

# PARRAMATTA LIGHT RAIL URBAN DESIGN REQUIREMENTS



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**ACKNOWLEDGMENTS**

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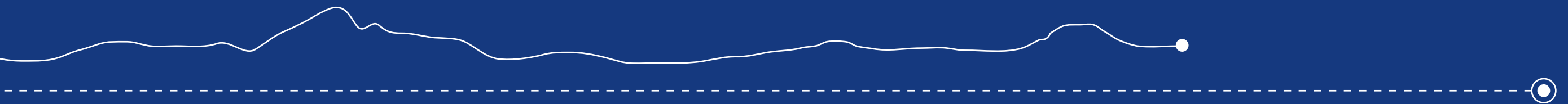


“ Greater Parramatta is undergoing rapid growth and change. Parramatta Light Rail will help communities to move to and around the rapidly growing city centre with its numerous employment, educational and leisure opportunities... ”



# — INTRODUCTION

**PARRAMATTA LIGHT RAIL**  
URBAN DESIGN REQUIREMENTS





# PROJECT OVERVIEW

## PURPOSE OF THIS DOCUMENT

The Stage 1 Urban Design Requirements establishes the principles, objectives and design responses to achieve design excellence for the Parramatta Light Rail.

To achieve urban design excellence, the Project is working with the City of Parramatta Council, and other stakeholders, to ensure a holistic design.

This document:

- Establishes a clear expectation of a consistent and high quality urban design.
- Establishes design objectives and principles for the project at a range of scales, from urban precincts to system elements.
- Defines the project route, stop locations and scope.
- Identifies the role of project elements, urban infrastructure and streetscape elements in contributing to public domain objectives.
- Establishes an agreed basis for further design development.
- Outlines design and functional requirements to inform procurement specifications.

## Evolving the design

The Parramatta Light Rail has developed place specific Urban Design Requirements with key stakeholders, including the City of Parramatta Council.

The requirements seek to balance engineering, transport and project constraints with the creation of positive place making outcomes. The concept seeks to:

- Achieve the most effective project outcome.
- Minimise clutter and improve the pedestrian environments.
- Refine and enhance stop, pedestrian traffic and light rail integration, while maintaining the base level of amenity and functionality required for each precinct.

As further design work is completed, there will be opportunities to identify and improve urban design responses and outcomes with a goal of achieving no lesser standard. The project team will further develop the design with stakeholders, contractors, TfNSW, regulatory agencies and an independent design excellence panel.

Design at all stages will need to satisfy the following requirements, in order of precedence:

- The Planning Approval.
- Laws and Mandatory Standards.
- Rail Safety and Operational Requirements.
- The Category 1 Works Scope.
- The Urban Design Requirements.

## STRUCTURE OF THE URBAN DESIGN MANUAL

The Urban Design Requirements has three chapters, increasing in scale from the city to the precinct, to the street and to the individual stop level design.

### Chapter 1 - Parramatta

Chapter 1 places the Parramatta Light Rail into Greater Parramatta, its evolving vision, current and future city scale projects and significant developments. It defines the Project's overall corridor design strategy, describes and responds to landscape settings, urban contexts, corridor wide transport networks and catchments. Information is both strategic and illustrative.

### Chapter 2 - Precinct & Corridor Wide Design

Chapter 2 defines specific precincts along the route, based on character and use. Each precinct includes a sequence overview, vision, pedestrian catchments and movements, urban design and landscape principles and public domain design.

Each Precinct section defines the proposed character, customer experience, including stop information, and details how the light rail integrates with the street and public domain. Stop plans describe key characteristics and typical arrangements, as well as any special conditions.

### Chapter 3 - Design and Operational Requirements

There are many elements along the light rail corridor that have design and operational impacts. Chapter 3 includes corridor wide public domain design and stop elements, including indicative:

- Furniture and cabinetry.
- Stop and public domain materials.
- Wayfinding
- Lighting strategy
- Corridor fencing and special safety requirements.

## BACKGROUND DOCUMENTS

The Parramatta Light Rail Urban Design Requirements is supported by legislation, strategies and policies at the federal, state and local government levels.

A number of these documents specifically relate to the project's urban design outcomes including:

- Parramatta Strategic Framework (2016).
- Parramatta Ways (2017).
- Parramatta CBD Pedestrian Strategy (2017).
- Draft Parramatta Bike Plan (2017).
- Towards Our Greater Sydney 2056 (2016).
- Draft West Central District Plan (2016).
- Greater Parramatta & the Olympic Peninsula (GPOP) (2016).
- The City of Parramatta Public Domain Guidelines (2017).
- Parramatta CBD Planning Strategy.
- Parramatta City River Strategy Design & Activation Plan (2015).
- Creating Places for People: An Urban Design Protocol for Australian Cities, Commonwealth of Australia, 2011 modified 2015.
- Our Cities, Our Future, Commonwealth of Australia, 2011.



# PROJECT OVERVIEW

The Parramatta Light Rail supports NSW Government’s strategic vision for Greater Sydney as a metropolis of three cities – the established Eastern City, the developing Central City and the emerging Western City. At the heart of the Central City, is the Greater Parramatta to the Olympic Peninsula (GPOP) priority growth area. An area earmarked for significant growth, the GPOP area includes 13 priority growth area precincts.

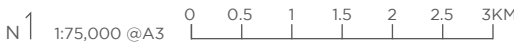
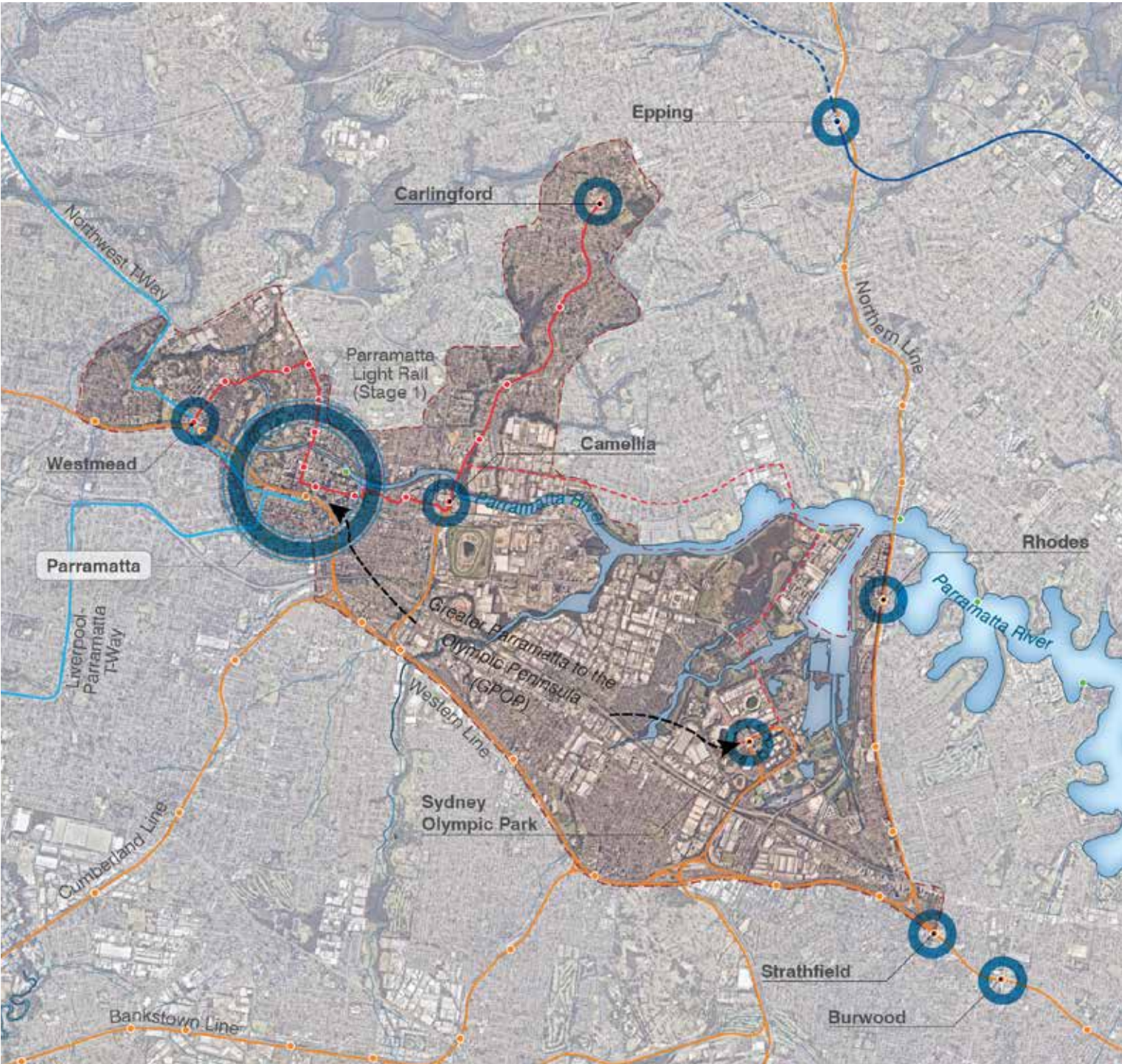
Stage 1 of the Parramatta Light Rail connects seven GPOP priority growth area precincts (refer to section 1.7) with a high frequency, turn-up and go light rail service that will improve accessibility and livability. The light rail catchment includes an expanding commercial CBD, city-scale health and education assets and growing residential areas that when connected, could transform Sydney’s economic geography and the way those in Greater Sydney live and work.

The Project will catalyse further investment and urban renewal, attract new jobs and residents, improve residential amenity and provide a range of city-shaping, place-making and transport benefits. The Project will provide a new, iconic transport mode that is direct, fast, reliable and integrated into the surrounding transport network.

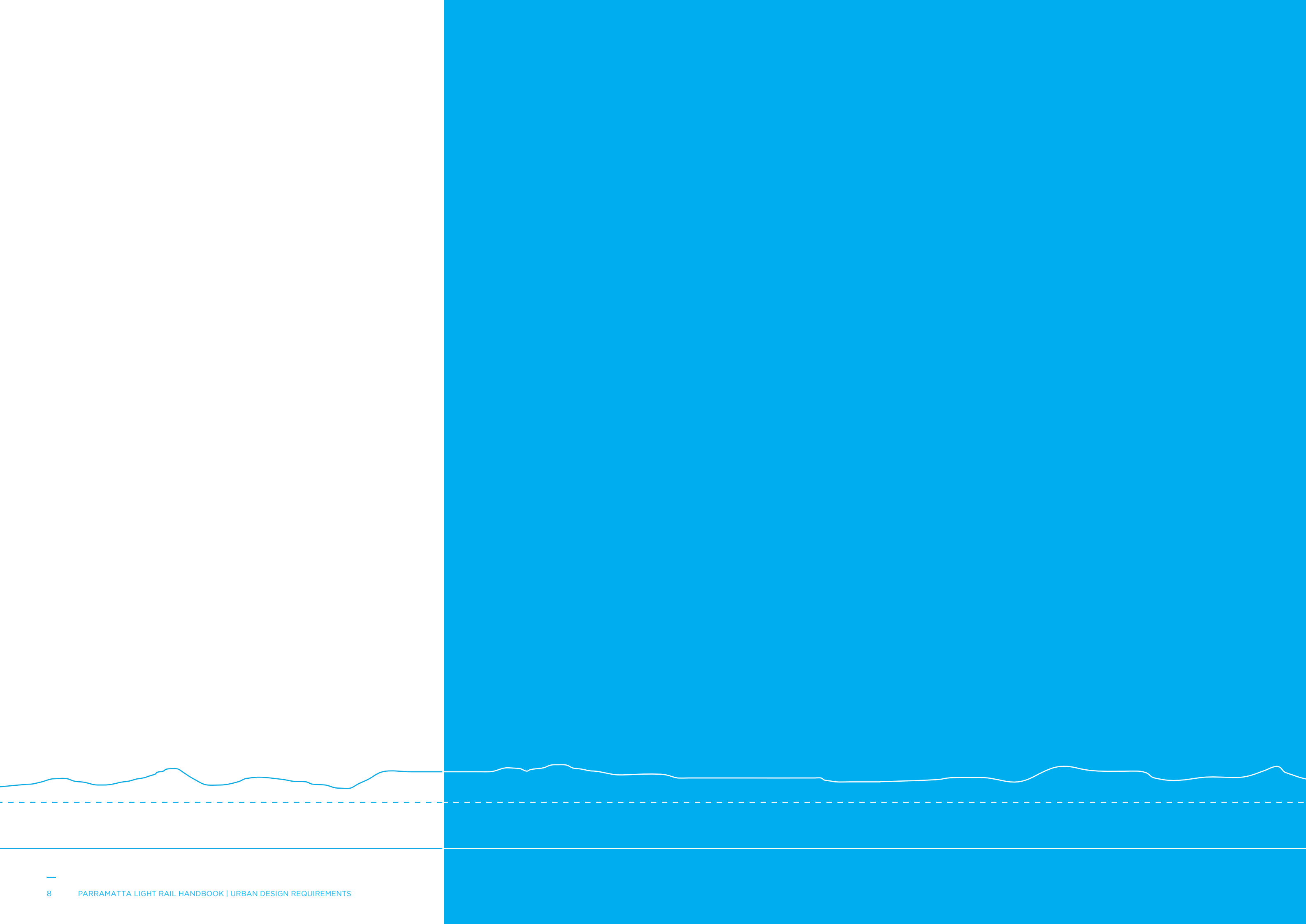
The Project’s urban design will respect, reinforce and both sensitively and safely integrate the Project into Greater Parramatta, whilst balancing operational and engineering requirements.

Key project partners are:

- City of Parramatta Council
- UrbanGrowth NSW
- Health Infrastructure
- Transport for NSW
- Roads and Maritime Services
- Department of Planning and Environment
- Western Sydney University
- Land and Housing Corporation



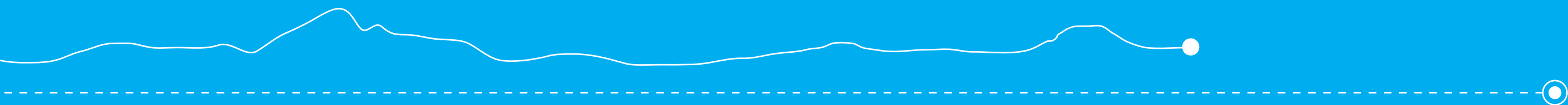






# — 1.0 CITY

## **PARRAMATTA LIGHT RAIL** URBAN DESIGN REQUIREMENTS





# 1.1 AN EFFORTLESS CITY

The design will be people-centric with a focus on universal access, safety, comfort and mobility between destinations and places.

Parramatta Light Rail will enhance the structure of Greater Parramatta, its street patterns, open spaces, views, landmarks, and evolving urban form. A legible light rail route and stops will promote light rail use and ease of access to stops and between transport modes. A people centred approach will reinforce movement patterns and create a comfortable and enjoyable light rail journey from door to door. The design will aim to provide safe and equal access for all.

## Connect Destinations

Parramatta Light Rail will connect existing and planned destinations within Greater Parramatta, including employment opportunities, destinations and places of recreation.

The Greater Parramatta area is rich with cultural, historical, educational and recreational destinations. These destinations provide amenity, points of interest and landmarks for the local population. They are a draw card for people of the Sydney Metropolitan region to Parramatta.

Destinations provide capacity for temporary events, experiences, festivals and sporting events (NRL, A-League, AFL, and horse racing) which bring an influx of visitors to the area at certain times of the week, month or year.

The project will also connect schools and service oriented facilities (such as hospitals) within the region, which attract large volumes of visitors.

Light rail stops are positioned to provide ease of access to destinations, or to facilitate an integrated transport system through multi-modal interchange.

## People Centred

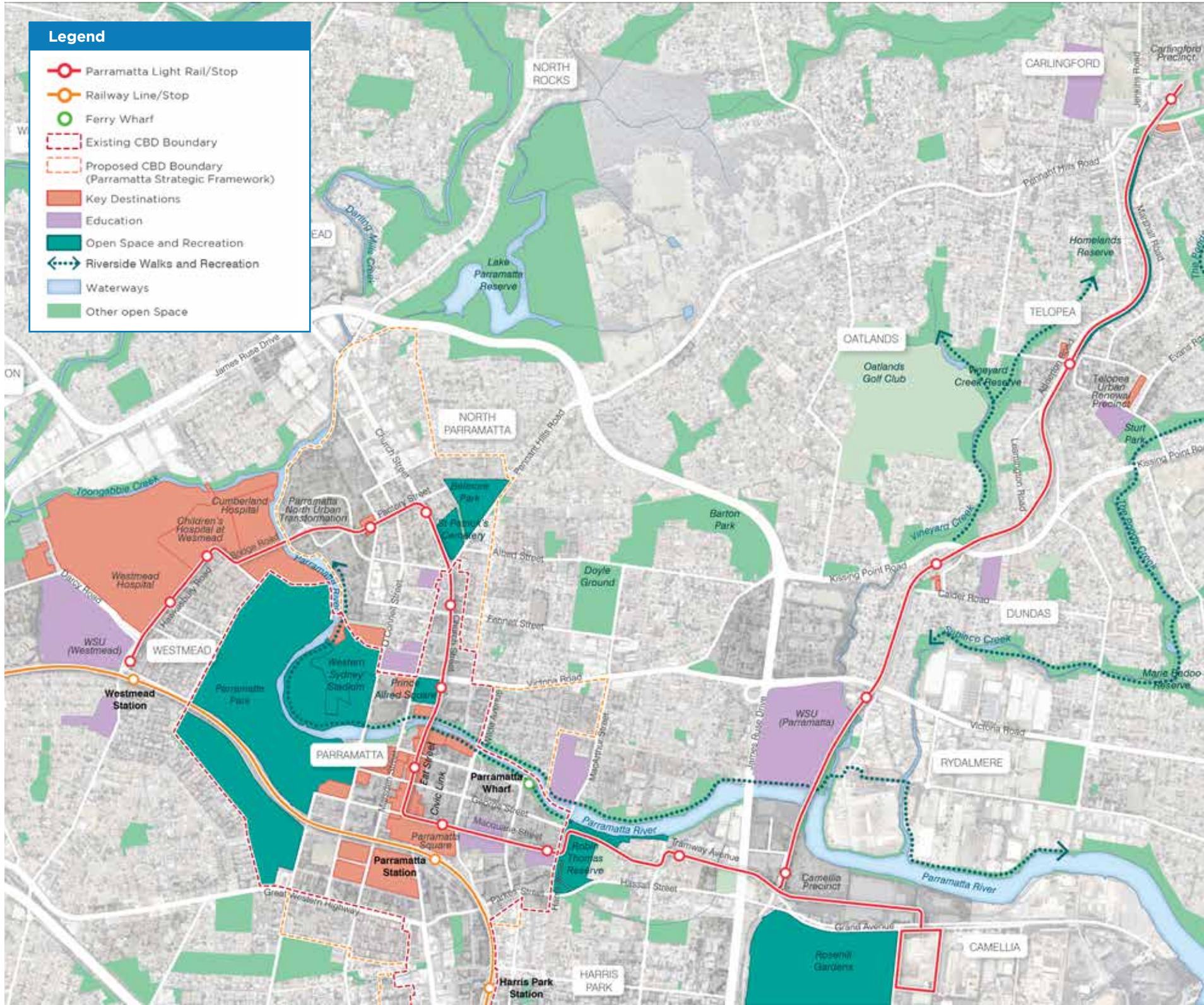
Parramatta Light Rail will reinforce living patterns in the city with a focus on human scale, experience, comfort and safety at light rail stops and within streets and spaces.

## Legibility and Wayfinding

Parramatta Light Rail will seamlessly connect to the surrounding area and local structures, places and streetscapes by creating clear and well-defined connections and wayfinding.

## Safety

Parramatta Light Rail will provide for the safety of light rail users and the public along the light rail route, at stops, interchanges and within the street and open spaces where the light rail travels.



Key places in Parramatta

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## 1.2 RESILIENT CITY

The Parramatta Light Rail will respond to the challenges of Parramatta as a city with a river at its heart. With expected higher temperatures and increased rainfall, the City is at greater risk of urban heat, drought, flooding, bushfires and storms.

The Parramatta Light Rail will plan for the challenges of climate change and seek to mitigate effects through:

### Greening the city

- Managing flood impacts.
- Protecting the natural environment.
- Promoting efficient resource use.

It will make Parramatta more liveable, amenable and safe for today's community and future generations.

### Flooding and Water Management

Parramatta is within the river flood plain and is affected by flooding and sea level rise. To respond to a growing population and the limitations of the City environment, light rail, as a major infrastructure project, will assist in increasing the cities capacity to deal with flood events along the alignment by designing for flood immunity.

### Natural Environment

The Parramatta Light Rail will respond to the local ecology and urban biodiversity along the corridor. It will expand the existing urban canopy with appropriately scaled street trees to improve the local microclimate, and manage the urban heat island affect along the light rail alignment.

An expanded urban canopy will enhance the level of community comfort, provide visual amenity and support the structure and landscape character of the City. Connected creek and bushland corridors will be reinforced and enhanced with a new linear parkway along the Carlingford Line.

### Bushland and Biodiversity

The project will seek to reinforce, respond and minimise impacts to the urban ecology of Greater Parramatta.

### Urban Forest

The Project will seek to increase tree canopy across the corridor to improve liveability, particularly in areas of high pedestrian use such as transport corridors, nodes and cycleways.



Centenary Square Parramatta.



# 1.3 A CONNECTED CITY

The design will create an effective transport network that provides efficient interchange between modes and strong links to adjacent places and surrounding regions.

The Parramatta Light Rail will significantly enhance transport options and connect people to employment, key destinations and places of enjoyment. By enabling effective mode interchanges and by forward planning to integrate with future transport, including light rail extensions, the project will strengthen links between Parramatta and the broader metropolitan Sydney. Increased public transport use will reduce reliance on private vehicles and improve the environment.

## Transport, Network & Interchange

The Parramatta Light Rail is a part of an integrated transport network, where light rail and the new active transport link will facilitate easy access and interchange between existing and future transport modes including heavy rail, buses, metro and ferry. The light rail alignment and stop locations will support the CBD, important employment areas, local centres and residential neighbours to enable the sustainable growth of greater Parramatta.

Repurposing the T6 Carlingford Line to light rail services will increase the number of services per hour, reduce average waiting times and provide a direct link between Carlingford, the Parramatta CBD and Westmead. Light rail customers traveling to the Parramatta CBD from the Carlingford Line will avoid a transfer at Clyde and benefit from a high-frequency, reliable and turn-up-and-go service that will connect them to key destinations, interchanges and employment areas.

Light rail customers will be able to interchange with Westmead and Parramatta Stations via a stop at Parramatta Square and at the Westmead terminus. These stops also encourage interchange with nearby bus nodes, including the T-Way and the Parramatta Transit way. Other significant interchange movements between bus and light rail are anticipated at the following light rail stops:

- Factory Street Stop for buses on Windsor Road.
- Fennell Stop for buses on Pennant Hills Road.
- Rydalmere Stop for buses on Victoria Road.

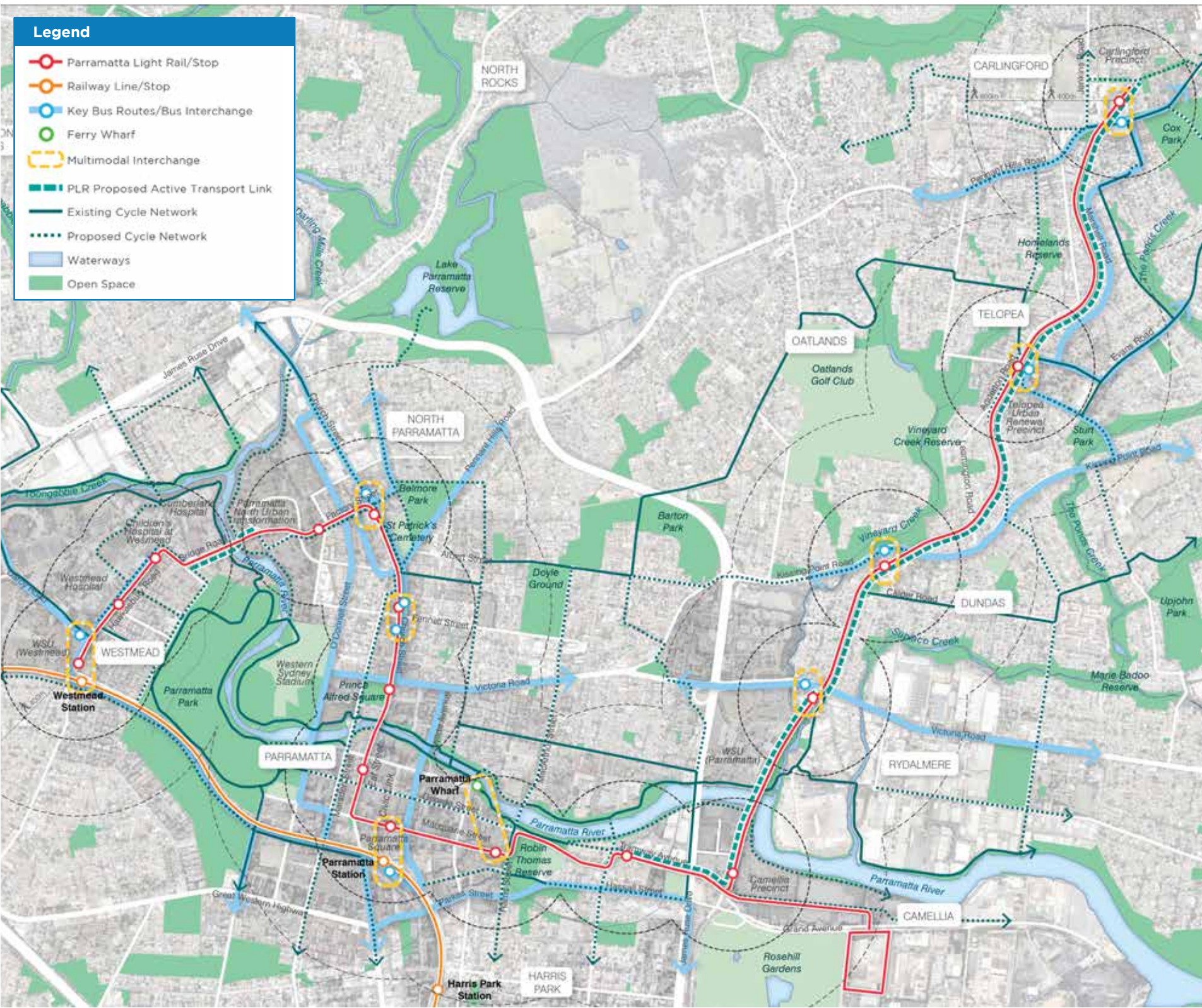
Light rail will also integrate and re-configure the existing road network as it moves through the city. Significant changes to the road network include:

- Prioritising public transport and pedestrians on Church Street, between Barney Street and Macquarie Street, by diverting north-south through traffic to O'Connell Street.
- Prioritising public transport and pedestrians on Macquarie Street by transforming George Street into a two way east-west link.

The project will maintain traffic movement on James Ruse Drive by bridging over this important north-south artery.

## Active Transport

The Parramatta Light Rail will make cycling a viable and attractive mode choice and will be a recreational and commuter cycling destination. A new dedicated corridor alongside light rail, between Carlingford and the River, will cater to cyclist and pedestrian mobility and safety.



Pedestrian and Cycle Network Plan

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## 1.4 A HIGH QUALITY CITY

The design will seamlessly integrate into the surrounding city to facilitate quality streets and spaces with minimal visual clutter, multi-functional smart city elements, and high quality materials and finishes.

The Parramatta Light Rail will have a cohesive, seamlessly designed public domain that promotes public transport use, supports the functionality of streets for movement, and is designed to cater for people as both light rail customers and city inhabitants. Public domain and built elements will be appropriate to place and achieve design excellence whilst balancing functional elements.

### Public Domain

Parramatta Light Rail will create a pleasant, safe and amenable pedestrian environment across the seasons and at both day and night, with easy access to light rail stops and adjacent places. Parramatta Light Rail will coordinate with the City of Parramatta Council to deliver a holistic public domain.

### Built Elements

Built elements of Parramatta Light Rail will be designed as a cohesive suite of elements that reinforce the identity and local character of each precinct.



Parramatta.



# 1.5 A DISTINCT CITY

The design will celebrate the history and natural beauty of Parramatta, foster art and culture, and capitalise on opportunities to express the unique Parramatta identity.

The Parramatta Light Rail is a distinct, new transport and cultural connector with a distinct Western Sydney identity. It will be shaped and informed by the places and stops it travels through.

Through a creative, curated approach the Parramatta Light Rail will provide a unique cultural experience that encourages curiosity and wonder, is authentic in speaking to place and delivers a legacy that is memorable, loved by the community, and overtime becomes a destination experience for visitors to Parramatta.

## Heritage Precincts and Places

Parramatta Light Rail will sensitively engage with the numerous heritage precincts and places, enhance the appreciation of these places through sensitive design, and minimise impacts to the heritage fabric.

## Archaeology and Interpretation

Parramatta Light Rail will minimise its impact on important Aboriginal and European archaeology along its corridor and incorporate historic interpretation.

## Public Art

Parramatta Light Rail will identify opportunities to incorporate public art as an integral element of the project, recognising its importance in embedding meaning, enhancing character and enriching the transport experience and local identity.

## Stop, Shelter and Light Rail Vehicle Design

Parramatta Light Rail will seek to incorporate cultural elements into the design of specific stops and shelters to add meaning to the project and foster a personal connection between the commuter and the light rail service. The design will draw visitors and deliver a memorable experience that is more than just a mode of transport from point A to point B.



Parramatta River



## 1.6 A LOCAL CITY

The design will respond to the needs of local businesses, contribute to safe streets and enhance the public domain. It will create new and improved places for the community, create jobs, support economic growth and build social capacity by connecting people to new opportunities.

### Active Edges and Urban Functions

The Parramatta Light Rail corridor will form a seamless and central defining element within high quality streetscapes. It will activate streets and contribute to day and night vibrancy and safety for all users.

The project will:

- Promote street address, active edges and versatile use of the public domain.
- Sensitively address interfaces with existing urban functions and promote new uses and activities that encourage vibrancy.
- Provide a seamless interface with adjoining properties that does not prohibit future adaptation and reuse.
- Ensure access to properties is maintained.
- Encourage pedestrian permeability, where practical across the streetscape to promote free movement, dynamism and activity.
- Facilitate City uses and operations through changes to kerbside use, including drop off/pick-up zones and maintenance access.
- Safeguard access for emergency vehicles.

### Local Business and Employment

The Parramatta Light Rail will improve access and movement within the City, providing a long-term benefit to local businesses and employment.

The project will maintain access to local businesses, public and educational facilities during construction.



Parramatta lanes



# 1.7 A FUTURE FACING CITY

The design will take an integrated approach to planning for urban renewal and revitalisation projects, support the City of Parramatta Council’s strategic planning goals, address the need for greater social infrastructure, and manage change in a way that supports businesses and communities.

The Parramatta Light Rail will encourage revitalisation and renewal along its spine. An integrated approach will support City planning initiatives, growth and development. Streets, parks, and public spaces impacted by the project will be carefully designed to fit usefully back into the shape and life of the City. Once completed, the light rail will integrate with everyday City functions allowing access for operations, service and maintenance activities.

## Grow Parramatta

The Parramatta Light Rail project will catalyst new growth and attract new investment across Parramatta. It will provide an efficient, sustainable and integrated transport system to connect people and places, support the diverse mix of customer needs and link employment, cultural, educational, health and sporting precincts with existing and new communities. Light rail will:

- Attract new residents and jobs to the area.
- Encourage mode shift and reduce noise and pollution by reducing a dependence on private vehicles.
- Link key precincts and city scale assets with a reliable, frequent, iconic public transport service.
- Encourage more cycling and walking contributing to a more active and healthy community.
- Accelerate planned development, catalyse further investment, and coordinate growth.

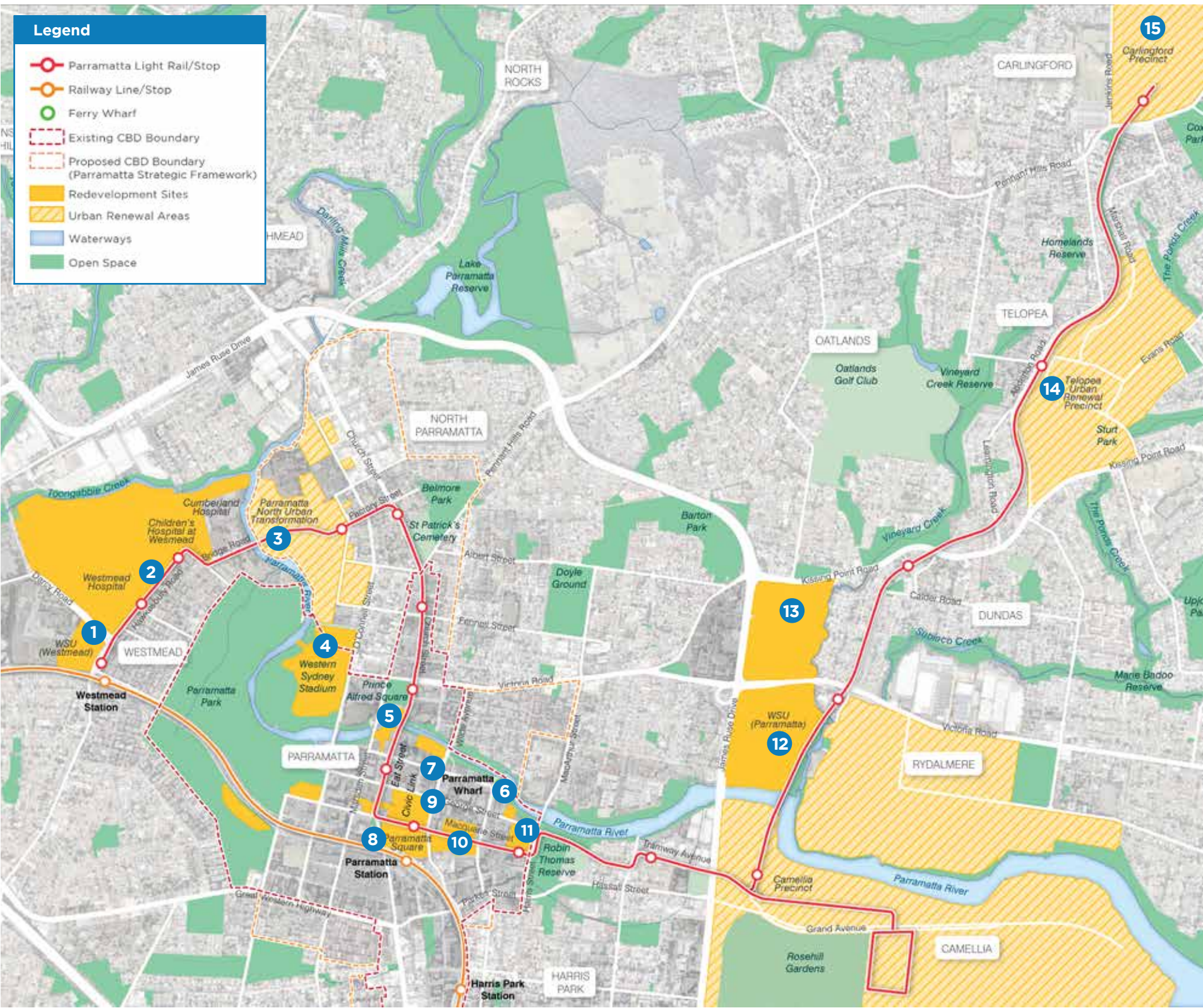
## Interface with City Planning and Initiatives

The Parramatta Light Rail will respond seamlessly to public and private redevelopment within the City. It will support City plans which directly engage with light rail including the:

- Implementation of the City of Parramatta Council CBD Planning framework, including associated integrated transport and emergency access plans.
- Redevelopment of Parramatta Square.
- Civic Link Framework Plan and associated access changes.
- Parramatta City River Strategy and CBD River foreshore upgrade.
- Realisation of Parramatta Quay and including improved access to Parramatta Ferry Wharf.
- Implementation of Parramatta Ways Walking Strategy.

## Restoration works and residual land

Parramatta Light Rail will ensure streets, parks, and public domain areas impacted by the project are seamlessly joined back into the City.



Parramatta Light Rail Route and Context Plan

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## 1.7 A FUTURE FACING CITY



**Western Sydney University (WSU) – Westmead Campus**

The WSU Westmead redevelopment is valued at \$450 million and includes education, commercial, residential and community spaces.



**Westmead Hospital and Children's Hospital at Westmead**

The \$900 million Westmead Hospital upgrade includes new operating theatres, critical care services and a new emergency department.



**Parramatta North Urban Transformation (PNUT)**

The PNUT redevelopment is a 26 hectare State Significant Site and is expected to generate 2,700 dwellings, 2,000 new jobs, and new riverside parks.



**Western Sydney Stadium**

The new Western Sydney Stadium is a \$300 million project providing improved sporting and large-scale event infrastructure, enhancing the night-time economy of Parramatta.



**Riverside Theatres**

The Riverside Theatres is part of a \$100 million upgrade to revitalise the riverfront as a performing arts and cultural precinct.



**Parramatta River and Wharf Upgrade**

The river improvements include a revitalised river foreshore precinct and wharf upgrades that will enhance amenity and public transport services to and from Parramatta.



**Parramatta CBD redevelopment**

Parramatta CBD is undergoing an \$8 billion urban transformation. By 2021, an additional population increase of 41,000 is predicted and an estimated 186,000 people will be working in Parramatta.



**Parramatta Square**

Parramatta Square is a \$2 billion redevelopment in the heart of the CBD, including new major commercial, civic, education and residential buildings within civic and green open spaces.



**Civic Link**

Civic Link is a 490 metre long, 20 metre wide public open space, providing pedestrian connectivity between Parramatta Square and Parramatta River.



**Arthur Phillip High School and Parramatta Public School**

The proposal expands the existing heritage-listed school to create a large teaching hub including a high rise secondary and primary school.



**Cumberland Media and Albion Hotel**

Planning Proposals for the Cumberland Media and Albion Hotel sites propose a mixed use development of up to 60 storeys and 35 storeys, respectively.



**Western Sydney University – Parramatta Campus**

The redevelopment of WSU Parramatta Campus at Rydalmere.



**Metro Residential Development**

The Metro Residences in Rydalmere are scheduled to be developed by Family and Community Services into a new mixed use community.



**Telopea Renewal Precinct**

Telopea is identified as a Priority Precinct. The master plan envisions social, affordable and market housing, parks and community facilities.



**Carlingford Renewal Precinct**

The Carlingford Renewal Precinct is set for urban renewal following recent changes to planning controls allowing for greater density.

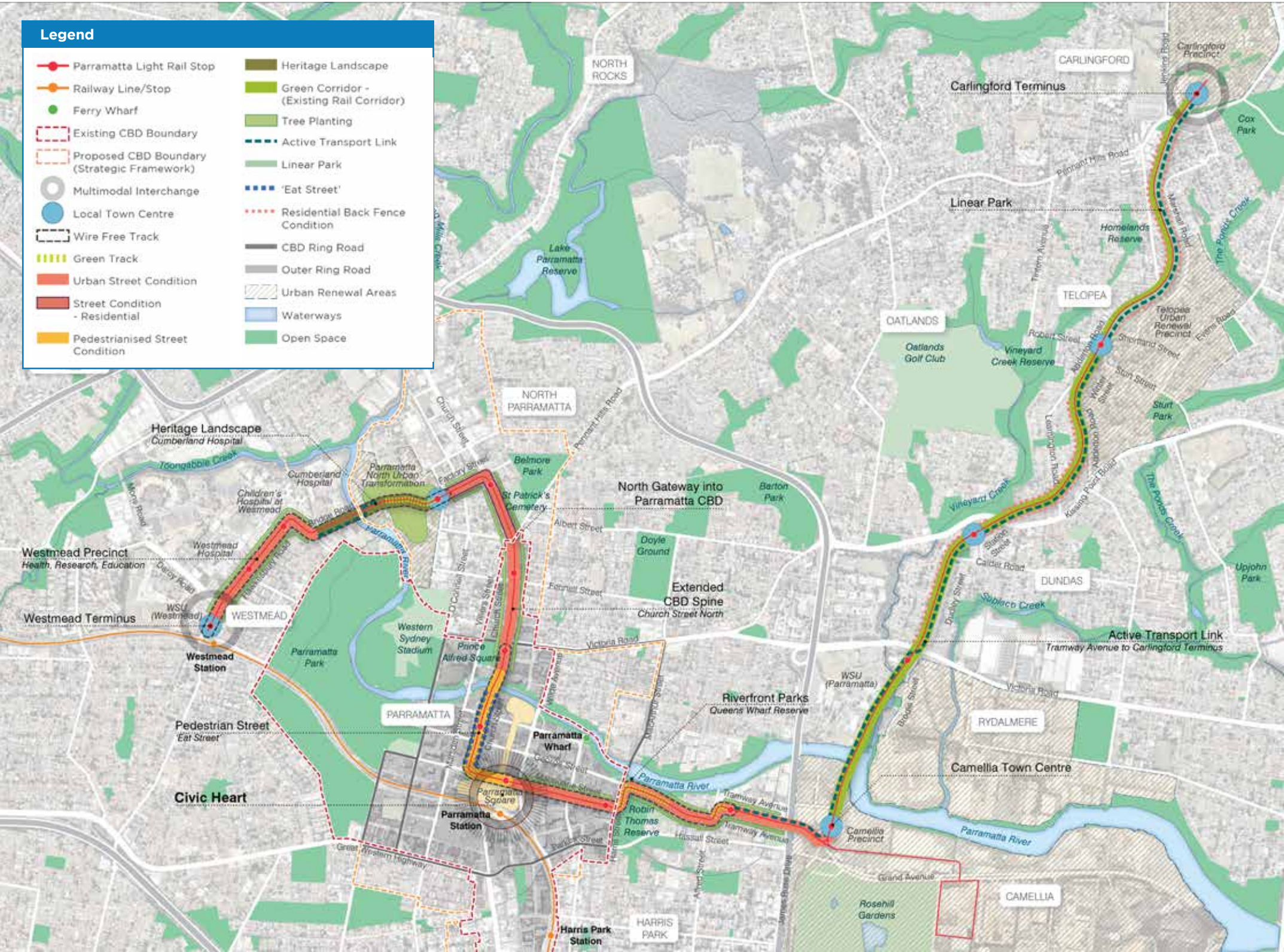


# 1.8 PLACE MAKING OUTCOMES / URBAN DESIGN SUMMARY

Parramatta Light Rail integrates with existing streets and public spaces, creates new vibrant precincts, connects people to places and facilitates growth.

The project's proposed urban design:

- Celebrates Eat Street's unique culture and commercial success by expanding the pedestrian space and upgrading the public domain. The design achieves this by removing private vehicles and using quality materials around a central, integrated light rail stop.
- Renews Hawkesbury Road into an accessible, shaded and legible street address and gateway into the rapidly expanding Westmead Health and Education Precinct. Wire-free running in this location minimises obstructions to pedestrian movements and maintains a clear streetscape.
- Respects the heritage landscape in Cumberland Hospital. Wirefree running and green track will sensitively and subtly integrate light rail infrastructure into this rich and important landscape.
- Transforms the Carlingford Line into a green and permeable corridor with a dedicated new active transport path and pedestrian crossings at stops. The Project will connect communities and cyclists to regional destinations and routes, such as the Parramatta Valley Cycleway.
- Reinforces Parramatta as a connected, accessible CBD at the geographical centre of Sydney. The CBD light rail stop will provide a short and convenient interchange with heavy rail and bus services at the Parramatta Rail Station.
- Expands the Parramatta CBD north along Church Street to catalyse commercial activity, increase amenity and preserve and celebrate valuable open spaces at Prince Alfred Square. By upgrading the public domain, creating new pedestrian spaces and planting new trees, the Project will increase amenity and heighten commercial activity at two new light rail stops at Fennell and Factory Streets.
- Enhances potential town centres at Camellia and Rosehill with new open spaces, dedicated light rail stops and a new connection to the Rosehill Gardens Racecourse.



Urban Design and Landscape

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## 1.9 PUBLIC DOMAIN DESIGN

### DESIGN PRINCIPLES

The design of Parramatta Light Rail will be coordinated with the City of Parramatta Council to deliver a holistic public domain. The corridor design principles are:

#### People Centred

- Provide an amenable pedestrian environment along the light rail corridor.
- Design stops and their immediate environment to enable human interest, convenience and comfort.
- Retain and enhance existing pedestrian connectivity across and along the light rail route, where practicable.
- Promote pedestrian connections and facilitate legible and easy connections from stops to the private/public domain, activity nodes and key attractors.
- Where crossings are constrained, retain key pedestrian desire lines and connections to destinations, where practicable.
- Provide access for pedestrians and cyclists traversing the light rail track, where safe and practicable.
- Position kerb ramps to form a clear and direct path of travel.
- Locate pedestrian crossings at stops to provide direct connections to both sides of the light rail corridor.
- Embed universal access principles in the project.
- Connect and integrate effectively with access to transport modes and interchanges, including: heavy rail, bus and T-Way, taxi, ferry services and the active transport network.
- Design systems to not preclude opportunities to expand the light rail network at Westmead, Church Street North, Camellia and Carlingford.

#### Legible

- Reinforce the street pattern to increase permeability and prioritise wayfinding in the public domain.
- Ensure the legibility of stop locations and mode interchange by defining direct paths of travel, aligning with view corridors or clear sight lines, and siting in proximity to key destinations and places.
- Ensure stops reinforce the structure of the city and provide easy access to key destinations and spaces whilst respecting important public spaces and landmarks.

- Create cohesive streetscapes which reinforce the desired urban and landscape character.
- Improve walking and cycling catchments along the light rail corridor and connect with the adjacent locality.
- Minimise clutter within the public domain and at stops.
- Promote opportunities for park and ride facilities, and drop off and pick up in the vicinity of key/selected stop locations.
- Ensure a legible, easy to navigate and welcoming integrated transport network for people with disabilities and/or vulnerable transport users.
- Provide on street opportunities for service, loading and delivery vehicles and maintain existing access into the private domain for all loading, off street parking, emergency and delivery vehicles.

#### High Quality

- Use high quality, durable materials and a sophisticated design. Avoid the use of shotcrete and other low quality materials.
- Demonstrate sensitivity with the surrounding built form and landscape context by reinforcing the urban structure, existing character and future scale of each place.
- Create a coherent identity for key precincts by integrating the location, arrangement and character of the light rail corridor with that of the surrounding public and private domain.
- Improve pedestrian amenity by providing generous footpaths, large canopy trees and landscape features, and considered streetscape lighting and furniture elements.
- Promote the revitalisation and/or activation of streets for outdoor dining, events and recreation where appropriate.
- Positively support major event locations and key attractors and minimise adverse impacts to the functions of the public domain, including outdoor dining and event systems.
- Effectively integrate with the City of Parramatta Council's significant public domain projects, including Centenary Square, Parramatta Square and the Civic Link.
- Ensure scope of restoration works is regularised such that new finishes extend to building lines and adjacent nearest elements within the Project boundary.

#### Resilient

- Create holistic streetscapes where drainage solutions are an integrated element within the street and enable high quality public domain and street tree planting, where practicable.
- Appropriately address high hazard flood zones, align with emergency evacuation procedures and enable the safety and protection of infrastructure, assets and communities within the Project boundary.
- Avoid water pollution to protect human and ecological health.
- Protect the water quality of the Parramatta River.
- Minimise creating remnant land, high walls and barriers within public spaces and streets and design residual land to be of a regular shape and form to function contiguously with adjacent land uses.
- Reinforce the urban ecology of Greater Parramatta.
- Protect existing native flora and fauna, urban bushland and waterways / riparian corridors.
- Respond to the natural environment, protect and retain ecologically endangered communities and remnant bushland impacted by the project and where possible, link bushland and open corridors, facilitating fauna movement across, over or under sites.

#### Safe

- Clearly delineate the light rail tracks within the overall streetscape design including changes to paving materials, median planting or WSUD swales as a preference over barriers and fences.
- Minimise the risk of conflict between pedestrian and light rail beyond the stops, at informal crossing points (existing and anticipated), and when approaching/ departing stops.
- Facilitate a permeable street and pedestrian network with the design of safe rail corridor crossings and access to stops.
- Consider CPTED principles and CCTV to improve safety along the route and at stops.
- Minimise barriers/fences and enable route specific solution to safety requirements.



# 1.10 LIGHT RAIL ALIGNMENT & PRECINCTS

The Parramatta Light Rail alignment is divided into 7 distinct precincts.








The Parramatta Light Rail runs from Westmead Station, through Cumberland Hospital, Parramatta CBD, Camellia and north to Carlingford. The light rail alignment can be characterised by the landscape nature of Greater Parramatta's river and hills.

The light rail alignment through the riverine plain between Westmead and Camellia loosely follows the Parramatta River and connects large areas that interface with the river. This area has an urban quality as it links the CBD, major health, education and employment precincts as well as areas of large-scale transformation and renewal.

The 'River' section is further divided into six precincts (Westmead to Camellia) to address the complexities, needs and distinct qualities of each precinct.

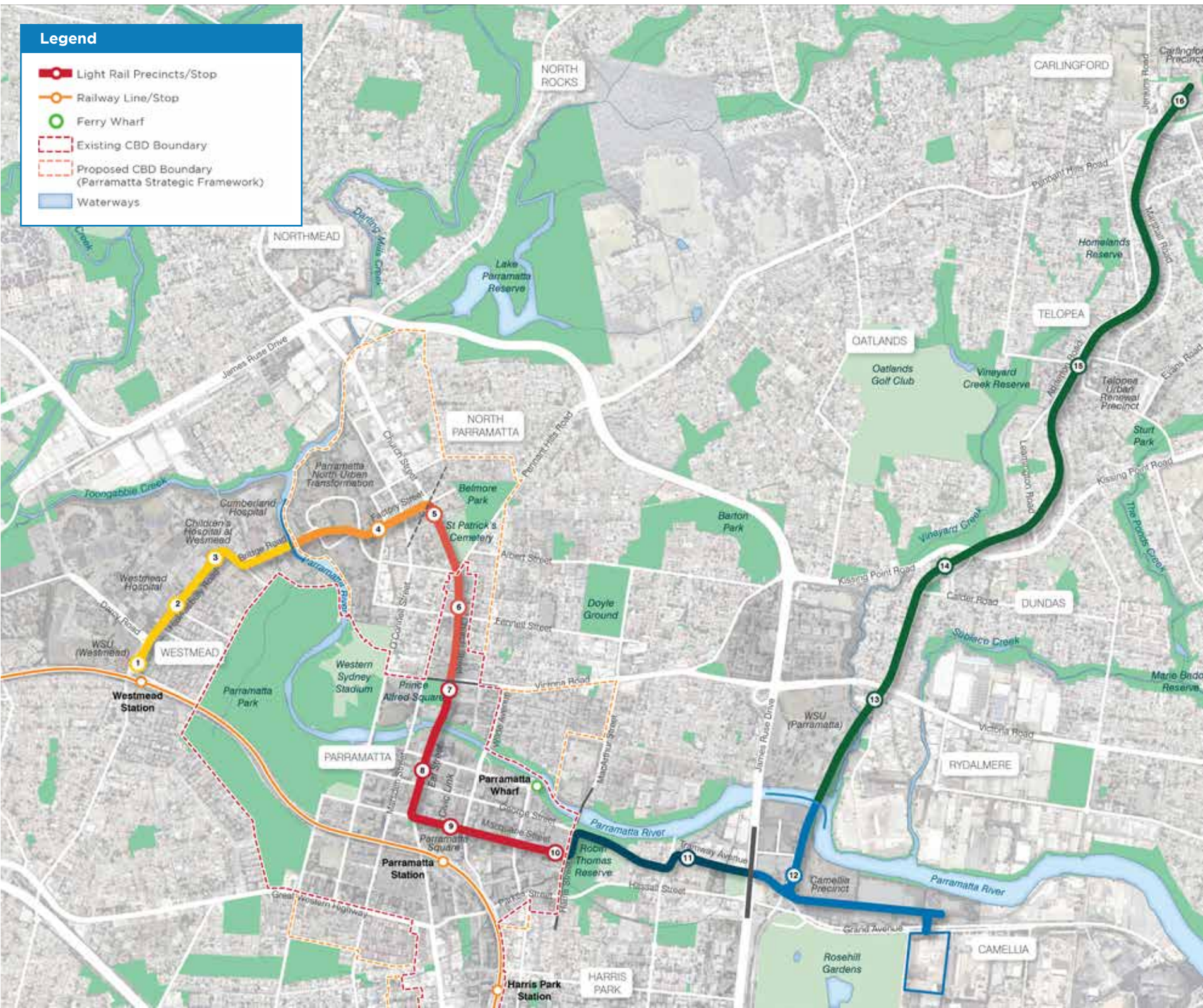
The 'Hills' section follows the existing Carlingford heavy rail corridor, where the alignment departs from the river at Rydalmere and follows the green corridor north through the elevated suburbs of Dundas, Telopea and Carlingford. The character of this section is low scale suburban and green with higher density and activity around the local centres.

## The Precincts Include:

-  **Westmead** – Education and Health precinct.
-  **Parramatta North** – Cultural heritage landscape and urban transformation area.
-  **Church Street North** – Extension of the CBD.
-  **Parramatta CBD** – Commercial core.
-  **Robin Thomas Reserve to Camellia** – Parramatta River foreshore and urban renewal.
-  **Camellia** – New town centre.
-  **Carlingford Line** – Landscape corridor.

## Light Rail Stops:

1. Westmead Terminus
2. Westmead Hospital
3. Children's Hospital at Westmead
4. Cumberland Hospital
5. Factory Street
6. Fennell Street
7. Prince Alfred Square
8. Eat Street
9. Parramatta Square
10. Harris Street
11. Tramway Avenue
12. Camellia
13. Rydalmere
14. Dundas
15. Telopea
16. Carlingford



Parramatta Light Rail alignment through precincts

N 1:25,000 @A3 0 200 400 600 800 1,000M



## 1.10 LIGHT RAIL ALIGNMENT & PRECINCTS



Westmead Hospital

### WESTMEAD

The gateway into an extensive health, research and education precinct.

Hawkesbury Road is a tree-lined spine with a strong landscape character that presents a clearly defined entry point into the Westmead precinct; facilitates comfortable, easy and legible pedestrian connections; and supports the functional needs of the community, research, health, education and innovation precinct. Integrating light rail within the Hawkesbury Road corridor will help support a vibrant and active corridor. It will be the connecting thread linking health and education destinations along its length.

The light rail will pass and connect a number of key locations including WSU, Westmead Hospital, the Children's Hospital at Westmead and Cumberland Hospital. The light rail will provide a significant role in unifying what will become Australia's largest health precinct.

- Connect Railway Parade to Parramatta River via Hawkesbury Road and Bridge Road.
- 3 stops: Westmead Terminus, Westmead Hospital and Children's Hospital.
- Integrated with existing transport modes including Westmead Railway Station and the T-Way bus.
- Rail stops located with easy access to local destinations integrated effectively and efficiently with surrounding public domain.



Female Factory

### PARRAMATTA NORTH

A considered transport intervention that integrates with the heritage fabric and landscape character of the precinct, **prioritises pedestrian experience, and provides a new public transport option for the emerging community.**

The light rail provides a new public transport and Active Transport Link across the Parramatta River between Westmead and the heritage listed PNUT Precinct. The light rail stop at PNUT will service the planned population, the new village centre and associated recreational and riverside spaces.

- Connect Parramatta River to Church Street via Parramatta North Urban Transformation Precinct, along Factory Street.
- 1 stop: Cumberland Hospital.
- Integrated with active transport to access recreational areas along the corridor to Westmead.
- Respect, reinforce and integrate the natural landscape and built heritage.
- Provide a catalyst for sustainable growth close to the CBD.



Church Street North, Parramatta

### CHURCH STREET NORTH

A tree lined northern entry into the Parramatta CBD.

The Parramatta CBD Precinct prioritises light rail, bus interchange, pedestrian and cycle amenity, and responds to important existing nodes which define the character of place. A key challenge for this corridor is balancing the demands of traffic movements, and providing sufficient space for high quality streetscape associated with the new light rail.

- The precinct extends along Church Street from Factory Street to Victoria Road.
- 2 stops: Factory Street and Fennell Street.
- Reinforce Church Street as the northern gateway into Parramatta CBD.
- Create a pedestrian friendly street with generous footpaths and public spaces for residents and visitors.



Church Street, Parramatta

### PARRAMATTA CBD

Unify Church and Macquarie Streets to create a cohesive pedestrian precinct with a high quality and beautiful public domain.

Light rail through Parramatta CBD will connect community, visitors and CBD workers and will increase opportunities for new businesses, retailers and hospitality providers as well as encourage a more diverse night time economy.

**Church Street** - A pedestrian focused connection between two historically important Squares, activated by outdoor dining, free from clutter and seamlessly integrated into the broader City public domain network.

**Macquarie Street** - A legible streetscape which enhances east-west pedestrian connections and supports significant pedestrian flows and permeability with high quality materials and a strong city character.

- The precinct extends from Church Street at Prince Alfred Square (Victoria Road), continues south over the Parramatta River via Lennox Bridge, through the CBD, east from Centenary Square along Macquarie Street to Harris Street and Robin Thomas Reserve.
- 4 stops: Prince Alfred Square, Eat Street, Parramatta Square, Harris Street.
- Church Street will be redefined as a great and memorable civic street supporting outdoor dining, linking public squares and Parramatta River.
- Macquarie Street will support transport interchange between light rail, trains, buses and ferries and provide access between schools and playing fields.



# 1.10 LIGHT RAIL ALIGNMENT & PRECINCTS



Parramatta River

## ROBIN THOMAS RESERVE TO CAMELLIA

Tramway Avenue will be revitalised as a new pedestrianised local centre.

The light rail will maintain the quality and green character of the Parramatta River and foreshore parklands. It will catalyse the renewal of Rosehill into a vibrant urban community that is closely connected to Parramatta.

- Extends from Robin Thomas Reserve in the west, along George Street east, Tramway Avenue across James Ruse Drive to Camellia.
- 1 Stop: Tramway Avenue.
- Public transport access to riverfront public open spaces, reinforcing the City of Parramatta Council's River City Strategy.
- Maintain the quality and green character of the Parramatta River and be a catalyst for the renewal of Rosehill.



View at Rose Hill, Camellia

## CAMELLIA

A 21st century living and business district comprising industry research, education, employment, retail, recreation, entertainment and residential uses with transport at its heart.

A future proof connection which enhances the desired urban and public domain structure of the Camellia Town Centre; maintains the regional functionality of James Ruse Drive; and addresses mobility needs of future residents and workers.

- Bounded by James Ruse Drive to the west, Parramatta River to the north and Rosehill Gardens Racecourse to the south. It includes Camellia Station, Grand Avenue and the existing Sandown Line running east.
- 1 stop: Camellia
- The Department of Planning and Environment and the City of Parramatta Council are currently preparing plans to rezone the existing industrial area into a mixed-use town centre with supporting employment uses.
- The key challenge for this corridor will be ensuring that the light rail support state and local government's future planning vision for Camellia.



Mobbs Hill, Carlingford

## CARLINGFORD LINE

A green permeable and well connected transport corridor linking evolving centres along the route and connecting communities with Parramatta CBD.

- The Parramatta River to Carlingford precinct runs along the existing rail corridor from Camellia to Carlingford.
- 4 Stops: Rydalmere Station, Dundas Station, Telopea Station and terminates at Carlingford Station.
- The precinct is distinct from other Parramatta Light Rail precincts as it utilises an existing heavy rail alignment and is set within a dedicated corridor with few street interfaces.
- Strategically the route connects with several important development sites.

**Rydalmere** - A local opportunity to serve a growing educational, employment and residential precinct, incorporating active transport, improved transport interchange and improved connections to Western Sydney University via a new pedestrian bridge over Vineyard Creek.

**Dundas** - An interchange that bridges major roads and steep topography to connect communities and catalyse the revitalisation of Dundas Town Centre.

**Telopea** - A thoughtfully positioned stop that bridges the rail corridor and improves the overall legibility of the street and public space network proposed within the future Telopea Town Centre.

**Carlingford** - Position of the stop is a central location surrounding future development and interchange with other transport modals.



## 1.11 BRIDGES & UNDERPASSES

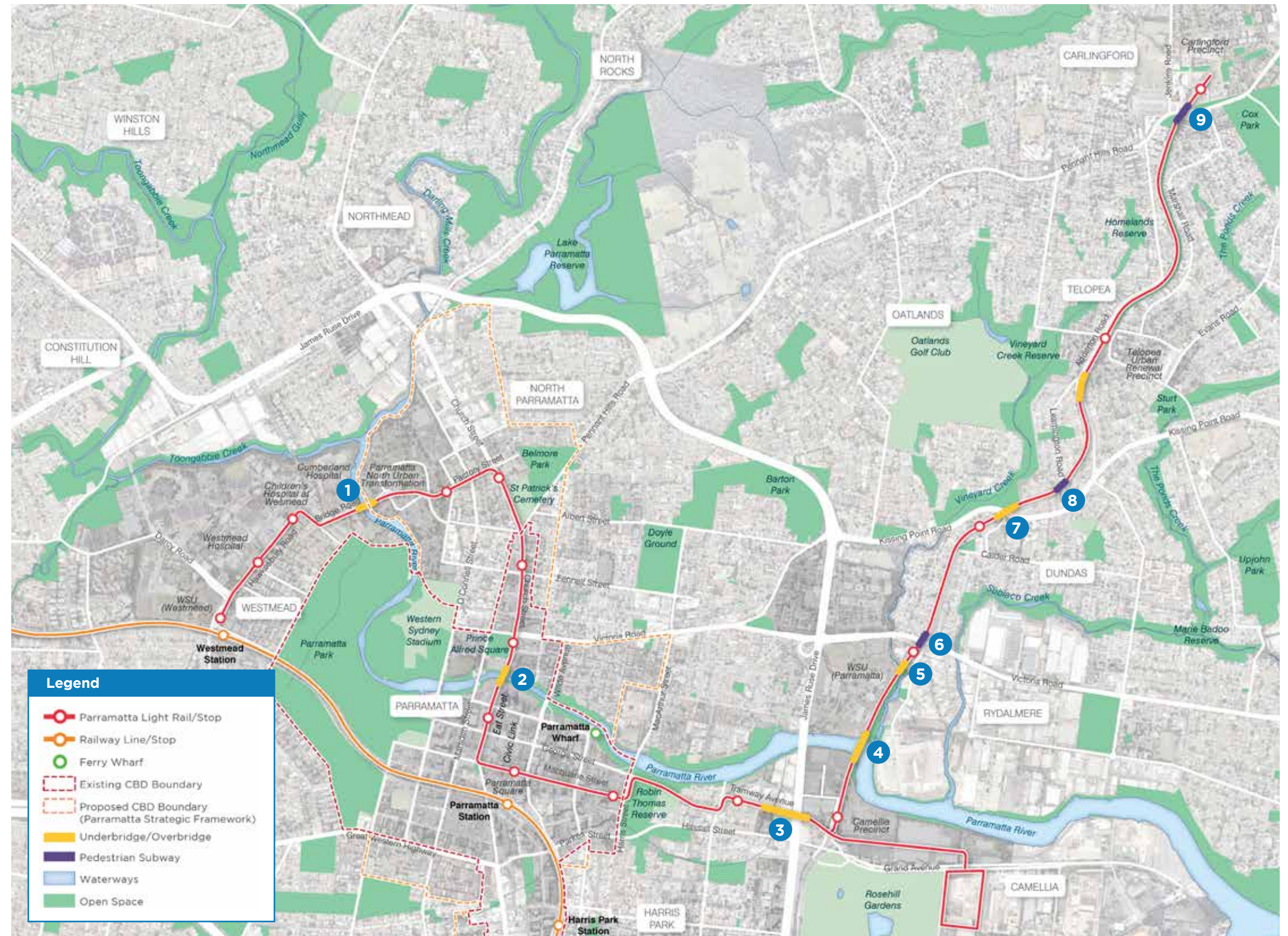
There are several bridges along the 12 kilometre corridor that will enable the smooth and effective running of the Parramatta Light Rail and provide for safe pedestrian connections to existing pathways and the dedicated ATL.

These include existing, adapted, upgraded and new bridges, and widened underpasses. This plan shows the location of the following bridges:

1. Duplication of Cumberland Hospital Bridge over the Parramatta Rive with ATL.
2. Lennox Bridge - Parramatta Light Rail (PLR) to be accommodated on existing heritage bridge.
3. Over James Ruse Drive, Tramway Ave to Camellia Town Centre - new bridge to accommodate PLR and ATL.
4. Parramatta River, Camellia to Rydalmere - reconfigure abutments and attach new ATL path to existing bridge.
5. Rydalmere - accommodate additional track and provide ATL link to WSU and across Vineyard Creek.
6. Rydalmere - Victoria Road bridge which accommodates PLR and ATL.
7. Dundas - New bridge over Kissing Point Road adjacent to existing to accommodate PLR.
8. Dundas - Widening and realignment of Leamington Road pedestrian subway to improve safety.
9. Carlingford - Widening of light rail corridor under Pennant Hills Road to accommodate PLR and ATL.

### Bridge and underpass design must:

- Be designed to minimise visual and environmental impacts on surrounding areas.
- Seamlessly integrate with the existing public domain and roadways.
- Be appropriate for place.
- Be safe for all road and bridge users including optimising CPTED principles and safety features.





“ Hawkesbury Road is a tree-lined spine with a strong landscape character that presents a clearly defined entry point into the Westmead precinct; facilitates comfortable, easy and legible pedestrian connections; and supports the functional needs of the community, research, health, education and innovation precinct. ”

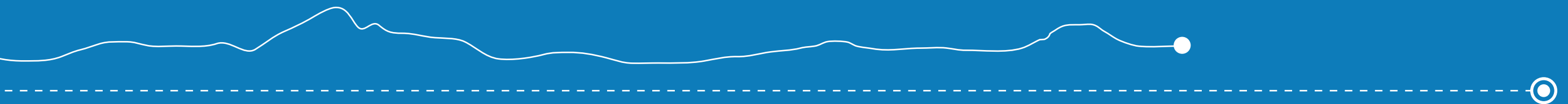


## 2.0 PRECINCT & CORRIDOR WIDE DESIGN

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# 2.1 WESTMEAD

### **PARRAMATTA LIGHT RAIL** URBAN DESIGN REQUIREMENTS





## 2.1.1 PRECINCT OVERVIEW

The Westmead precinct begins at the terminus opposite Westmead Station, runs north along Hawkesbury Road to Hainsworth Street, and ends at Parramatta River within the Cumberland Hospital site.

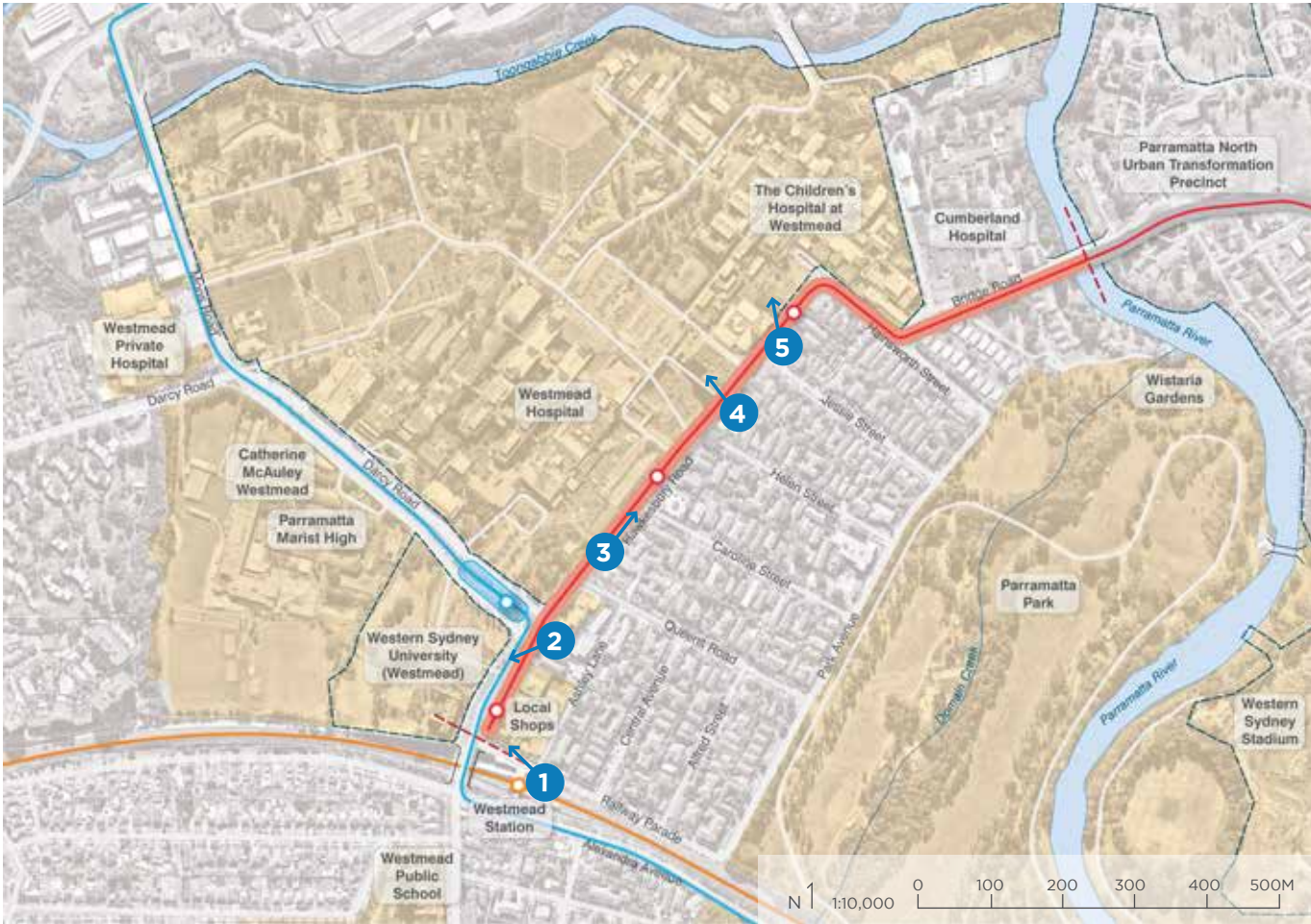
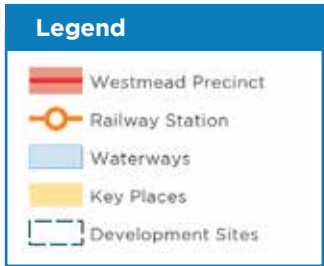
The light rail passes through and services several important destinations including WSU, Westmead Hospital, The Children's Hospital at Westmead, and Cumberland Hospital.

The precinct is experiencing significant growth and development. Together with allied health and education facilities, Westmead is to become Australia's largest health precinct.

### EXISTING CHARACTER

Hawkesbury Road plays an important role in providing pedestrian and vehicle access to Westmead Hospital, The Children's Hospital at Westmead and WSU's, Westmead campus. Due to the significant volume of vehicle traffic including emergency vehicles, and primary vehicle access to the residential area, the quality of the public domain along Hawkesbury Road is poor in areas. Pedestrians moving between Westmead Station, the hospitals, WSU and adjacent residential streets are offered limited amenity with often narrow pavements, limited cycling infrastructure and inconsistent tree cover. Large carparks front the street, creating an inactive streetscape. Wayfinding is difficult and there are several areas of pedestrian/vehicular conflict. There is a large signalised intersection at Darcy Road where the T-Way bus stop is located.

The western portion of the Cumberland Hospital sits within the Westmead Precinct. The Parramatta River links the hospital site to Wistaria Gardens and the World Heritage listed Parramatta Park. The vegetation on the banks of the river is listed as an Endangered Ecological Community (EEC) - River Flat Eucalypt Forest.



01 Looking north-west from the station concourse at Westmead train station towards the pedestrian crossing on Railway Parade.



02 Looking south-west from Hawkesbury Road towards the WSU campus and development site at the intersection with Darcy Road.



05 Looking north from Hawkesbury Road at the plaza in front of the Children's Hospital at Westmead.



04 Looking west from Hawkesbury Road at the Westmead Institute of Medical Research (WIME).



03 Looking north-east along the footpath on the east side of Hawkesbury Road with Westmead Hospital on the left.



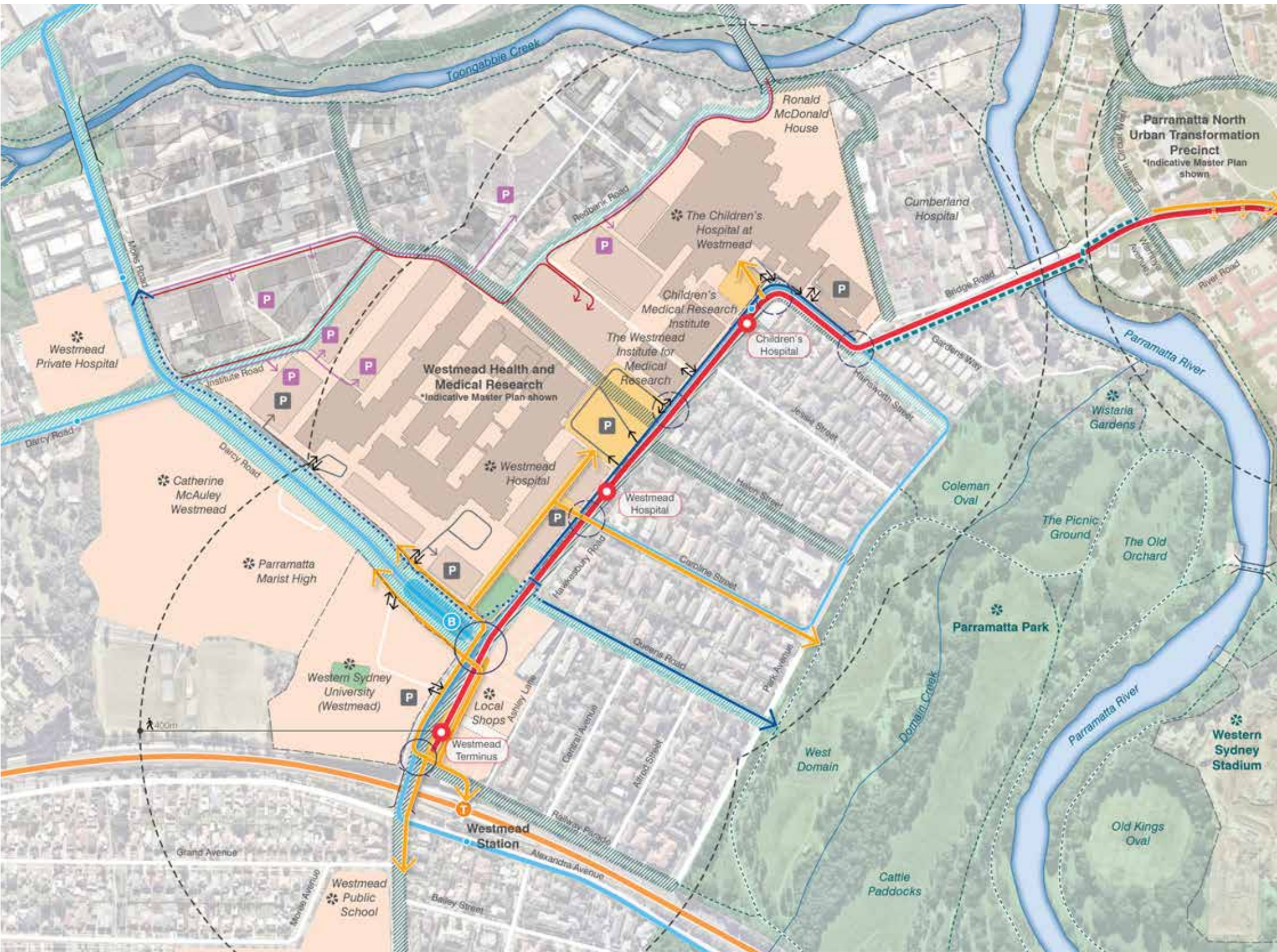
## 2.1.2 LAND USE, ACCESS AND CIRCULATION

The introduction of the light rail into the streetscape of Hawkesbury Road will reinforce the role of the area as a gateway into the extensive health, research and education precinct. It will connect this corridor to adjoining recreational parkland and riverside open space.

The light rail integrates with existing modes of transport, providing interchange with Westmead Railway Station, the T-Way bus stops on Darcy Road, other local bus stops as well as walking and cycling options.

While, Westmead Hospital has already relocated staff parking to the rear of the Hospital to reduce vehicular traffic on Hawkesbury Road, the future amalgamation of emergency departments will further reduce operational movements along Hawkesbury Road.

The streets are arranged to serve a world-class medical campus, including emergency clinics, visitor access and also local resident and community access in the precinct.





## 2.1.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES

Hawkesbury Road will be a vibrant corridor with high quality public domain provision. Lying between a medium-rise residential community to the east, and a vast and expanding health precinct to the north and west, Hawkesbury Road provides important vehicle and pedestrian connections to key health and education destinations. It also provides a connection via Queens Road to the World Heritage listed Parramatta Park. An avenue of street trees and landscaped spaces will contribute significantly to amenity for residents and those working at and visiting the hospital.

The urban design strategy for this precinct focuses on a coordinated approach with Health NSW and the City of Parramatta to ensure Hawkesbury Road becomes a well-connected, safe and revitalised street. The strategy seeks to improve pedestrian amenity and provide high quality and sustainable public domain outcomes. These interventions will support Westmead in becoming the premier health precinct in Australia.

### Pedestrian amenity

- Create a pedestrian-friendly, shaded street with safe connections between the light rail stops and the key destinations of Westmead Hospital, The Children's Hospital at Westmead, WSU and Parramatta Park.

- Provide a legible and attractive public domain through selection of a simple palette of high-quality, durable, natural materials and furniture elements.
- Provide generous and clear footpaths, widened pedestrian crossings and coordinated traffic signaling that will safely accommodate the high pedestrian

numbers that are predicted to increase in the future with new development.

- Where feasible, limit street clutter (furniture signage and line marking) to improve public domain legibility to maximise pedestrian movement and maintain the visual integrity of the street.

- Create a whole of street approach to the Westmead Precinct that is pedestrian focused and includes large shade street trees where possible, high quality pavements and clear sight lines





## 2.1.3 URBAN DESIGN & LANDSCAPE PRINCIPLES

### Transport

- Deliver a transport interchange that is a gateway to Westmead and emphasises multimodal legibility, safety, connectivity and accessibility between Westmead Station, the light rail terminus and T-Way bus stops.
- Design alignment to future proof southern light rail extension beyond heavy rail corridor

- Locate light rail stops with easy access to Westmead Hospital and The Children's Hospital at Westmead.
- Provide convenient and direct customer access to light rail services and related public transport modes.
- Coordinate the design and location of light rail stops, light rail vertical elements, street furniture, lighting and street trees to minimise clutter

- in the public domain and maintain sight lines.
- Ensure light rail stops integrate effectively and seamlessly with surrounding public domain.
- Provide a light rail alignment that remains as consistent as possible along Hawkesbury Road and Hainsworth Street.

- Provide wire-free running from the terminus to Cumberland Hospital Stop

### Active transport

- Support bicycle and pedestrian connections to Parramatta North and beyond through the provision of a separated ATL adjacent to the light rail from Hainsworth Street along Bridge Road.

- Support bicycle and pedestrian connections from Darcy Road to Parramatta Park via Queens Road by facilitating a safe crossing point over Hawkesbury Road.

### Landscape

- Create a strong and consistent landscape character with street tree\* planting on both sides of Hawkesbury Road.

- Integrate the design of the public domain with adjacent open spaces, including the planned Westmead Hospital Entry Plaza and the Children's Hospital at Westmead forecourt.
- Utilise planting to provide screening and safety buffers.
- Employ water sensitive urban design (WSUD) elements, where appropriate.



1:2000 @A3 0 20 40 60 80 100M

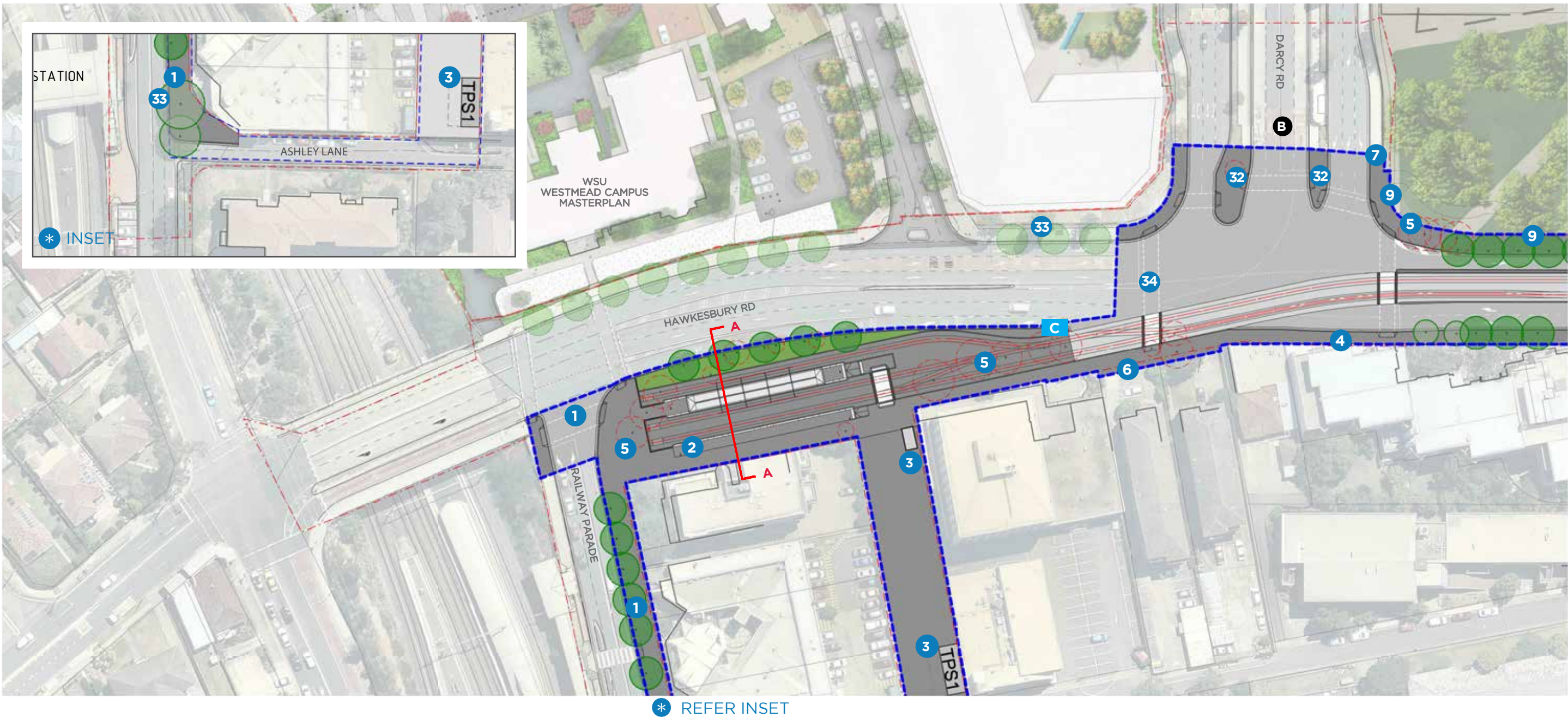


## 2.1.4 CORRIDOR AND PUBLIC DOMAIN DESIGN

The following corridor and public domain design plans indicate the project requirements for the Westmead precinct.

The plans should be read in conjunction with the sections and stop plans, as well as chapters 1 and 3.

1. Extend kerblines on Railway Parade between the terminus and Ashley Lane. Retain existing marked pedestrian crossing. Widen signal crossing across Railway Parade. Provide granite paving, street trees, lighting, and seating.
2. High quality terminus space with granite paving, lighting, street furniture tree and understory planting between the stop and Hawkesbury Road. Refer to Stop Plan on p34. Note: Opportunity to optimise design of Terminus area to improve light rail operations and vehicle movement whilst maintaining high quality urban design outcome including pedestrian amenity and accessibility.
3. Incorporate traction substation and drivers' facilities, on new property acquired as indicated.
4. Granite paving on Hawkesbury Road footpaths and medians.
5. Remove existing trees.
6. Widen footpath adjacent to signal crossing.
7. Tie in widened pathway into existing cycle path.





# 2.1.4 CORRIDOR AND PUBLIC DOMAIN DESIGN

8.

Incorporate bicycle crossing refuges between traffic lanes and light rail, subject to further development and coordination at detailed design stage.
9.

Widen path between Darcy Road and Hawkesbury Road bicycle crossing.
10.

Tie in footpath with existing bicycle path/ramp and accommodate waiting space for pedestrians and cyclists.
11.

Low planting. WSUD opportunity in medians, adjacent to stops and in footpaths.
12.

Marked pedestrian crossing, kerb ramps and tactile indicators. Granite sett threshold treatment on road surface.
13.

Westmead Hospital Stop. Refer to Stop Plan on p35.
14.

Unsignalised pedestrian crossing with kerb ramps and tactile indicators.
15.

Marked pedestrian crossings.
16.

Unsignalised right turn into hospital plaza subject to further detailed assessment of traffic signal phasing.
17.

The Children's Hospital at

Legend

\*\*PLR Project works boundary

PLR disturbance footprint

B

Bus Interchange / Stop

Pavement

Tree

Existing tree retained

Landmark Tree

Palm Tree

Existing tree removed

Low planting and water sensitive urban design opportunity

Potential outdoor dining zone

Marked pedestrian crossing

C

Point Control Box

\*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.

\*\*Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.

SENSITIVE: NSW GOVERNMENT

PARRAMATTA LIGHT RAIL HANDBOOK | URBAN DESIGN REQUIREMENTS

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## 2.1.4 CORRIDOR AND PUBLIC DOMAIN DESIGN

- Westmead stop. Refer to Stop Plan on p36.

18. Driveway cross-over. Granite sett finish. Retain existing vehicle movements.
19. Opportunity to remove existing bus bay, subject to transport service planning feasibility.

20. Bicycle rack, seating and landmark tree planting.
21. Widened footpath to accommodate pedestrian flows to The Children's Hospital at Westmead.

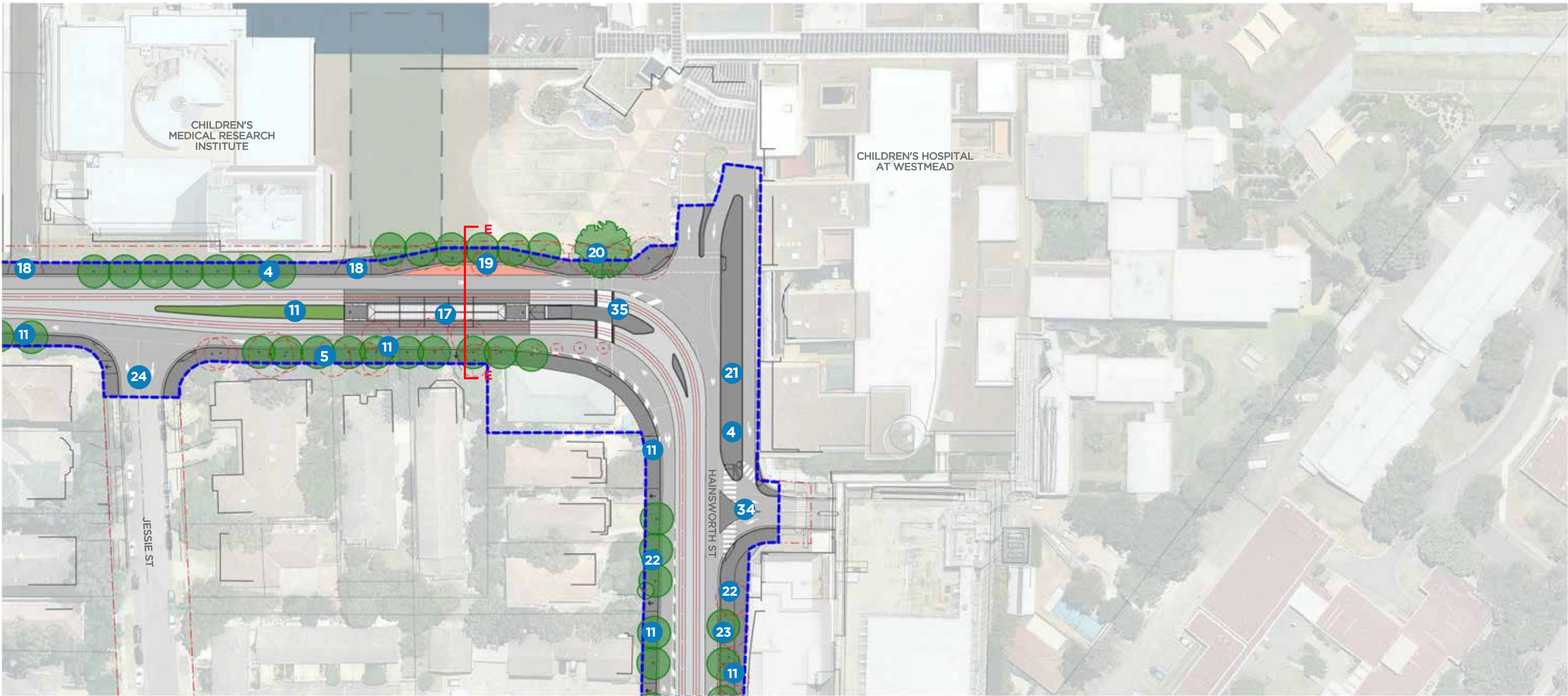
22. Concrete footpaths on Hainsworth Street.
23. Provide new large canopy street trees to replace removed trees.

24. Granite sett threshold treatment on road surface.

25. Landmark tree planting\* with indigenous low planting and seat.
26. Mass tree planting with native species, low grasses and WSUD where appropriate.

27. ATL with concrete finish. Pole lighting and native tree and low shrub planting adjacent.
28. Fence and low stepped retaining wall along property boundary.

29. ATL with concrete finish, pole lighting and fence where fall exceeds 1m. Retaining wall where required.





- |   |   |   |
|---|---|---|
| <p><b>30.</b> Mass native shrub and tree planting* at existing ground level.</p>      | <p><b>32.</b> Concrete footpath.</p>  | <p><b>35.</b> Pedestrian crossing subject to confirmation by traffic modelling.</p> |
| <p><b>31.</b> Marked pedestrian crossing (replace existing crossing to the east).</p> | <p><b>33.</b> Retain existing trees.</p>  |   |
|   | <p><b>34.</b> Pedestrian crossing subject to further safety assessment and traffic modelling.</p> |   |

- ### Legend

	**PLR Project works boundary		Palm Tree	*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.
	PLR disturbance footprint		Existing tree removed	
	Bus Interchange / Stop		Low planting and water sensitive urban design opportunity	**Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.
	Pavement		Potential outdoor dining zone	
	Tree		Marked pedestrian crossing	
	Existing tree retained		Point Control Box	
	Landmark Tree			





## 2.1.5 STOP LAYOUTS

### WESTMEAD TERMINUS

Interchange with heavy rail and bus.  
Side platform stop configuration.

The Westmead Light Rail Terminus is located north of the Westmead Railway Station, and east of the intersection on Railway Parade and Hawkesbury Road, opposite WSU on Hawkesbury Road. The Westmead stop is intended to service the T-Way bus stops on Darcy Road and the Westmead Railway Station on Railway Parade.

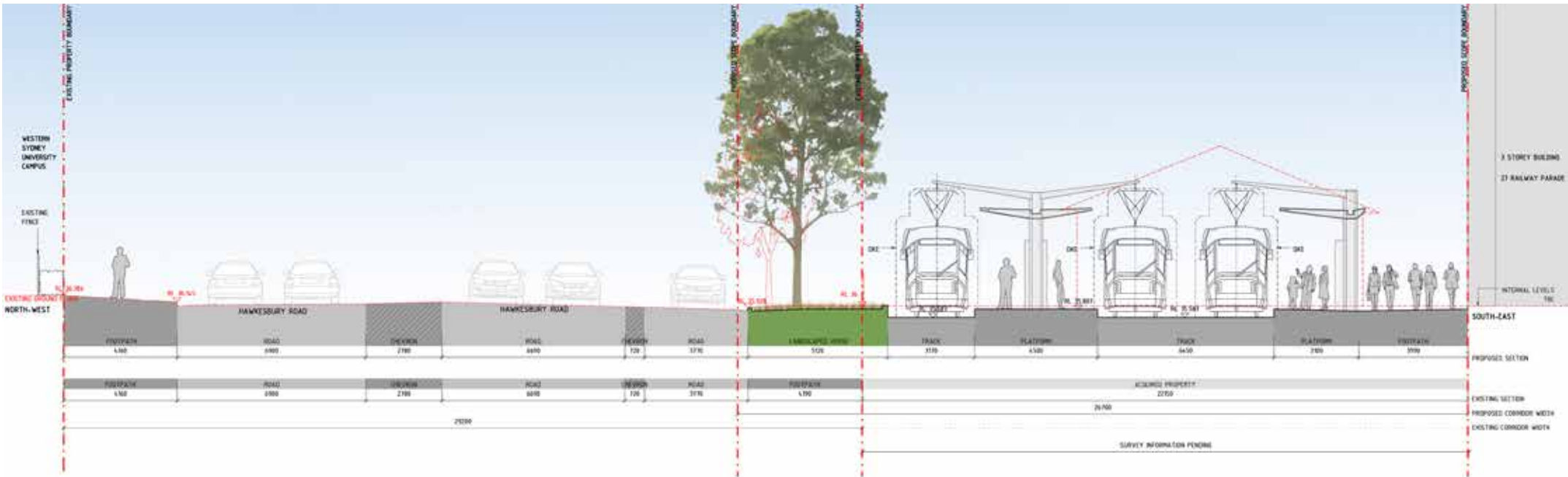
The terminus consists of three tracks, a side platform and one island platform. There is future potential for 27 Railway Parade to be developed with offsets to footpath widths. A large five-module canopy configuration is proposed in this location to assist with urban heat mitigation.

An upgrade of the northern footpath along Railway Parade from the terminus to Ashley Lane is proposed with appropriate footpath widening and street tree planting. A landscape buffer is maintained west of the terminus for increased amenity and pedestrian safety. The Westmead Stop will have driver facilities, bicycle parking and a traction power substation located at 149 Hawkesbury Road.



Westmead Terminus Plan

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Westmead Terminus CH 10020 - Section A-A  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M



## 2.1.5 STOP LAYOUTS

### WESTMEAD HOSPITAL STOP

#### Side Platform stop configuration.

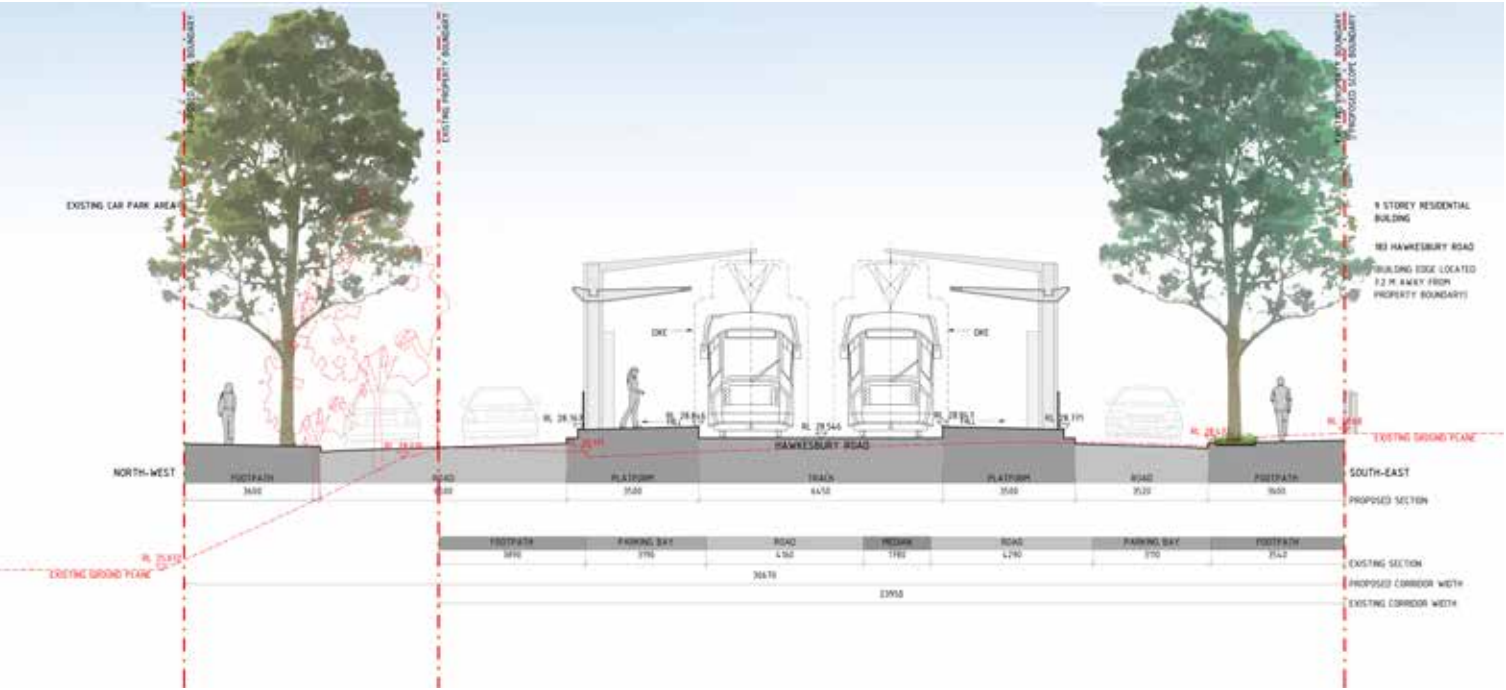
The Westmead Hospital stop is located on Hawkesbury Road between Helen and Caroline Street. There is one lane of through traffic and one turning lane between the light rail stop and the Hospital on the west, and one lane of southbound traffic on the east. The traffic lanes adjoining the stop require a barrier along the rear edge of the platform for pedestrian safety and vehicle crash protection. Access to the stop will be from either end of the platforms through walkways and walk-up spaces.

The crossing to the north opposite the hospital plaza is a staggered, unsignalled pedestrian crossing. The crossing at the southern end will be a signalised crossing. A five-module canopy configuration is proposed in this location to improve pedestrian amenity. The northern end of the platform proposes an extension to the medians on both sides with suitable, low maintenance planting.



Westmead Hospital Stop Plan

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Westmead Hospital Stop CH 10420 - Section B-B  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M



## 2.1.5 STOP LAYOUTS

### CHILDREN'S HOSPITAL AT WESTMEAD STOP

#### Island platform configuration.

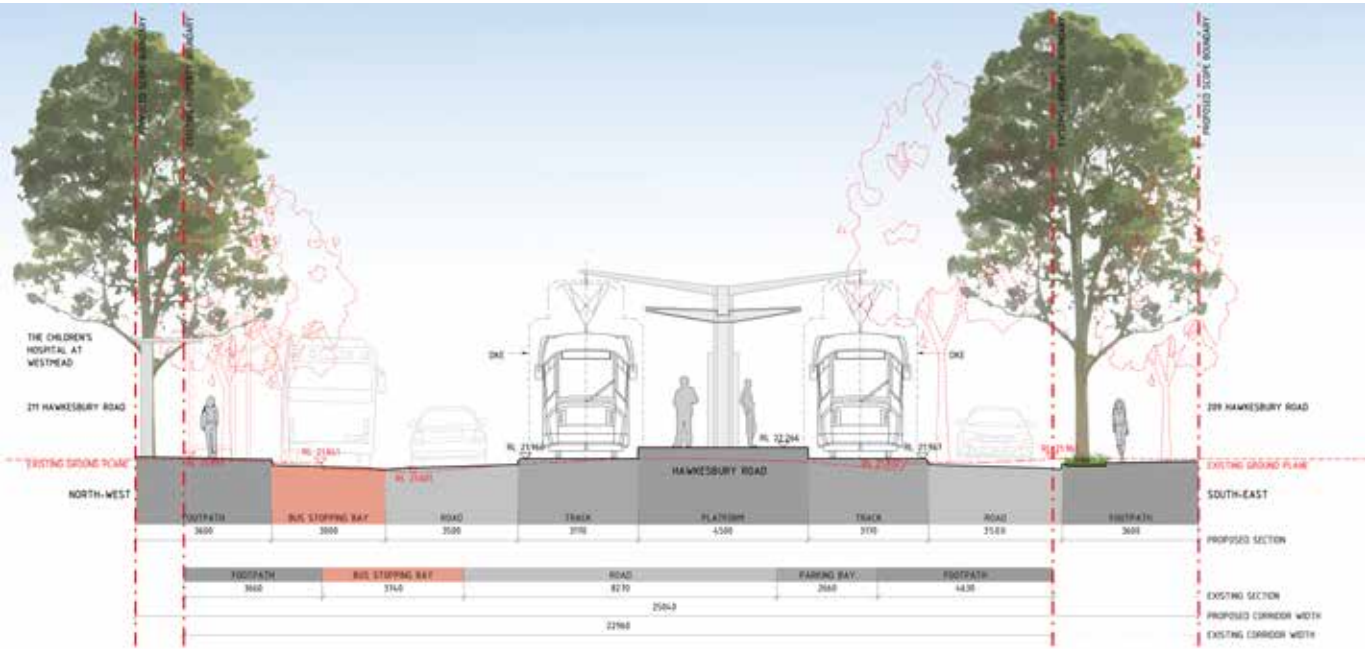
The Children's Hospital at Westmead Stop is located on Hawkesbury Road near the intersection of Hawkesbury Road and Hainsworth Street. The stop sits opposite the Children's Hospital at Westmead, between Jessie Street and Hainsworth Street. On the western side of the stop is the Children's Hospital at Westmead plaza. This stop is an island platform configuration. The cross section of the street at the stop, from east to west, has one traffic lane southbound, a rail corridor, platform, a traffic lane northbound and a bus bay on the west to facilitate the high pedestrian volumes of the hospital and Hawkesbury Road.

The northern end of the platform walkway provides primary access to and from the stop, with the signalised crossing tying in with the Children's Hospital at Westmead intersection. Further investigation into the straightened crossing is subject to traffic modelling and safety assessment. There is no access to the southern end of the platform in compliance with RMS requirements. A balustrade has been provided at this end for pedestrian safety. The platform consists of a five-module canopy to assist with urban heat mitigation. The southern end of the platform includes an extension to the median with suitable, low maintenance planting to provide greening to the street.



Children's Hospital at Westmead

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Children's Hospital at Westmead CH 10720 - Section E-E  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M




# 2.1.6 TYPICAL STREET CHARACTER

## CORRIDOR SECTIONS

- 01 Section C-C between Caroline Street and Helen Street.
- 02 Section D-D adjacent to Westmead Institute for Medical Research.

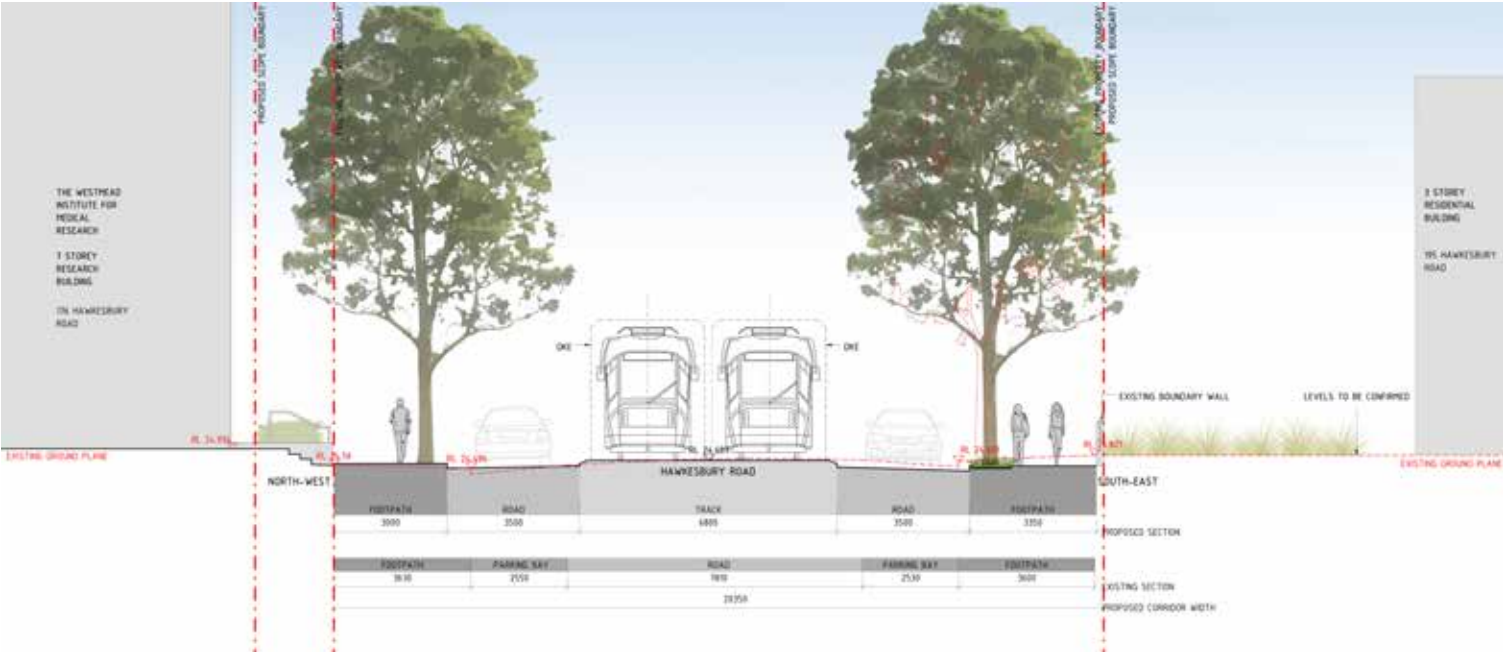
Legend



Existing Tree  
NOTE: All other trees shown are proposed trees



01 Typical cross section - Hawkesbury Road CH 10470 - Corridor Section C-C  
\*Refer to the Engineering drawings for information on levels



02 Typical cross section - Hawkesbury Road CH 10580 - Corridor Section D-D  
\*Refer to the Engineering drawings for information on levels  
\* Potential road fencing around crossing subject to RMS requirements. Fencing design / appearance to be approved by TfNSW.



## 2.1.7 LANDSCAPE TYPICAL ARRANGEMENT

### Hawkesbury Road plan

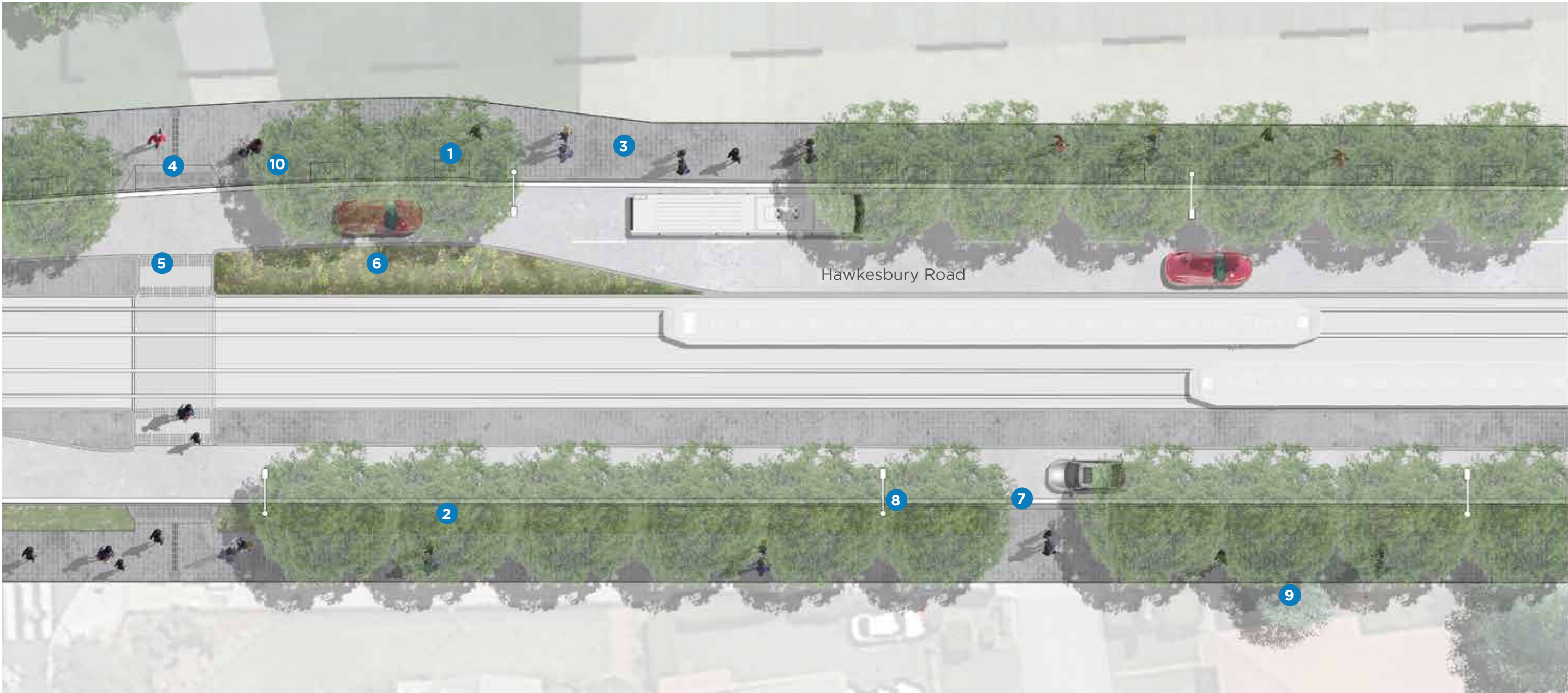
- 1. Street trees with bound aggregate tree pit finish.
- 2. Low planting strip at back of kerb on eastern side of street to improve appearance of street and manage stormwater runoff.

- 3. Granite flagstone paving on footpaths.
- 4. Granite paved pram ramps and tactile ground surface indicators to improve safety.
- 5. Bicycle and pedestrian crossing with safety refuges. Median

- 6. Low planting. WSUD opportunity in medians and adjacent to stops.
- 7. Concrete kerbs. Kerb laybacks provided at existing driveways.

- 8. Street lighting / multi function poles.
- 9. Existing trees on private property. Retain and protect during works.

- 10. Potential road fencing around crossing subject to RMS requirements. Fencing design / appearance to be approved by TfNSW.



1:250 @A3 0 2 5 10M



## 2.1.8 VISUALISATION - WESTMEAD TERMINUS



Artists impression. Images are indicative and do not show drainage, operational and other infrastructure.



“ A considered transport intervention that integrates with the heritage fabric and landscape character of the precinct, prioritises pedestrian experience, and provides a new public transport option for the emerging community. ”

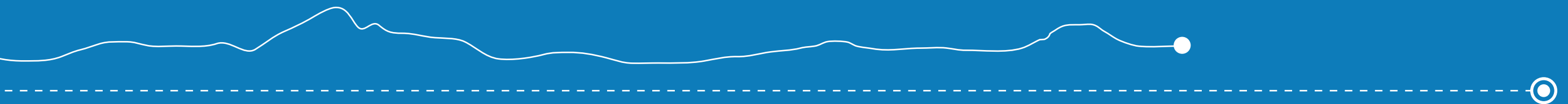


## 2.0 PRECINCT & CORRIDOR WIDE DESIGN

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# 2.2 PARRAMATTA NORTH

### **PARRAMATTA LIGHT RAIL** URBAN DESIGN REQUIREMENTS





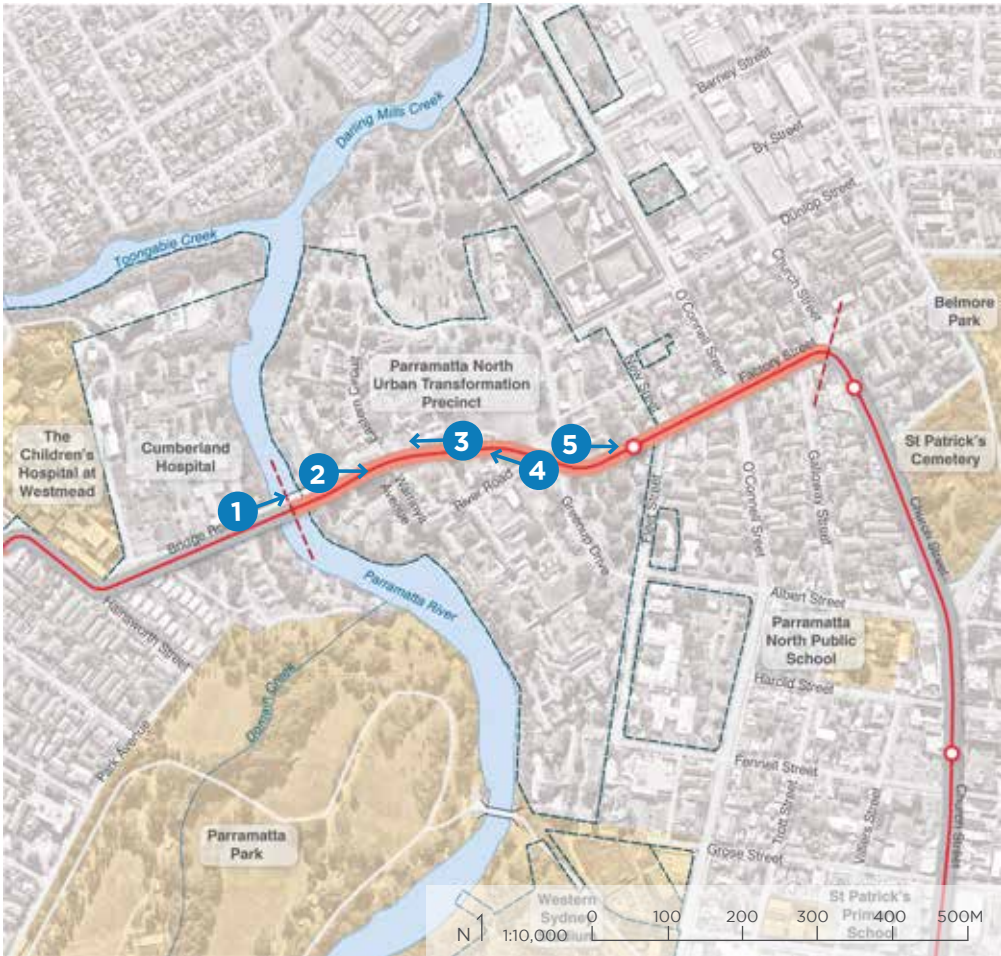
## 2.2.1 PRECINCT OVERVIEW

The Parramatta North precinct continues on from the Parramatta River, through the former Cumberland Hospital East Campus and Parramatta North Urban Transformation Area to Church Street, North Parramatta.

### EXISTING CHARACTER

The Parramatta North precinct includes part of the former Cumberland Hospital East Campus and part of Factory Street, a residential street lined with three-storey apartment buildings. The Parramatta North Urban Transformation (PNUT) site is within a sensitive landscape setting bounded by the Parramatta River. The PNUT site is heritage listed (local and state) and contains many heritage buildings and mature trees. Notable buildings include the Parramatta Female Factory which is the earliest surviving example of a female reformatory in Australia dating back to 1818 and was listed as a nationally significant heritage site in November 2017.

The site is subject to master planning by UrbanGrowth NSW, who envision a mixed-use precinct including adaptive re-use of many heritage buildings and the construction of residential apartments. A development application by UrbanGrowth NSW for roads and subdivision has been submitted to the City of Parramatta.



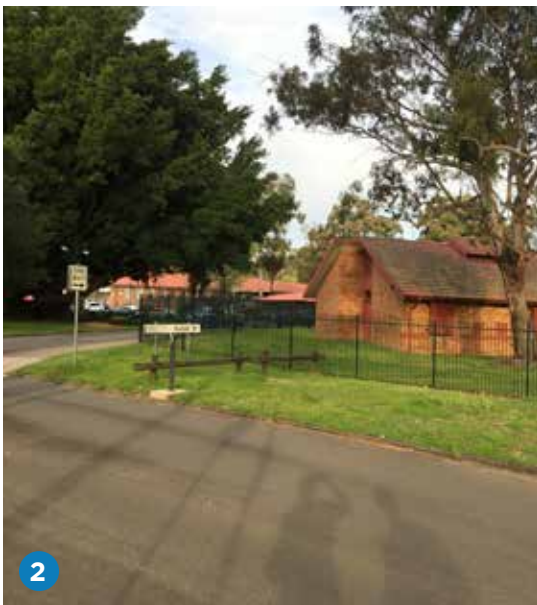
05 Looking east across the existing car park and open space with the heritage-listed former Nurses' Home in the distance.



04 Looking west from the Eastern Circuit loop at the heritage-listed former Dining Hall.



01 Looking east along the existing vehicular and pedestrian bridge towards Cumberland Hospital.



02 Looking east along Bridge Road towards the Bunya Complex.



03 Looking west from the Eastern Circuit loop.

Legend

Parramatta North Precinct

Waterways

Key Places

Development Sites

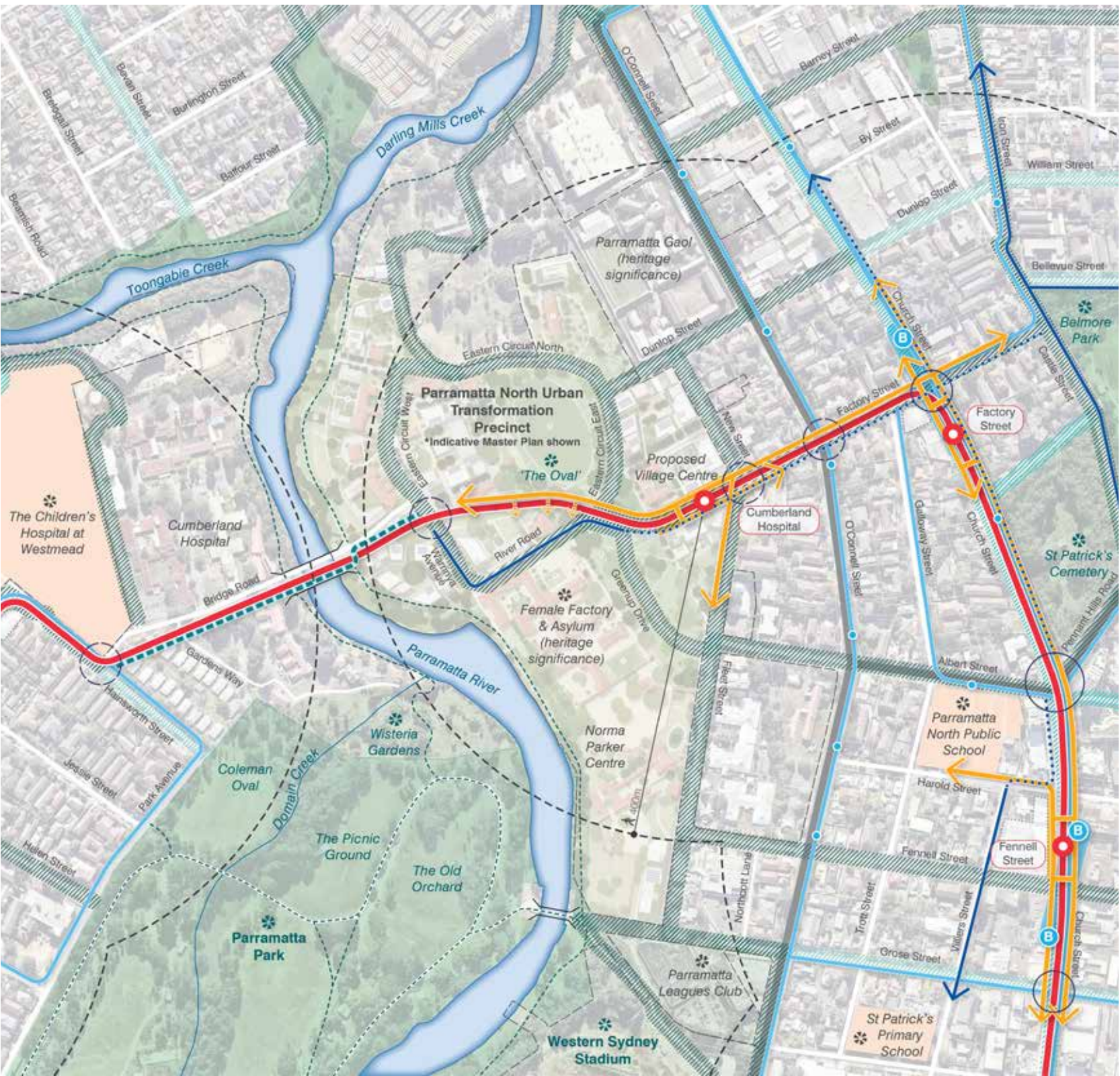


## 2.2.2 LAND USE, ACCESS AND CIRCULATION

The light rail provides a new public transport and ATL across the Parramatta River between Westmead and the heritage listed PNUT Precinct. The Cumberland Hospital Stop at PNUT will service the planned population, the new village centre and associated recreational and riverside spaces along with existing local residents. A new tree lined urban plaza will cater for light rail, pedestrian and cycle movement at the village centre with convenient access to the light rail stop. The light rail and ATL allows pedestrians and cyclists to access recreational areas around Parramatta along the corridor to Westmead.

The light rail route through the PNUT site is identified in the Parramatta Ways Green Grid (prepared by the NSW Government Architects Office and City of Parramatta Council) as a 'Major Route' suggesting a strong desire for improved pedestrian facilities, including "large shade tree planting" and active transport.

Where the light rail route adjoins historic structures and open space, the track-form and high-quality pedestrian pathways will be sensitively integrated into the heritage landscape. Where controlled intersections are required to safely accommodate future vehicle and light rail operation, intersection size and infrastructure will be minimised to ensure an appropriate relationship to retained heritage buildings and formal open spaces.





## 2.2.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES

The Parramatta Light Rail urban design strategy is to respect, reinforce and integrate into the natural open, vegetated landscape and built heritage of the precinct of Parramatta North, while providing a catalyst for sustainable growth close to the CBD. The Cumberland Hospital stop is located in the proposed village centre and public plaza on Factory Street. The village centre will incorporate retail and residential frontages to define the corridor bringing with it an increase in density to reinforce precinct activation.

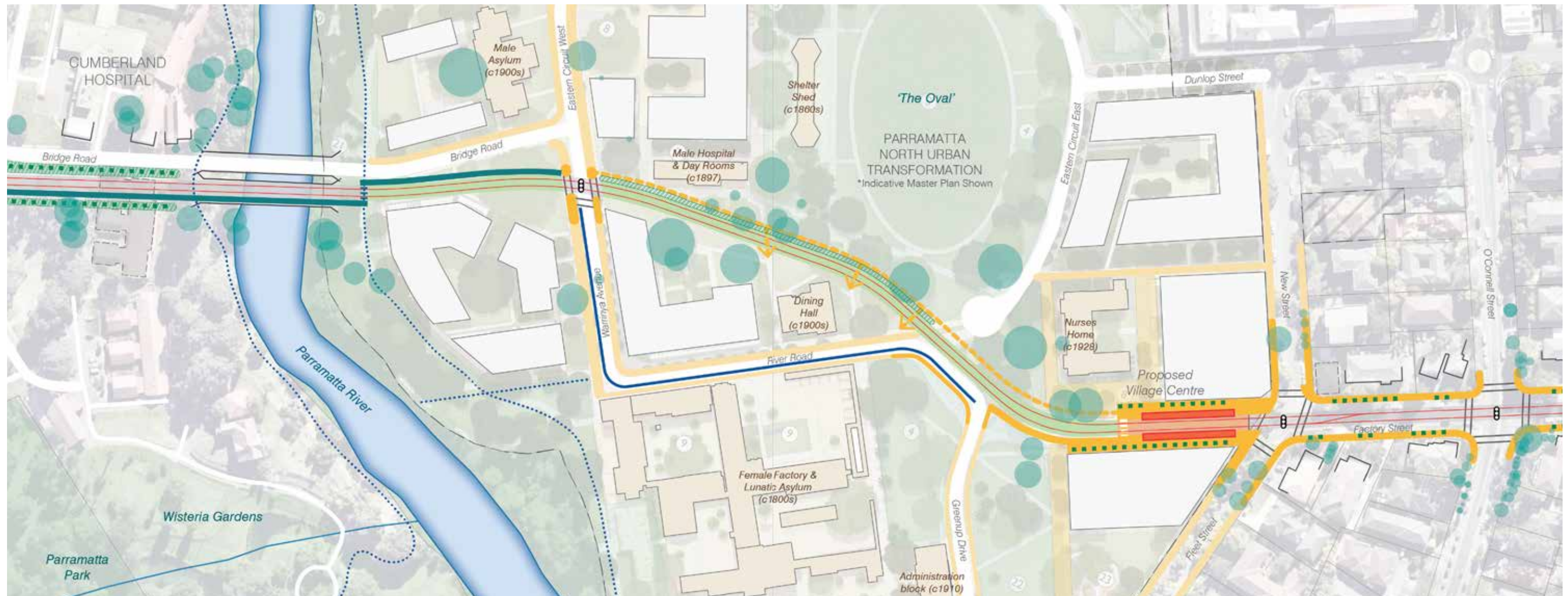
The Parramatta Light Rail urban and landscape design will consider the heritage values, principles and public domain materials outlined in UrbanGrowth NSW's Urban Design and Landscape Report and the PNUT DCP. The design will also respond to the Canopy Replenishment Strategy for PNUT. This approach will include retaining significant existing landscapes, historic view lines and replanting to address unavoidable impacts on historically significant trees.

### Pedestrian amenity

- Prioritise pedestrians and support new connections and pedestrian paths as part of the future PNUT site.
- Locate the light rail stop to reinforce the new local village centre.
- Pedestrian cross connections will complement the historic structure and form a seamless part of the pedestrian circulation network.
- Provide public domain that integrates with current and future ground floor uses at light rail stop
- Provide seamless finishes with the urban fabric to minimise the impact of the light rail.
- Promote a decluttered environment and good permeability for pedestrians.

### Transport

- Integrate light rail within the existing cultural, heritage and landscape setting of Parramatta North.
- Incorporate wire-free and green tracks through the PNUT site.
- Design road and drainage infrastructure to sensitively respond to the historic context and cultural landscape.
- Provide an integrated public domain design connecting Factory Street retail / commercial ground floor uses and the light rail stop.
- Create a bridge crossing that minimises visual impacts and damage to river vegetation and ecological communities.
- Support future growth within the PNUT area through a well-designed and integrated light rail service.
- Provide a convenient light rail connection for the new community to Parramatta CBD and Westmead and other transport modes.





### 2.2.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES

Active Transport

- Provide ATL to Warringya Avenue and cycle parking at the light rail stop to encourage modal shift.
- Provide pedestrian and cycle links to the cycle path proposed by both City of Parramatta and UrbanGrowth NSW along the eastern bank of the Parramatta River.
- Facilitate pedestrian and bicycle movement along the southern side of Bridge Road, the northern side of Factory Street, the eastern side of Church Street

Landscape

- Maintain the existing open, vegetated character of the PNUT precinct.
- Retain existing mature trees where possible and celebrate heritage landscapes.
- Preserve and protect sensitive vegetation along the river banks.
- Use planting to minimise conflicts between pedestrians / cyclists and light rail.
- Plant large canopy street trees\* to complement existing trees.
- Coordinate utilities and services to maximise landscape and street tree planting.
- Use low planting on Factory Street to soften the street and reduce stormwater runoff.
- Transition materials and finishes sensitively within the public domain of PNUT.





## 2.2.4 CORRIDOR AND PUBLIC DOMAIN DESIGN

The following corridor and public domain design plans indicate the Project requirements for the Parramatta North precinct.

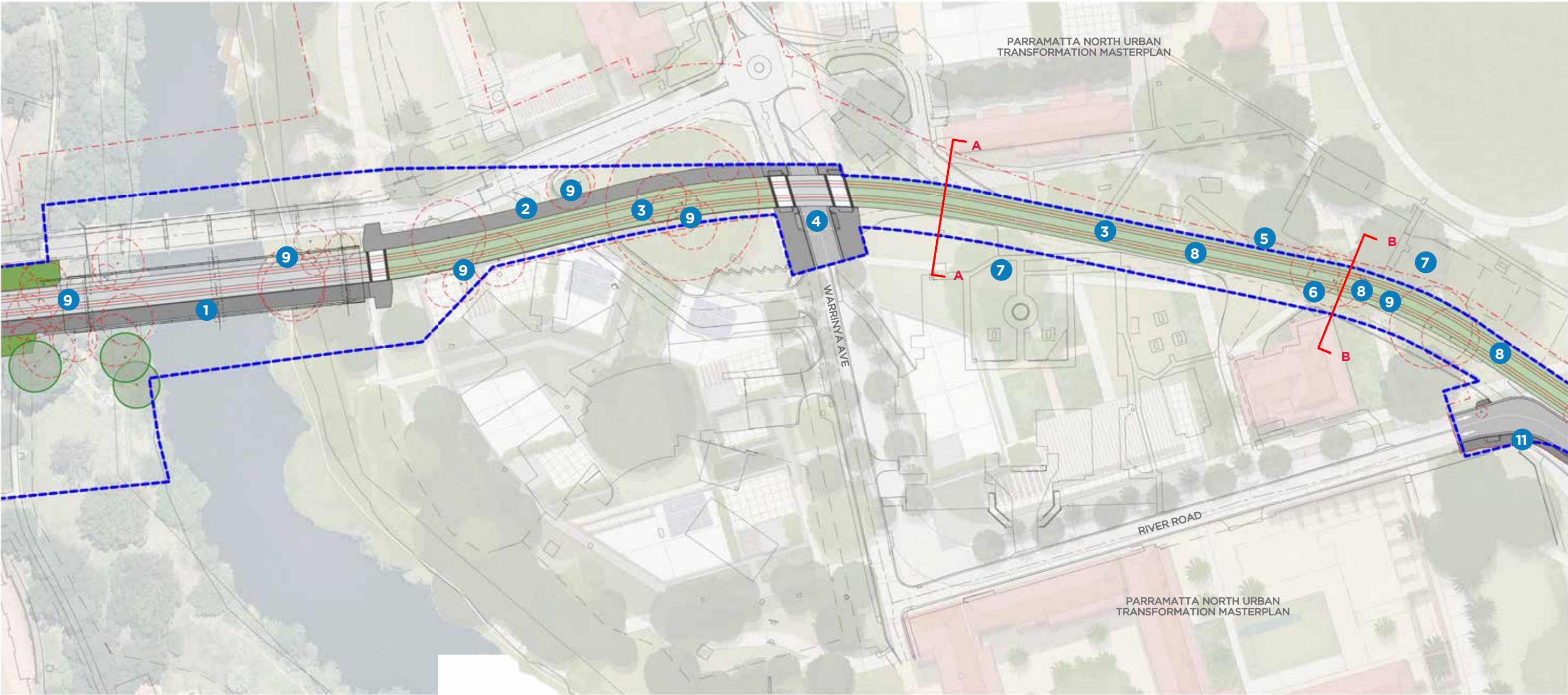
The plans should be read in conjunction with the sections and stop plans, as well as chapters 1 and 3.

- 1. ATL on south side of bridge. Concrete finish.
- 2. ATL.
- 3. Green track.
- 4. Intersection design to match proposed UrbanGrowth NSW layout.

- 5. Direct pathway between village centre and Warringa Avenue / planting / fencing. Subject to further safety and operational review to determine feasibility of removing fence by others.

- 6. Design of ATL between Greenup Drive at Warringa Avenue is under development by UrbanGrowth NSW in consultation with PLR and City of Parramatta Council.
- 7. Retain and protect existing trees adjacent to corridor.

- 8. Pedestrian crossings over track between Greenup Drive and Warringa Avenue. Final locations to be determined.
- 9. Remove existing trees.
- 10. Pram ramps and tactile indicators at crossing.















Parramatta North scope boundary to be finalised at detailed design stage.



- |  |  |   |  |
|--|--|---|--|
| <p><b>11.</b> Footpath.</p> <p><b>12.</b> Stone paving selection subject to detail design and consultation with UrbanGrowth NSW and Parramatta City Council.</p> <p><b>13.</b> Cumberland Hospital stop. Refer to Stop Plan on page 48 of this document.</p> | <p><b>14.</b> Unsignalised pedestrian crossing with kerb ramps and tactile indicators.</p> <p><b>15.</b> Future public space by others.</p> <p><b>16.</b> Tie new footpaths into existing.</p> <p><b>17.</b> Opportunity to retain and protect two existing Fig trees.</p> | <p><b>18.</b> Street tree planting*, seats, bin and lighting. Selections consistent with PNUT Draft Development Control Plan.</p> <p><b>19.</b> Concrete pavements on New, Fleet, O'Connell and Galloway Streets.</p> | <p><b>20.</b> Street trees.</p> <p><b>21.</b> Tie in works with off-corridor works.</p> <p><b>22.</b> Strip of low planting between back of kerb and footpath.</p> |
|--|--|---|--|

### Legend

	**PLR Project works boundary		Palm Tree	*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.
	PLR disturbance footprint		Existing tree removed	
	Bus Interchange / Stop		Low planting and water sensitive urban design opportunity	**Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.
	Pavement		Potential outdoor dining zone	
	Tree		Marked pedestrian crossing	
	Existing tree retained		Point Control Box	
	Landmark Tree			



Parramatta North scope boundary to be finalised at detailed design stage.

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0 10 20 30 40 50M



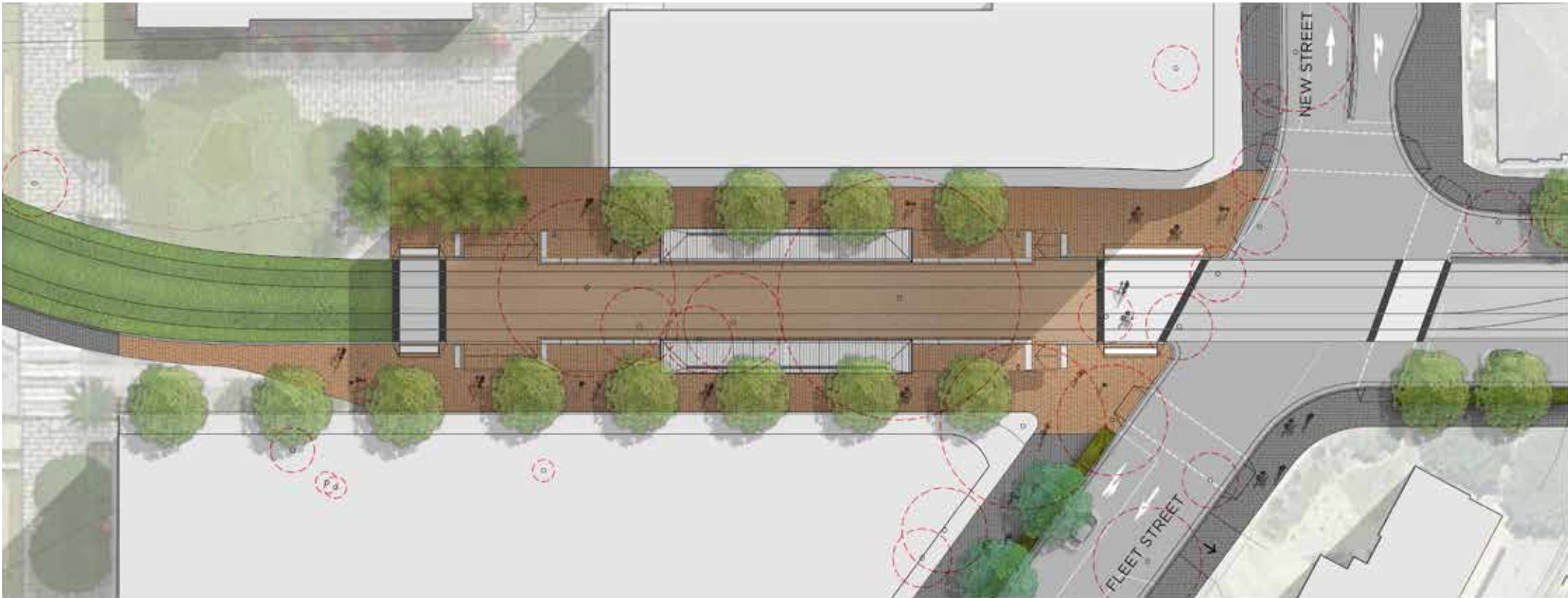
## 2.2.5 STOP LAYOUTS

### CUMBERLAND HOSPITAL STOP

#### Side platform configuration.

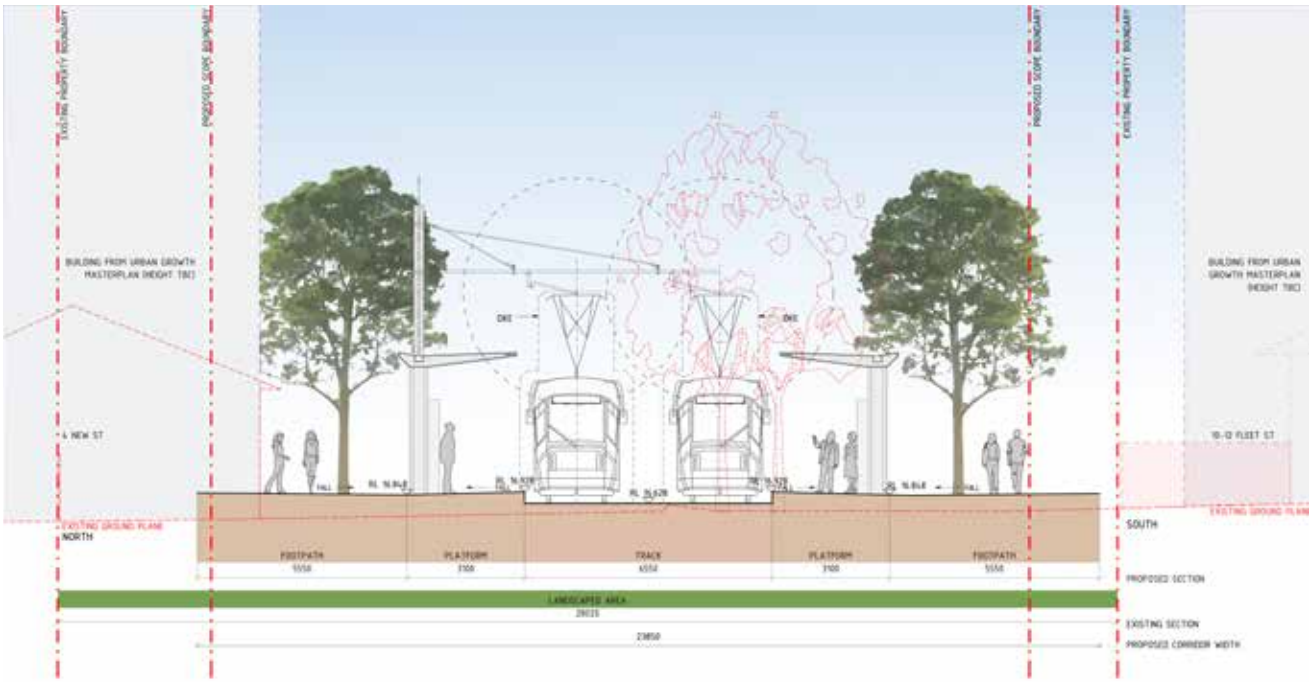
The stop is located within the PNUT Precinct at Factory Street. The stop is central to the future local village centre. This arrangement will provide connectivity with local services and the proposed retail / commercial plaza.

Cumberland Hospital Stop consists of a side platform in a pedestrianised centre. Access to the stop is from either ends of the platform. To the east is a signalised crossing that ties in with the New Street and Fleet Street intersection. To the west, is an un-signalised pedestrian crossing. The platform consists of a three-module canopy, subject to patronage numbers. The stop includes overhead wire poles between the two tracks. The platform finish is level with the surrounding footpath area, to provide a seamless integration with the public domain. It is proposed to be stone paving to match the requirements as outlined in the draft Urban Design and Landscape report for the site.



Cumberland Hospital Stop Plan

1:500 @A3 0 5 10 15 20 25M



\*Typical cross section - Cumberland Hospital Stop CH 11660 - Section C-C  
Parramatta North scope boundary to be finalised at detailed design stage  
\*Refer to the Engineering drawings for information on levels

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## 2.2.6 TYPICAL STREET CHARACTER

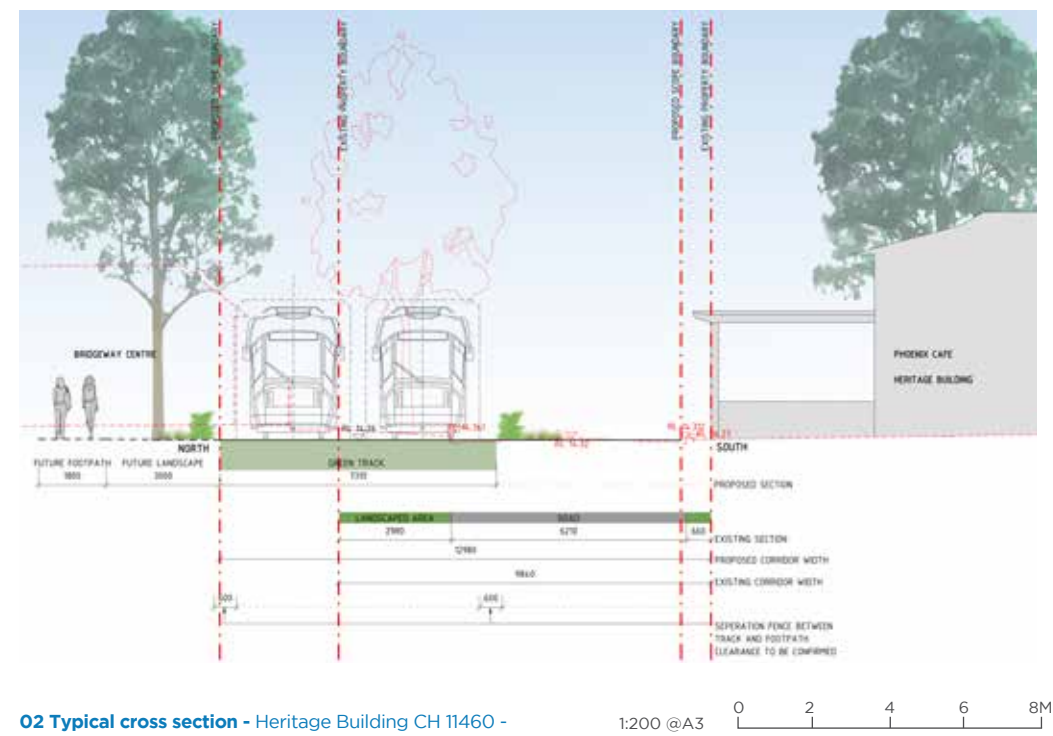
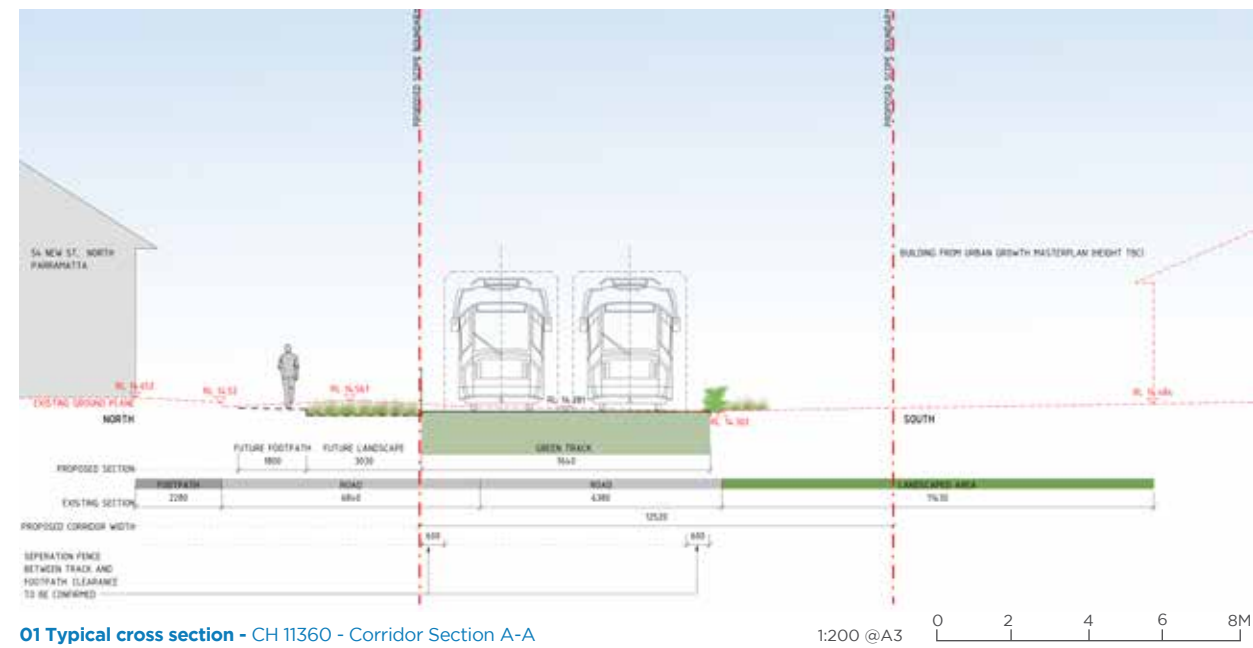
### CORRIDOR SECTIONS

- 01 Section A-A adjacent to heritage building between Warrinya Avenue and River Road.
- 02 Section B-B adjacent to Phoenix cafe heritage building.

Legend



Existing Tree  
NOTE: All other trees shown are proposed trees





# 2.2.7 LANDSCAPE TYPICAL ARRANGEMENT

**Parramatta North plan**

1. Existing Phoenix Cafe building. Clear access retained.

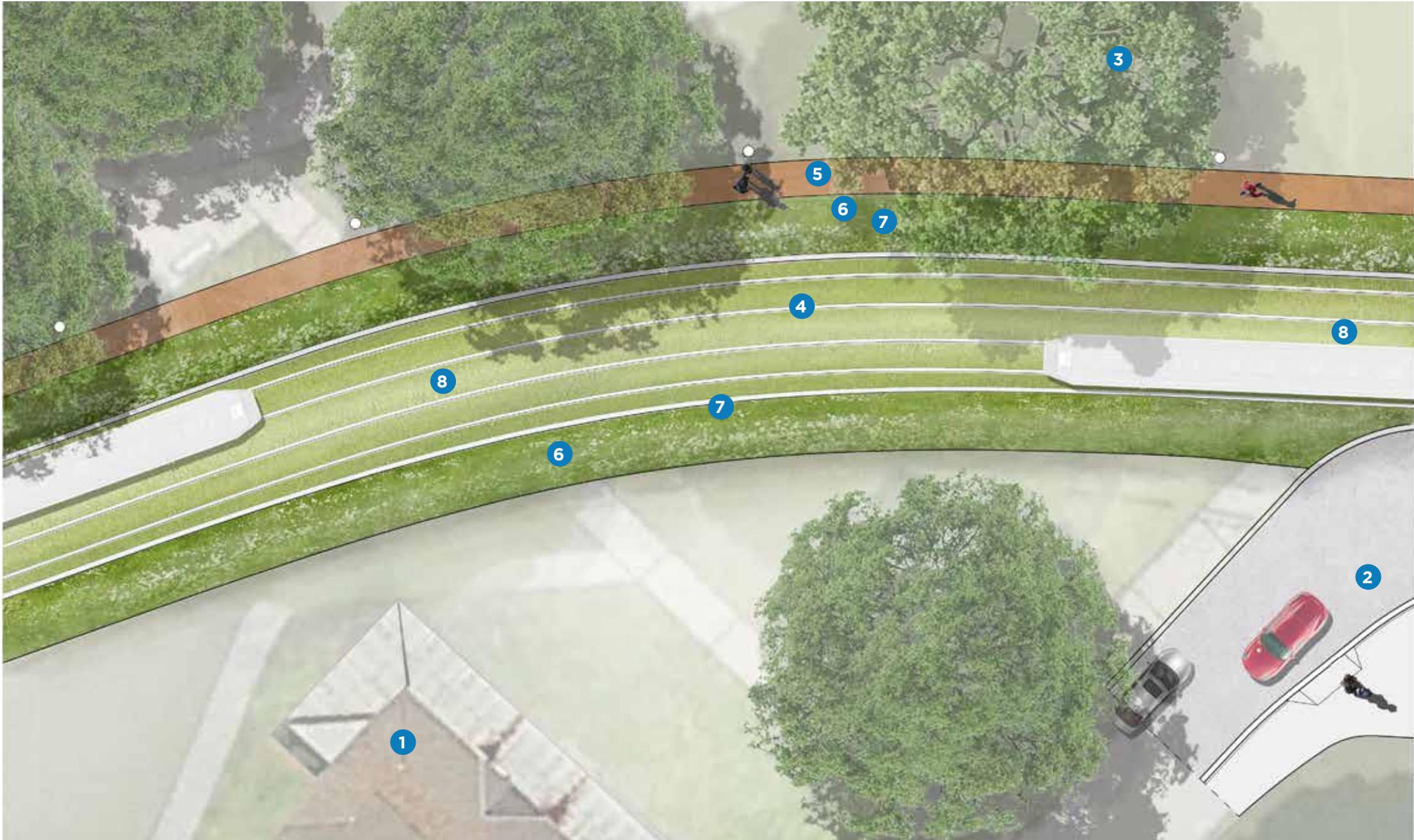
2. Street and footpath works to River Road.

3. Existing trees retained and protected during works.
4. Green track. Wire-free.

5. Pedestrian path linking Factory Street and Bridge Road. Final location and material subject to stakeholder discussions.
6. Planting beds separating path and pedestrians from light rail track. Planting to provide clear sightlines. Species to be determined following stakeholder discussions.

7. Potential fencing, subject to safety assessment.

8. Pedestrian crossings over track between Greenup Drive and Warrinya Avenue. Final locations to be determined.



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“ A tree lined northern entry into the Parramatta CBD which prioritises light rail, bus interchange, pedestrian and cycle amenity; and responds to important existing nodes which define the character of place. ”

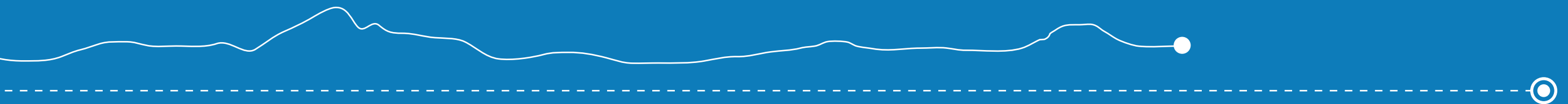


## 2.0 PRECINCT & CORRIDOR WIDE DESIGN

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# 2.3 CHURCH STREET NORTH

### **PARRAMATTA LIGHT RAIL** URBAN DESIGN REQUIREMENTS





# 2.3.1 PRECINCT OVERVIEW

The precinct extends along Church Street from Factory Street to Victoria Road.

## EXISTING CHARACTER

This section of Church Street is busy with traffic moving between the CBD, Pennant Hills Road and the Cumberland Highway. There are several large intersections, two accommodating up to six lanes of traffic. As a result, footpaths are narrow, pedestrian amenity is poor and retail frontages are compromised. The streetscape is a haphazard mix of building types and size, irregular footpaths, building alignments and sporadic street tree planting.

There are two heritage items, the Royal Oak Hotel on the corner of Ross Street and St Patrick's Cemetery at the junction of Pennant Hills Road. The densely-vegetated cemetery is a significant landscape feature of Church Street.

The City of Parramatta is currently planning to extend the commercial core of the CBD north, along the Church Street corridor. This will likely see a much higher density of commercial, retail and residential uses.

As a result there will be an increase the demand for a high quality public domain connecting pedestrians with transport and services and around the CBD. A key challenge for this corridor is balancing the demands of traffic movements with providing sufficient provision for high quality streetscape.



05 Looking south at the intersection of Church Street and Victoria Road towards Prince Alfred Square.



04 Looking north along Church Street towards the heritage-listed Royal Oak Hotel.



03 Looking south along Church Street between Harold Street and Sorrell Street.



01 Looking south along Church Street towards St Patrick's Cemetery on the east.



02 Looking south at the intersection of Church Street, Pennant Hills Road and Albert Street.

Legend

Church Street North Precinct

Waterways

Key Places

Development Sites



### 2.3.2 LAND USE, ACCESS AND CIRCULATION

The introduction of light rail in Church Street North will provide a public transport corridor with capacity for future urban intensification as the Parramatta CBD expands north. The light rail will provide the framework to create a continuous, legible streetscape with consistent footpath and building alignments that sensitively responds to the heritage landscape and buildings.

Coordinated light rail and bus interchanges will reduce the need for some vehicle lanes, and allow for high quality public domain improvements along the residential and enterprise corridor.

Church Street North will be transformed into a tree-lined street with wide footpaths and a portion of shared to reinforce the role of Church Street North as the northern entry to Parramatta CBD.





## 2.3.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES

The light rail along Church Street will support City of Parramatta's vision to extend the Parramatta CBD into North Parramatta through provision of a high quality public domain, improved pedestrian amenity and transport choice.

The Urban Design Strategy for this area is to build on, and improve the existing character of Church Street North. To provide quality and amenity that is required of a future expanding CBD. Interchanges with bus services will ensure a smooth transition between modes servicing the northern suburbs. Street tree plantings will connect the strong cultural landscapes of St Patrick's Cemetery and Prince Alfred Square, and improve pedestrian comfort and amenity within the public domain.

### Pedestrian amenity

- Reinforce Church Street as the northern gateway into Parramatta CBD.
- Coordinate with Council to create a continuous, legible, high-quality streetscape with consistent footpath and building alignments, where possible.
- Recognise the extension of the CBD northwards by adopting Council's palette of public domain materials and street furniture.

- Create a pedestrian friendly street with generous footpaths and public spaces.
- Maximise pedestrian safety and amenity by widening crossings and locating crossings to correspond with light rail stops and bus interchanges.
- Improve pedestrian amenity and walkability by reducing traffic movement to and from secondary streets, and re-designating this spaces for passive recreational use

- Create a consistent street profile where possible that builds from existing elements in the streetscape such as St Patrick's Cemetery.
- Visually extend, clarify and define historic Prince Alfred Square.
- Promote a decluttered public domain environment with good sightlines.

### Transport

- Design Church Street North as a pedestrian, cycle and public transport corridor with capacity for future urban intensification and uplift.
- Maintain proximity between bus and light rail stops to facilitate modal interchange.
- Design a light rail alignment that remains as consistent as possible along Church Street.





### 2.3.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES



- Future proof a northern light rail extension at the Factory Street Stop.

**Active transport**

- Promote active transport by establishing a link along the Church Street corridor between Villiers Street and Factory Street.

**Landscape**

- Preserve the mature tree plantings inside St Patrick’s Cemetery to maintain the green amenity and character of Church Street.
- Plant new, mature trees where possible to create a tree-lined street, to highlight the importance of Church Street North as an extension of the CBD.

- Reinforce the green link between St Patrick’s Cemetery, Prince Alfred Square and Parramatta River with verge planting and street trees.
- Select tree species that will provide high levels of shade to improve pedestrian amenity and of a proportion appropriate to proposed scale of the street.
- Introduce WSUD into verges where appropriate.

**Legend**

Parramatta Light Rail / Stop	Pedestrian Zebra Crossing	Development Sites
Bus Interchange / Stop	On Road Separated Cycleway (by others)	Existing Buildings
Plaza/Footpath Upgrade	Shared Cycle Route (by others)	Key Heritage Items
Enhanced Track Finish	Tree Planting	Acquired Site/Future Development Site
Plaza/Footpaths (by others)	Understorey Planting	
Threshold Treatment (On Road)	Landmark Tree	
Signalised Pedestrian Crossing	Existing Retained Trees	
Unsignalised PLR Pedestrian Crossing	Public / Private Green Open Space	

*\*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.*

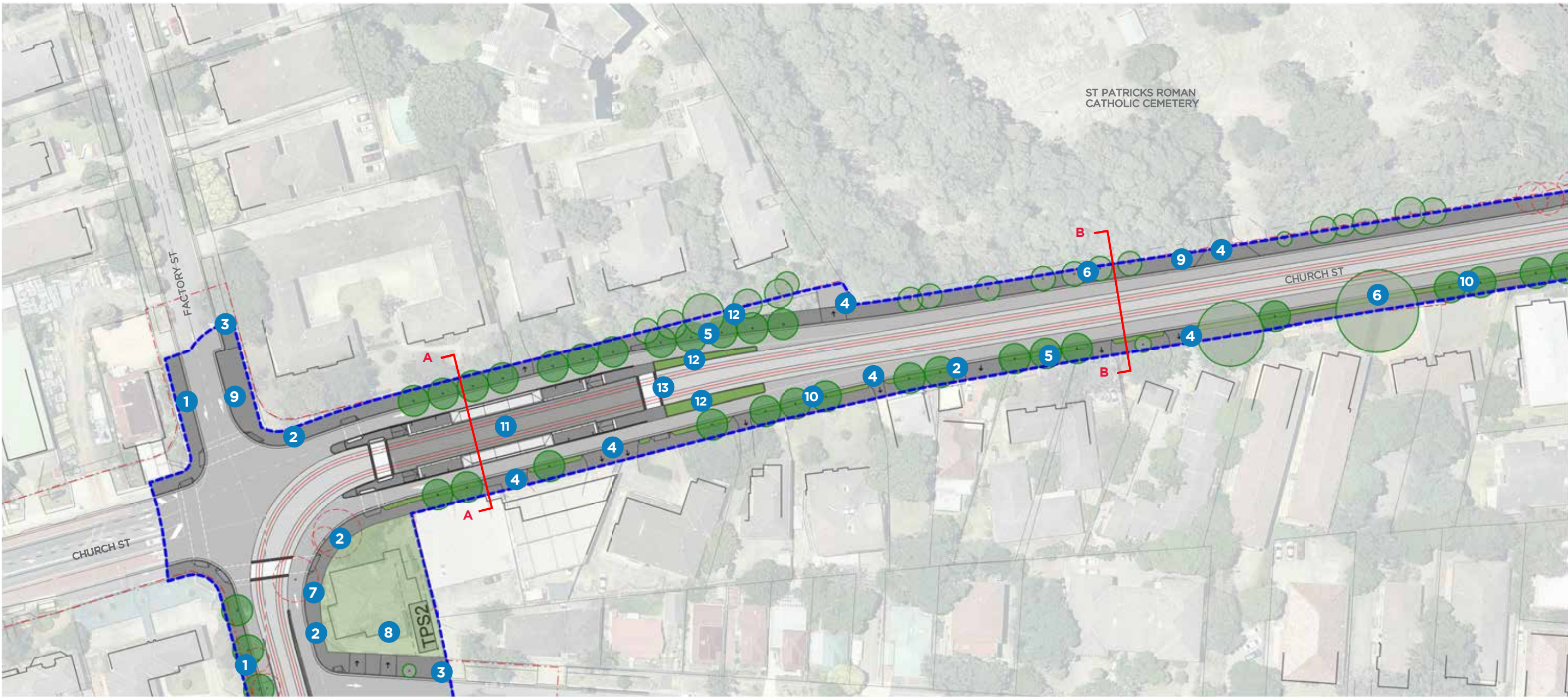


## 2.3.4 CORRIDOR AND PUBLIC DOMAIN DESIGN

The following Corridor and Public Domain Design plans indicate the project requirements for the Church Street North precinct.

The plans should be read in conjunction with the sections and stop plans, as well as Chapters 1 and 3.

- 1. In situ concrete footpaths on Factory Street (north side) and Galloway Street.
- 2. Concrete unit paved footpaths north of Pennant Hills Road.
- 3. Tie in new footpaths to existing.
- 4. Driveway cross-overs to be at footpath level and paved in footpath material.
- 5. Street tree planting\*.
- 6. Existing trees retained and protected, where possible.
- 7. Existing trees removed.
- 8. TPS2 Substation site and opportunity for planting.
- 9. Retain and protect historic Cemetery latch gate, sandstone piers, palisade fence / gates at vehicle entry and post and rail fence. Retain and protect existing trees where possible. Sandstone kerb adjacent to Cemetery.
- 10. Strip of low planting between back of kerb and footpath.
- 11. Factory Street stop. Refer to Stop Plan on p61 of this document.
- 12. Low planting with WSUD opportunity.
















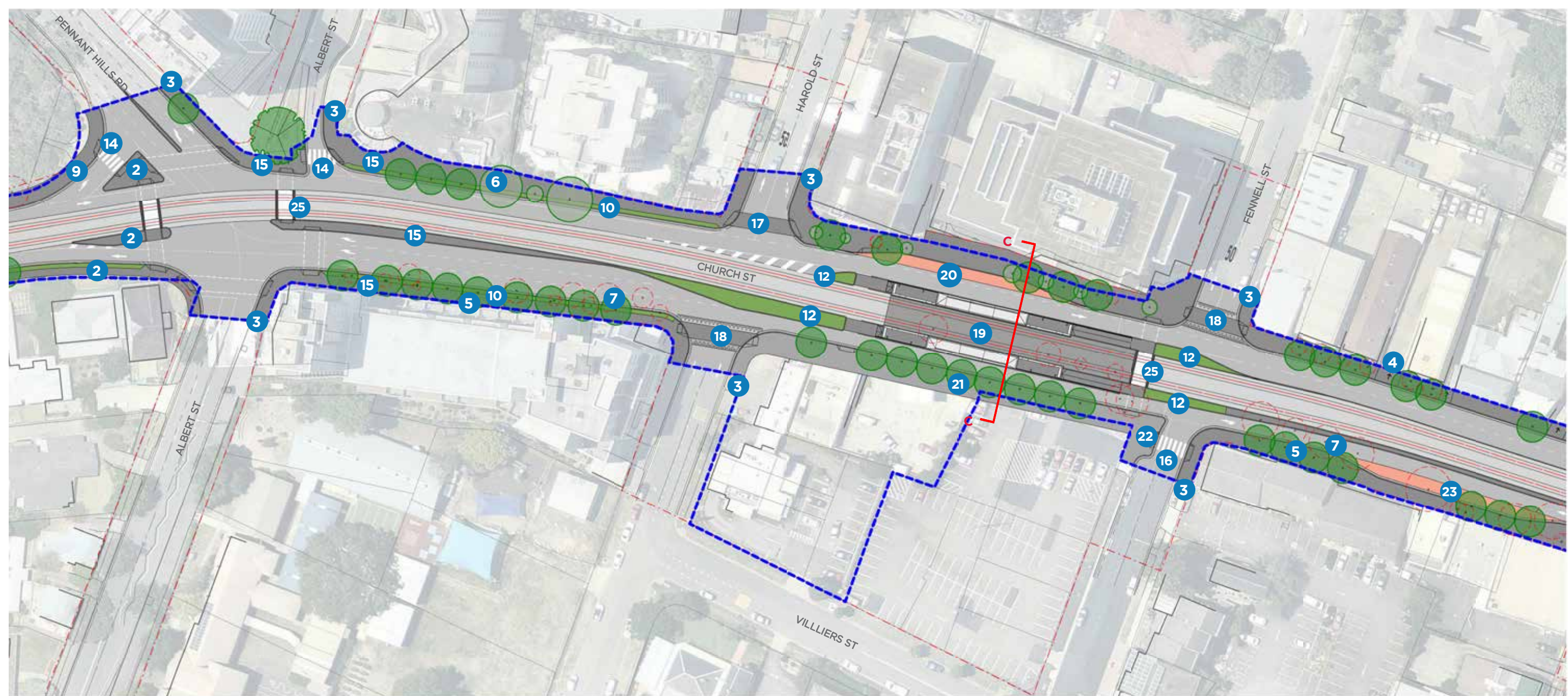


<p><b>13.</b> Unsignalised pedestrian crossing with kerb ramps and tactile indicators.</p> <p><b>14.</b> Existing marked pedestrian crossing.</p> <p><b>15.</b> Granite flagstone paving, kerbs and medians south of Pennant Hills Road.</p>	<p><b>16.</b> Marked pedestrian crossing, subject to traffic warrant and pedestrian warrant.</p> <p><b>17.</b> At-grade threshold treatment at intersection with granite paving, pram ramps and tactile indicators.</p>	<p><b>18.</b> Raised threshold treatment at intersection with granite paving and tactile indicators. Subject to drainage and flooding feasibility assessment during the detail design phase.</p> <p><b>19.</b> Fennell Street stop. Refer to Stop Plan on p62 of this document.</p>	<p><b>20.</b> Bus bay.</p> <p><b>21.</b> Widened footpath to accommodate pedestrian flows adjacent to stop.</p> <p><b>22.</b> Kerb build out / widened footpath.</p> <p><b>23.</b> Retain existing bus stop location.</p>
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- |  |   |   |   |
|--|---|---|---|
| <p><b>13.</b> Unsignalised pedestrian crossing with kerb ramps and tactile indicators.</p> <p><b>14.</b> Existing marked pedestrian crossing.</p> <p><b>15.</b> Granite flagstone paving, kerbs and medians south of Pennant Hills Road.</p> | <p><b>16.</b> Marked pedestrian crossing, subject to traffic warrant and pedestrian warrant.</p> <p><b>17.</b> At-grade threshold treatment at intersection with granite paving, pram ramps and tactile indicators.</p> | <p><b>18.</b> Raised threshold treatment at intersection with granite paving and tactile indicators. Subject to drainage and flooding feasibility assessment during the detail design phase.</p> <p><b>19.</b> Fennell Street stop. Refer to Stop Plan on p62 of this document.</p> | <p><b>20.</b> Bus bay.</p> <p><b>21.</b> Widened footpath to accommodate pedestrian flows adjacent to stop.</p> <p><b>22.</b> Kerb build out / widened footpath.</p> <p><b>23.</b> Retain existing bus stop location.</p> |
|--|---|---|---|

### Legend

	**PLR Project works boundary		Palm Tree	*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.
	PLR disturbance footprint		Existing tree removed	
	Bus Interchange / Stop		Low planting and water sensitive urban design opportunity	**Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.
	Pavement		Potential outdoor dining zone	
	Tree		Marked pedestrian crossing	
	Existing tree retained		Point Control Box	
	Landmark Tree			
















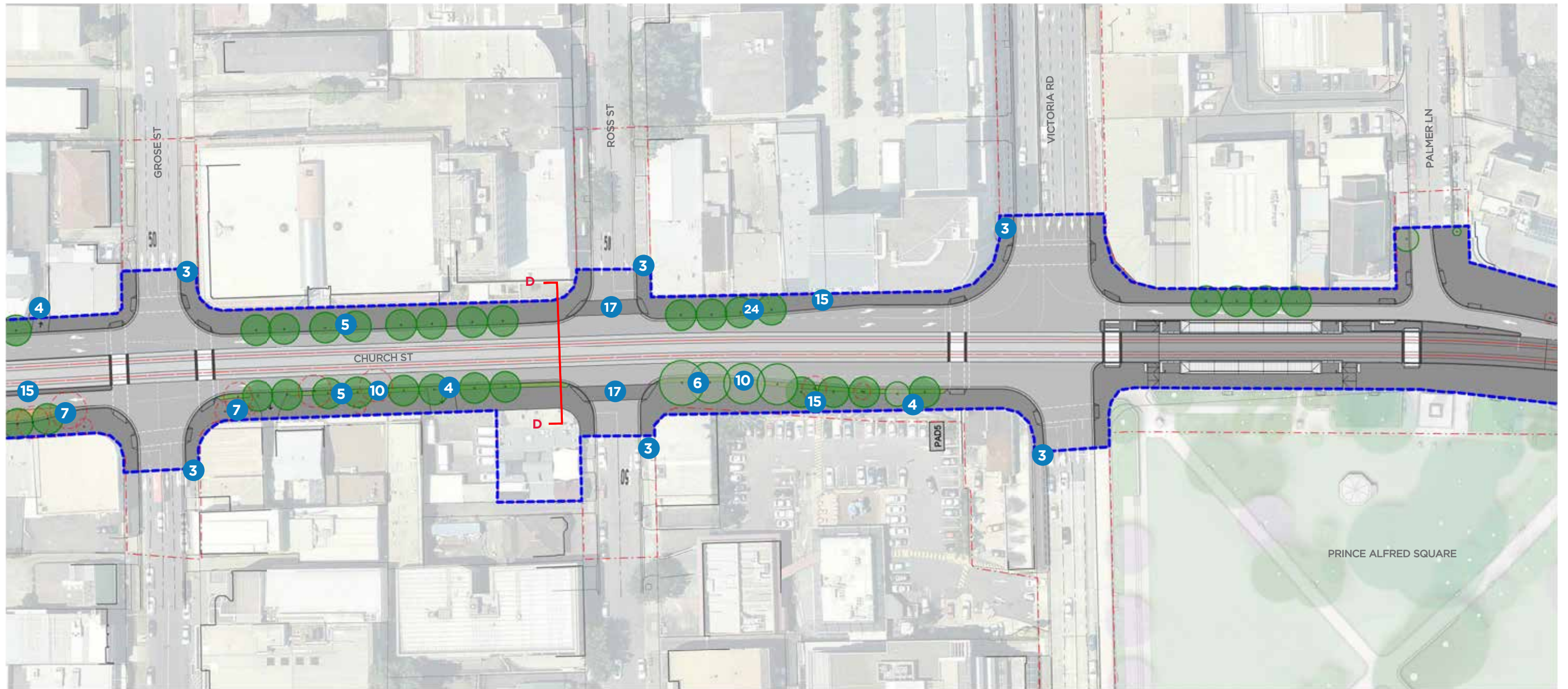


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- 25.** Pedestrian crossing subject to further safety assessment and traffic modelling.

### Legend

	**PLR Project works boundary		Palm Tree	*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.
	PLR disturbance footprint		Existing tree removed	
	Bus Interchange / Stop		Low planting and water sensitive urban design opportunity	**Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.
	Pavement		Potential outdoor dining zone	
	Tree		Marked pedestrian crossing	
	Existing tree retained		Point Control Box	
	Landmark Tree			



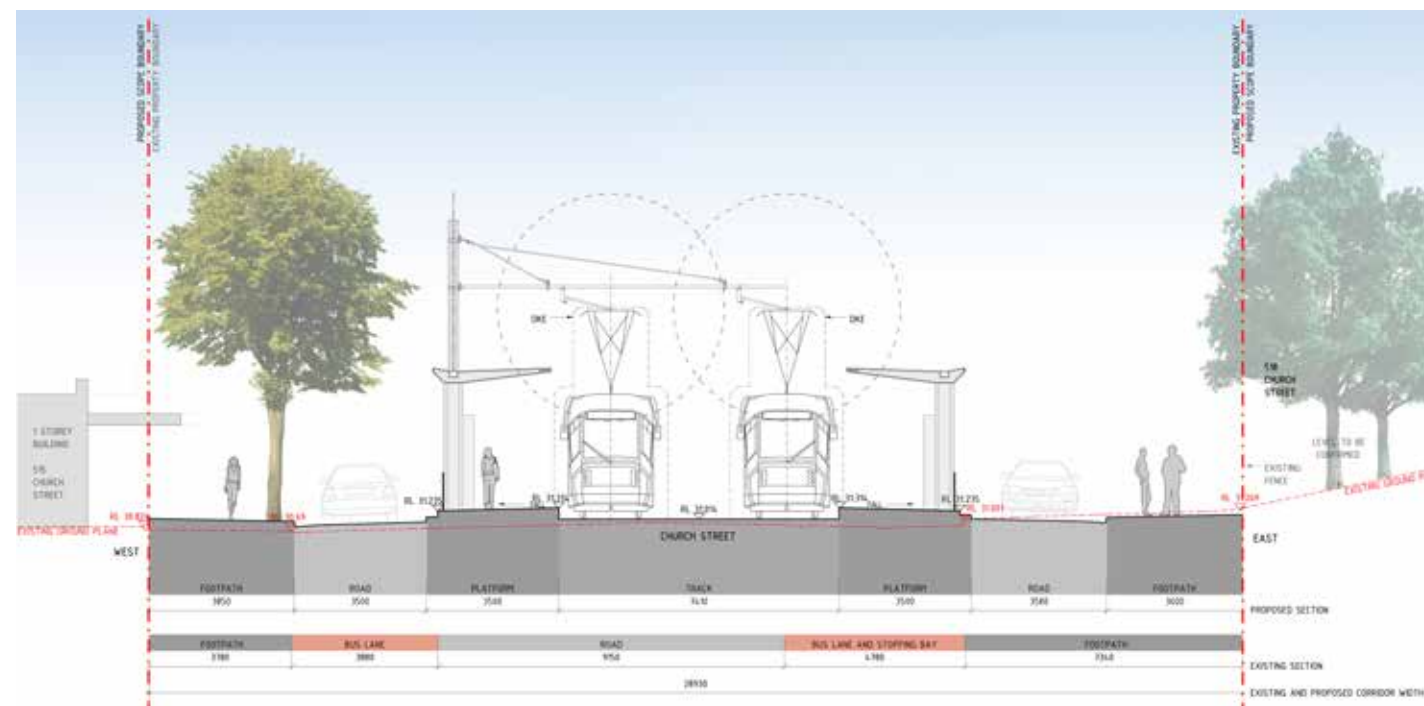
1  
2  
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— **U.S. DEPARTMENT OF AGRICULTURE**


The medians to the south of the stop provide opportunity for WSUD integration. The southbound traffic lane is maintained and the northbound traffic lane has been amended to a single lane in the proposed design. The traffic lanes adjoining the stop require a barrier along the rear edge of the platforms for pedestrian safety and vehicle crash protection. The reduction of the traffic lanes is required to accommodate the light rail and achieve a better outcome for pedestrian safety and amenity. It allows the formation of wider footpaths and tree planting opportunities along Church Street North.



\*Refer to the Engineering drawings for information on levels



## Legend



Existing Tree

NOTE: All other trees shown are proposed trees



## 2.3.5 STOP LAYOUTS

### FENNEL STREET STOP

#### Side Platform configuration.

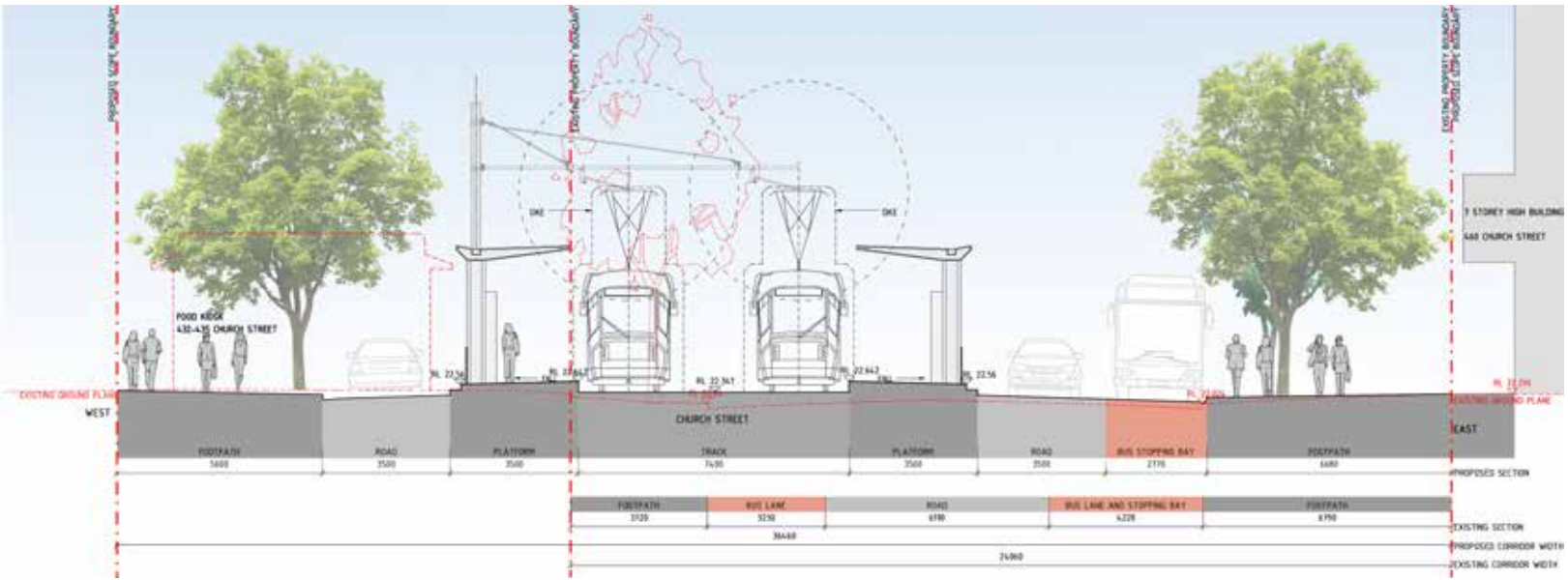
The Fennell Street stop is located south of the intersection of Harold Street and Church Street intersections. The access to the stop from the southern end is via a signalised pedestrian crossing. Further investigation into the straightened crossing is subject to traffic modelling and safety assessment. The access to the stop from the northern end is via an unsignalised pedestrian crossing. Balustrades are provided for pedestrian safety.

A median strip has been provided, at both ends of the stop to create an opportunity for WSUD integration. The existing bus stop to the east is aligned with the stop configuration. The light rail corridor along Church Street can accommodate shared running with buses during traffic incidents. The northbound and southbound traffic lanes are adjacent to the rear of the light rail stops. The traffic lanes adjoining the stop require a barrier along the rear edge of the platforms for pedestrian safety and vehicle crash protection. A three-module canopy configuration is proposed in this location, subject to patronage numbers.



Fennell Street Stop Plan

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Fennell Street Stop CH 20540 - Section C-C  
\*Refer to the Engineering drawings for information on levels

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## 2.3.6 TYPICAL STREET CHARACTER

### CORRIDOR SECTIONS

**01** Section B-B adjacent to St Patrick’s Cemetery between Factory Street and Albert Street.

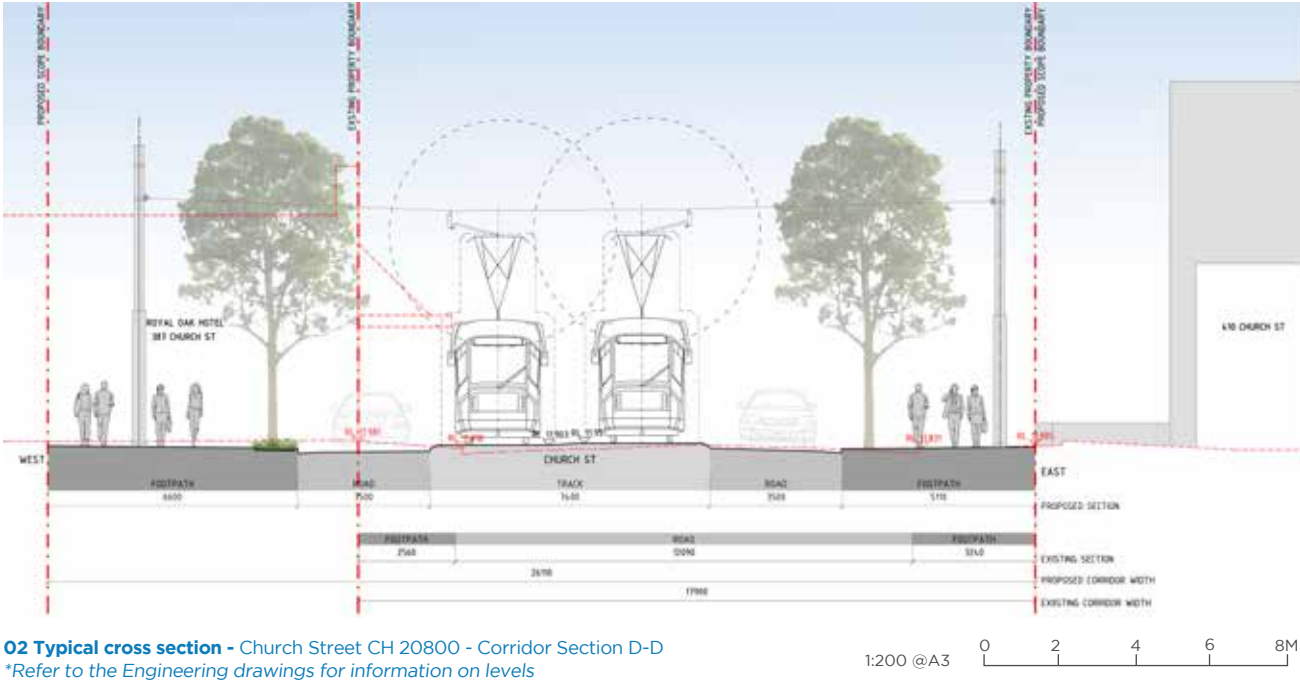
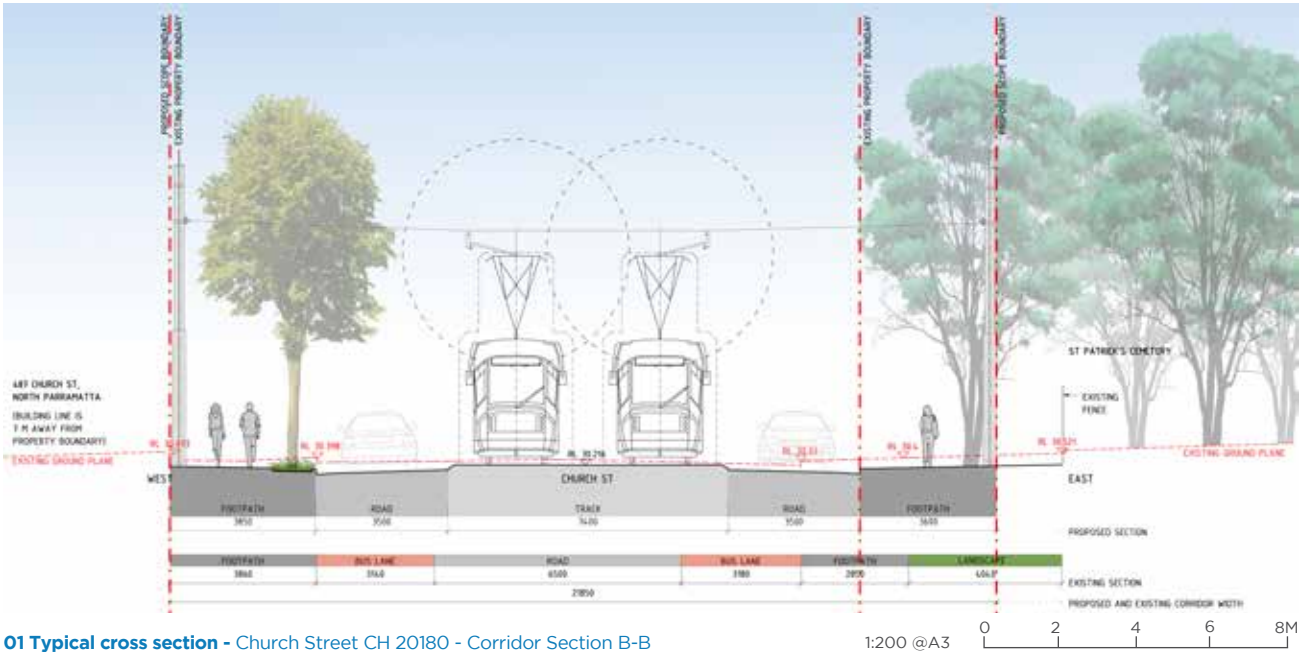
**02** Section D-D between Grose Street and Ross Street.

Legend



Existing Tree

NOTE: All other trees shown are proposed trees





## 2.3.7 LANDSCAPE TYPICAL ARRANGEMENT

### Church Street North plan

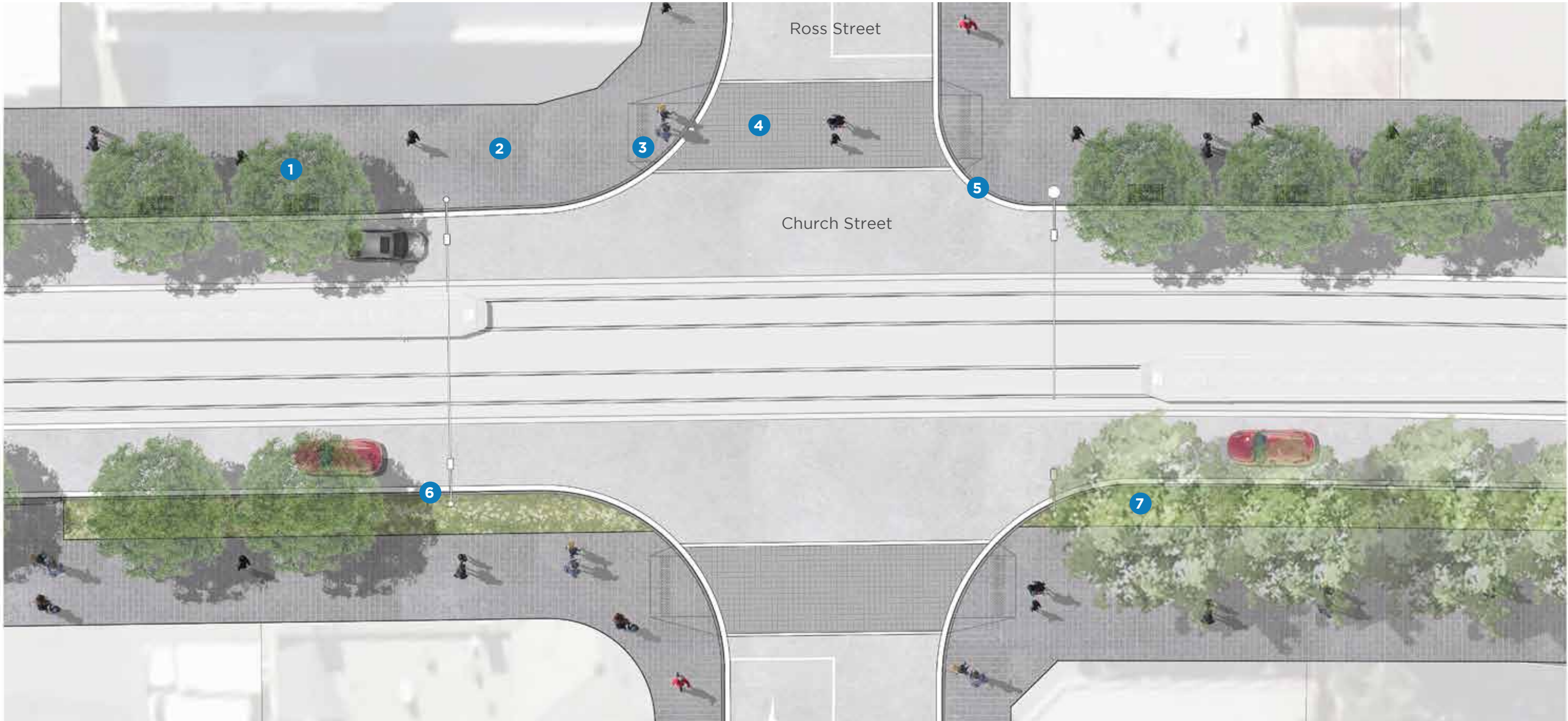
- 1. Street trees with bound aggregate tree pit finish.
- 2. Granite flagstone paving on footpaths.

- 3. Granite paved pram ramps and tactile ground surface indicators to improve safety.

- 4. Granite sett paving at street thresholds to improve public domain quality and pedestrian experience.

- 5. Granite kerbs. Kerb laybacks provided at existing driveways.
- 6. Street lighting / multi function poles

- 7. Existing street trees retained and protected during works. New tree pit finishes provided. Low planting strip at back of kerb.



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Light rail through Parramatta CBD will connect community, visitors and CBD workers and will increase opportunities for new businesses, retailers and hospitality providers as well as encourage a more diverse night time economy.

#### CHURCH STREET -

A pedestrian focused connection between two historically important Squares, activated by outdoor dining, free from clutter and seamlessly integrated into the broader City public domain network.

#### MACQUARIE STREET -

A legible streetscape which enhances east-west pedestrian connections and supports significant pedestrian flows and permeability with high quality materials and a strong city character.



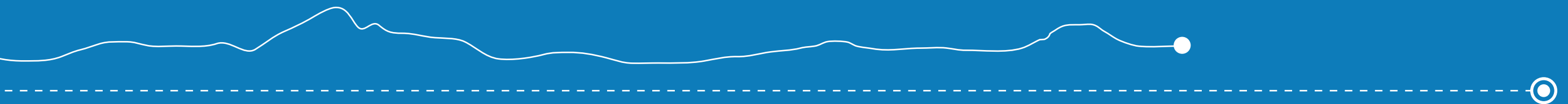


## 2.0 PRECINCT & CORRIDOR WIDE DESIGN

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# 2.4 PARRAMATTA CBD

### **PARRAMATTA LIGHT RAIL** URBAN DESIGN REQUIREMENTS





## 2.4.1 PRECINCT OVERVIEW

### EXISTING CHARACTER

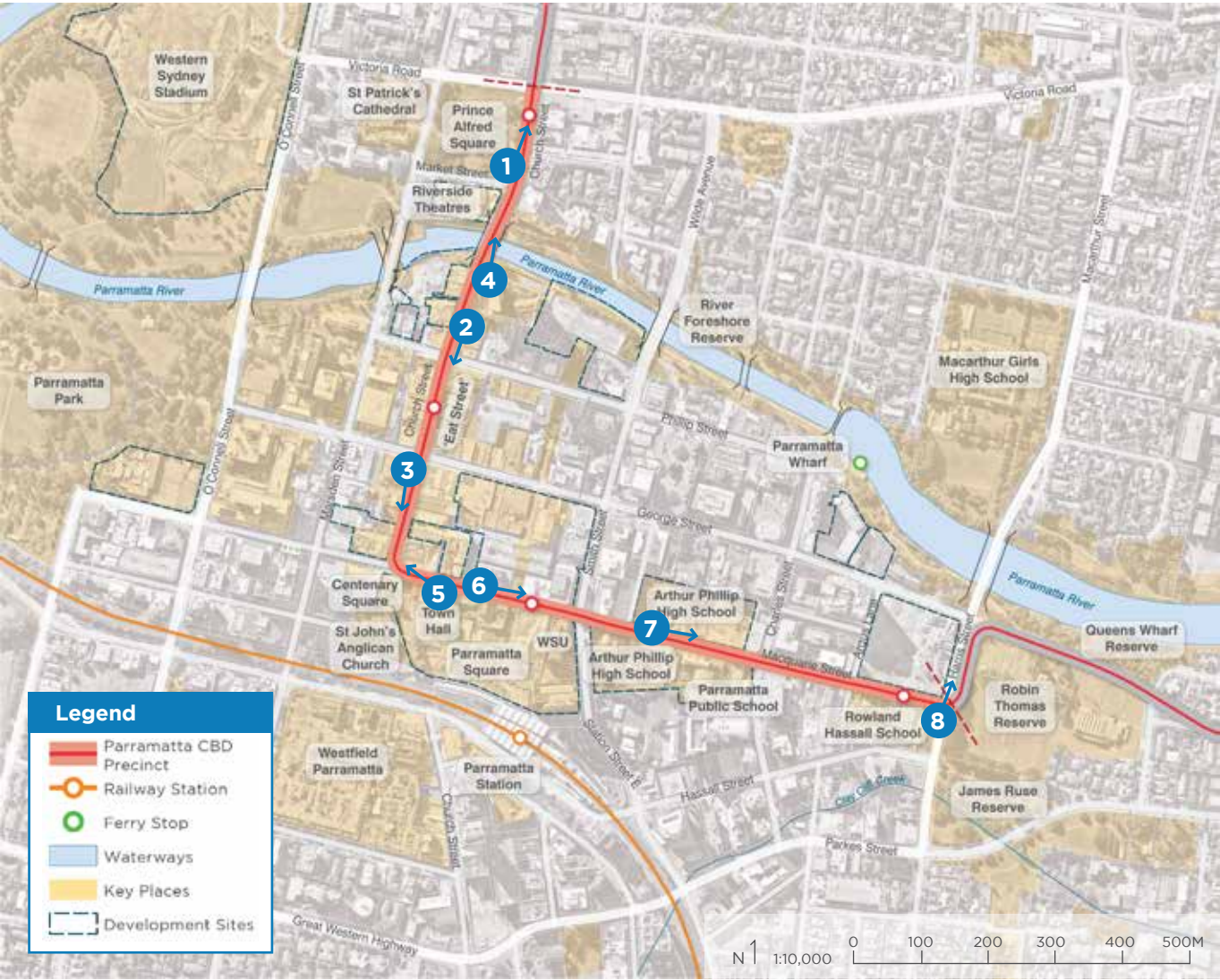
The Parramatta CBD precinct extends from Church Street at Prince Alfred Square (Victoria Road), south over the Parramatta River via Lennox Bridge, through the CBD, east from Centenary Square along Macquarie Street to Harris Street and Robin Thomas Reserve.

Typical of a CBD, the primary land uses are retail, commercial and education. Church and Macquarie Street are centrally located and include some of Parramatta's primary retail, food and beverage frontages, as well as providing access to commercial office premises.

Church Street links Prince Alfred Square and Centenary Square, the urban heart of Parramatta. The street functions as three distinct but connected city blocks south of the river. The streetscape is fairly consistent with rows of fine-grained, two to three storey street-aligned buildings. The same building typology wraps around into Macquarie Street addressing Centenary Square. The public domain is a mix of materials, landscaping, street and dining furniture, signage and physical barriers. The hedges and fences separate pedestrians from vehicles and limit informal crossing of the street. The result is a vehicle dominated street with a cluttered public domain, and areas of poor pedestrian amenity.

The block north of the river is set apart from the three city blocks physically, visually and by the change in land use being recreational, entertainment and tourist accommodation. Macquarie Street heading east is undergoing change with new developments in planning and under construction. Major developments include: Parramatta Square, the redevelopment of Arthur Phillip High School and the new mixed-use development on the corner of Macquarie Street and Harris Street. There Council also has plans for a Civic Link, a major public open space walkway crossing Macquarie Street at Horwood Place, connecting Parramatta Square to the river.

There are a number of prominent state significant heritage buildings within the precinct, including: the Lennox Bridge, the Bendigo Bank building (corner of Church and Macquarie Streets), and the Leigh Memorial Uniting Church on Macquarie Street. The open space areas of Prince Alfred Square, Robin Thomas Reserve and Queens Wharf Reserve are also of high heritage significance. Other key development sites include the proposed Riverside Theatre redevelopment, Museum of Applied Arts and Sciences along with major commercial and mixed-used developments.



01 Looking north along Church Street towards Prince Alfred Square. War Memorial monument on the west and heritage-listed building on the east.



02 Looking south along 'Eat Street'.



03 Looking south along 'Eat Street' towards outdoor dining and Centenary Square in the distance.



08 Looking north at the intersection of Harris Street and Macquarie Street with Robin Thomas Reserve on the east.



07 Looking east along Macquarie Street towards Parramatta Public School and Arthur Phillip High School.



06 Looking east along Macquarie Street with heritage-listed buildings in the foreground and Robin Thomas Reserve in the distance.



05 Looking west towards the Centenary Memorial Clock and intersection of Macquarie Street and Church Street.



04 Looking north towards Lennox Bridge and Riverside Theatre.



## 2.4.2 LAND USE, ACCESS AND CIRCULATION

The light rail will connect major public open spaces, cultural and entertainment venues and provide seamless intermodal connections to support the City's employment, enterprise, education and residential growth. The intervention of light rail will complement the heritage character of the CBD, while providing a modern intermodal transport system to support Parramatta's large-scale urban redevelopment. While the southern area of Church Street, and parts of Macquarie Street, will be closed to general traffic, vehicle access will be maintained around Prince Alfred Park to Parramatta Square basement, and to other properties along Macquarie Street.

### Church Street

#### Prince Alfred Square Stop

- The stop will reinforce the legibility of the square, as an important historic and public space within Parramatta. It will service the Riverside Theatre, Western Sydney Stadium redevelopment and the future urban intensification of the proposed expansion of the CBD.

#### Church Street Stop

- The stop will provide convenient access to the vibrant 'Eat Street', the proposed Museum of Applied Arts and Sciences and river front. It will also connect to Council's proposed east-west cycleway on George Street between Queens Wharf Reserve to Parramatta Park.

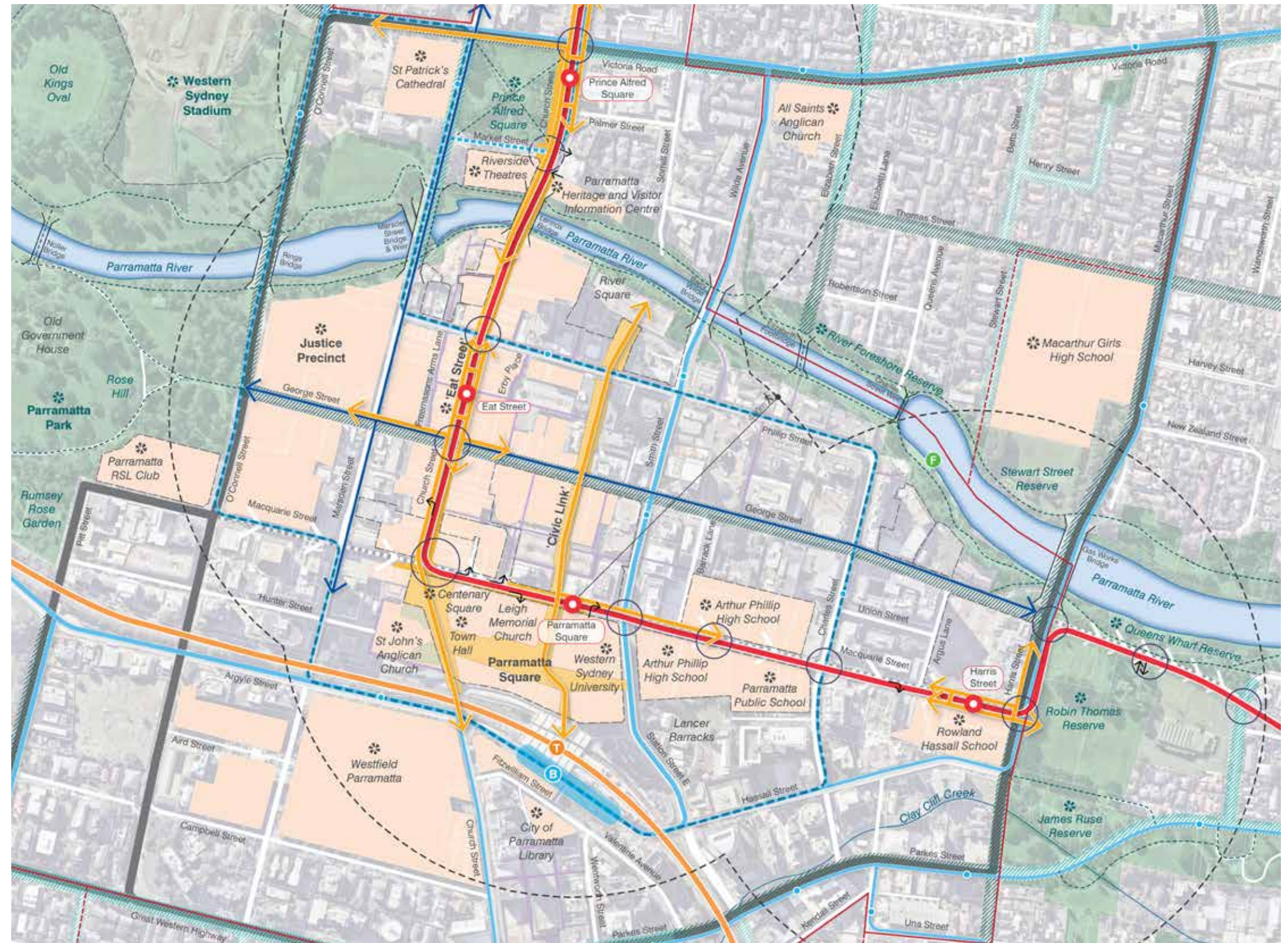
### Macquarie Street

#### Parramatta Square Stop (Macquarie Street)

- The stop will provide transport interchange with Parramatta Railway Station and buses. The stop will service Arthur Phillip High School and WSU CBD Campus. It will also link to Parramatta Square, Centenary Square and the proposed pedestrian Civic Link to the river front.

#### Harris Street Stop (Macquarie Street east)

- The stop will allow access to east CBD residents and workers, Robin Thomas Reserve and Queens Wharf Reserve. The stop will allow access to the ferry terminal and river front cycleways. The stop will service local schools and playing fields and support the proposed mixed-use development of the former Cumberland Media site.



\*For legend see p. 71

N 1:6,000 @A3 0 50 100 150 200 250m



## 2.4.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES - CHURCH STREET

The light rail will provide an integrated public transport system that reinforces the strategic importance of the Parramatta CBD. It will continue to transform the city as a highly connected, liveable pedestrian environment.

The alignment of the light rail through the CBD will unify Church and Macquarie Streets to create a cohesive pedestrian zone while providing the opportunity to create a high quality, beautiful public domain. Church street will be redefined as a great and memorable civic street. It will support outdoor dining and become an active spine linking public squares and Parramatta River.

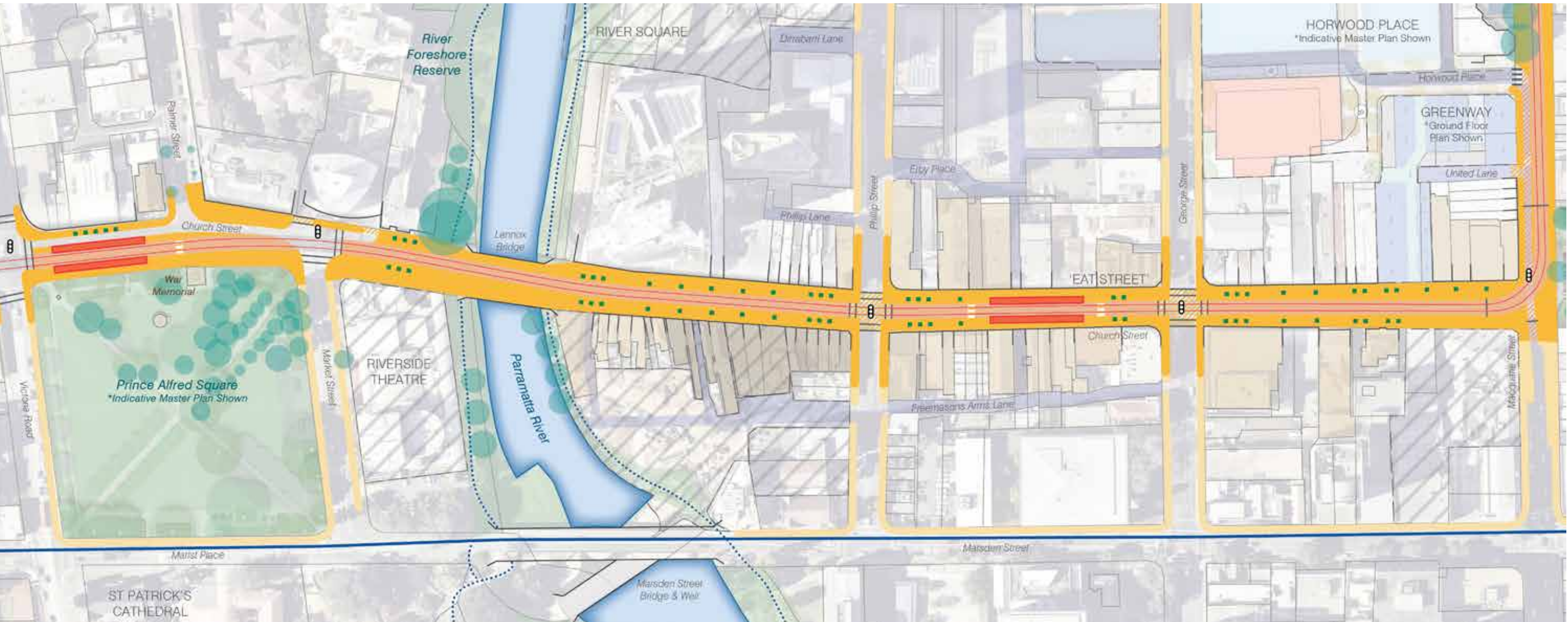
### Pedestrian amenity

- Create a spatial arrangement for Church Street that will safely and comfortably accommodate the light rail alignment, light rail stops, pedestrian circulation, public domain elements, outdoor dining and trading opportunities.
- Create a streetscape arrangement that is consistent, simple and responds to location specific constraints and influences.
- Enhance the historic Lennox Bridge river crossing by creating a pedestrian and light rail only environment with appropriate public domain treatments.
- Remove vehicles and existing barriers and clutter and create a safe pedestrian zone from Prince Alfred Square along Church Street to Centenary Square and east along Macquarie Street to Smith Street.

- Integrate the light rail infrastructure with The City of Parramatta's vision for a high quality seamless public domain by providing a flush treatment on Church Street from Phillip Street to Macquarie Street to reinforce a visually and physically cohesive streetscape.  
*\*\*Flush treatment subject to feasibility being confirmed through further design development (flooding and drainage, utilities,*

*grading) and to Operator and ISA review of speed of operation.*

- Continue footpath surface treatments and levels across the tracks and intersections to further unify the street.
- Clearly delineate and contrast materials between track and pedestrian areas.



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## 2.4.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES - CHURCH STREET

- Ensure robust and high-quality paving, delineation treatments, landscaping and furnishings.
- Consolidate street furnishings and amenities to facilitate pedestrian circulation.
- Provide enhanced pedestrian crossings at Prince Alfred Square, Centenary Square and major intersections.
- Promote a decluttered public domain with minimal barriers and clear sightlines.
- Create an urban environment that is respectful of the prevailing heritage context including

- buildings, statues and bridges.
- Provide a safe, well-lit pedestrian environment with integrated lighting including multi-function poles where appropriate.
  - Design drainage and levels to maintain access to buildings and avoid adverse drainage impacts.

- Transport**
- Identify ferry interchange with wayfinding elements.
  - Design light rail stops to be accessible and comfortable with clear sight lines to promote a high degree of safety and surveillance.
  - Integrate light rail stop into the public domain to support pedestrian movement and commercial activity
  - Incorporate wire-free running from Prince Alfred Square Stop to Tramway Avenue Stop.

- Active transport**
- Consider existing and proposed cycle connections in design.
  - Provide bicycle racks and associated infrastructure to support the use of active transport.

- Landscape**
- Retain or relocate existing street trees where possible and consider options to provide new trees to the streetscape.
  - Ensure tree planting locations along Church Street to Lennox Bridge maintain generous access and sight lines around stops and intersections.

Legend		*Page 69 Legend	
<ul style="list-style-type: none"><li>Parramatta Light Rail / Stop</li><li>Plaza/Footpath Upgrade</li><li>Enhanced Track Finish</li><li>Plaza/Footpaths (by others)</li><li>Lanes Network</li><li>Threshold Treatment (On Road)</li><li>Enhanced Road Treatment</li><li>Signalised Pedestrian Crossing</li><li>Unsignalised PLR Pedestrian Crossing</li><li>Pedestrian Zebra Crossing</li><li>On Road Separated Cycleway (by others)</li><li>Shared Cycle Route (by others)</li><li>Opportunity for Green Track</li><li>Tree Planting</li></ul>	<ul style="list-style-type: none"><li>Understorey Planting</li><li>Existing Retained Trees</li><li>Public / Private Green Open Space</li><li>Master Plans / Development Sites</li><li>Existing Buildings</li><li>Key Heritage Items</li></ul> <p><i>*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.</i></p>	<ul style="list-style-type: none"><li>Parramatta Light Rail / Stop</li><li>Railway Line / Stop</li><li>Ferry Stop</li><li>Bus Interchange</li><li>Bus Route / Stop</li><li>Free Parramatta Shuttle Bus</li><li>Coach &amp; Special Event Bus</li><li>CBD Ring Road</li><li>One Way Streets</li><li>Lanes Network</li><li>Vehicular Access</li><li>On Road / Off Road Cycle Route</li><li>Bicycle &amp; Pedestrian Park/River Trails</li><li>400m Pedestrian Catchment</li></ul>	<ul style="list-style-type: none"><li>Parramatta Ways Major Routes</li><li>Parramatta Ways Intermediate Routes</li><li>Parramatta Ways Local Routes</li><li>Key Pedestrian Connections</li><li>Plaza / Plaza (by others)</li><li>Public / Private Green Open Space</li><li>Waterways</li><li>Key Destinations</li><li>Parks and Sporting Facilities</li><li>Development Sites</li><li>Existing CBD Boundary</li><li>Proposed CBD Boundary (Parramatta Strategic Framework)</li></ul>



## 2.4.4 URBAN DESIGN AND LANDSCAPE PRINCIPLES - MACQUARIE STREET

The alignment of the light rail through the CBD will unify Macquarie Street with Church Street to create a cohesive pedestrian zone while providing the opportunity to create a high quality, beautiful public domain, with a high level of pedestrian amenity.

Macquarie Street will support transport interchange between light rail, trains, buses and ferries, and provide access between schools and playing fields. The Macquarie Street light rail stop is adjacent to the proposed Civic Link, a generous, activated pedestrian walkway that will connect the Parramatta Railway Station, Parramatta Square and the river.

### Pedestrian amenity

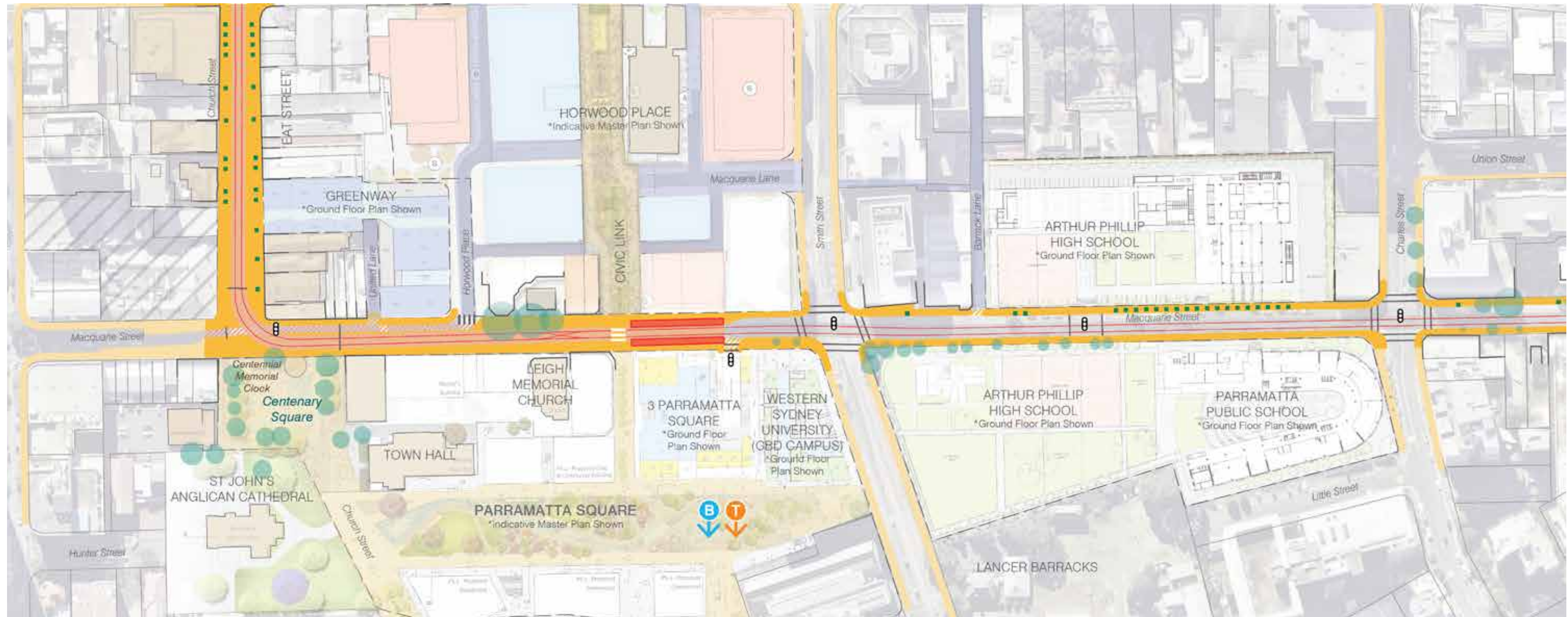
- Create a spatial arrangement for Macquarie Street that will safely and comfortably accommodate the light rail alignment, light rail stops, pedestrian circulation and vehicular traffic between Smith Street and Harris Street.
- Retain access to Parramatta Square basement parking and properties between Church Street and Smith Street.

- Create a streetscape arrangement that is consistent and simple as possible but also responds to location specific constraints and influences.
- Integrate the light rail infrastructure with The City of Parramatta's vision for a high quality seamless public domain by providing a flush treatment on Macquarie Street at Centenary

Square (between Church Street and United Lane). \*\*Flush treatment subject to feasibility being confirmed through further design development (flooding and drainage, utilities, grading) and to Operator and ISA safety review of operations.

- Consider pedestrian flows, access and emergency evacuation at Arthur Phillip High School.

- Continue footpath surface treatments and levels across the tracks, vehicle lanes and intersections to further unify the street.
- Prioritise pedestrian movement at selected sides streets and all driveway cross-overs.
- Ensure robust and high-quality paving, delineation treatments, landscaping and furnishings.





# 2.4.4 URBAN DESIGN AND LANDSCAPE PRINCIPLES - MACQUARIE STREET

- Consolidate street furnishings and amenities to facilitate pedestrian circulation.
- Provide enhanced pedestrian crossings at Centenary Square, Parramatta Square, Robin Thomas Reserve and major intersections.
- Promote a legible streetscape with high quality materials and finishes that considers universal access and encourages good pedestrian permeability wherever possible.

## Transport

- Design stops and public domain to provide easy access to train, bus and ferry interchange.
- Design light rail stops to be accessible, comfortable with clear sight lines to promote a high degree of safety and surveillance.
- Design light rail to facilitate links to major public open spaces, squares and playing fields.

- Design light rail alignment to facilitate connections to employment, education, residential and entertainment venues.
- Integrate light rail stop into the public domain to support pedestrian movement and commercial activity

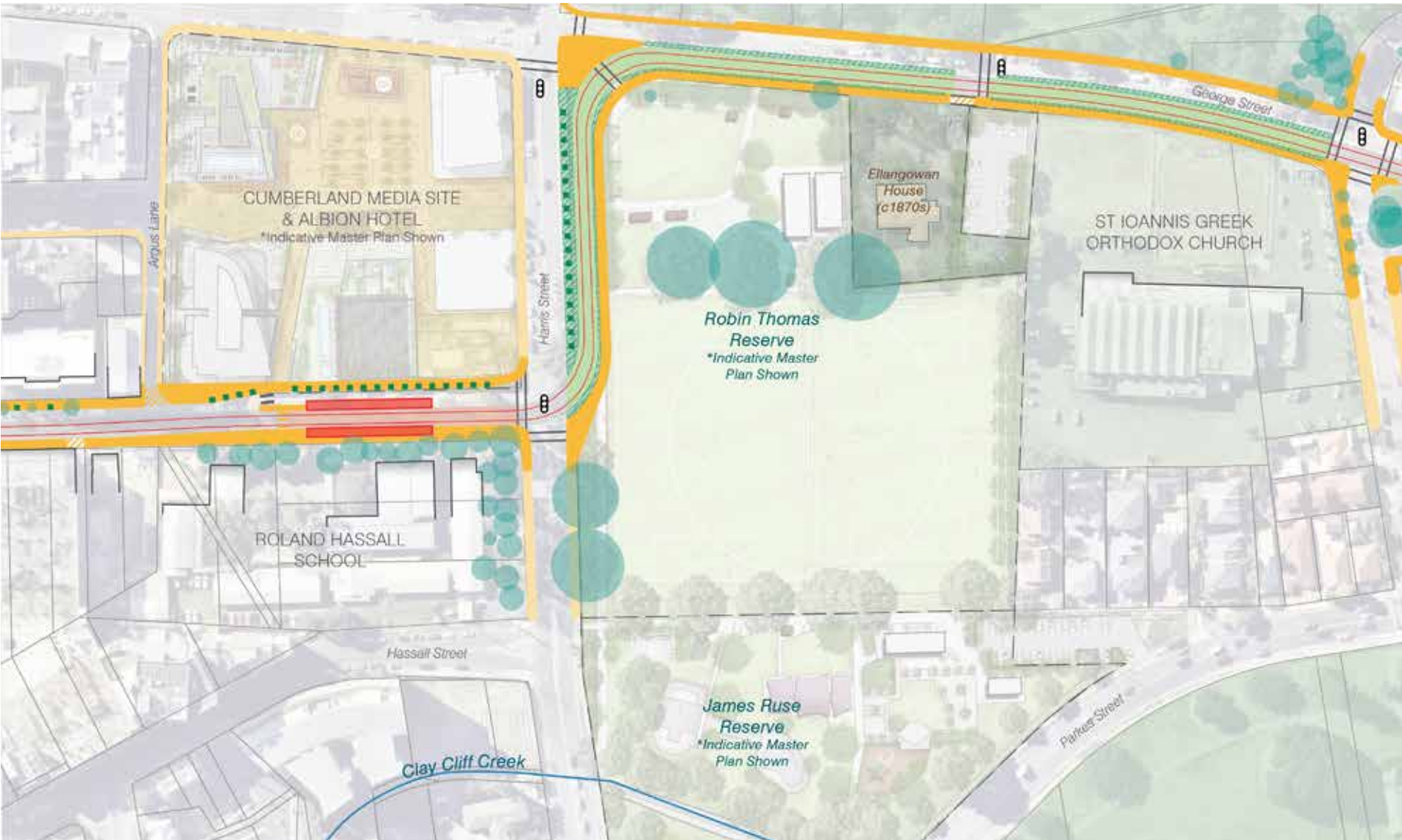
## Active transport

- Integrate stops with The City of Parramatta's existing and proposed cycle paths, where possible.
- Provide bicycle racks and associated infrastructure to support the use of active transport for a wide range of journeys.

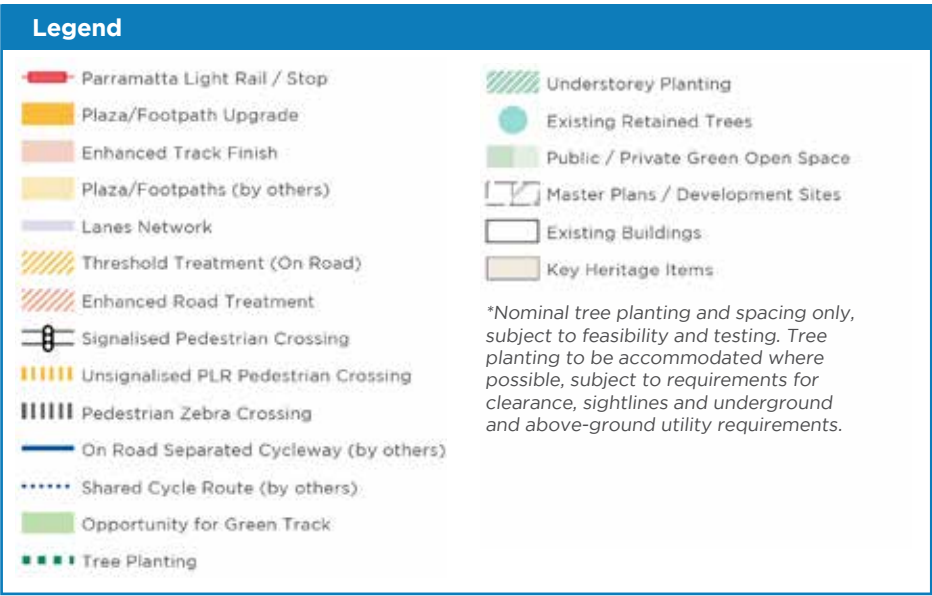
- Reinforce pedestrian links to the river and ferry wharf, and the future Civic Link as a major pedestrian spine linking Parramatta Square and the river.

## Landscape

- Retain existing street trees along Macquarie Street where possible and plant new street trees\* east of Smith Street. Enhance the continuity of landscaping where possible. Consider clearances, sightlines and utility regulations.



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## 2.4.5 CORRIDOR AND PUBLIC DOMAIN DESIGN

The following corridor and public domain design plans indicate the project requirements for the Parramatta CBD precinct.

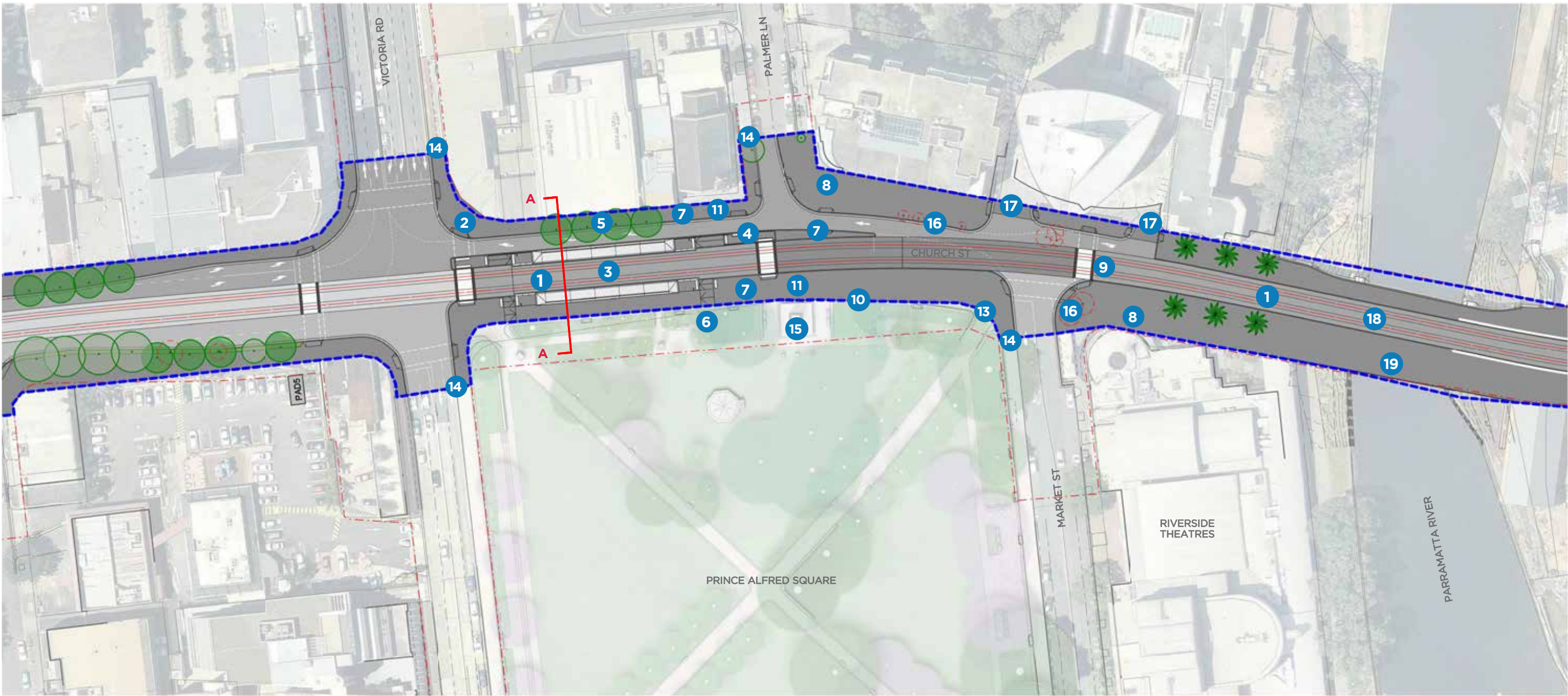
The plans should be read in conjunction with the sections and stop plans, as well as chapters 1 and 3.

1. Granite paving to track between Victoria Road and Harris Street.
2. Retain and protect existing bicycle rack sculpture.
3. Prince Alfred Square Stop. Refer to Stop Plan on p79.
4. Unsignalised pedestrian crossing with pram ramps

- and tactile indicators.
5. Street trees. Locate trees away from driveways, signal poles, light poles and awnings.
6. Retain and protect existing Prince Alfred Square including memorials, trees, planting, flagpoles, retaining walls, edges and paving.

7. Granite flagstone paving, granite kerbs and granite medians south of Victoria Road.
8. Outdoor dining to be retained where possible and maximised between Prince Alfred Square and Macquarie Street
9. Remove existing marked pedestrian crossing.

10. Existing seats and bin removed and replaced with new street furniture.
11. No street trees in front of Prince Alfred Square and the Church.
12. Pull-over space on footpath for single maintenance vehicle.





# 2.4.5 CORRIDOR AND PUBLIC DOMAIN DESIGN

13. Tie-in pavement and finish levels with Prince Alfred Square.

14. Tie-in new footpaths with existing.

15. Retain and protect existing Anzac Memorial.

16. Existing trees removed.
17. Novotel driveway cross-overs to be at footpath level. Granite paving.

18. Retain and protect historic Lennox Bridge. Lennox Bridge finished pavement levels to be advised.
19. Remove existing seats and replace with new seats.

20. Opportunity for footpath widening / road narrowing at intersection to improve pedestrian accessibility.

21. Potential outdoor dining zone
22. Church Street between Lennox Bridge and Macquarie Street. Granite flagstone paving to footpaths. Footpath and track levels will be flush to maximum extent possible. Design of public domain will include delineation and elements to ensure safe and efficient light rail operations.

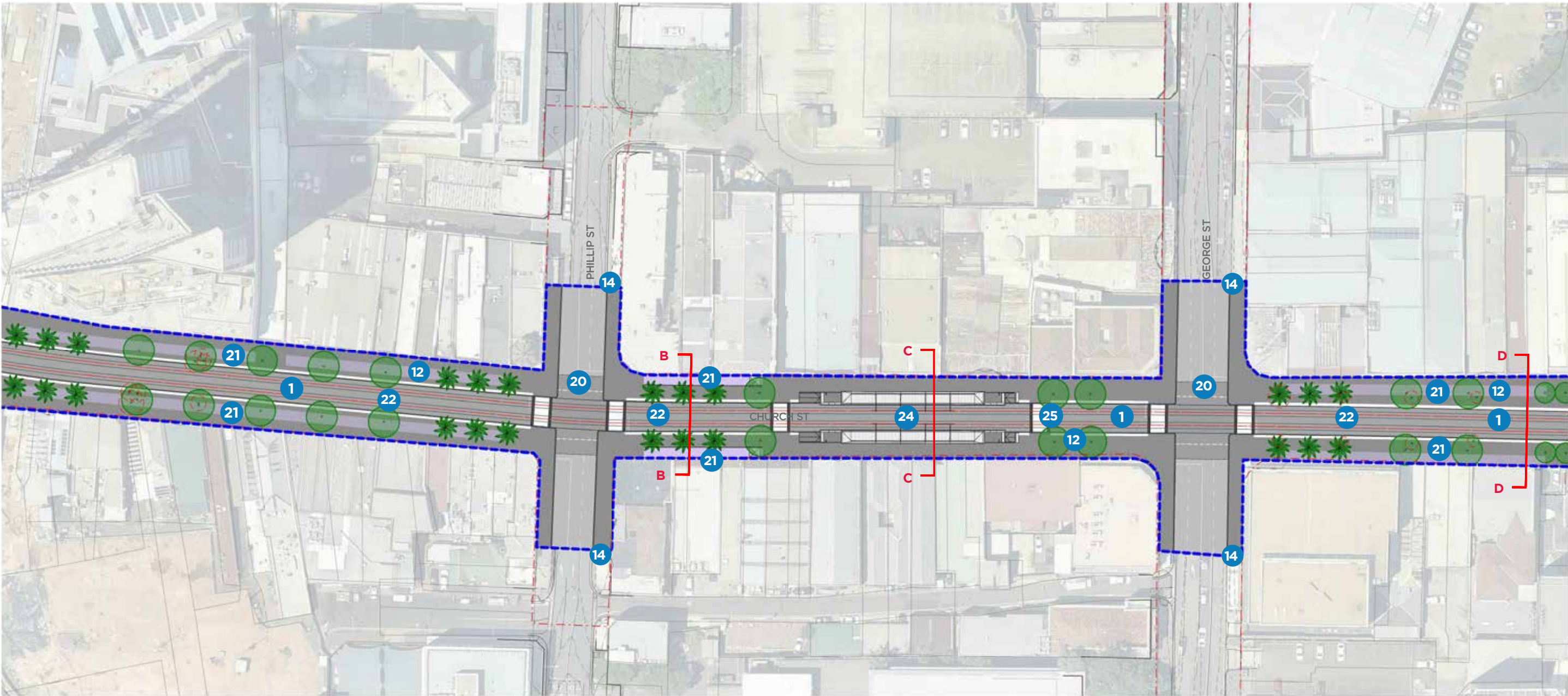
**Legend**

- \*\*PLR Project works boundary
- PLR disturbance footprint
- (B) Bus Interchange / Stop
- Pavement
- Tree
- Existing tree retained
- Landmark Tree

- Palm Tree
- Existing tree removed
- Low planting and water sensitive urban design opportunity
- Potential outdoor dining zone
- Marked pedestrian crossing
- Point Control Box

\*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.

\*\*Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.





## 2.4.5 CORRIDOR AND PUBLIC DOMAIN DESIGN

- 23.** Both sides of Church Street will contain public domain elements including: street lighting; street trees (subject to awning locations); seats and bins.
- 24.** Eat Street Stop. Refer to Stop Plan on p80 of this document.
- 25.** Unsignalised pedestrian crossing.

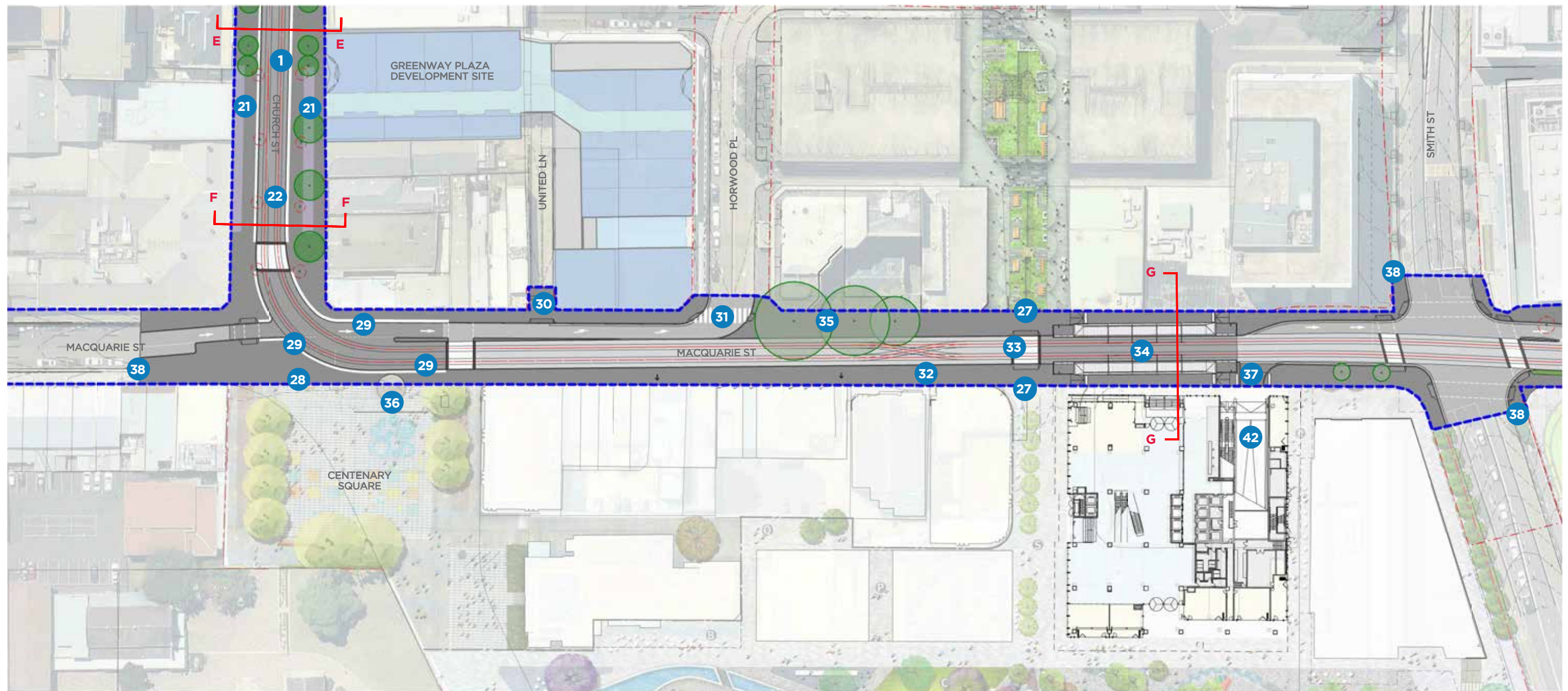
- 26.** Raised granite paving threshold treatment Subject to drainage and flooding feasibility assessment during the detail design phase.

- 27.** Integrate with the public domain including planned Civic Link and Parramatta Square developments
- 28.** Integrate footpath materials and levels at Centenary Square
- 29.** Flush intersection design to facilitate pedestrian desire lines and interface with Centenary Square

- 30.** Existing raised threshold repaved with granite paving.
- 31.** Retain existing marked pedestrian crossing.
- 32.** Macquarie Street: Granite flagstone paving to footpaths and granite kerbs / medians.

- 33.** Unsignalised pedestrian crossing with wide pram ramps and tactile indicators.
- 34.** Parramatta Square Stop. Refer to Stop Plan on p81.
- 35.** Retain and protect existing trees\*.
- 36.** Retain and protect existing

- memorial and provide effective operating clearances for light rail.
- 37.** Driveway cross-over at footpath level and paved in footpath material.
- 38.** Tie in new footpaths into existing.
- 39.** Kerb ramps for full width of crossing.



\*Flush treatment subject to feasibility being confirmed through further design development (flooding and drainage, utilities, grading) and to Operator and ISA review of speed of operation.



—

- maintained.
- 43.** Retain existing driveway.
- 44.** Raised threshold treatment with granite sets and tactile indicators. Subject to drainage and flooding

Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.

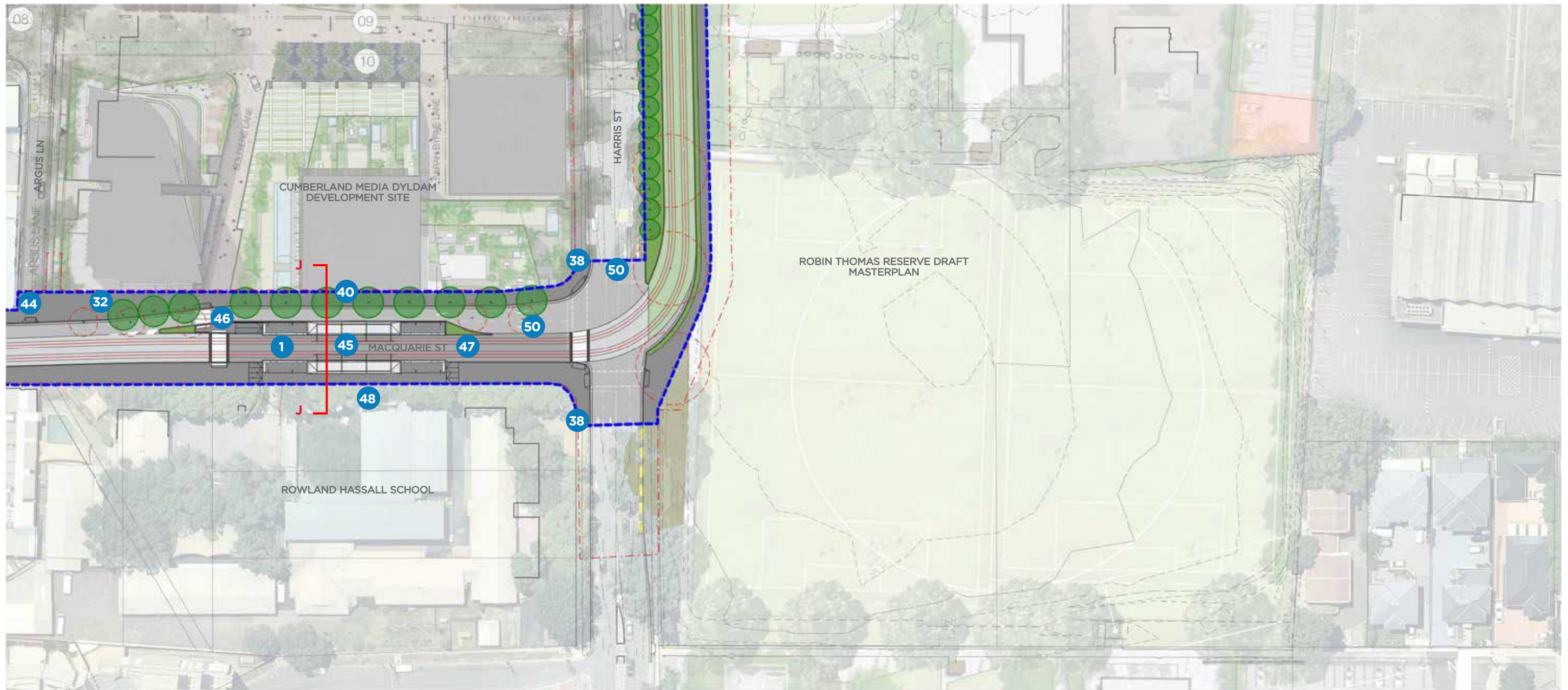
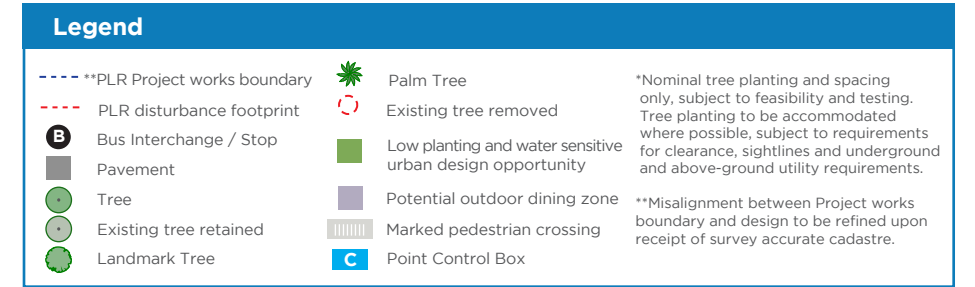
\*\*Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.





— 10 —

- 10 —



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0 10 20 30 40 50M



## 2.4.6 STOP LAYOUTS

### PRINCE ALFRED SQUARE STOP

Side Platform stop configuration.

The Prince Alfred Square stop is located south of Victoria Road, on Church Street. Its placement in front of the heritage listed Prince Alfred Square emphasises the importance of this location. The stop also services the Riverside Theatre, and the Western Sydney Stadium. This stop is proposed to be an event stop.

Access to the stop platform from the Southern end, is via a staggered un-signalised pedestrian crossing. Handrails will be used on both ends. Access to the northern end is via a signalised straight crossing. The eastern side of the stop is flanked by a single, north bound single traffic lane. This requires a barrier along the rear edge of the platform for pedestrian safety and vehicle crash protection. The western platform is integrated with the footpath and public domain. A five module canopy configuration is proposed in this location due to the high volume of patronage that is expected at this stop.



Prince Alfred Square Stop Plan



Typical cross section - Prince Alfred Square CH 20960 - Section A-A  
\*Refer to the Engineering drawings for information on levels





## 2.4.6 STOP LAYOUTS

### EAT STREET STOP

#### Side Platform stop configuration.

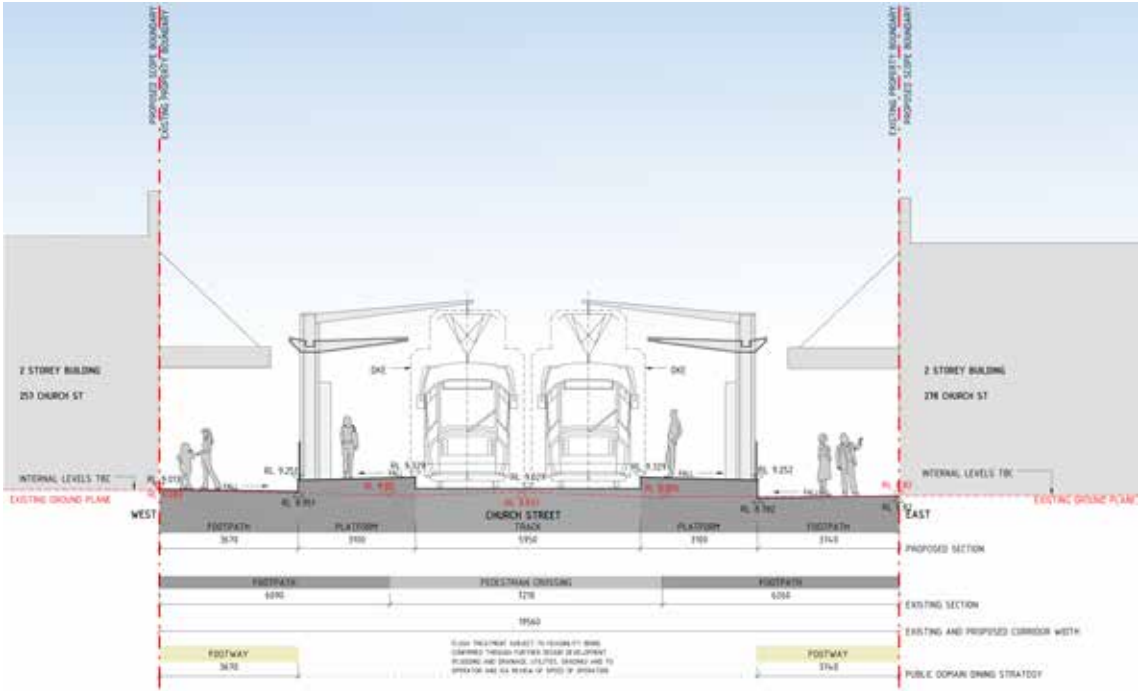
The Eat Street Stop is located at the intersection of Church and George Street. The stop location provides convenient access to the busy 'Eat Street'. The stop is flanked by footpaths to the rear of the platforms on both the eastern and western sides. The street level in this area is proposed to be flush with adjacent footpaths. This treatment is subject to further design development (flooding and drainage, utilities and grading) as well as to Operator and ISA review of speed / safety of operation. This arrangement will create a step between the stop, and the footpath requiring a balustrade along the back edge for pedestrian safety.

Access to the stop platform from the northern and southern ends are via walkways. A five-module canopy configuration is proposed for this location, subject to further detail design. There is a higher volume of patronage expected in this location due to the outdoor dining and trading areas in this precinct.



Eat Street Stop Plan  
\*Refer to the Engineering drawings for information on levels

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Eat Street Stop CBD CH 30460 - Section C-C  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M



## 2.4.6 STOP LAYOUTS

### PARRAMATTA SQUARE STOP

#### Side Platform stop configuration

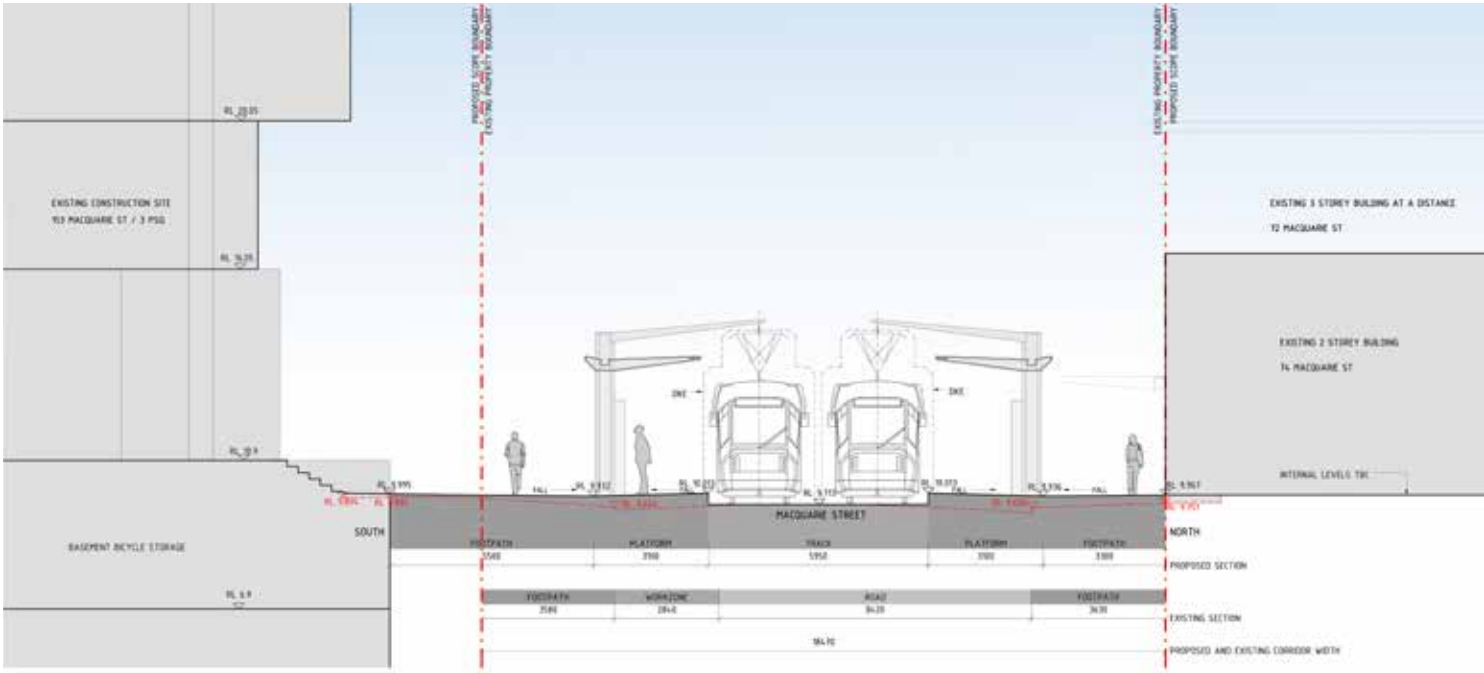
The Parramatta Square Stop is located on Macquarie Street in the heart of Parramatta Square. The stop sits on the eastern side of the proposed pedestrian Civic Link, which connects the City to the river front. This stop is an important interchange between the Parramatta Railway Station and buses. The stop will also service a growing number of commercial and educational developments within this area.

The stop is to be seamlessly integrated within the public domain. The northern and southern platforms are flanked at the rear by footpaths. Access to the stop platform from the northern and southern ends are via walkways. A five-module canopy configuration is proposed for this due to the high volume of patronage expected in this location. Transport for NSW will continue to investigate the City of Parramatta's preferred stop location to the west of the Civic Link.



Parramatta Square Stop Plan  
\*Refer to the Engineering drawings for information on levels

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Parramatta Square Stop CH 30900 - Section G-G  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M



## 2.4.6 STOP LAYOUTS

### HARRIS STREET STOP

#### Side Platform stop configuration.

The Harris Street Stop is located at the intersection of Macquarie Street and Harris Street. The stop connects the city to the river front and will provide connection to the Ferry Terminal. The stop allows a connection to the ATL along the Parramatta River, and access to the local schools and Robin Thomas Reserve and Queens Wharf Reserve.

The northern platform backs onto an eastbound traffic lane. This requires a barrier along the rear edge of the platform for pedestrian safety. There is no access from the east end of the northern platform. The west end of this platform is accessed via a staggered un-signalised crossing. Handrails will be used to enforce the stagger on both ends. Access to the southern platform on both ends are by walkways. A three-module canopy configuration is proposed for this stop, subject patronage numbers.



Harris Street Stop Plan  
\*Refer to the Engineering drawings for information on levels

N 1:500 @A3 0 5 10 15 20 25M



Typical cross section - Harris Street Stop CH 31440 - Section J-J  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M

#### Legend



Existing Tree  
NOTE: All other trees shown are proposed trees



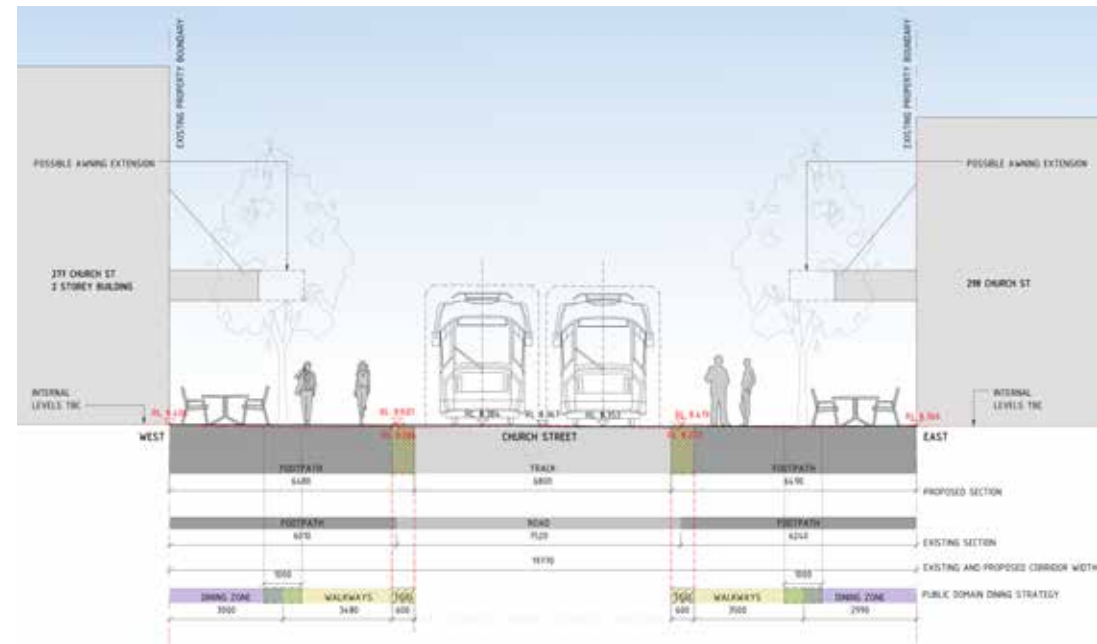
# 2.4.7 TYPICAL STREET CHARACTER

## CORRIDOR SECTIONS CHURCH STREET

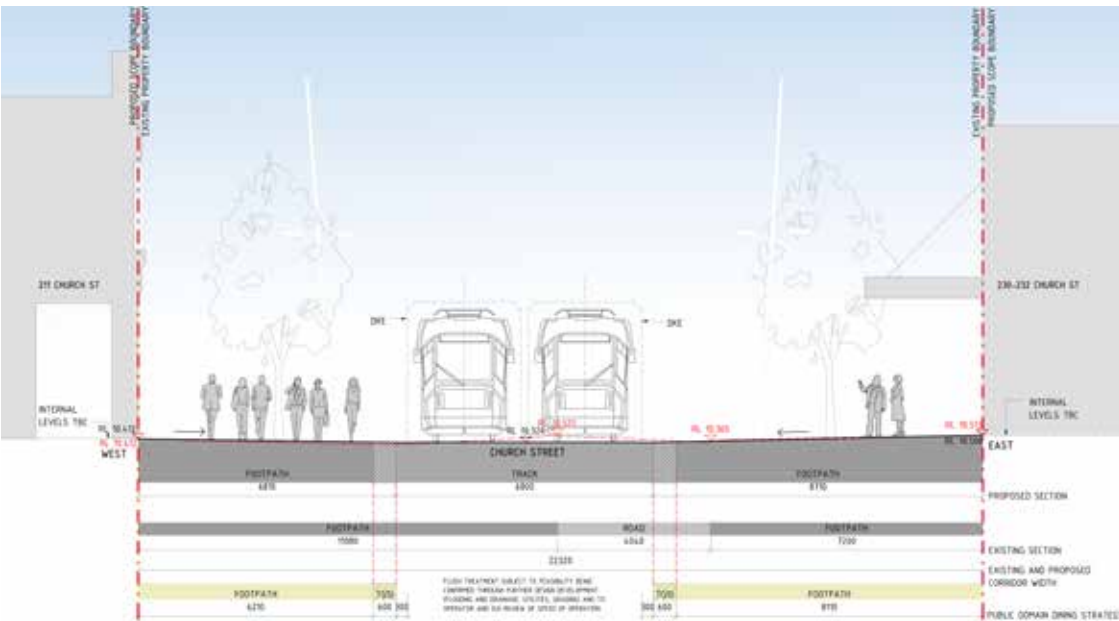
- 01** Section B-B between Phillip Street and George Street.
- 02** Section D-D between George Street and Macquarie Street.
- 03** Section E-E between Phillip Street and George Street
- 04** Section F-F between George Street and Macquarie Street.

*\*\*For all sections refer to the Engineering drawings for information on levels*

1:200 @A3 0 2 4 6 8M



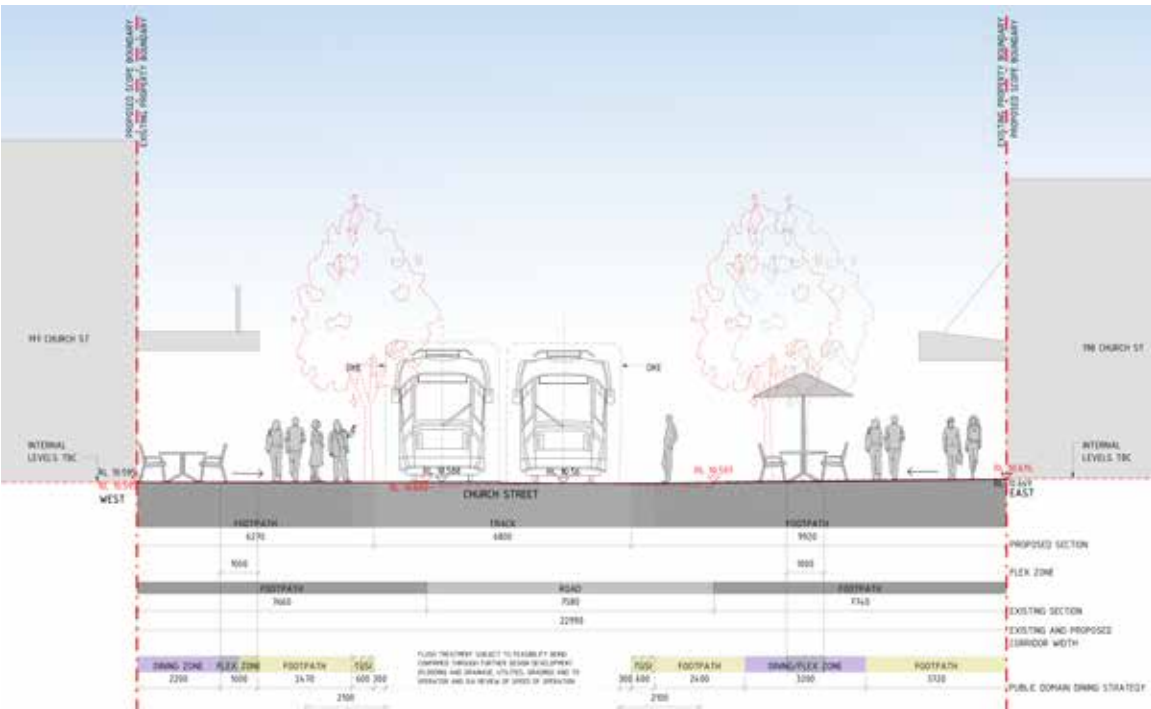
**01 Typical cross section\*\*** - Church Street CBD CH 30380 - Corridor Section B-B  
*\*Footpath and track levels will be flush to maximum extent possible. Design of public domain will include delineation and elements to ensure safe and efficient light rail operations. Indicative tree locations refer to pages 62, 63 & 64.*



**03 Typical cross section\*\*** - Church Street CBD CH 30600 - Corridor Section E-E  
*\*Footpath and track levels will be flush to maximum extent possible. Design of public domain will include delineation and elements to ensure safe and efficient light rail operations. Indicative tree locations refer to pages 62, 63 & 64.*



**02 Typical cross section\*\*** - Church Street CBD CH 30580 - Corridor Section D-D  
*\*Footpath and track levels will be flush to maximum extent possible. Design of public domain will include delineation and elements to ensure safe and efficient light rail operations. Indicative tree locations refer to pages 62, 63 & 64.*



**04 Typical cross section\*\*** - Church Street CBD CH 30650 - Corridor Section F-F  
*\*Footpath and track levels will be flush to maximum extent possible. Design of public domain will include delineation and elements to ensure safe and efficient light rail operations. Indicative tree locations refer to pages 62, 63 & 64.*



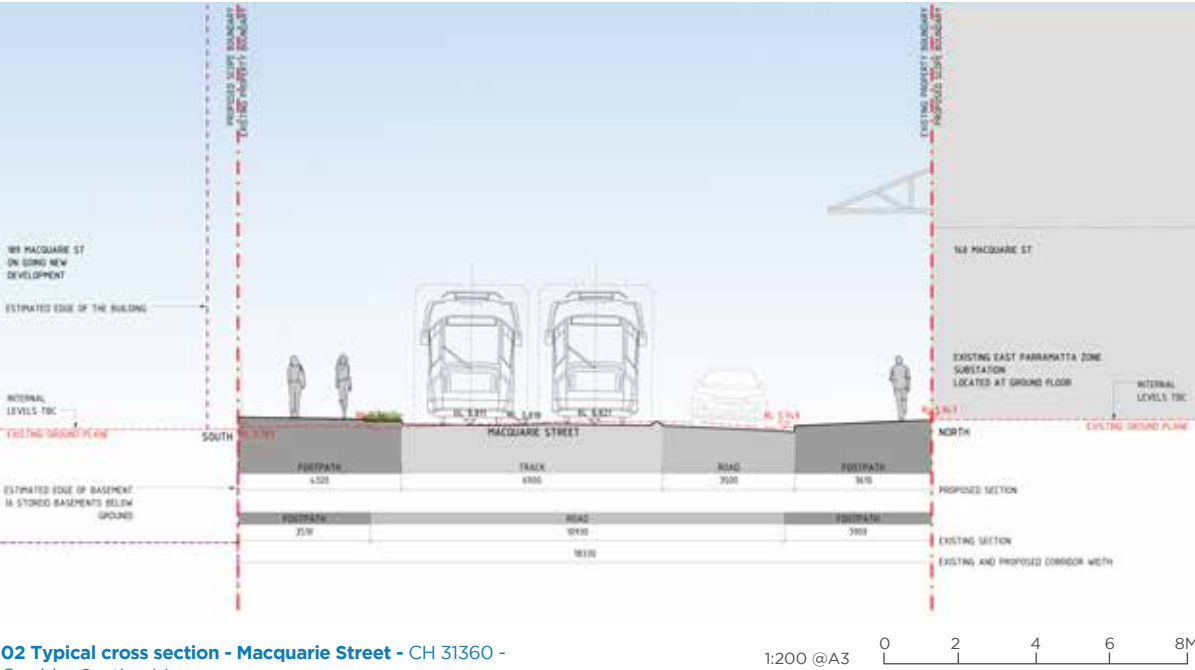
## 2.4.7 TYPICAL STREET CHARACTER

### CORRIDOR SECTIONS MACQUARIE STREET

- 01** Section H-H adjacent to Arthur Phillip School between barrack Lane and Charles Street.
- 02** Section I-I between Charles Street and Argus Lane.



**01 Typical cross section - Macquarie Street - CH 31080 - Corridor Section H-H**  
\*Refer to the Engineering drawings for information on levels



**02 Typical cross section - Macquarie Street - CH 31360 - Corridor Section I-I**  
\*Refer to the Engineering drawings for information on levels

**Legend**

Existing Tree

NOTE: All other trees shown are proposed trees



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## 2.4.7 LANDSCAPE TYPICAL ARRANGEMENT

### Church Street CBD

1. Wire-free light rail in Parramatta CBD. Footpath and track levels will be flush to maximum extent possible. Design of public domain will include delineation and elements to ensure safe and efficient light rail operations.

2. Granite paving to track. Tactile Ground Surface Indicators between track and footpaths.

3. Existing signalised intersection redesigned to accommodate light rail and to improve universal accessibility (design indicative only).

4. Granite flagstone paving on footpaths.

5. Potential outdoor dining zones in various locations within public domain. Final arrangements subject to stakeholder discussions and detailed design.

6. Eat Street stop.

7. "Flex zone" organising device located both sides of street. "Flex zone" includes public domain elements, furniture and trees.

8. Street trees/ palms with custom CBD tree pit finish. Street tree locations subject to further utility service investigations and detailed design.

9. Street lighting / multi function poles.

10. Other potential road fencing adjacent to traffic signals subject to Roads and Maritime Services

requirements. Fencing design/ appearance to be approved by TfNSW.



1:250 @A3 0 2 5 10M



# 2.4.7 LANDSCAPE TYPICAL ARRANGEMENT

## Macquarie Street CBD

1.

Low planting strip at back of kerb separating footpath and track.
2.

Catenary free light rail in Parramatta CBD.
3.

Granite flagstone paving in Parramatta CBD. Generous width footpaths both sides of street.
4.

Large street trees\*.
5.

Granite paved kerb ramps and Tactile Ground Surface Indicators to improve safety.
6.

Granite sett paving at lane way threshold to prioritise pedestrian movement.
7.

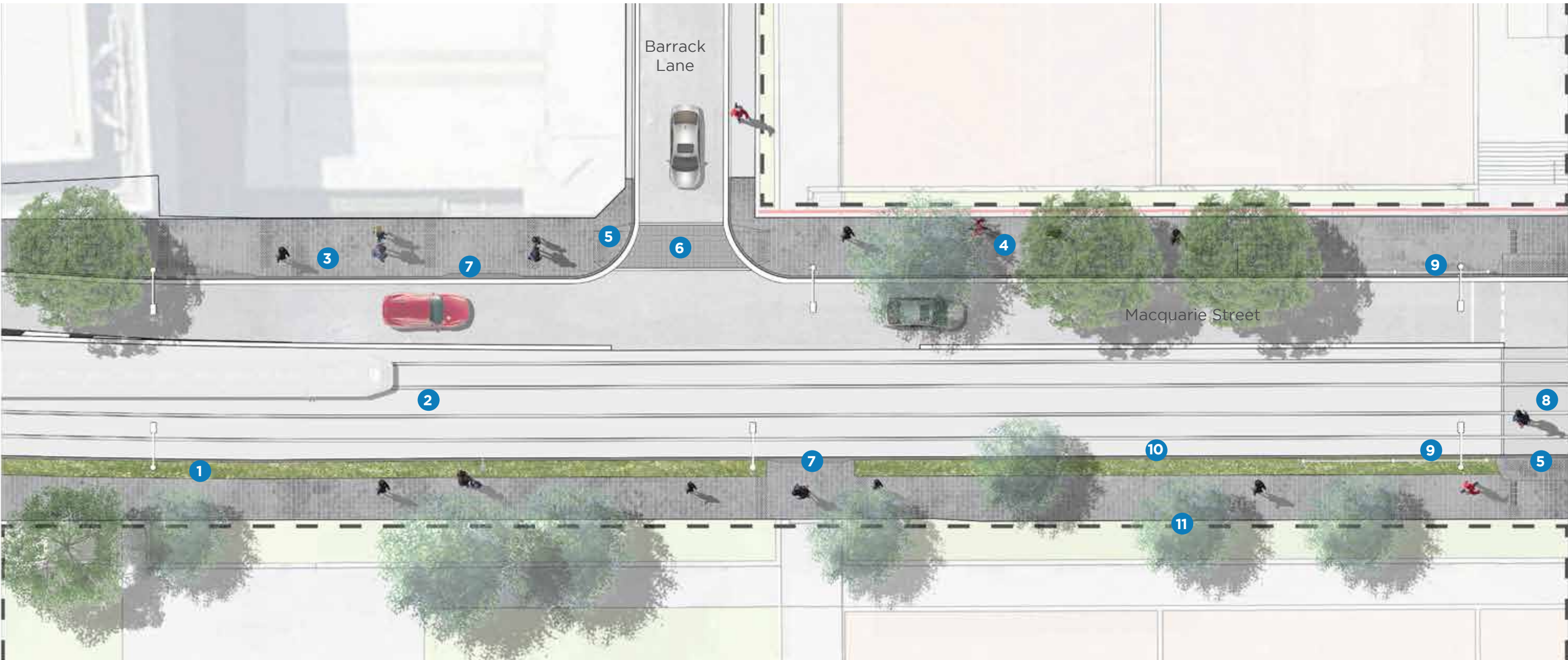
Granite kerbs in Parramatta CBD. Kerb laybacks provided at existing driveways.
8.

Existing signalised intersection improved with Tactile Ground Surface Indicators.
9.

Fencing subject to RMS requirements. Fencing design/ appearance to be approved by TfNSW.
10.

Street lighting / multi function poles.
11.

Existing trees on school site retained and protected during works.



N 1:250 @A3 0 2 5 10M



## 2.4.8 VISUALISATION - PRINCE ALFRED SQUARE



Artists impression. Images are indicative and do not show drainage, operational and other infrastructure.



## 2.4.8 VISUALISATION - CENTENARY SQUARE



Artists impression. Images are indicative and do not show drainage, operational and other infrastructure.



“ Light rail will maintain the quality and green character of the Parramatta River and foreshore parklands and be a catalyst for the renewal of Rosehill into a vibrant urban community that is closely connected to Parramatta. ”

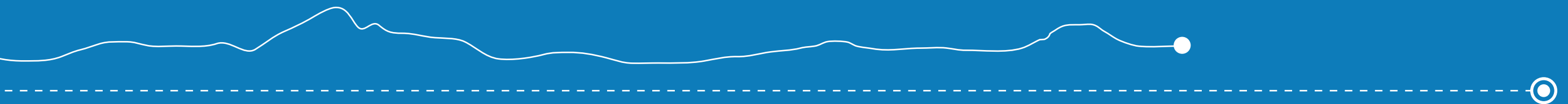


## 2.0 PRECINCT & CORRIDOR WIDE DESIGN

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# 2.5 ROBIN THOMAS RESERVE TO CAMELLIA

**PARRAMATTA LIGHT RAIL**  
URBAN DESIGN REQUIREMENTS





## 2.5.1 PRECINCT OVERVIEW

The foreshore precinct extends from Robin Thomas Reserve in the west, along George Street east to Tramway Avenue, across James Ruse Drive in to Camellia.

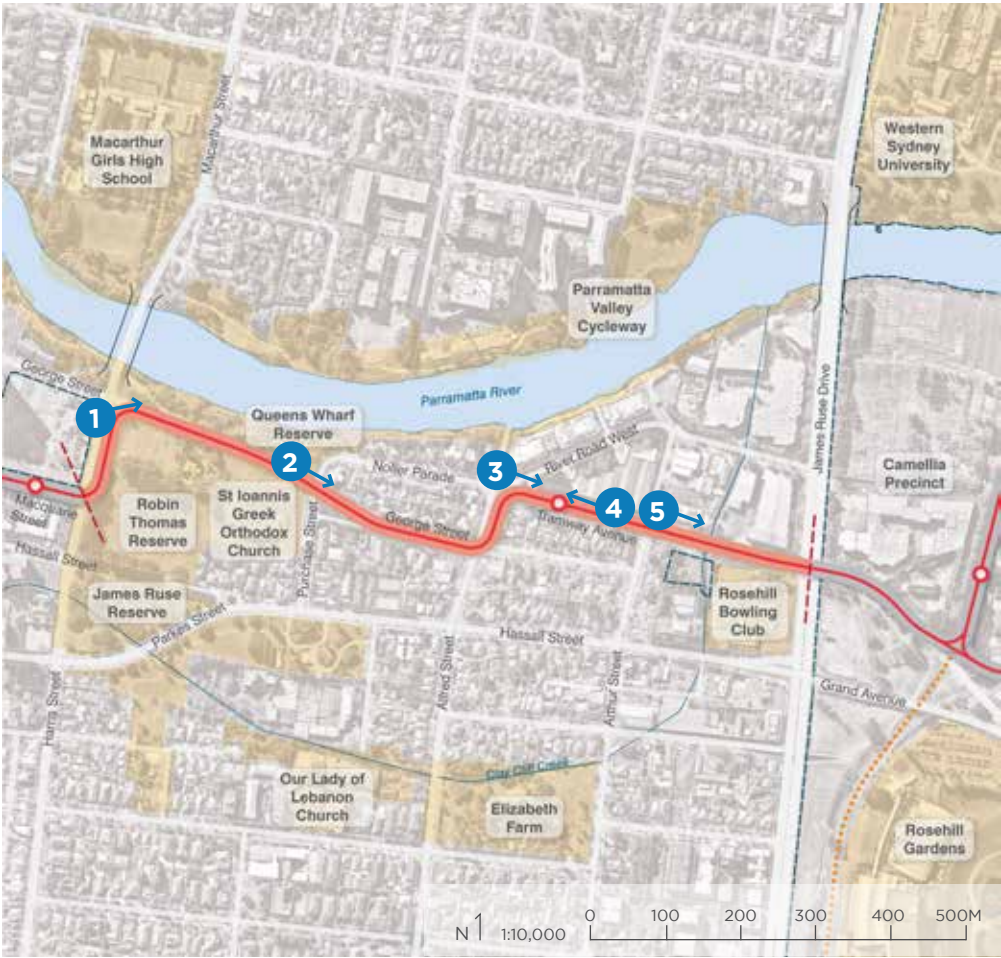
### EXISTING CHARACTER

The Harris and George Street segment of the precinct is defined by the adjoining green spaces of Robin Thomas Reserve and Queens Wharf Reserve. Robin Thomas Reserve provides valuable parkland with Aboriginal and European heritage close to Parramatta CBD. Several large high-density development sites are located nearby.

Queens Wharf Reserve is a linear parkland with extensive river frontage. There are several significant groves of paperbark trees in Queens Wharf Reserve, as well as high quality riverside paths that are a significant local and regional attraction for walking and cycling.

Tramway Avenue was historically a rail corridor, which has resulted in a wide street reserve. The south side of the street provides access to the rear of a row of detached dwellings. The northern side provides access to a large warehouse complex, typical of the transition into the extant light industrial areas of Rosehill and Camellia.

James Ruse Drive is a major road connecting the Great Western Highway to the Cumberland Highway with links to the M4 Motorway and multiple connections to Parramatta. It is a wide and traffic dominated environment with poor pedestrian amenity. There are draft plans in place to increase its current capacity.



05 Looking east across Clay Cliff Creek towards James Ruse Drive and Camellia.



04 Looking west along Tramway Avenue.



01 Looking northeast at the intersection of Harris Street and George Street towards Robin Thomas Reserve and Queens Wharf Reserve.



02 Looking east along George Street with Queen Wharf Reserve on the north and a median of mature trees on the south.



03 Looking southeast at the intersection of George Street and Alfred Street towards Tramway Avenue.



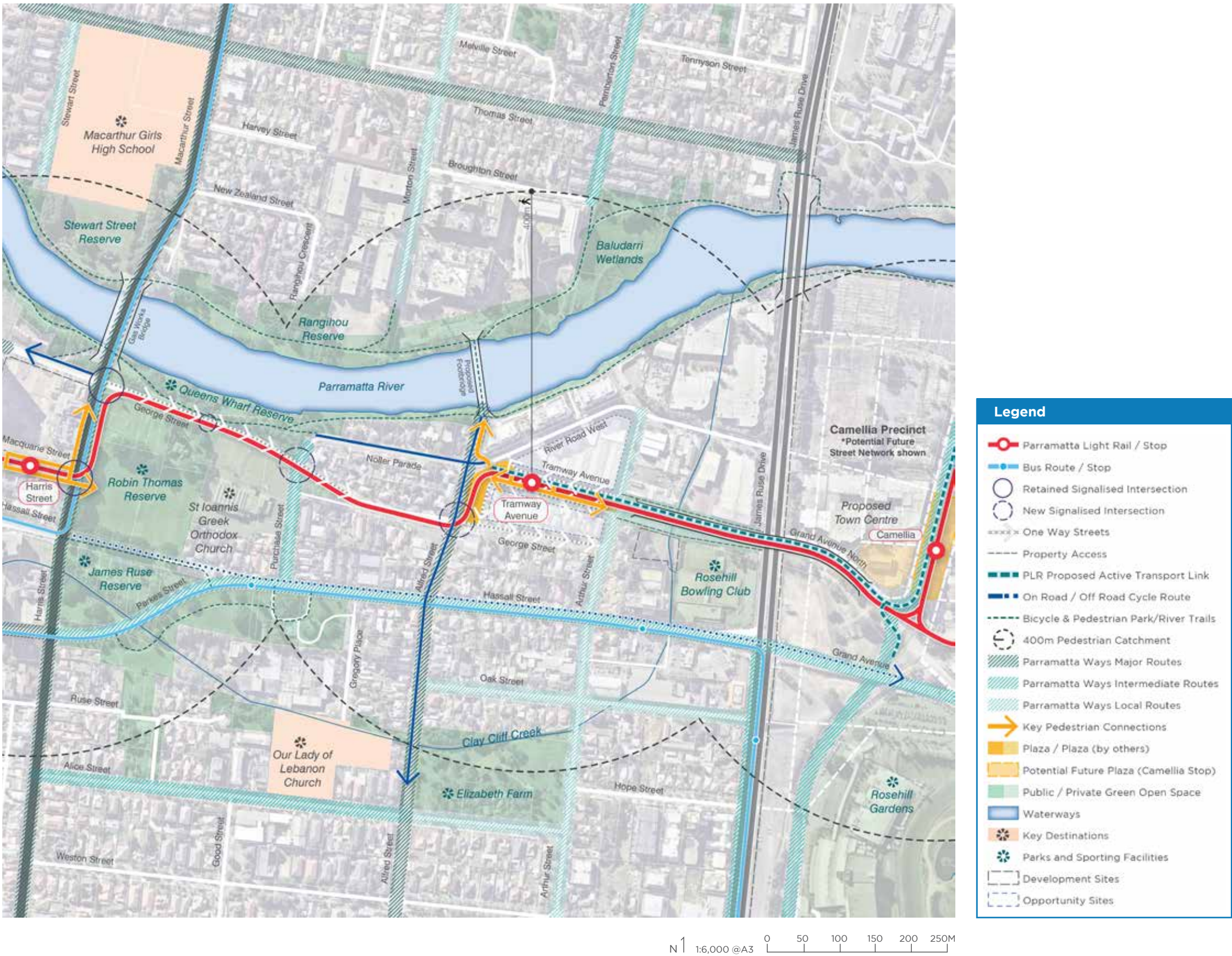
## 2.5.2 LAND USE, ACCESS AND CIRCULATION

The light rail provides a seamless public transport connection linking the Parramatta CBD to the proposed Camellia Town Centre. It enables access to the riverfront and supports the urbanisation of Rosehill.

The route runs between Queens Wharf Reserve and Robin Thomas Reserve and affords extensive views of the riverfront within a tree-lined corridor. The introduction of the light rail provides access opportunities to adjacent housing, sporting facilities and areas of cultural significance.

The Tramway Avenue Stop will provide infrastructure for cyclists with links to existing paths along the Parramatta River foreshore and to Council's proposed cycleways. There is also a provision for an ATL along the light rail corridor linking Tramway Avenue stop and Camellia.

The Project will create a safer pedestrian environment, with upgraded footpaths and new pedestrian and signalised crossings. To maintain an effective movement network in this area, it is imperative that the design of the light rail around Arthur Street, at the approach to the James Ruse Drive Bridge, is further refined to address flood issues while ensuring Arthur Street remains connected for pedestrians and bicycles.





## 2.5.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES

The George Street east segment of the Parramatta Light Rail is defined by the adjoining green spaces of Robin Thomas Reserve and Queens Wharf Reserve. An alignment and streetscape design that is highly sympathetic to this environment, will ensure that locals and visitors have access to public transport and high quality riverfront public open spaces for social and recreation activities and reinforce City of Parramatta's River City Strategy.

Tramway Avenue will be revitalised as a new pedestrian and cycle friendly local centre for an area undergoing urban renewal. Light rail will support the desired future character with a high quality public domain and connections to the Parramatta River and Parramatta CBD. The Parramatta Light Rail project will maintain the quality and green character of the Parramatta River and be a catalyst for the renewal of Rosehill.

### Pedestrian amenity

- Provide a safe, civic light rail stop on Tramway Avenue that will support the urban renewal and growth of Rosehill.
- Design a people-focused public space around the light rail stop and encourage active frontages to provide a safe, vibrant and attractive pedestrian environment.

- Create an attractive public open space on Alfred Street with high quality design of the public domain and landscaping. Maintain visual links to the river.
- Introduce high quality and robust paving, landscaping, street furniture and lighting.
- Minimise clutter to promote permeability and visual amenity around parkland

- Integrate flood mitigation strategies into the overall streetscape design to support positive landscape and urban outcomes.

### Transport

- Sensitive integrate the light rail alignment within Robin Thomas Reserve and along George Street Including wire-free from Prince Alfred Square Stop to Tramway Avenue Stop

- Design an elegant and simple bridge over James Ruse Drive that minimises visual, environmental and flood impacts on the local area and considers the designs relationship to the surrounding natural and built landscape.
- Ensure bridge landings are designed to integrate with surrounding streets and public spaces.





## 2.5.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES

- Provide safe access under the bridge for pedestrians and cyclists and clear sight lines for road users.
- Design for material durability, ease of maintenance and resistance to vandalism and graffiti.
- Consider the integration of public art, seating and landscaping.
- Consider future north-south connections along Clay Cliff Creek.

### Active transport

- Provide ATL between River Road West and Camellia.
- Provide bicycle racks and associated infrastructure to support the use of active transport.
- Enhance pedestrian links around the Tramway Avenue Stop and between the Parramatta River and Robin Thomas Reserve, nearby schools and sports fields.

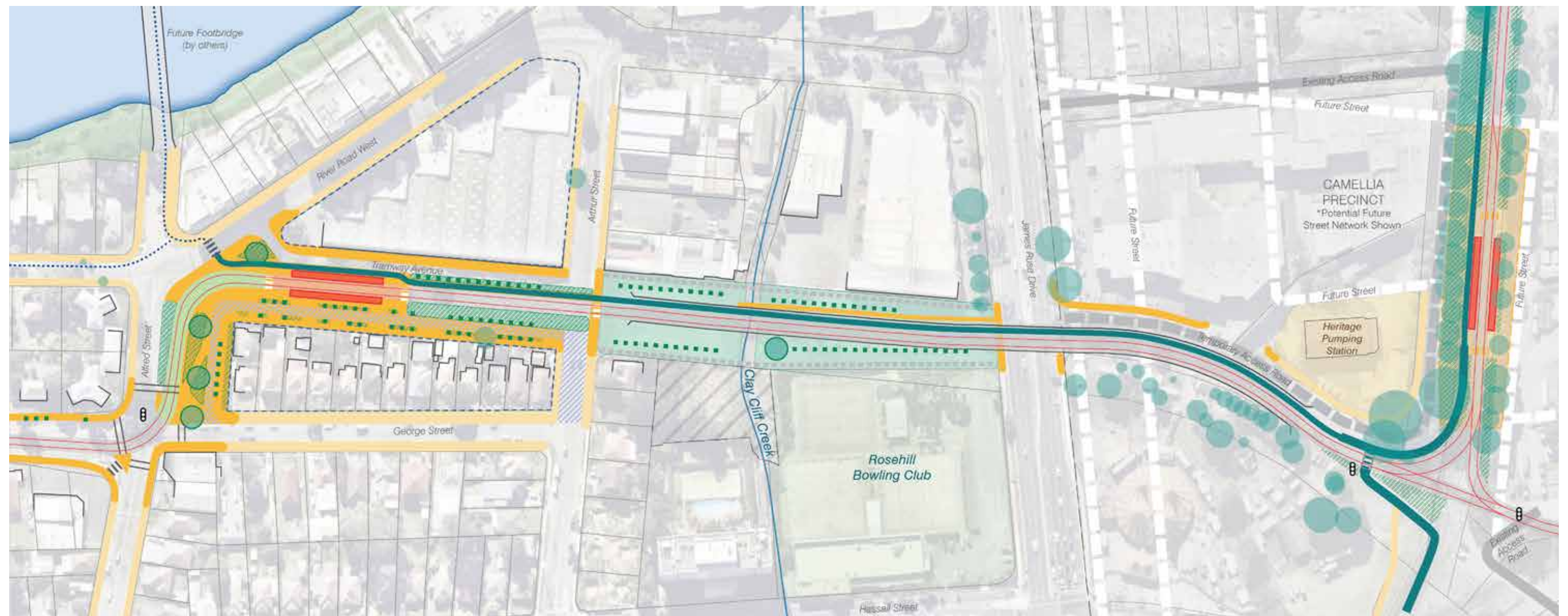
- Provide footpaths along both sides of the light rail corridor.
- Ensure pedestrian and future vehicle access to properties on the northern and southern sides of Tramway Avenue.
- Consider pedestrian and cycle movements around Alfred Street
- Facilitate local and regional pedestrian and cycle network connections and minimise impact on Queens Wharf Reserve

### Landscape

- Minimise loss of green space and trees along the light rail corridor, and the heritage listed Eucalyptus grove on the corner of George Street and Purchase Street.
- Reinforce the grid of Parramatta Green Ways Major Routes in particular, Alfred Street linking the Parramatta River Tramway Avenue Stop and Elizabeth Farm.

- Enhance the streetscapes with street \*trees of appropriate scale and form to reinforce the green corridor.
- Integrate flood detention in Tramway Avenue (if required) within a holistic streetscape and public domain design.
- Utilise WSUD to improve catchment and waterway health management, where appropriate.

- Integrate sensitively with heritage landscapes of Robin Thomas Reserve and Queens Wharf Reserve.



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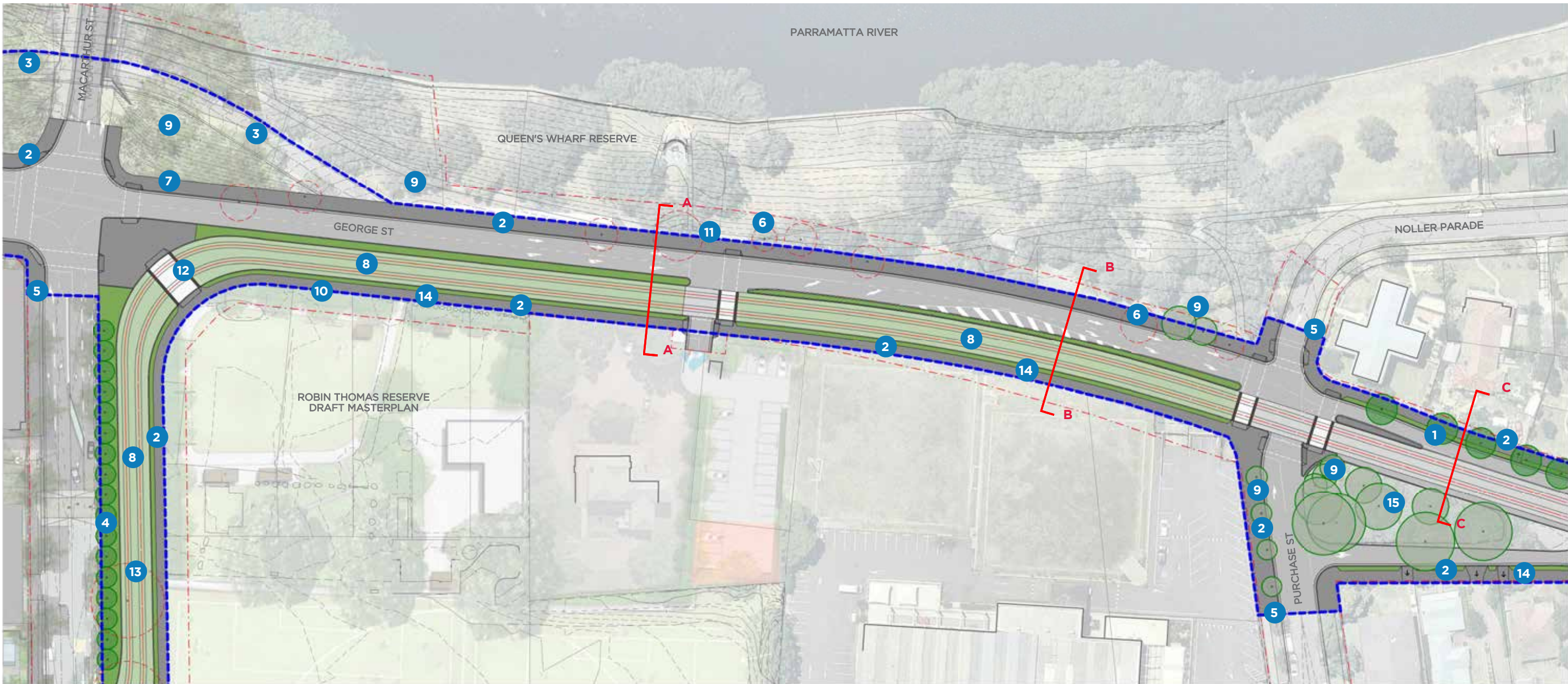


## 2.5.4 CORRIDOR AND PUBLIC DOMAIN DESIGN

The following corridor and public domain design plans indicate the project requirements for the Robin Thomas Reserve to Camellia precinct.

The plans should be read in conjunction with the sections and stop plans, as well as chapters 1 and 3.

- 1. Proposed street trees.
- 2. In situ concrete for all footpaths except footpath adjacent to Robin Thomas Reserve and 153 George Street, which is to be approved stone material.
- 3. Remove existing slip-road, replace with turf and return it to Queens Wharf Reserve.
- 4. Trees in low planting. Opportunity for WSUD.
- 5. Tie new footpaths in to existing.
- 6. Existing trees to be removed.
- 7. Narrower footpath at top of slope and edge of Queens Wharf Reserve.
- 8. Green track between Harris Street and Purchase Street.
- 9. Minimise impact on existing trees in adjacent green open spaces and properties. Existing trees to be retained and protected.
- 10. Tie in design with Robin Thomas Reserve Masterplan.
- 11. Tie new footpath in to existing paving and levels in Queens Wharf Reserve.
- 12. Widened pedestrian crossing.
- 13. Green track between Alfred Street and Tramway Avenue Stop.





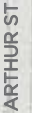
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- 20.** \*Trees, low planting and WSUD

- Opportunity to remove general traffic from northern side of

- 24.** Un-signalised pedestrian crossing with pram ramps and tactile indicators.

receipt of survey accurate cadastre.


$$z^1$$



# 2.5.4 CORRIDOR AND PUBLIC DOMAIN DESIGN

25. Landmark tree, bicycle rack and seat.

26. Landscaped terraces with stone-faced retaining walls subject to assessment of utilities impacts at detail design stage.

27. ATL. In situ concrete finish.

28. Steps connecting Arthur Street.
29. Low planting.

30. Space provision for vehicle access to properties on Tramway Avenue. Turf finish.

31. Trees in low native planting.

32. Turf.

33. Vehicle access to Clay Cliff Creek
- retained. Locate new trees to ensure access.

34. James Ruse Drive Bridge.

35. Accessible bridge ATL. In situ concrete finish.

36. Ramp connecting Bridge ATL and Tramway Avenue.
37. Shared path. In situ concrete finish.

38. Landmark tree.

39. \*Tree planting.

40. Lighting throughout Tramway Avenue.

41. Footpath. In situ concrete finish.

42. Temporary access road.

Legend

---

\*\*PLR Project works boundary

---

PLR disturbance footprint

B

Bus Interchange / Stop

Pavement

Tree

Existing tree retained

Landmark Tree

Palm Tree

Existing tree removed

Low planting and water sensitive urban design opportunity

Potential outdoor dining zone

Marked pedestrian crossing

C

Point Control Box

\*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.

\*\*Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.

N 1:1000 @A3 0 10 20 30 40 50M

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SENSITIVE: NSW GOVERNMENT



## 2.5.5 STOP LAYOUTS

### TRAMWAY AVENUE STOP

#### Side Platform stop configuration

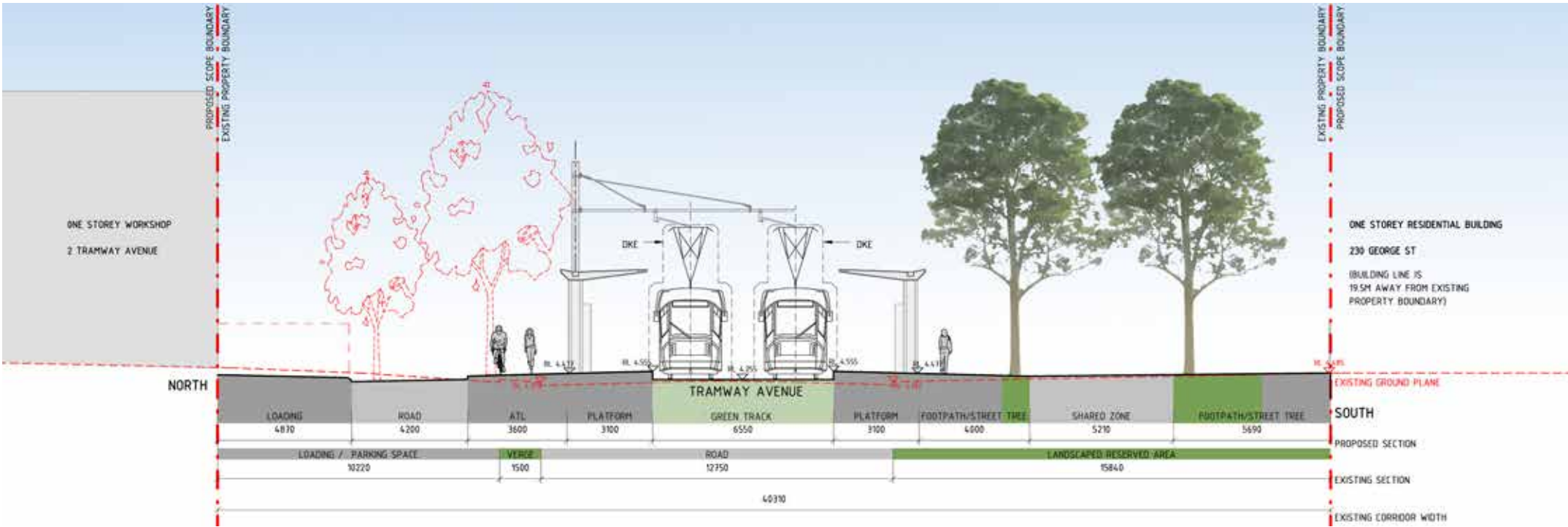
The Tramway Avenue Stop is located at the intersection of Alfred Street, River Road West and Tramway Avenue. The surrounding area is currently experiencing urban renewal and the stop forms an important link to the future Camellia Town Centre development. The stop and the surrounding infrastructure provides connections to existing cycle paths along the river and to the Parramatta CBD. The location of the stop creates a new public space with potential for active frontages and enhanced landscape treatment to the street and shared zone.

The ATL along the light rail corridor, linking Camellia and Carlingford, commences at this stop and connects onto the James Ruse Drive Bridge. The track is raised from the surrounding area to minimise flood impact but pedestrian access along Arthur Street (over the light rail) will be provided. The platforms on the north and south are accessed by walkways. The southern platform backs onto a tree-lined footpath. A three-module canopy configuration is proposed for this stop (subject to patronage numbers).



Tramway Avenue Stop Plan

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Tramway Avenue Stop CH 32300 - Section D-D  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M




# 2.5.6 TYPICAL STREET CHARACTER

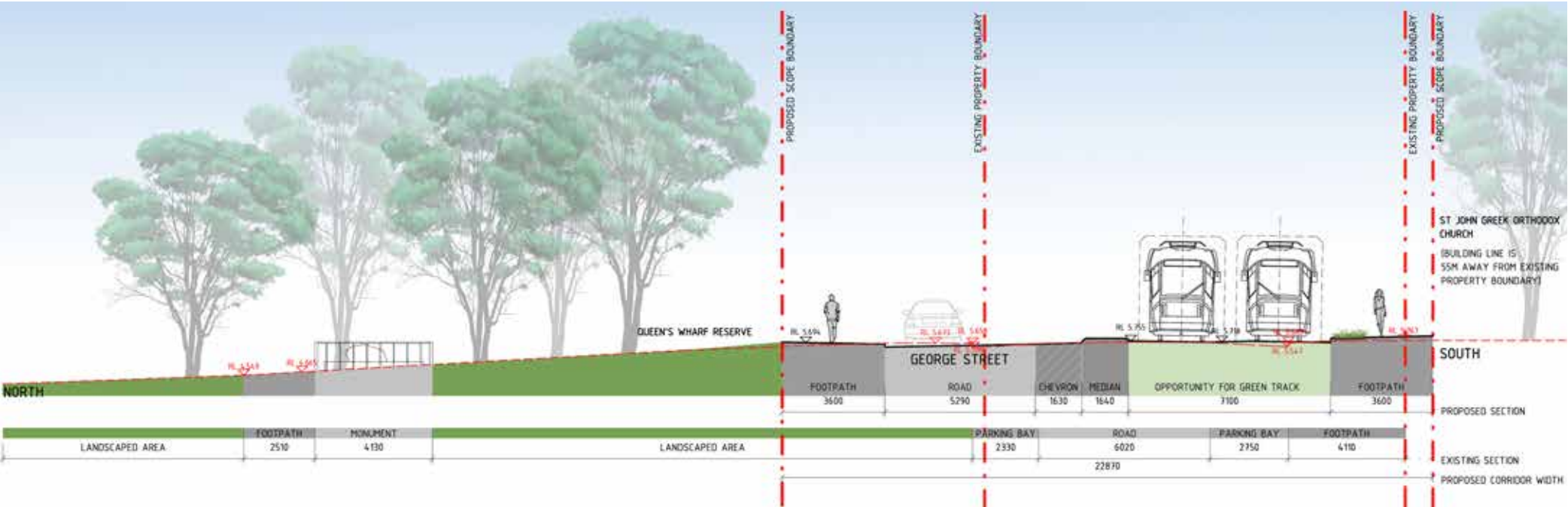
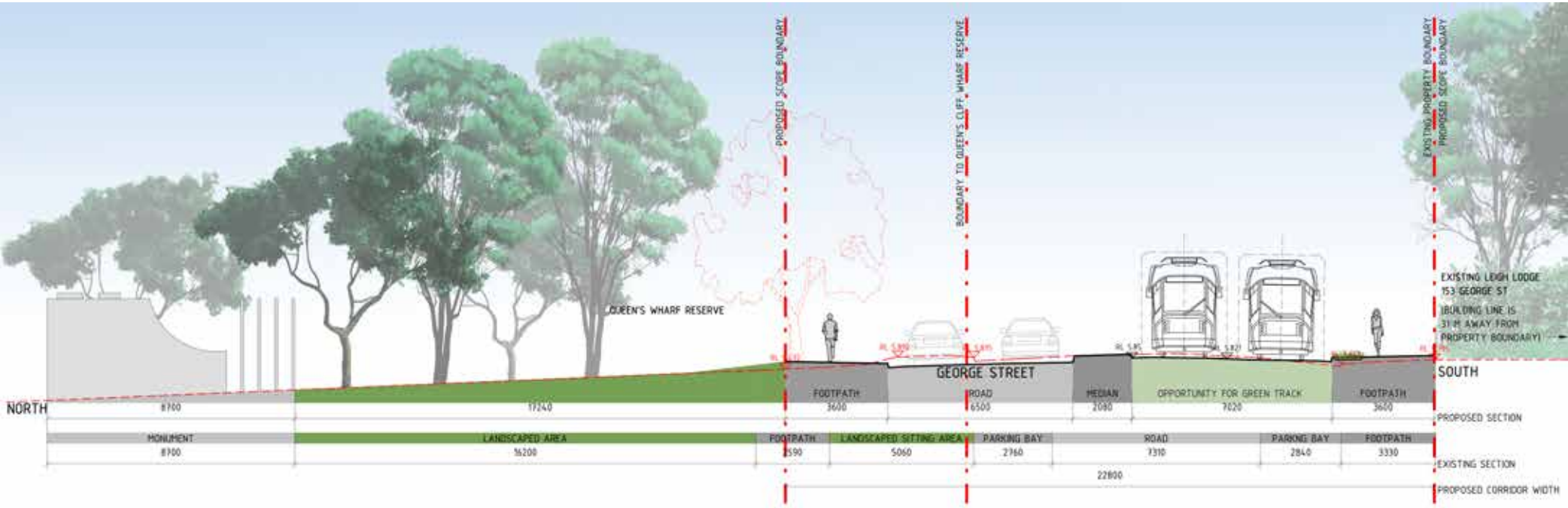
## CORRIDOR SECTIONS

- 01 Section A-A George Street adjacent to Leigh Lodge and Queens Cliff Wharf reserve.
- 02 Section B-B George Street adjacent to Queens Cliff Wharf and St John's Greek Orthodox Church.

Legend



Existing Tree  
NOTE: All other trees shown are proposed trees






## 2.5.6 TYPICAL STREET CHARACTER

### CORRIDOR SECTIONS

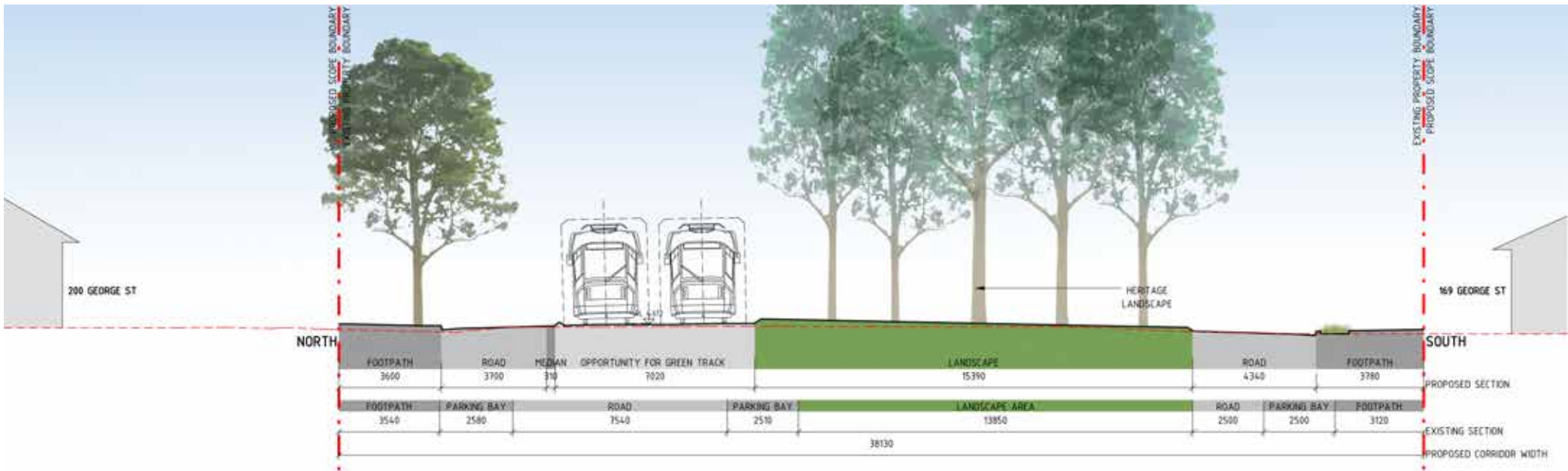
- 01 Section C-C between Purchase Street and Alfred Street.
- 02 Section E-E between Alfred Street and Arthur Street.

Legend



Existing Tree

NOTE: All other trees shown are proposed trees



01 Typical cross section - George Street CH 31960 - Corridor Section C-C  
\*Refer to the Engineering drawings for information on levels



02 Typical cross section - Tramway Avenue CH 32380 - Corridor Section E-E  
\*Refer to the Engineering drawings for information on levels



# 2.5.7 LANDSCAPE TYPICAL ARRANGEMENT

## Robin Thomas Reserve

1.

Low planting strip at back of kerb separating footpath and track.
2.

Approved stone footpath to footpath adjacent to Robin Thomas Reserve.
3.

Insitu concrete.
4.

Signalised intersection providing safe pedestrian crossing and vehicular access.
5.

Insitu concrete pram ramps and Tactile Ground Surface Indicators.
6.

Narrower footpath alongside Queens Wharf Reserve to reduce extent of works / impact on the Reserve.
7.

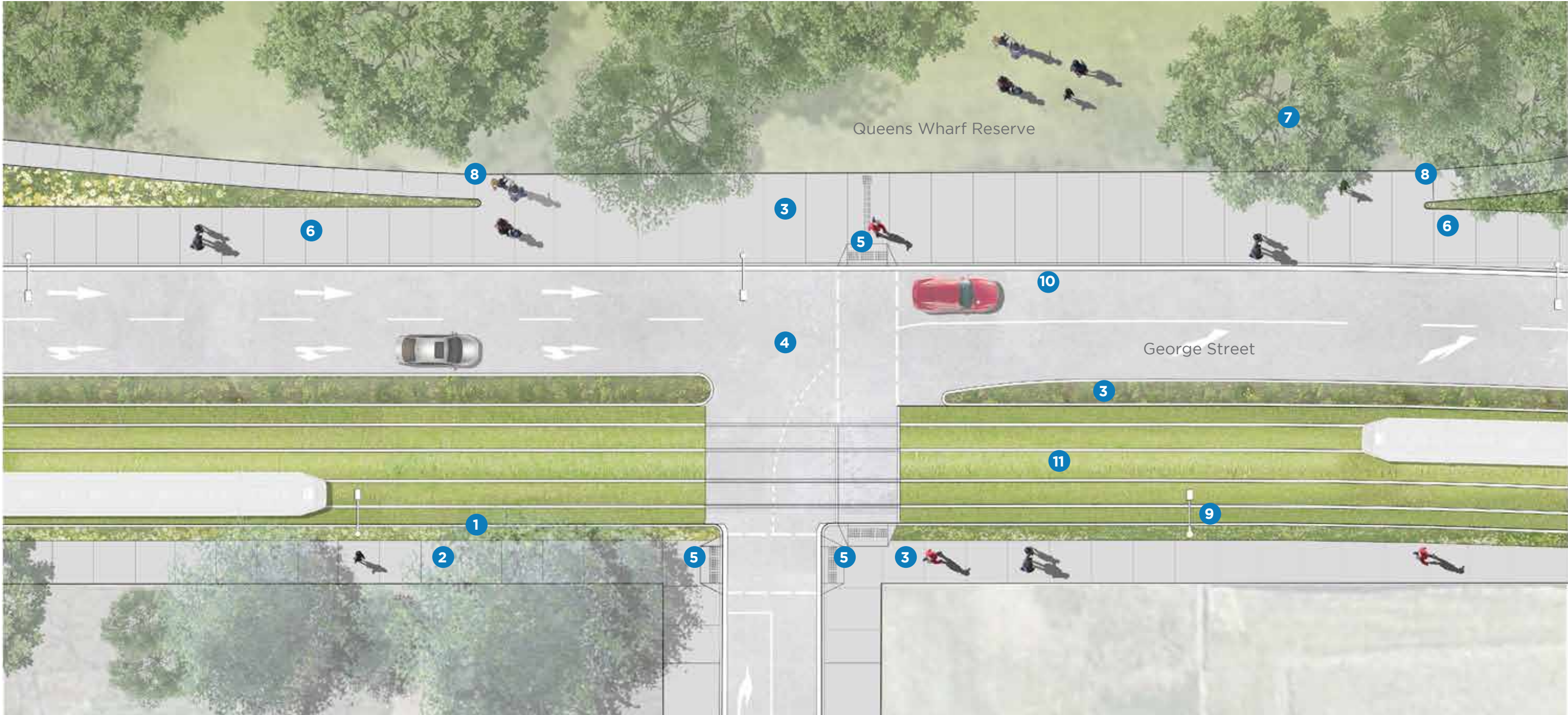
Existing trees in Reserve retained wherever possible and protected during works.
8.

New footpath keyed into existing pathways within Reserve.
9.

Street lighting locations indicative only.
10.

Opportunity for on-road cycle movement (by others).
11.

Green track.



N 1:250 @A3 0 2 5 10M



2.5.8 VISUALISATION - ROBIN THOMAS RESERVE



Artists impression. Images are indicative and do not show drainage, operational and other infrastructure.



“ A future proof connection which enhances the desired urban and public domain structure of the Camellia Town Centre; maintains the regional functionality of James Ruse Drive; and addresses mobility needs of future residents and workers. ”

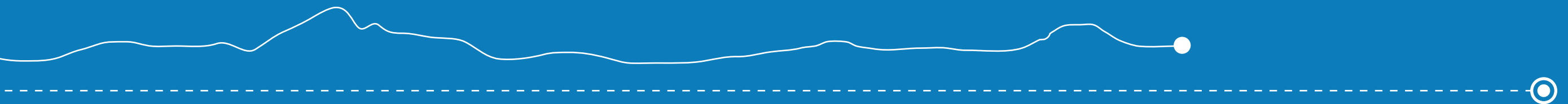


## 2.0 PRECINCT & CORRIDOR WIDE DESIGN

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# 2.6 CAMELLIA

### **PARRAMATTA LIGHT RAIL** URBAN DESIGN REQUIREMENTS





## 2.6.1 PRECINCT OVERVIEW

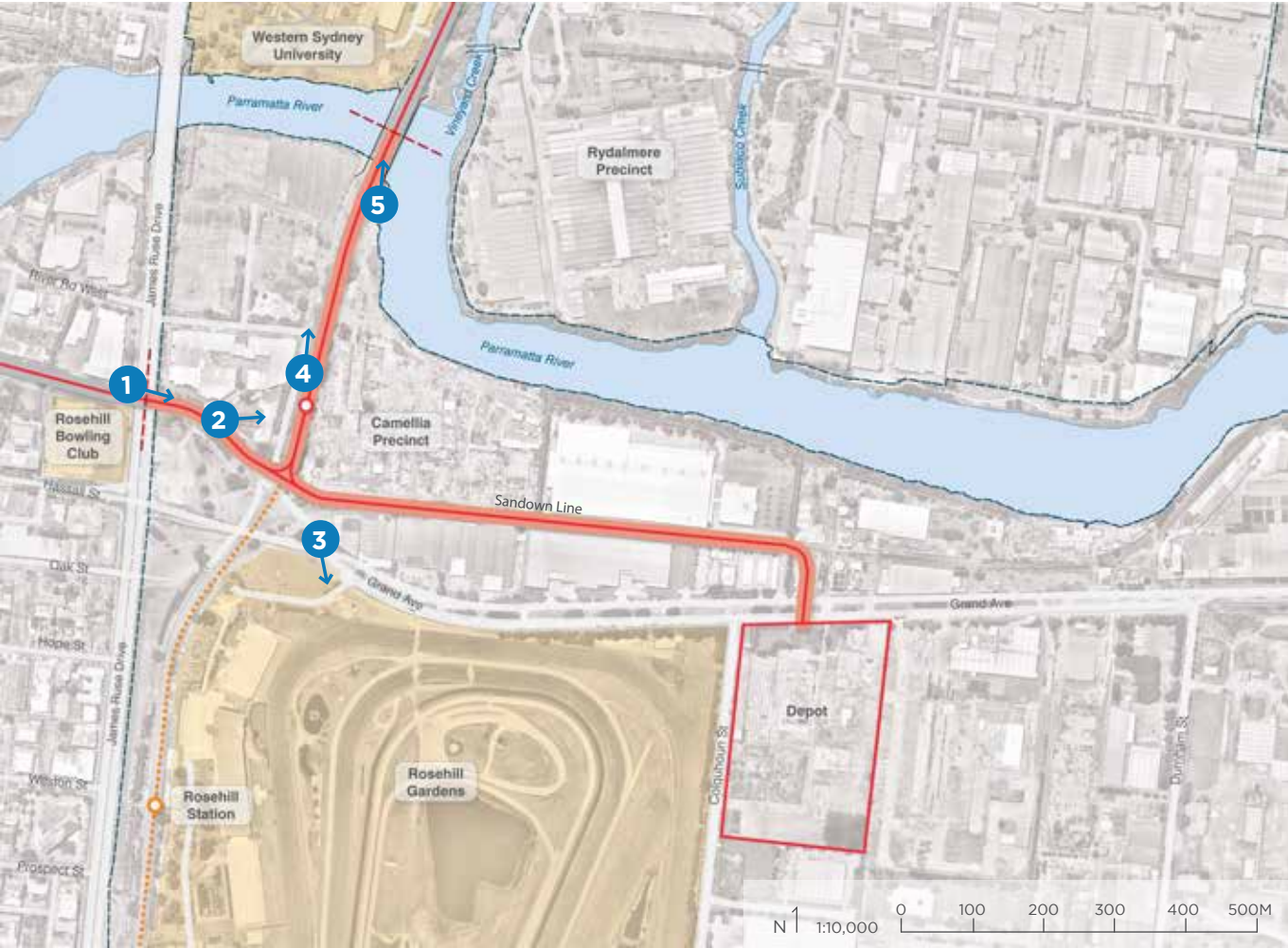
The Camellia precinct is bounded by James Ruse Drive to the west, Parramatta River to the north and Rosehill Gardens Racecourse to the south. It includes Camellia Station, Grand Avenue and the existing Sandown Line running east.

The existing Camellia Railway Station predominantly services the existing industrial area with large areas of hardstand on redundant land with extensive river frontage.

The Department of Planning and Environment and the City of Parramatta are currently preparing plans to rezone the existing industrial area into a mixed-use town centre with supporting employment uses to the east. Several key land owners within the town centre are pursuing planning proposals adjacent to the rezoning and light rail design. Rosehill Racecourse is also preparing a master plan to transform their facility into a major entertainment destination.

Grand Avenue is listed as a local heritage item, for its past use as a tram route. Sydney Water Pumping Station 67, located to the west of the existing Camellia Station, is listed as a state heritage item. The pumping station is currently operational, but relocation is being considered in the rezoning process.

The key challenge for this corridor is the co-ordination and implementation of the light rail to support state and local government's future planning vision for Camellia.



05 Looking south towards the existing railway bridge over Parramatta River.



04 Looking north from the existing Camellia Train Station.



01 Looking east across James Ruse Drive towards Camellia.



02 Looking northeast along Grand Avenue North towards the heritage-listed pumping station.



03 Looking southeast along Grand Avenue towards Rosehill Gardens Racecourse.

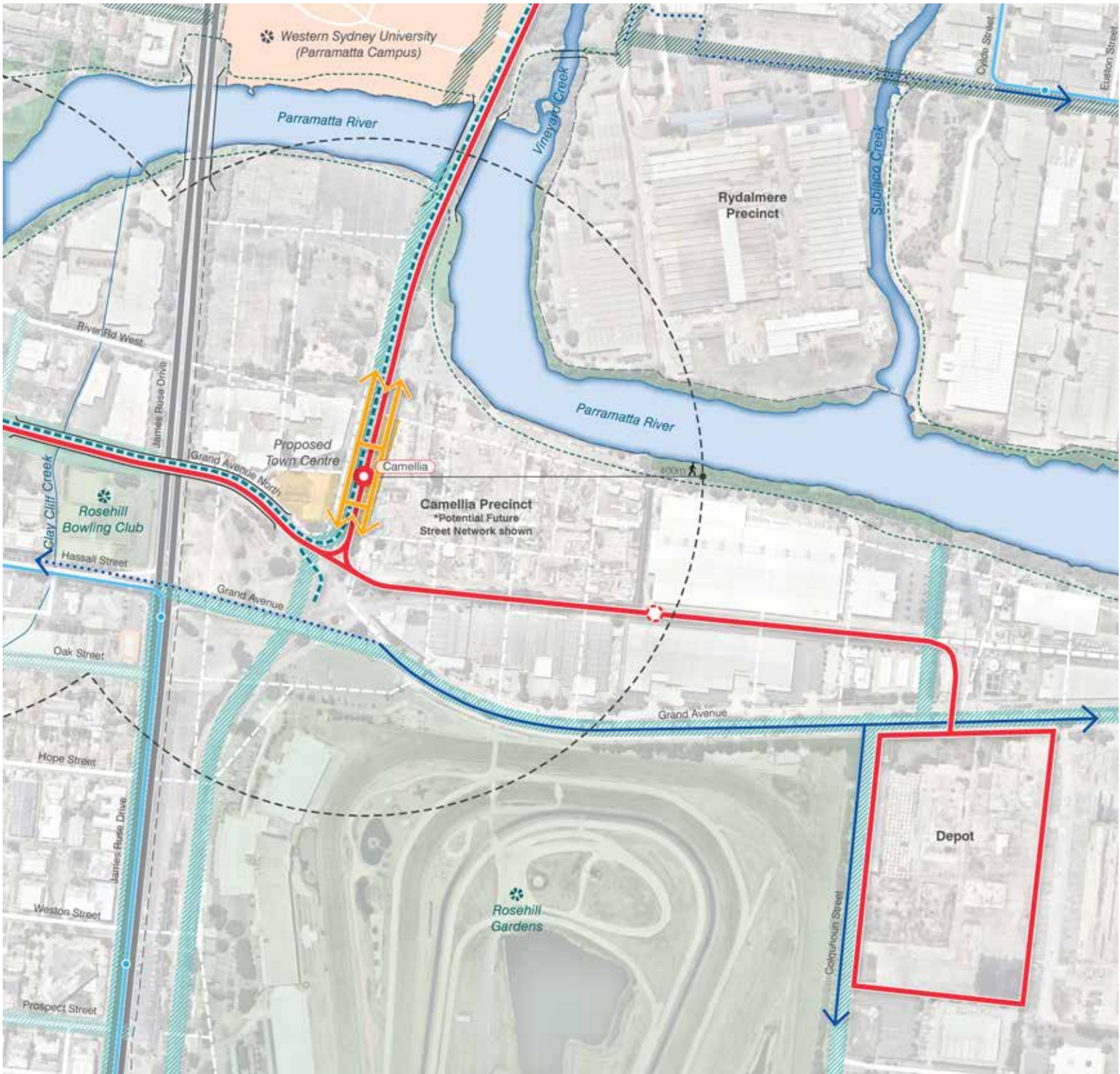


2.6.2 LAND USE, ACCESS AND CIRCULATION

A two-way light rail line will replace the existing single heavy rail line, between Camellia and Carlingford, providing a more efficient and frequent public transport offer.

An ATL will follow the alignment of the light rail line from the Tramway Avenue stop, across James Ruse Drive overpass, through Camellia Town Centre, and north to Carlingford. Provision is made for an attachment to the existing rail line bridge over the Parramatta River to accommodate both the dual light rail line and ATL.

The Camellia Stop will be located within the proposed town centre civic plaza, just north of the existing Camellia Railway Station. A light rail spur from the junction, to the east along the Sandown rail alignment, will provide access to the light rail depot to enable stabling and maintenance. The eastern light rail corridor will be future proofed for potential Stage 2 light rail.





## 2.6.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES

The Camellia Town Centre is planned to be a 21st century living and business district comprising industry research, education, employment, retail, recreation, entertainment and residential uses with transport at its heart. The light rail is an integral component of the Camellia

Town Centre vision and its growth as a vibrant mixed-use area. Ongoing consultation between NSW Government agencies continue to coordinate light rail and Camellia Town Centre design. The Sandown line extends from Camellia Town Centre to the depot as two light rail tracks.

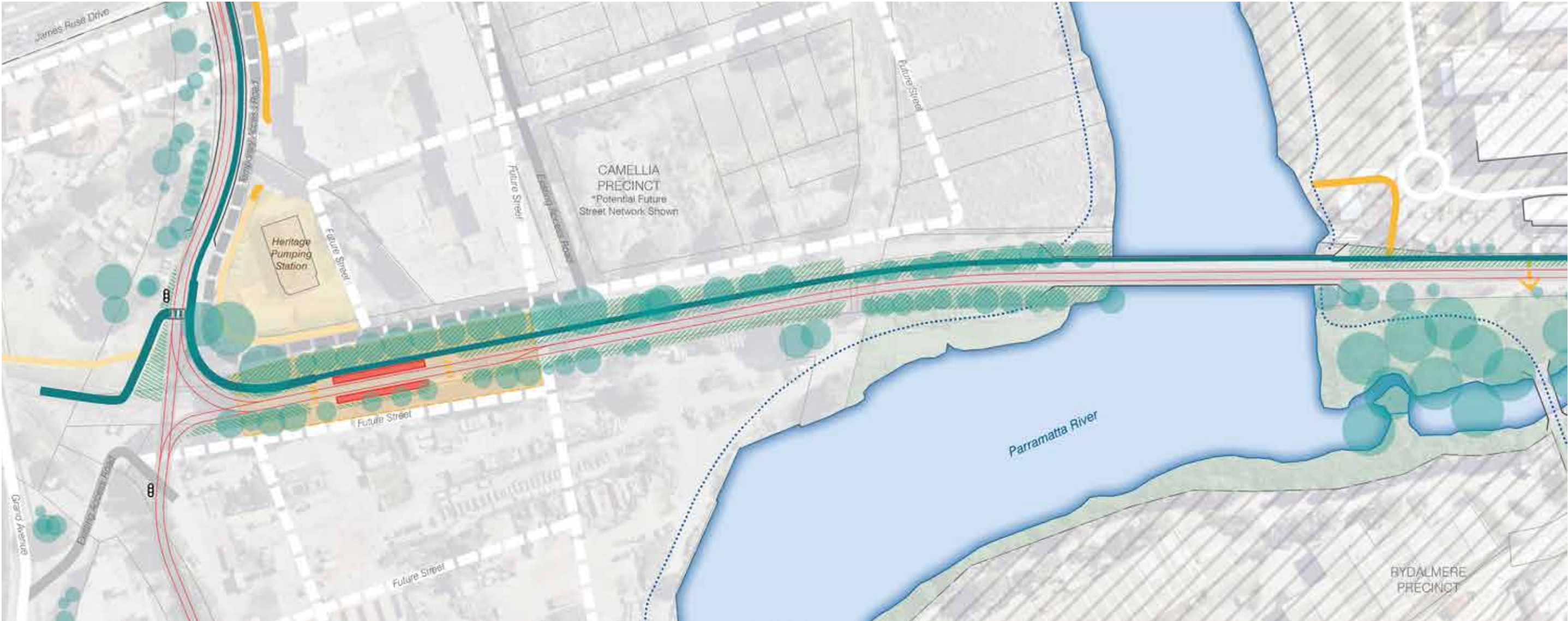
### Pedestrian amenity

- Facilitate the urban renewal of Camellia for transit-oriented development, urban activation and place making.
- Allow for a large, safe, civic plaza at the Camellia Stop and town centre with high quality public domain.
- Ensure pedestrian safety by maintaining sight lines around the proposed stops and junction.

- Ensure safe and easy pedestrian movement around The Camellia Stop, town centre and the Parramatta River.
- Provide a sensitive interface with and views to the historic Sydney Water heritage pumping station.
- Provide safe and generous pedestrian access to Rosehill Racecourse, from the Camellia stop, to accommodate event demand.

### Transport

- Ensure the light rail alignment and levels support the evolving urban form of the Camellia Town Centre.
- Ensure safe access to the light rail that considers Camellia's development staging. Design a legible, well-connected, and well-lit urban environment.
- Design the James Ruse Drive overpass landing to integrate with the proposed town centre and plaza. Maximise access and minimise hidden, awkward spaces around the landing.
- Integrate with planned Camellia Town Centre by minimising track area and integrating light rail infrastructure.



1:2000 @A3 0 20 40 60 80 100M



## 2.6.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES

- Adapt the Sandown Line to support light rail access to the light rail stabling and maintenance facility.
- Enable accessible transport interchange to any future expansion of light rail.
- Ensure the stabling and maintenance facility addresses Grand Avenue and reinforces the streetscape.

- Extend the stop slab to provide for future street intersection north of Camellia stop.
- Design to consider possible extension of light rail from Camellia stop to Clyde along existing heavy rail corridor.

- Active transport**
- Incorporate an ATL from the Tramway Avenue stop over James Ruse Drive to Camellia stop and north along light rail corridor to Carlingford.
  - Design a sensitive bridge addition to accommodate the ATL.

- Landscape**
- Provide high-quality landscape around light rail stop and beside track.
  - Plan for substantial tree planting and other green elements to reduce the heat island effect.

- Coordinate landscape plan with the Camellia Town Centre master plan.
- Retain easement and access to north-south underground fuel line adjacent to the rail alignment.
- Retain existing trees and provide low level planting with shallow top soil adjacent to utility services to improve stop amenity and stabilise embankment.

Legend

Parramatta Light Rail / Stop

Potential Additional Stop Location

Plaza/Footpath Upgrade

Potential Future Urban Plaza

Potential Pedestrian Crossing

Plaza/Footpaths (by others)

Signalised Pedestrian Crossing

Unsignalised PLR Pedestrian Crossing

PLR Proposed Active Transport Link

Shared Cycle Route

Property Access

Understorey Planting

Existing Retained Trees

Public / Private Green Open Space

Master Plans / Development Sites

*\*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.*



## 2.6.4 CORRIDOR AND PUBLIC DOMAIN DESIGN

The following Corridor and Public Domain Design plans indicate the project requirements for the Camellia precinct.

The plans should be read in conjunction with the sections and stop plans, as well as Chapters 1 and 3.

1.

Camellia Stop.

2.

ATL. Insitu concrete finish in Camellia.

3.

Widened path between stop and Australian Turf Club property.
4.

Widened pedestrian crossing.

5.

Track with insitu concrete.

6.

Existing trees removed.

7.

Existing trees retained and protected.
8.

Low planting, subject to underground utility locations.

9.

Low planting with WSUD opportunity between track and ATL.
10.

Rail crossing.

11.

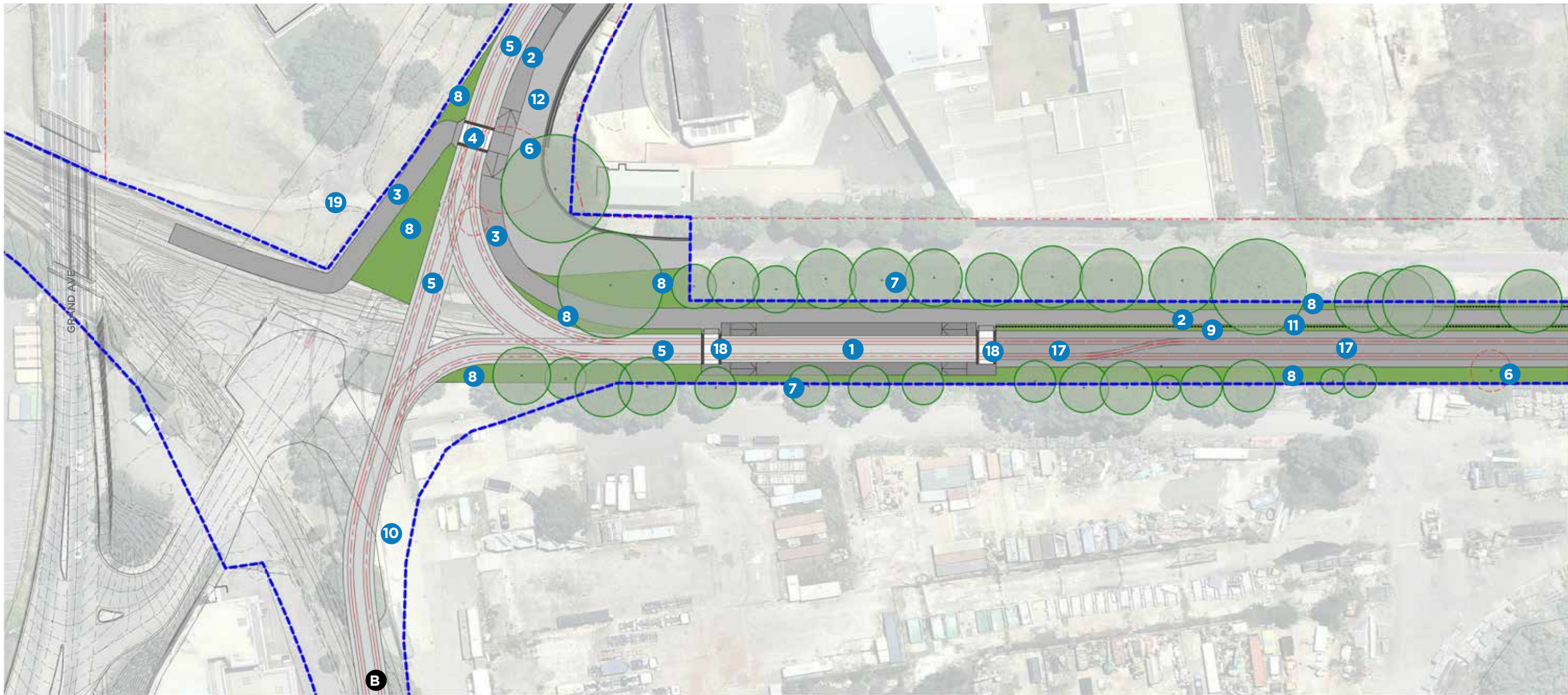
Fence, subject to safety assessment.

12.

Access road. Subject to Camellia Precinct Plan.

13.

Low Native Planting.


















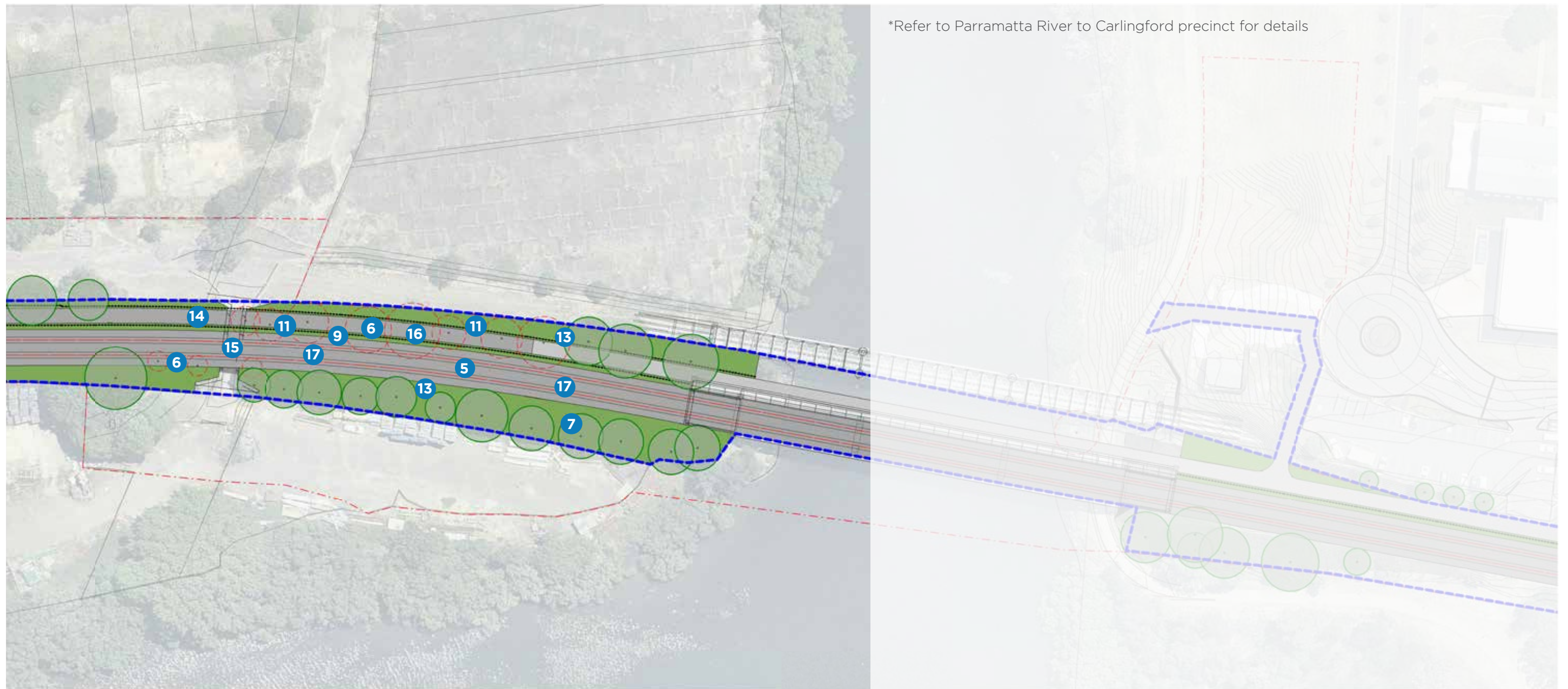
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14. Insitu concrete to ATL.
15. Double-track light rail.
16. Pole lighting along ATL
17. Ballast track (north of Camellia Stop).

18. Stop crossings.
19. Access to Rosehill Gardens Racecourse.

## Legend

- |   |                              |   |   |  |
|---|------------------------------|---|---|--|
|  | **PLR Project works boundary |  | Palm Tree   | *Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements. |
|  | PLR disturbance footprint    |  | Existing tree removed                                     |  |
|  | Bus Interchange / Stop       |  | Low planting and water sensitive urban design opportunity |  |
|  | Pavement                     |  | Potential outdoor dining zone                             |  |
|  | Tree                         |  | Marked pedestrian crossing                                | **Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.   |
|  | Existing tree retained       |  | Point Control Box   |  |
|  | Landmark Tree                |   |   |  |



\*Refer to Parramatta River to Carlingford precinct for details

1:1000 @A3





#### CARLINGFORD LINE -

A green permeable and well connected transport corridor linking evolving centres along the route and connecting communities with Parramatta CBD.

#### RYDALMERE -

A local opportunity to serve a growing educational, employment and residential precinct, incorporating active transport, improved transport interchange and improved connections to Western Sydney University via a new pedestrian bridge over Vineyard Creek.

#### DUNDAS -

An interchange that bridges major roads and steep topography to connect communities and catalyse the revitalization of Dundas Town Centre.

#### TELOPEA -

A thoughtfully positioned stop that bridges the rail corridor and improves the overall legibility of the street and public space network proposed within the future Telopea Town Centre.



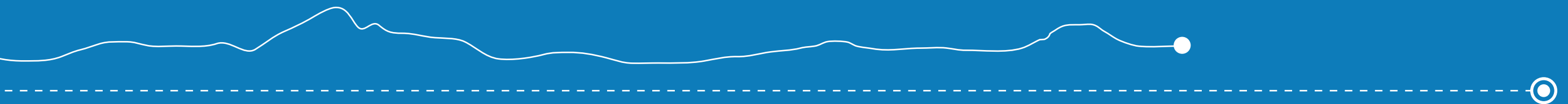


## 2.0 PRECINCT & CORRIDOR WIDE DESIGN

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# 2.7 PARRAMATTA RIVER TO CARLINGFORD

### PARRAMATTA LIGHT RAIL URBAN DESIGN REQUIREMENTS





## 2.7.1 PRECINCT OVERVIEW

The Parramatta River to Carlingford precinct runs along the existing rail corridor from Camellia to Carlingford and includes Rydalmere Railway Station, Dundas Railway Station, Telopea Railway Station and terminates at Carlingford Railway Station.

The precinct is distinct from other Parramatta Light Rail precincts as it utilises an existing heavy rail alignment and is set within a dedicated corridor with few street interfaces. The scale and character of existing development around the corridor is generally more suburban, with evolving higher density local centres located at the existing stations.

Strategically, the route connects with several important development sites, including:

- The WSU, Rydalmere Campus.
- The planned Metro residential redevelopment at Rydalmere.
- The proposed redevelopment of the Telopea Urban Renewal area.
- The high residential development at Carlingford.



01 Looking south from the existing Rydalmere Train Station towards Western Sydney University.



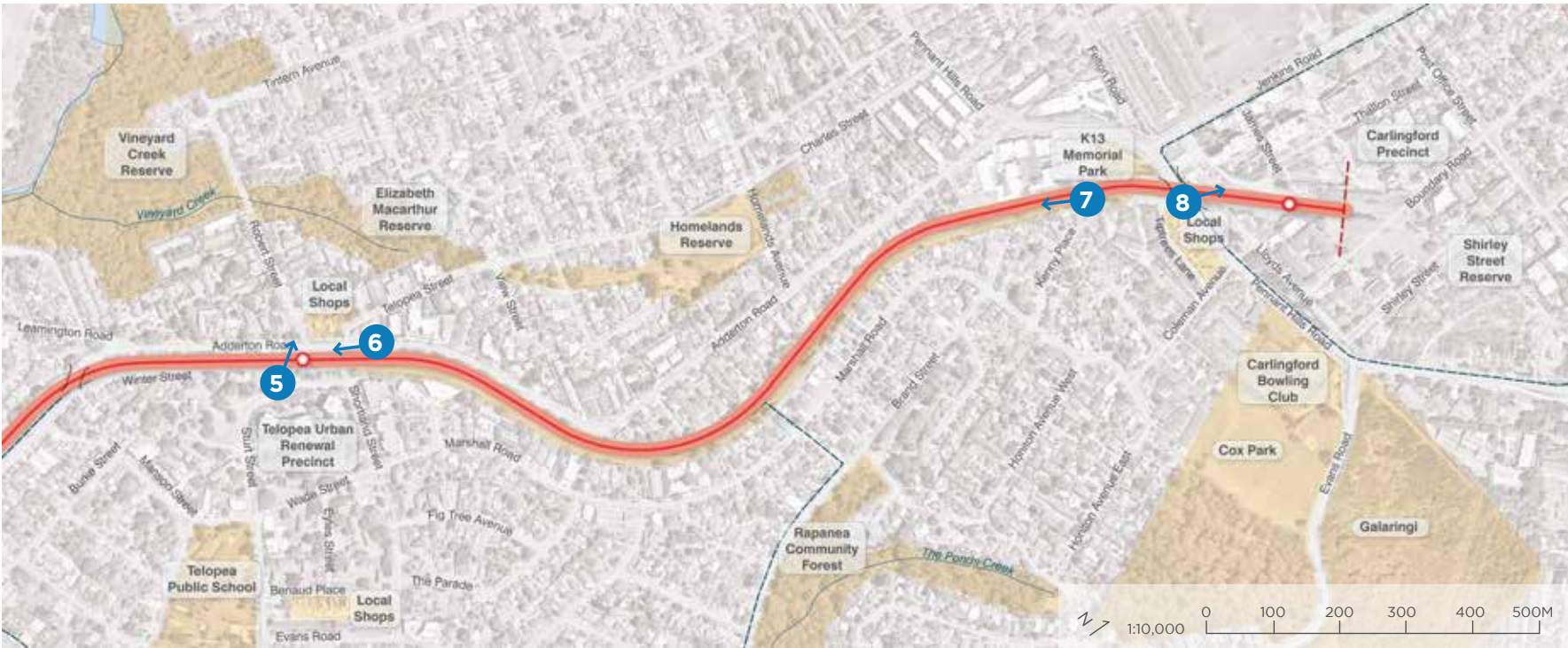
02 Looking north from the existing Rydalmere Train Station towards the Victoria Road overpass.



03 Looking north along Dudley Street with the existing railway corridor on the west.



# 2.7.1 PRECINCT OVERVIEW



08 Looking north from the Pennant Hills Road overpass towards the existing Carlingford Train Station.



04 Looking northwest from Station Street towards local shops and the existing Dundas Train Station.



05 Looking northwest from the eastern entry of the existing Telopea Train Station towards the railway tracks and local shops in the distance.



06 Looking south along Adderton Road with the existing Telopea Train Station on the east and local shops on the west.



07 Looking south along the existing linear park adjacent to the railway tracks between Carlingford and Telopea.



## 2.7.2 LAND USE, ACCESS AND CIRCULATION

The predominant land use throughout this precinct is low to medium density residential, with pockets of higher density residential around existing railway stations.

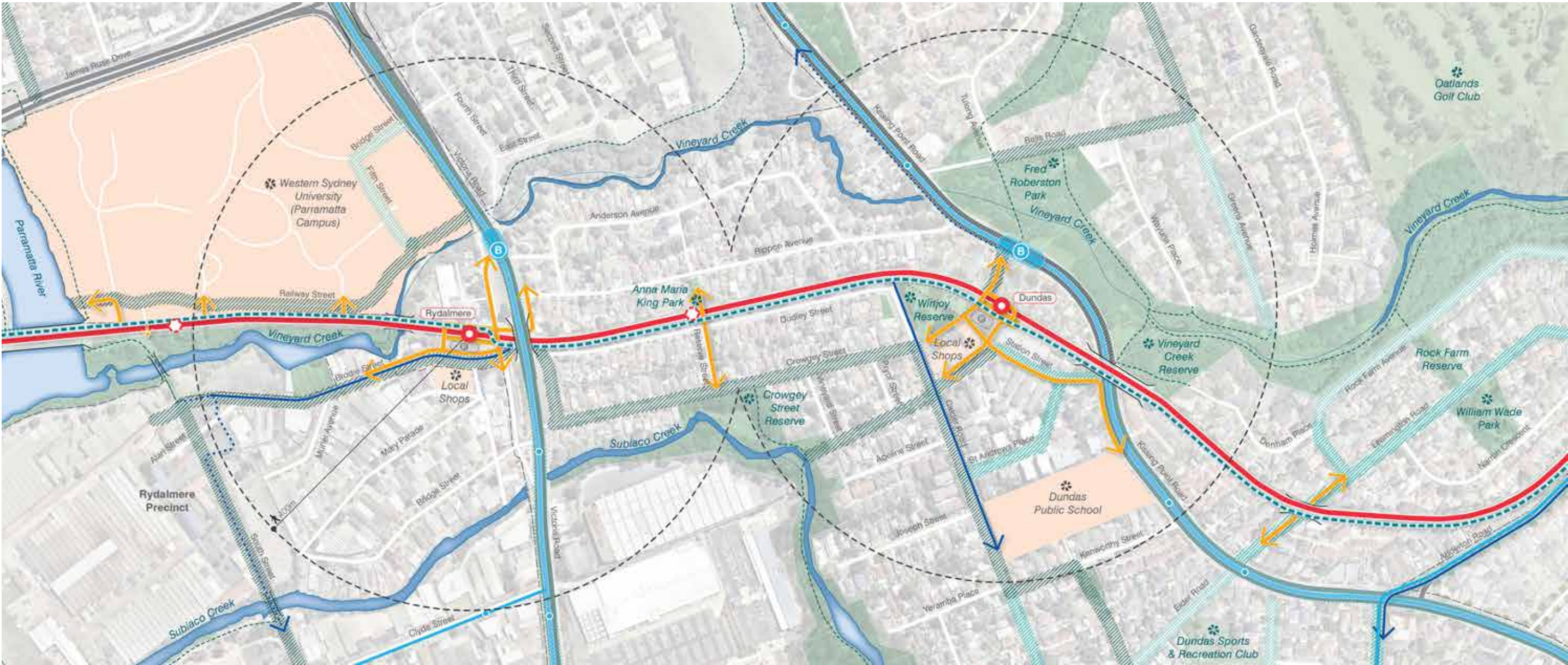
The existing single track heavy rail line will be replaced with a dual track light rail system. Existing railway stations at Rydalmere, Dundas, Telopea and Carlingford will be replaced with light rail stops. The existing rail corridor has limited interface with roads, and with a dual track

this will result in an efficient and frequent public transport system. To improve connectivity across the rail corridor, new crossings are designed to be universally accessible and safe. The existing corridor will also accommodate a continuous dedicated ATL from Tramway Avenue, Rosehill to Carlingford with an additional ATL bridge link to WSU. In the southern most portion of the precinct, at the Parramatta River, the light rail corridor is bounded by the WSU Campus to the west and light industrial areas to the east.

There are several significant areas of major redevelopment at Rydalmere, including development at WSU and the Metro Residences site to the north of the university across Victoria Road, scheduled to be redeveloped by Family and Community Services. This development will become a new mixed-use community with approximately 2,000 new dwellings, including social housing, retail, commercial and educational uses. The industrial land east of the rail corridor is earmarked by Council as a future high-tech knowledge precinct with ties to WSU.

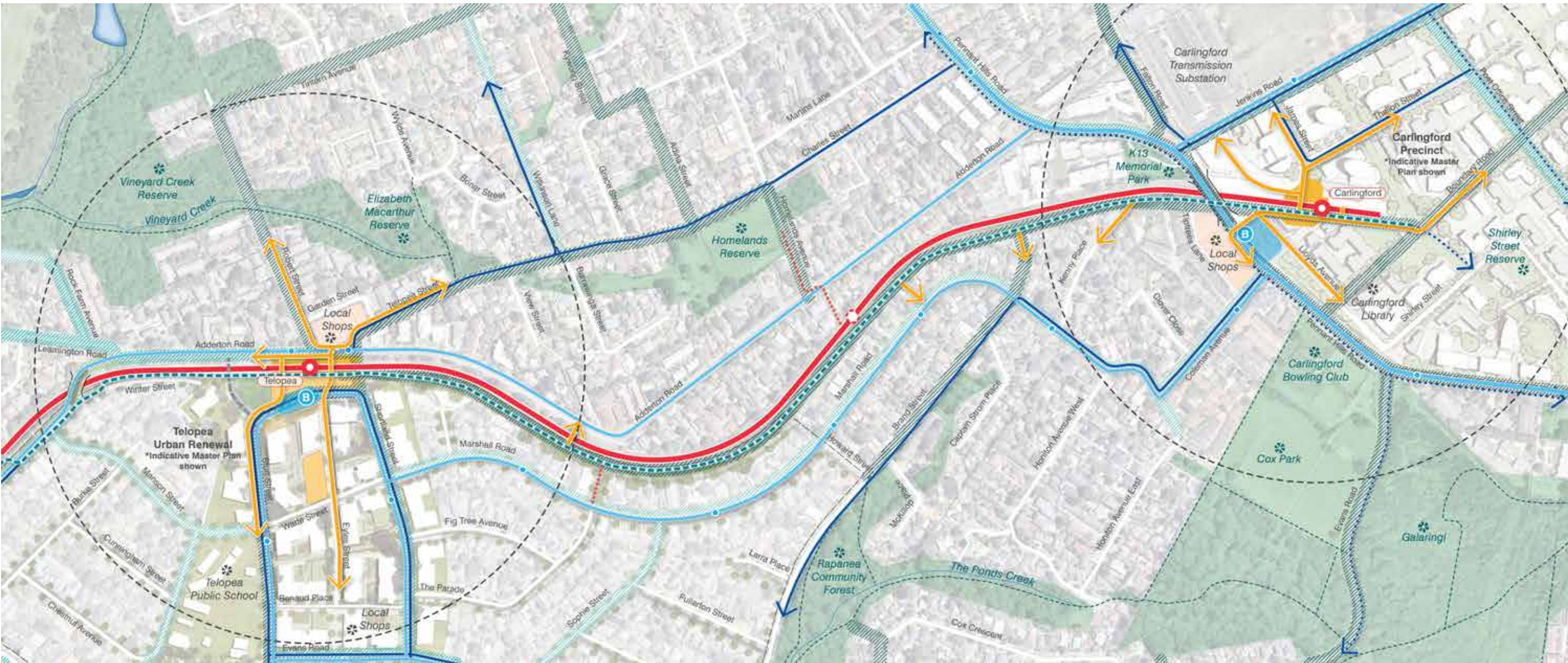
At Telopea, Land and Housing are planning the re-development of the Telopea Urban Renewal area where around 4,000 new dwellings are proposed as part of a mixed-use redevelopment of the existing social housing estate.

There are also several new multi-storey residential developments in planning, and under construction in and around the Carlingford Station. A new public plaza at Carlingford Railway Station has been identified in The Hills Shire Development Control Plan (DCP) 2012, to reinforce





2.7.2 LAND USE, ACCESS AND CIRCULATION



the heart of the precinct. Carlingford is now within the City of Parramatta local government area.

There are notable heritage assets at Dundas Railway Station (Dundas platform buildings) and at Carlingford Station (Carlingford Produce Store). Areas of environmental conservation that include nominated Endangered Ecological Communities (EEC) are also located directly adjacent to the existing rail corridor from Rydalmere Railway Station south to Parramatta River.

There will be accessible bus interchanges at Rydalmere Stop, Telopea Stop and Carlingford Stop as well as conveniently located 'kiss and ride' and 'park and ride' zones. The change from heavy to light rail provides opportunities for cross corridor pedestrian and street connections.



## 2.7.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES - RYDALMERE

The Parramatta River to Carlingford precinct will be a sustainable transport corridor supporting evolving centres at each stop. An ATL will be delivered along this section of the line to provide safe active transport choices and improve connections across the corridor. Opportunities for parkland areas to create new open space and enhanced public domain will be considered along the corridor.

Landscape design will optimise planting opportunities along the precinct to enhance the natural landscape and help screen residential properties. Planting will increase in density and become more formal around each stop. This will reinforce a sense of arrival and setting for a new public domain. Views from elevated vantage points are to be retained. The riparian corridor at Rydalmere will be preserved and enhanced with native species planted to encourage a diverse ecosystem, create habitat for native flora and fauna and maintain the bushland character of the riverfront.

### Pedestrian amenity

- Create safe, attractive and accessible public domain around the Rydalmere Stop with high-quality street furniture, lighting and signage.
- Coordinate design of the stop and public domain to deliver high pedestrian amenity, improve connectivity and support the local centre.

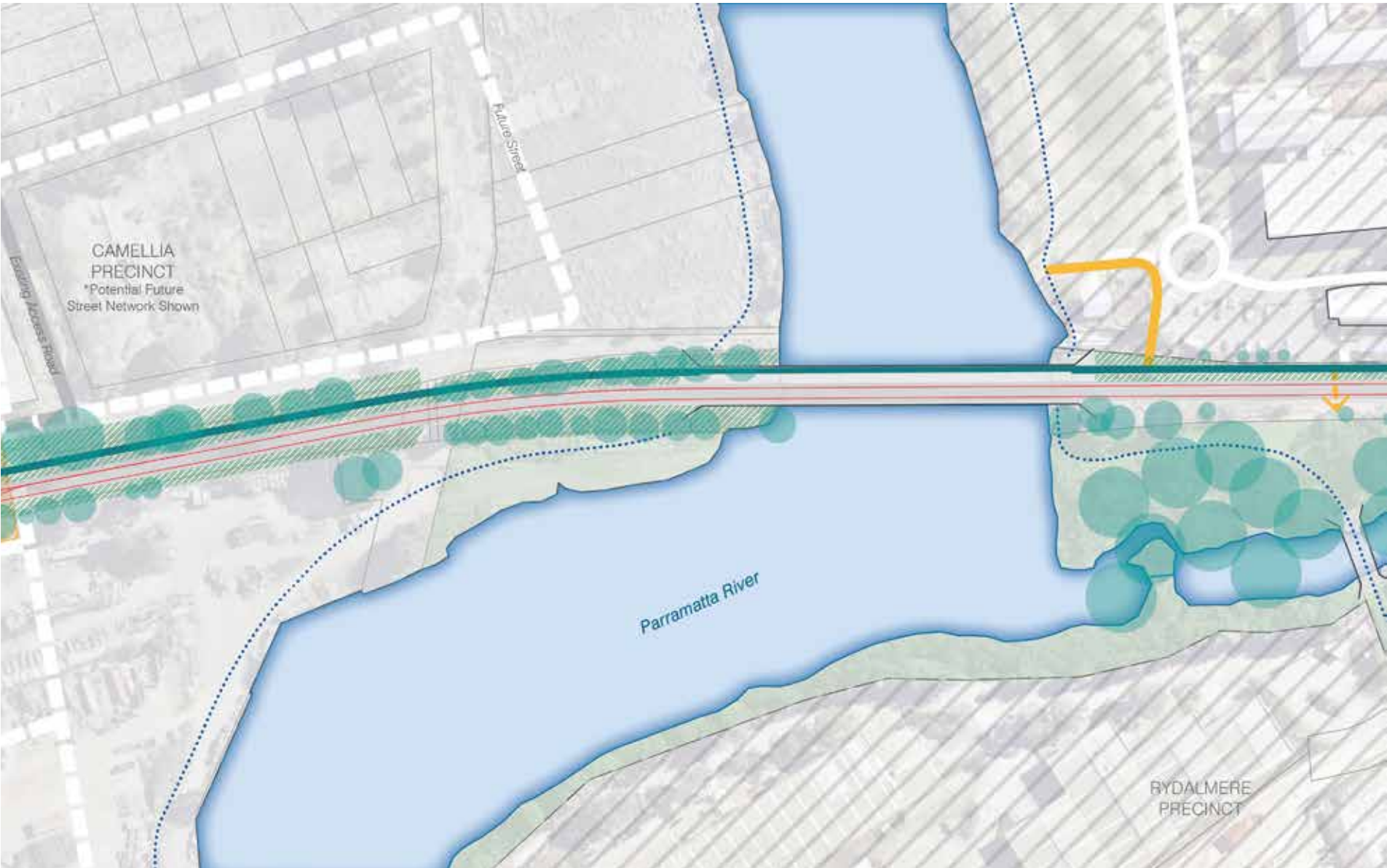
- Provide a high quality, landscaped pedestrian focused public open space at the Rydalmere Stop. Upgrade the footpath network to improve connectivity and provide a high level of pedestrian and customer amenity.
- Enhance pedestrian and cycle access to UWS through the provision of a shared pathway with direct access to the University.

- Establish a sense of arrival and enhanced frontage to WSU at the northern and southern bridge crossings that integrates pedestrian and cycle connections.

### Transport

- Provide safe, well-lit and compliant access to platforms.
- Improve underpass condition at Victoria Road, Rydalmere, to

- provide a safe, adequate corridor for light rail and the ATL, where appropriate.
- Provide high quality, safe and legible connections from light rail stops to the ATL, 'kiss and ride' and 'park and ride' and bus stops.
- Redesign existing Park and Ride facilities to improve the public domain and ensure a high level of pedestrian amenity.



Legend	
Parramatta Light Rail / Stop	Urban Forest Planting
Potential Additional Stop Location	Understorey Planting
Bus Interchange / Stop	Existing Retained Trees
Plaza/Footpath Upgrade	Linear Park - Telopea to Carlingford
Enhanced Track Finish	Proposed Green Open Space
Potential Pedestrian Crossing	Public / Private Green Open Space
Plaza/Footpaths (by others)	Master Plans / Development Sites
Potential Future Link (by others)	Proposed Buildings (by others)
Signalised Pedestrian Crossing	Approved/Under Construction
Unsignalised PLR Pedestrian Crossing	Existing Buildings
Pedestrian Zebra Crossing	Key Heritage Items
PLR Proposed Active Transport Link	Acquired Existing Depot Site (Dundas)
On Road / Off Road Separated Cycleway	<i>*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.</i>
Shared Cycle Route	
Shareway	
Existing Commuter Car Parking	
Tree Planting	



## 2.7.3 URBAN DESIGN AND LANDSCAPE PRINCIPLES - RYDALMERE

- Provide opportunities to connect existing and future communities by facilitating improved east-west pedestrian connections with the change to light rail within the corridor.

### Active transport

- Create a safe, continuous ATL that connects the Parramatta River to Carlingford, via Rydalmere, Dundas and Telopea.

- Integrate the ATL with each stop and provide adequate infrastructure to encourage transport choice.
- Provide bike racks and water stations at Rydalmere, Telopea Dundas and Carlingford stops.

- Design a safe pedestrian bridge link to WSU that is adequate in size, appropriate for proposed use and sensitive to landscape and existing vegetation.
- Create connections throughout the precinct to provide links to the ATL and surrounding suburbs.

### Landscape

- Where the light rail and ATL run parallel to existing streets, integrate the landscape to create a cohesive movement corridor and streetscape.
- Retain the vegetation along the corridor to screen and visually integrate the project with the surrounding area, including

sensitive ecological communities, for example along Vineyard Creek.

- Landscape design to ensure sight lines are maintained along corridor at stops and at crossings.
- Landscape design to define the light rail corridor, provide local character, and amenity along the ATL and provide privacy screening to adjacent residential, where appropriate.

- Integrate lighting within the landscape design along the corridor.
- Consider planting strategies, including the use of endemic plant species where appropriate, that will contribute to the creation of a biodiversity corridor along the Carlingford Line which will improve habitat and bushland links between existing vegetation communities.



1:2000 @ A3 0 20 40 60 80 100M



## 2.7.4 URBAN DESIGN AND LANDSCAPE PRINCIPLES - DUNDAS



### Pedestrian amenity

- Create safe, attractive and accessible public domain around the light rail stops with high-quality street furniture, lighting and signage.
- Integrate the stop infrastructure with the heritage building and platform to create seamless access to light rail stop and promote the heritage value of the buildings.

- Coordinate design of the Dundas stop and public domain to deliver high pedestrian amenity and improve connectivity.
- Upgrade existing pedestrian path to bus interchange on Kissing Point Road.
- Improve connections between Station Street and Kissing Point Road and ATL.
- Widen, realign and upgrade the underpass at Leamington

- Road, Dundas, to improve sight lines and create safe, clear pedestrian access.

### Transport

- Provide safe, well-lit and DDA compliant access to platforms.
- Design a bridge over Kissing Point Road that is adequate in size, appropriate to use, sensitive to landscape and vegetation.

- Provide high quality, safe and legible connections from light rail stops to ATL, 'kiss and ride' and 'park and ride'.
- Redesign existing Park and Ride facilities to improve the public domain and ensure a high level of pedestrian amenity.
- Provide opportunities to connect existing and future communities by facilitating improved east-west pedestrian connections.

### Active transport

- Create a safe, continuous ATL that connects the Parramatta River to Carlingford, via Rydalmere, Dundas and Telopea.
- Integrate ATL with each stop and provide adequate infrastructure to encourage transport choice.
- Define the ATL with ground markings on approach and as it passes by the Dundas Stop to avoid potential cycle / pedestrian

conflict, where appropriate.

- Create connections along the Carlingford Line corridor to provide links to the ATL and surrounding suburbs.

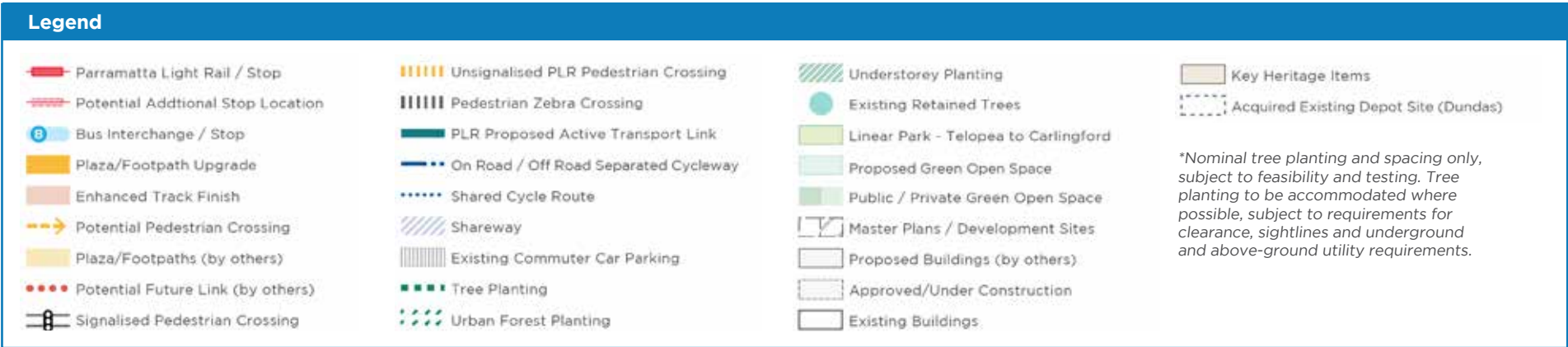
### Landscape

- Where the light rail and ATL runs parallel to existing streets, integrate landscape to create a cohesive movement corridor and streetscape.



# 2.7.4 URBAN DESIGN AND LANDSCAPE PRINCIPLES - DUNDAS

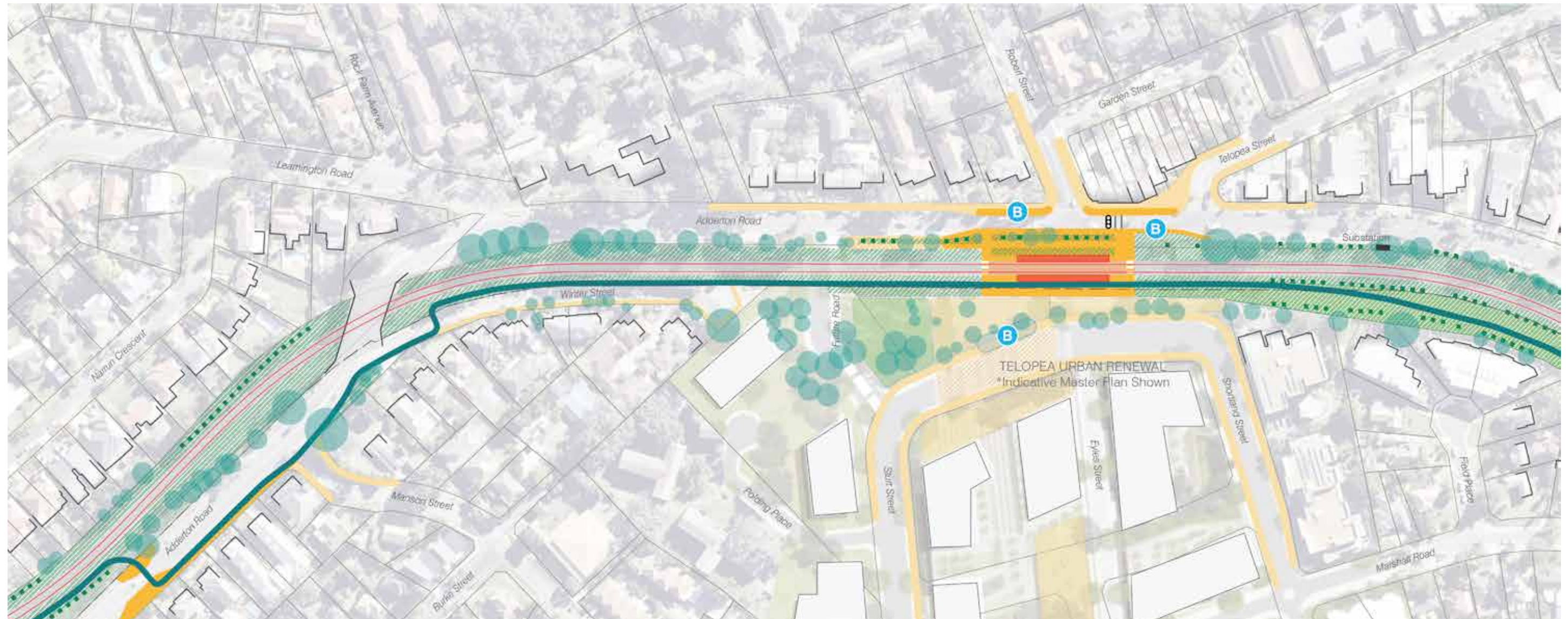
- Retain and supplement the vegetation along the corridor to screen and visually integrate the project with the surrounding area, including sensitive ecological communities.
- Landscape design to ensure sight lines are maintained along corridor, at stops and at crossings.
- Landscape design to define the light rail corridor, provide local character, provide amenity along the along the ATL and provide privacy screening to adjacent residential, where appropriate.
- Integrate lighting within the landscape design along the corridor.
- Integrate the landscape design with Winjoy Reserve.



1:2000 0 20 40 60 80 100M



## 2.7.5 URBAN DESIGN AND LANDSCAPE PRINCIPLES - TELOPEA



### Pedestrian amenity

- Create safe, attractive and accessible public domain around the light rail stops with high-quality street furniture, lighting and signage.
- Coordinate design of the stops and public domain with to deliver high pedestrian amenity and improve connectivity.

- Coordinate the refined landscape and urban design with Telopea Urban Renewal master plan.
- Provide a high quality, accessible connection between Telopea Stop and the existing crossing at Adderton Road.
- Upgrade footpaths on Adderton Road where ATL departs the corridor, at the Telopea Stop.

### Transport

- Provide safe, well-lit and DDA compliant access to platforms.
- Provide high quality, safe and legible connections from light rail stops to ATL, 'kiss and ride'.
- Provide opportunities to connect existing and future communities by facilitating improved east-west pedestrian connections with the change to light rail within the corridor.

### Active transport

- Create a safe, continuous ATL that connects the Parramatta River to Carlingford, via Rydalmere, Dundas and Telopea.
- Integrate the ATL with each stop and provide adequate infrastructure to encourage transport choice.
- Create safe ATL crossing of Adderton Road and Winter Street where ATL departs the corridor.

### Landscape

- Work with Council on the development of a linear park between Telopea and Carlingford along the light rail alignment.
- Coordinate landscape design with Telopea Urban Renewal Area master plan.

- Where the light rail and ATL runs parallel to existing streets, integrate landscape to create a cohesive movement corridor and streetscape character.
- Retain and supplement the vegetation along the corridor to screen and visually integrate the

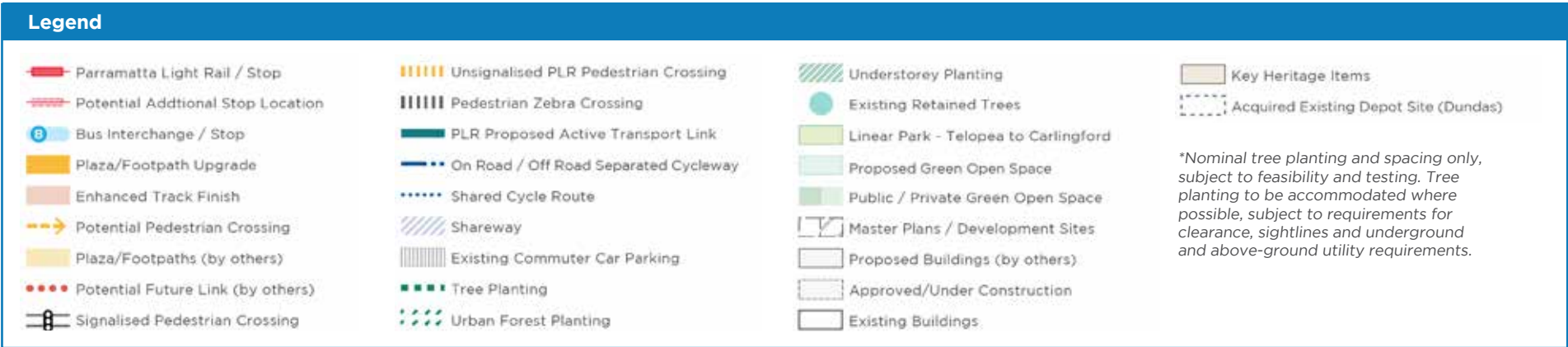


# 2.7.5 URBAN DESIGN AND LANDSCAPE PRINCIPLES - TELOPEA

- project with the surrounding area, including sensitive ecological communities.

  - Landscape design to ensure sight lines are maintained along corridor and at stops.
  - Landscape design to define the light rail corridor, reinforce the local character, provide amenity
- along the ATL and provide privacy screening to adjacent residential where appropriate.

  - Integrate lighting within the landscape design along the corridor.





## 2.7.6 URBAN DESIGN AND LANDSCAPE PRINCIPLES - CARLINGFORD

### Pedestrian amenity

- Create safe, attractive and accessible public domain around the light rail stops with high-quality street furniture, lighting and signage.

- Provide a large public square with integrated stop to improve connectivity and provide a high level of pedestrian and customer amenity.
- Coordinate stop design and public domain, to deliver high pedestrian amenity and improve connectivity.

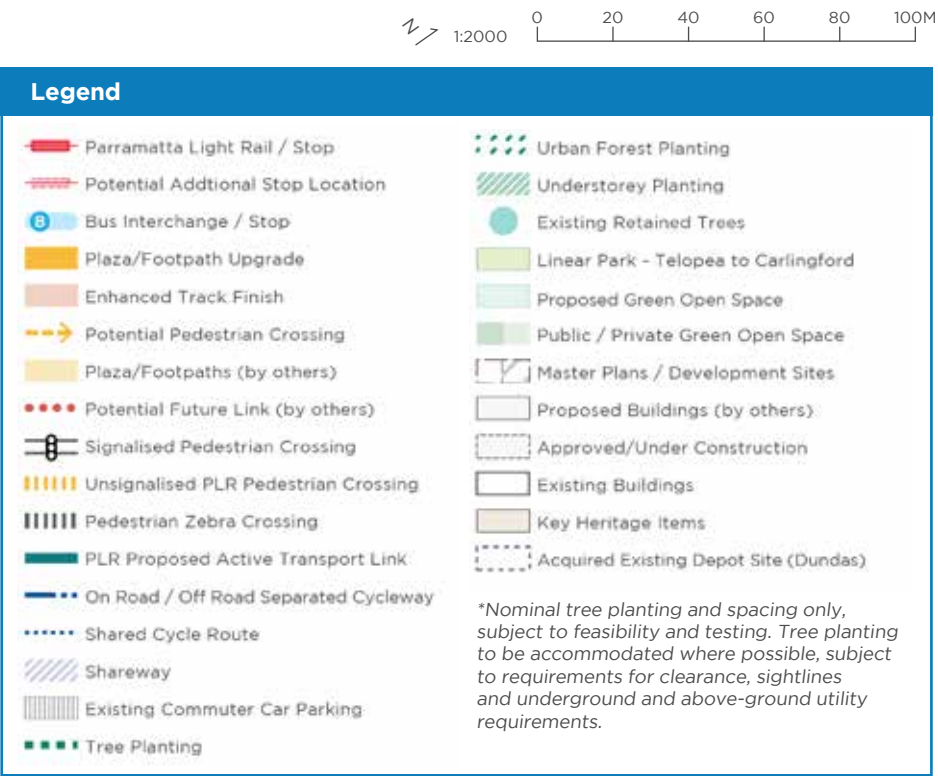
- Create pedestrian only paths on eastern side of the station with compliant access to bus interchange, and 'kiss and ride' and 'park and ride'.
- Design stop and corridor to respond to the character of the local areas.

### Transport

- Provide safe, well-lit and DDA compliant access to platforms.
- Widen and improve underpass conditions at Pennant Hills Road, Carlingford, to create a safe corridor for light rail and the ATL.

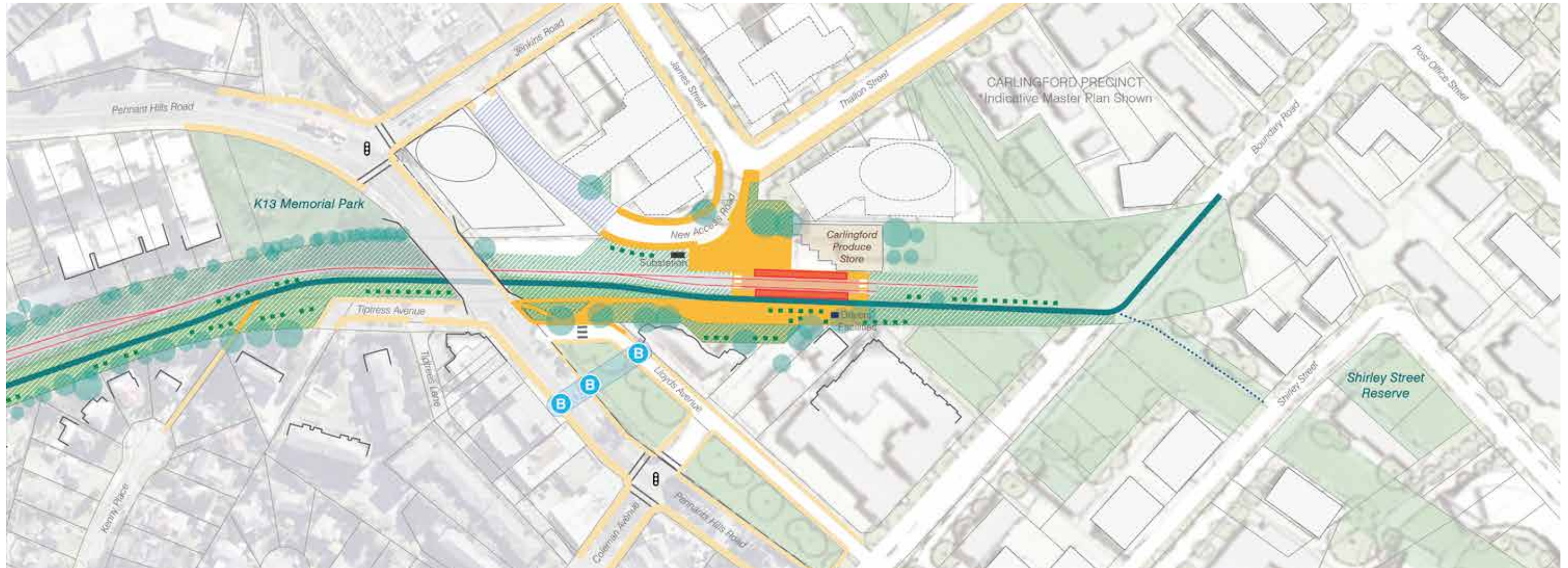
- Formalise new street / share way on western side of Carlingford Stop to connect Jenkins Road and Thallon Street to improve connectivity, provide for additional 'kiss and ride' and 'park and ride' (on-street, angled parking including accessible parking.)

- Integrate the light rail over-run at Carlingford Stop into the public domain.
- Design Carlingford Stop to enable future potential opportunities for light rail extension.





## 2.7.6 URBAN DESIGN AND LANDSCAPE PRINCIPLES - CARLINGFORD



- Provide opportunities to connect existing and future communities by facilitating improved east-west and north-south pedestrian connections with new stop, pedestrian paths and ATL.
- Future proof connection of Boundary Road.
- Allow for parking and access to proposed substation.

### Active transport

- Create a safe ATL that connects the Parramatta River to Carlingford.
- Integrate ATL with the light rail stop and provide adequate infrastructure to encourage transport choice.

### Landscape

- Where the light rail and the ATL run parallel to existing streets, integrate landscape to create a cohesive movement corridor and streetscape.
- Retain and supplement the vegetation along the corridor to screen and visually integrate the

project with the surrounding area, including sensitive ecological communities.

- Landscape design to ensure sight lines are maintained along corridor, at stops and pedestrian paths.
- Landscape potential areas of hazard such as hidden spaces.

- Landscape design to allow for potential extension of the light rail.
- Refine landscape design with design of public square.
- Locate trees in public square to provide shade and shelter to enhance pedestrian amenity.



# 2.7.7 CORRIDOR AND PUBLIC DOMAIN DESIGN

The following corridor and public domain design plans indicate the project requirements for the Parramatta River to Carlingford precinct.

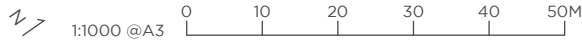
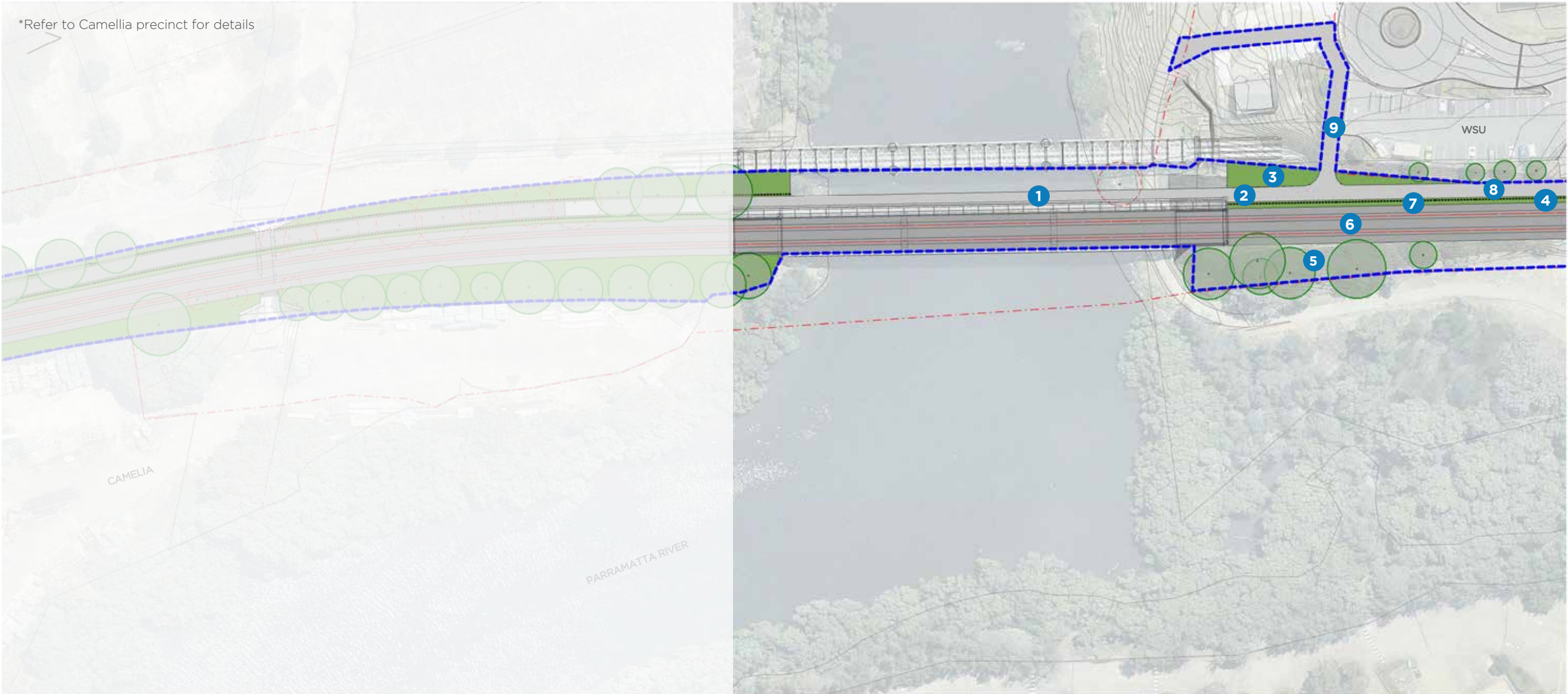
The plans should be read in conjunction with the sections and stop plans, as well as chapters 1 and 3.

- 1. ATL on bridge. Fibre composite mesh finish.
- 2. ATL. Insitu concrete finish.
- 3. Low native planting.
- 4. Fence, subject to safety assessment.

- 5. Retain and protect existing remnant vegetation community.
- 6. Double-track light rail.
- 7. Low planting with WSUD opportunity between track and ATL.
- 8. Pole lighting along ATL.

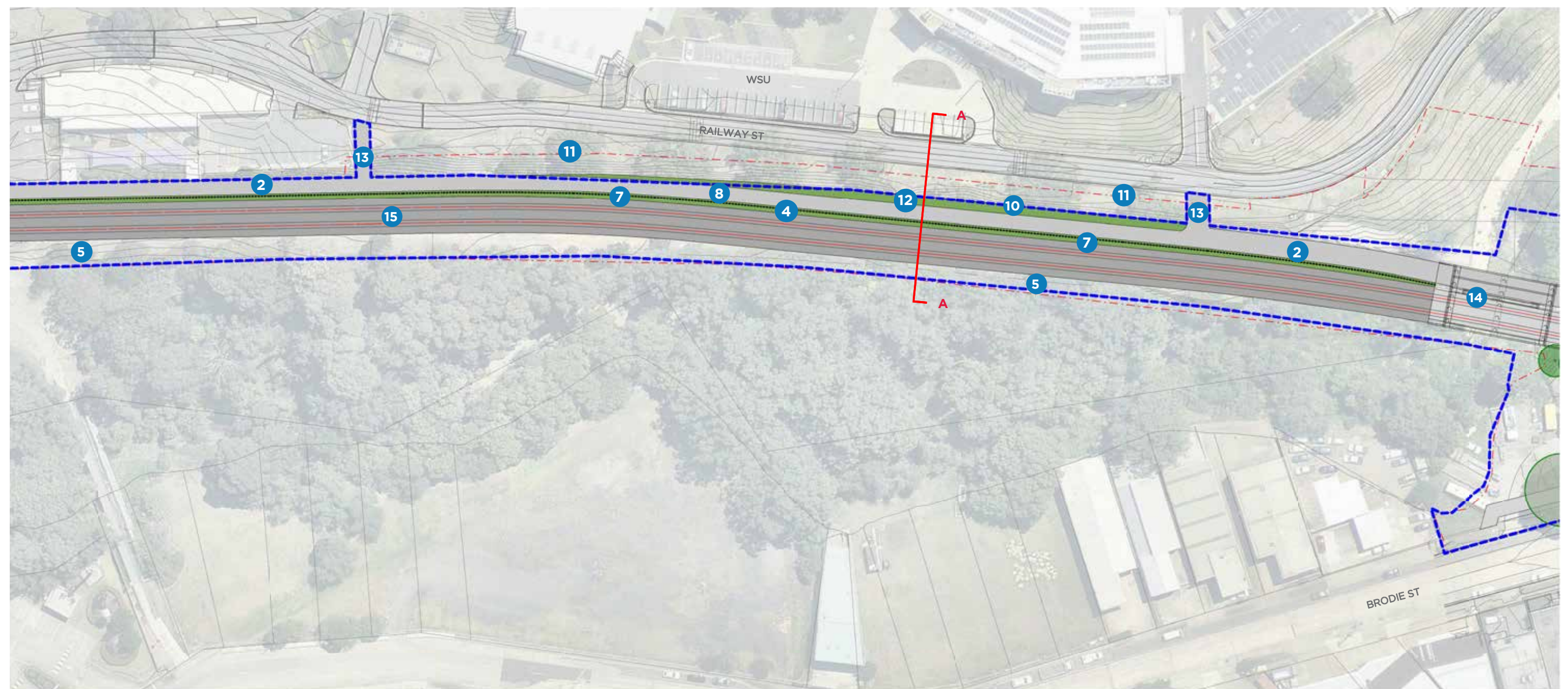
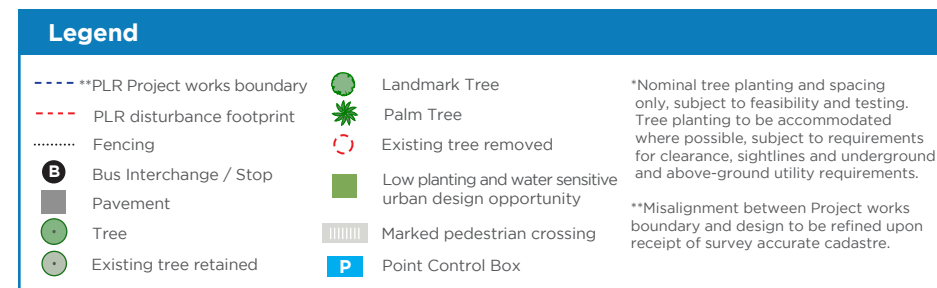
- 9. Connect ATL to Parramatta Valley Cycle Ways.
- 10. Remove existing boundary palisade fence, subject to agreement with WSU.
- 11. Existing trees retained and protected, where possible.

- 12. Turf.
- 13. Footpath connection to WSU Campus.
- 14. Vineyard Creek bridge replaced to provide additional track and ATL.
- 15. Opportunity for future-proof Stop.





### 2.7.7 CORRIDOR AND PUBLIC DOMAIN DESIGN



<sup>1</sup>Opportunity to remove existing fencing subject to safety assessment and operations review.





## 2.7.7 CORRIDOR AND PUBLIC DOMAIN DESIGN

1. Rydalmere Stop. Refer to Stop Plan on p139 of this document.

2. Existing car park retained. Opportunity for public space with upgraded paving, seats, trees and some restricted access to vehicles for servicing and disabled drivers.
3. Connection with crossing and footpath to be confirmed at detail design.

4. Opportunity for additional angle parking, subject to achieving pedestrian access.
5. Coloured concrete track form at Stop.

6. Ballast track.

7. Bicycle parking, seating and bin.

8. Potential future marked pedestrian crossing.
9. Retain existing marked pedestrian crossing.

10. Wider ATL. Insitu concrete.

11. Wider ATL adjacent to stop. Precast concrete unit paving.
12. Opportunity for 'kiss and ride'.

13. Turf.

14. Footpath insitu concrete.

15. ATL. Insitu concrete.
16. Fence<sup>1</sup> and low planting with water sensitive urban design opportunity between track and ATL.

17. Low native planting.

18. Pole lighting along ATL.
















<sup>1</sup>Opportunity to remove existing fencing subject to safety assessment and operations review.



19. Double-track light rail.
20. Native grasses between track and property boundary.
21. Retain and protect existing trees where possible.
22. Remove existing trees.
23. Pedestrian crossing.
24. Opportunity for future-proof Stop.

- 22. Remove existing trees.
- 23. Pedestrian crossing.
- 24. Opportunity for future-proof Stop.

### Legend

	**PLR Project works boundary		Landmark Tree	*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.
	PLR disturbance footprint		Palm Tree	
	Fencing		Existing tree removed	
	Bus Interchange / Stop		Low planting and water sensitive urban design opportunity	**Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.
	Pavement		Marked pedestrian crossing	
	Tree		Point Control Box	
	Existing tree retained			





## 2.7.7 CORRIDOR AND PUBLIC DOMAIN DESIGN

1. Dundas Stop. Refer to Stop plan on p140 of this document.

2. Coloured concrete track form at stop.

3. Ballast track.

4. Substation with architectural treatment.
5. Existing car park retained. Opportunity for public space with upgraded paving, seating, trees and some restricted access to vehicles for servicing and disabled drivers.
6. Existing pedestrian link from bus stop on Kissing Point Road and Rydalmere Stop to be upgraded with new asphalt paving, lighting, handrails and signage.

7. Upgrade lighting and accessibility of existing ramp between Kissing Point Road and Station Street.
8. Opportunity for 'kiss and ride'.

9. Precast concrete unit paving apron around stop. Bicycle parking, seating and bin.

10. Opportunity for adaptive reuse of existing heritage station building.
11. Retain and protect existing trees, where appropriate.

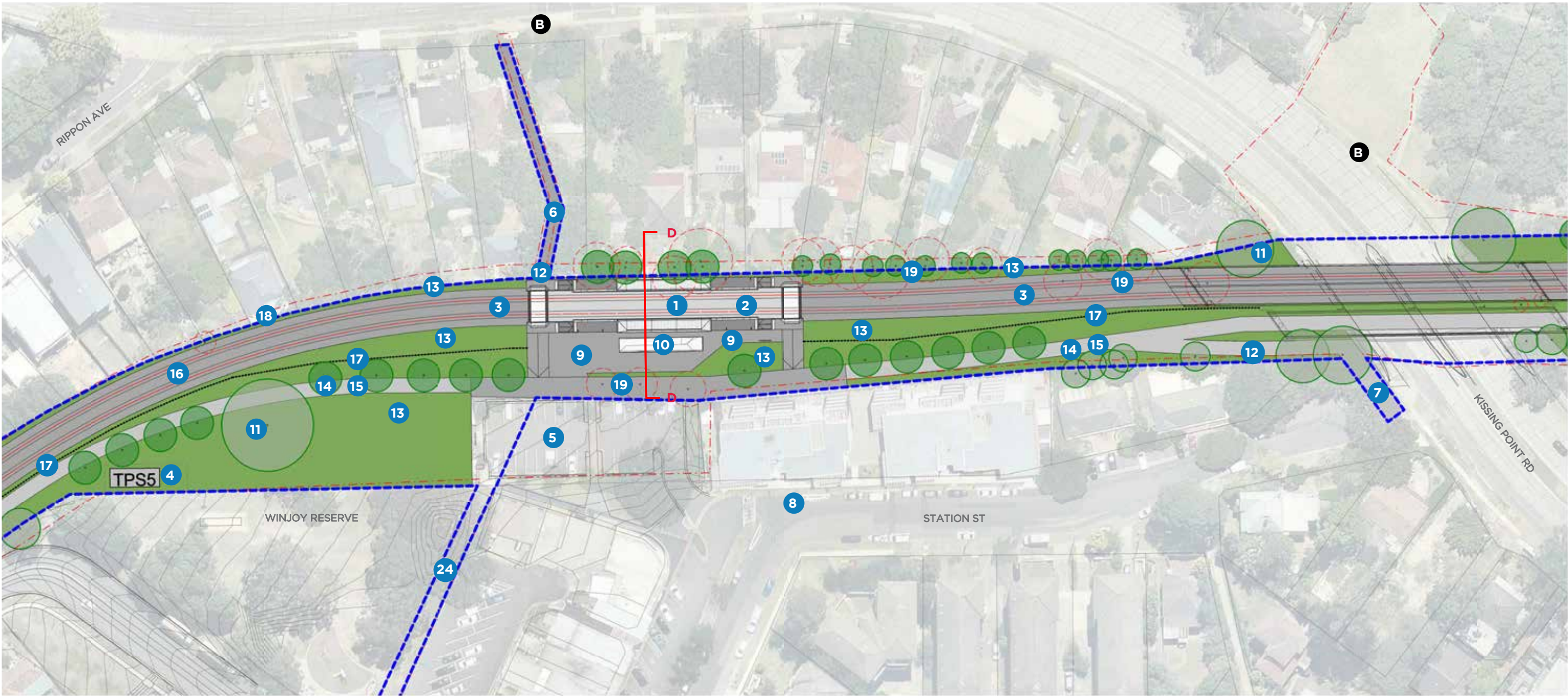
12. Path (and steps as required). Insitu concrete unit paving.

13. Low native planting.

14. ATL. Insitu concrete finish.
15. Pole lighting along ATL.

16. Double-track light rail.

17. Fence and low planting with water sensitive urban design opportunity between track and ATL..
















1:1000 @A3 0 10 20 30 40 50M



- 18. Native grasses between track and property boundary.
- 19. Remove existing trees.
- 20. Retain existing maintenance path connecting Leamington Road and ATL. Insitu concrete finish.
- 21. Stabilise existing embankment.
- 22. Improved pedestrian underpass, realigned and widened.
- 23. Paving, pram ramps, and connection to ATL adjacent to underpass. Tie in paving into existing footpaths. Concrete finish.
- 24. Opportunity for path and lighting to Calder Road. Concrete finish.

- ### Legend

	**PLR Project works boundary		Landmark Tree	*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.
	PLR disturbance footprint		Palm Tree	
	Fencing		Existing tree removed	
	Bus Interchange / Stop		Low planting and water sensitive urban design opportunity	
	Pavement		Marked pedestrian crossing	**Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.
	Tree		Point Control Box	
	Existing tree retained			



<sup>1</sup>Opportunity to remove existing fencing subject to safety assessment and operations review.

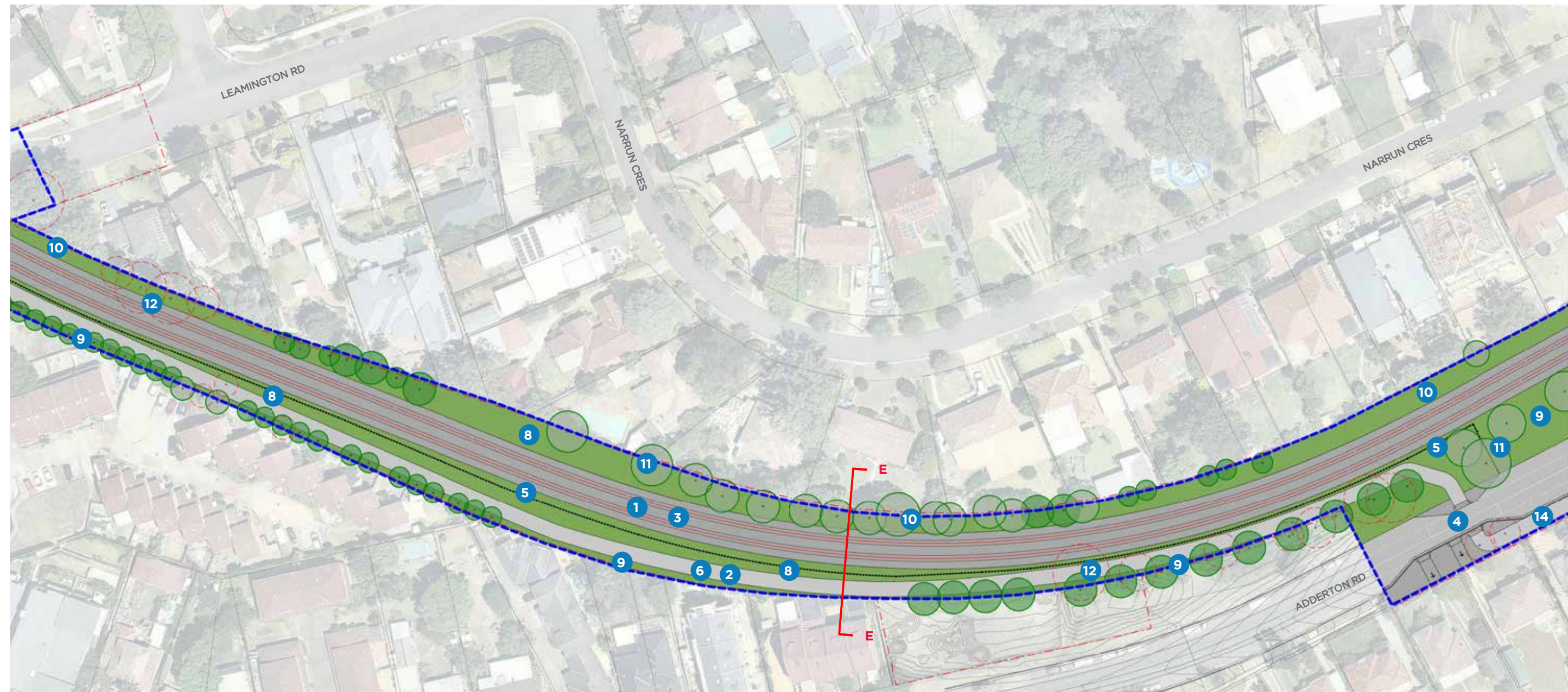




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- ### Legend

	**PLR Project works boundary		Landmark Tree	*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.
	PLR disturbance footprint		Palm Tree	
	Fencing		Existing tree removed	**Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.
	Bus Interchange / Stop		Low planting and water sensitive urban design opportunity	
	Pavement		Marked pedestrian crossing	
	Tree		Point Control Box	
	Existing tree retained			

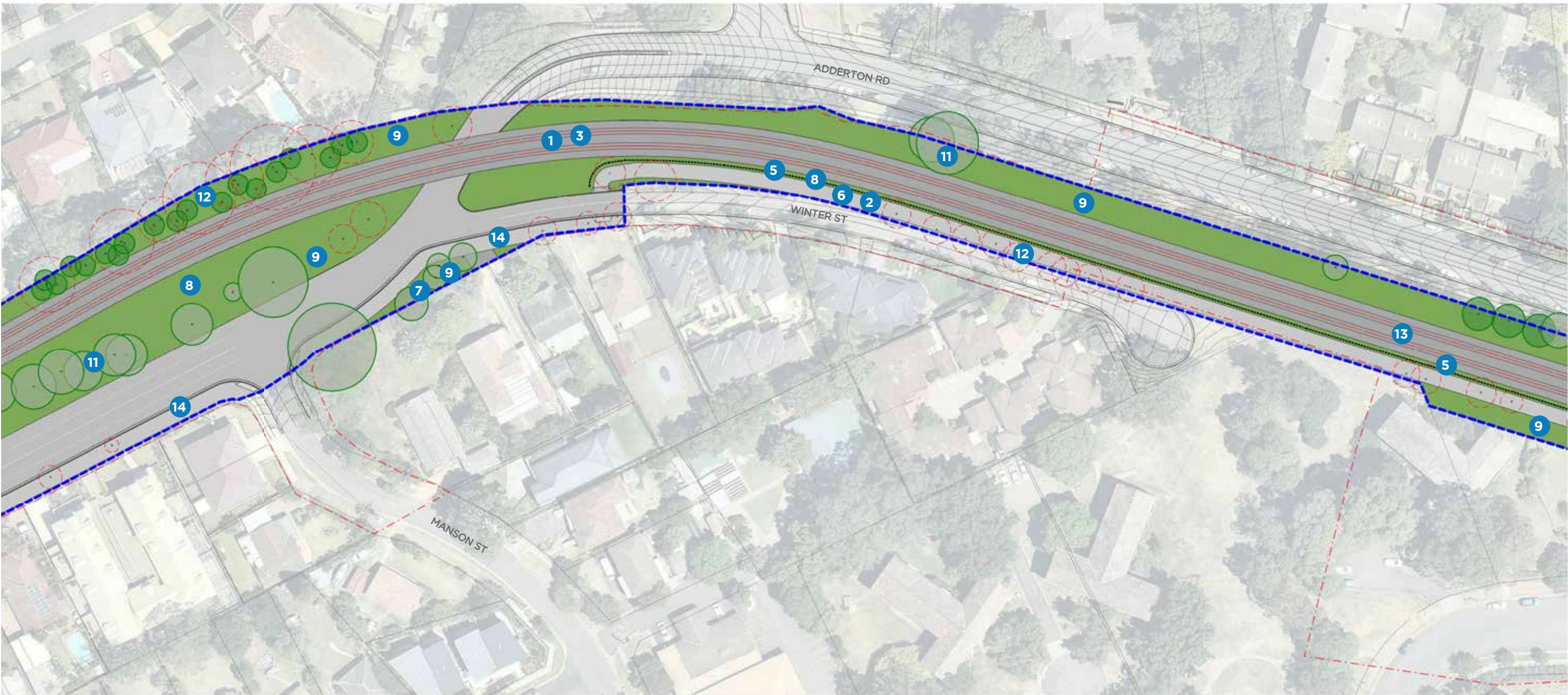


<sup>1</sup>Opportunity to remove existing fencing subject to safety assessment and operations review.





# 2.7.7 CORRIDOR AND PUBLIC DOMAIN DESIGN





# 2.7.7 CORRIDOR AND PUBLIC DOMAIN DESIGN

1. Telopea Stop. Refer to Stop plan on p141 of this document.

2. Coloured concrete track form at stop.

3. Ballast track.

4. Tie-new footpaths into existing.
5. ATL. Insitu concrete.

6. Pole lighting along ATL.

7. Double-track light rail.

8. 'Kiss and ride'.

9. Substation with architectural treatment.
10. Precast concrete unit paving adjacent to stop.

11. Accessible path. Precast concrete unit paving.

12. Low native planting.

13. Bicycle parking, seating and bin.
14. Concrete footpath.

15. Fence<sup>1</sup> between track and existing electricity poles / wires.

16. Low planting with WSUD opportunity between track and ATL.

17. Turf.
18. Retain and protect existing trees.

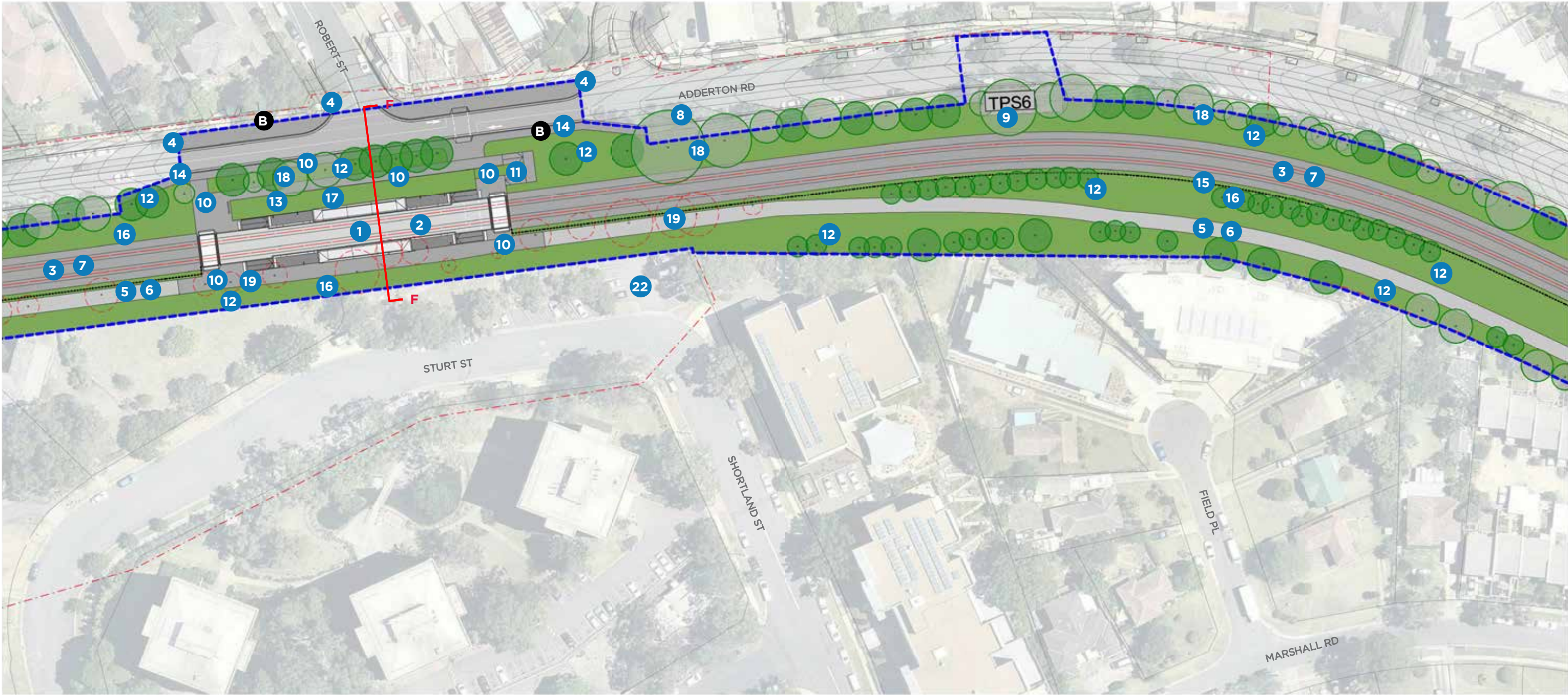
19. Remove existing trees.

20. Native grasses between track and property boundary.

21. Opportunity for signalised pedestrian crossing, subject to safety assessment and Operator review.
22. Retain existing car park.

23. Pedestrian crossing.

24. Connection with crossing and footpath to be confirmed at detail design.



<sup>1</sup>Opportunity to remove existing fencing subject to safety assessment and operations review.



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# 2.7.7 CORRIDOR AND PUBLIC DOMAIN DESIGN

1.

Ballast track.
2.

Double-track light rail.
3.

Fence<sup>1</sup> between track and existing electricity poles / wires.
4.

ATL. Insitu concrete.
5.

Pole lighting along ATL.
6.

Shared concrete footpath..
7.

Turf.
8.

Low planting with WSUD opportunity between track and ATL.
9.

Low native planting.
10.

Native turf between track and property boundary.
11.

Retain and protect existing trees.
12.

Remove existing trees.
13.

Stabilise embankment.
14.

Opportunity for signalised pedestrian crossing, subject to safety assessment and Operator review.
15.

Opportunity for future-proof Stop.

Legend

---

\*\*PLR Project works boundary

---

PLR disturbance footprint

.....

Fencing

B

Bus Interchange / Stop

Pavement

Tree

Existing tree retained

Landmark Tree

Palm Tree

Existing tree removed

Low planting and water sensitive urban design opportunity

Marked pedestrian crossing

P

Point Control Box

\*Nominal tree planting and spacing only, subject to feasibility and testing. Tree planting to be accommodated where possible, subject to requirements for clearance, sightlines and underground and above-ground utility requirements.

\*\*Misalignment between Project works boundary and design to be refined upon receipt of survey accurate cadastre.

<sup>1</sup>Opportunity to remove existing fencing subject to safety assessment and operations review.

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SENSITIVE: NSW GOVERNMENT



# 2.7.7 CORRIDOR AND PUBLIC DOMAIN DESIGN





# 2.7.7 CORRIDOR AND PUBLIC DOMAIN DESIGN

1. Carlingford Stop. Refer to Stop plan on p142 of this document.

2. Ballast track.

3. Double-track light rail.

4. ATL. Insitu concrete.

5. Pole lighting along ATL.
6. Coloured concrete track form at stop.

7. Fence<sup>1</sup>.

8. Substation with architectural treatment.

9. Access road with pedestrian provision. Opportunity for car parking under investigation.
10. Existing car parking removed. Replaced with tree planting and native low planting.

11. 'Kiss and ride'.

12. DDA compliant footpath with lighting to bus stop on Lloyds Avenue and Pennant Hills Road. Precast concrete unit paving.
13. Marked pedestrian crossing. Tactile indicators and pram ramps.

14. Pedestrian court with lighting and precast concrete unit paving.

15. Retain Carlingford Produce Store parking / access.

16. Seating and bin.
17. Bicycle parking.

18. Extend ATL and turf to Boundary Road. Pole lighting to ATL.

19. Low native planting.

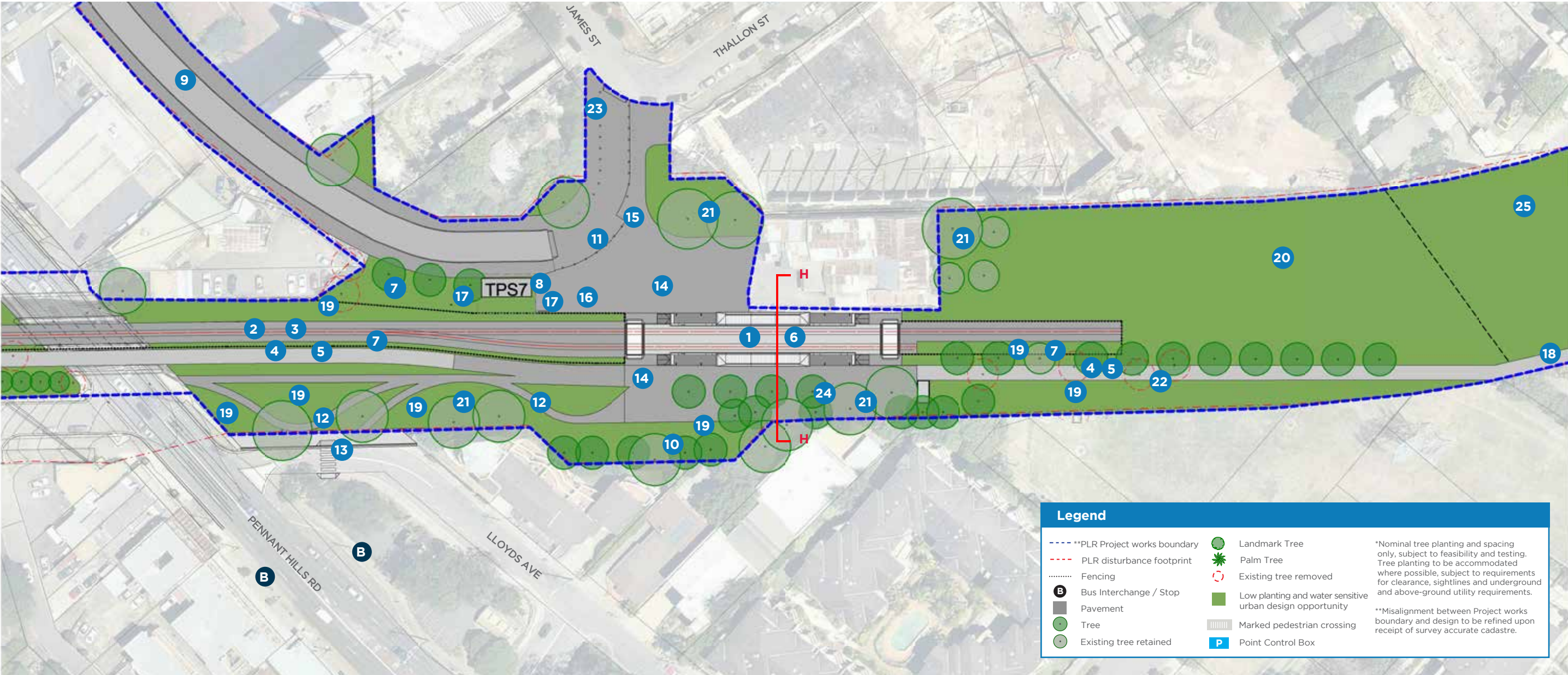
20. Smooth out surface and re-turf.

21. Retain and protect existing trees.
22. Remove existing trees.

23. Raised driveway with controlled vehicle access.

24. Drivers' facilities and opportunity for public toilet facilities.

25. Opportunity for car park under investigation.



<sup>1</sup>Opportunity to remove existing fencing subject to safety assessment and operations review.



## 2.7.8 STOP LAYOUTS

### RYDALMERE STOP

#### Side Platform stop configuration.

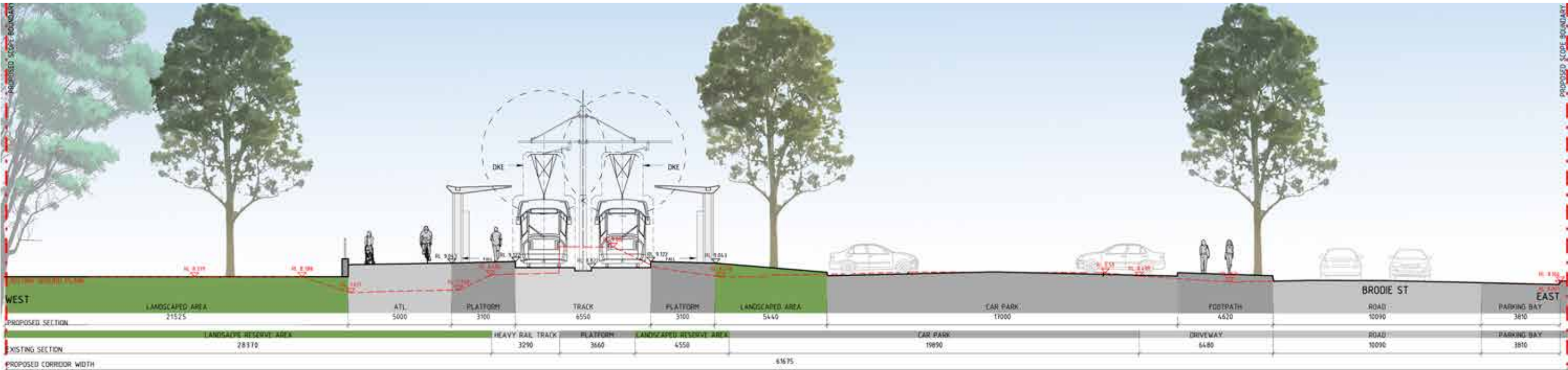
The Rydalmere Stop is located beside the existing Rydalmere Railway station, within close proximity to the existing local centre and WSU. The commuter car park will be maintained. The ATL along the western side of the Rydalmere Stop, provides safe, direct and efficient pedestrian and cycle links to WSU and Victoria Road.

The ATL crosses the track north of the stop. The track from at the stop is a concrete finish. The platforms on the east and west are accessed via walkways. The southern platform backs onto a tree-lined footpath. A three-module canopy configuration is proposed for this stop, subject to patronage numbers.



Rydalmere Stop Plan

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Rydalmere Stop CH 51180 - Section B-B  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M



## 2.7.8 STOP LAYOUTS


### DUNDAS STOP

#### Side Platform stop configuration.

The Dundas Stop is located beside the existing Dundas heritage railway station. The stop canopy is to be sensitively integrated with the heritage building. There is opportunity for adaptive reuse of the existing heritage building. The current commuter car park is to be maintained. The platforms on the north and south are accessed via walkways. The southern platform backs onto the existing heritage railway stop and is integrated with the terrace curtilage for DDA compliant access from the south, where appropriate.

A three-module canopy configuration is proposed for this stop, subject to patronage numbers. The track form at the stop is of concrete finish. The substation is located in close proximity to the car park for ease of access and bicycle parking will be provided at the stop. The ATL runs parallel to the stop on the Southern side of the stop, alongside Winjoy Reserve.

Legend

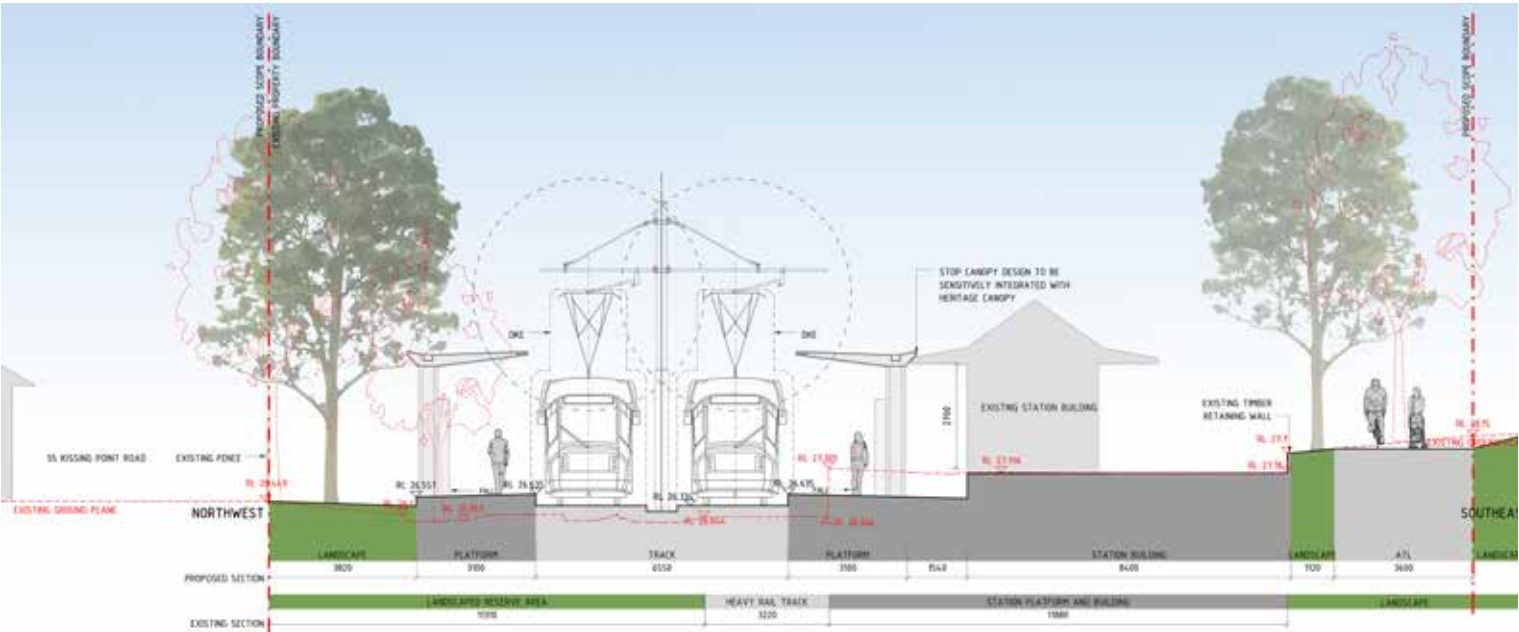


Existing Tree  
NOTE: All other trees shown are proposed trees



Dundas Stop Plan  
\*Refer to the Engineering drawings for information on levels

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Dundas Stop CH 51980 - Section D-D  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M



## 2.7.8 STOP LAYOUTS


### TELOPEA STOP

#### Side Platform stop configuration.

The Telopea Stop is located along Adderton Road and is within close proximity to the local commercial centre. The stop will be central to the future Telopea Precinct Plan that will revitalise the neighbourhood. The stop location maintains the existing crossing from the shops across Adderton Road.

Access to the stop is by accessible ramps and walkways from road level to the platforms. The platforms on the east and west will be accessed via walkways. A three-module canopy configuration is proposed for this stop, subject patronage numbers. The ATL runs parallel to the stop on the eastern side of the stop, subject to realignment with Land and Housing masterplan.

Legend



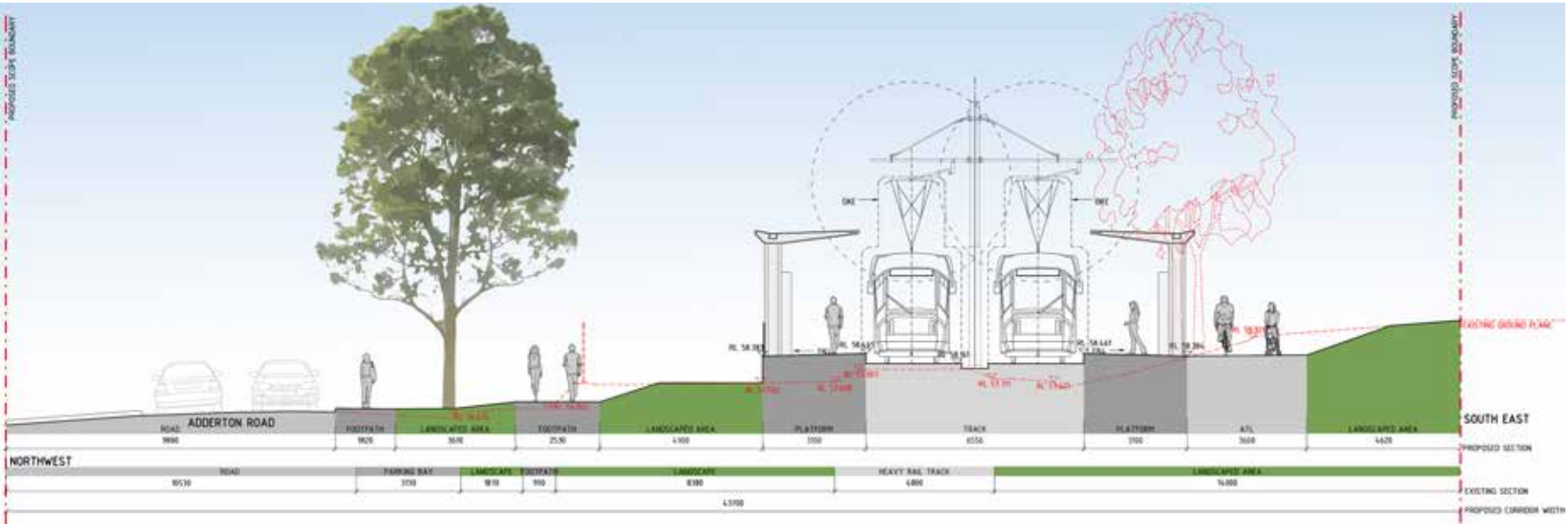
Existing Tree

NOTE: All other trees shown are proposed trees



Telopea Stop Plan

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Telopea Stop CH 53420 - Section F-F  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M



## 2.7.8 STOP LAYOUTS

### CARLINGFORD STOP

#### Side Platform stop configuration.

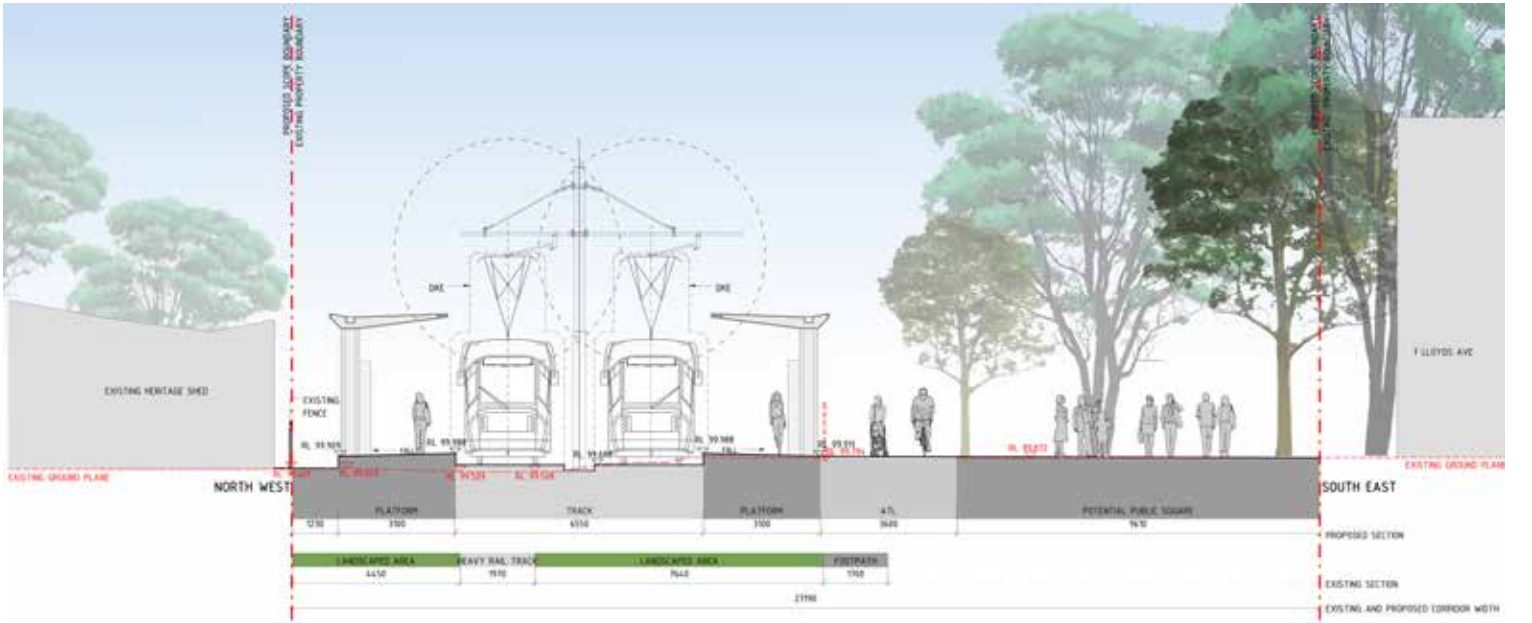
The Carlingford Stop is the terminus. It is located north of Pennant Hills Road bridge. The stop serves as an important connection to the buses on Lloyds Avenue and the Carlingford town centre. The heritage listed Carlingford Produce Store, which will remain, is located west of the stop. This building will maintain parking and access. The Carlingford Stop is proposed to be located to the centre of future and new residential development.

The platforms on the east and west are accessed via walkways. The southern platform interfaces with a landscaped pedestrian court. A three-module canopy configuration is proposed for this stop, subject to patronage numbers. The ATL runs parallel to the stop on the eastern side of the stop and extends towards Boundary Road on the eastern side. A driver's facility is provided at this stop.



Carlingford Stop Plan  
\*Refer to the Engineering drawings for information on levels

1:500 @A3 0 5 10 15 20 25M



Typical cross section - Carlingford Stop CH 55060 - Section H-H  
\*Refer to the Engineering drawings for information on levels

1:200 @A3 0 2 4 6 8M




# 2.7.9 TYPICAL STREET CHARACTER

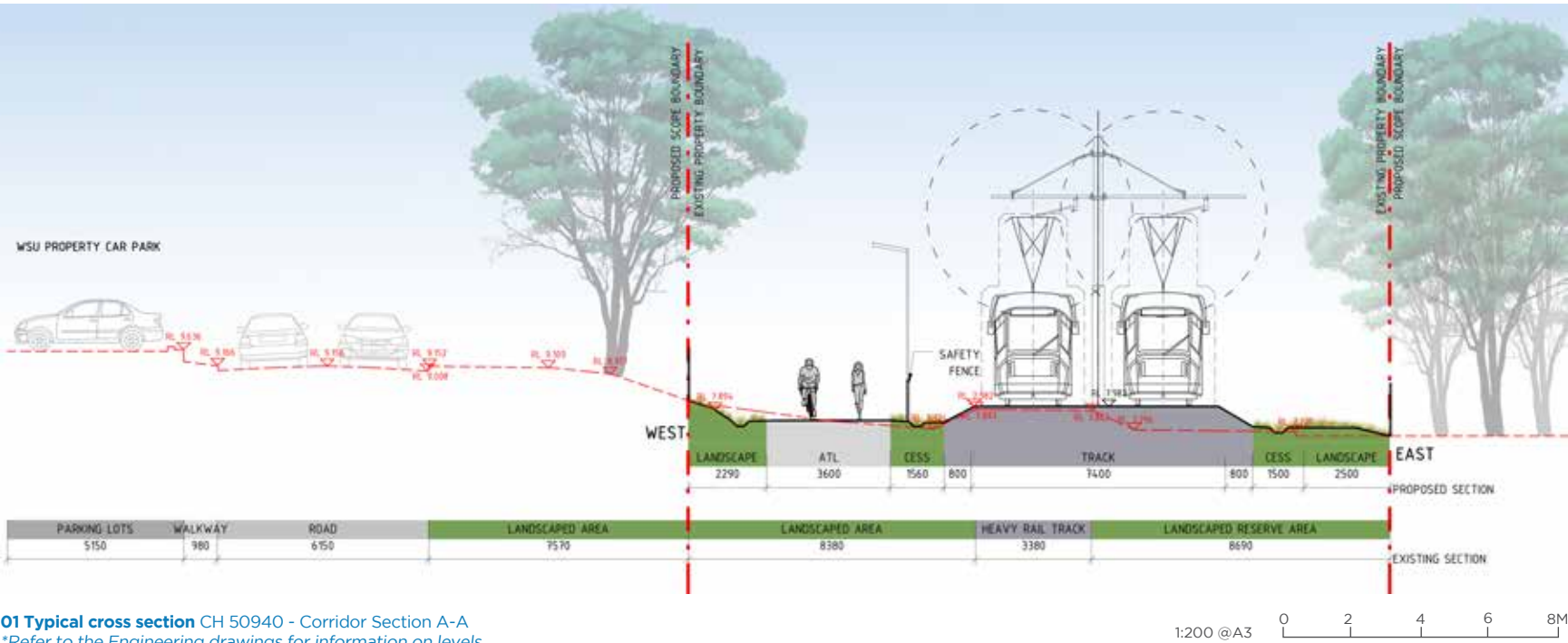
## CORRIDOR SECTION

- 01 - Section A-A between Western Sydney University and Reserve Road.
- 02 - Section C-C Between Anne Marie Reserve and Reserve Street.

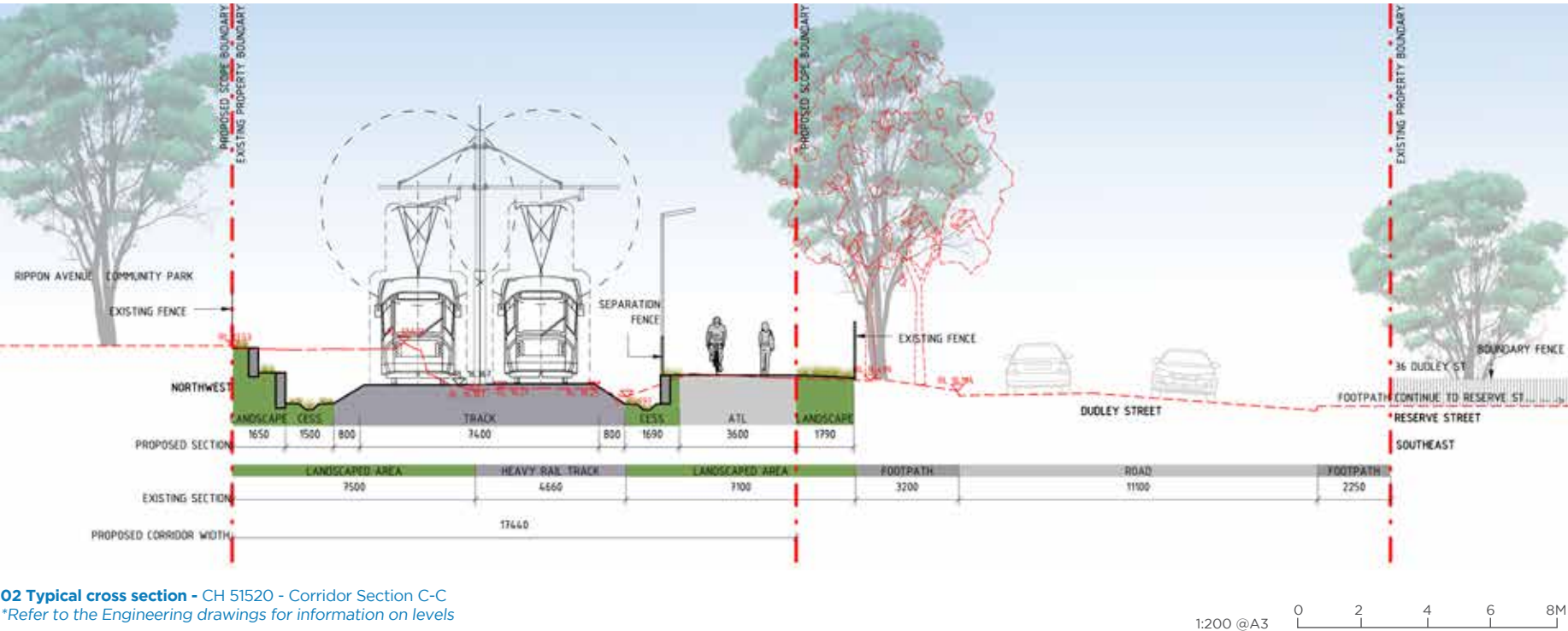
Legend



Existing Tree  
NOTE: All other trees shown are proposed trees



01 Typical cross section CH 50940 - Corridor Section A-A  
\*Refer to the Engineering drawings for information on levels



02 Typical cross section - CH 51520 - Corridor Section C-C  
\*Refer to the Engineering drawings for information on levels




## 2.7.9 TYPICAL STREET CHARACTER

### CORRIDOR SECTION

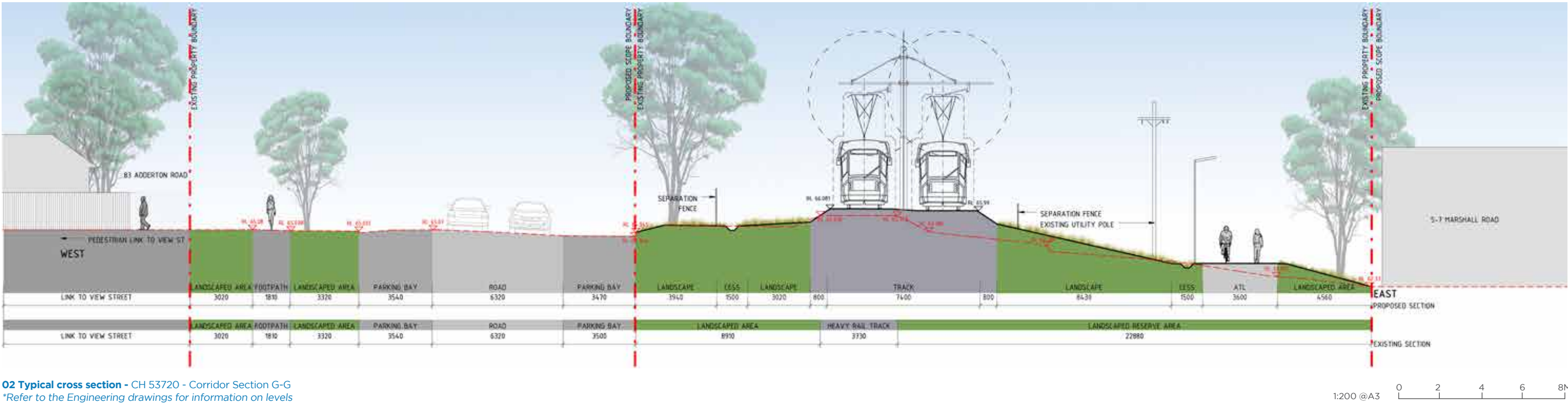
**01** - Section E-E Taken at curve of Adderton Road.

**02** - Section G-G Between Adderton Road and Marshall Road.

Legend



Existing Tree  
NOTE: All other trees shown are proposed trees





## 2.7.10 LANDSCAPE TYPICAL ARRANGEMENT

**Western Sydney University plan**

1. Bushland on the east side of the track and existing trees on WSU land are to be retained and protected during works.
2. ATL, insitu concrete, flush edge restraints and compliant cross-falls to planting areas and drains.
3. Pole lighting alongside ATL. Poles setback a safe distance from shared path (locations shown are nominal only).
4. Planting separating ATL and track. Species selection subject to detailed design.
5. Maintenance tracks located at toe of ballast batters to provide access to the light rail track.
6. Fence located alongside maintenance track. Fence design and colour to minimise visual prominence.
7. New ground levels are to transition seamlessly into existing boundary levels.
8. Investigate removal of boundary fence to improve access and safety.



1:250 @A3 0 2 5 10M



# 2.7.10 LANDSCAPE TYPICAL ARRANGEMENT

## Adderton Road plan

1.

ATL, insitu concrete, flush edge restraints and compliant cross-falls to planting beds and drains. Path to be offset a safe distance from back fences.
2.

Pole lighting alongside ATL. Poles setback a safe distance from shared path (locations shown are nominal only).
3.

Mixed shrubs, grasses and groundcover planting. Species and planting locations to ensure clear sightlines. Species selection and planting design subject to detailed design.
4.

Tree planting to provide shade and fauna habitat. Trees to be planted a safe distance away from the ATL and away from light rail infrastructure.
5.

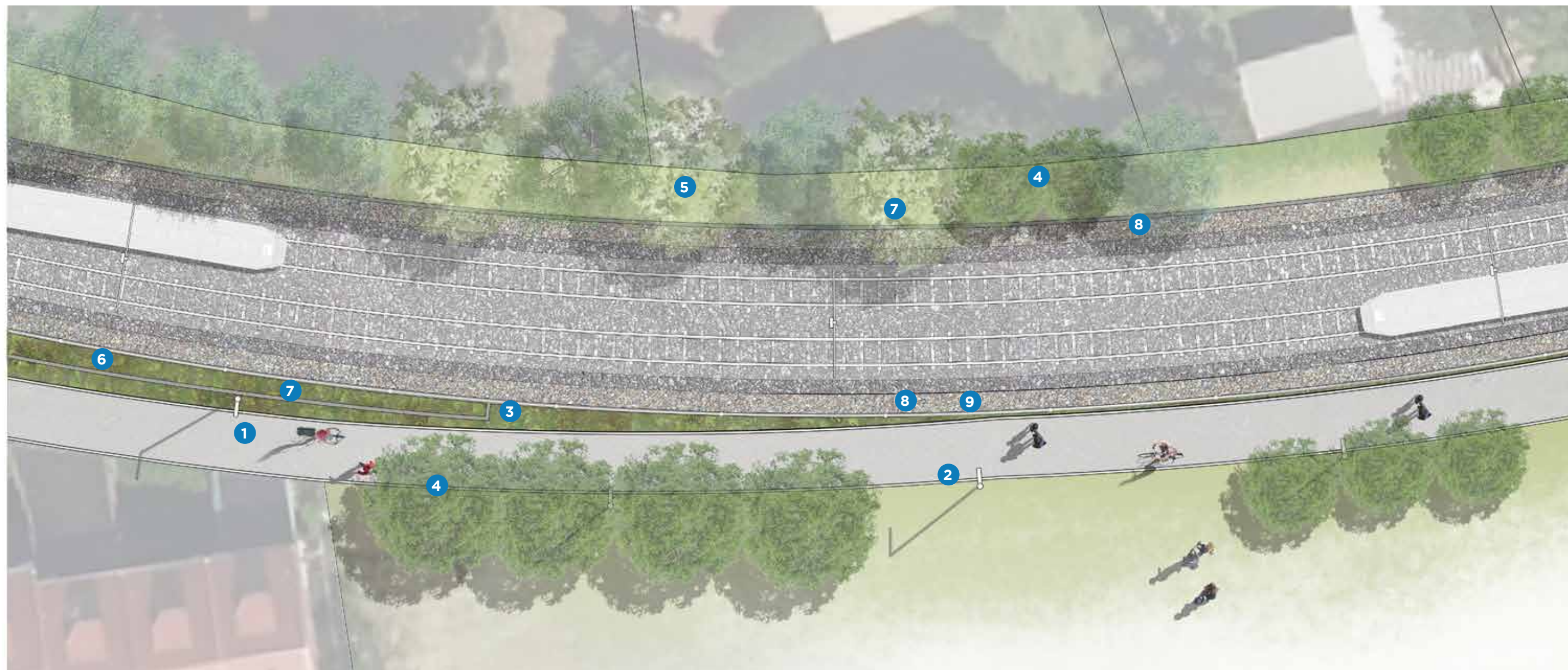
Existing trees retained wherever possible and protected during works.
6.

Planting beds and vegetation to soften the impact of light rail infrastructure and walls.
7.

Retaining walls required where slopes are too steep for planting. Walls to be screened with vegetation and offset safe distance from the ATL.
8.

Maintenance tracks located at toe of ballast batters to provide access to the light rail track.
9.

Fence located alongside maintenance tracks. Fence design and colour to minimise visual prominence.



1:250 @A3 0 2 5 10M



1. ATL, insitu concrete, flush edge restraints and compliant cross-falls to planting beds and drains. Path to be offset a safe distance from back fences.

3. Mixed shrubs, grasses and groundcover planting. Species and planting locations to ensure clear sightlines. Species selection

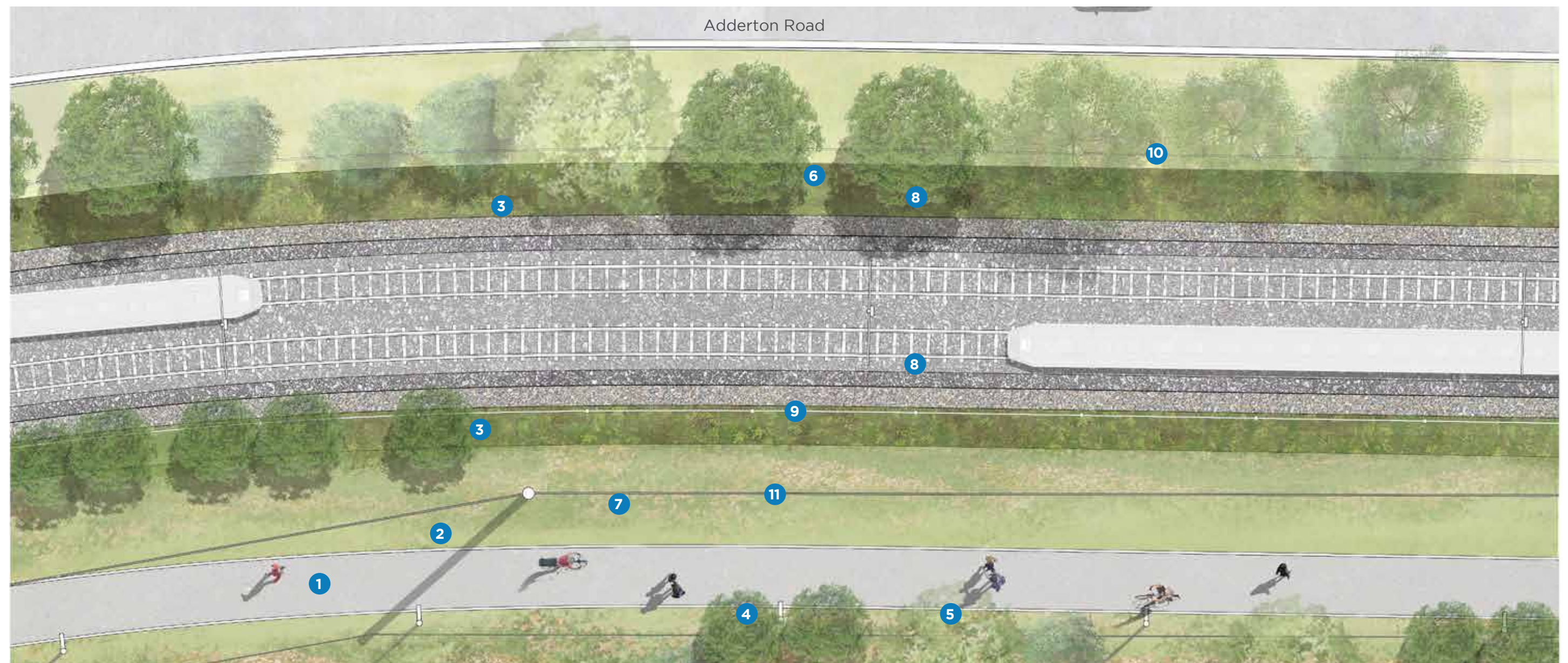
detailed design.

4. Tree planting to provide shade and fauna habitat. Trees to be planted informally and generously to maximise amenity and natural bushland character.


- 6. Planting on slopes to reduce erosion and maintenance requirements.

8. Maintenance tracks located at toe of ballast batters to provide access to the light rail track.

- maintenance tracks. Fence design and colour to minimise visual prominence.
- 10.** Existing fence to be removed subject to safety assessment.
  - 11.** Existing overhead power poles / lines accessible from ATL pathway.



N 1:250 @A3



0 2 5 10M



## 2.7.11 VISUALISATION - TELOPEA



Artists impression. Images are indicative and do not show drainage, operational and other infrastructure.

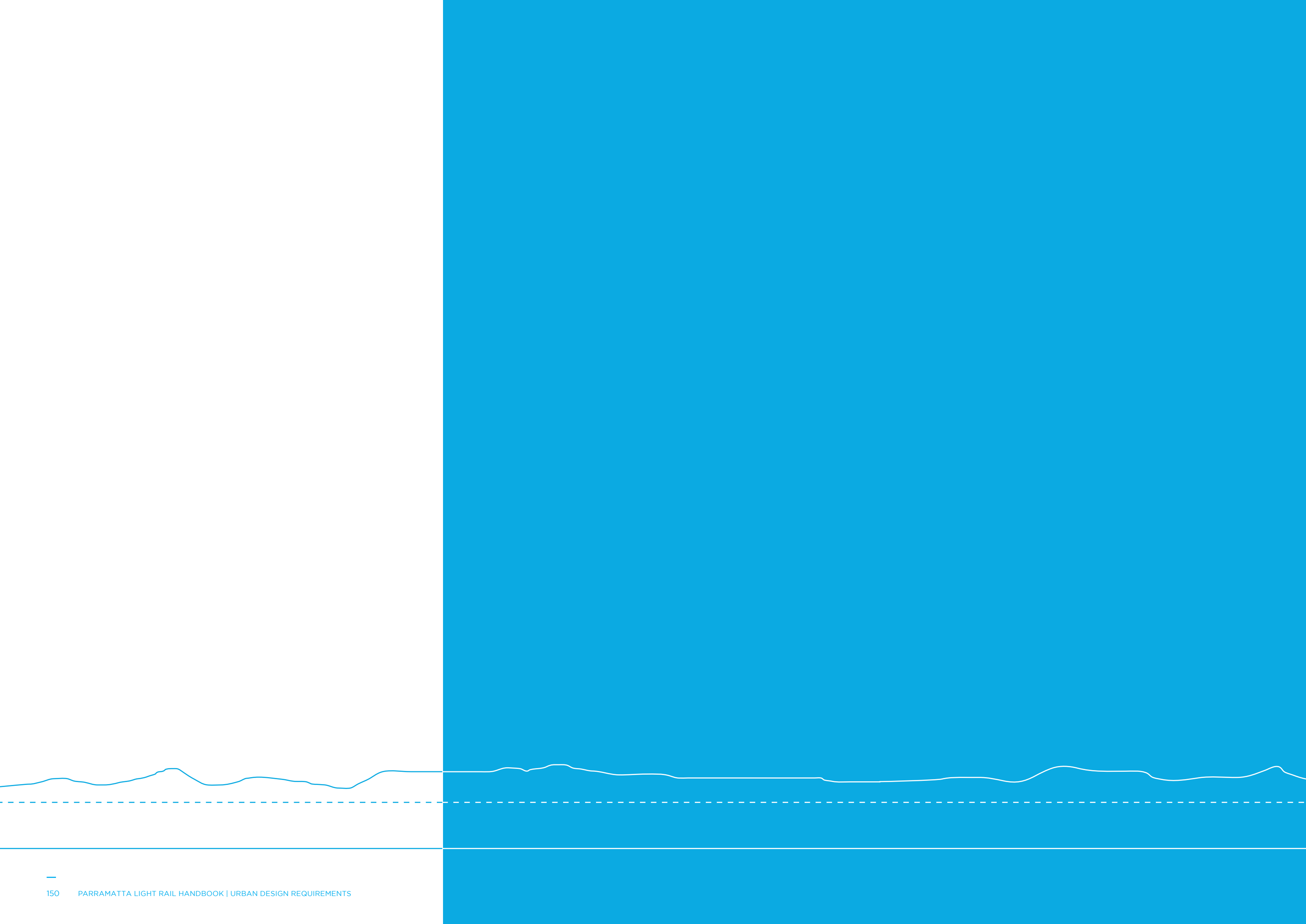


## 2.7.11 VISUALISATION - CARLINGFORD ATL



Artists impression. Images are indicative and do not show drainage, operational and other infrastructure.

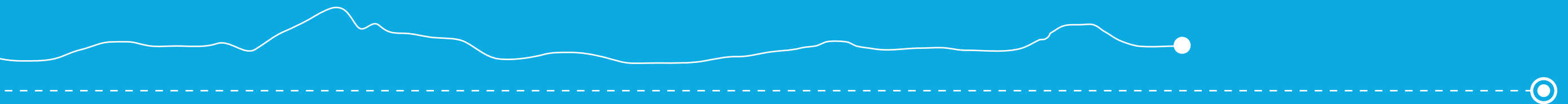






# — 3.0 DESIGN REQUIREMENTS

**PARRAMATTA LIGHT RAIL**  
URBAN DESIGN REQUIREMENTS





# 3.1 INTRODUCTION

The Parramatta Light Rail Urban Design Requirements describe how the urban design, landscape and architecture of the project will integrate a major new transport corridor into the existing and emerging character of Greater Parramatta, its streets and public spaces.

The design requirements provide detail on initiatives proposed in Chapter 2 Precinct and Corridor Wide Design to ensure high quality urban design outcomes. It includes sections showing light rail in the public domain, the interface of light rail with pedestrians, vehicles and landscaping and the various corridor conditions from Westmead through the CBD and onto Carlingford.

This chapter identifies public domain design principles integrating the light rail in different environments to ensure they are safe, customer focused and accessible by all users. Further design principles are outlined for bridges, substations and drivers’ facilities, and the light rail stabling and maintenance facility.

Strategies on wayfinding, signage and lighting are also included to create a highly functional, safe and legible integrated light rail system and well-designed public domain that is culturally, environmentally, economically and socially sustainable.

The requirements are informed by the City of Parramatta Public Domain Guidelines (July 2017). Where necessary, the document addresses variations to the guidelines to facilitate quality place making with the integration of light rail into the public spaces and streets of Greater Parramatta.

## PROCESS FOR DEVELOPING LIGHT RAIL REQUIREMENTS

The Parramatta Light Rail urban design requirements will be developed further in consultation with stakeholders, the Operator, and rail regulator as the project develops. The following are the intended steps in the requirements development process:

- 1. Operational Assessment and Hazard Identification:** physical conditions and land use along the light rail alignment assessed to understand how light rail could operate efficiently and identify potential conflict between light rail and the public domain.
- 2. Detail Design:** public domain requirements developed further by a light rail operator in consultation with stakeholders and TfNSW to start once the contractor and operator is appointed.
- 3. Accreditation and Implementation:** public domain requirements assessed by the rail regulator and implemented as the light rail begins service during construction and near practical completion.

When service begins, changes to the light rail operation, such as change of land use or significant population increases, may require the project to re-assess impacts. This may influence change to the public domain requirements.

## CORRIDOR AND ADJACENT AREAS

The Parramatta Light Rail alignment has two adjacent zones that change in dimension to meet different operational environments.

The zones are:

- The Permanent Light Rail Corridor (PLRC).
- Adjacent area(s).

The PLRC and Adjacent areas each have different owners, designs and safety requirements that impact light rail operations, the public domain and stakeholder interfaces. The Project will continue to develop and define the relationship between the zones, and their application, as part of the design process.

## PERMANENT LIGHT RAIL CORRIDOR

The PLRC is a legal and contractual zone, owned by TfNSW, and maintained by the Light Rail Operator. The PLRC typically follows the light rail alignment and contains all light rail infrastructure, including, but not limited to:

- Tracks and track slab.
- Power supply, including overhead wiring.
- Stops and furniture.

However, it is not a contiguous zone. It includes items separated from the light rail alignment, such as substations or drivers facilities, and is also broken by the road surface at intersections. TfNSW requires ownership of the PLRC, so the light rail operator can safely and efficiently operate the light rail system.

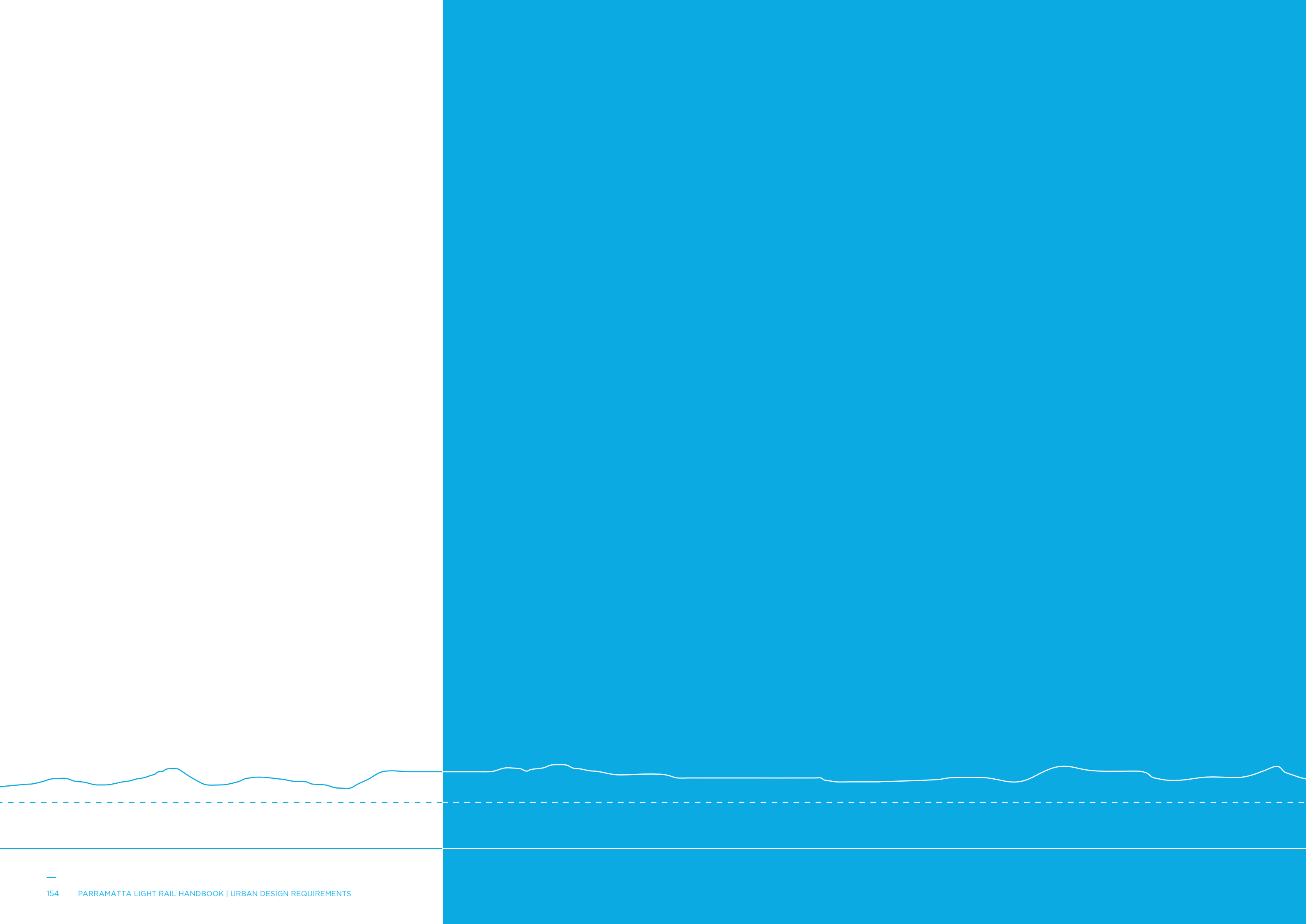


01 Street trees providing a high amenity streetscape and pedestrian experience - Between light rail, roads and trees must allow for inter-visibility between light rail driver and pedestrians.



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## 3.2 PUBLIC DOMAIN DESIGN

**PARRAMATTA LIGHT RAIL**  
URBAN DESIGN REQUIREMENTS



## 3.2.2 LIGHT RAIL IN THE PUBLIC DOMAIN

### LIGHT RAIL ALIGNMENT CONFIGURATION

The Parramatta Light Rail will consider the safety of light rail users and the public along the light rail route, at stops, at mode interchanges and within the street and open spaces where the light rail operates.

There are two major aspects of the public domain design that play a key role in ensuring both the operational and urban design project objectives are met:

- The spatial arrangement of public domain elements and the impact this has on reciprocal visibility, line-of-sight operations, and track zone accessibility.
- The visual and tactile qualities of the public domain materials and the design cues these provide to the LRV driver and public domain users.

Reciprocal visibility is the visual connection between the light rail vehicle driver and other transport modes, including pedestrians, cyclists, and road motor vehicles. The need for reciprocal visibility affects the layout of the public domain, particularly the location of common elements that can influence visibility, such as poles, trees, fencing and street furniture.

Light rail vehicles are driven on 'line-of-sight', which requires LRV drivers to adjust their vehicle speed based on prevailing conditions, and to stop (using the service brake) before a reasonably visible stationary obstruction, at any point on the network.

Designing for line-of-sight operation requires careful consideration of public domain elements, track geometry, stop location, pedestrian crossing layouts, and intersection design, as well as considering the reaction times of LRV drivers, pedestrians, cyclists and motorists. Alignment design speeds, journey times and light rail vehicle specifications are also influenced by line of sight operation.

The placement of public domain elements will be particularly important in ensuring reciprocal visibility and line-of-sight within the pedestrianised areas of the project.

Drivers will seek to balance the demands of maximising on-time running while maximising safety - two objectives which will be in conflict while travelling in pedestrianised areas.

Safe movement of the LRV relies on effective LRV driver decision-making.

The driver must be able to identify and assess risks and hazards so that they can select an effective driving speed and select appropriate actions to mitigate risks. The design of the public domain must maximise visibility for the driver and their ability to see what is occurring within the environment, increasing their situational awareness and their ability to determine the correct course of action to avoid a pedestrian collision.

A secondary risk to avoid is applying the emergency brake, as this is a leading cause of injuries to light rail passengers. The design of the public domain to avoid a pedestrian collision should not rely on the application of the emergency brake.

Public domain users also need to be aware of the light rail corridor and approaching light rail vehicles. The design of the public domain must maximise visibility and reaction times for these users. In some areas, physical separation may be used to limit potential interactions between light rail vehicles, pedestrians, cyclists, and road motor vehicles. Separation can be continuous and impermeable, such as fences, or discontinuous and permeable, such as planting beds, kerbs, bollards or a row of street furniture.

Continuous separation is typically used to manage user conflicts that are judged to have a high likelihood and/or serious consequences (such as areas with poor visibility or higher operating speeds).

Permeable separation is typically used to visually and physically separate conflicting uses where the likelihood and/or consequences of conflict are lower.



01 Green trackform, Strasbourg, France



02 Segregated light rail alignment - Inner west light rail stop, Dulwich Grove Stop



03 Segregated rail alignment - Inner west light rail, Haymarket



04 Mixed light rail alignment - CSELR, George Street CBD



## 3.2.3 LIGHT RAIL INTERFACE

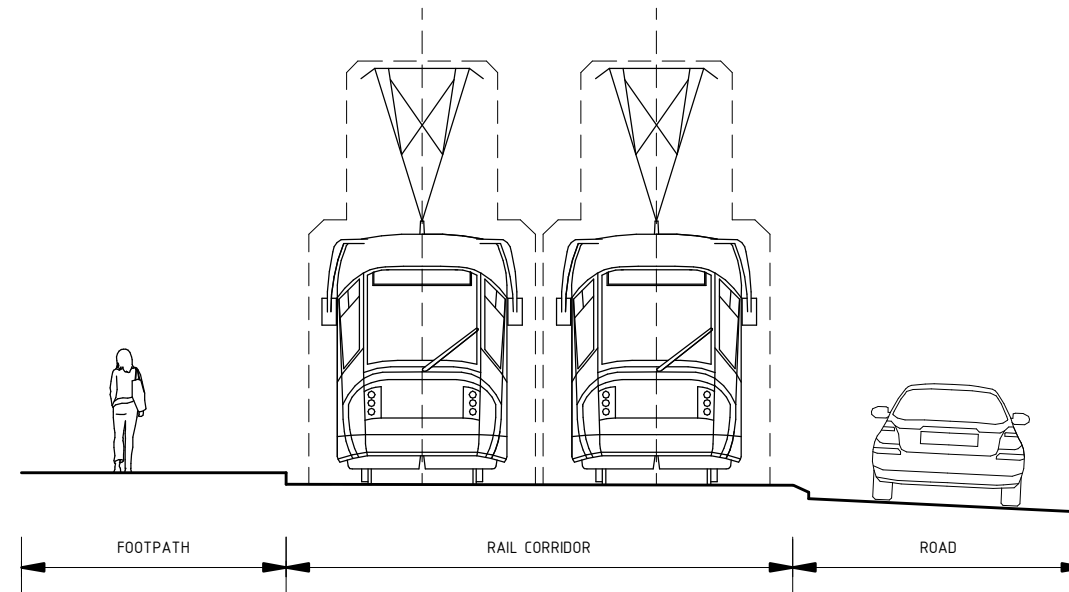
### VEHICLE AND LIGHT RAIL INTERFACE

#### Principles

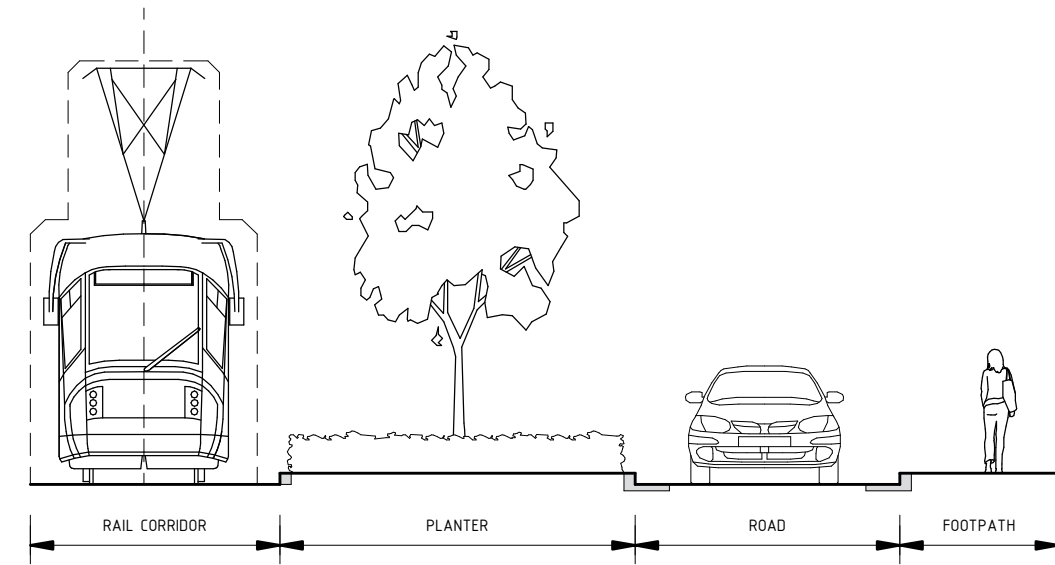
- Minimise opportunities for conflict between vehicles and light rail.
- Ensure road safety for pedestrians, cyclists, vehicles and light rail.
- Promote efficient light rail operations.

#### Design Criteria

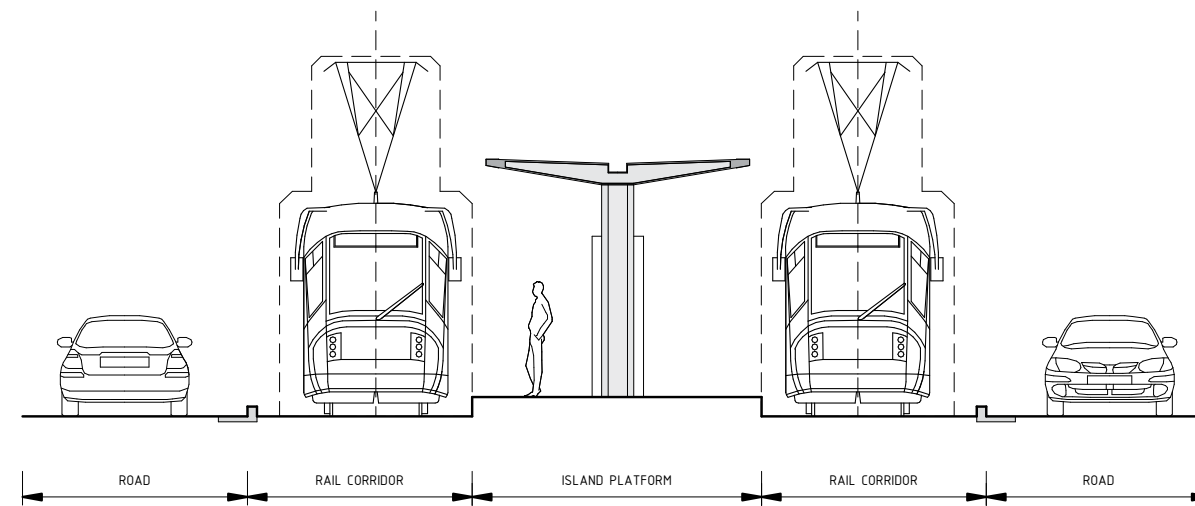
- Delineate between light rail corridor and vehicle lanes with kerb treatment, bollards, varying materials finishes, line marking and other corridor specific strategies.
- Separate the light rail corridor from adjacent vehicle lanes with low scale planted medians or road kerbs (refer to vehicle and light rail interface diagrams).
- Comply with RMS and AusRoad standards.



01 Typical - Vehicle and light rail interface - Delineation between light rail and road



02 Typical - Vehicle and light rail interface - Vegetation strip with low level tree planting delineating road and rail in specific conditions



03 Typical - Vehicle and light rail interface - Island Platform



### 3.2.3 LIGHT RAIL INTERFACE

#### PLATFORM AND PUBLIC DOMAIN INTERFACE

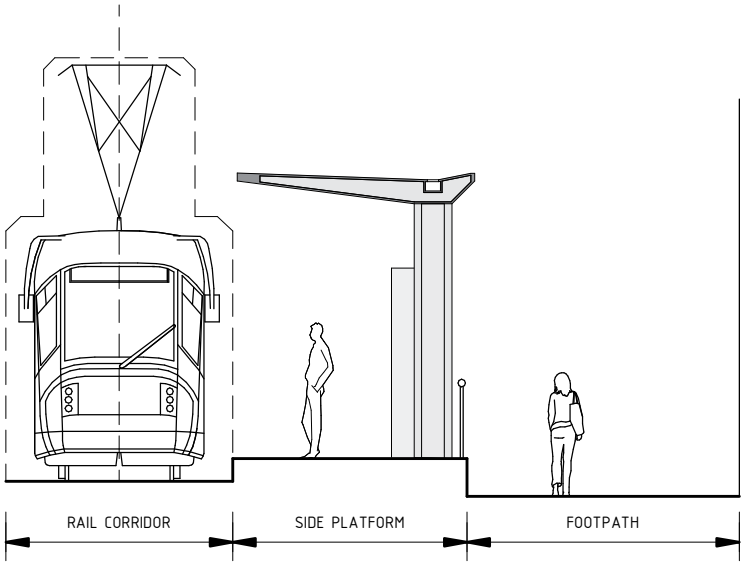
Principles

- Ensure safe and convenient movement of pedestrians.
- Design to assist with intuitive wayfinding.
- Promote efficient access to light rail.

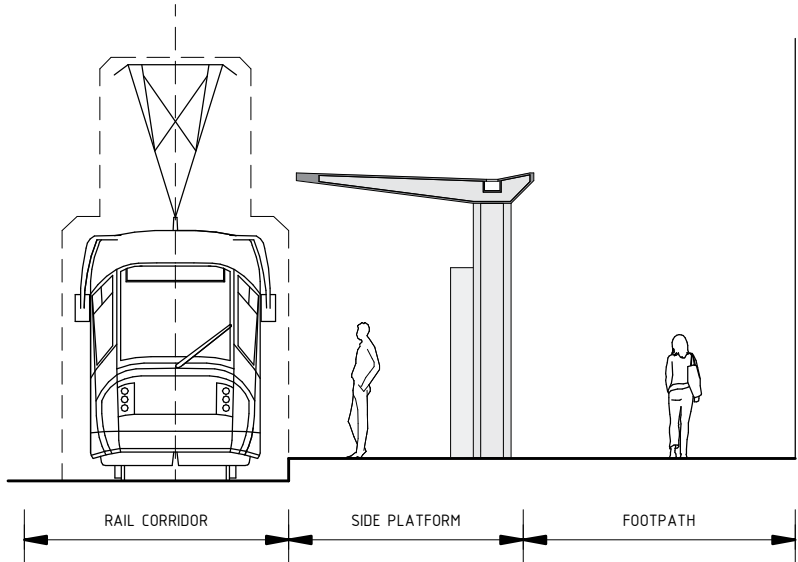
Design criteria

- Maintain clear sightlines.
- Provide direct and DDA compliant access from footpath to stop platform.
- Ensure platforms provide a safe environment for all users with due consideration to adjoining land uses or traffic lanes.
- Provide signaled crossings, where necessary.
- Ground tactile indicators to be installed at the pedestrian light rail interface.

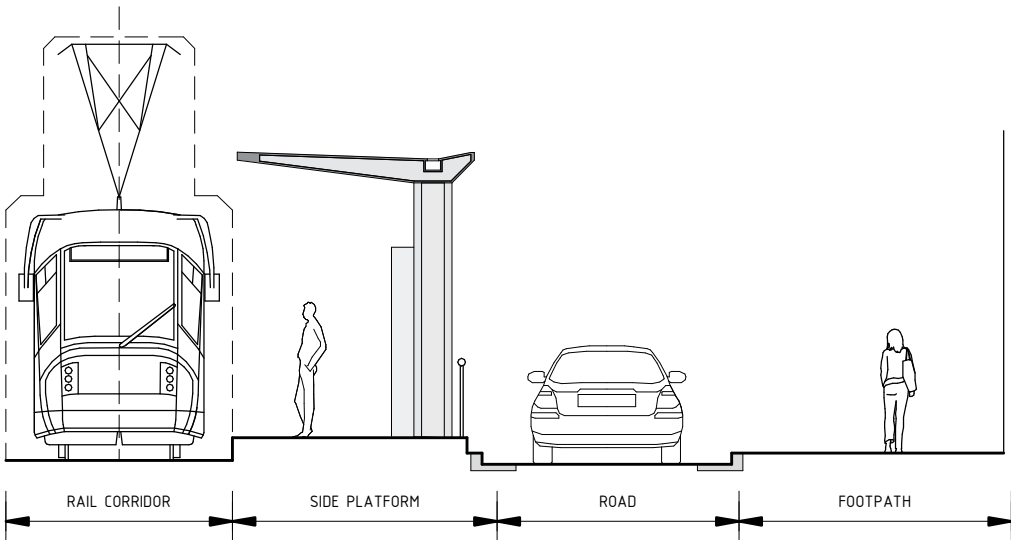
The drawings adjacent show various typical interface details.



01 Typical - Platform and public domain interface - Platform with step down to footpath



02 Typical - Platform and public domain interface - Side platform flush with footpath



03 Typical - Vehicle and light rail interface - Side platform dividing light rail and road



## 3.2.3 LIGHT RAIL INTERFACE

### PEDESTRIAN AND LIGHT RAIL INTERFACE WITH KERB

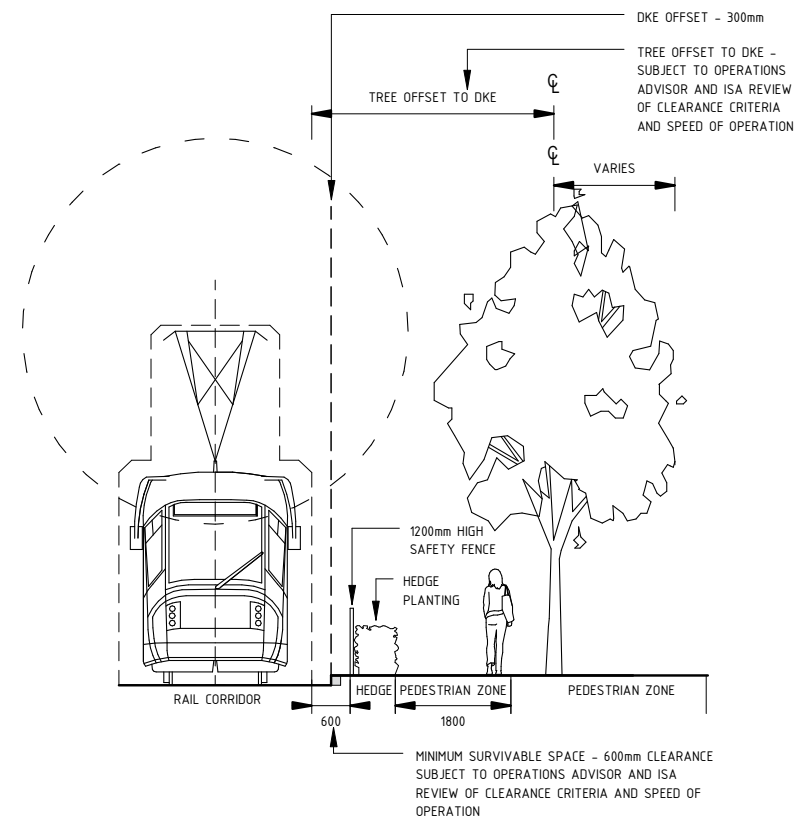
#### Principles

- Minimise conflicts between pedestrians and light rail movements.
- Ensure safe movement of pedestrians.
- Design to assist with intuitive wayfinding.
- Promote efficient light rail operations.
- Promote a quality streetscape design.

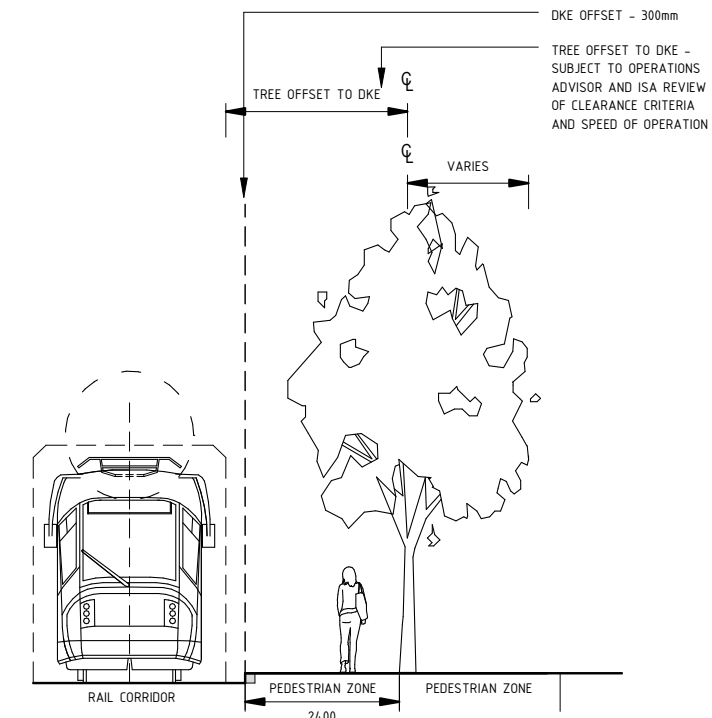
#### Design criteria

- Maintain clear sight lines for all users.
- Clearly define the light rail corridor through surface treatment finishes.
- Encourage intuitive wayfinding to manage pedestrian access to stops and the use of defined pedestrian crossings.
- Provide legible and generous pedestrian crossing points.
- Ensure ground tactile indicators are installed, where necessary, at the pedestrian light rail interface.
- Provide landscape planting, where applicable, to manage pedestrians accessing the light rail corridor.
- Enable appropriately located tree planting and landscaping to reinforce the streetscape and create pedestrian amenity.
- All footpaths widths will determined by precinct specific conditions. Footpaths must comply with AS1428.1.

The drawings adjacent show various typical interface details.



01 Typical diagram - Kerbed with planting hedge or fence separating light rail and pedestrian zone



02 Typical diagram - Kerb with pedestrian footpath adjacent to the light rail corridor



## 3.2.3 LIGHT RAIL INTERFACE

### PEDESTRIAN AND LIGHT RAIL INTERFACE FLUSH DINING ENVIRONMENTS

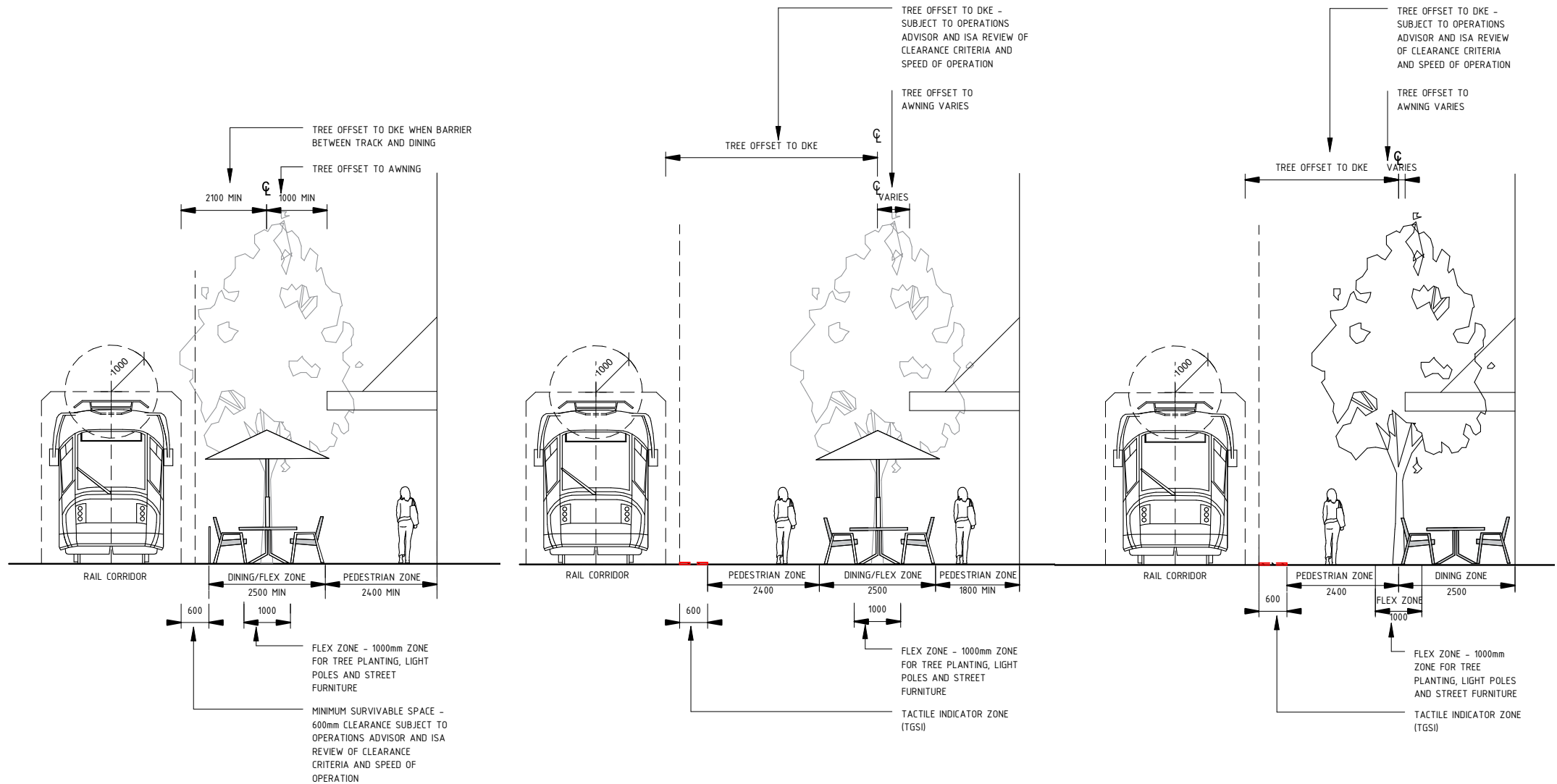
#### Principles

- Minimise conflicts between pedestrians and light rail.
- Ensure the safe movement of pedestrians.
- Provide a safe and pleasant atmosphere for outdoor dining.

#### Design criteria

- Ensure ample footpath width to allow for outdoor dining and pedestrian movement.
- Ensure pedestrians can move freely along footpath and from shop fronts with no obstructions.
- Outdoor dining to be located along building line where possible. Ensure a clear path of travel and consistent shoreline is provided along street.
- Alternatively, locate a footpath (minimum 2400mm wide) between light rail and dining. Footpath located minimum 600mm from light rail corridor.
- Ensure ground tactile indicators are installed at the pedestrian light rail interface, offset 300mm from the light rail vehicle developed kinematic envelope (DKE).
- Ensure any trees, street furniture; including OHW, lighting, benches etc. do not obstruct safe operations of light rail.

Please note: Proposed arrangement and location of outdoor dining subject to operator requirements and safety assessment, to be finalised in consultation with Council and business owners.





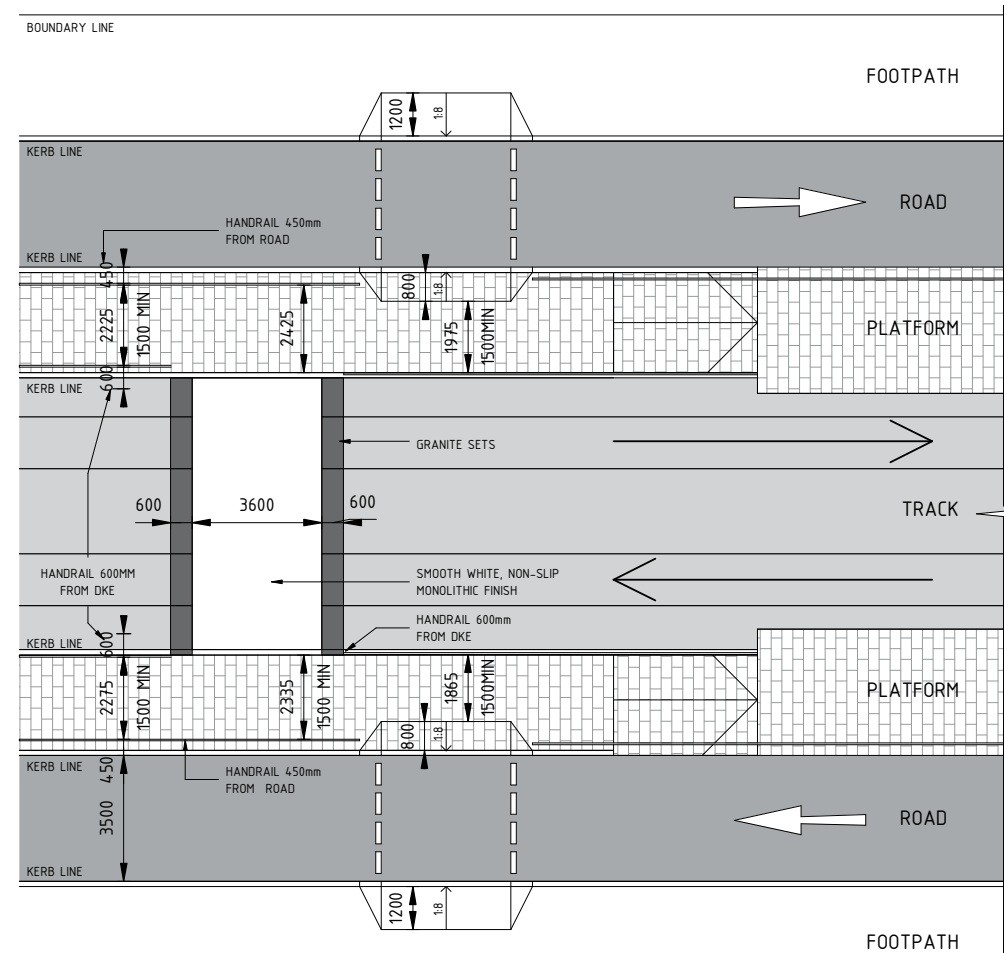
## 3.2.3 LIGHT RAIL INTERFACE

### PEDESTRIAN CROSSINGS

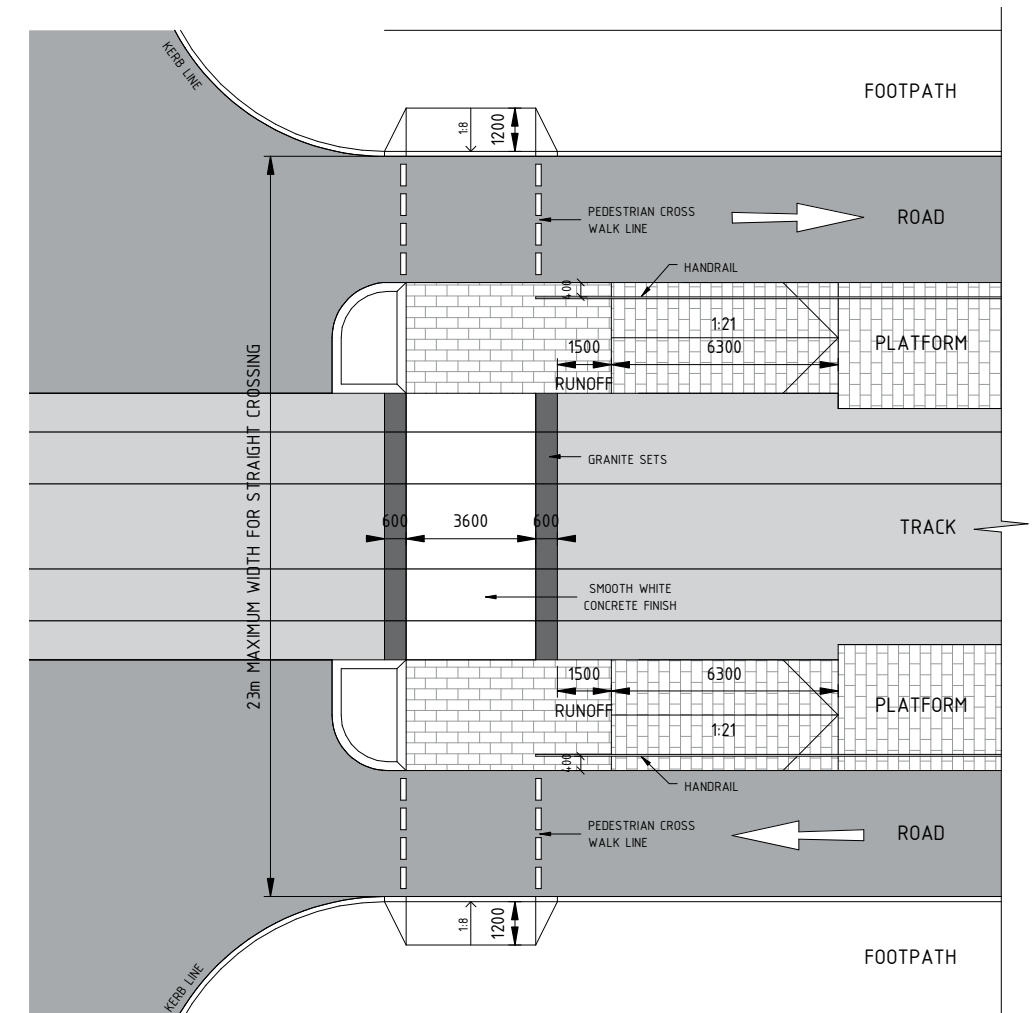
- Design in accordance with the project-specific safety assessment, and to meet relevant Australian Standards, the Disability Standard for Accessible Public Transport 2002 and RMS standards.
- Pedestrian crossings should be straight wherever possible.
- Provide pedestrian crossing materials that clearly delineate pedestrian paths of travel across the light rail track zone and roadway, differentiating between general track form and crossing areas by means of material variation and luminance contrast in accordance with AS 1428.4.
- Where possible, provide raised pedestrian crossings across the roadway to remove the need for kerb ramps in medians.
- Avoid handrails and balustrades adjoining the light rail track zone wherever possible.
- Provide pedestrian crossings as close as possible to the stop exits to discourage illegal and dangerous pedestrian movement.

#### Pedestrian Crossing Diagrams

- Platform access ramp should ideally be a maximum grade of 1:21, avoiding the need for TGSIs and track-side handrail.
- Crossings should be staggered in some locations to achieve traffic and signal phasing requirements and as a safety measure to encourage pedestrians to reassess the crossing situation and not undertake the full crossing in one movement. This may be relevant in instances where a vehicle could obscure the view of the adjacent lane.
- Crossings may be straight in some locations for pedestrian accessibility and convenience.



01 Side Platform Crossing - Indicative staggered crossing



02 Straight Platform Crossing - Indicative straight pedestrian crossing



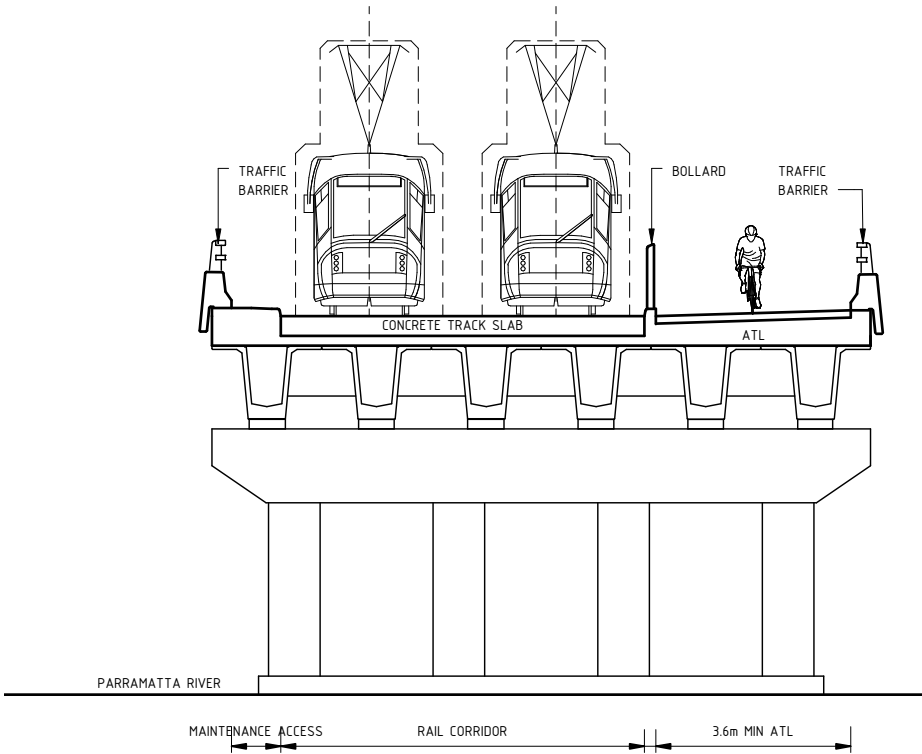
### 3.2.3 LIGHT RAIL INTERFACE

#### LIGHT RAIL BRIDGE AND UNDERPASS INTERFACE

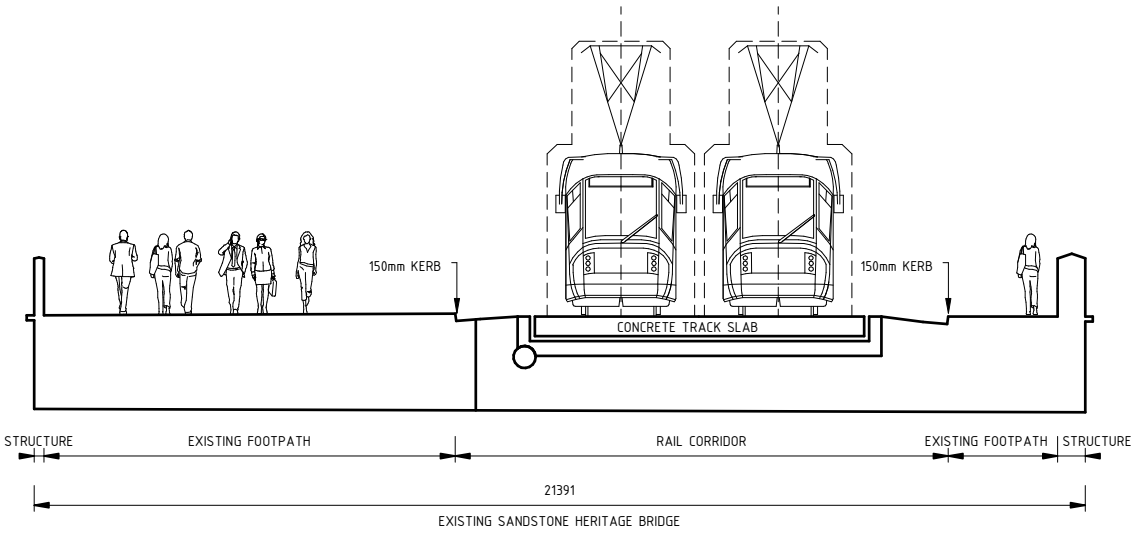
A number of bridge interfaces are required along the light rail route to accommodate the ATL. These include bridge widening, separate bridge structures and underpasses. Each design is shown indicatively in the adjacent diagrams. Each design ensures the continuity, safety and quality of the ATL. Urban design treatment will be further developed in subsequent stages.

##### Principles

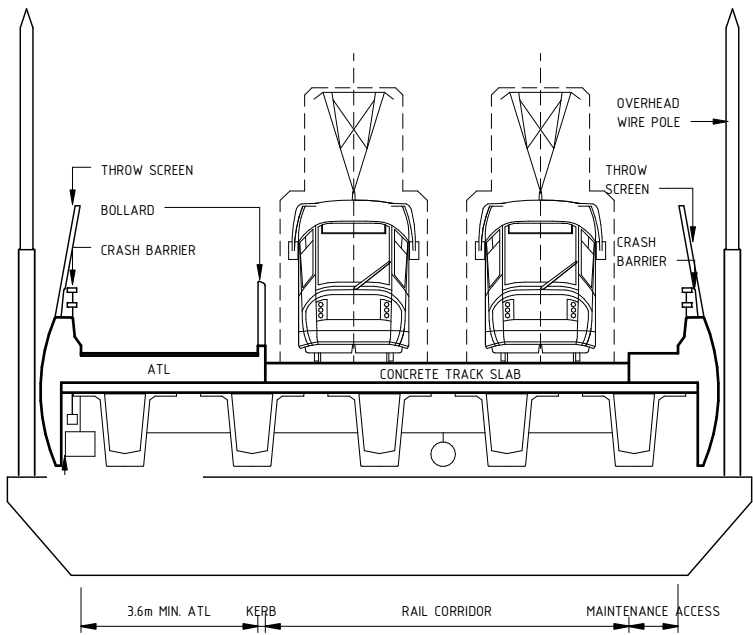
- Design size and type of bridge and/or underpass appropriate to use and place.
- Integrate bridge design into the surrounding context.
- Ensure bridges and underpasses are lit to a safe level.
- Limit visual impact of bridge while maximising views and maintaining sight lines in accordance with CPTED principles and vehicle signal sighting.



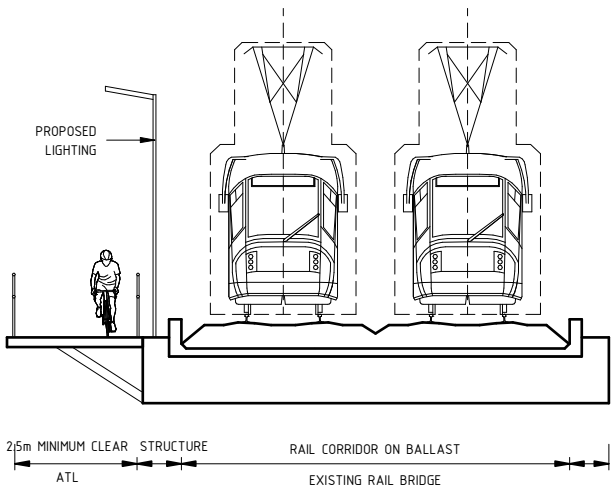
01 Indicative River Road Bridge



02 Indicative Lennox Bridge



03 Indicative James Ruse Drive Bridge



04 Indicative Parramatta River Truss Bridge



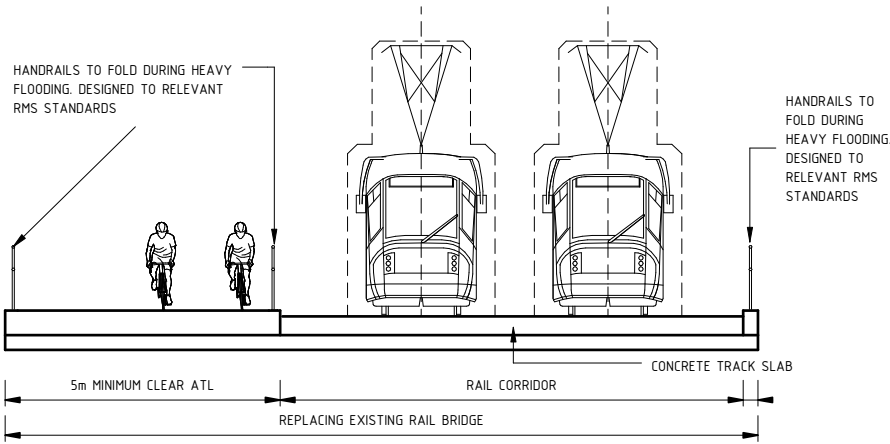
### 3.2.3 LIGHT RAIL INTERFACE

#### Design criteria

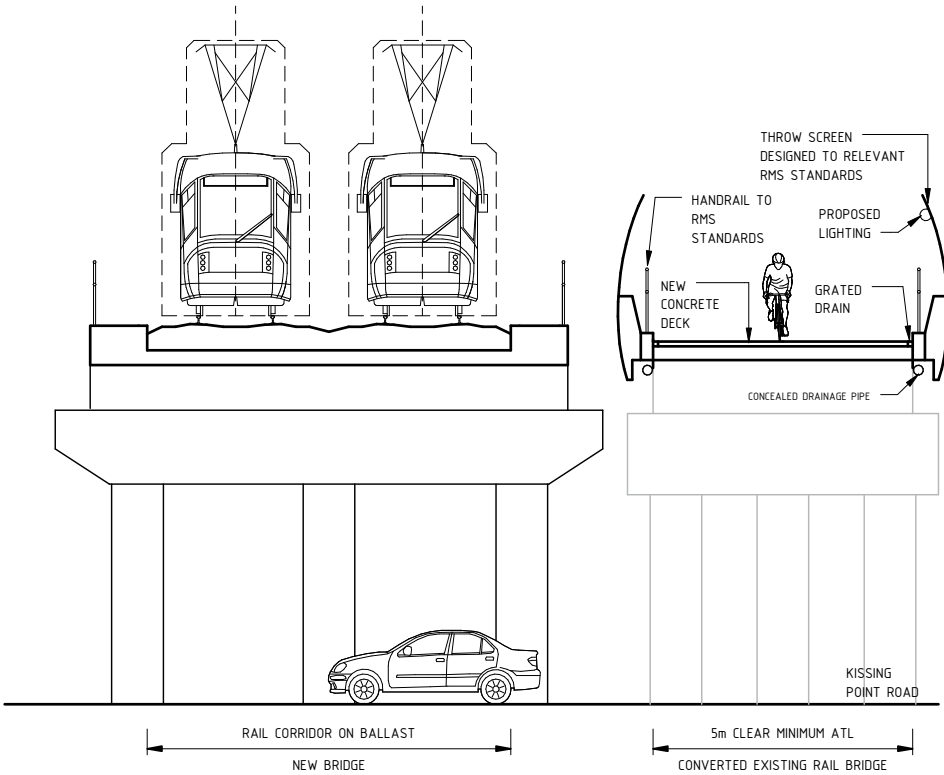
- Design in accordance with relevant standards and codes.
- Design in accordance with CPTED principles.
- Incorporate safety features.
- Provide compliant widths for safe movement.

#### Specific Bridge Requirements

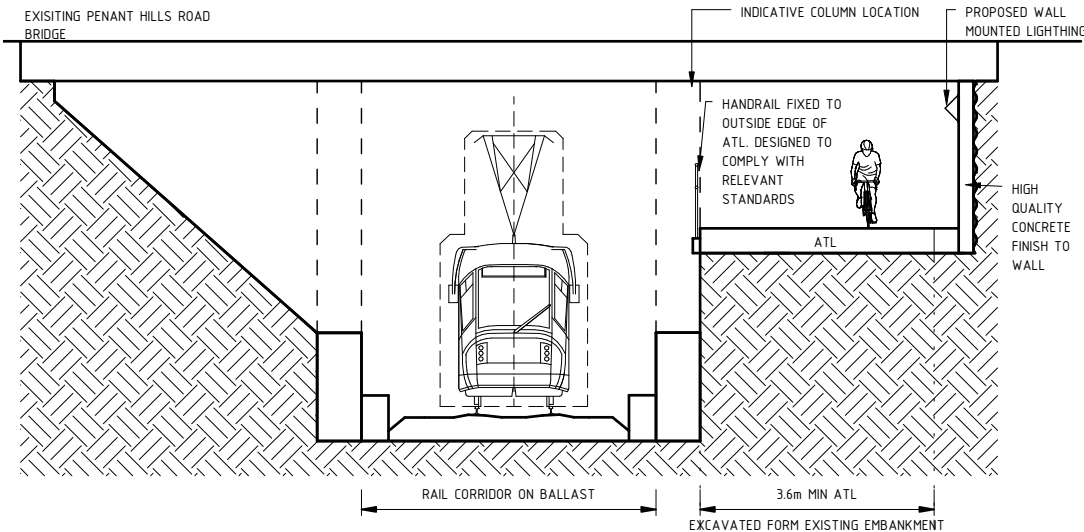
- Parramatta River heritage bridge (Camellia-Rydalmere) – ATL attached to existing bridge to comply with structural requirements. ATL clear width minimum of 2.5m.
- Vineyard Creek bridge – ATL 5m clear width.
- Kissing Point Road, Dundas bridge – Existing rail bridge repurposed for ATL. Approximate 5m clear width.
- Pennant Hills Road, Carlingford bridge – ATL positioned under the eastern span of the bridge with modifications to existing embankments and abutment headstock to meet safety and structural requirements.
- Refer to Section 3.4 Bridges and Underpasses.



05 Indicative Bridge over Vineyard Creek



06 Indicative Bridge over Kissing Point Road  
**Note:** all bridge components are to be integrated into the overall design of the bridge.



07 Indicative Pennant Hills Road underpass



## 3.2.4 ACTIVE TRANSPORT LINK

### LIGHT RAIL AND PEDESTRIAN INTERFACE

#### Design approach and principles

There are over six kilometres of proposed ATL along the Parramatta Light Rail corridor. The design will provide an additional transport mode that complements the use of light rail, increases the transport catchment, and integrates with each stop to encourage different transport choices.

#### Principles

The ATL should:

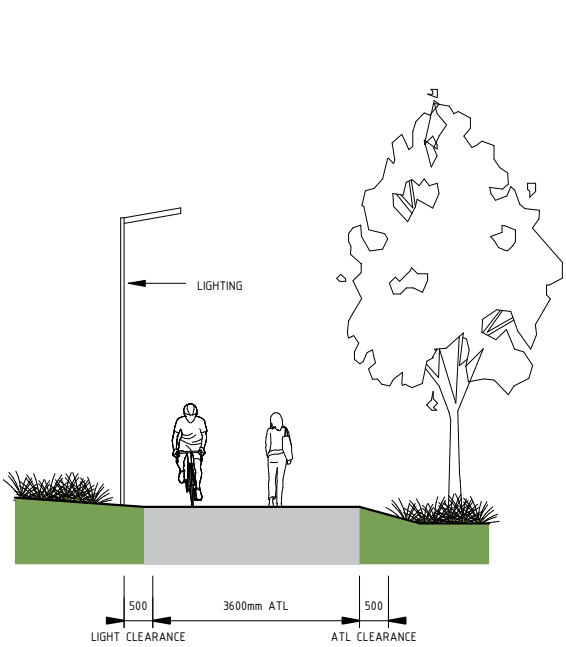
- Link popular destinations and other routes around Parramatta.
- Connect Carlingford to the Parramatta River Corridor with a continuous ATL.
- Establish consistent and coherent paths to promote comfort, efficiency and awareness for both cyclists and pedestrians.
- Reinforce City of Parramatta Council's policy for a walkable and cycleable city centre by maintaining cyclist access to all streets, where possible.
- Create an amenable link with appropriate shade, seating, lighting and vegetation.
- Create a permeable active transport corridor with frequently spaced links to the broader street and cycle network.
- Maximise safety of pedestrians and cyclists.
- Where possible avoid high retaining walls and places of concealment that could impact safety.

#### Design criteria

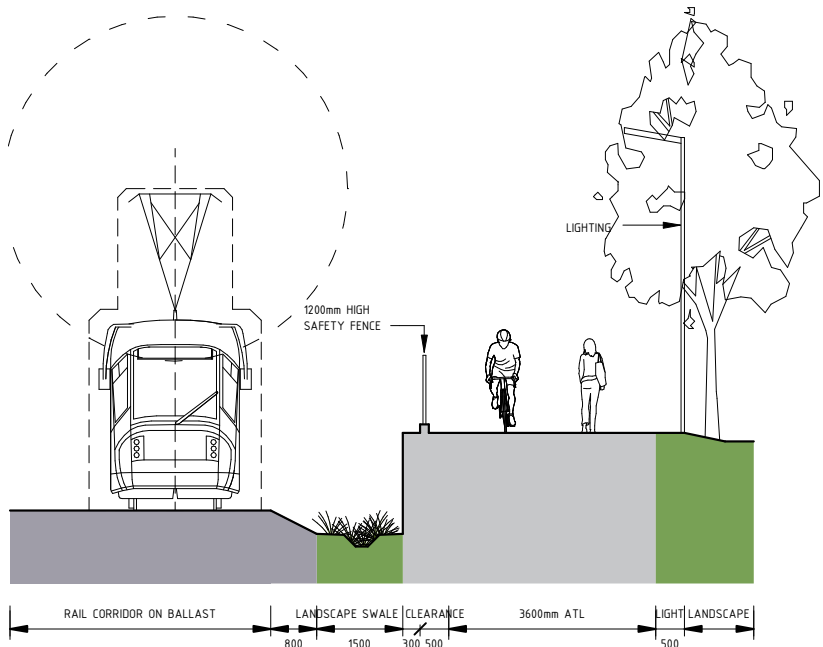
- Follow natural desire lines and be as direct as practicable. Avoid long detours.
- Integrate with a high quality public domain.
- Minimise physical barriers and visual clutter.
- Be well-lit and sign posted and link light rail stops with open space and major destinations.

Community support exists for walking and cycling, provided they are enjoyable and safe activities.

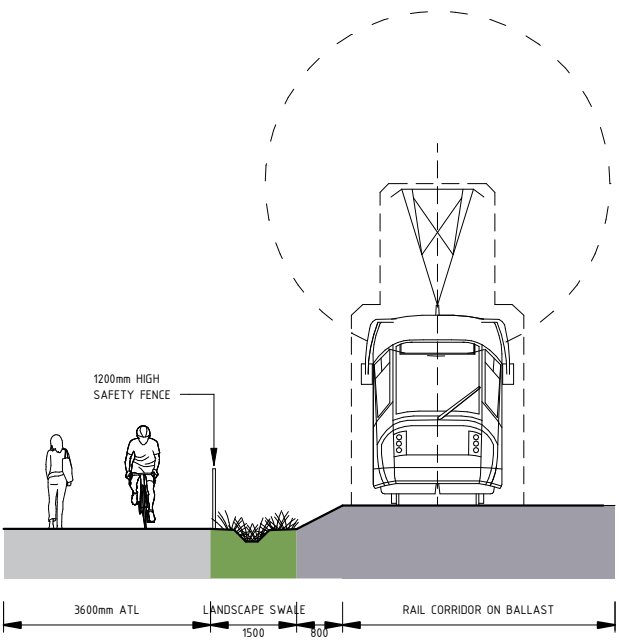
- Intersections should be designed to facilitate safe access to and from the ATL and ensure safe and efficient road crossings.
- Use speed reduction strategies on dedicated cycle paths to indicate change in condition and requirements.
- Provide clear lines of sight before cyclist and pedestrian approaches to any shared spaces.
- Provide cyclist facilities, including bicycle parking.



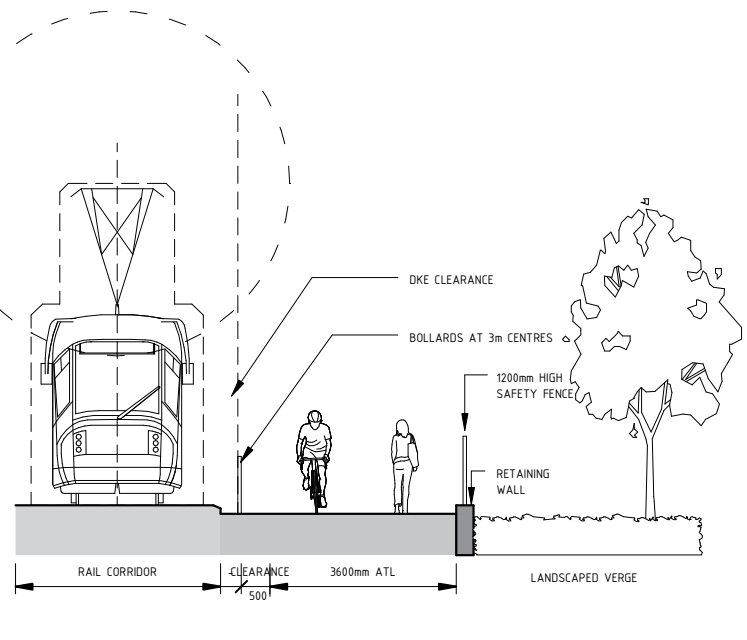
01 Typical Active Transport Link



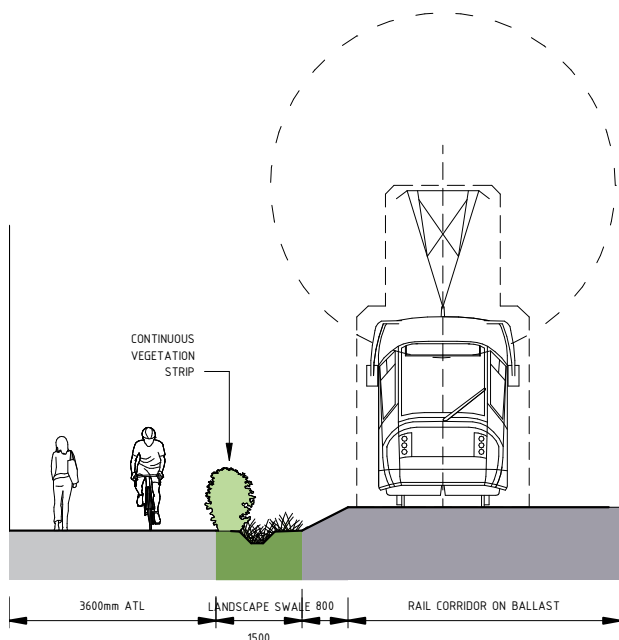
02 Typical Active Transport Link above rail corridor delineated by landscape swale, retaining wall and safety fence



03 Typical Active Transport Link separated by fence and landscape swale



04 Typical Active Transport Link immediately adjacent to light rail corridor



05 Typical Active Transport Link separated by continuous vegetation strip, landscape swale from light rail corridor



## 3.2.5 LIGHT RAIL AND TREE PLANTING

Trees provide environmental, economic and social benefits. They can beautify and soften streetscapes, provide shade for buildings and people, lower local air temperatures, improve air and water quality, and conserve soil. Parramatta's trees are also a link to its natural and built heritage.

The project is committed to retaining trees, wherever possible, however some impact on existing trees is inevitable when building new infrastructure in dense urban environments. The project may affect trees by:

- Clearing within the alignment for light rail infrastructure, including tracks, stops and overhead wiring, and maintaining safe clearances to vegetation during operation.
- Constructing new road configurations and infrastructure.
- Relocating underground or overhead utilities to accommodate light rail infrastructure.
- Excavating cuttings or constructing embankments.
- Establishing and maintaining sightlines between light rail vehicles and other modes.
- Maintaining safe clearances during operation.

These impacts can result in canopy or root pruning, or even tree removal. Design modification, sensitive construction techniques and relocation of trees will be considered, where appropriate, to retain trees of high value. Trees identified for pruning or removal will be assessed further by the Project Arborist, through detailed design and construction stages.

The project will develop a tree offset strategy to mitigate impacts to trees, and identify re-vegetation opportunities in and around the project. All trees removed as part of the project will be offset in accordance with TfNSW's Vegetation Offset Guide (2016).

PLR will also develop technical requirements for tree planting to ensure safe and efficient light rail operation and a successful public domain along the corridor.

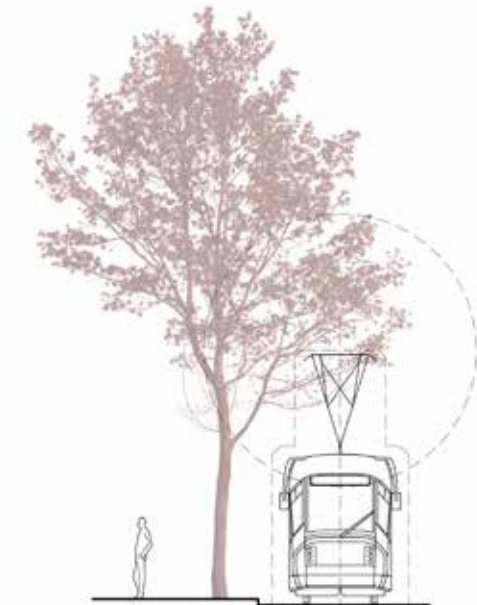
*\*These images reflect project impacts on tree canopies and roots.*



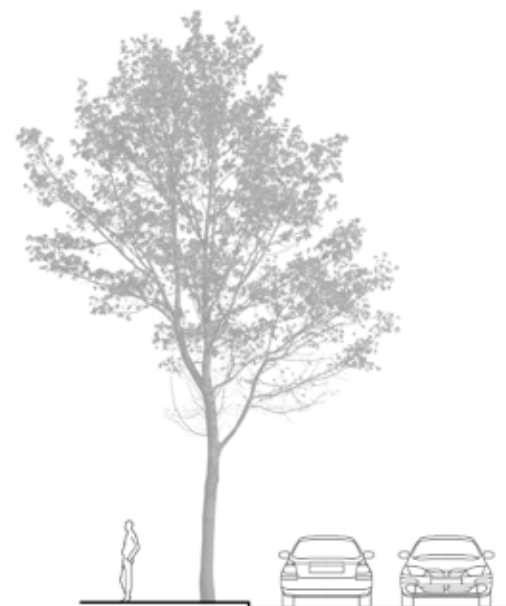
O1 Typical existing condition with street tree and vehicle lane\*



O2 Typical street tree and wire-free light rail adjacent - lower impact on tree\*



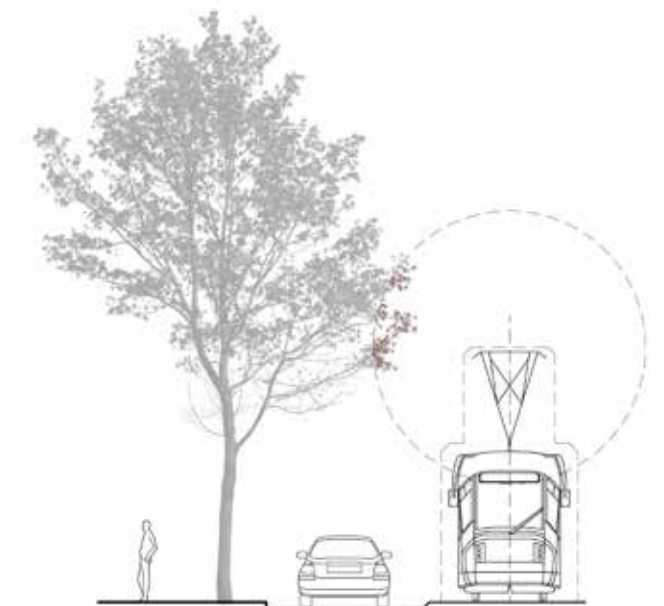
O3 Typical street tree and light rail adjacent - major tree impact / possible loss of tree\*



O4 Typical existing condition with street tree and vehicle lane\*



O5 Typical street tree with vehicle lane adjacent and wire-free light rail - lower / zero tree impact\*



O6 Typical street tree with vehicle lane adjacent and light rail - lower impact on tree\*



## 3.2.5 LIGHT RAIL AND TREE PLANTING

### NEW TREE PLANTING REQUIREMENTS

Tree planting along the Parramatta Light Rail corridor will be guided by technical and design considerations to ensure safe light rail operation and high quality integration with the public domain. These include tree form, size, crown spread, growth rate, as well as desired aesthetics and shading.

### PRINCIPLES

Tree planting will be undertaken in accordance with the principles identified The Parramatta Public Domain Guidelines (2017) and will subject to project-specific safety assessment and design framework.

Principles include:

- Create shaded streets and open spaces along the light rail route by increasing urban tree canopy, reducing heat island effect, fostering a pleasant microclimate, and improving the amenity of the streets.
- Align tree planting and vegetation selection with desired character of each precinct and the project's environmental objectives.
- Provide whole of street solution for coherence and consistency of streetscape.
- Plantings will reinforce the character and visual consistency of streets, avenues, gateways and river edges.
- Assist in meeting the City of Parramatta Council's 40% canopy target with an emphasis on streets, plazas and hard surfaces.
- Tree density and siting will balance shading with solar access.
- Plantings will seek to provide and enrich urban habitat.
- Ensure resilience of the urban forest by providing a diversity of tree species.
- Species selection will consider form, scale, mature height, colour, and texture.
- Species selection will consider growth rate, longevity in the local climate and soil and drainage context.
- Design and siting of tree pits, root guards and growing media will allow healthy root systems to coexist with pavement, utilities and structures.
- Minimise impacts on established open spaces and prioritise retention of existing trees over removal and planting of new trees.
- Provide medium and large size trees wherever possible in streets, parks and urban spaces.

### DESIGN CRITERIA

The following guidelines will inform tree planting;

Species selection

- Species size and form will accommodate clearance requirements to light rail infrastructure, such as overhead wires, without requiring significant ongoing maintenance.
- Species attributes, such as leaf, flower or fruit fall, will not reasonably affect safe light rail operations.
- Species size will be appropriate for achievable tree pits volumes.
- Each tree provided must be able to grow sustainably for 50-80 years beyond establishment period without intervention.
- Species selection and existing and new tree locations in footpaths to be coordinated with authorities such as City of Parramatta and RMS, where required.

Tree pit volume

- Ensure longevity of street trees by providing large soil volumes and consolidated soil zones.
- Tree pit volumes will be maximized within site constraints, through use of continuous planting trenches and structural soil.

Coordination with utility locations

- Investigate opportunities to relocate existing utilities and drainage infrastructure within the street reserve to enable viable street tree planting.
- Clash detection will be undertaken to reduce likelihood of conflict between tree planting and underground and overhead services.
- Exemptions from standard utility restrictions on tree planting should be sought where highest benefits can be realised, through site specific mitigation measures such as encasement.

Management

- Protect the health and form of all retained trees to ensure urban forest remains resilient.
- Maintain, manage and monitor tree planting and species diversity.

### TREE MANAGEMENT

This section should be read in conjunction with:

- AS 4970 – 2009, Protection of trees on development sites.
- AS 4373—2007, Pruning of amenity trees.
- Parramatta Light Rail- Arboricultural Impact Assessment (AIA) report (V3-issued 12 May 2017).



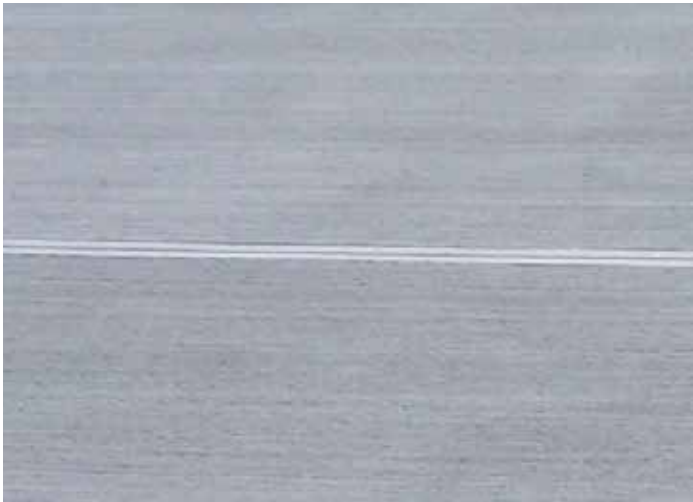
## 3.2.6 PUBLIC DOMAIN MATERIALS

### INDICATIVE PUBLIC DOMAIN MATERIALS PALETTE

The public domain will incorporate materials and finishes that enhance existing place, character and the quality of the surrounding built and natural environment.

Public domain materials and finishes will be:

- Attractive and visually consistent.
- Robust and resistant to vandalism.
- Responsive to setting, including heritage values and the Parramatta River.
- Fit for their intended use including high pedestrian activity and cycling.
- Consistent with relevant DDA and Australian Standards particularly in regard to slip resistance.
- Preferentially select materials with higher sustainability credentials and those with a reduced whole of life cycle impact.
- City of Parramatta's public domain palette.
- Consistent with Parramatta North Urban Transformation Precinct DCP where relevant.



01 Broom finish concrete paving



02 Exposed aggregate concrete paving



03 Asphaltic paving - fine aggregate



04 Bound aggregate tree pit finish and stainless steel grate



05 Granite flagstone unit paving



06 Granite setts



07 Granite kerb in Parramatta CBD



08 Stainless steel Tactile Ground Surface Indicators (TGSIs)



09 Precast concrete unit paving



### 3.2.7 LANDSCAPE AND TREE PLANTING

#### INDICATIVE PLANTING PALETTE

The planting palette will include vegetation that enhances the existing natural environment, place and character.

Tree, shrub and groundcover vegetation within the public domain:

- Provide shade and amenity.
- Be drought tolerant and hardy.
- Increase biodiversity and habitat.
- Be responsive to context including heritage and Parramatta River.
- Provide plant species that result in clear sightlines between properties, the ATL corridor and light rail vehicles.
- Be responsive to urban scale including street reserves and building heights.
- Select species that reduce drop onto stop surfaces and cause potential for slip.
- City of Parramatta's vegetation palette and Parramatta North Urban Transformation Precinct DCP and planting strategy.
- Explore opportunities to use plantings from the swamp sclerophyll forest on coastal floodplains



01 *Livistona australis* - Cabbage Tree Palm



02 *Eucalyptus saligna* - Sydney Blue Gum



03 *Lophostemon confertus* - Brush Box



04 *Melaleuca styphelioides* - Prickly leafed Paper Bark



05 *Jacaranda mimosifolia* - Jacaranda



06 *Corymbia maculata* - Spotted Gum



07 *Tristaniopsis laurina* - Water Gum



08 *Ficus rubiginosa* - Port Jackson Fig

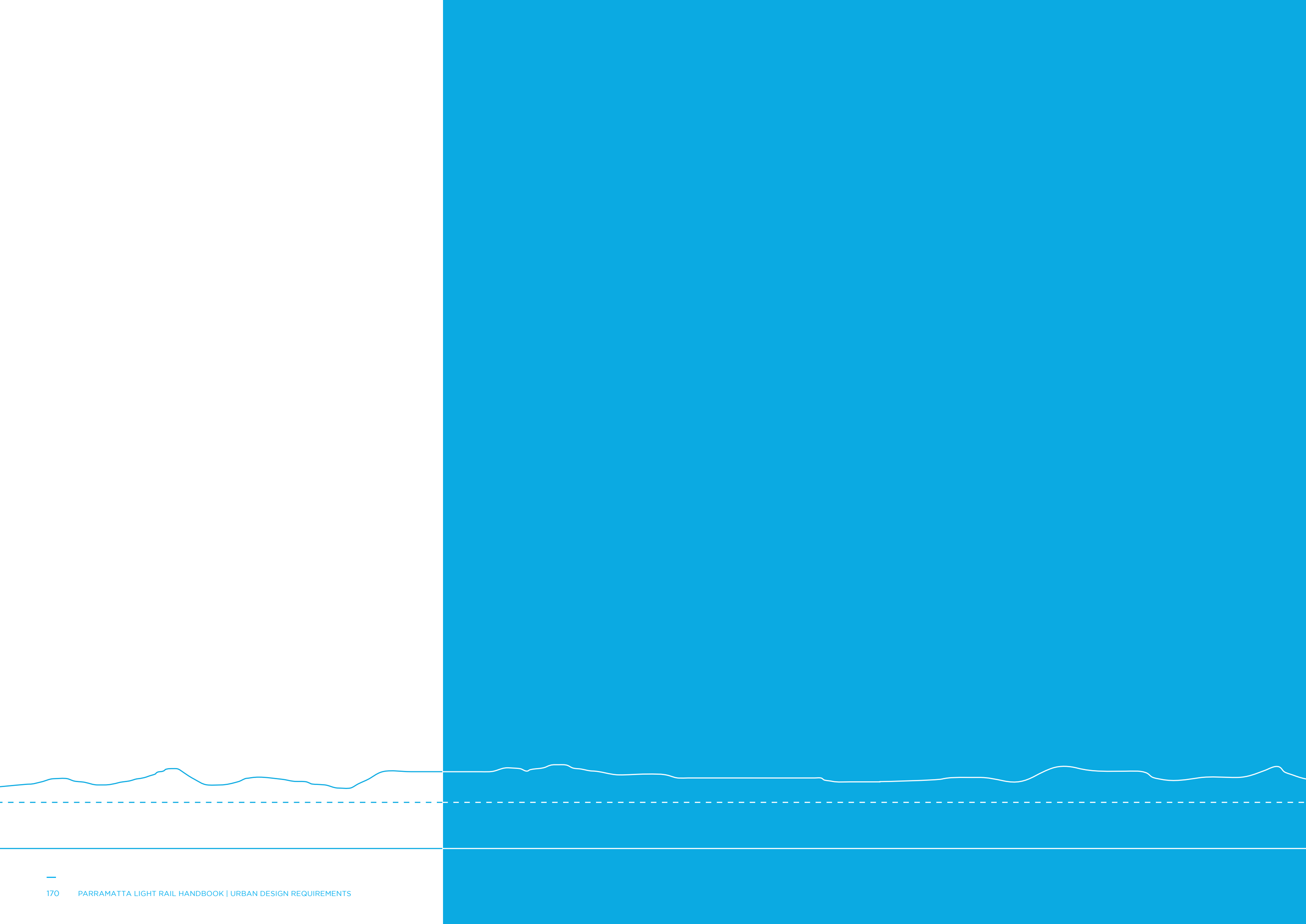


09 *Ulmus parvifolia* - Chinese Elm



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# 3.3 STOP DESIGN

**PARRAMATTA LIGHT RAIL**  
URBAN DESIGN REQUIREMENTS



# 3.3.1 INTRODUCTION

## Stop Design Principles

A project-wide customer centred design approach focuses on improving customer comfort in the public realm.

The light rail stops will consist of urban elements that will integrate into the existing Greater Parramatta context. These elements will include stop canopies, furniture, signage, lighting and landscape and sustainable features.

Design light rail stops to create a legible and specific identity for Parramatta and light rail with a modular and scalable design.

- Create a 'whole of line' shelter strategy which balances the need for consistent identifiable wayfinding elements with the ability to deliver unique responses which respond to place.
- Ensure shelter design is sensitive to heritage precincts and items at key locations.
- Ensure shelter design and stop placement does not form a barrier to free flowing pedestrian movement.
- Design for customers and maximise accessibility and pedestrian priority.
- Integrated architecture, urban design and landscape design to reflect local character and improve active transport integration.
- Design stops to maintain visibility and passive surveillance.
- Design stops to allow room for dispersal and marshalling during event periods, where appropriate.

## Benchmarking

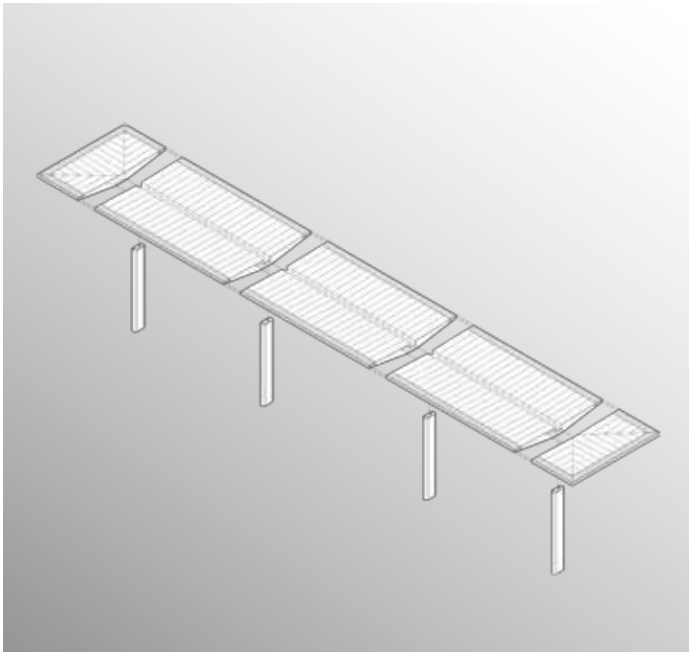
The CBD and South East Light Rail, Inner West Light Rail and Newcastle Light Rail projects have been used as benchmark projects. These examples demonstrate how to integrate architecture and urban design using a modular kit of parts.

The following examples of integrated architecture and urban design have been used as benchmark criteria:

- Appropriate levels of shelter.
- Choice of robust materials.
- Sustainable design and materials.
- Clarity of architectural form.
- Integrated signage and wayfinding.



01 Design for Parramatta - Design with a sense of space, design for Parramatta.



02 Modular and scalable design - Using modular and scalable design.



03 CBD and South East Light Rail Stop, Sydney, Australia



04 CBD and South East Light Rail Stop, Sydney, Australia



05 Inner West Light Rail Stop, Australia



06 Integrated charging platform, Newcastle, Australia



### 3.3.2 DESIGN CRITERIA

The stop design criteria aims to improve customer comfort and deliver a legacy of visual amenity and utility, with active consideration to its overall sustainability. A series of diagrams, shown on this page, identify the design process, constraints and opportunities in stop design.

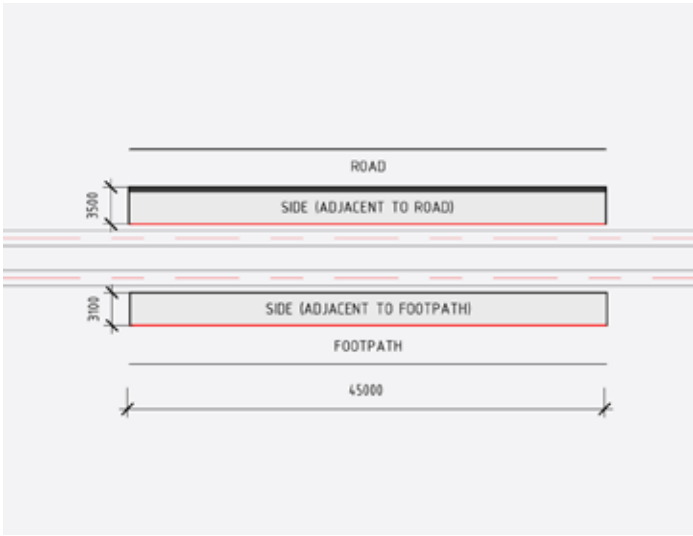
The stops will be designed in a modular system that will deliver architectural merit, consistency, maintainability, durability and seamless integration with the existing fabric along the light rail corridor.

The following are principles, in designing stop elements:

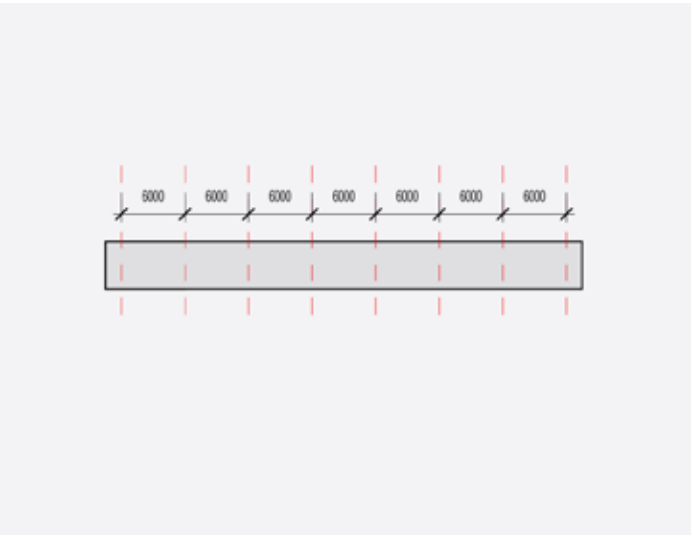
- 1. Typical Platform Types.
- 2. Consistent Grid Setout.
- 3. Scalable Modular Canopy System.
- 4. Access and DDA compliance.
- 5. Furniture and Integrated Services Cabinet.

The relevant compliance documents include the following:

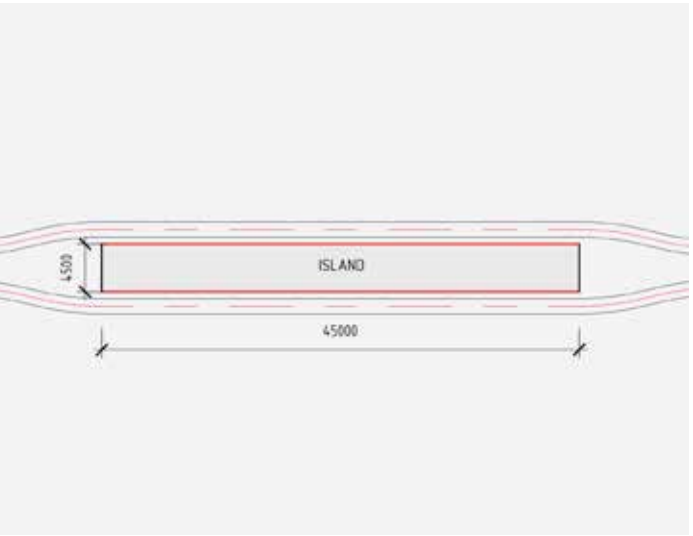
- Disability Standards for Accessible Public Transport (DSAPT).
- Australia Standards (AS), 1428.
- Building Code of Australia (BCA).
- National Construction Code (NCC), Part H2.



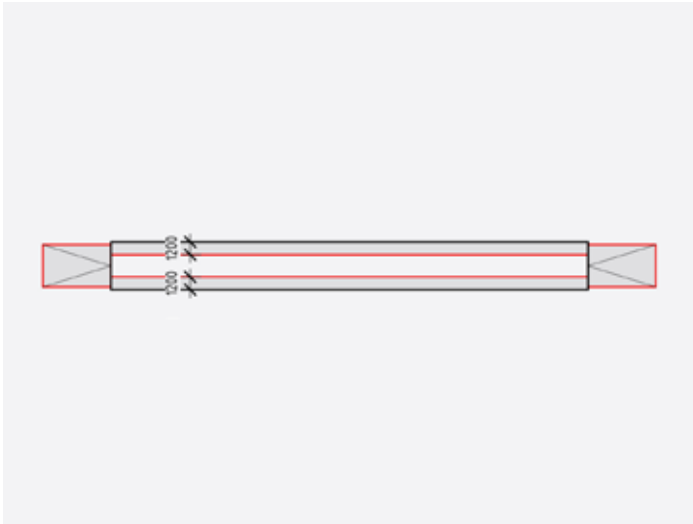
**Typical Side Platform**  
Typical side platforms to be 45m long.  
Typical side platforms to be 3.1m wide. When there is a road adjacent to the platform width to be 3.5m.



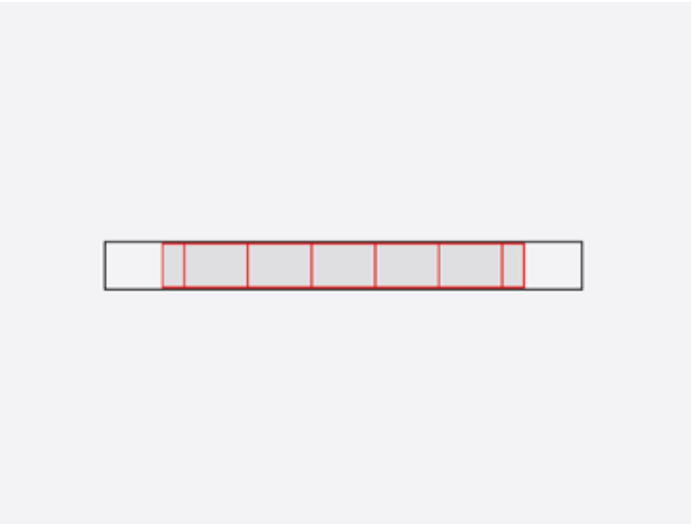
**Consistent Grid Setout**  
The primary canopy grid is setout centrally at 6m to be consistent with paving dimensions.



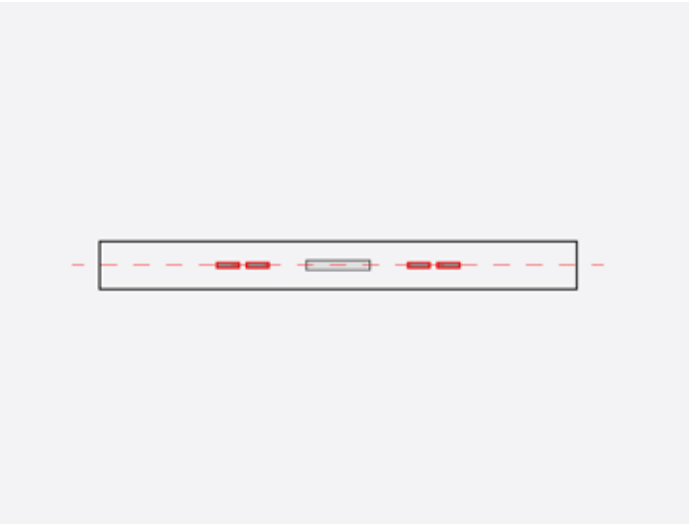
**Typical Island Platform**  
Typical island platforms to be 45m long.  
Typical island platforms to be 4.5m wide.



**DDA compliance**  
DDA compliance requires minimum of 1.2m unobstructed clearance path on the platform.  
**Access walkways**  
Walkway access to platforms to ideally be 1:21 gradient.



**Scalable Modular Canopy System**  
Scalable modular canopy system with consistent kit of parts for maximum flexibility and efficiency.



**Furniture and Integrated Services Cabinet**  
Platform furniture to consist of modularised elements to assist in future growing demand. Service cabinet modules to contain equipment and will be centrally located.



### 3.3.3 PLATFORM TYPES

There are two types of platforms for light rail stops, island platform or a side platform. The typical stops defined for the project are based on the type and the extent of the stop canopy coverage.

#### PLATFORM GEOMETRY

The following criteria applies to platform geometry:

##### Island Platform

- Typically 4.5m wide and 45m long.
- Access from both ends of an island platform should be prioritised.
- When crossing multiple lanes of traffic, provide a median
- Safe and equitable access to be achieved from both ends of the platform where possible.

##### Side Platform

- Typically 3.1m wide and 45m long.
- Pedestrian access on both ends in most locations.

#### CANOPY MODULES

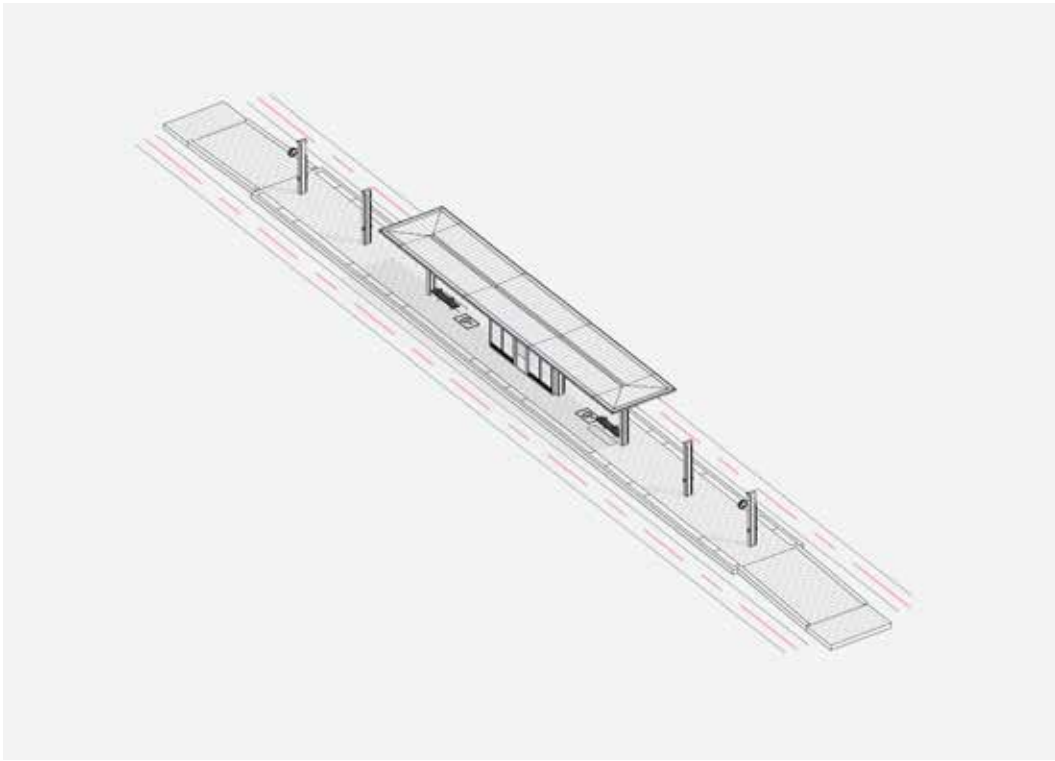
The following are two typical canopy types for island and side platforms:

- Three Module Canopy.
- Five Module Canopy.

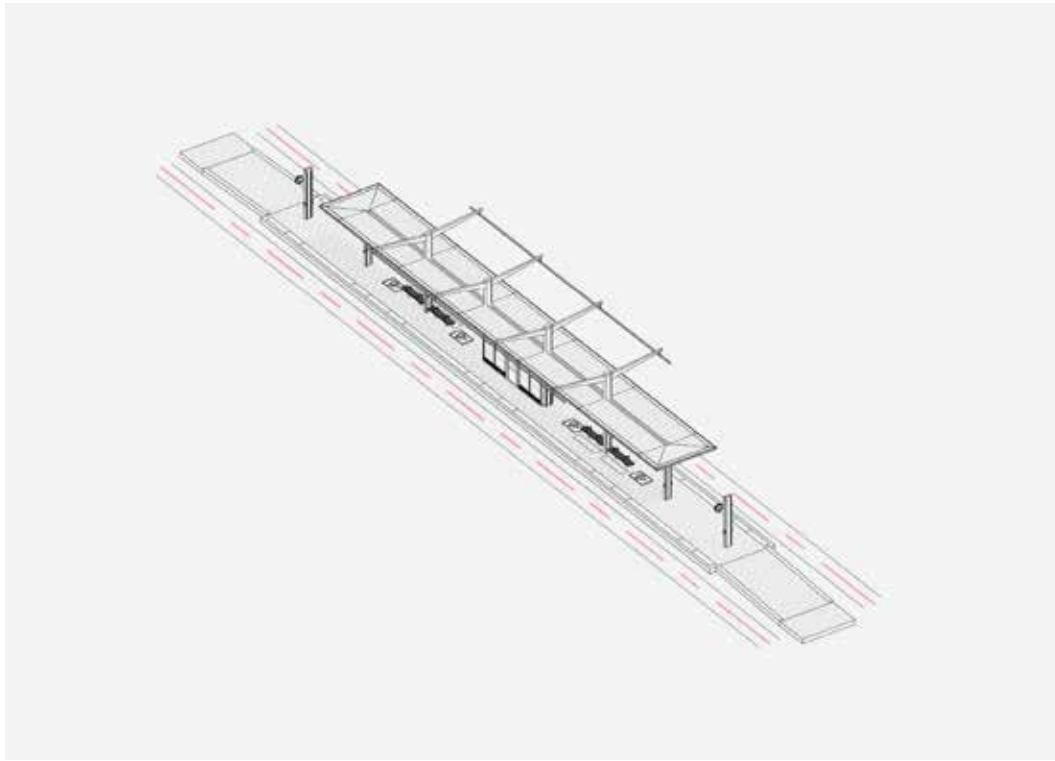
#### CHARGING BAR DESIGN CRITERIA

PLR selected corridor sections are intended to be wire-free running. For wire-free sections on the corridor, charging bars will be integrated into the canopy design. General principles include:

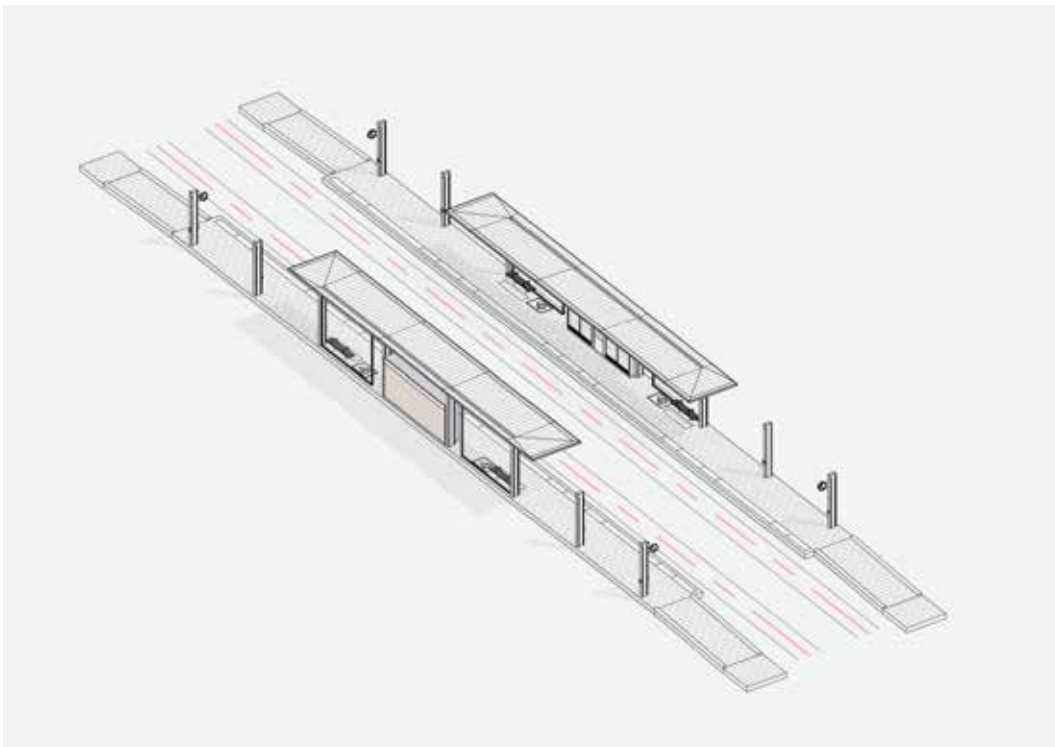
- Charge bar fixed to four column supports aligned with platform structural grid.
- Angle of charging bar arm to match angle of soffit.
- Charge bar finishes to correspond with stop design finishes.



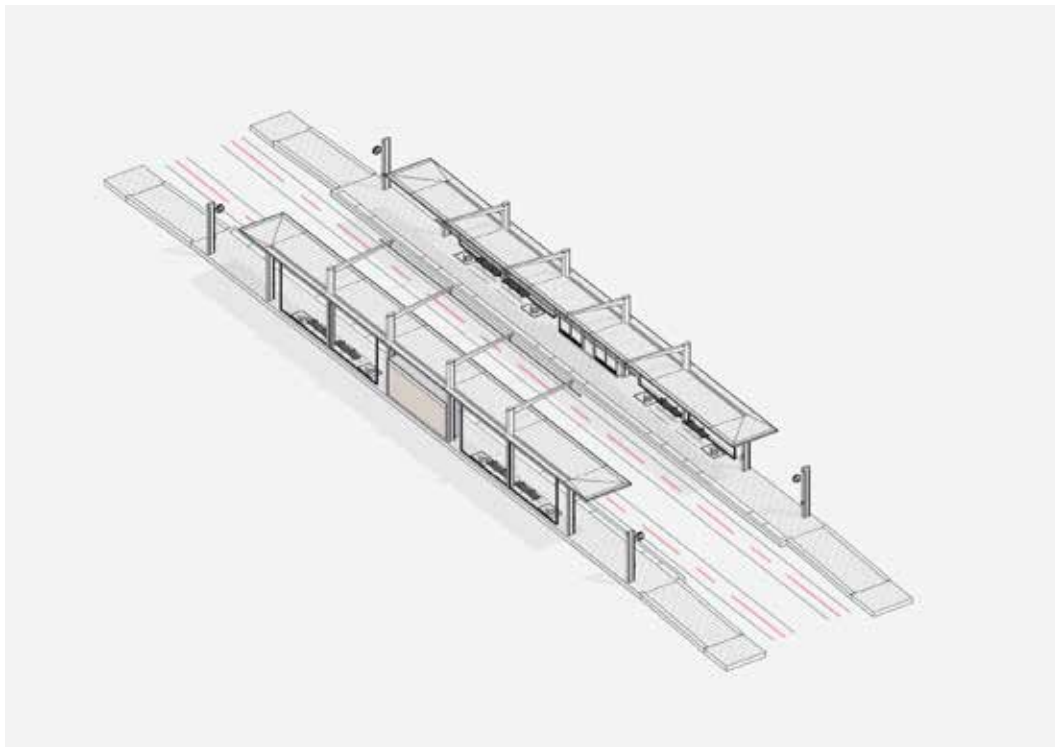
Typical Island Platform - Three Module Canopy



Typical Island Platform - Five Module Canopy including charging bar



Typical Side Platform - Three Module Canopy



Typical Side Platform - Five Module Canopy including charging bar



## 3.3.4 MATERIALS PALETTE

The proposed materials are drawn from the Parramatta vernacular, with an intent to design with a sense of place.

Materials are to be chosen with consideration to:

- High quality.
- Appropriate to context as defined in the Council's Public Domain Guidelines.
- Sustainable, robust and hard-wearing.
- Provide sufficient shelter and shade at stops to respond to Parramatta climate.
- Life-cycle assessment of selected proposed materials.
- Integrate Water Sensitive Urban Design (WSUD) in appropriate locations.
- Use local low embodied energy and recycled materials such as locally sourced aggregates within the concrete.
- All materials selection to be low maintenance and vandal proof. All furniture to be subsurface mounted and any exposed fixings to be tamper proof.

### Benchmark materials



01 Dark granite paving



02 Light granite paving



03 Ceramic tactile indicator tiles



04 Use of hardwoods in public furnitures



05 Granite setts



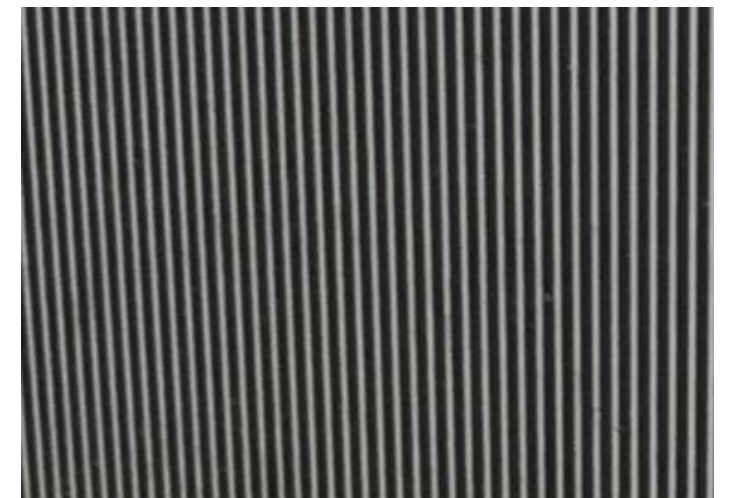
06 Timber veneer panels



07 Water Sensitive Urban Design



08 Perforated metal screen



09 Vertical linear rigidised stainless steel



# 3.4 BRIDGES AND UNDERPASSES

## Design Principles for Bridges

- Create an elegant, slender bridge design with minimal structural depth and a simple, attractive design which considers form, proportion and scale and the relationship of bridge elements to each other.
- Provide a design which minimises visual, environmental and flood impacts on the local area and considers the designs relationship to the surrounding natural and built landscape.
- Provide a bridge design which is appropriate for place.
- Provide a bridge design which is safe for bridge users and users of the adjacent roadways.
- Integrate the bridge structure with the Camellia Town Centre Master Plan and adjacent land uses by minimising the length and impact of the bridge approaches and abutments.
- Ensure universal access to both ends of the bridge in accordance with BCA, DDA and Australian Standards.
- Provide clear, safe access under the bridge for pedestrians and cyclists and optimised road user line-of-sight by minimising structure and locating columns and structures away from pedestrian desire lines and road user sight lines.
- Ensure the bridge design optimises CPTED principles and incorporates safety features, such as lighting within a fully integrated bridge architecture, urban and landscape design.
- Consider sensitive additions which enhance the overall visual appearance and amenity of other bridge upgrades.
- Design bridges with a straight and direct alignment and with a refined and slender structure that is not visually bulky.
- Integrate elements for noise or visual privacy, lighting and poles into a holistic bridge design.
- Ensure bridges are well-integrated into the public domain.
- Minimise extensive pedestrian ramps and avoid their expression as add on elements.
- Avoid creating places of concealment and entrapment and ensure structural elements and abutments enable clear sight lines.
- Ensure underpasses are designed with straight alignments, generous in width and height, to ensure clear sightlines from end to end.
- New bridge structures across Parramatta River and Vineyard Creek should minimise the impact to stream hydrology and vegetation communities.
- Seamless integration with heritage fabric of Lennox Bridge
- Achieving design excellence for the James Ruse Drive Bridge.
- Deliver a bridge design which is structurally efficient, expressing structural forces without unnecessary embellishment.

- Deliver a design which meets the RMS Bridge Aesthetics: Design guideline to improve the appearance of bridges in NSW (2012).
- Provide a bridge design which considers material durability, maintenance and resistance to vandalism and graffiti.
- Provide a design which considers the integration of public art.
- Provide a bridge that achieves excellence in design, aesthetics and functionality.
- Consider the potential for north-south pedestrian access along Clay Cliff Creek.
- Within the Parramatta North precinct design a new bridge over Parramatta River that sensitively integrates into the riparian setting and historic context.
- Consider the existing character of the existing Parramatta River bridge at Rydalmere when designing new infrastructure within the existing bridge's setting.
- Adopt best practice urban design principles to achieve design excellence.

## Design Principles for Underpasses

- Provide enough width for purpose and safe movement.
- Ensure sight-lines to and through underpass.
- Provide safe connections on both sides of underpass.
- Consider material durability, maintenance and resistance to vandalism and graffiti.
- Provide adequate lighting for safety and legibility.

## Reference documents

- Roads and Maritime Bridge Aesthetics: Design guideline to improve the appearance of bridges (RMS, 2012).
- AustRoads Standards.



01 Pedestrian Bridge, USYD, Sydney



02 Lennox Bridge, Parramatta CBD



03 Underpass, Birmingham, Alabama



# 3.5 DEPOT

The initial site layout is set to make best use of the existing site conditions. Located on site are the stabling areas, administration, maintenance control facilities and sand and wash plants.

The proposed stabling and maintenance depot site is at Camellia, an area that has future development potential as a town centre. The Parramatta Light Rail depot design needs to be integrated into an overall project environment, where depot and maintenance facilities would be part of a holistic approach, rather than separate industrial facilities.

The preferred layout can initially house the required number of LRVs with the capacity to expand in the future. The main access point for LRVs, pedestrians and road vehicles is located on Grand Avenue.

## OVERALL PRINCIPLES

The design principles are based on objectives and customer focused design that will enhance the precinct and be part of an integrated building in the Project.

- Creating effective administration and maintenance facilities and minimise public domain impacts.
- Design building height and building mass to context.
- Ensure legible connections and access paths within facilities.
- Ensuring design safety, access and connectivity in workplace.
- Design clear, equitable access for staff and visitors.
- Minimise conflicts between pedestrian routes and LRV's.
- Ensure good lighting.
- Provide space planning for efficient operations.
- Ensure spaces are located with effective functionality.
- Provide good surveillance for all facilities.
- Create a desirable workplace for employees and visitors.
- Ensure the depot street address provides a safe and legible public frontage.
- Consider street presentation and the built form/street interface to avoid long sterile edges to the surround streets and adjacent blocks.
- Locate main depot entry on Grand Avenue to provide a safe and legible address for pedestrians.
- Provide generous footpaths and a wide building setback along Grand Avenue to enable pedestrian circulation and tree planting appropriate to the context.
- Create active street edges through entry design and strategic placement of entries and use.
- Design to minimise interface issues and promote seamless integration with surrounding public domain.

## LANDSCAPE PRINCIPLES

The Depot will be designed to fit within the existing and emerging urban character.

The northern boundary, which is also the main entry/exit to the site will offer permeable views through the site. A rich landscaped edge of trees, open grassland, perennials and low shrubs will creatively act as a positive statement for the depot which will face onto a future mixed use residential development. Principles include:

- Landscaping, including planting of shade trees, to reduce the urban heat island effect and provide improved amenity for staff.
- Be visually screened from adjacent residential areas as appropriate.
- Seek to design in visual or physical permeability consistent with security considerations.
- Respond to local environmental context of habitat and species.
- Maximise permeable surfacing to support stormwater detention and infiltration, subject to contamination risks.

## SUSTAINABILITY INITIATIVES

The architecture and urban design for the depot is focused on responding to local context and sense of place. There are opportunities in the depot building and site to implement sustainability strategies some of which are listed below:

- WSUD - depot and stabling facilities to incorporate bio swales to collect and clean rainwater; rainwater harvesting from the depot maintenance building roof for use in vehicle wash facilities; and, permeable surfaces to improve surface infiltration.
- Solar Photovoltaic (PV) panels integration – Solar energy harvesting PV panels integrated with the depot maintenance building roof to provide power for the building.
- Roof skylights – use of roof skylights for enhanced natural light and low energy lighting of the depot workshop and office areas.
- Design for high thermal insulation for depot occupied building areas.
- Opportunity for use of local recyclable materials.
- Building to be designed to contribute to the achievement of the appropriate green star rating for the project.
- Tree planting and urban design strategy to enhance the context for a greener outcome.
- Energy modeling scenario testing for the depot and stabling facilities.



# 3.5 DEPOT

## Design Principles

Selection of materials for the depot will follow the character and language of the project to a practical extent. Materials will be robust and sustainable with a similar palette of textures and colours. Material selection principles will include:

- Consistency of language between depot, substations and stops.
- Selection of low embodied energy and recycled materials.
- Easy assembly and panel sizes able to be standardised.
- Durable, robust and low maintenance.
- A mix of solid and void interpretation defined by building function and solar orientation.

## Indicative Material Palette

- Painted steel portal and truss frame.
- High level skylights with integrated louvers in anodised finish.
- Compressed fibre cement sheet or low profiled sheet metal cladding – internal.
- Possible plasterboard and suspended ceilings to administrative areas.
- In-situ concrete flooring.
- External metal cladding and possible block work with appropriate insulation.

## Benchmark images



01 Steel portal framing systems and high level skylights



02 Insitu concrete flooring



03 Metal cladding on external walls



04 Integration of photo-voltaic panels



05 Insulated metal roofing



06 Timber battens on aluminum framing



## 3.6 SUBSTATION AND DRIVERS' FACILITIES

### SUBSTATIONS

Substations can have a major impact on the public domain. The location and design of substations in the initial stages is part of the holistic design of the public domain. The siting of substations should not obstruct pedestrian movement, be easily accessed for maintenance and at the same time, secure from public access.

The design of the substations should complement the neighbourhood character of each location and be constructed of materials robust enough to endure environmental conditions and potential damage or defacement. Screening and landscaping may be designed to reduce the visual impact of the substations or alternatively, incorporating artwork may make a feature of the substation. The final number and location of substations will be confirmed during the detailed design phase.

#### Design Principles

Consider the design of substations, the setting of each location for neighbourhood character, scale, materiality in order to minimise visual impact.

#### Design Criteria

- Locate substations to be unobtrusive in the streetscape and allow clear passage for pedestrians.
- Integrate the design of the substation into the public domain.
- Consider location and design of access pits if sited within the public domain.
- Design cladding material to be site specific and complement the public domain.
- Design substations that are secure, robust, vandal-proof and follow CPTED principles.
- Construct substations of durable materials.
- Provide parking bay adjacent to substations for maintenance vehicles, where required. Equipment loading areas, hardstand and driveways to include the use of reinforced turf, permeable surfacing and WSUD where feasible.
- Design substations as a seamless part of the urban streetscape

### DRIVERS' FACILITIES

Drivers' facilities will be installed at both Westmead and Carlingford termini. The end-of-journey facility will provide amenity for light rail drivers and include wash, storage, change areas and toilet facilities including an accessible toilet. The units will be located, where appropriate, within the public domain.

#### Design Principles

- Locate drivers' facilities to be discrete, yet allow for passive surveillance.
- Design drivers' facilities to be simple, aesthetically pleasing and make a positive contribution to the public domain.

#### Design Criteria

- Locate drivers' facilities close to the light rail termini.
- Design drivers' facility to be sympathetic to the character of the precinct and surrounding public domain.
- Design to be of a scale that will complement the streetscape.
- Construct with materials that are hardy and low maintenance.
- Use robust fixtures and fittings.
- Introduce sustainability initiatives such as using recycled materials, roof skylights, rain water collection and grey water re-use, PV panels to provide power.
- Locate driver's facilities to form an integrated part of the urban environment.
- Consider CPTED, night time access and use.



# 3.7 PRELIMINARY LIGHTING STRATEGY

## CORRIDOR LIGHTING

### Design Principles

- Provide safe levels of illuminance and comply with relevant standards.
- Ensure lighting is well considered and integrated within the landscape and fabric of the architectural elements.
- Design lighting to reflect the character of the precinct.
- Implement high environmental lighting standards to:
  - Use the most efficient lights possible while ensuring all standards are met.
  - Prevent an increase in ‘sky glow’ and detract from the setting or compete with feature lighting of heritage buildings.
  - Minimize light pollution to residents and ecological sensitive areas adjacent to the light rail corridor, particularly along the Carlingford corridor.
- Conserve energy implement the use of green energy, where possible.
- Create a visually stimulating night-time experience for night-time illumination and an acceptable aesthetic appearance for lighting infrastructure during daylight hours.
- Develop a simple range of light infrastructure and fittings that can be applied to varying conditions along the length of the light rail corridor.
- Rationalise and unify the lighting types throughout Stops to establish a coherent identity, and to enable efficiencies in planning, implementation, management and maintenance.
- Rationalise and unify the lighting types throughout the Parramatta River to Carlingford precinct to establish a coherent identity, and to enable efficiencies in planning, implementation, management and maintenance.
- Install robust, vandal and bug resistant design with tamper proof fixings. Light fittings and fixtures to meet appropriate standards for Ingress Protection Standards.
- Integrate lighting into design of bridges and other infrastructure.
- Integrate lighting into upgrades of underpasses and comply with Australian Standard V and P levels where appropriate.
- Light fittings and fixtures should be accessible for easy maintenance and management.



01 Typical Smartpoles along corridor, City of Sydney.



02 Linear Lighting, Orange Regional Museum



03 ATL Lighting, Forgarty Park Carins.



## 3.8 DESIGN TARGETS

### STOP LIGHTING PRINCIPLES

There are three principle environments for lighting design at stops, these include:

- **CBD Environment** - With a higher ambient and increased pedestrian flows, it is important to provide higher contrast and visual interest within the platform to allow for better recognition of the location for the stands. Compared to the suburban type, a higher overall lighting level should be allowed.
- **Suburban Environment** - With the low ambient surrounding, the design of the stops should be subtle. The base level of downward lighting will be provided for code compliance. Highlighting of the ticket machine as well as the seating area are kept to a minimal.
- **Event Environment** - The event platforms have a similar environment as the CBD type, however the vision is to allow for dynamic lighting to allow for promotion of events, or celebration of festivals. Colour changing lighting should be considered within these platforms, with the content being easily modified by Op-co.

### LIGHTING STANDARDS

- AS1158 Lighting for roads and public spaces.
- AS 4282 – 1997 Control of the obtrusive effects of outdoor lighting.
- Ingress Protection Rating – is used to define levels of sealing effectiveness of electrical enclosures against intrusion from foreign bodies (tools, dirt etc) and moisture.

To tie in with the development of other light rails projects locally, the following design codes and benchmarks were compared and referenced:

#### International Design Targets

- Australian Standards and other local Design Targets
- Australian Standards AS1158: Interior and Workplace Lighting
- Australian Standards AS1680: Lighting for Roads and Public Spaces
- Australian Standards AS4282: Control of the Obtrusive Effects of Outdoor Lighting
- Franchise agreement for train and metro Victoria Railcorp engineering manual
- Sydney Light Rail Design Guideline
- Canberra Light Rail Design Guideline



01 Lewisham West Light Rail Stop, Sydney



02 Epping Station, Victoria



03 Taverner's Hill Light Rail Stop, Inner West Sydney



04 Tram Stop, Alicante



# 3.9 WAYFINDING AND SIGNAGE

Wayfinding helps light rail customers orientate themselves and navigate to, from and around light rail stops.

Signage provides information for customers traveling between light rail, other transport modes and destinations. Successful wayfinding is established by anticipating customer needs, providing the right information at the right time, planning and designing predictable and intuitive environments.

## Design Principles

- Locate signs at decision points.
- Make signs legible and visible from a distance.
- Assist with intuitive wayfinding by maintaining a legible and accessible environment for customers and the public by considering the location of stops and crossings.
- Ensure travel to destinations is clear, direct and safe.
- Ensure clear sightlines to stops, along the light rail corridor, at crossings and approach paths.

## Design Guidelines

- Use TfNSW suite of signage to easily identify light rail stops and other transport modes.
- Provide floor signage and markers to provide easy, safe accessible travel.
- Incorporate wayfinding into design of the stops, light rail infrastructure and public domain.
- Coordinate wayfinding signage suite to provide clear directional signage at stops along the light rail corridor, and within the public domain.
- Design stops and public domain to assist with intuitive wayfinding.

## TfNSW Wayfinding System

TfNSW’s wayfinding system considers a customer’s end-to-end journey and provides a consistent level of signage at each stage to meet customer needs. These needs are categorised into the following six zones:

- **Approach Zone** - where customers need to easily identify the stop, even when arriving at a site for the first time. Maintaining clear sightlines to the mode and stop identification signs is a key consideration in these areas.
- **Information Zone** - where customers need to plan their trip, find the right platform, see what time their service leaves, make a connection to another form of transport, or find a destination in the local precinct.
- **Circulation Zone** - where customers need to move comfortably and efficiently. This zone will be kept clear of infrastructure.
- **Portal Zone** - where customers need to decide on a path of travel and commit to it. Customers may need to slow down in these spaces, to understand their choices and the impact of choosing one way or another. Clear, simple information and wayfinding is the highest priority for customers in these areas. It is essential to keep these spaces free of physical and visual clutter, to allow customers to quickly get the information.
- **Facilities / Boarding Zone** - where customers need clear information at facilities to streamline and enhance customers’ experiences in the transport environment.
- **Waiting Zone** - where customers need facilities that are comfortable for all abilities.



01 Example of totem mounted signage



02 Example of cabinet mounted signage



## 3.9 WAYFINDING AND SIGNAGE

### TfNSW WAYFINDING AND SIGNAGE TYPES

TfNSW has a standard Kit of Parts, outlining the suite of wayfinding signage for light rail that will be applied within the light rail corridor. Directional signage outside the light rail corridor, within land owned by others, can be consistent with TfNSW's standard suite or in keeping with existing third party signage. Coordination with Council on the design and location of signage within the public domain will result in safe and efficient travel to destinations. The following types of signage may be provided at stops and in the surrounding public domain:

#### Totem Pole or Pole Mounted Signage and Devices

- **Mode Identification Sign** - an illuminated sign to identify the light rail mode. The mode identification sign is an independent form that must maintain the round shape, in 3D form. The location and fixing of the mode ID is determined on a site by site basis, depending on the approach and alignment, in consultation with TfNSW wayfinding.
- **Stop Name Sign** - a flag sign centrally fixed to the totem pole to identify the stop name. These signs are spaced at regular intervals along the platform.
- **Passenger Information Display (PID)** - a dynamic information sign mounted to a totem column in the centre of the platform to display timetable information.
- **Fixed Location Reader (FLR) Sign** - identifying the position of the Opal card reader.

#### Cabinet Mounted Signage

- **Integrated Stop Name Sign** - a continuous illuminated horizontal frieze sign mounted to the integrated services cabinet or suspended from canopy where a cabinet is not provided.
- **Emergency Help Point and Hearing Loop Signage** - these may be integrated with totem columns or totem poles where a cabinet has not been provided.
- **Regulatory Sign** - this sign is integrated with the services cabinet cladding or as a panel on the side of the totem.
- **Poster Cases** - Two per stops, located on the cabinet.

#### Floor Signage

- **Accessible Door Marker** - a marker recessed within the paving tile and located on the platform in front of the accessible LRV doors.
- **Wheelchair Waiting Space Marker** - a marker recessed within the paving tile and located on the platform adjacent to the priority bench seat.
- **Earthing and Bonding Pit Markers** - for the identification of pits concealed below the floor finish.

#### Directional and Approach Signage

- **Directional Sign** - a sign positioned within the stop access point directing customers off the stop.
- **Blade Signs** - a sign that identifies the name of the light rail stop on the approach to the entry and contains printed collateral, relevant to the stop. Blade signs may not be required at all stops. To be determined on a stop by stop basis, in conjunction with TfNSW wayfinding.

#### Public Domain Signage

- **Directional Finger Sign** - a sign positioned in the public domain (at nearest cross street or as applicable) directing customers to the stop.
- **Local Area Information** - signage provided by the Local Council, most likely belonging to the Local Council suite of wayfinding and information signage.

#### Printed Collateral

- Content for all poster cases is determined by TfNSW wayfinding and CSD.

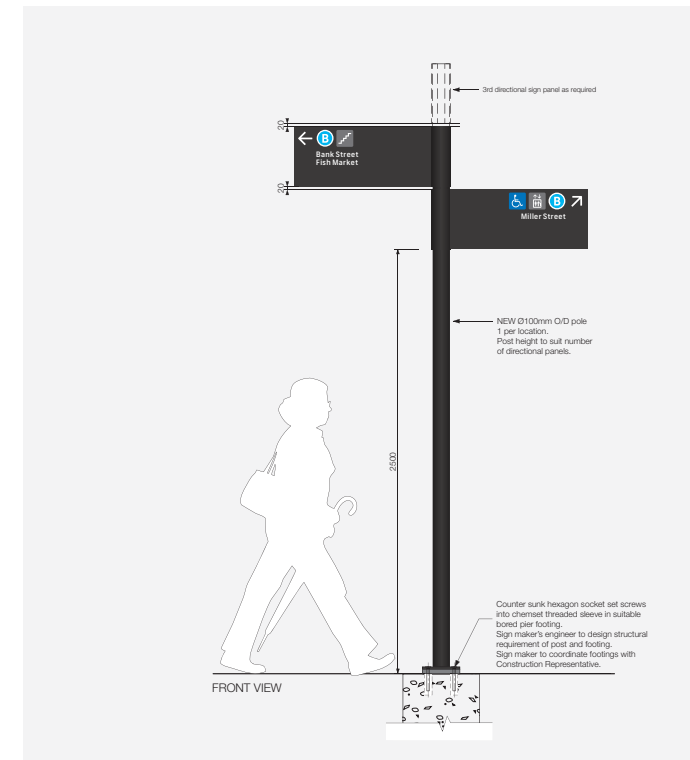
#### Digital Displays

- Content for all digital displays is determined by TfNSW wayfinding and CSD.

#### Reference Documents

The following reference documents inform the provision of signage for Light Rail.

- TfNSW Wayfinding Planning Guide\_Light Rail.
- TfNSW Wayfinding Kit of Parts\_Light Rail.



03 Typical Directional sign



04 Typical Totem mounted stop signage



05 Typical Column mounted passenger information display



06 Typical Stop cabinet mounted signage



# 3.10 HERITAGE

Parramatta has a rich history of Aboriginal and post-European settlement and the proposed light rail journey provides the opportunity to reveal and celebrate Greater Parramatta's significant cultural heritage.

The landscape, local cultural traditions, and place the use are as important as the built environment in defining and shaping past and future character. These need to be considered holistically when integrating the light rail system and locating light rail stops. The light rail corridor will sit in the historic setting and its design should complement and enhance the distinctive landscape and built environment. It should protect the heritage items and cultural places for future generations.

The use of wire-free and green tracks through Cumberland Hospital and minimisation of signaled crossings will assist in sympathetically integrating the light rail within the culturally significant landscape setting.

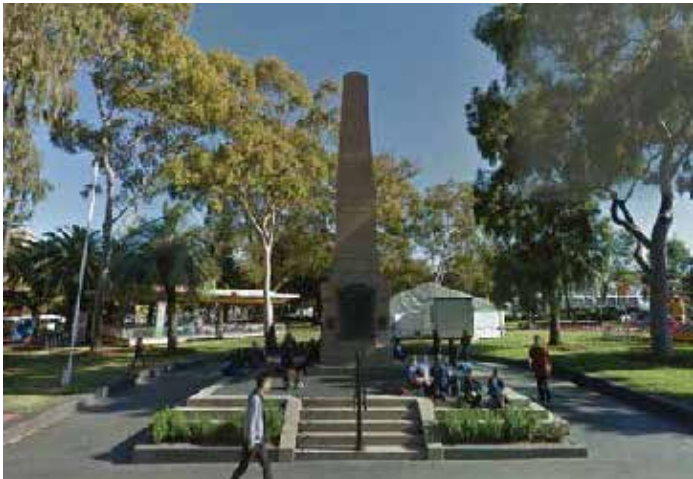
Items of heritage significance along the light rail corridor should, where appropriate, be adaptively re-used and integrated as part of the light rail infrastructure or into the public domain. Adaptive re-use of buildings is a highly sustainable practice that conserves and retains historic fabric and setting and saves in the cost and provision of new resources.



01 Cumberland Hospital, buildings and trees



02 St Patrick's Cemetery



03 Prince Alfred Square



04 Lennox Bridge



05 Parramatta CBD



06 Centenary Square



## 3.10 HERITAGE

### Design Principles

- Maintain significant views and vistas to and from items and places of significance.
- Adaptively re-use of heritage items, where appropriate.
- Retain significant trees and vegetation, where possible.
- Ensure new structures sensitively respond to the landscape and heritage setting.
- Ensure strategies to enable universal accessibility respond sensitively to the setting.
- Minimise the impacts to heritage sites caused by demolition, vibration, archaeological disturbance, and altered heritage context.
- Consider landscape and public domain design as an important mechanism for interpreting cultural landscapes along the light rail corridor and strengthening these settings through the delivery of sensitive cultural planting.
- Seamlessly integrate into the public domain of heritage precincts and places through sensitive design approach which responds to place and minimises visual clutter.
- Respond to the prevailing geometry of built form and public domain elements.
- Review and respond to conservation management plans for precincts and buildings along the light rail corridor.
- Consider the meaningful adaptation and reuse of Dundas Station as an integral part of the broader stop precinct.
- Minimise impacts to sensitive archaeology and sites of Aboriginal cultural significance.
- Consider historic context and interpretation themes in the design of elements.
- Interpret the overall form of the site by responding to both the specific place needs and its broader precinct context

### Guidelines, Policies and Registers

- Managing Heritage issues in rail projects guidelines, (2016) prepared by TfNSW sets out a best practice process and applicable reference documents, policies, standards and legislation to assist with design with heritage.
- City of Parramatta Local Environmental Plan (LEP).



07 George Street and Queens Wharf Reserve



08 Dundas Station Building



09 Product Store at Carlingford



## 3.11 GREEN TRACK AND WIRE FREE

Green track is an attractive and environmentally positive track form that is utilised on numerous international and domestic light rail networks, including Melbourne and Adelaide.

Benefits of green track:

- Visually integrates light rail into parks and neighbourhoods.
- Softens dense urban environments where vegetation is sparse.
- Makes a noticeably cooler and quieter city by absorbing heat and sound.
- Improves water and air quality by filtering out dust and pollutants.
- Defines Light Rail Environments and reduces the chances of conflict between light rail vehicles and other modes by providing a track surface that does not look or feel like a road or pathway.

### Principles

- Maintain safe and efficient movement for all modes, including; light rail vehicles, pedestrians, cyclists and road motor vehicles.
- Ensure place making benefits outweigh any potential operational issues including poor grass performance.
- Maintain solar access in the changing urban context.
- Manage wear from pedestrian, bicycle and motor vehicle traffic as population increases.
- Prioritise green track next to Robin Thomas Reserve to visually extend and buffer public recreation.
- Prioritise green track in PNUT to reduce the visual impact of new light rail infrastructure.

### Wire-free

Wire free running is a means of operating light rail without continuous overhead power supply. Wire free running reduces the amount of light rail infrastructure in the public domain which in turn:

- Preserves space for people moving around the city and accessing stops.
- Respects historic landscapes and heritage buildings.
- Enables positive additions to public domain, such as street trees.
- Improves safety of light rail operations by maximising visibility for the light rail driver.
- Wire free running also allows more efficient regenerative energy opportunities which helps contribute to meeting project sustainability targets.

### Design Principles

- Integrate wire free charging systems into stop design to minimise additional infrastructure.
- Prioritise wire free in busy pedestrian environments that benefit most from the reduction in infrastructure, such as the CBD.
- Prioritise wire free in historic landscapes and adjacent to public parks where views and vegetation are significant.



01 Adelaide Tramway, Victoria Square



02 Adelaide-Glenelg Tramway



## 3.12 PUBLIC ART

Incorporating art and creativity within the public domain contributes to the identity of places, and is a key element of good urban design.

Parramatta Light Rail proposes to work with key partners, stakeholders and the community integrate opportunities for public art into infrastructure design. TfNSW draft Creativity Guidelines will inform the development of public art for the project.

### Design Principles

The inclusion of art and interpretation on the Parramatta Light Rail will:

- Enliven the experience of travel and engage with the community to make every day journeys pleasant and interesting and connected to place.
- Enhance the environment responding to places, vistas, urban landscape and buildings through subject, form, scale materials, lighting elements and colour.
- Be specific to its site or context, drawing from and adding to the history, heritage and environment of its location, demographics, working life, travel, and telling a story.
- Be appropriate and suitable to its site, in scale and impact on amenity and other uses.
- Be innovative, fresh, creative and original.
- Be high quality in design, materials and finishes.
- Be integrated as part of the design, construction and operation of the light rail system.
- Consider varied approaches to the expression of public art along the corridor.
- Consider site specific installations which address broader public domain objectives.
- Consider the experience of public art in motion
- Consider stops as locations to connect and engage people in local stories while they wait.

### Design Guidelines

To deliver public art and interpretation for the Parramatta Light Rail, the project will:

- Engage with Create NSW, City of Parramatta and other stakeholders to develop a plan for how public art will be delivered.
- Engage with the Western Sydney Arts community where possible.
- Ensure all public art is developed in partnership with, and meets the City of Parramatta's Public Art Policy and requirements.
- Consider integrating both indigenous and non-indigenous public artworks which are generally robust, fit for purpose and of a high quality into public domain elements.
- Carefully remove and reinstate or relocate any existing public artworks impacted by the construction or operations of the light rail, where appropriate.



01 Wall tile artwork, Edgware Road Station, London



02 Lewisham West Stop Shelter, Inner West Light Rail, Sydney



03 Dulwich Grove Light Rail Stop, Sydney



# 3.13 HOSTILE VEHICLE MITIGATION

## PROTECTION AGAINST HOSTILE IMPACTS

Crowded places will continue to be appealing targets for terrorist acts. The Australian Security Intelligence Organisation (ASIO) has advised that individuals and groups will continue to possess both the intent and capability to commit terrorist attacks in Australia.

These acts are not constrained to metropolitan centres.

Attacks on crowded spaces overseas, including major events and civic spaces, demonstrate how basic weapons can have devastating effects. In 2017, the Australian-New Zealand Counter Terrorism Committee (ANZCTC) prepared the Australia’s Strategy for Protecting Crowded Places from Terrorism (the Strategy).

### The Strategy

- Defines crowded spaces as locations that are easily accessible by large groups of people on a predictable basis, including but not limited to, stadiums, transport infrastructure, shopping centres and civic places.
- Has four objectives:
  - Build Strong Partnerships.
    - » Create strong and sustainable partnerships between all levels of government and the private sector through the ‘Crowded Places Partnership’.
  - Enable Better Information Sharing and Guidance.
    - » Participate in ‘Crowded Places Forums’ to give owners and operators access to better and emerging threat and security information.
  - Implement Effective Protective Security.
    - » Seek appropriate guidance, use layered security and use supplementary guidelines and vulnerability assessment tools to assess site-specific threats.

- Increase resilience.
  - » Build strong security cultures, strong communication strategy’s, regularly train staff, and evaluate and test policies, procedures, arrangements and responses, consummate with the level of risk.
- Outlines how the Australian Government will work with the private sector to protect domestic crowded places.
- Emphasises the primary role of owners and operators in protecting their site(s), assessing the specific-risks and vulnerability of their site(s), and needs to change as the security level is either raised or lowered.

The Project will need to consider measures, through design, to better protect people in crowded places from terrorism acts. In particular, the Project will need to consider areas in, and around the Parramatta Square Stop and Church Street through the Parramatta CBD, where the Project proposes to pedestrianise areas.

The Project will connect and is creating new places that could be defined as ‘crowded spaces’:

- Eat Street – a new, pedestrianised space in the heart of the CBD.
- A potentially flush environment in the Parramatta CBD.
- Light rails stops, particularly stops serving events at Rosehill, Prince Alfred Square and the Parramatta CBD.
- New civic spaces, such as the Westmead Interchange.

The Project proposes to design protection measures and to integrate them with the Project’s public domain. The Project will need to design protection measures, during the following Project phases:

- Construction Phase - opening,
- Temporary end state (temporary).
- End state – pinned or footings highly likely that footings should be assumed.

### Lessons learnt

The CBD and South East Light Rail (CSLER) has to provide measures to protect people from possible terrorist attacks. CSLER has proposed to create safer places, and to protect people from hostile vehicles, using the following public domain items, among other measures:

- Seating.
- Concrete blocks.
- Security Bollards.
- Planters.

The CSLER has designed items at 1.2m spacing’s. Footings needs to be pinned or objects weighted such that they can stand the force of vehicles. This provides people safety, giving them time to react and get to a safer place.

Many global examples show how these elements can be integrated into the streetscape elements. The Project proposes to integrate these requirements into the next design phase.



01 Sydney’s CBD and South East Light Rail, George street



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# 3.14 REFERENCES

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