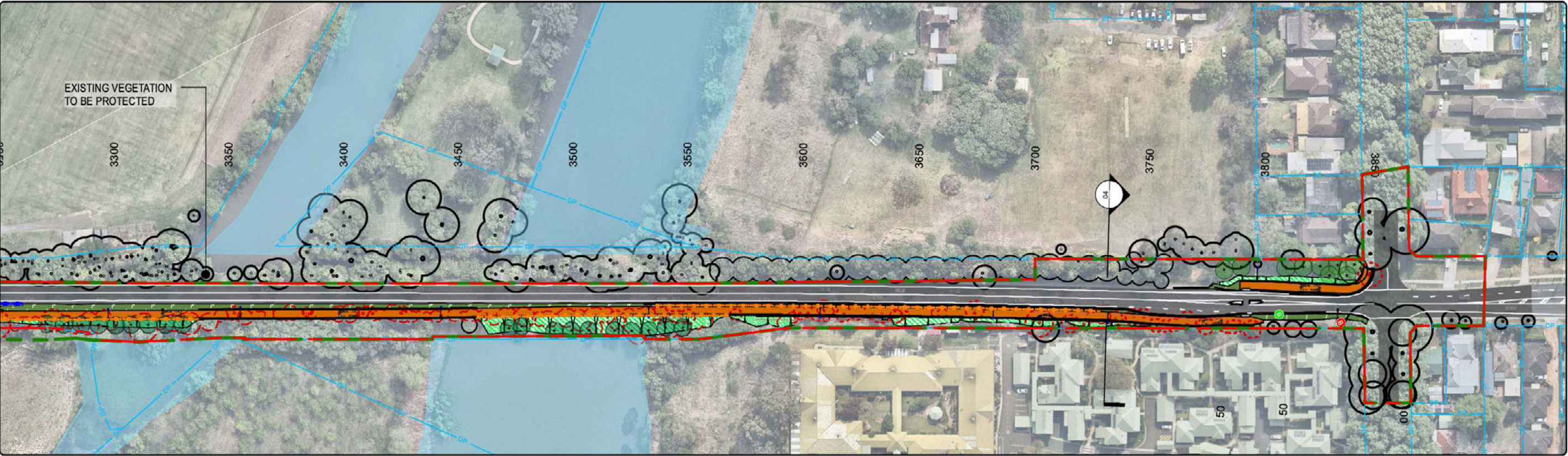


Figure 4-7: Stage 2A urban design plans - sheet 4 of 7

4 Urban design concept



05. KURRAJONG ROAD (CH 2400 - 3300) - 1: 2500



06. KURRAJONG ROAD (CH 3250 - 3800) - 1: 1800

Figure 4-8: Stage 2A urban design plans - sheet 5 of 7

4 Urban design concept

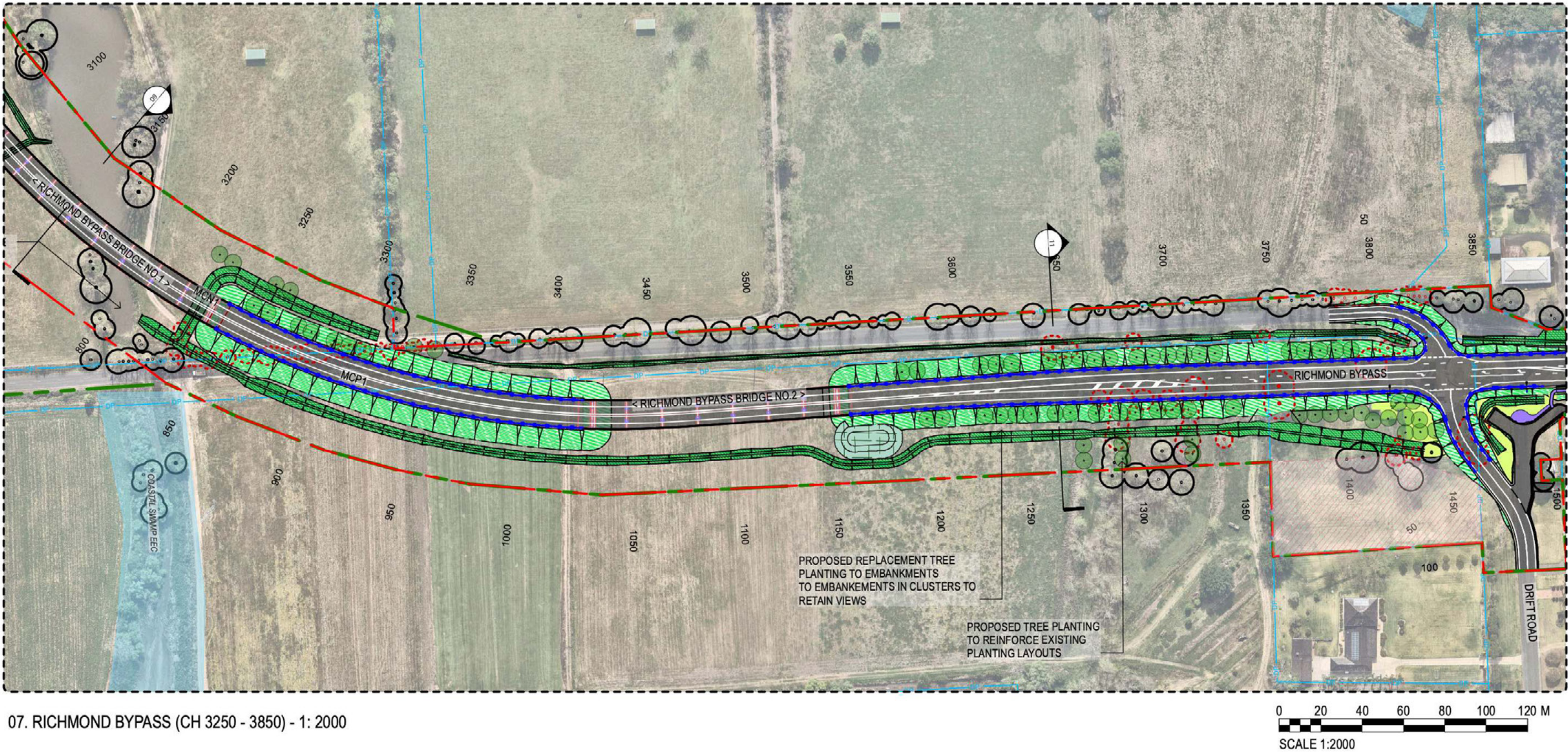


Figure 4-9: Stage 2A urban design plans - sheet 6 of 7

4 Urban design concept

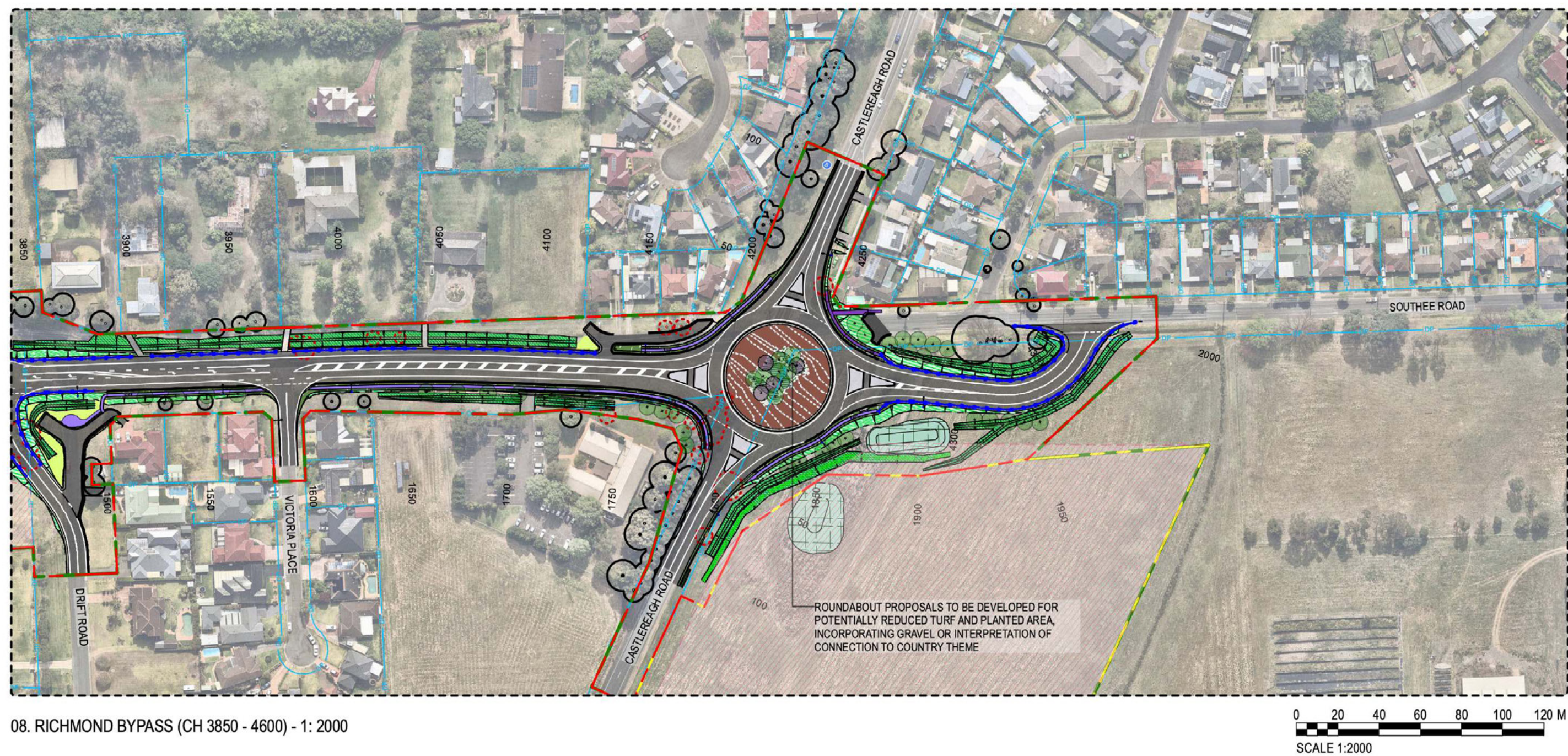
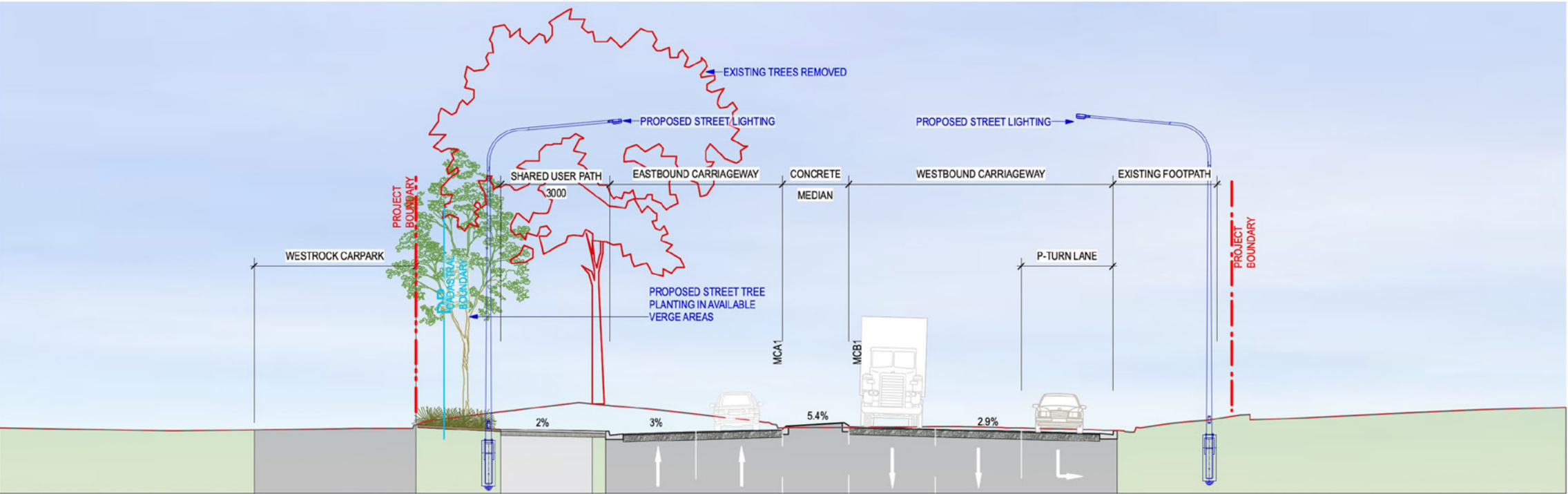
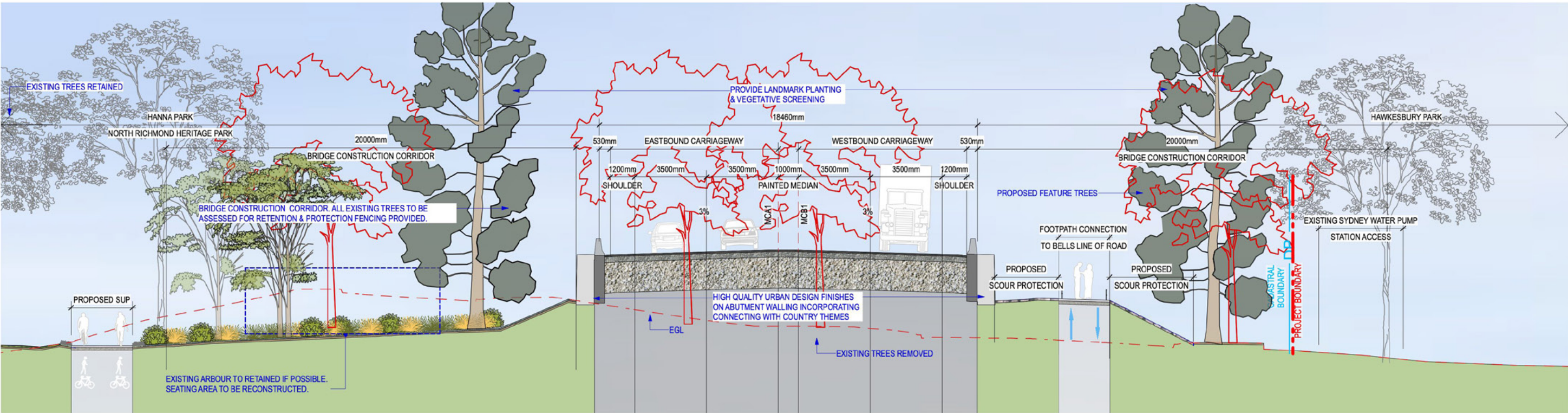


Figure 4-10: Stage 2A urban design plans - sheet 7 of 7

4 Urban design concept



01 SECTION 2: BELLS LINE OF ROAD (CH 1280 MCA1)
SCALE 1:200



02 SECTION 5: BELLS LINE OF ROAD - New Bridge (CH 1400 MCA1)
SCALE 1:200

Figure 4-11: Stage 2A urban design sections - sheet 1 of 4

4 Urban design concept

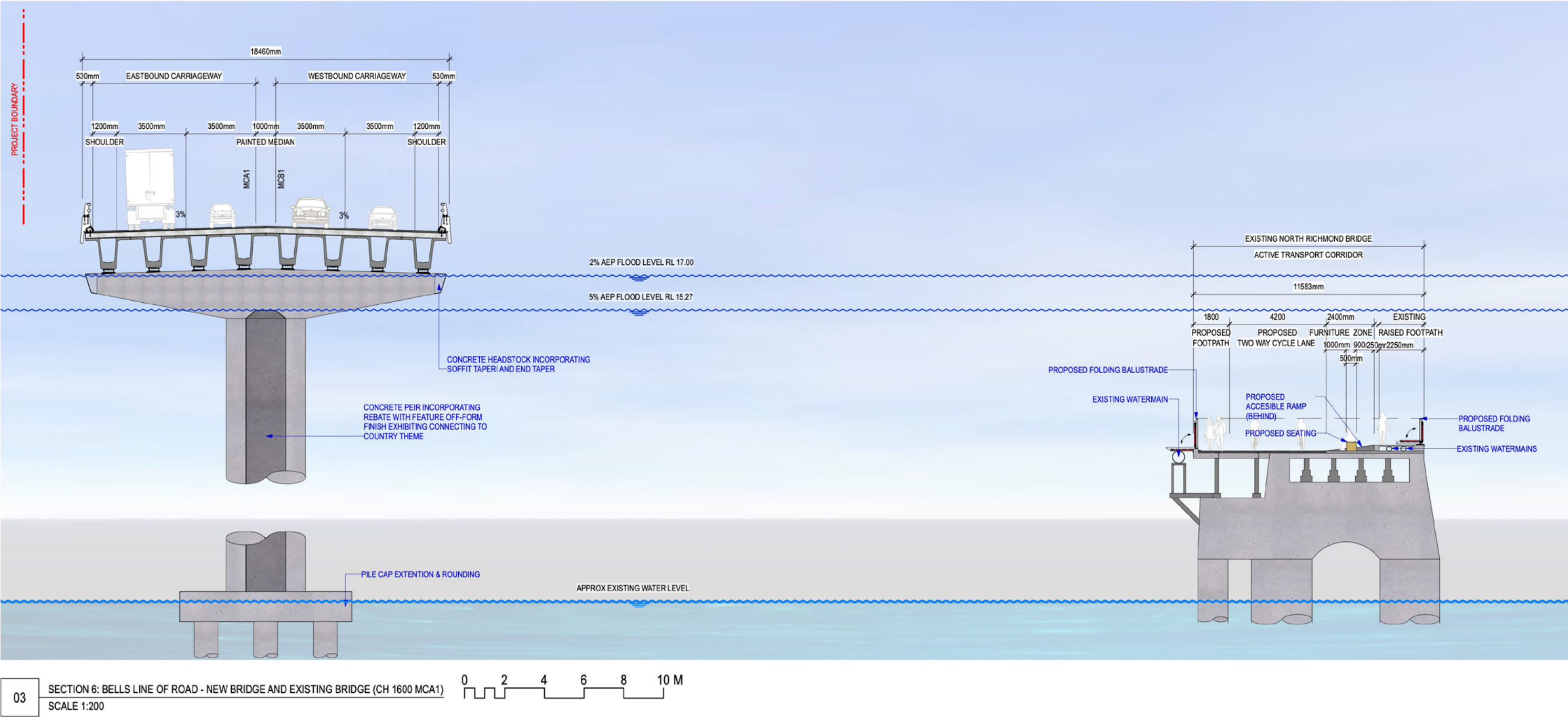
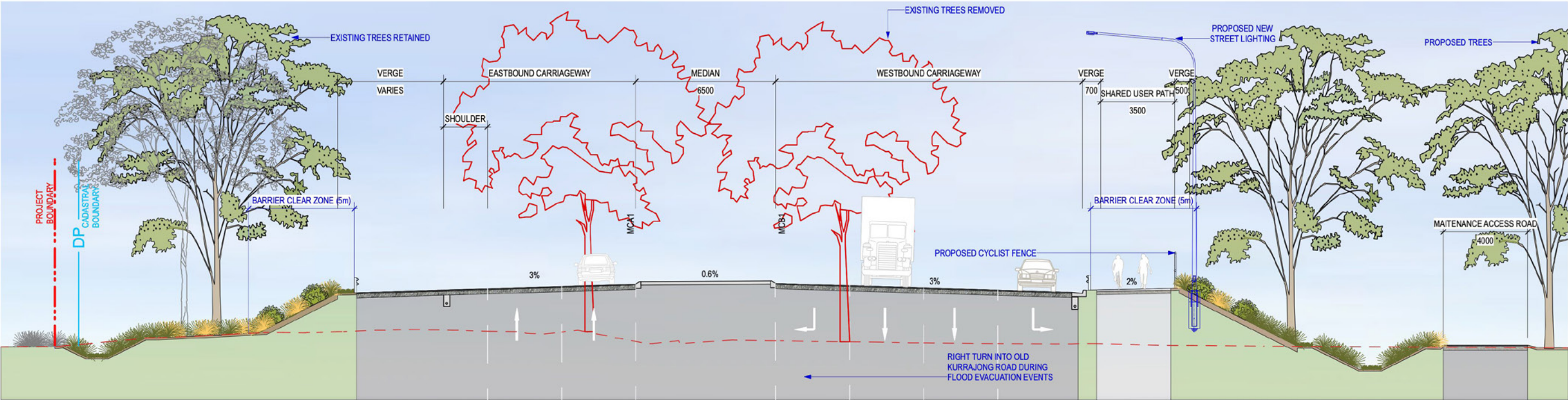
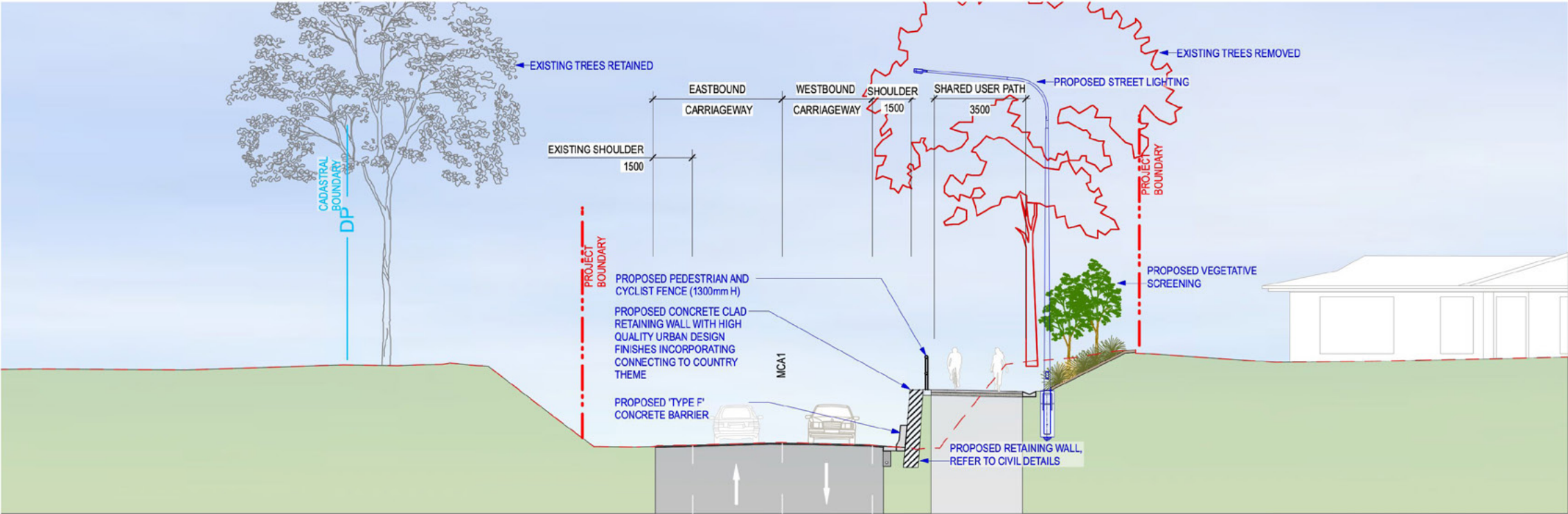


Figure 4-12: Stage 2A urban design sections -sheet 2 of 4

4 Urban design concept



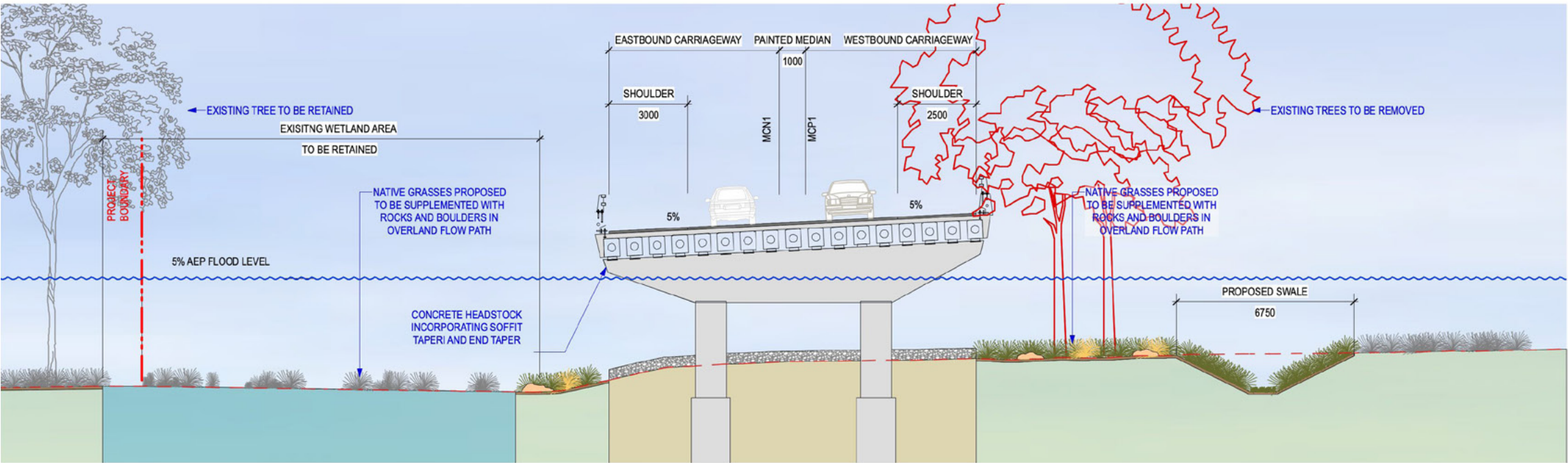
04 SECTION 3: KURRAJONG ROAD (CH 2360 MCA1)
SCALE 1:200



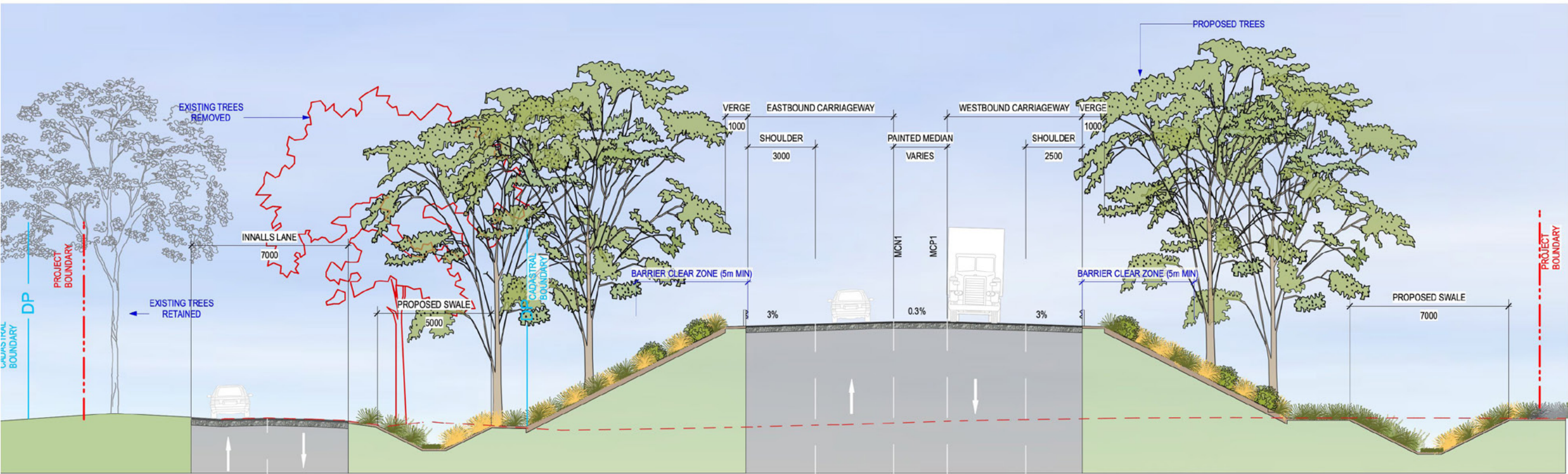
05 SECTION 4: KURRAJONG ROAD (CH 3700 MCA1)
SCALE 1:200

Figure 4-13: Stage 2A urban design sections - sheet 3 of 4

4 Urban design concept



06 SECTION 9: RICHMOND BYPASS (CH 3140 MCN1)
SCALE 1:200



07 SECTION 11: RICHMOND BYPASS (CH 3640 MCN1)
SCALE 1:200

Figure 4-14: Stage 2A urban design sections - sheet 4 of 4

4 Urban design concept

4.5 Stage 2B

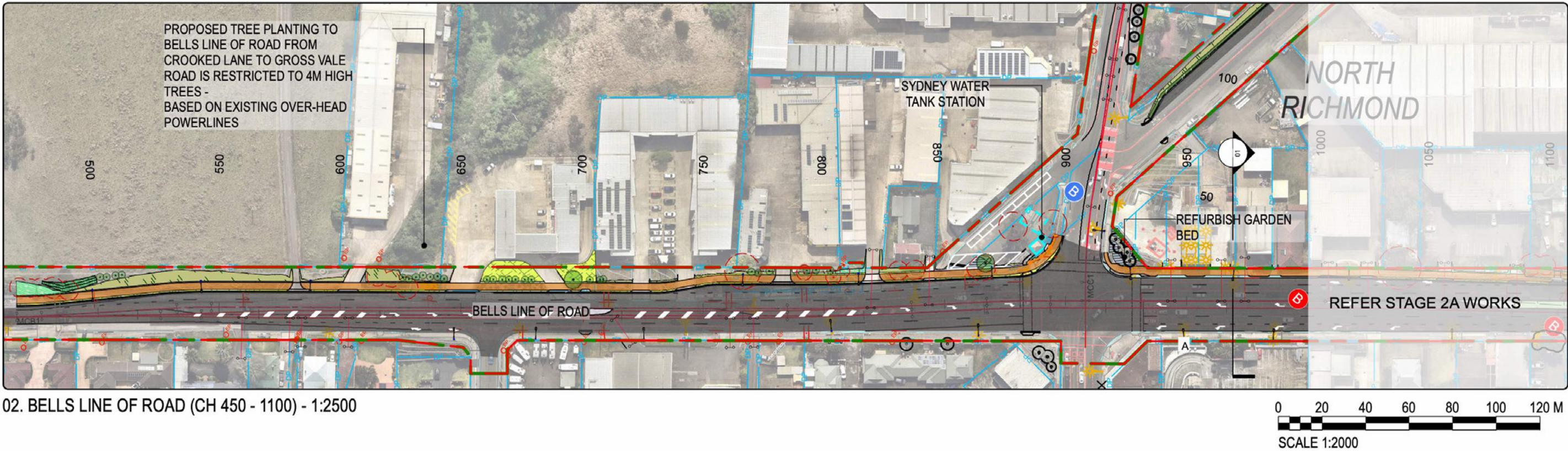
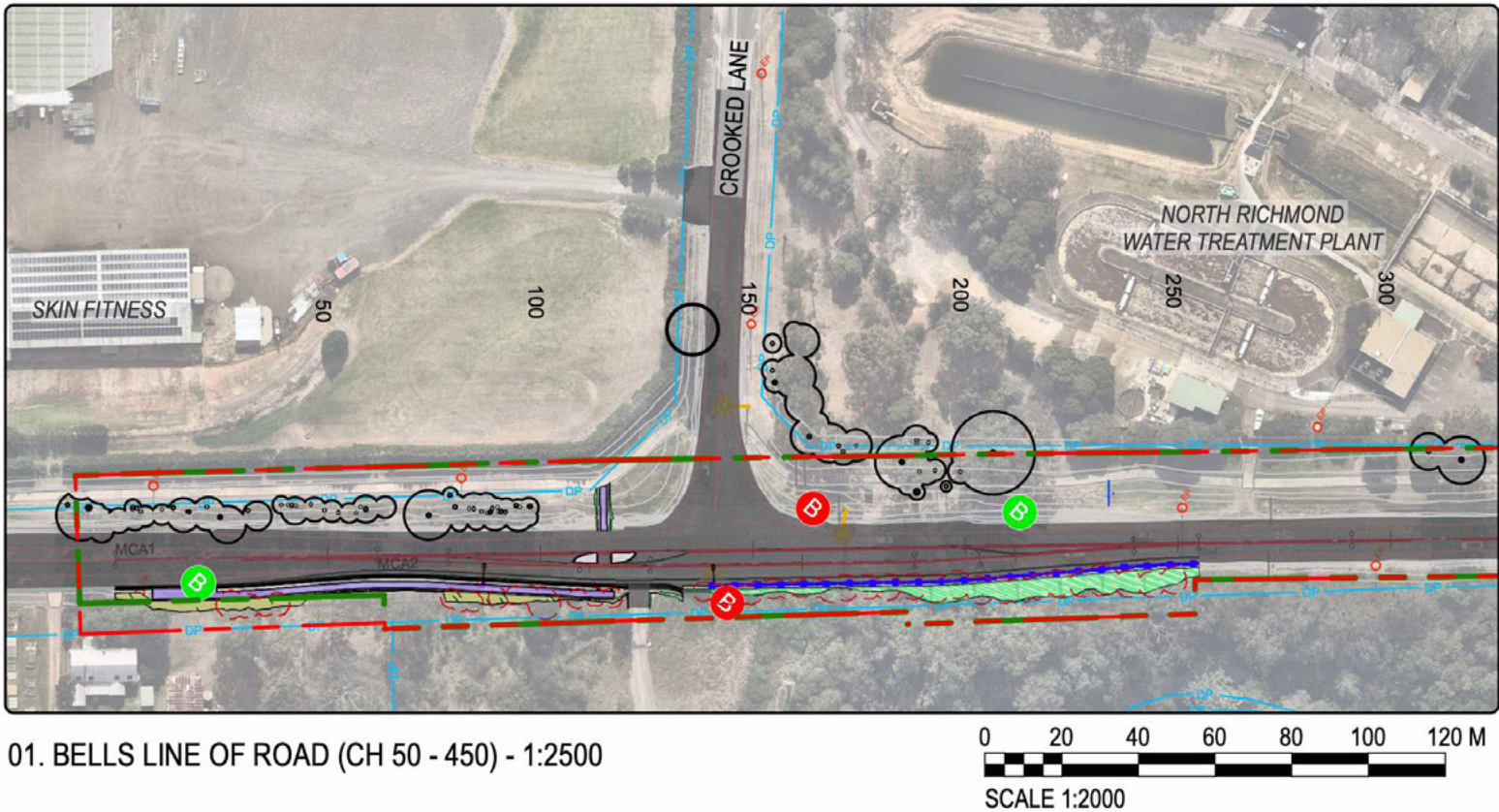


Figure 4-15: Stage 2B urban design plans - sheet 1 of 3

4 Urban design concept

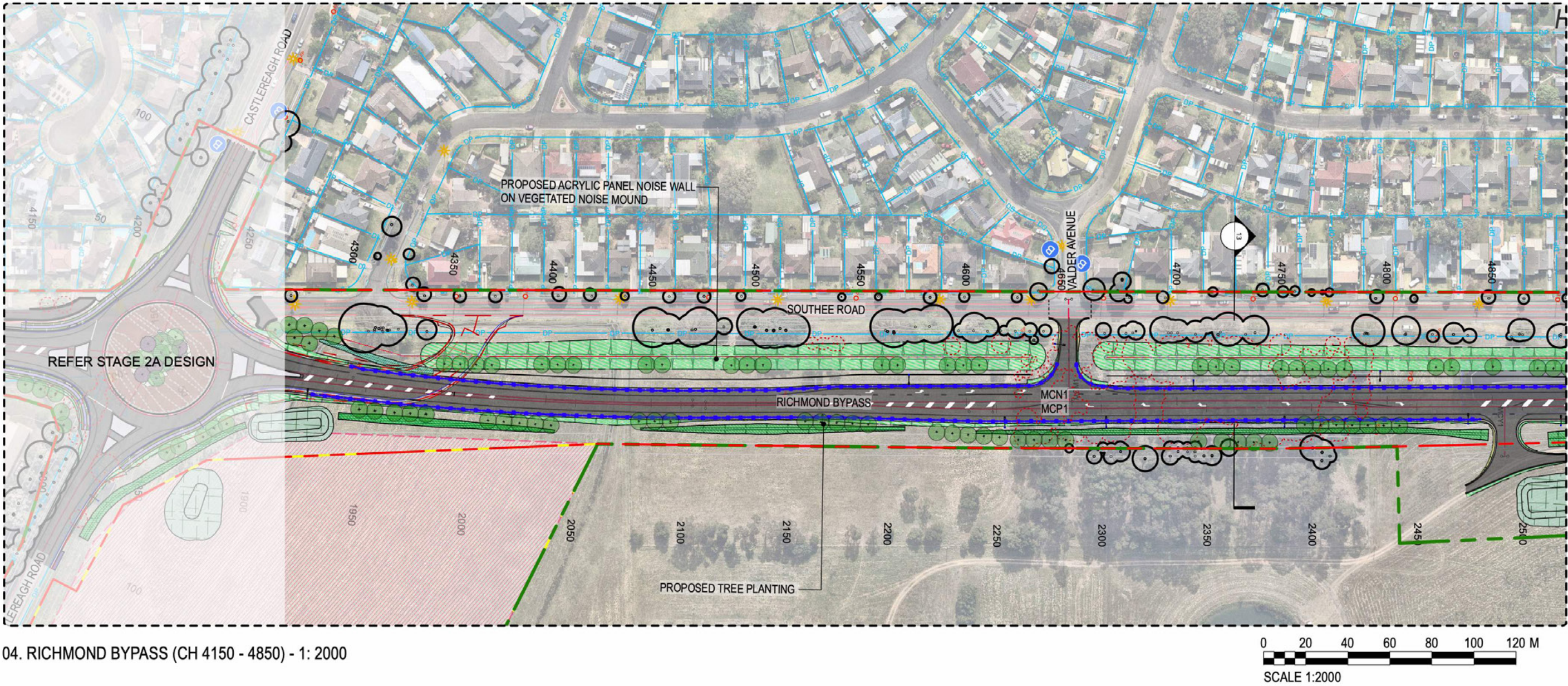


Figure 4-16: Stage 2B urban design plans - sheet 2 of 3

4 Urban design concept

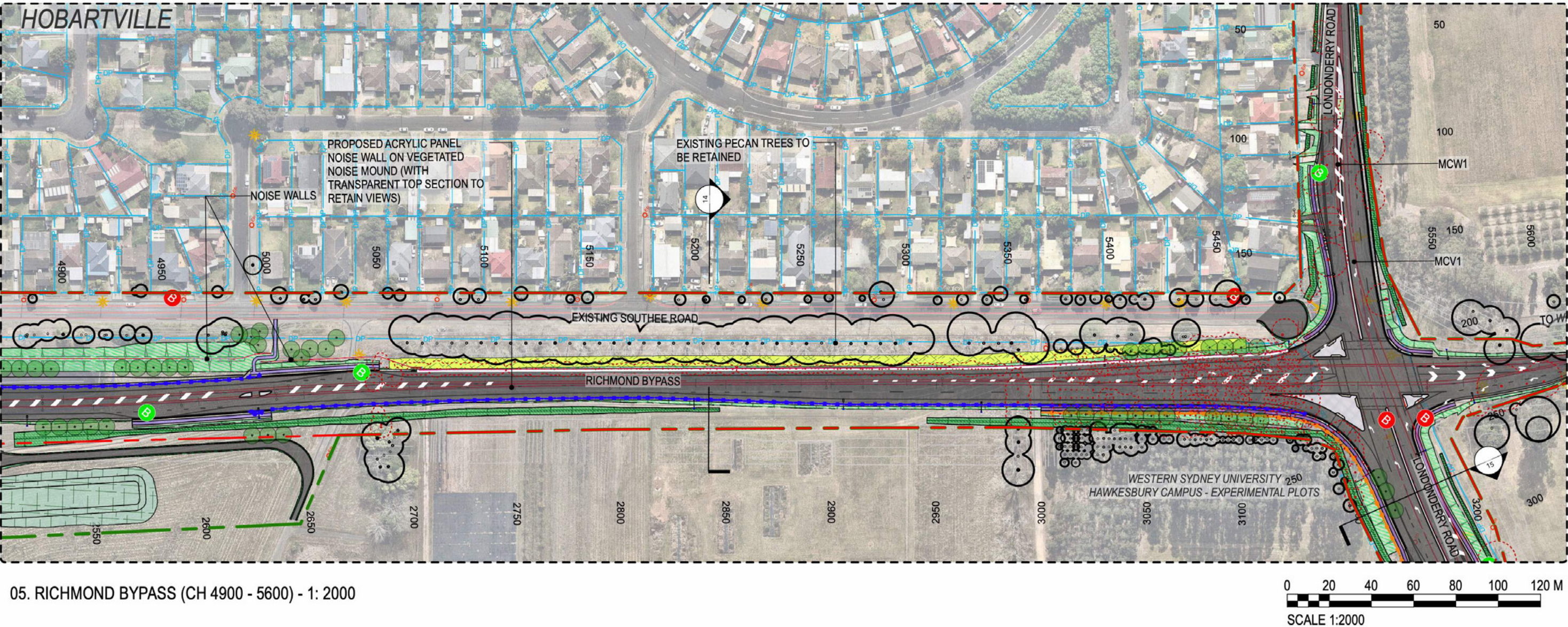


Figure 4-17: Stage 2B urban design plans - sheet 3 of 3

4 Urban design concept

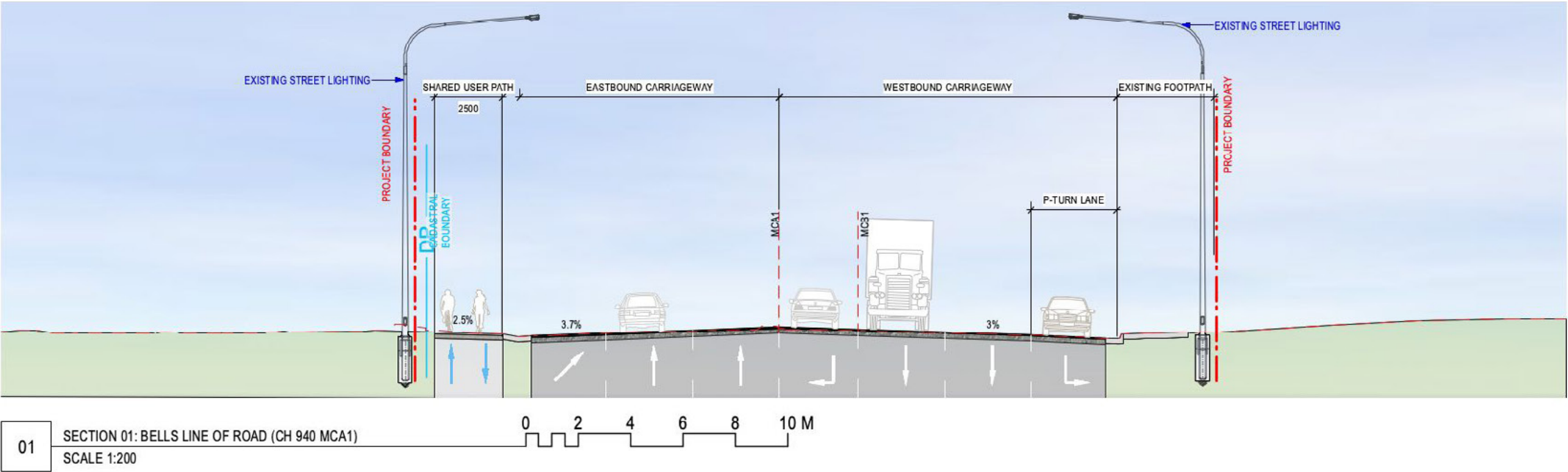
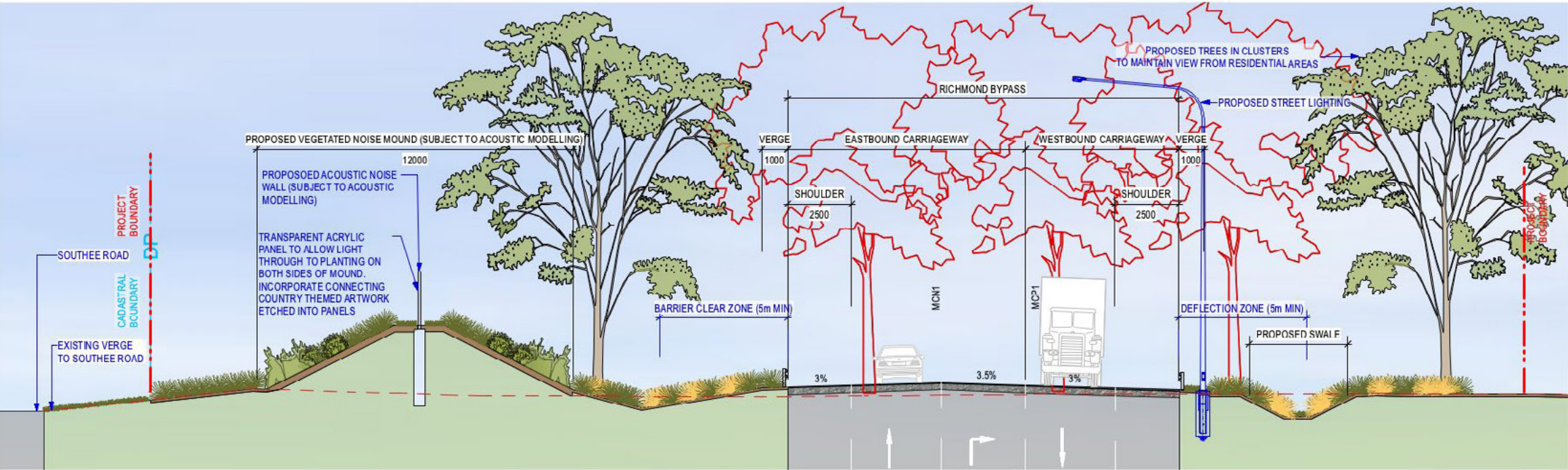
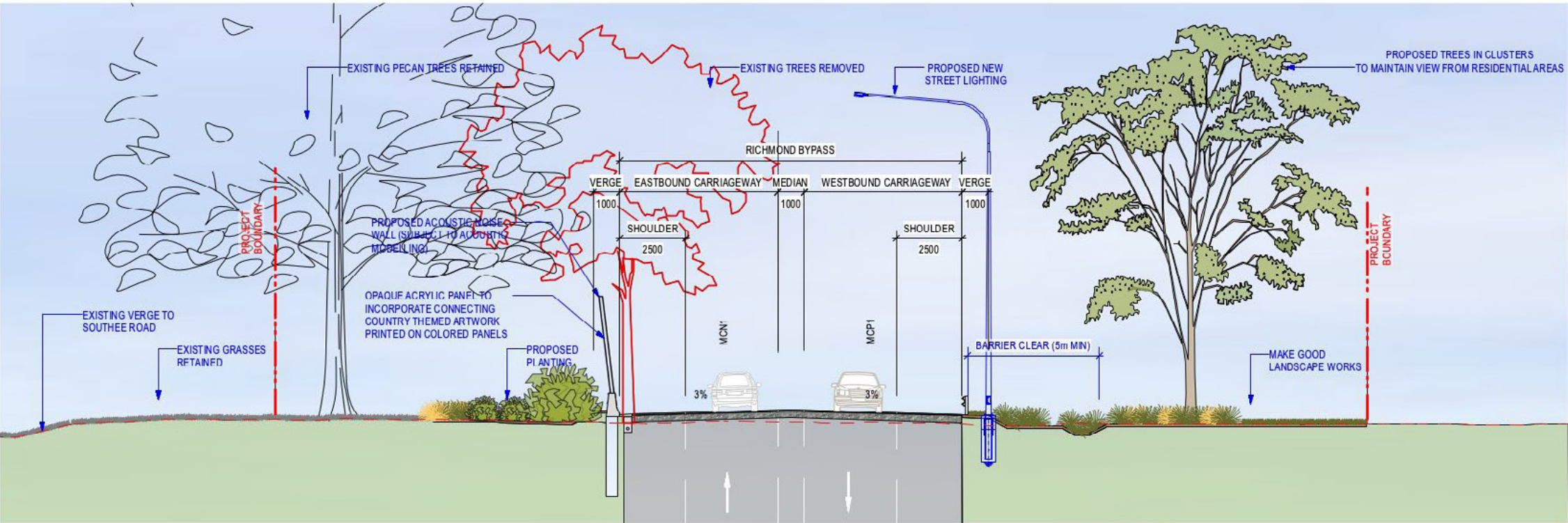


Figure 4-18: Stage 2B urban design sections - sheet 1 of 3

4 Urban design concept



02 SECTION 13: RICHMOND BYPASS (CH 4740 MCN1)
SCALE 1:200



03 SECTION 14: RICHMOND BYPASS (CH 5200 MCN1)
SCALE 1:200

Figure 4-19: Stage 2B urban design sections -sheet 2 of 3

4 Urban design concept

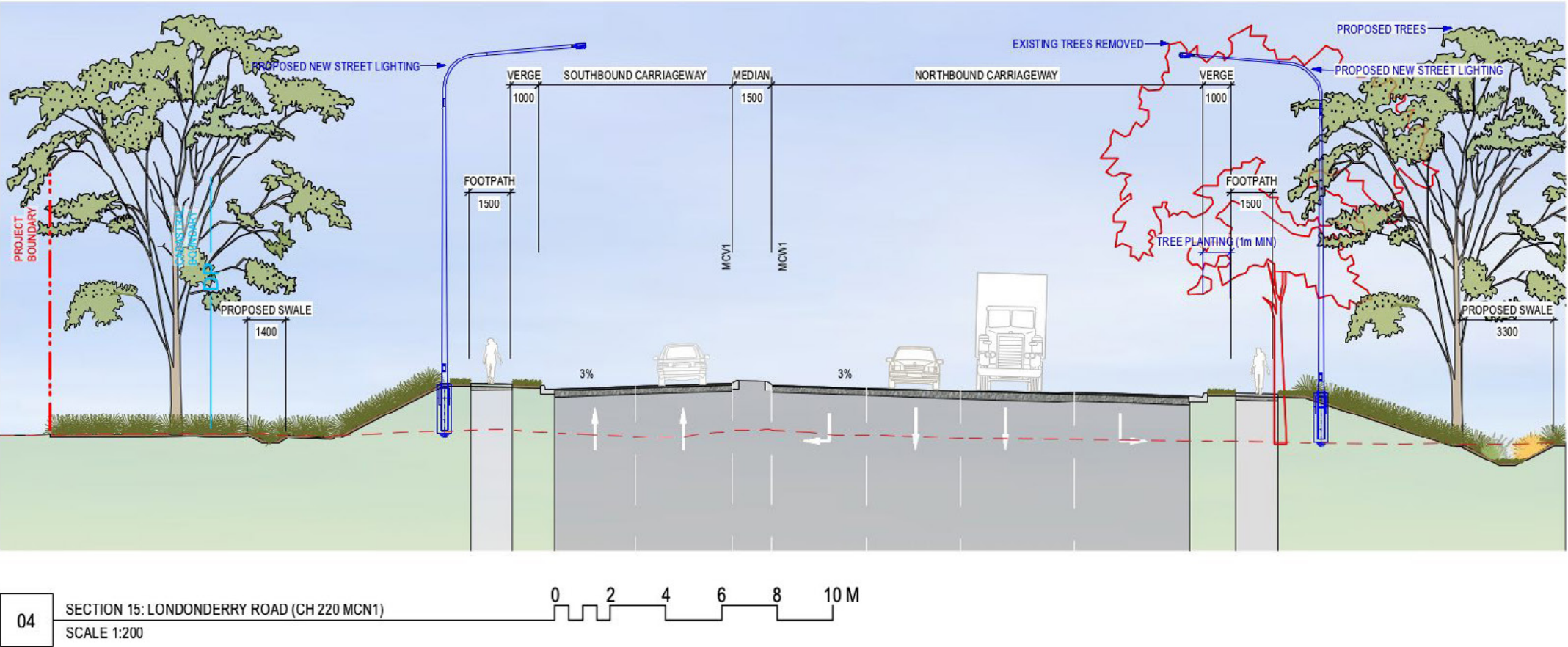


Figure 4-20: Stage 2B urban design sections - sheet 3 of 3



5 Landscape character impact assessment

5.1 Methodology

Chapter overview

To enable the assessment of impacts from the proposal on the surrounding landscape, the study area has been classified into distinct character areas or landscape character zones (LCZ). These zones are defined as having a distinct, recognisable and consistent pattern of elements, be it natural (soil, vegetation, landform) and/ or human built form, distinguishing one zone as different from another.

Guideline for landscape character and visual impact assessment, *Environmental impact assessment practice note EIA-N04* provides the following definition of landscape character:

Landscape character is the aggregate of built, natural and cultural aspects that make up an area and provide its unique sense of place. Landscape in this context is taken to include all aspects of a tract of land - the built, planted and natural topographical and ecological features.

In applying this definition to the specific conditions within the study area and the features of the proposal, the landscape character assessment also considers how the Proposal would be used and how it would function as a part of the region. The assessment has considered both existing landscape character and desired future character (where relevant).

Landscape character zones

To enable the assessment of impacts on the landscape character of each assessment zone, landscape elements including landform, hydrology, vegetation, land use and built form were identified during site visits.

Two primary factors are used to determine impacts:

- **Sensitivity** of the character within the zone
- **Magnitude** of the proposal in that zone.

Refer to **Table 5-1 on page 67** for landscape character zone identification.

Sensitivity

The degree to which a particular landscape type can absorb and accommodate change arising from a proposal. Sensitivity refers to how sensitive the character of the setting is to the proposed change, which may also include the sensitivity of regular users and viewers of the zone. For example a pristine natural environment would be more likely to be sensitive to change than an industrial area.

It considers the perceived cultural, natural and heritage values of the visual environment and the elements within it.

Magnitude

Magnitude is a study of the bulk scale and form. It reflects the degree of physical change between the proposal and the landscape setting. In the case where future development is already approved, for example rezoning, this context is used in the assessment. Consideration is given to existing built form in the landscape and how closely the proposal matches this in bulk, scale and form. This is categorised as follows:

- The proposal would be the dominant feature in the landscape and would affect and change its character
- The proposal would form a readily visible and new feature in the landscape that changes its character
- The proposal would constitute a minor feature in the landscape with minor changes.

Refer to **Table 5-1 on page 67** for landscape character zone identification.

		Magnitude			
Sensitivity		High	Moderate	Low	Negligible
	High	High	High-Moderate	Moderate	Negligible
	Moderate	High-Moderate	Moderate	Moderate-Low	Negligible
	Low	Moderate	Moderate-Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Table 5-1: Landscape character impact rating matrix (Source:Transport EIA-N04)

5 Landscape character impact assessment

5.2 Character zones

Six LCZ were identified during desktop studies and confirmed during the site visit where they were recorded and photographed and these are shown in [Figure 5-1 on page 69](#). This figure illustrates the delineation of Stages 2A and Stage 2B. Across the study area the LCZ include:

- LCZ 1: Mixed uses North Richmond (Stage 2B)
- LCZ 2: Commercial /Light industrial/ Residential
- LCZ 3: River/ Estuary / Open space
- LCZ 4: Rural Richmond
- LCZ 5: Residential Richmond (Stage 2A)
- LCZ 6: Southee Road (Stage 2B).

Each character zone across the study area is summarised in [Table 5-2 on page 70](#) and in the following pages in terms of the existing physical attributes as well as proposal elements which are likely to impact the LCZ.

This chapter examines the LCZs for Stage 2 as a whole (Stage 2A + Stage 2B). It should be noted that based on the extent of works, some LCZs are only in Stage 2B works.



Plate 5-1: LCZ1 Mixed uses Southee Road



Plate 5-2: LCZ2 Commercial/ Light industrial/ Residential



Plate 5-3: LCZ3 River/ Estuary /Open space



Plate 5-4: LCZ4 Rural Richmond



Plate 5-5: LCZ5 Residential Richmond



Plate 5-6: LCZ6 Southee Road

5 Landscape character impact assessment

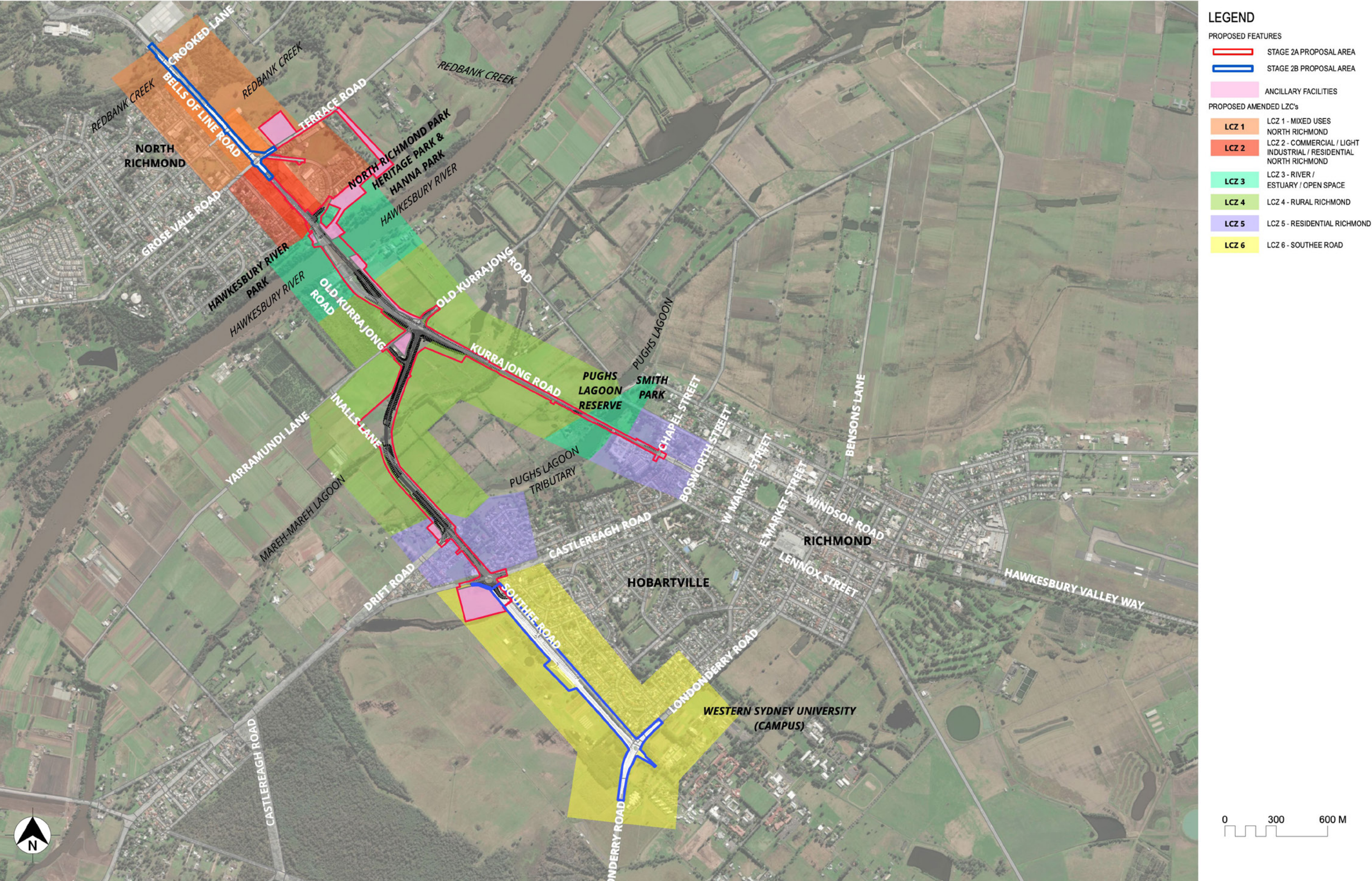


Figure 5-1: Landscape character zones

5 Landscape character impact assessment

LCZ	Summary of landscape setting	Proposal elements causing change	Staging
1	Mixed uses North Richmond This zone comprises mixed uses along Bells Line of Road. The landscape character changes from rural, through residential to mixed commercial, adjoining Bells Line of Road, from north to south within this LCZ.	The proposal would include: <ul style="list-style-type: none"> Local widening of Bells Line of Road at its intersection with Crooked Lane to provide a dedicated right turn lane into Crooked lane. Widening of the road corridor south of Charles Street, along Bells Line of Road up to Terrace Road. This would replace the existing footpath on the eastern side of Bells Line of Road with a SUP. 	Stage 2B
2	Commercial / Light Industrial / Residential North Richmond This zone is defined by a mix of industrial and commercial buildings along either side of Bells Line of Road in North Richmond, together with nearby residential estates. This zone includes the commercial area of 'North Richmond Village' and the light industrial premises of WestRock.	The proposal would include: <ul style="list-style-type: none"> Widening of the road corridor south of Charles Street, from Terrace Road up to the approach to the new four-lane bridge. This would replace the existing footpath on the eastern side of Bells Line of Road with a SUP. Road improvements to Terrace Road and Beaumont Avenue (including additional parking to Beaumont Avenue). There would also be new light vehicle access from Westrock onto Beaumont Avenue and landscape streetscape improvements to the Westrock car park. Re-alignment and widening of the road for the approach to the new four-lane bridge with increased traffic lanes and the construction of a new four-lane bridge. 	Stage 2A
3	River/ Estuary / Open Space This zone comprises the Hawkesbury River and estuary and also Pughs Lagoon. It also includes the associated open spaces of Hanna Park, North Richmond Heritage Park, Pughs Lagoon Reserve and Smith Park.	The proposal would include: <ul style="list-style-type: none"> Construction of a new four-lane bridge and the re-purposing of the existing Richmond Bridge for active transport. In the vicinity of Pughs Lagoon (and the tributary to Pughs Lagoon) there would be widening of the road corridor to accommodate a SUP to the southern side of Kurrajong Road. 	Stage 2A
4	Rural Richmond This zone comprises rural areas of Richmond that include two areas of the proposal. The first is Kurrajong Road (from Old Kurrajong Road to Chapel Street). The second is that of the bypass from Old Kurrajong Road, joining with the existing Inalls Lane at Drift Road.	The proposal would include: <ul style="list-style-type: none"> Widening of the road corridor to accommodate a SUP to the southern side of Kurrajong Road. A modified intersection with Old Kurrajong Road to connect with the Richmond Bypass. For the Richmond Bypass, a new elevated two lane road would run through the floodplain, over or parallel to existing roads. Upgraded intersection at the junction of the bypass with Castlereagh Road. 	Stage 2A
5	Richmond Residential This zone comprises the residential areas of Richmond surrounding the southern end of Kurrajong Road and also the middle portion of the Bypass at the edges of the suburbs of Richmond and Hobartville.	The proposal would include: <ul style="list-style-type: none"> Widening of the road corridor to accommodate a SUP to the southern side of Kurrajong Road. For Richmond Bypass, a new elevated two lane road would run over or parallel to existing roads, with links to Old Kurrajong Road and Yarramundi Lane New floodplain bridges to bypass, one over a tributary to Mareh-Mareh Lagoon, the other over the floodplain, parallel to Inalls Lane. Intersection of bypass with Drift Road and Victoria place Upgraded intersection of bypass at the junction with Castlereagh Road. 	Stage 2A
6	Southee Road This zone comprises the bypass area between the Castlereagh Road and Londonderry Road intersections of Southee Road	The proposal would include: <ul style="list-style-type: none"> A new two lane road would run parallel to the existing Southee Road and include noise attenuation measures of noise mounds and noise walls. Bypass intersection with Valder Avenue and an upgraded intersection at the junction of Southee Road with Castlereagh and Londonderry Roads. 	Stage 2B

Table 5-2: Landscape character zones summary

5 Landscape character impact assessment

LCZ 1: Mixed uses North Richmond

Existing landscape character

This zone comprises mixed uses along the Bells Line of Road, which transition from a rural to a more urban character towards the southern portion of this character zone at the intersection of Bells Line of Road with Terrace Road (& Grose Vale Road).

The rural portion of this character zone is characterised by mature trees and some low roadside plantings.

There is an existing footpath and a turf verge adjoining the eastbound carriageway.

The residential area comprises low density houses with side fronting boundary fencing fronting Bells Line of Road. There are isolated mature trees within the private properties, but the dominant landscape is of a turf verge.

For the southern portion of this character zone, there are residential properties adjoining the westbound carriageway (with some commercial properties), but only commercial and light industrial properties adjoining the eastbound carriageway. These commercial properties are low density buildings set-back from the road to allow some low landscape plantings. Due to the presence of overhead power lines there is an absence of tree planting close to the road. These commercial properties include petrol stations and car yards.

Refer to [Plate 5-7](#) to [Plate 5-9](#) for existing character images.

Landscape character changes

The local road widening and provision of a dedicated right turn into Crooked Lane would impact the current rural landscape character of the northern portion of this character zone, but the impact would be limited to a small portion of the road.

The road corridor widening to the eastbound carriageway to Bells Line of Road (to upgrade the existing footpath to a SUP and provide more lane capacity for storage on the approach to the signals) would cause a minor increase in traffic flows and impact a greater portion of the character zone, but the impact on the existing landscape character would be low.

Landscape character impact assessment

The overall sensitivity of this character zone is considered low. Whilst the landscape character to the northern portion of the proposal area at Crooked Lane area is less urbanised than the rest of the zone, the landscape character is still highly modified, despite the woodland setting.

The magnitude of change would also be low. There would be a low to moderate magnitude of change at the Crooked Lane intersection, but the majority of the zone would have a low magnitude of change restricted to the increased footpath width and a minor increase in traffic flow.

The impact on landscape character is summarised in [Table 5-3 on page 72](#).



Plate 5-7: View of LCZ1 just south of Crooked Lane intersection with Bells Line of Road, North Richmond

5 Landscape character impact assessment



Plate 5-8: View of LCZ1 mixed residential and rural to Bells Line of Road, North Richmond



Plate 5-9: View of mixed commercial uses to Bells Line of Road, North Richmond

Sensitivity	Magnitude	Impact
Low The sensitivity of this zone is considered low, based on the majority of the zone being of a highly modified landscape character.	Low The overall magnitude of change to this character zone is considered low. There would be a moderate change locally at the Crooked Lane intersection, but a low magnitude of change for the rest of the zone, based on the magnitude of change being restricted to the increased footpath width.	Low
Summary The overall impact is considered low, based on a low sensitivity to change and a low magnitude of change.		

Table 5-3: LCZ 1 ‘Mixed uses North Richmond ’ impact rating summary

5 Landscape character impact assessment

LCZ 2: Commercial/Light Industrial/Residential

Existing landscape character

This zone is defined by a mix of industrial and commercial buildings along either side of Bells Line of Road in North Richmond and includes the commercial area of 'North Richmond Village' and the light industrial premises of WestRock. There is limited planting to these properties and any existing street trees are typically exotic palms or trees, which are now considered weed species by Hawkesbury City Council.

Set behind the commercial (& light industrial) properties adjoining Bells Line of Road, there are residential properties and estates to the east and west. To the west is an extensive established low density residential area with large lots interspersed with mature trees to private properties. To the eastern side of Bells Line of Road there is the relatively modern Riverside Gardens retirement development with low to medium density lots fronting Beaumont Avenue and further east, low density and large lot homes to Norfolk Place, with some mature street side plantings.

Refer to [Plate 5-10](#) to [Plate 5-12](#) for existing character images.

Landscape character changes

There would be impact on this character zone to both existing residential and commercial or industrial areas. The increased elevation of the road and amended lane configuration on its approach to the new four-lane bridge would be a notable change to the existing landscape character. It should be noted that the new bridge itself would however be constructed some 250 metres away. There would also be a widened road corridor through this zone and some minor traffic flow increases through some residential areas.

Landscape character impact assessment

Whilst the impact on the character of this zone would include the road corridor extension to accommodate a SUP as in LCZ1, it would also include increased traffic lanes on both sides of the road and re-configured access to the new four-lane bridge, as well as the notable impact of the construction of the new four-lane bridge, with increased road elevation and associated embankments for the increased bridge height.

In addition, other impacts would include the road improvements to Beaumont Avenue and the light vehicle Westrock access to this residential road.

Within the residential areas of this character zone, some of the impacts would include:

- Minor increase in traffic flows to Beaumont Avenue, to accommodate localised diverted traffic from the diverted Westrock access
- Amended character of residential properties of Norfolk Place backing onto Hanna Park, due to the construction of the new elevated four-lane bridge, (but at a distance, beyond existing trees).

This LCZ is considered to have low sensitivity to change, and a moderate magnitude of character impact, based on the impacts to residential areas as well as commercial or industrial areas.

The impact on landscape character is summarised in [Table 5-4](#).

It is noted that this character zone would be impacted by the ancillary areas required to construct the new bridge and the utilisation of these areas and surrounding roads during the construction phase.

Refer to [Figure 7-40](#) and [Figure 7-41](#) for ancillary facility locations and [Section 7.5](#) for a discussion of construction impacts.



Plate 5-10: View of North Richmond shopping plaza on Bells Line of Road

5 Landscape character impact assessment



Plate 5-11: View of commercial and light industrial buildings, Bells Line of Road North Richmond



Plate 5-12: View of Riverside Gardens retirement homes to Beaumont Avenue North Richmond

Sensitivity	Magnitude	Impact
Low The overall sensitivity of this zone is considered low. This is based on the moderate sensitivity of the residential areas impacted, combined with the low sensitivity of the more dominant areas of commercial activity.	Moderate The magnitude of change on all areas of this character zone is considered moderate, based on the impacts on the residential areas and also the road widening in both directions through industrial and commercial areas for most of this character zone.	Moderate - Low
Summary The overall character impact is considered moderate-to-low based on the low sensitivity and moderate magnitude ratings. The setting to residential areas will be impacted by the increased traffic flows and construction of the new four-lane bridge, however would be viewed from over 250m away and screened by trees. The setting to the industrial and commercial areas of Bells Line of Road will be impacted by the road widening for the approach to the new bridge.		

Table 5-4: LCZ 2 'Commercial/ Light industrial/ Residential' impact rating summary

5 Landscape character impact assessment

LCZ 3: River / Estuary / Open space

Existing landscape character

This zone is dominated by the Hawkesbury River and estuary along with the current bridge crossing, it also includes the associated open spaces of Hanna Park and North Richmond Heritage Park.

The existing mature trees and open space grass areas form the typical landscape character for this zone. Within the park there are more formal seating and landscape areas. The existing heritage bridge forms part of the landscape character for the zone areas close to the river.

There is another element of this zone which encompasses Pughs Lagoon and its tributary and includes the open space areas of Pughs Lagoon Reserve close to Kurrajong Road (and Smith Park, close to Old Kurrajong Road). Whilst the reserve and park are characterised by open space grass areas and seating areas, the waterbody areas of Pughs Lagoon include mapped coastal wetlands communities and both the lagoon and its tributary include informal vegetated water edges.

Refer to **Plate 5-13** to **Plate 5-15** for existing character images.

Landscape character changes

The impact on this character zone would be high based on the sensitivity of the areas within this zone to change. The area of the Hawkesbury River, including the river banks and parkland areas of Hanna Park and North Richmond Heritage Park would have the greatest impact and associated character change with the addition of the new four-lane bridge and loss of a number of existing mature trees, as well as disruption to existing park facilities in Hanna Park.

The character impact on the Pughs Lagoon portion of this zone would be limited. The widening of the Kurrajong Road corridor to accommodate a SUP would not impact the Pughs Lagoon reserve as such, but it would have an impact on the setting to the reserve, Pughs Lagoon and its tributary as some existing vegetation parallel to the westbound carriageway would be removed.

Landscape character impact assessment

The major impact on the character of this zone associated with the Hawkesbury River would be the loss of existing mature trees that currently contribute to the existing character. In addition, the construction of the new four-lane bridge and resultant traffic flow, would dominate the landscape character, with the much smaller existing Richmond Bridge being the only infrastructure element currently in this part of the character zone. The existing Richmond Bridge would also be re-purposed for active transport which would positively impact the existing character.

At Pughs Lagoon and its tributary, the impact would be restricted to the associated loss of existing vegetation as a result of the road corridor widening adjoining the westbound carriageway.

Overall, the sensitivity and magnitude are considered high, resulting in an overall high impact for this character zone.

The impact on landscape character is summarised in **Table 5-5**.

There would also be notable impacts to this character zone from the use of ancillary areas for construction of the new bridge. Refer to **Figure 7-40** and **Figure 7-41** for ancillary facility locations and **Section 7.5** for a discussion of construction impacts.



Plate 5-13: View of Hanna Park river and open space, facing the existing Richmond Bridge

5 Landscape character impact assessment



Plate 5-14: View of Hanna Park open space, facing Bells Line of Road, North Richmond



Plate 5-15: View of Pughs Lagoon Reserve, Richmond

Sensitivity	Magnitude	Impact
High The sensitivity of this character zone is considered high, based on its open space nature, with existing infrastructure currently restricted to the Richmond Bridge and its approaches. Close to Pughs Lagoon Reserve, the existing character is rural undisturbed vegetation.	High The magnitude of change would be high on this character zone, as a result of the construction of the new four-lane bridge and its approaches. There would also be character impacts from the removal of existing vegetation close to Pughs Lagoon Reserve through the widening of the Kurrajong Road corridor.	High

Summary
The overall impact is considered high based on the sensitivity of these environmental and recreational uses, together with the magnitude of change, notably on the recreational areas of the Hawkesbury River, but also on Pughs Lagoon Reserve.

Table 5-5: LCZ 3 'River/ Estuary/ Open space' impact rating summary

5 Landscape character impact assessment

LCZ 4: Rural Richmond

Existing landscape character

This zone comprises rural areas of Richmond that include two areas of the proposal. The first is Kurrajong Road (from Old Kurrajong Road to Chapel Street). The second is that of the bypass from Old Kurrajong Road, joining with the existing Inalls Lane at Drift Road.

This zone is characterised by either open rural landscape surrounding existing roads, with hedgerows and mature trees or maintained grass areas for recreational use, also bounded by hedgerows with mature trees. It includes some isolated rural estates, the Heritage Stud and also recreational clubs including:

- Colo soccer club
- Windsor polo club
- Killarney polo club

Refer to **Plate 5-16** to **Plate 5-18** for existing character images.

Landscape character changes

The impact on this character zone would be high based on the existing rural character and layout of hedgerows and fields that would be highly sensitive to change. The type of change would be different for the two areas of the proposal that intersect this zone. For the bypass, the new road alignment would be very different to the existing and at an elevated level across the floodplain, cutting across hedgerows and the existing Colo soccer playing fields, with associated embankments and swales.

For Kurrajong Road, the relative change would be in the widening of the road corridor and the perception of a more urbanised road and intersection.

Landscape character impact assessment

For the Richmond Bypass section of this zone, the associated character impacts would include the construction of two flood plain bridges, a new elevated two-lane road, running over or parallel to existing roads, the upgraded intersection at the junction with Castlereagh Road, and the associated increases in traffic flow. The magnitude of this impact is considered high, although there would be limited vegetation loss, it would impact the existing rural character of the landscape that currently absorbs the existing local roads.

For Kurrajong Road, the impact on the character of this zone would be limited to the widening of the road corridor to accommodate a SUP parallel to the westbound carriageway (and associated vegetation loss) and include a modified intersection with Old Kurrajong Road, to connect with the Richmond Bypass. This intersection modification would include raising the level of the existing road and lane reconfigurations, resulting in the loss of existing mature trees on the sides of the existing intersection and the formation of a much larger intersection in general.

With both areas of the character zone, there would be loss of existing vegetation, most typically to Kurrajong Road, whilst this vegetation is not considered of high value, its loss will have a notable character impact. With the bypass area, the impact will be more of a character change from a rural setting to a more urban setting.

The sensitivity is considered moderate, and the magnitude of change considered high, resulting in a high-to-moderate overall character impact.

The impact on landscape character is summarised in **Table 5-6**.



Plate 5-16: View of rural properties on Inalls Lane, Richmond

5 Landscape character impact assessment



Plate 5-17: View of Colo Soccer Club sportfields parallel to Inalls Lane, Richmond



Plate 5-18: View of Windsor Polo Club fields off Kurrajong Road, Richmond

Sensitivity	Magnitude	Impact
Moderate The sensitivity of this zone to both areas of the proposal is considered moderate, based on their existing largely rural character.	High The magnitude of change is considered high for both areas of the proposal, the impact being relatively high for Kurrajong Road, as well as the more noticeable impacts from the bypass construction and increase in traffic flow on the Inalls lane area.	High - Moderate
Summary The overall impact is considered high-to-moderate based on the sensitivity of these existing rural areas to change and the magnitude of the impact of the elevated bypass and associated embankments and also the road corridor widening to Kurrajong Road.		

Table 5-6: LCZ 4 'Rural Richmond' impact rating summary

5 Landscape character impact assessment

LCZ 5: Richmond Residential

Existing landscape character

This zone comprises the residential areas surrounding the southern end of Kurrajong Road in Richmond and also the central portion of the Bypass at the edges of the suburb of Richmond, close to Hobartville.

These residential areas are typically low density and include the Heritage houses on Inalls Lane.

Refer to **Plate 5-19** to **Plate 5-21** for existing character images.

Landscape character changes

Both residential areas that comprise this character zone would be highly sensitive to change, based on the current infrastructure only being a relatively small component of the existing character.

For the residential area around Inalls Lane, the character changes would be most pronounced, as the new bypass will form a new road, with additional width from road shoulders and associated swales and embankments, combined with increased traffic flows. At the edge of this zone, the current intersection with Castlereagh Road is proposed to be replaced with a large roundabout, which will impact the character of properties surrounding the existing intersection, as verges are adjusted and existing trees removed.

For the residential area around Kurrajong Road, the character changes would be less pronounced, as this residential area is located around the transition of the Kurrajong Road widening works (to accommodate a SUP) with the existing road infrastructure.

Landscape character impact assessment

For the Richmond Bypass section of this zone, the character impacts would be greater than the Kurrajong Road section.

For the bypass, the impact would be of a new two-lane road, running parallel to the existing Inalls Lane and then intersecting back with it. The greatest impact being at the intersection with Castlereagh Road, where the existing four-way intersection would be replaced by a large roundabout and associated islands. Although it is proposed to plant this roundabout, the existing rural character of the intersection would change to a more urban setting.

With Kurrajong Road, the character impact would be limited to the road corridor widening to accommodate the SUP, associated loss of existing vegetation and the transition of this SUP to the existing footpaths through Richmond.

The sensitivity to change of this zone is considered high, since the current infrastructural elements would be increased under the proposal, notably to the bypass area. The magnitude of change would vary, within the bypass residential area, affecting some properties more than others, however overall the magnitude of change is considered moderate, resulting in a moderate overall character impact.

The impact on landscape character is summarised in **Table 5-7**.



Plate 5-19: View of residential property on William Cox Drive, Richmond

5 Landscape character impact assessment



Plate 5-20: View of single-dwelling house, 32 Inalls Lane Richmond

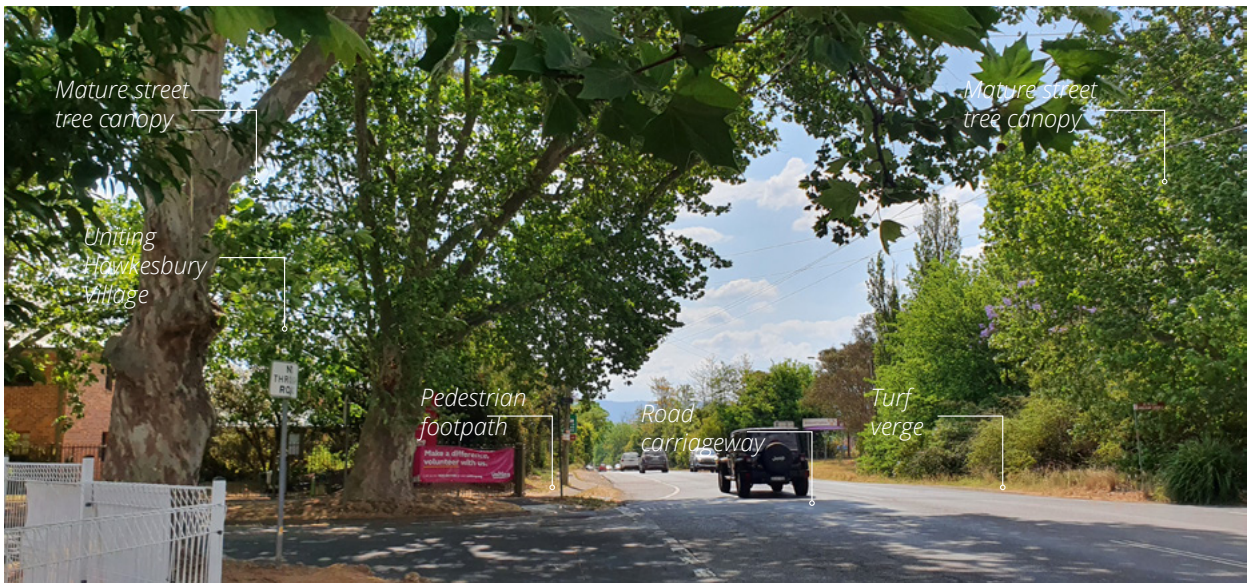


Plate 5-21: View of Uniting Hawkesbury Village on Kurrajong Road and Chapel Street intersection, Richmond

Sensitivity	Magnitude	Impact
Moderate The sensitivity of this zone is considered moderate, based on the zone comprising residential properties currently adjoining only relatively small existing roads.	Moderate Whilst the impact on the properties at the Castlereagh intersection would be high, the overall impact on this zone is largely considered moderate based on increased traffic noise and verge modifications.	Moderate
Summary Both the sensitivity and magnitude of change for this character zone is considered moderate		

Table 5-7: LCZ 5 ‘Richmond Residential’ impact rating summary

5 Landscape character impact assessment

LCZ 6: Southee Road

Existing landscape character

This zone comprises the bypass area between the Castlereagh Road and Londonderry Road intersections of Southee Road.

The residential areas of Hobartville, adjoining the eastbound carriageway of Southee Road are included in this zone along with the Western Sydney University experimental areas adjoining the westbound carriageway of the bypass.

This zone is characterised by the current open landscape setting to the western side of Southee Road and the built-up character of the residential areas to the eastern side of Southee Road,

Refer to **Plate 5-22** to **Plate 5-24** for existing character images.

Landscape character changes

There would be a change in the character of LCZ6 due to the change in setting provided by the existing Southee Road (currently a local road travelling alongside residences) and the alteration of the open landscape areas, and groupings of mature trees at the edge of the existing road corridor. The construction of the new bypass, increase in traffic flows, associated embankments, noise walls, and a noise mound, would impact this setting, along with the loss of a number of existing mature trees.

These changes would also impact the existing character of the open rural land, currently leased by Western Sydney University.

Landscape character impact assessment

The new road would be constructed parallel to the existing Southee Road, with a noise attenuation buffer (of noise mounds and noise wall) between the new and existing road. The existing character would change to a more urban bypass setting, although the sub-division of the two roads, would help to reduce this character impact.

There would also be character impact changes associated with the intersection upgrades at the junction with Castlereagh Road and Londonderry Road.

The sensitivity of change is considered moderate, based on the retention of the existing road and only limited areas within the residential estates being affected. The impact of the Western Sydney University experimental areas is also considered moderate, based on some tree loss, but the existing character going largely unchanged.

The magnitude of change is also considered moderate, based on the new bypass being an additional, but separate road, located behind a noise wall and mound, therefore creating less impact on the character of the overall zone.

The construction of the noise mound and noise wall would greatly reduce the character impact by creating a vegetated separating barrier from the new bypass and its traffic.

The overall character impact is considered high to moderate, based on the high sensitivity of the area to change.

The impact on landscape character is summarised in **Table 5-8**.



Plate 5-22: View of Southee Road after Castlereagh Road intersection, Hobartville

5 Landscape character impact assessment



Plate 5-23: View of Southee Road after Londonderry Road intersection, Hobartville



Plate 5-24: View of Southee Road at the corner of Anderson Avenue, Hobartville

Sensitivity	Magnitude	Impact
Moderate The sensitivity of this zone is considered moderate. Whilst the setting to the residential areas to the western side of the zone is that of a semi-rural setting, this landscape setting is still that of a modified landscape and currently leased to Western Sydney University for experimental agricultural practices.	Moderate The magnitude of change on this character zone is considered moderate based on the change of setting of the existing Southee Road, to include a parallel road with noise mound and noise walls, and associated traffic flow, that will impact the existing semi-rural setting.	Moderate
Summary The overall impact on this character zone is considered moderate based on the character impacts being restricted to the areas of this zone (both residential and educational) that have frontages the existing Southee Road and new Bypass.		

Table 5-8: LCZ 6 ‘Southee Road’ impact rating summary

5 Landscape character impact assessment

5.3 Summary of landscape character impact assessment

The six character zones within the proposal area have been ranked [Table 5-9](#) below, assessing the cumulative impact on sensitivity and magnitude.

The highest character impacts are considered to be on the River /estuary/ open space areas of LCZ3. This is based on its high sensitivity to change, given its current undeveloped character and limited infrastructure components. There would be a high magnitude of change to these areas, as a result of the construction of the taller, and more dominant, new four-lane bridge, in LCZ3, and the increase of traffic flow.

For the Rural Richmond areas of LCZ4, there would be a high-to-moderate overall impact on the existing character. The sensitivity of this zone is considered moderate, although appearing rural in character, the landscape is still modified with a number of sport fields. The magnitude of impact is considered high based on the construction of the new two-lane bypass, particularly where elevated, and the associated increase in traffic flow, having an impact on the character of the existing floodplain, together with the local impacts of the Kurrajong Road corridor widening.

There would be a moderate overall impact on the residential areas of Richmond and Southee Road, LCZ5 & LCZ6. The sensitivity of these areas to change is considered moderate, since for LCZ5 with the exception of a few properties with rural settings or outlook, most of the residential area is characterised by the rural street network and suburban character. For LCZ6, whilst the perimeter properties of Southee Road have a semi-

rural, although modified landscape outlook, the setting is largely suburban. The magnitude of impact on these LCZs is considered moderate. Despite efforts to retain existing trees, the loss of a number of existing mature trees, combined with the construction of a new parallel road, embankments and noise walls, and the associated increase in traffic flow, would impact the character of the existing Southee Road residential properties.

The lowest character zones impacted are envisaged to landscape character zones LCZ1 and LC2. Whilst the local impact of the upgrade of the Crooked Lane intersection with Bells Line of Road would be moderate, the impact on the rest of LCZ1, due to the general Bells Line of Road corridor widening (to accommodated a SUP) would be low. The more urbanised commercial and residential existing character of most of this zone would also be more able to absorb change. For LCZ2, encompassing the main commercial hub of North Richmond, but also residential areas, the overall impact is considered moderate-to-low. The existing character has an overall low sensitivity to change. The impacts on this zone would include the widening of the existing Bells Line of Road, combined with amended traffic lane configurations at the approach to the new four-lane bridge. For the residential areas, it would include increased traffic flows, but also the changes to the character setting of these areas, with the construction of the new higher four-lane bridge.

Landscape Character Zone		Sensitivity	Magnitude	Impact	Staging
1	Mixed uses North Richmond	Low	Low	Low	Stage 2B
2	Commercial / Light Industrial/ Residential North Richmond	Low	Moderate	Moderate - Low	Stage 2A
3	River / Estuary / Open space	High	High	High	Stage 2A
4	Rural Richmond	Moderate	High	High - Moderate	Stage 2A
5	Richmond Residential	Moderate	Moderate	Moderate	Stage 2A
6	Southee Road	Moderate	Moderate	Moderate	Stage 2B

Table 5-9: Landscape character impact rating summary



6 Visibility of the proposal

6.1 Visual envelope

Chapter overview

This chapter identifies the areas where the proposal would be visible, in order to determine representative viewpoints that cover a range of different land uses and viewers surrounding the proposal.

A visual envelope is a theoretical assessment of visibility to or from the proposal. [Figure 6-1 on page 86](#) illustrates the visual envelope, which was generated manually during desktop analysis and verified in the field, taking in to account such factors as built structure, intervening vegetation and topography.

Staging

The proposal is reviewed for Stage 2 works as a whole, comprising each of Stage 2A and Stage 2B works. The extent of this staging is illustrated in [Figure 6-1](#), [Figure 6-2](#) and [Figure 6-3](#).

Viewpoints for assessment

[Table 6-1](#) lists viewpoints that have been selected to assess potential visual impacts including:

- Publicly accessible locations that are representative of residential properties and businesses
- Heritage items and precincts
- Public domain, including parks, footpaths, shared user paths and lookouts
- Popular destinations and tourist attractions
- Road user views from the existing road.

The locations and directions of selected viewpoints are representative of the range of locations both within and beyond the road corridor and are shown in [Figure 6-2 on page 87](#) and [Figure 6-3 on page 88](#).

This list does not represent the entire number of receptors likely to be visually impacted by the proposal, but rather, represents the range of viewers potentially impacted by some part of the proposal across each LCZ. These viewpoints are assessed further in [Section 7.4](#).

VP	Location	LCZ	Stage 2A	Stage 2B
1	View of Bells Line of Road looking south east towards the existing Richmond Bridge	LCZ 2	✓	
2	View within Hanna Park facing south towards the Hawkesbury River	LCZ 3	✓	
3	View from the existing bridge (Bells Line of Road), facing towards North Richmond	LCZ 3	✓	
4	View from Old Kurrajong Road looking south west towards the intersection with Kurrajong Road and the bypass	LCZ 4	✓	
5	View on Kurrajong Road looking north west towards Pughs Lagoon	LCZ 4	✓	
6	View from Yarramundi Lane looking south east towards Colo Soccer Club fields	LCZ 4	✓	
7	View from Inalls Lane, looking north west	LCZ 4	✓	
8	View of Inalls Lane looking south east towards the Castlereagh Road intersection	LCZ 5	✓	
9	View from residential area of Southee Road looking south west	LCZ 6		✓
10	View from edge of Southee Road looking south east towards the Londonderry Road intersection	LCZ 6		✓
Additional (private property) viewpoints				
11	View adjacent to Shortland Close properties facing east towards North Richmond Playground and the existing bridge	LCZ 3	✓	
12	View from rear of Norfolk Place properties facing south towards Hanna Park and the existing bridge	LCZ2	✓	
13	View from intersection of William Cox Drive and Grand Flaneur Avenue facing William cox properties, with potential views of the bypass	LCZ4	✓	

Table 6-1: Viewpoint summary

6 Visibility of the proposal - visual envelope

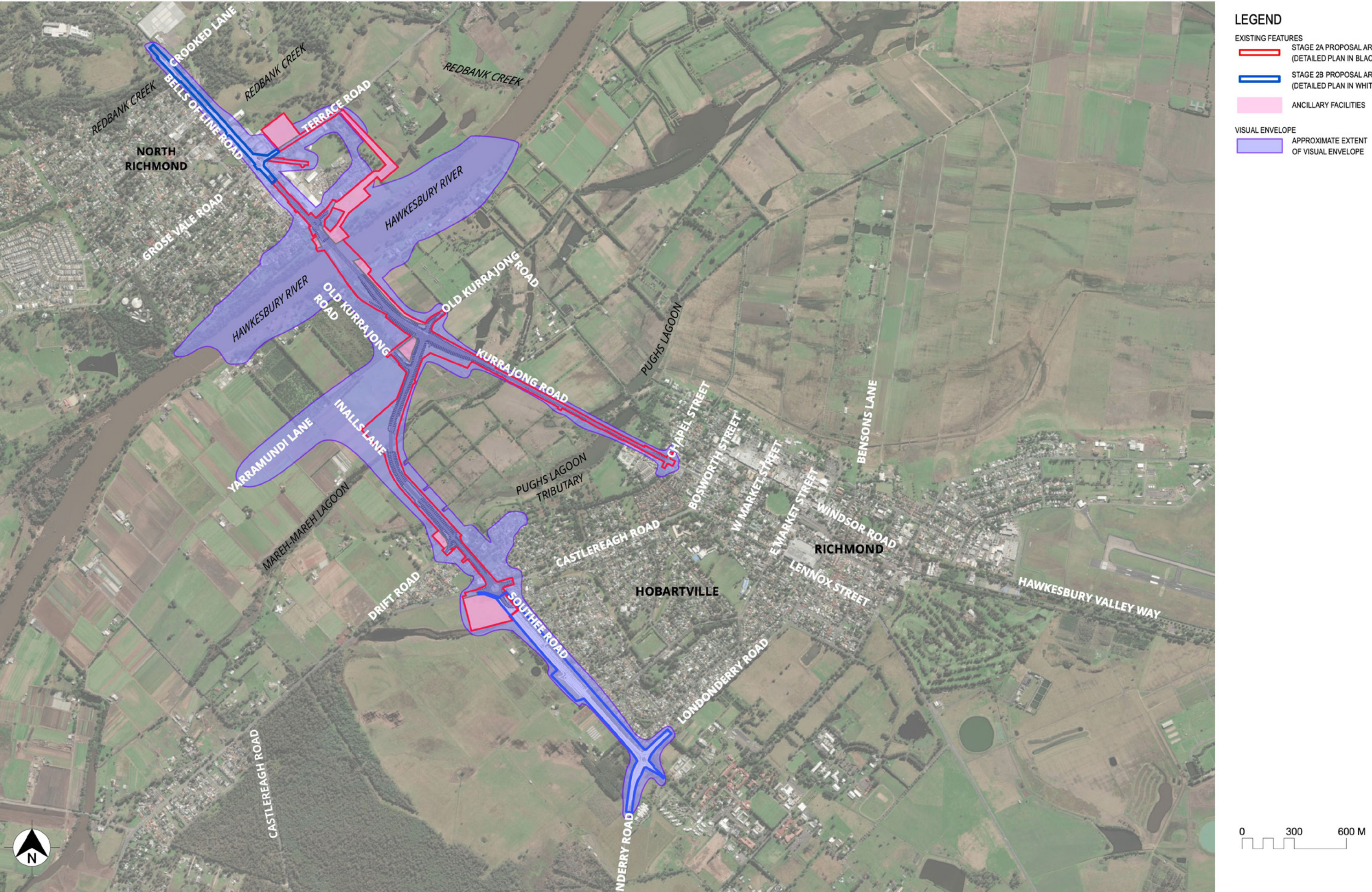
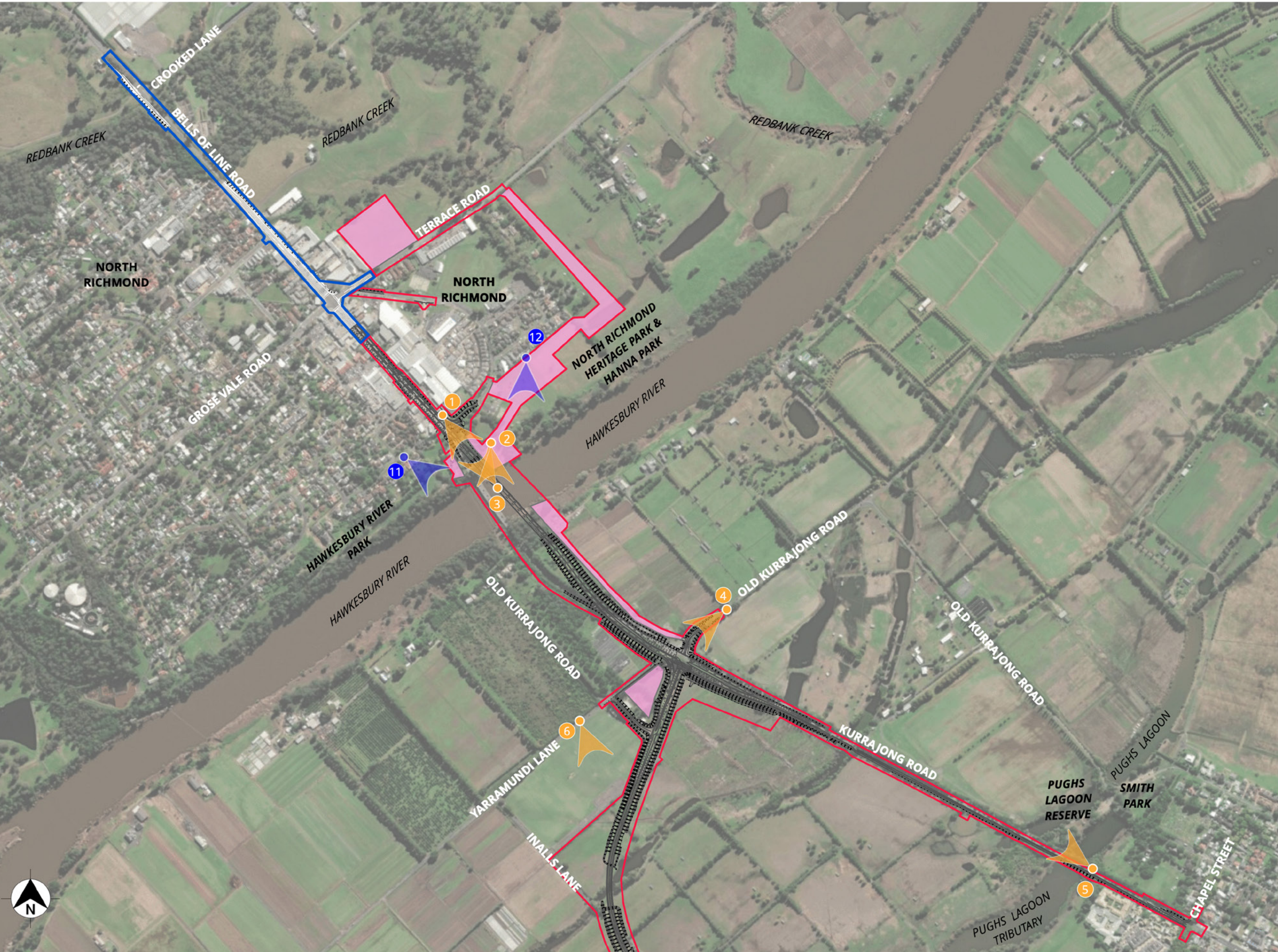


Figure 6-1: Visual envelope mapping

6 Visibility of the proposal - viewpoint locations



LEGEND

VIEWPOINT LOCATIONS

- STAGE 2A PROPOSAL AREA
- STAGE 2B PROPOSAL AREA
- ANCILLARY FACILITIES

VIEWPOINT WITH VISUALISATION

VIEWPOINT WITHOUT VISUALISATION

- VIEWPOINT 1 - EXISTING VIEW LOOKING SOUTH EAST TOWARDS EXISTING RICHMOND BRIDGE
- VIEWPOINT 2 - EXISTING VIEW HANNA PARK FACING SOUTH TOWARDS HAWKESBURY RIVER
- VIEWPOINT 3 - EXISTING VIEW FROM EXISTING BRIDGE (BELLS LINE OF ROAD), FACING TOWARDS NORTH RICHMOND
- VIEWPOINT 4 - VIEW FROM OLD KURRAJONG ROAD LOOKING SOUTHWEST TOWARDS THE INTERSECTION WITH KURRAJONG ROAD AND THE BYPASS
- VIEWPOINT 5 - EXISTING VIEW KURRAJONG ROAD LOOKING NORTH WEST TOWARDS PUGH'S LAGOON
- VIEWPOINT 6 - EXISTING VIEW YARRAMUNDI LANE LOOKING SOUTH EAST TOWARDS COLO SOCCER CLUB FIELDS
- VIEWPOINT 11 - SHORTLAND CLOSE FACING EAST TOWARDS NORTH RICHMOND PLAYGROUND
- VIEWPOINT 12 - BEHIND NORFOLK PLACE AT HANNA PARK FACING SOUTH TOWARDS EXISTING NORTH RICHMOND BRIDGE

NOTE: ALL VIEWPOINTS ARE APPLICABLE TO STAGE 2, STAGE 2A + STAGE 2B UNLESS STATED OTHERWISE

0 50 150 250 M

Figure 6-2: Viewpoint locations

6 Visibility of the proposal - viewpoint locations



LEGEND

VIEWPOINT LOCATIONS

- STAGE 2A PROPOSAL AREA
- STAGE 2B PROPOSAL AREA
- ANCILLARY FACILITIES
- VIEWPOINT WITH VISUALISATION
- VIEWPOINT WITHOUT VISUALISATION

7 VIEWPOINT 7 - EXISTING VIEW INALLS LANE, LOOKING NORTH WEST

8 VIEWPOINT 8 - EXISTING VIEW INALLS LANE LOOKING SOUTH EAST TOWARDS CASTLEREAGH ROAD INTERSECTION

9 VIEWPOINT 9 (STAGE 2B) - EXISTING VIEW FROM RESIDENTIAL AREAS OF SOUTHEE ROAD LOOKING SOUTH WEST

10 VIEWPOINT 10 (STAGE 2B) - EXISTING VIEW SOUTHEE ROAD LOOKING SOUTH EAST TOWARDS THE LONDDERRY ROAD INTERSECTION

13 VIEWPOINT 13 - INTERSECTION OF WILLIAM COX DRIVE AND GRAND FLANEUR AVENUE FACING WEST TOWARDS INALLS LANE

NOTE: ALL VIEWPOINTS ARE APPLICABLE TO STAGE 2A UNLESS STATED OTHERWISE

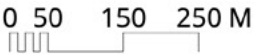


Figure 6-3: Viewpoint locations



7 Visual impact assessment

7.1 Methodology

Chapter overview

This chapter assesses the visual impact at each of the selected viewpoints based on the established visual envelope.

Impact assessments are based on a qualitative assessment of the sensitivity of the view and magnitude of the proposal potentially visible in that view. This enables the development of a mitigation strategy to address the impacts identified.

Sensitivity

Sensitivity is the measure of the 'completeness' and the perceived 'value' of the existing view. An assessment is made as to the quality of the landscape, its cultural and historical importance to the community, scenic value and overall composition of the place.

The following sensitivity parameters have been used as the basis for this assessment:

- The category of view such as residential, tourism or commercial and frequency at which the scene is viewed
- The elements of the proposal that are visible
- Importance of the view. Places with high social, recreational, and historical significance to local residents have higher sensitivity, as do areas of unique scenic quality
- Generally, views with the highest sensitivity include:
 - Residential views that would be affected by the proposal and the context of this view i.e. kitchen window, balcony, bedroom, living room
 - Public open space with a notable visual landscape, for example, lookouts or other scenic natural areas
 - Views with high cultural and historical significance on the visual landscape
- Views with the lowest sensitivity are most likely to be:
 - Commercial areas with enclosed workplaces
 - Road user views where the road corridor signage take precedence – however it is important to provide a stimulating motorist experience, particularly for tourists.

Magnitude

The 'magnitude of visual change' describes the contrast or type of change resulting from the proposal or proposal, the extent of change and also the proximity of the viewer. Changes are categorised as follows:

- A high magnitude of change would result if the proposal is of a major scale and considered out of scale or uncharacteristic of the existing view, or if there is considerable modification to the existing built fabric or landscape
- A moderate magnitude of change would result if the proposal is prominent but not considered to be substantially different from the existing character
- A low magnitude of change would result if there is minimal alteration to the existing view and the proposal is of a scale and nature that is consistent with the existing landscape.

7.2 Viewpoints

For the purpose of this chapter, the viewpoints 1-10 (and supplementary viewpoints 11-14) are largely applicable to the visibility of the complete works of Stage 2 (Stage 2A + Stage 2B).

Exceptions to this are as follows:

- Viewpoints 9 & 10: Whilst these viewpoints are part of the overall Stage 2 works, It should be noted that these viewpoints are only applicable to the Stage 2B component of the works, which would be constructed following the construction of the Stage 2A works and specifically refers to the continuation of the bypass construction, parallel to Southree Road, including the proposed vegetated noise mounds and noise walls.

		Magnitude			
Sensitivity		High	Moderate	Low	Negligible
	High	High	High-Moderate	Moderate	Negligible
	Moderate	High-Moderate	Moderate	Moderate-Low	Negligible
	Low	Moderate	Moderate-Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Table 7-1: Visual impact rating matrix, Source: Transport EIA-N04

7 Visual impact assessment

Assessment tools

In order to assess the potential impacts of the proposal across the variable landscape features of the study area, it was necessary to investigate the potential visual impacts using different tools.

Views were assessed in conjunction with plans and site photography taken during the site visit.

Transport EIA-N04 defines the methodology that was used to assess the likely changes to landscape composition. Elements of the view include dominance of form, lines, colours and textures. The qualitative sensitivity of potential viewers was combined with objective measurement to form assessment conclusions.

Notated photographs

The proposed road design has been overlaid onto the site photographs, scaled and positioned so that they matched existing features.

Each photograph is marked up to illustrate the changes as a result of the proposal. Each image provides an approximation of the design in its setting rather than a fully resolved representation of the design and is a graphic presentation of the following design elements:

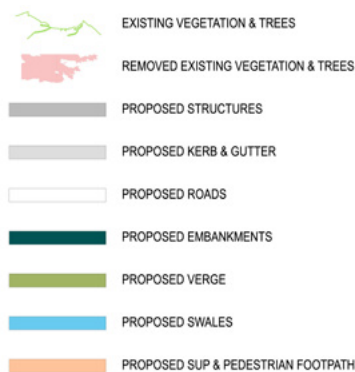


Figure 7-1: Legend for existing viewpoint site photograph analysis



Figure 7-2: Typical before and after viewpoints

7 Visual impact assessment

Viewpoint 1

Location and description

Viewpoint 1 is located on the grass verge to the side of the eastbound carriageway of Bells Line of Road in North Richmond. This viewpoint is facing south east towards the existing Richmond Bridge.

The major compositional elements within this view are the existing turf verge/embankment on the eastern edge towards Westrock industrial premises, car parking to the facility, street trees and the existing mature tree canopy of Hanna Park in the middle-ground of the existing view, framing the approach to the existing bridge (Bells Line of Road).

Visible elements of the proposal

At this location, the visible elements of the proposal would be the widened road corridor (to accommodate a SUP) in the foreground of the view, but most noticeably, the elevated approach to the new four-lane bridge which would dominate the middle-ground of the view.

Affected viewers

- Motorists
- Pedestrians and cyclists
- Workers and visitors within the commercial/light industrial proposal.

Description of impacts

The proposal would be highly visible at this viewpoint. The new road corridor would follow the existing road structure but it would be widened to accommodate a SUP along the eastern edge of Bells Line of Road and the approach to the new four-lane bridge. The most noticeable visual impact would be the raised approach to the new four-lane bridge and the loss of existing trees in Hanna Park, as a consequence of the construction of this new structure, these existing trees currently defining the middle-ground of the existing view.

In addition, the foreground of the viewpoint location would be modified to accommodate the SUP, resulting in the loss of existing street trees. The existing turf embankment modifications would include the construction of a retaining wall to accommodate the SUP and result in a reduced extent of turf verge.

Due to the loss of vegetation and increase in the scale of the infrastructure elements to the existing road corridor, there would be a high-to-moderate visual impact, impacting the experience of motorists and pedestrians using the road corridor.

The visual impact on these viewpoints is summarised in [Table 7-2](#). For mitigation measures relating to these views refer to [Section 8 on page 122](#) of this report.



Figure 7-3: Viewpoint 1 location map

7 Visual impact assessment



Figure 7-4: Viewpoint 1 - Existing view of Bells Line of Road looking south east towards the existing Richmond Bridge

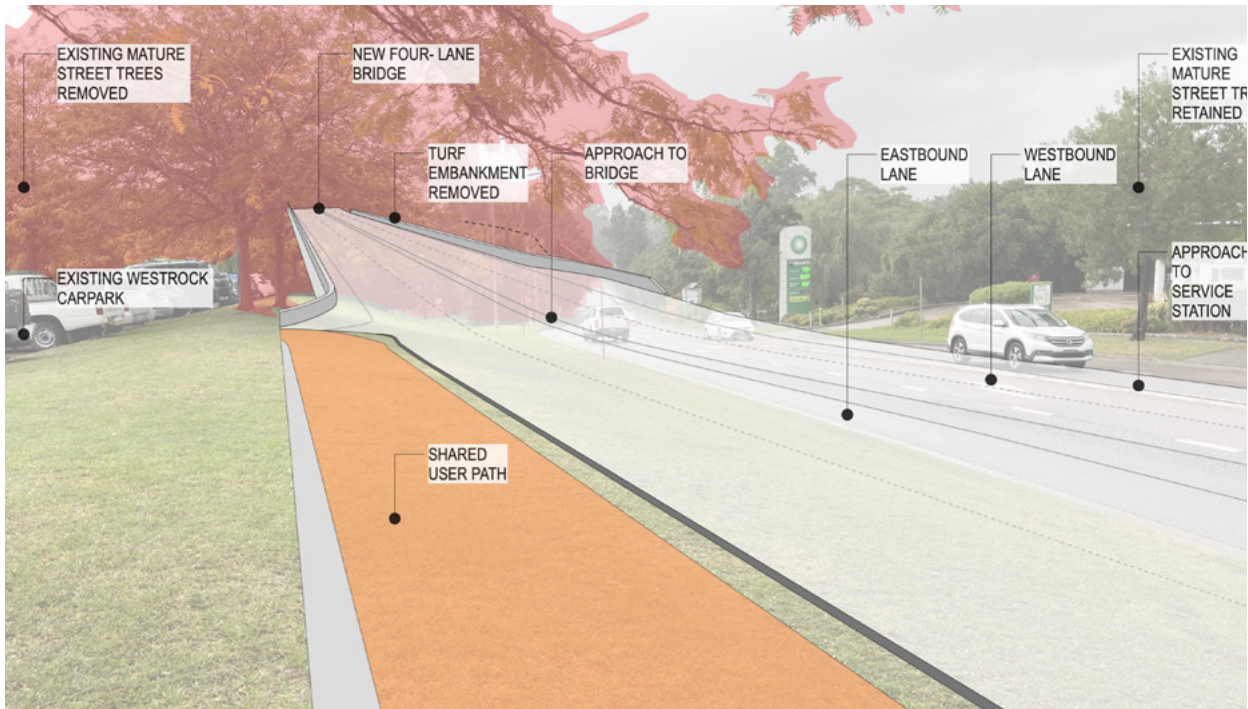


Figure 7-5: Viewpoint 1 - Proposed view of Bells Line of Road looking south east towards the existing Richmond Bridge

Sensitivity	Magnitude	Impact
Moderate The sensitivity of the view is considered moderate, based on its location at the approach to Hanna Park, but on the edge of the commercial zone of Bells Line of Road The existing view comprises a wide turf verge with a background of street trees and mature existing trees to Hanna Park and North Richmond Heritage Park, but includes the service station to the western side of Bells Line of Road	High The magnitude of change on the view is considered high based on the increased dominance of infrastructure in the view, comprising the SUP and the approach to the new four-lane bridge. The removal of existing street trees and mature trees to Hanna Park also accentuate the visual impact.	High - Moderate

Table 7-2: Visual impact summary viewpoint 1

7 Visual impact assessment

Viewpoint 2

Location and description

This viewpoint is located within Hanna Park, looking south towards the Hawkesbury River and the existing Richmond Bridge.

The main compositional elements of the view are the existing mature trees and turf riverbank in the foreground, with the Hawkesbury River in the background. The existing bridge is partly visible through the existing trees in the background of the view.

Visible elements of the proposal

The new four-lane bridge would be highly visible from this viewpoint, with the underside of the bridge deck and associated balustrades dominating the view, along with the individual bridge piers. Removal of a number of existing mature trees for the construction of the bridge would also result in the existing bridge being more visible from this viewpoint.

Affected viewers

- Recreational users of Hanna Park
- Pedestrians.

Description of impacts

The construction of the new four-lane bridge would result in the removal of the existing mature trees in both the foreground and background of the view.

The new four-lane bridge would dominate the view as a result of the tree removal. Given the height of the new bridge, the view would focus on the under-croft of the new bridge. It is proposed to carry out some landscape works, to include replacement tree planting to mitigate the visual impact of the new bridge on the park.

The bridge is quite wide (at approximately 20 metres). The under-croft area would be devoid of any direct sunlight, making reinstatement of the existing turf not a viable proposition, the proposal would therefore change the visual character of this area. In association with hard surfaced landscape for the under-croft area and shade resistant planting, it is also proposed to provide recreational uses, such as fitness equipment.

The visual impact on these viewpoints is summarised in [Table 7-3](#). For mitigation measures relating to these views refer to [Section 8 on page 122](#) of this report.



Figure 7-6: Viewpoint 2 location map

7 Visual impact assessment



Figure 7-7: Viewpoint 2 - Existing view within Hanna Park facing south towards the Hawkesbury River

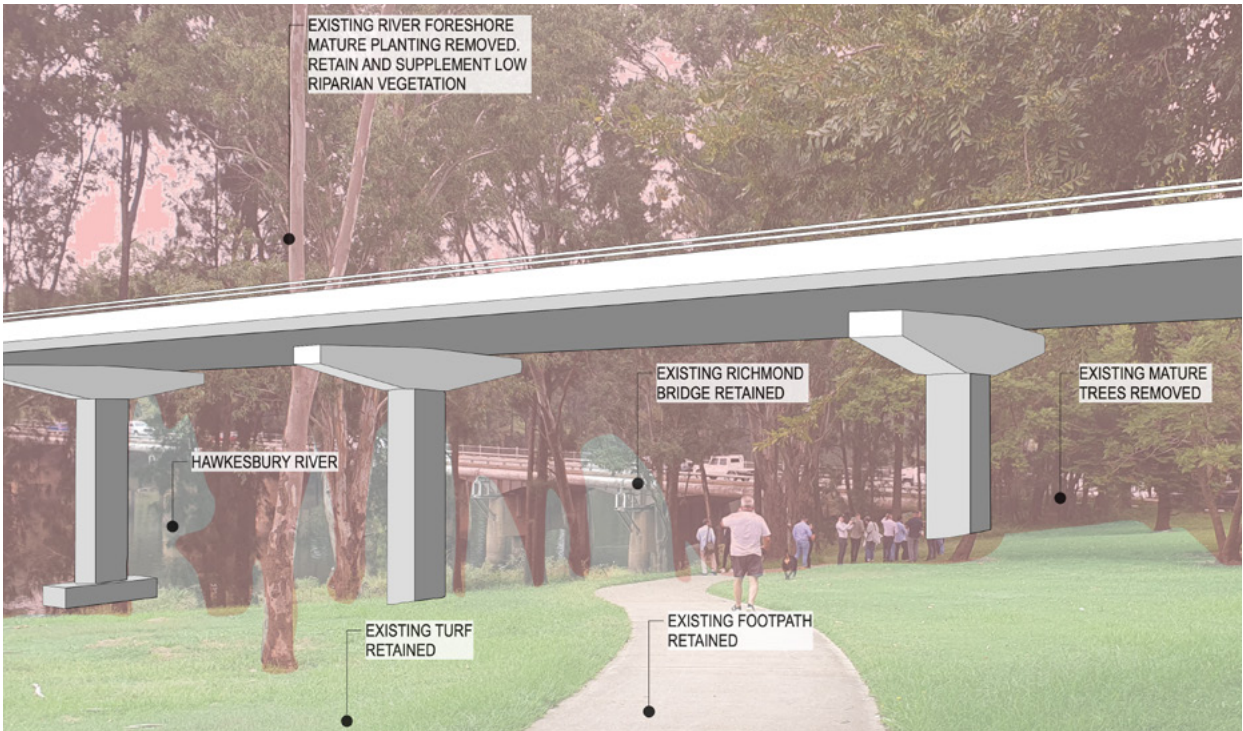


Figure 7-8: Viewpoint 2 - Proposed view within Hanna Park facing south towards the Hawkesbury River

Sensitivity	Magnitude	Impact
High	High	High
The sensitivity of the view is considered high as it represents a typical view from the existing recreation area of Hanna Park, which currently is a largely landscape view, with only glimpse views of the existing bridge through the trees.	The magnitude of the view would be high based on the dominance of the new bridge infrastructure and removal existing trees. The existing view would be change from one of landscape elements to one of built form.	

Table 7-3: Visual impact summary viewpoint 2

7 Visual impact assessment

Viewpoint 3

Location and description

This viewpoint is located within the westbound travel lane of the Bells Line of Road on the existing bridge. The viewpoint is facing towards Hanna Park and the Hawkesbury River, looking towards North Richmond.

The major compositional elements within this view are the mature trees, grass slopes and footpaths within Hanna Park, together with the banks and edge of the Hawkesbury River. The bridge surface and safety barrier of the existing Richmond bridge dominate the foreground of the existing view.

Visible elements of the proposal

The new proposed four-lane bridge would dominate the view from this location.

In the foreground, the safety barrier on the eastern side of bridge would be upgraded (together with the western barrier). There is a potential for the existing Richmond bridge to be re-surfaced and re-purposed for pedestrians, cyclists and general recreation, including seating. It is proposed to have only a centre line marking to divide east and westbound active transport users.

Affected viewers

- Motorists
- Pedestrians and cyclists.

Description of impacts

The proposal would be highly visible at this location. The view would be dominated by the new four-lane bridge (and its bridge piers) to the eastern side of the view and any associated re-configuration of Hanna Park for the new SUP along the eastern edge of Bells Line of Road. It should be noted however that due to the height of the proposed bridge, some visibility of the riverbank and existing trees is retained in between the piers of the new bridge (essentially retained views under the bridge). In addition, the re-purposing of the existing Richmond bridge and new safety barriers would impact the foreground view, but in a positive way.

Despite these considerations, the existing landscape elements of the view would be obscured by the new four-lane bridge, resulting in a high visual impact.

The visual impact on these viewpoints is summarised in [Table 7-4](#). For mitigation measures relating to these views refer to [Section 8 on page 122](#) of this report.

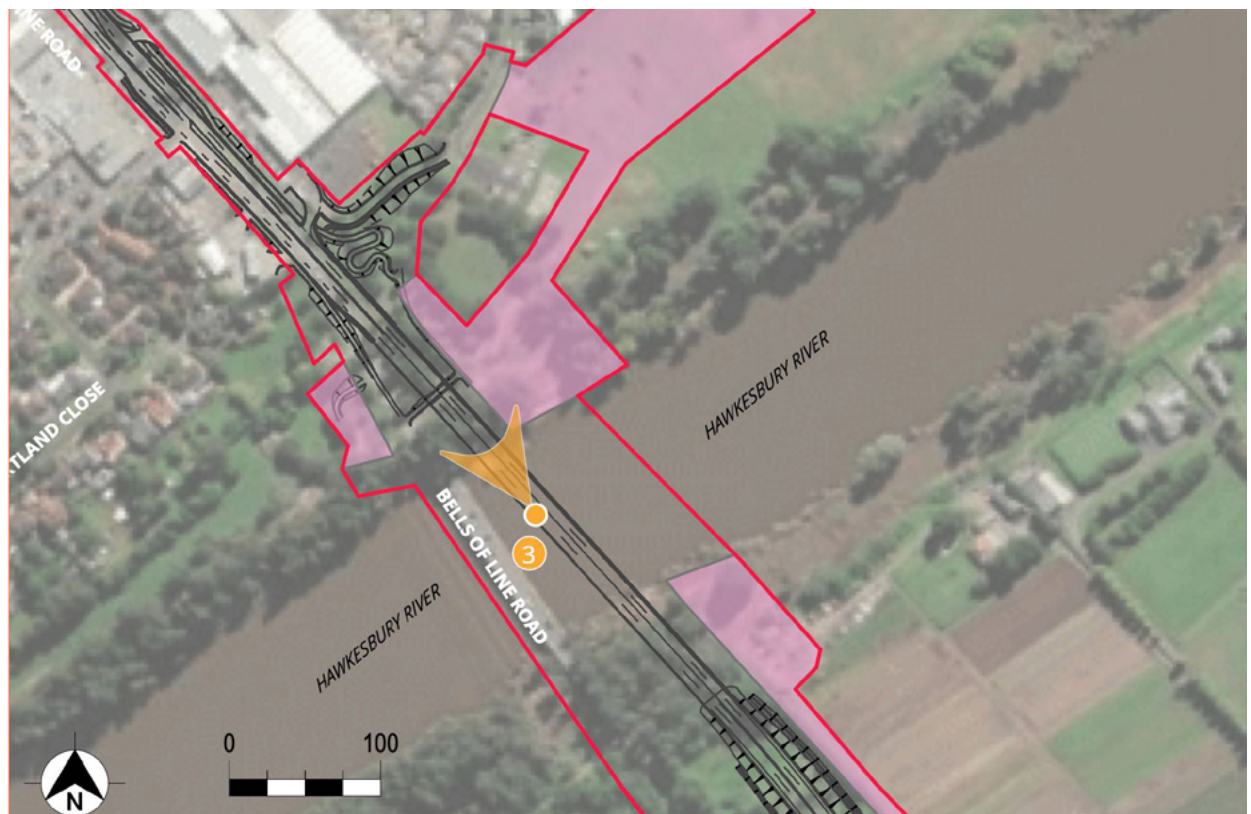


Figure 7-9: Viewpoint 3 location map

7 Visual impact assessment

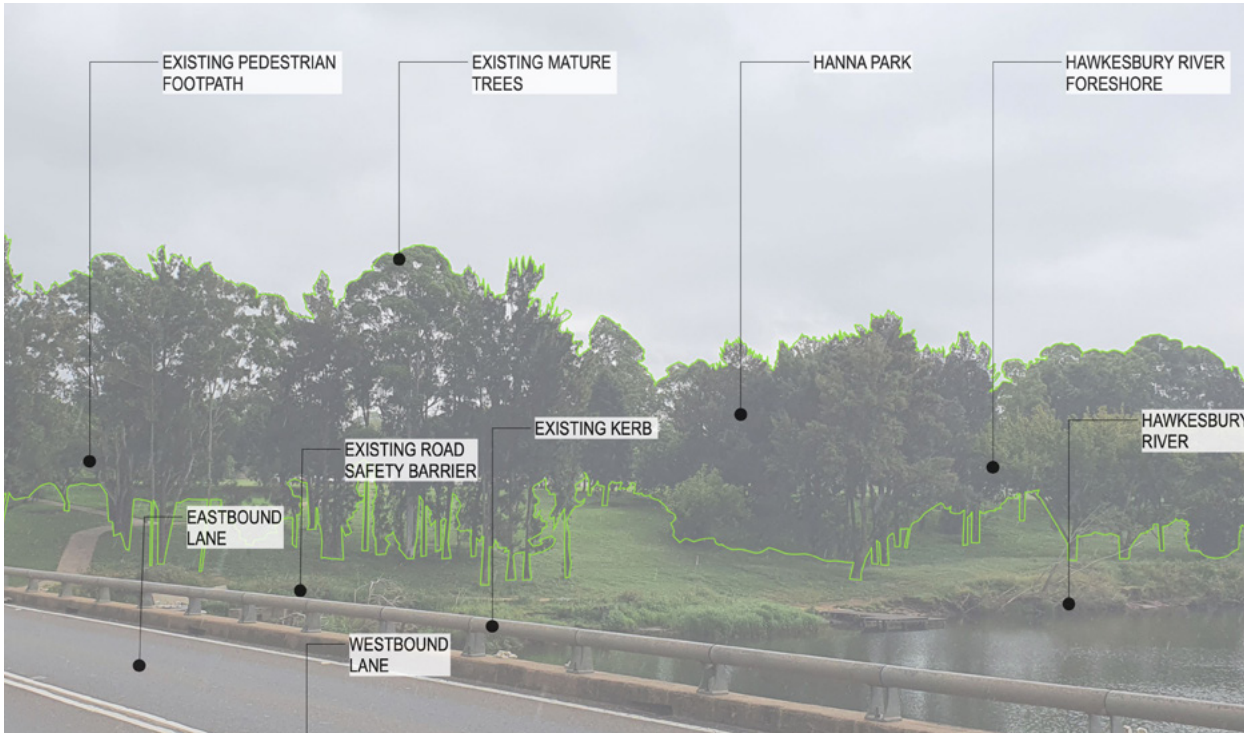


Figure 7-10: Viewpoint 3 - Existing view from the existing bridge (Bells Line of Road), facing towards North Richmond

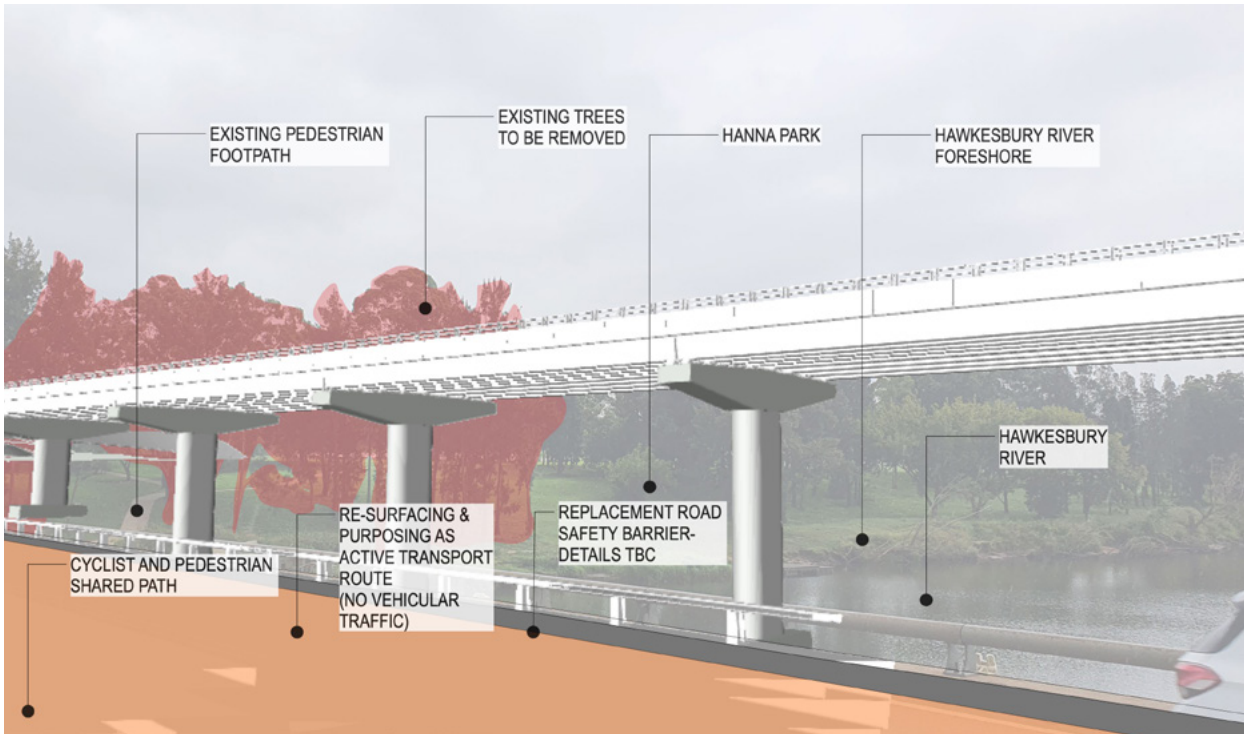


Figure 7-11: Viewpoint 3 - Proposed view from the existing bridge (Bells Line of Road), facing towards North Richmond

Sensitivity	Magnitude	Impact
High The sensitivity of this view is considered high as it is largely an existing view of the existing mature trees that are an integral part of the parkland of Hanna Park, with only infrastructure elements in the foreground of the existing view.	High The existing middle-ground view of Hanna Park and the Hawkesbury River would be obscured by the new four-lane bridge and its piers. The foreground view would include an upgrade to the existing safety barrier with a new balustrade and the existing road corridor would be re-purposed to active transport.	High

Table 7-4: Visual impact summary viewpoint 3

7 Visual impact assessment

Viewpoint 4

Location and description

This viewpoint is located on a portion of Old Kurrajong Road (north east of intersection), facing south west towards the intersection with Kurrajong Road and the bypass.

The major compositional element of the view is the existing local road and its rural setting. There are existing mature trees and hedgerows to the eastern side of the road and an existing timber post and rail fence with open views to the rural landscape to the western side of the road.

Visible elements of the proposal

At this location, the embankments and swales associated with the bypass and Kurrajong Road corridor widening (to accommodate a SUP) would be the main visible elements of the proposal, but only in the middle-ground of the view. The proposal would include a new three-way signalised intersection connecting Kurrajong Road and the new bypass. It would also result in this section of Old Kurrajong Road being closed to the public, with a two-way gated emergency driveway access to be opened during flood evacuation events by emergency services.

Affected viewers

- Motorists
- Pedestrians and cyclists

Description of impacts

The magnitude of the visual change would be low at this viewpoint, as the main elements of change associated with the intersection of Bells Line of Road and Kurrajong Road, in the form of embankments and swales, would only be visible as distant elements of the view.

The sensitivity of this viewpoint is considered moderate based on its semi rural location, but dominated by the existing infrastructure of a small local road and private driveway. The overall impact would be moderate to low.

The visual impact on these viewpoints is summarised in [Table 7-5](#). For mitigation measures relating to these views refer to [Section 8 on page 125](#) of this report.



Figure 7-12: Viewpoint 4 location map

7 Visual impact assessment



Figure 7-13: Viewpoint 4 - Existing view from Old Kurrajong Road looking south west towards the intersection with Kurrajong Road and the bypass

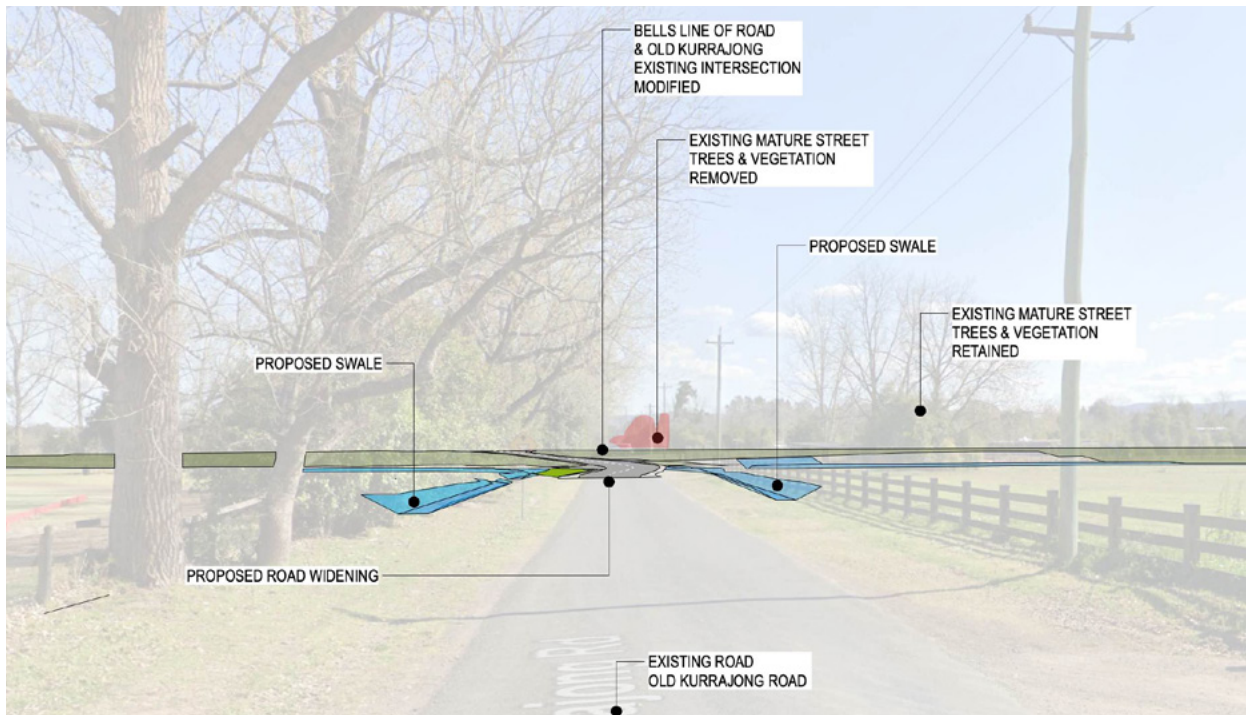


Figure 7-15: Viewpoint 4 - Proposed view from Old Kurrajong Road looking south west towards the intersection with Kurrajong Road and the bypass

Sensitivity	Magnitude	Impact
Moderate The sensitivity of the view is considered moderate based on it's existing semi-rural setting, but still within a moderated landscape of fields and the small local road of Old Kurrajong Road, which dominates the existing view.	Low The magnitude of change of this viewpoint is considered low, based on the elements of change comprising the middle-ground of the existing view. This portion of Old Kurrajong Road would be closed to public access.	Moderate - Low

Table 7-5: Visual impact summary viewpoint 4

7 Visual impact assessment

Viewpoint 5

Location and description

This viewpoint is located on the westbound carriageway of Kurrajong Road, Richmond. The viewpoint is facing west, crossing Pughs Lagoon (and the endangered Coastal Wetlands community) in the distance, to the east.

The major compositional elements within this view are the existing vegetated embankments immediately adjoining to the east and west of the existing road, with the existing road central to the view.

Visible elements of the proposal

At this location the road corridor would be widened to the west to accommodate the proposed SUP to be installed parallel to the westbound carriageway, resulting in the removal of the western embankment and associated mature vegetation.

Affected viewers

- Motorists
- Pedestrians and cyclists.

Description of impacts

The proposal would be highly visible at this location. The road corridor would be widened on the western side, removing the existing embankment and associated established vegetation to accommodate a SUP. This existing vegetation currently acts as a visual barrier for commuters using the road corridor.

The sensitivity of the view is considered low, based on the existing view being largely of the road and its embankments. The magnitude of change is considered high based on the removal of existing embankments, changing the nature of the existing view and the loss of existing vegetation to this western side of the road. The vegetation that would be lost however is overgrown roadside vegetation.

The overall visual impact is considered moderate.

The visual impact on these viewpoints is summarised in [Table 7-6](#). For mitigation measures relating to these views refer to [Section 8 on page 122](#) of this report.

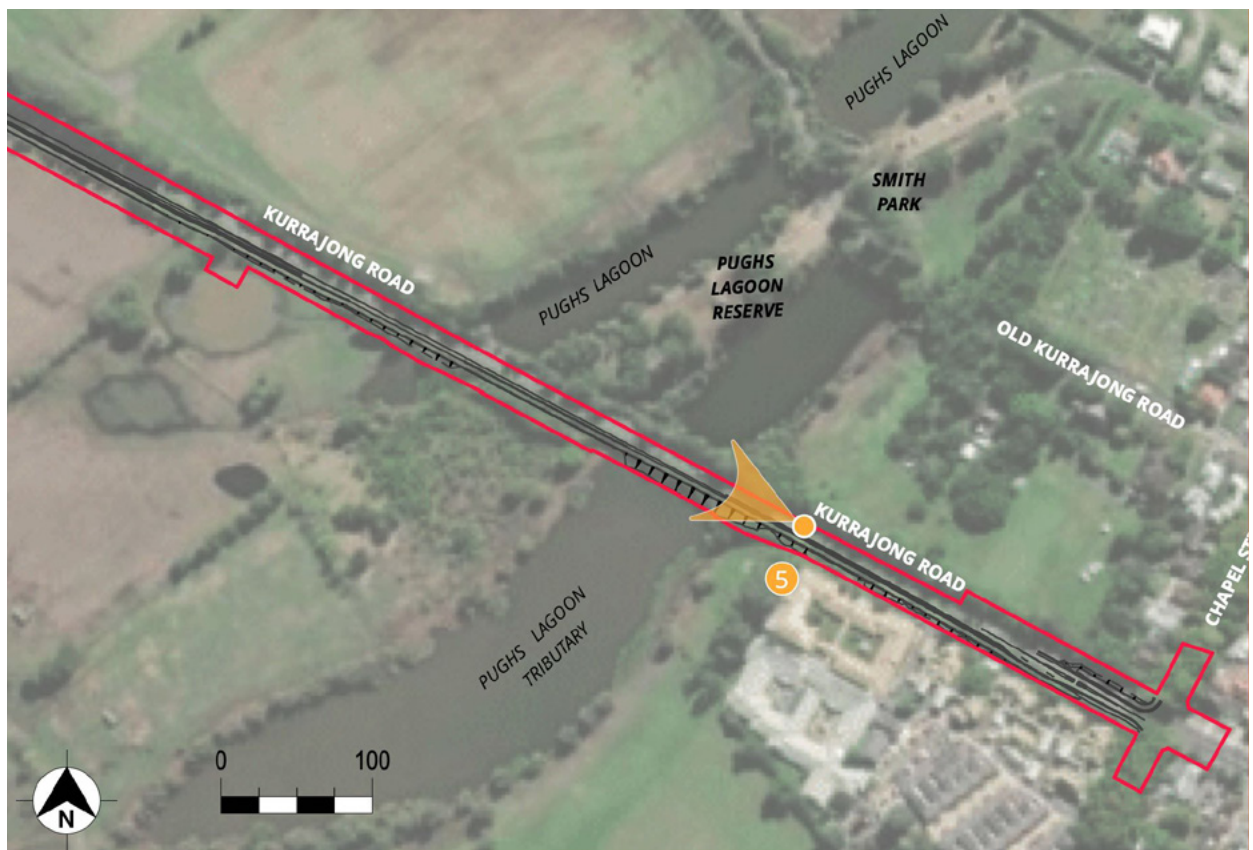


Figure 7-16: Viewpoint 5 location map

7 Visual impact assessment



Figure 7-17: Viewpoint 5 - Existing view on Kurrajong Road looking north towards Pughs Lagoon

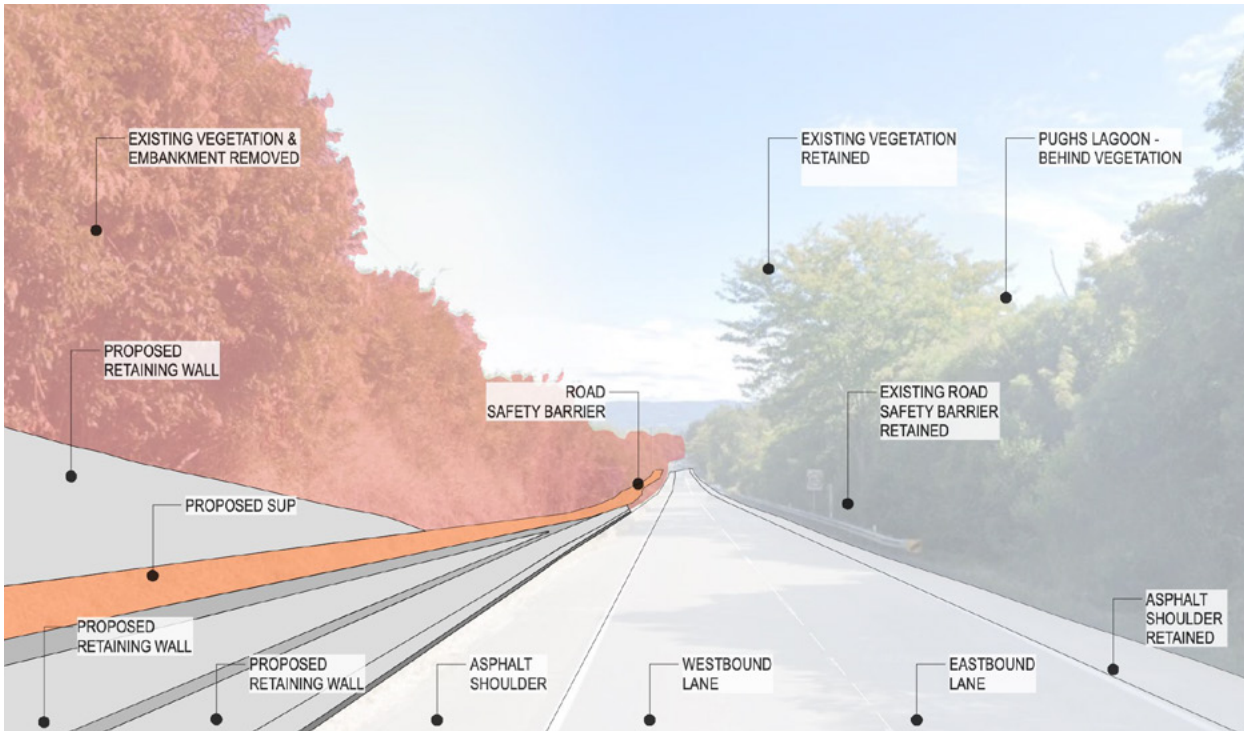


Figure 7-18: Viewpoint 5 - Proposed view on Kurrajong Road looking north towards Pughs Lagoon

Sensitivity	Magnitude	Impact
Low The sensitivity of the view is considered low since the existing view is of an existing two-lane carriageway enclosed by embankments and vegetation.	High The magnitude of change on the view is considered high based on the widening of the road corridor to accommodate a new SUP on the western side with proposed retaining walls, resulting in the loss of the existing embankment and associated vegetation from the foreground through to the distance.	Moderate

Table 7-6: Visual impact summary viewpoint 5

7 Visual impact assessment

Viewpoint 6

Location and description

This viewpoint is located along Yarramundi Lane, Richmond. The viewpoint is facing the Colo Soccer Club playing fields, looking towards the proposed Richmond bypass, which would run across the view towards the south east.

The major compositional elements within this view are the soccer club playing fields, which are located at the edge of Yarramundi Lane and extend into the distance of this viewpoint and the mature trees and hedgerow plantings in the distance, which mark the extent of the soccer fields.

Visible elements of the proposal

At this location, the proposed bypass and associated embankments would be visible in the distance, where there is currently no existing road.

Affected viewers

- Motorists
- Users of the soccer club.

Description of impacts

The most notable impact of the proposal would be the new elevated bypass and its embankments cutting across the existing rural view of hedgerows and mature trees in the background of the view. This would lead to a reduction in the playing field capacity of the Colo Soccer Club.

The sensitivity of this view is considered high based on its rural setting and the absence of any infrastructure in the existing view, except for the lane from which the view is taken.

The magnitude of the view would be moderate, the magnitude being limited by the distance of the proposal to the viewpoint. The high sensitivity of this view would result in an overall high to moderate visual impact.

The visual impact on these viewpoints is summarised in [Table 7-7](#). For mitigation measures relating to these views refer to [Section 8 on page 122](#) of this report.



Figure 7-19: Viewpoint 6 location map

7 Visual impact assessment



Figure 7-20: Viewpoint 6 - Existing view from Yarramundi Lane looking south east towards Colo Soccer Club fields

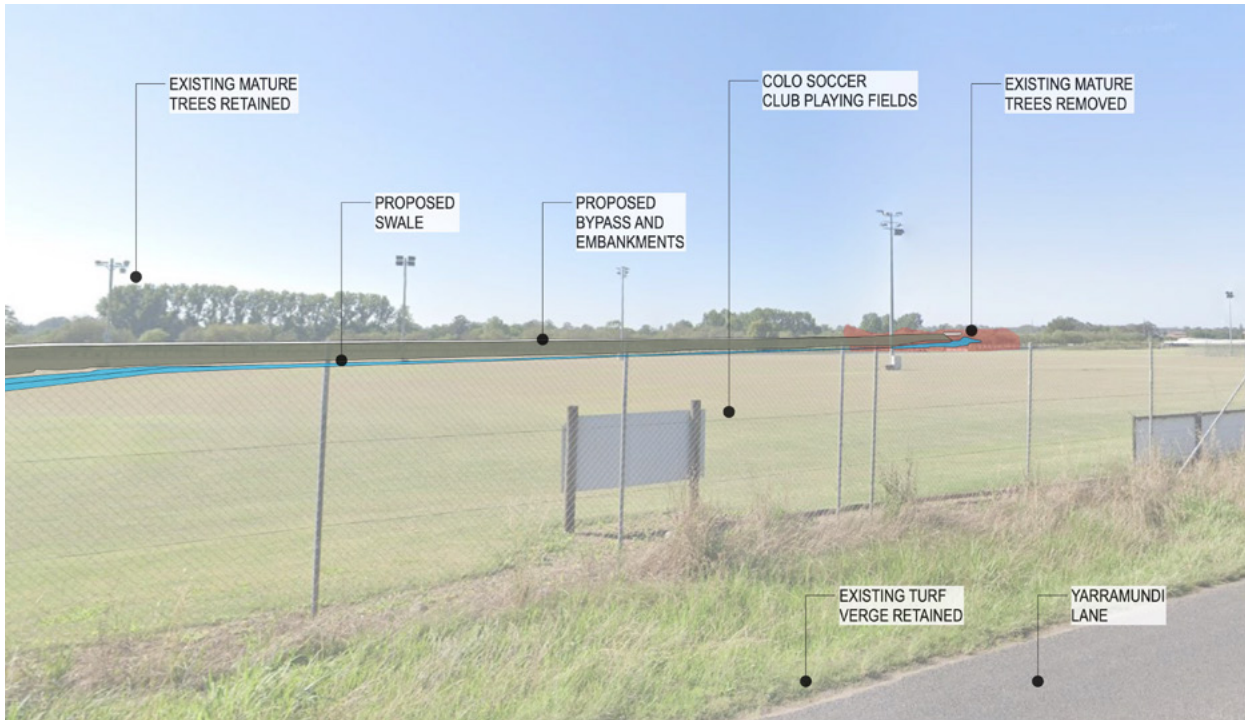


Figure 7-21: Viewpoint 6 - Proposed view from Yarramundi Lane looking south east towards Colo Soccer Club fields

Sensitivity	Magnitude	Impact
High The sensitivity of the view is considered high due to its rural location and absence of infrastructure.	Moderate The visual impact at this viewpoint would be moderate as the new Richmond bypass would be visible across the background of the view, but at a distance, replacing the existing view of hedgerows and mature trees with that of a new elevated road and associated embankments.	High-Moderate

Table 7-7: Visual impact summary viewpoint 6

7 Visual impact assessment

Viewpoint 7

Location and description

This viewpoint is located looking westbound on Inalls Lane facing north west with the heritage 'Hobartville Stud' property on the eastern side of the view.

The major compositional elements within this view are the two-lane road, undefined grass verge edges and adjoining mature vegetation. The westbound side vegetation is mature shrub and hedge planting, whereas the eastbound side vegetation comprises more notable mature street trees, with a traditional style timber post and rail fence at the edge of the grass verge.

Visible elements of the proposal

The Richmond bypass would cut across the existing view of the existing Inalls Lane road corridor dominating the view with a new elevated two-lane carriageway and associated embankments. It would also result in the truncation of the existing Inalls Lane roadway, resulting in alternative access arrangements for some residents of Inalls Lane.

Affected viewers

- Motorists and cyclists
- Rural landowners

Description of impacts

The proposal would be highly visible at this location, as it would be elevated in comparison to the existing Inalls Lane roadway. It would start parallel to the existing Inalls Lane and then turns to the east to pass across the existing rural landscape (and a grid of hedgerows and mature trees). Some existing roadside vegetation would be removed in the distance of this view. One of the Richmond bypass bridge structures would be just visible in the distance.

The sensitivity of the view is considered high, based on its rural setting. The magnitude of change and the overall visual impact are also considered high, as a result of the elevated new roadway with its associated embankments and their dominance on the existing view.

The visual impact on these viewpoints is summarised in [Table 7-8](#). For mitigation measures relating to these views refer to [Section 8 on page 122](#) of this report.



Figure 7-22: Viewpoint 7 location map

7 Visual impact assessment



Figure 7-23: Viewpoint 7 - Existing view from Inalls Lane, looking north west

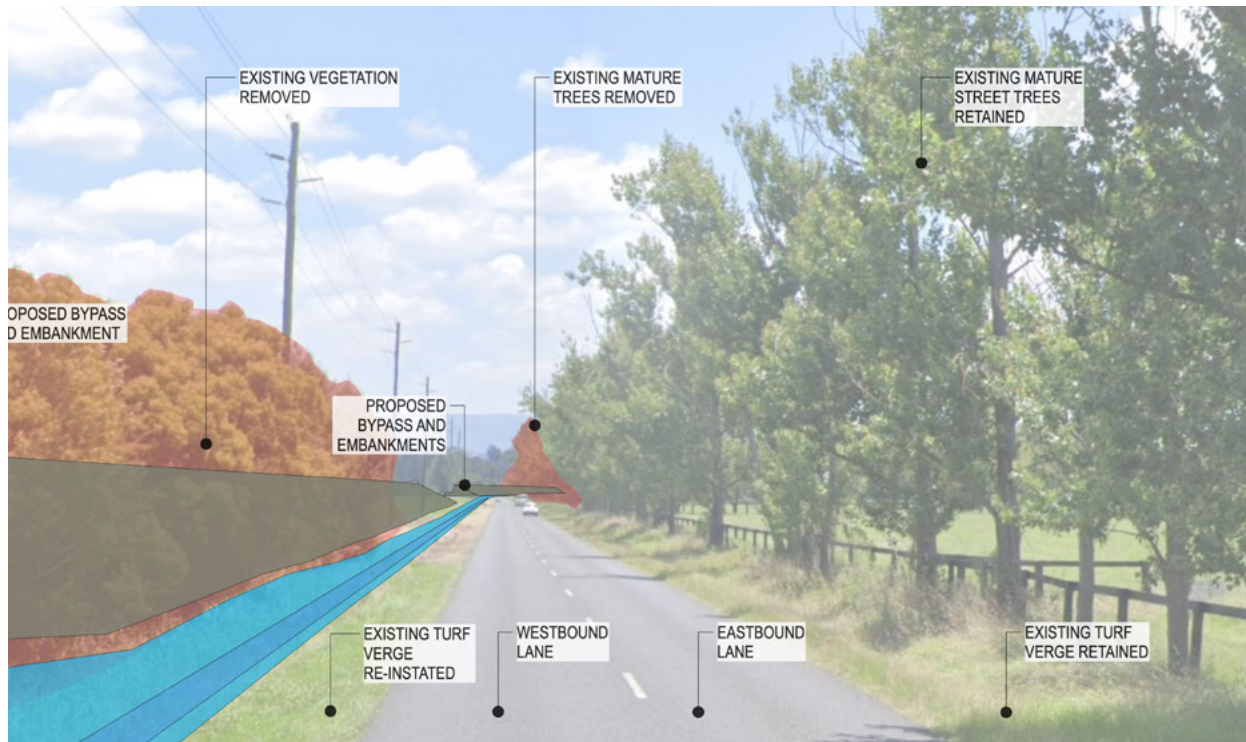


Figure 7-24: Viewpoint 7 - Proposed view from Inalls Lane, looking north west

Sensitivity	Magnitude	Impact
High	High	High
The nature of the existing local road and surrounding rural landscape would be highly sensitive to the impact of the proposal.	The proposal would have a high visual impact on the existing view with the dominance of the new elevated roadway structure, its associated embankments, swale and loss of existing vegetation. The close proximity of the new road would also be contribute to the perceived magnitude of change.	

Table 7-8: Visual impact summary viewpoint 7

7 Visual impact assessment

Viewpoint 8

Location and description

This viewpoint is located close to the westbound carriageway of Inalls Lane, looking south at the approach to the intersection with Castlereagh Road. The viewpoint is located on the existing grass verge to the side of the property of the existing church (The Church of Jesus Christ of the Latter-day Saints).

The main compositional elements of the view are the wide grass verge, existing road corridor and mature existing trees in the background of the view.

Visible elements of the proposal

The construction of a new roundabout (to replace the existing four-way intersection) would be visible in the distance at this viewpoint. The most visible elements of the proposal would however be the widened road pavement, incorporating a new painted median. The widened pavement would dominate the foreground view. The addition of a new footpath and drainage swales would have relatively minimal impact.

Affected viewers

- Motorists
- Pedestrians and cyclists
- Residents of Inalls Lane
- Church-goers.

Description of impacts

The visual impact would largely be to the foreground element of this view, comprising local road widening. Whilst the widened road pavement would be highly visible, other elements of the proposal such as the new footpath and drainage swales would have minimal visual impact. The roundabout structure and merging lanes would be hardly visible in the distance of the view, however the mature trees requiring removal would be the most noticeable element of the roundabout from this viewpoint.

The sensitivity of this view is considered low, since it is located within an existing road corridor, within a residential area.

The magnitude of change is considered moderate, since whilst the existing road widening would become a noticeable element of change to the existing view, but only at low level. The overall visual impact is moderate-to-low.

The visual impact on these viewpoints is summarised in [Table 7-9](#). For mitigation measures relating to these views refer to [Section 8 on page 122](#) of this report.



Figure 7-25: Viewpoint 8 location map

7 Visual impact assessment

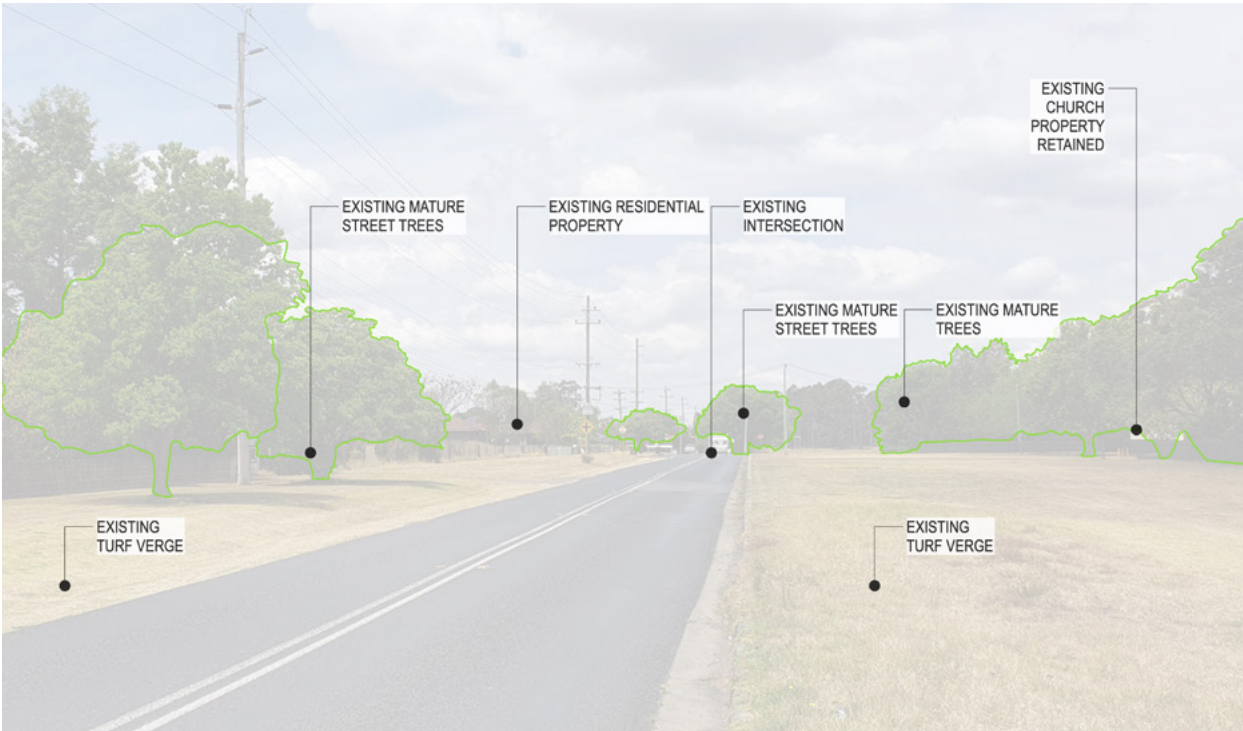


Figure 7-26: Viewpoint 8 - Existing view of Inalls Lane looking south east towards the Castlereagh Road intersection

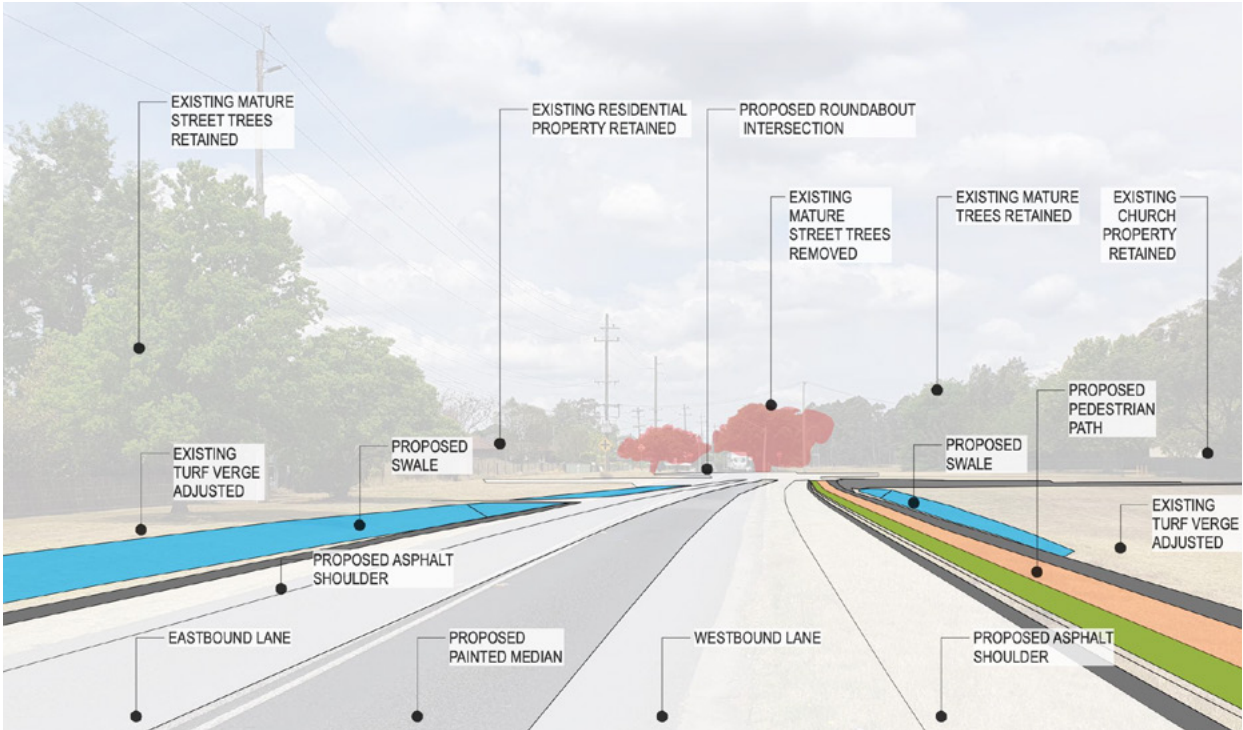


Figure 7-27: Viewpoint 8 - Proposed view of Inalls Lane looking south east towards the Castlereagh Road intersection

Sensitivity	Magnitude	Impact
Low The sensitivity of this viewpoint is considered low based on its location in a road corridor within a residential area	Moderate The magnitude of change is moderate, based on the noticeable widening of the road pavement to the low level view.	Moderate - Low

Table 7-9: Visual impact summary viewpoint 8

7 Visual impact assessment

Viewpoint 9

Location and description

This viewpoint is located next to the westbound travel lane of Southee Road, looking south west. The viewpoint is located within the residential area of Hobartville, close to the intersection with Hill Avenue.

The major compositional elements of the view are the existing road, mature trees next to the westbound carriageway, and the view to rural landscape (currently leased by Western Sydney University).

Visible elements of the proposal

The major visible element of the proposal would be the proposed noise mound with noise wall on top, which would be constructed parallel to the western side of the existing road, to screen and mitigate the noise impact of the bypass. The bypass and its associated traffic would not be visible from this viewpoint, screened largely by the structure of the proposed vegetated noise mound and the noise wall.

Affected viewers

- Residents of properties fronting Southee Road
- Motorists on Southee Road
- Pedestrians and cyclists
- Local residents on adjoining streets.

Description of impacts

The visual impact would be most notable to the residents of the properties facing onto the existing Southee Road, since the noise mound would be visible from their dwellings and would potentially block views. It is proposed to install a transparent section to the top of the noise wall to maintain some of these existing views. The noise mound and wall would be visible for motorists on Southee Road, in their peripheral view.

The magnitude of impact would be high, based on the noise mound and noise wall elements of the proposal obscuring the current views from properties adjoining the road. The resultant overall impact would be high to moderate.

The visual impact on these viewpoints is summarised in [Table 7-10](#). For mitigation measures relating to these views refer to [Section 8 on page 122](#) of this report.



Figure 7-28: Viewpoint 9 location map

7 Visual impact assessment

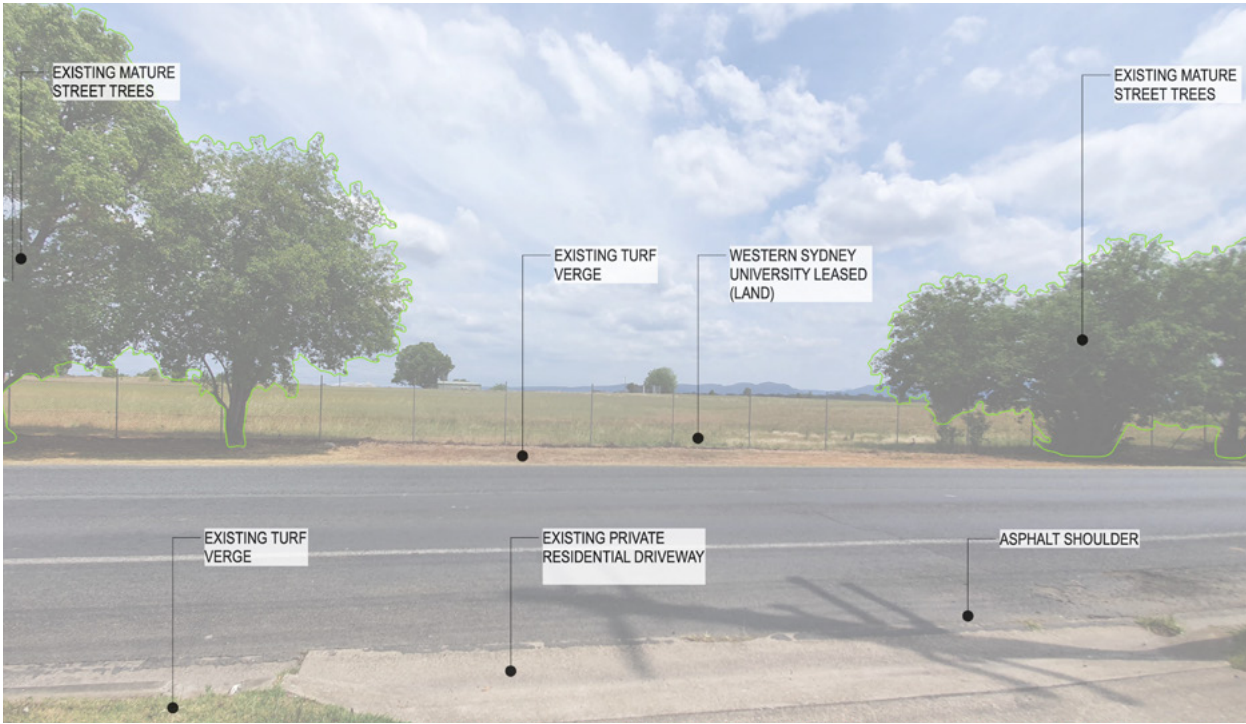


Figure 7-29: Viewpoint 9 - Existing view from residential area of Southee Road looking south west

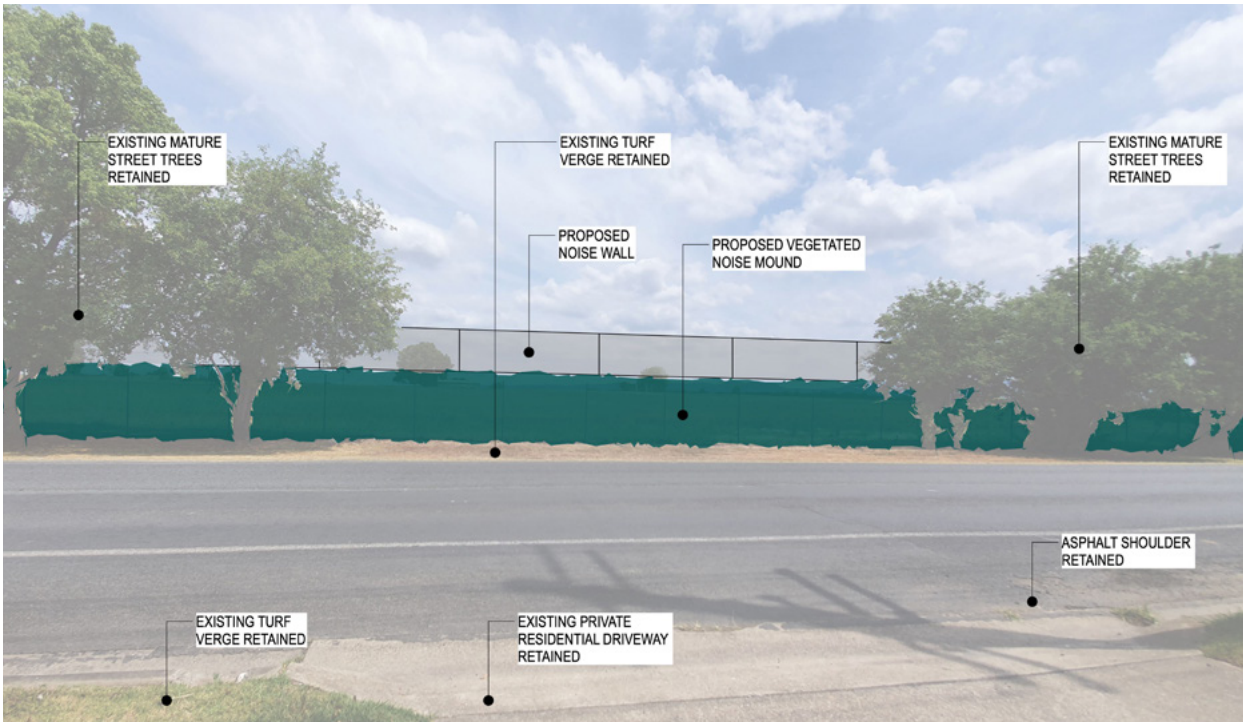


Figure 7-30: Viewpoint 9 - Proposed view from residential area of Southee Road looking south west

Sensitivity	Magnitude	Impact
Moderate The sensitivity of the view is considered moderate. It is located along an existing two-lane road, it is within an existing residential area, and whilst the properties fronting this road have an open semi-rural view, it is of a modified landscape, where the existing infrastructure is an important component of the view.	High The magnitude of change is considered high based on the noise mound and noise wall obscuring the existing view from residential properties fronting the road.	High - Moderate

Table 7-10: Visual impact summary viewpoint 9

7 Visual impact assessment

Viewpoint 10

Location and description

This viewpoint is located next to the eastbound carriageway of Southee Road, close to the intersection with Anderson Avenue. The viewpoint is located outside a residential property facing south east toward the intersection of Londonderry Road.

The major compositional element within this view is the mature stand of verge side Pecan trees to the west of the existing road corridor. These Pecan trees have been identified for retention. The existing road corridor and grass verge is the major element to the foreground view.

Visible elements of the proposal

At this location, the noise wall element of the new bypass would be visible to the west, through the existing Pecan trees. The material of the noise wall would affect its visibility to some extent.

Affected viewers

- Residents of properties fronting Southee Road
- Motorists on Southee Road
- Pedestrians and cyclists
- Local residents on adjoining streets.

Description of impacts

The proposal would be most visible to the residents of properties fronting Southee Road, but only the associated noise wall. It is proposed that planting would be installed to the base of this wall and a transparent section installed to the top of the noise wall to maintain existing views from these properties.

The sensitivity of this view is considered moderate, based on it being located with existing properties that already have a view of a road corridor. The magnitude of the impact is also considered moderate, based on the visual impact being restricted to low level distant views. The overall visual impact is considered moderate.

The visual impact on these viewpoints is summarised in [Table 7-11](#). For mitigation measures relating to these views refer to [Section 8 on page 122](#) of this report.



Figure 7-31: Viewpoint 10 location map

7 Visual impact assessment

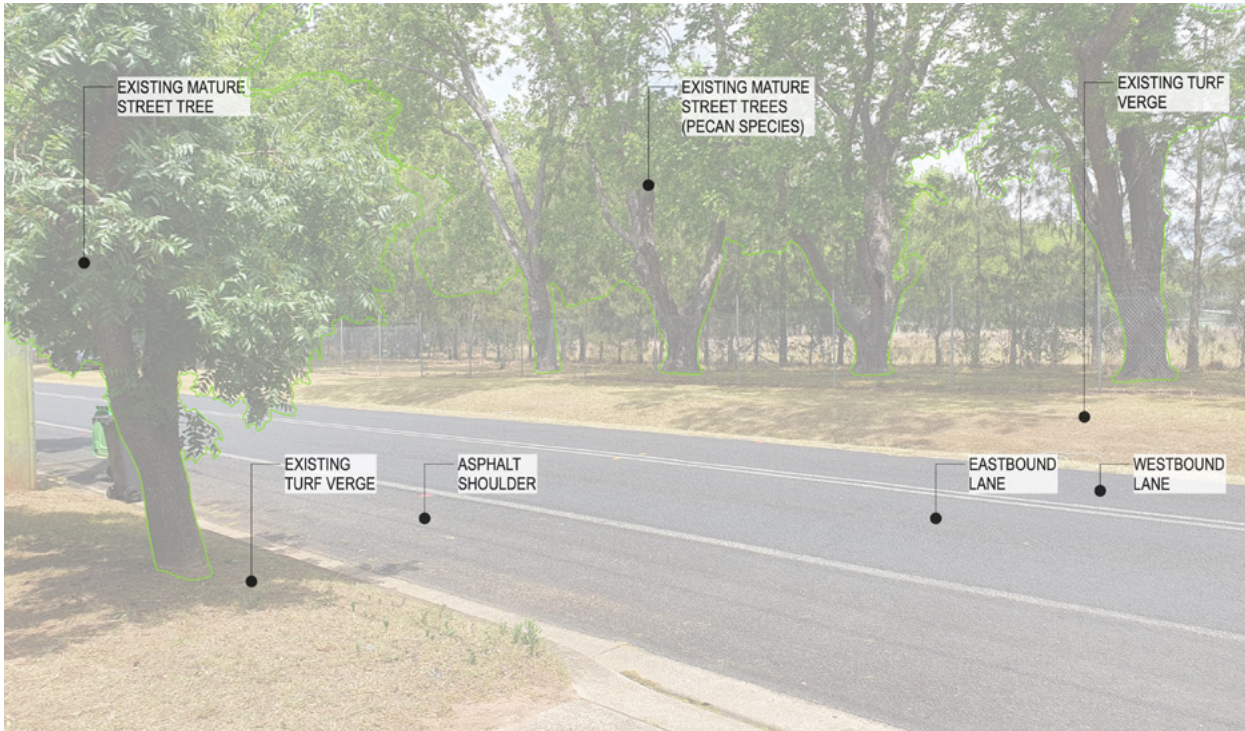


Figure 7-32: Viewpoint 10 - Existing view from edge of Southee Road looking south east towards the Londonderry Road

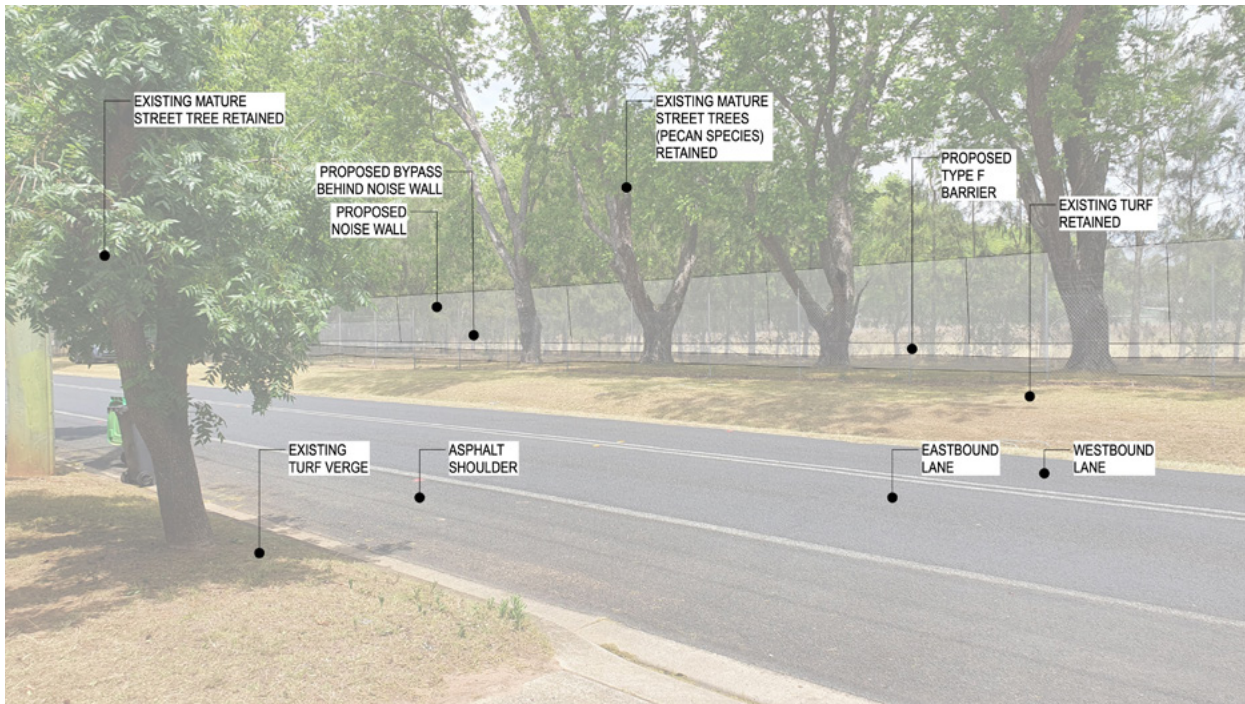


Figure 7-33: Viewpoint 10 - Proposed view from edge of Southee Road looking south east towards the Londonderry Road

Sensitivity	Magnitude	Impact
Moderate The sensitivity of the view is considered moderate, based on its location outside residential properties fronting an existing road corridor (Southee Road) .	Moderate The new bypass would be visible in the form of the associated noise wall behind the existing Pecan trees. Construction of the noise wall and bypass is proposed at a sufficient distance to retain the existing stand of Pecan trees.	Moderate

Table 7-11: Visual impact summary viewpoint 10

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7.3 Additional viewpoints

The following three viewpoints have been identified where it is predicted that views of the proposal may exist from within the private properties of residential areas. Since these views are likely to be from either upper levels of dwellings or rear gardens, it is not possible to obtain representative photographs from these private properties and as such, these have been reviewed without 3D montage simulation.

Viewpoint 11

Location and description
This viewpoint is located adjoining the residential area at Shortland Close, North Richmond. From this viewpoint it is likely that the new four-lane bridge would be visible above the existing trees from either rear gardens or from the rear of the dwellings themselves. The comparison view is taken from above the open space area, at the pedestrian access path from Shortland Close through to the open space adjoining the existing Richmond Bridge. The view best simulates the high point where views could be afforded above the existing mature trees that fringe the river bank of the Hawkesbury River.

Table 7-12: Visual impact summary viewpoint 11

Sensitivity	Magnitude	Impact
High The sensitivity of this view is considered high, based on the lack of infrastructure in the existing view and the dominance of existing mature trees.	Moderate The magnitude of impact on the view would be moderate (to high), depending on the height of the new four-lane bridge above the existing trees. Whilst some of the trees would require removal for construction of the new bridge, increasing the visual impact, the foreground trees would be unaffected.	High - Moderate



Figure 7-34: Viewpoint 11 location plan



Figure 7-35: Viewpoint 11 - Potential view adjacent to Shortland Close properties facing east towards the North Richmond playground and the existing bridge

7 Visual impact assessment

Viewpoint 12

Location and description

This viewpoint is located adjoining the residential area at Norfolk Place, North Richmond. From this viewpoint it is likely that the new four-lane bridge would be visible above the existing trees from either rear gardens or from the dwellings themselves. The comparison view is taken from an embankment in Hanna Park below these properties.

The viewpoint best simulates views that may be afforded of the new four-lane bridge over the existing trees in the distance. It is noted that the two hoop pine trees that would need to be replaced at the approach to the new four-lane bridge are visible on the skyline of this viewpoint.

Table 7-13: Visual impact summary viewpoint 12

Sensitivity	Magnitude	Impact
Moderate The sensitivity of the viewpoint is considered moderate, based on the view largely comprising the extremities of the existing park, with existing recreational facilities.	Moderate The magnitude of impact on the view would be moderate (to high), depending on the height of the new four-lane bridge above the existing trees. Some of these trees would require removal for construction of the new bridge, including the two memorial Hoop Pine trees. It is likely that the foreground views would also be temporarily impacted by the acquisition of park areas for ancillary facilities during construction of the bridge.	Moderate



Figure 7-36: Viewpoint 12 location plan



Figure 7-37: Viewpoint 12 - Potential view from rear of Norfolk Place properties facing south towards Hanna Park and the existing bridge

7 Visual impact assessment

Viewpoint 13

Location and description

This viewpoint is located looking towards the residential street of William Cox Drive, from its intersection with Grand Flaneur Avenue, Richmond. From this viewpoint it is likely that the new elevated bypass would be visible running across the existing rural landscape from either rear gardens or at the very least from the second floor of any two storey dwellings. The comparison photo is taken from the street looking towards a potential property that may have a view of the bypass.

The properties on this portion of William Cox Drive would be most likely to afford views down to the new bypass, since their rear gardens back onto the currently undeveloped rural landscape, where the bypass would be located, with no existing buildings likely to block their views.

Table 7-14: Visual impact summary viewpoint 13

Sensitivity	Magnitude	Impact
Moderate The sensitivity of the view is considered moderate based on it being from an existing residential property over a modified landscape.	Moderate It is envisaged that the magnitude of the view would moderate, based on the likelihood that the visual impact of the new bypass route and structures would be in the distance of the view (out over the floodplain)	Moderate



Figure 7-38: Viewpoint 13 location plan



Figure 7-39: Viewpoint 13 - View from intersection of William Cox Drive and Grand Flaneur Avenue facing William Cox properties, with potential views of the bypass

7 Visual impact assessment

7.4 Summary of visual impact assessment

The visual impact assessment has identified 10 viewpoints where the proposal demonstrates a range of high to moderate-to-low impacts. The level of impact has been determined through the analysis of sensitivity and magnitude of the proposal. **Table 7-15** summarises this assessment.

High visual impacts are anticipated for viewpoints 2, 3 and 7. Viewpoint 2 looks from Hanna Park towards Hawkesbury River, whilst viewpoint 3 looks from the existing bridge back towards Hanna Park and the proposed new bridge. These high visual impacts are largely based on the proposed height of the new bridge, which would dominate these views which have minimal infrastructure at present. The high visual impact noted for viewpoint 7, which is located at Inalls Lane, is due to the new elevated Richmond Bypass dominating the existing view, due to its proximity to the existing local road which would also result in the removal of existing mature roadside trees.

Viewpoints 1, 6 and 9 are anticipated to have high to moderate visual impacts. The view from viewpoint 1, which looks towards the existing Richmond Bridge, would be impacted by the new SUP approach, with some tree loss. Viewpoint 6, looking towards where the Richmond Bypass would cut across the existing

soccer fields in the distance, which would impact the existing rural view. Viewpoint 9, located on Southee Road, would experience a high to moderate impact due to the new bypass noise mound and wall, which would dominate the existing view from outside residential properties fronting the existing road.

Viewpoints 5 and 10 are considered to have moderate visual impacts. For viewpoint 5, along Kurrajong Road, a moderate impact is expected due to the removal of the existing mature vegetated embankment adjoining the westbound carriageway. It is also anticipated that there would be a moderate impact at the southern end of Southee Road, at the approach to the intersection with Londonderry Road (viewpoint 10) where the proposed noise wall would be visible through the existing Pecan trees. These trees are proposed to be retained, reducing the potential visual impact.

Finally, viewpoints 4 and 8 would witness moderate to low visual impacts. Viewpoint 8 would experience widening of the road pavement in its relatively urban view, which already features a road corridor in a residential area on Inalls Lane. Viewpoint 4 would experience road widening at the approach to the intersection and the potential removal of two trees in its semi-rural location, dominated by existing infrastructure.

VP	Location	Sensitivity	Magnitude	Impact	Stage 2A	Stage 2B
New Richmond Bridge Stage 2						
1	View of Bells Line of Road looking south east towards the existing Richmond Bridge	Moderate	High	High - Moderate	✓	
2	View within Hanna Park facing south towards the Hawkesbury River	High	High	High	✓	
3	View from the existing bridge (Bells Line of Road) facing towards North Richmond	High	High	High	✓	
4	View from Old Kurrajong Road looking south west towards the intersection with Kurrajong Road and the Bypass	Moderate	Low	Moderate - Low	✓	
5	View on Kurrajong Road looking north west towards Pughs Lagoon	Low	High	Moderate	✓	
6	View from Yarramundi Lane looking south east towards the Colo Soccer Club	High	Moderate	High-Moderate	✓	
7	View from Inalls Lane, looking north west	High	High	High	✓	
8	View of Inalls Lane, looking south east towards the Castlereagh intersection	Low	Moderate	Moderate-Low	✓	
9	View from residential area of Southee road looking south west	Moderate	High	High - Moderate		✓
10	View from the edge of Southee Road looking south east towards the Londonderry Road intersection	Moderate	Moderate	Moderate		✓

Table 7-15: Viewpoint assessment summary

7 Visual impact assessment

7.5 Impacts during construction

Ancillary facilities

'Ancillary Facility' is the term referred to for areas of land that would be temporarily used during the construction stage of the proposal. The proposal boundary has been extended to include these ancillary facility areas, as illustrated in [Figure 7-40 on page 119](#) and [Figure 7-41 on page 120](#), with viewpoint locations shown for reference.

Ancillary facility areas could be required for a variety of uses:

- Site compound areas for site offices and parking facilities
- Storage of materials
- Storage of various types of construction vehicles, from light vehicles and rollers through to delivery trucks, concrete mixers and excavators
- Generators
- Pre-assembly of bridge components, such as girders
- Elevated work platforms.

Staging

There are differences in the ancillary facilities used for Stage 2A and Stage 2B of the works, as shown in [Table 7-16](#). In stage 2A, all ancillary facilities would be required, however ancillary facility G would not be required for as long as in Stage 2A, since the Stage 2B section of the bypass parallel to Southee Road would not be constructed in Stage 2A and hence the ancillary facility would potentially be required for less time. All time frames would not be determined however until the Detailed Design stage of works. During Stage 2B, only ancillary facilities A and G would be used.

Location of Ancillary facilities

Ancillary facility areas have been located where there would be minimal disruption to the existing landscape and features. In some areas close to the proposed location of the new four-lane bridge however, it is envisaged that there may potentially be a corridor of up to 20 metres width either side of the proposed layout of the new bridge, where existing vegetation, including some mature trees would require removal to enable the construction of the bridge.

It is proposed that at the Detailed Design stage, an Arborist is engaged to review these potentially affected trees, to determine specific trees and groups of trees to be protected and retained. Where possible, the construction methodology for the bridge would be developed around these trees to be retained, however most realistically this would only be applicable for retaining trees on the perimeter of the construction zone.

The most extensive ancillary facilities are associated with the construction of the new bridge and also include areas of road access, that would be required at night for the delivery of the large components of the new bridge. It is envisaged that some of these ancillary facility areas would accommodate elevated work platforms.

There are also ancillary facility areas located in association with the other components of the proposal, Kurrajong Road and the bypass from the intersection with Kurrajong Road to the intersection with Londonderry Road. The location of facility areas is also a function of the potential staging of the works.

Construction methodology and staging

Details of the construction methodology and staging of the works will be developed in more detail at the Detailed Design stage. Within each stage of construction, a basic sequencing of the road works would be as follows:

- Site establishment at ancillary facilities
- Site set-out and survey
- Tree removal
- Utility relocation works
- Box out and excavation of new pavement
- New stormwater pits and connections
- Pavement construction
- Line marking
- Site demobilisation.

A more specific sequence of works would apply to the construction of the bridge.

Mitigation measures

Mitigation measures that would apply to both the road corridor and ancillary facility areas would include:

- Sediment and run-off control
- Tree protection
- Minimisation of noise
- Minimisation of work hours
- Work at night for road closures, where possible
- Staging of activities to reduce disruption to residents, motorists and other users
- Temporary fencing.

The ancillary facility areas would potentially be in use for relatively longer periods of time, compared to the staged construction road corridor road works. The mitigation measures for ancillary facilities would include:

- More permanent fencing or hoarding to help to visually screen these areas
- Concentration of activities, materials or temporary buildings to reduce visual impact
- Aesthetic design of screening and hoarding
- Minimisation of work hours for elevated platforms, particularly where obtrusive lighting would be visible

7 Visual impact assessment

- Daylight hours working where possible to reduce the impact of construction noise on residential areas
- Work at night for road closures, especially for deliveries of large bridge components
- Progressive site demobilisation to increase the assimilation of make good areas
- Make good any affected areas, including re-turfing and re-planting works.

Potential visual impacts

Seven ancillary facility areas (A-G) have been assessed for potential visual impacts. This is a preliminary assessment based on the indicated location of ancillary areas only, without confirmed time frames of use or the nature of activities proposed at each location. These details would be more apparent at the Detailed Design stage of the project.

Ancillary area A - Terrace Road, North Richmond

The proposed ancillary area is located in a open field area off Terrace Road in North Richmond. It is located in a semi-rural area, but with nearby light industrial and commercial facilities.

Based on the assumption that this area would be used for temporary buildings and storage of materials or vehicles, the visual impact would be limited to the hoarding surrounding the site area and the passage of vehicles into and out of the site. Terrace road is a regional road, servicing isolated rural properties, but also riverside residential areas further to the east.

The overall impact is considered moderate to low, based on a moderate sensitivity and low magnitude of impact.

Ancillary area B - North Richmond Park and Hanna Park (east)

This proposed ancillary area comprises the private road access off Terrace Road linking onto Norfolk Place (a residential road servicing residential properties with rear gardens backing onto the Hawkesbury River) and the open space areas of North Richmond Heritage Park and Hanna Park, including the north eastern riverbank of the Hawkesbury River.

It is assumed that these areas would be used for access, principally at night, for the delivery of large bridge components for the new four-lane bridge. This would have visual impacts for residential properties on Norfolk Place, for a limited number of nights during deliveries. Additionally, this area would be required for the construction of the new four-lane bridge and involve elevated working platforms as the bridge components are assembled in place. This would likely involve a number of existing mature trees being removed. As a mitigating measure to be taken to Detailed Design stage, an Arborist survey should be undertaken to determine trees or groups of trees to be retained and protected, where possible, in the construction methodology of the new bridge.

The overall impact is considered high to moderate, based on a high sensitivity and a moderate magnitude of visual impact.

Ancillary area C - Hanna Park (west)

This area comprises the open space areas of the Hawkesbury River Park.

These areas would be required for access of construction vehicles for the construction of the new bridge. As with ancillary area 3, the impact may include the removal of existing mature trees, some of which are proposed to be assessed and protected where possible.

The overall impact is considered high to moderate, based on a high sensitivity and a moderate magnitude of visual impact, notably to park users and the residents of the adjoining Shortland Close.

Ancillary area D - Eastern side of the Hawkesbury River

This area comprises the Hawkesbury River, south eastern riverbank, and the existing embankment to Bells Line of Road.

This area would be used for water-based construction activities, such as piling, and for the construction of the widened road on its approach to the intersection with Old Kurrajong Road, Kurrajong Road and the new bypass. The south eastern riverbank may also be used for elevated working platforms for the assembly of components of the new bridge. The road widening would necessitate modification of the existing roadside embankment and as such include the removal of existing mature roadside vegetation.

The overall impact is considered high to moderate, based on a moderate sensitivity and a high magnitude of visual impact, given the scenic nature of this area and the potential clearance of existing vegetation.

Ancillary area E - Old Kurrajong Road

This area comprises a wedge of land between the intersection of Bells Line of Road with Old Kurrajong Road, Kurrajong Road and the new bypass. It includes a small agricultural / industrial property that would require removal as a result of the construction of a link from the bypass to the nearby Yarramundi Lane, as part of the proposal.

The ancillary area is likely to be used to accommodate temporary buildings and storage of materials or vehicles. The visual impact would be restricted to passing of vehicles.

The overall impact is considered moderate to low, based on a moderate sensitivity, but a low magnitude of impact.

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Ancillary area F - Inalls Lane

This area comprises a private lot adjoining Drift Road, where the new bypass would join Drift Road.

The ancillary area is likely to be used to accommodate temporary buildings and storage of materials or vehicles. The visual impact would be restricted to passing vehicles.

The overall impact is considered moderate to low, based on a moderate sensitivity, but a low magnitude of impact.

Ancillary area G - Castlereagh Road, Richmond

This area comprises rural land adjoining the south western side of the proposed upgraded intersection of the bypass with Castlereagh Road, close to Southee Road.

The ancillary area is likely to be used to accommodate temporary buildings and storage of materials or vehicles. The visual impact would be restricted to the access of vehicles, however it is a relatively large area that would be visible from some residential properties of Hobartville (on the eastern side of the existing Southee Road) and to a lesser extent the properties of Inalls Lane (Richmond) including the church property, at the intersection with Castlereagh Road.

The overall impact is considered moderate, based on a moderate sensitivity and a moderate magnitude of impact.

Ancillary Facility area		Use of area	Sensitivity	Magnitude	Impact	Stage 2A	Stage 2B
New Richmond Bridge Stage 2							
A	Terrace Road, North Richmond	Storage	Moderate	Low	Moderate - Low	√	√
B	North Richmond Park & Hanna Park (east)	Delivery access and construction of bridge	High	Moderate	High - Moderate	√	
C	Hanna Park (west)	Construction access	High	Moderate	High - Moderate	√	
D	Eastern side of the Hawkesbury River	Piling and construction works for bridge and modified embankment and construction access	Moderate	High	High - Moderate	√	
E	Old Kurrajong Road	Storage and construction access	Moderate	Low	Moderate - Low	√	
F	Inalls Lane	Storage and construction access	Moderate	Low	Moderate - Low	√	
G	Castlereagh Road, Richmond	Storage and construction access	Moderate	Moderate	Moderate	√	√

Table 7-16: Ancillary facility area assessment summary

7 Visual impact assessment - construction impact



Figure 7-40: Construction ancillary facility areas

7 Visual impact assessment - construction impact



Figure 7-41: Construction ancillary facility areas



8 Mitigation strategy

8.1 Mitigation incorporated in the concept design

Chapter overview

This section provides a summary of the mitigation measures that have been included as part of the concept design for the proposal. These mitigation measures have been developed to address the impacts identified in the visual analysis section of the report and would continue to be considered during the detailed design and construction phases of the proposal.

The guiding principles and design opportunities on pages 29 and 30 of the *Connecting with Country Report* (Murawin, 2024) should also be considered as the design enters detailed design stage.

The landscape and urban concept design responds to the overall proposal objectives and is underpinned by a set of specific landscape and urban design principles, which are set out in [Section 4](#). Mitigation measures are illustrated in detail in the Urban Design Concept Plans (01-07) [Figure 4-3 on page 48](#) to [Figure 4-20 on page 65](#) and a summary of these measures is listed below in [Table 8-1](#) and illustrated in [Figure 8-1 on page 123](#).

Table 8-1: Mitigation measures incorporated into the concept design

Mitigation #	Description of mitigation based on objectives	Reason	Stage 2A	Stage 2B
Contributing to urban structure, urban quality, and the economy				
M01	Provide street tree planting to Bells Line of Road	To provide shade where possible for SUP users and increase the urban amenity	✓	✓
M02	Incorporate transparent elements to proposed noise walls along residential road corridors	To retain existing rural views from residential areas along Southee Road, Hobartville, to improve the urban quality of affected areas		✓
Fitting with the built fabric				
M03	Carry out sensitive design and supplementary planting to reduce the impact of the new Four-lane Bridge on the open space areas of Hanna Park and North Richmond Heritage Park	To reduce the visual and character impact on existing parkland areas and assimilate to the built fabric of the proposal	✓	
M04	Plant embankments and swales to reduce the visual bulk and dominance of the proposal	To help to reduce the impact of these engineering elements and improve the landscape character	✓	✓
Connecting modes and communities and promoting active transport				
M05	Incorporate planting and rest areas to the SUP design	Provision of rest areas and planting to encourage active transport users and improve the quality of their experience	✓	
Fitting with the landform				
M06	Maximise replacement tree planting to reduce the impact of tree removal	Reduce impact to existing tree canopy cover by replacing trees removed within the proposal area	✓	✓
M07	Combine planting at the base of noise walls to reduce their visual impact and better assimilate them into the existing landscape	Use of softscape elements to minimise the impact of built elements such as noise walls to maintain the existing landscape character		✓
Contributing to green infrastructure and responding to natural systems				
M08	Provide supplementary tree planting to strengthen any existing tree canopies and reduce the heat island effect	Maintain & supplement existing tree canopies to improve climatic conditions such as air quality, shade coverage and average temperature	✓	✓
M09	Restore disturbed ground and planting impacted during construction to the original state prior construction	Make good landscape areas disturbed during construction to minimise impact to existing natural systems	✓	✓
Connecting to Country and Incorporating heritage and cultural contexts				
M10	Protect endangered coastal wetland habitats and Pecan trees and further investigate during detailed design, avoiding impacts to any Heritage tree planting	To retain any endangered habitats and the biodiversity endemic to proposal area, maintaining the overall landscape character unique to the LGA	✓	✓
M11	Use a planting design palette that aligns and strengthens existing vegetation communities, based on endemic species	Plant endemic species within the proposal area to maintain green corridors within the LGA, sustaining and improving the existing biodiversity habitat	✓	✓
M12	Investigate opportunities for the potential incorporation of First Nations artworks to noise walls. Design opportunities to be explored to align with the guiding principles of the Connecting with Country Report	To ensure an inclusive design process, community involvement and representation	✓	✓

8 Mitigation strategy

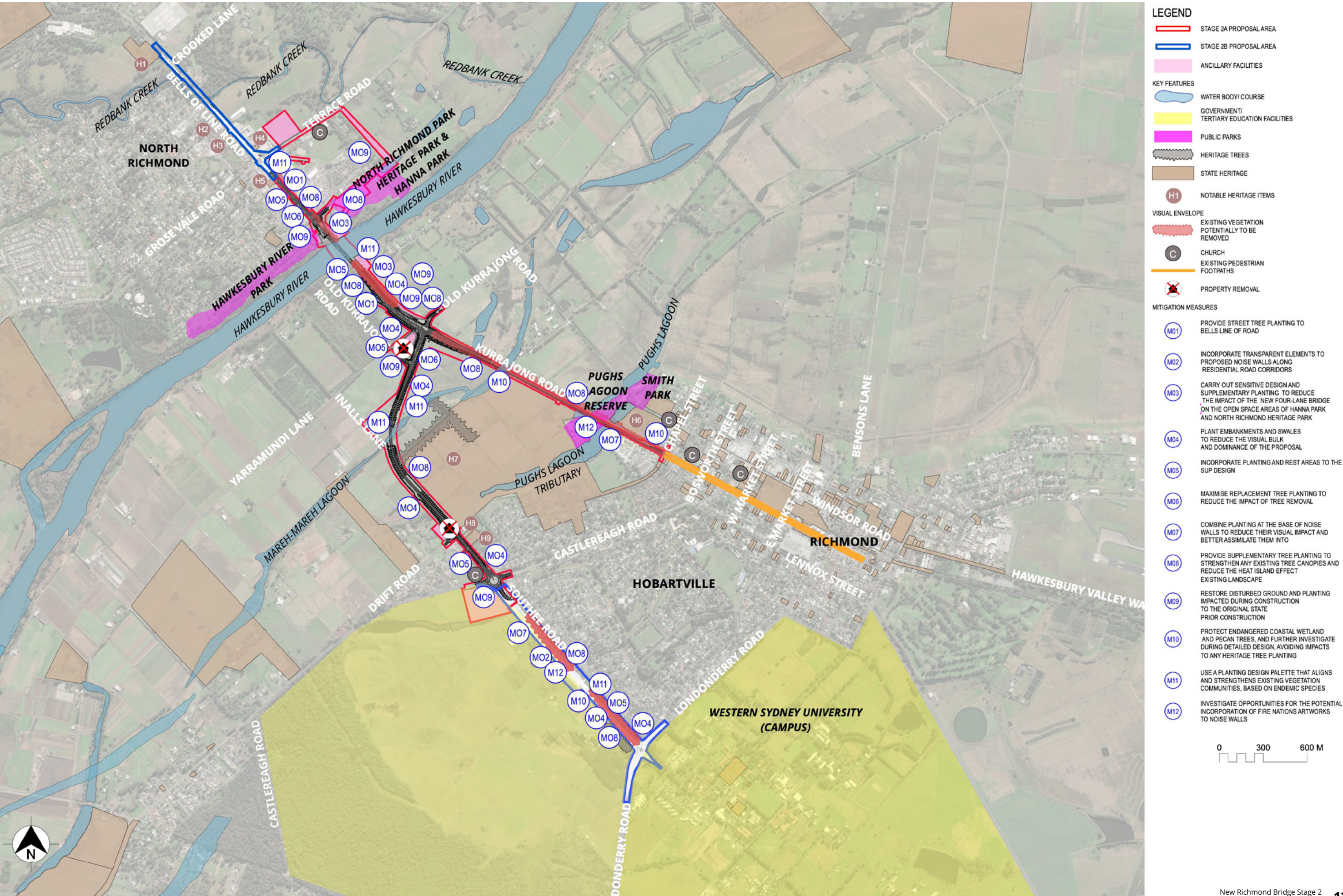


Figure 8-1: Mitigation measures

8 Mitigation strategy

8.2 Mitigation to be incorporated in detailed design

Table 8-2 below lists recommendations and issues to be addressed during the detailed design phase.

Table 8-2: Detailed design recommendations

Design element	Detailed design stage recommendation/ comment
Road design:	
– SUP	– Develop amenity areas to shared user path (SUP) from North Richmond to Richmond
– Footpaths	– Refine footpath connections from the SUP to existing pedestrian networks, notably through Hanna Park, from Bells line of Road to Old Kurrajong Road and Yarramundi Lane, to the bypass through the intersection with Castlereagh Road and from Southee Road to bus stops on the bypass.
Structures:	
– Noise walls	– Develop the design of noise walls to include features such as transparency, artwork, colour and other visual features (Stage 2B only)
– Bridges	<ul style="list-style-type: none"> – Develop the design to include modifications to the structure to achieve shadowing and other refinements to reduce the visual impact and provide better urban amenity – Coordinate finishes to abutment walls and the potential integration of First Nations artwork, design opportunities to be explored to align with the guiding principles of the Connecting with Country Report.
– Existing bridge	<ul style="list-style-type: none"> – Develop the design of the replacement balustrade – Investigate resurfacing materials, patterning and delineation methods for active transport route – Develop the design of seating areas – Investigate the potential for solar lighting on bridge
Earthworks:	
– Fill embankments	– Refine proposed planting of native grasses and shrubs to provide a robust and economical landscape treatment, with clusters of trees to suit refined embankment design
– Swales	– Refine planting to revegetate swales to help treat the stormwater run-off and incorporate turf to bases
Drainage and water quality:	
– WSUD features	– Incorporate best-practice WSUD initiatives where feasible to increase the environmental performance of the project especially where they are linked to existing watercourses
Road furniture:	
– Barriers	<ul style="list-style-type: none"> – Review barrier locations and employ a barrier clearance distance for planting non-frangible trees behind road barriers – Where safety barriers are not installed consider non frangible planting
– Signage	– Consolidate signage structures where possible to minimise visual clutter and obstructions
– Lighting	– Ensure light positions are coordinated with tree planting both above and below ground to avoid clashes and reduce any future maintenance requirements
Landscape treatments:	
– Existing open space areas	– Carry out sensitive design and replacement planting to minimise visual and character impacts
– Existing trees to be retained	– Minimise the number of trees to be removed, notably for construction of the new four-lane bridge. Engage an Arborist to identify key trees to be retained, to be separately fenced off for protection within construction areas
– Existing coastal wetlands vegetation communities	– Adequately protect mapped coastal wetland areas and vegetation communities, developing boardwalk constructions where appropriate for the SUP to Kurrajong Road
– Feature planting	– Employ landscape sequencing techniques to improve user perception by effectively promoting distinctive character precincts and activity nodes along a corridor

8 Mitigation strategy

Table 8-2 Detailed design recommendations

Design element	Detailed design stage recommendation/ comment
– Median planting	<ul style="list-style-type: none"> – Continue to develop and refine opportunities to improve the visual appearance of medians where locations are suitable to sustain vegetation and where safety and maintenance requirements are satisfied. – Prioritise areas that are considered of landscape importance for greening. – All median proposals to be in line with the Landscape Design Guideline (Transport 2023)
– Screen planting	– Particular emphasis is to be placed on creating a green corridor that reduces the apparent scale of large infrastructure interventions and structures
– Off-site mitigation	– Adequately protect existing vegetation outside the road corridor boundary to assist in visually screening of the proposal
– Species	<ul style="list-style-type: none"> – Maintain and supplement the existing vegetation patterns to ensure that the road corridor better integrates with the landscape – Vary plant species along the road journey to reinforce the different landscape characters and areas
Specific design areas	
– Bells Line of Road	– Develop the preliminary landscape proposals shown at Concept Design for increased planting opportunities, including tree planting where utilities permit
– Hanna Park	<ul style="list-style-type: none"> – Coordinate with Hawkesbury City Council and property owners on the planting of replacement Hoop Pine trees to Hanna Park – Coordinate with Hawkesbury City Council and property owners on the detailed design of all open space areas (including under-croft areas) following construction of the new four-lane bridge and integrate any urban design proposals, including pedestrian connectivity with the existing design of Hanna Park



Mareh-Mareh Lagoon, Inalls Lane, Richmond

9 Summary of Urban Design findings

Overview

Following an analysis of landscape context, the development of objectives, principles, opportunities, constraints and mitigation measures, an assessment of landscape character and visual impact has been undertaken in accordance with Transport guidelines.

The results of this assessment have been incorporated into the concept urban design drawings and are to be further refined during detailed design.

The landscape character and visual impact assessment of the proposal represents a qualitative assessment based on the landscape character zones and selected representative viewpoints, which have been determined based on an investigation of landscape and cultural context as well as an analysis of land use, vegetation, topography and scenic values. This analysis then proposes a series of mitigation measures that are to be utilised to address the proposal impacts to landscape character.

Findings

This proposal is largely one of improving connectivity, for motorists, cyclist and pedestrians, including in times of medium flood (1:20), through the construction of a new four-lane bridge and bypass. It is however, equally important to address the urban design qualities of these engineering improvements to reduce the visual and character impact of these structures and associated traffic improvements, but also to improve the visual and landscape amenity of the proposal areas

The proposal comprises three main components:

- Bells Line of Road improvements, construction of a new four-lane bridge and re-purposing of the existing Richmond Bridge
- Kurrajong Road improvements for a SUP from the intersection with Old Kurrajong Road to Chapel street
- New bypass construction from Old Kurrajong Road, across Inalls Lane to Southee Road intersection with Londonderry Road.

Each of the above components has its own specific urban design considerations, that have been explored in detail in [Section 4 on page 26](#) of this report.

The proposals outlined in [Section 4](#), combined with the findings of the landscape and visual impact assessments have informed the mitigation measures outlined in [Section 8 on page 122](#).

It is important that these mitigation measures are reviewed and addressed at the Detailed Design stage.



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