

Willoughby City Council

August 2026

Traffic Impact Assessment

Hampden Road and Herbert
Street Cycleway
(Chatswood to St Leonards)

wsp



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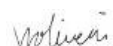
Traffic Impact Assessment Hampden Road and Herbert Street Cycleway (Chatswood to St Leonards)

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WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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1 Introduction

1.1 Site location and context

The Hampden Road and Herbert Street Cycleway (formerly known as the Chatswood to St Leonards Cycleway) will provide a separated bicycle path on Hampden Road (between Mowbray Road and Artarmon) and Herbert Street (between Artarmon and St Leonards). It aims to provide a continuous bicycle link between the two Strategic Centres (Chatswood and St Leonards) in Willoughby Local Government Area (LGA) which would contribute to providing a sustainable transport option, enable 15-minute neighbourhoods, providing safer and thriving places and promote walking and cycling.

The design corridor as shown in Figure 1.1, extends from the Pacific Highway, St Leonards at the southern end and Mowbray Road to the north. At the northern end, the cycleway would connect to an area currently used for Sydney Metro's City and Southwest dive site and connect to Frank Channon Walk, a shared path facility along the railway line, to Chatswood.



1.2 Project objectives

Willoughby City Council (the Council) through its strategic plans for a resilient city including *Our Green City Plan 2028*, and Transport for NSW through its *Future Transport Strategy*, have identified a priority need to provide a cycleway connection between the two Strategic Centres Chatswood and St Leonards within the Willoughby LGA.

As such, the project has a clear objective to achieve Council's and Transport for NSW's strategic need, and deliver a high quality, attractive, safe and comfortable cycleway that directly connects the two Strategic Centres.

The cycleway would be designed as a separated bicycle path on Herbert Street and Hampden Road and connect with key land uses such as transport interchanges, Royal North Shore Hospital, Artarmon industrial area, St Leonards and Artarmon town centres, local schools, future use of Sydney Metro dive site and connection to Frank Channon Walk to Chatswood.

1.3 Report objectives

The purpose of this report is to assess the potential traffic and transport impacts from the construction and operation of the Hampden Road and Herbert Street cycleway project to support the concept design. Specifically, this report has the following objectives:

- Describes the existing conditions for all modes of transport in the study area including general access vehicles, freight (including restricted access vehicles), public transport (rail services, bus services and point-to-point transport) and active transport (bicycles and pedestrians).
- Describes the existing environment (road function, classification, and operation) in the study area that are likely to be affected by the construction and operation of the project.
- Assesses the impacts of the project to the surrounding road network, including the potential impacts of construction activities and associated vehicle movements.
- Recommend mitigation measures to manage identified traffic and transport construction impacts of the project.

1.4 Structure of this report

- Section 1 Introduction: Describes the context of the Hampden Road and Herbert Street cycleway project in terms of location and its role in the regional road network. This section also describes the purpose of this report in the REF submission.
- Section 2 Assessment Methodology: Describes the approach that was used to assess the proposed concept design.
- Section 3 Existing conditions: Describes the existing condition of the road network, transport services and abutting developments.
- Section 4 Issues and Opportunities: Summarises the key issues and opportunities that informed the development of the concept design.
- Section 5 Proposed Design: Provides an outline of the proposed cycleway design.
- Section 6 Road network impact: Outlines the impact of the proposed concept design in terms of intersection performance, access changes and public transport.

- Section 7 Construction Impact: Outlines the potential impact of construction on the surrounding road network and highlights any mitigation measures.
- Section 8 Mitigation Measures: Details mitigation measures to reduce the impact of the project on the road network
- Section 9 Conclusions: Summarises the findings from the report and reinforces the recommendations made throughout sections 6 and 7.

1.5 Strategic context

1.5.1 State-level policies

1.5.1.1 Future Transport Strategy

Future Transport Strategy is a 40-year vision for the State's transport system, supported by a suite of plans. The Strategy sets a vision for safe, healthy, sustainable, accessible and integrated passenger and freight journeys in NSW.

At a glance, the Future Transport strategy aims to:

- Provide more choice and better access by improving transport solutions for customers
- Environmentally responsible by moving towards net zero emissions
- Provide thriving places by enhancing liveability for customers and communities
- Maximising the use of the road network through reallocating road space to more efficient modes of transport like buses, walking, cycling and micromobility devices.
- Building for resilience and economic growth through providing reliable transport system to support freight and passenger journeys and successful places.

The proposed Hampden Road and Herbert Street cycleway objectives are directly aligned with the strategies identified in Future Transport Strategies.

1.5.1.2 Active Transport Strategy

The *Active Transport Strategy* draws on the *Future Transport Strategy* and its vision for walking, bike riding and personal mobility. It has an aim to double active transport trips in 20 years. This Strategy provides longer term ambitions accompanied by five-year priority moves to guide planning, investment and priority actions for active transport across NSW. The five focus areas of the Strategy are:

- Enable 15-minute neighbourhoods
- Deliver connected and continuous cycling networks
- Provide safer and better precincts and main streets
- Promote walking and riding and encourage behaviour change
- Support delivery partners to accelerate change

Under the Strategic Cycleway Corridors Program, TfNSW would partner with Councils to deliver more than 100 kilometres of new strategic cycleways that contribute towards a connected cycleway network by 2028.

1.5.1.3 Strategic Cycleway Corridors

The NSW Government wants cycling to be a preferred mode of transport for short trips and a viable safe and efficient option for longer trips. Safe and connected cycling networks across Greater Sydney will enable more people to ride their

bikes as part of everyday travel. Strategic cycleway corridors for the Six Cities will provide the framework for establishing safe and convenient cycleways that better connect centres, precincts and places, while supporting councils' local bike networks.

The Plan recognises that there are five immediate opportunities for investigation that have been identified for the Eastern Harbour City which includes the St Leonards to Artarmon connection. The others include Alexandra Canal connection, North Sydney connections, Newtown and Green Square connection and Lilyfield connection.

The strategic cycleway corridors identified in areas around Chatswood and St Leonards are depicted in Figure 1.2.



Source: Greater Sydney strategic cycleway corridors network map (TfNSW, 2022)

Figure 1.2 Strategic cycleway corridor in Eastern Harbour City

1.5.2 Local-level policies

1.5.2.1 Our Green City Plan 2028

Willoughby City Council's Our Green City Plan responds to the community priorities identified to achieve the 'Green City' outcomes the Council has set in Our Future Willoughby 2028 which includes:

- Reduce carbon and greenhouse gas (GHG) emissions
- Promote sustainable lifestyles and practices
- Enhance, protect and respect waterways, bushland, nature, wildlife and ecological systems
- Reduce energy, water and resource waste and encourage reuse and recycling

The plan sits in between the Community Strategic Plan (10+ years) and the Delivery Program (4 years).

To promote sustainable lifestyles and practices, Council has identified the importance of sustainable transport to effectively reduce greenhouse gas emissions from resident car transport. This includes an aim to increase cycling mode share by 10 percent by 2028 (measured from the baseline set in 2017).

The implementation of Hampden Road and Herbert Street cycleway is reflective of Council's sustainable transport ambitions to improve cycling connections in its City and increase the mode share by 10 percent by 2028.

1.6 Other referenced documents

Table 1.1 below lists and describes a number of documents which have been referenced as part of this study.

Table 1.1 Referenced documents

Document	Description and relevance
Chatswood to St Leonards Principal Bike Network Study Route Planning Network	Willoughby City Council engaged the <i>Route Planning Network</i> study in May 2020 to develop and assess two Tier 1 bicycle routes, the first from Chatswood to Artarmon and the second from Artarmon to St Leonards. This route would support Transport for NSW's Principal Bicycle Network established at the time of study and provide users a safe and efficient route to commute and travel by bicycle. The two routes would also link to provide a continuous bicycle network from Chatswood to St Leonards. A number of routes were assessed as part of the report, with the preferred route being Hampden Road (between Chatswood to Artarmon) and Herbert Street (between Artarmon and St Leonards) being advanced further into the design stage.
Chatswood to St Leonards draft detailed design and traffic signal design	A design for the route was developed and consulted with the community in October 2021. The draft design and traffic signal designs have been provided to the design team for reference.
Cycleway Design Toolbox (Designing for cycling and micromobility)	The aim of the <i>Cycleway Design Toolbox</i> is to provide guidance for practitioners on how to design for cycling and micromobility in the context of New South Wales and Greater Sydney. Six design principles that apply in this Toolbox include safe, connected, direct, attractive, comfortable and adaptable.
Austroads Guide to Road Design	The <i>Guide to Road Design</i> is a set of comprehensive Austroads guides developed to capture the contemporary practice of member organisations in road design. It provides guidance to designers in the production of safe, economical and efficient road designs, which are most relevant in developing feasible mitigation measures suggested in this report.
Austroads Guide to Traffic Management	The <i>Guide to Traffic Management</i> captures the contemporary traffic management practice including emerging techniques and technologies, and relevant international experience. For this study, this guide provides valuable guidance and considerations to achieve efficient, safe and economical management of road traffic.

2 Assessment Methodology

2.1 Site Visit

A site visit was undertaken on Monday 20 May 2024 by Willoughby City Council and the design team to walk along the project corridor and observe and discuss existing conditions, underlying issues and any opportunities for the proposed design.

2.2 Data Collection

Traffic surveys were undertaken by Trans Traffic Survey between Wednesday 29 May 2024 and Tuesday 4 June 2024. The survey was undertaken between 7am and 7pm for each weekday and weekend day throughout the week, providing information on existing vehicle, cyclist and pedestrian movements at key intersections within the corridor. The following intersections and crossings were included in this survey:

- | | |
|-------------------------------------|--|
| — Hampden Road / Mowbray Road | — Herbert Street / Ella Street |
| — Hampden Road / Brand Street | — Herbert Street / Lanceley Street |
| — Hampden Road / Broughton Road | — Herbert Street / Eileen Street |
| — Herbert Street / Cleg Street | — Herbert Street zebra crossing near St Leonards station |
| — Herbert Street / Frederick Street | |

SCATS signal phasing data provided by TfNSW has also been collected and used as an input into the intersection modelling.

A parking survey has also been undertaken during the same dates (Wednesday 29 May 2024 to Tuesday 4 June 2024), across a smaller study area between St Leonards station (zebra crossing) and Lanceley Avenue along Herbert Street.

2.3 Intersection Modelling

2.3.1 *Modelling Scenarios*

Intersection modelling to assess the impact of the proposed cycleway design was undertaken in SIDRA Intersection 9.1 (v6.228). SIDRA is an industry-recognised traffic engineering software and is suitable to assess the measurable intersection performance metrics relevant for the project including Level of Service (LOS), queue length and degree of saturation (volume/capacity). These metrics are discussed further in Section 2.3.2.

The SIDRA intersection modelling was conducted using the most recent intersection counts for the specified key intersections in Section 2.2. Analysis of the data revealed that Thursday the 30th of May and Saturday the 1st of June 2024, had the highest traffic volumes for weekdays and weekends, respectively. We utilized data from these peak days to model the weekday morning and afternoon peaks (AM and PM), as well as the weekend midday peak, for the following scenarios:

- Existing Conditions (2024) – calibrated to road geometry and traffic signal operation data (SCATS) where applicable and validated to queue lengths observed on-site
- Option 1 (2024) – assessment of the intersection performance with the option 1 configuration with cycleway, under existing traffic conditions.

— Option 2 (2024) – assessment of the intersection performance with the option 2 configuration with cycleway, under existing traffic conditions.

The intersection analysis for this project focuses on six key intersections outlined in Section 3.1.1, each situated at different points along the corridor. The constraints of the surrounding road environment have been considered in the assessment, and the detailed considerations have been provided in Section 6.

2.3.2 Assessment Criteria – Intersection Performance

2.3.2.1 Level of Service

Level of Service (LOS) is a basic performance measure used to describe the operation of an intersection. Levels of Service range from A (indicating good intersection operation) to F (indicating over-saturated conditions with long delays and queues). At signalized intersections, the LOS criteria are related to average intersection delay (seconds per vehicle). At priority-controlled (give-way and stop control) and roundabout intersections, the LOS is based on the modelled delay (seconds per vehicle) for the most delayed movement.

The Transport for NSW (TfNSW) LoS criteria for intersections, which has been used throughout this assessment, is displayed in Table 2.1.

Table 2.1 Level of Service criteria for intersections

Level of service	Average delay (seconds per vehicle)	Traffic signals, roundabout	Give-way and stop signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
C	29 to 42	Satisfactory	Satisfactory, but accident study required.
D	43 to 56	Operating near capacity	Near capacity and accident study required.
E	57 to 70	At capacity. At signals, incidents would cause excessive delays. Roundabouts require other control mode.	At capacity, requires other control mode.
F	Greater than 70	Unsatisfactory with excessive queuing.	Unsatisfactory with excessive queuing; requires other control mode.

Source: *Guide to Traffic Generating Developments (Transport for NSW, 2002)*

2.3.2.2 Degree of Saturation

The Degree of Saturation (DoS) is the ratio of demand flow to capacity, and therefore has no unit. As it approaches 1.0, extensive queues and delays can be expected. For a satisfactory situation, DoS should be less than the nominated practical degree of saturation, which is usually 0.90. The intersection DoS is based on the movement with the highest value.

According to Austroads, in practice, the target degrees of saturation (practical degrees of saturation) for signal, roundabout and priority-controlled intersections are 0.90, 0.85 and 0.80 respectively.

2.3.2.3 Average Vehicle Delay

This is the difference between interrupted and uninterrupted travel times through the intersection and is measured in seconds per vehicle. At signalised intersections, the average intersection delay is usually reported. At roundabouts and priority-controlled intersections, the average delay for the most delayed movement is usually reported.

2.3.2.4 Queue Length

Queue length is measured in metres reflecting the number of vehicles waiting at a stop line and is usually reported as the 95th percentile back of queue, which is the value below which 95 per cent of all observed queue lengths fall. It reflects the number of vehicles per traffic lane at the start of the green period, when traffic starts moving again after a red signal. The intersection queue length is usually taken from the movement with the longest queue length.

3 Existing Conditions

3.1 Existing facilities

3.1.1 Study area

The study area spans Chatswood, Artarmon and St Leonards, along Hampden Road and Herbert Street (see Figure 3.1). The north most intersection, Hampden Road / Mowbray Road, currently supports construction vehicle access to the Sydney Metro Chatswood Dive site. Just south of this intersection is the Artarmon town centre, which is currently undergoing streetscape improvements to improve pedestrian safety and shopping precinct visual quality. Willoughby City Council is undertaking these improvements, which started in March 2023 with completion expected during 2024. Surrounding this Artarmon town centre is primarily residential areas, as well as Artarmon Public School just south of the town centre.

Towards the middle to southern section of the study area, the land use is primarily industrial and commercial. The St Leonards precinct at the southern end of the study area, is characterised by more high-density residences and local cafes, particularly on the eastern side of Herbert Street. The Royal North Shore Hospital and health precinct is located on the western side of Herbert Street, attracting daily patronage. St Leonards station indicates the southernmost section of the study area and supports shopping and dining activities.

With the proposal of the new cycleway, several key intersections have been identified as being impacted by this development. These intersections have been assessed in more detail as part of this work and include:

- 1 Hampden Road / Mowbray Road
- 2 Hampden Road / Brand Street
- 3 Hampden Road / Broughton Road
- 4 Herbert Street / Frederick Street
- 5 Herbert Street / Cleg Street
- 6 Herbert Street / Ella Street

These key intersections have been included in the assessment due to the likely impact of the proposed cycleway design on their configuration and operations. However, there are other intersections and pedestrian crossing points within the corridor that have also been considered in the cycleway design.

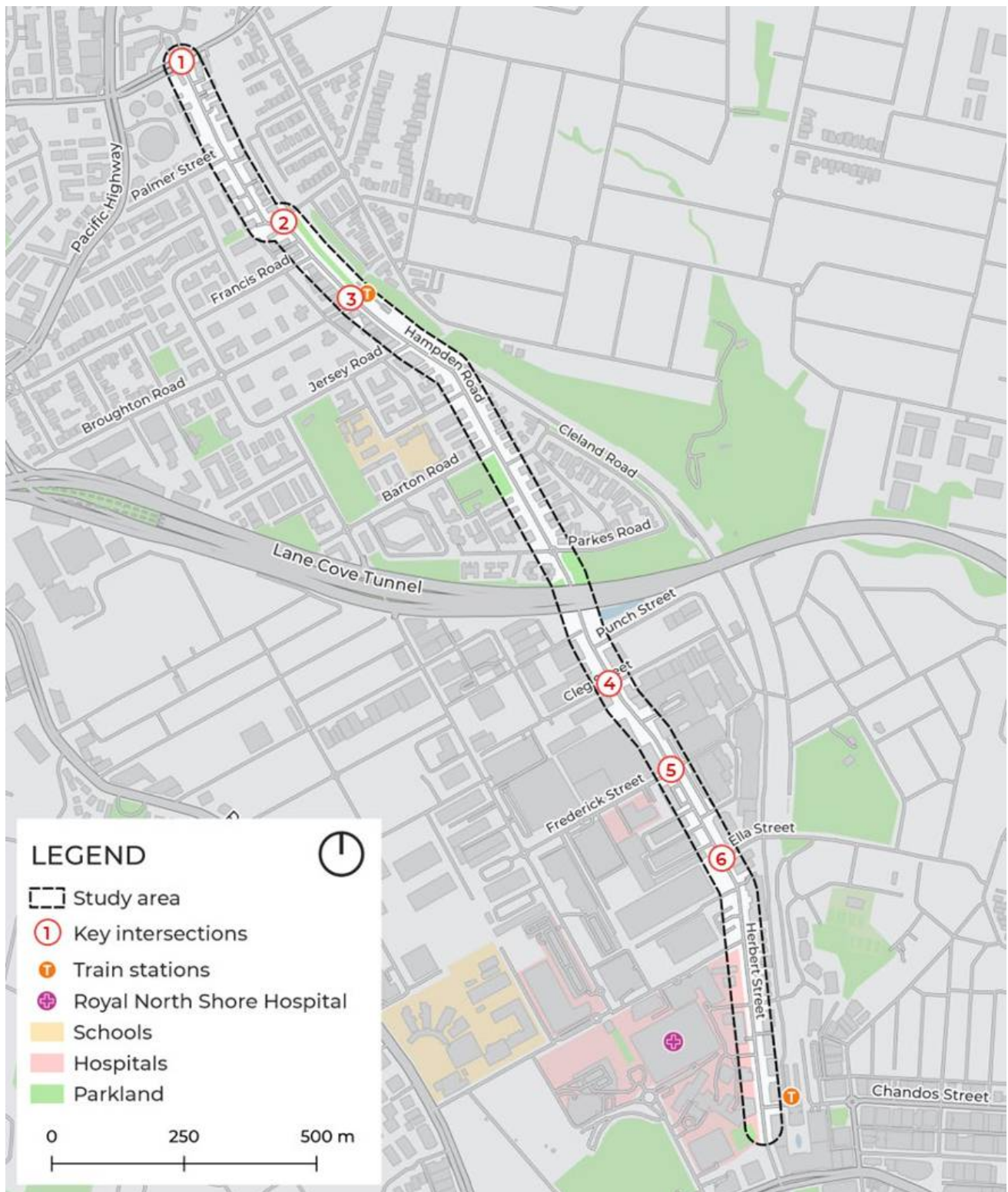


Figure 3.1 Hampden Road and Herbert Street cycleway – study area

3.1.2 Road network

The proposed cycleway runs along Hampden Road and Herbert Street between Pacific Highway to the south and Mowbray Road to the north. While it also runs over the M1 Gore Hill Freeway, it does not interact with it. Figure 3.2 shows the classification of the road network around the design corridor.

Pacific Highway is a state road that runs north-south and connects with Herbert Street on the southern end of the design corridor. It is a six-lane, two-way road at the intersection with Herbert Street, with a posted speed limit of 60 km/h. The Pacific Highway provides an alternate to the M1 Motorway to travel south towards the CBD, and runs north towards Hornsby, travelling through Chatswood.

Mowbray Road is a regional road that runs east-west between North Ryde and Willoughby. It connects with Hampden Road on the northern end of the design corridor. It is a four-lane, two-way road at the intersection with Hampden Road, with a posted speed limit of 50 km/h.

Hampden Road is a local road which forms the northern half of the design corridor. It is generally a two-lane, two-way road that runs north-south, connecting with Mowbray Road to the north, and turning into Herbert Street south of the bridge over the M1 Motorway. It has a posted speed limit of 50 km/h, but a reduced speed limit of 40 km/h between Brand Street and McMillan Road where Artarmon Station and a commercial area are. Hampden Road has kerbside parking along both sides of the road along the length of it, and also marked on-road bicycle lanes on both sides of the road south of Francis Road.

Herbert Street is a local road which forms the southern half of the design corridor. It is generally a two-lane, two-way road that runs north-south, connecting with Pacific Highway to the south, and turning into Hampden Road north of the bridge over the M1 Motorway. It has a posted speed limit of 40 km/h along most of the corridor – through the train station, health, and industrial precincts. Elsewhere (north of Frederick Street) it is a 50 km/h road. Herbert Street generally has kerbside parking and marked on-road bicycle lanes on both sides of the road. Some stretches do not have parking or bicycle lanes on both sides – generally at the approach to intersections, and at a limited number of constrained locations.



Figure 3.2 Hampden Road and Herbert Street cycleway – road classification

3.1.3 Intersections

This section outlines the existing configuration and traffic counts for the assessed intersections within the study area.

3.1.3.1 Hampden Road and Mowbray Road (I01)

Hampden Road and Mowbray Road is a signalised cross-intersection (I01), with the Chatswood Metro Dive Site situated on the northern side and residences (medium density) and an electricity sub-station on the southern side of the intersection. This intersection is located at the northern end of the Hampden Road and Herbert Street cycleway study area.

Mowbray Road is a regional road, supporting east-west traffic flow through this intersection. The eastern leg of Mowbray Road provides a signalised pedestrian crossing, connecting pedestrians between the southern footpath and the splitter island on the north leg access road. Both east and west approaches provide two full length lanes, while the western approach also includes a dedicated turning lane for right turns onto Hampden Road.

The southern leg (Hampden Road) is a local road, facilitating left turning onto Mowbray Road west only. A signalised pedestrian crossing is provided on this approach, supporting east-west travel along Mowbray Road. Notably the approach on Hampden Road has a relatively steep incline. Across from Hampden Road, the northern leg access road accommodates authorised vehicles exiting the Metro Dive Site. This intersection approach comprises one full lane on the western side and a slip lane on the east, with a staged pedestrian crossing located at the intersection.



Figure 3.3 I01 intersection layout

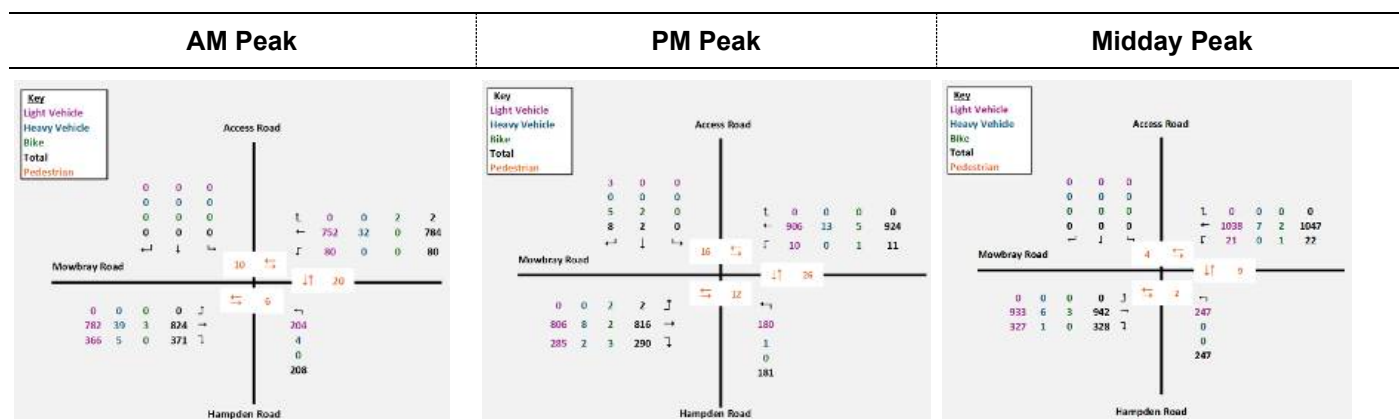
Intersection Counts

Results from the traffic survey have been summarised for the Hampden Road and Mowbray Road intersection in Table 3.1. Traffic (light and heavy), cyclist and pedestrian volumes have been provided for the weekday AM and PM and weekend midday peak periods. Findings from the survey results indicate the following existing demand:

- Strong east-west traffic flow across Mowbray Road during all peak periods analysed, particularly during the weekend midday peak
- There is a higher demand for right turns from the Mowbray Road west leg onto Hampden Road, compared with left turns from Mowbray Road east
- Demand for left turns from Hampden Road onto Mowbray Road west is moderate, at around 200 vehicles per hour during the weekday peaks and higher on the weekend

Active travel demand at this intersection is low, likely due to the high traffic volumes and limited attractors nearby. Currently, the highest demand for cycling is east-west on Mowbray Road, which currently does not provide any cycling infrastructure. There are currently few cyclists using the new shared path on the eastern side of the Metro Dive Site, which connects to the existing shared path running alongside the train line.

Table 3.1 I01 – weekday AM and PM peak and weekend midday peak volumes



3.1.3.2 Hampden Road and Brand Street (I02)

The intersection of Hampden Road and Brand Street (I02) is a T-intersection controlled by a single-lane roundabout. It is located north of the Artarmon town centre, surrounded primarily by low and medium residential land to the north. Both roads, Hampden Road and Brand Street, are local roads.

The intersection has single lane approaches to the roundabout with splitter islands separating the approach and departure lanes. The only exception to this is Hampden Road (south) where two approach lanes are provided with designated left and right turn lanes. There is a gradual incline along Hampden Road south approaching the intersection, which increases on the Hampden Road west leg.

There are limited pedestrian crossing opportunities at the intersection, with the only provision being a staged crossing on the western approach, approximately 40 metres east of the intersection.



Figure 3.4 I02 intersection layout

Intersection Counts

Results from the traffic survey have been summarised for the Hampden Road and Brand Street intersection in Table 3.2. Traffic (light and heavy), cyclist and pedestrian volumes have been provided for the weekday AM and PM and weekend midday peak periods. Findings from the survey results indicate the following existing demand:

- Highest demand for the right turn from Hampden Road south to Brand Street across all peak periods analysed
- Higher demand also for turning onto Hampden Road south from both Hampden Road west and Brand Street

At this intersection, active travel demand is low. Pedestrian demand is limited across all peak periods and especially at the Brand Street approach, as most pedestrians likely choose to detour to the refuge further east.

Table 3.2 I02 – weekday AM and PM peak and weekend midday peak volumes

AM Peak	PM Peak	Midday Peak
Key: Light Vehicle, Heavy Vehicle, Bike, Total, Pedestrian Hampden Road Brand Street Hampden Road Diagram showing traffic volumes for the AM Peak at the I02 intersection. Hampden Road has 5 vehicles turning left, 89 turning right, and 393 going straight. Broughton Road has 132 vehicles turning left, 5 turning right, and 135 going straight. Total volumes are 132, 5, and 135 respectively.	Key: Light Vehicle, Heavy Vehicle, Bike, Total, Pedestrian Hampden Road Brand Street Hampden Road Diagram showing traffic volumes for the PM Peak at the I02 intersection. Hampden Road has 7 vehicles turning left, 98 turning right, and 187 going straight. Broughton Road has 122 vehicles turning left, 21 turning right, and 126 going straight. Total volumes are 122, 21, and 126 respectively.	Key: Light Vehicle, Heavy Vehicle, Bike, Total, Pedestrian Hampden Road Brand Street Hampden Road Diagram showing traffic volumes for the Midday Peak at the I02 intersection. Hampden Road has 11 vehicles turning left, 59 turning right, and 137 going straight. Broughton Road has 118 vehicles turning left, 16 turning right, and 123 going straight. Total volumes are 118, 16, and 123 respectively.

3.1.3.3 Hampden Road and Broughton Road (I03)

The intersection of Hampden Road and Broughton Road (I03) is a T-intersection, located at the heart of the Artarmon town centre, directly across from Artarmon station. This intersection is currently under construction as part of the Artarmon Local Centre Streetscape Upgrade, a deliverable of the Artarmon Local Centre Public Domain Masterplan, which commenced in March 2023 and is expected to be completed in mid-2024. These works will see the signalisation of this intersection and the establishment of signalised pedestrian crossings along all three intersection approaches.

When the 7-day traffic surveys were undertaken, this intersection was unsignalised, with single lane approaches on Broughton Road and the southern leg of Hampden Road, while the northern leg of Hampden Road provides two approach lanes. Notably, Broughton Road has a minor decline towards the intersection.

Pedestrians are currently only able to cross Broughton Road at this intersection. However, approximately 20 metres north of the on Hampden Road, there is a signalised pedestrian crossing that facilitates walking trips to Artarmon station.

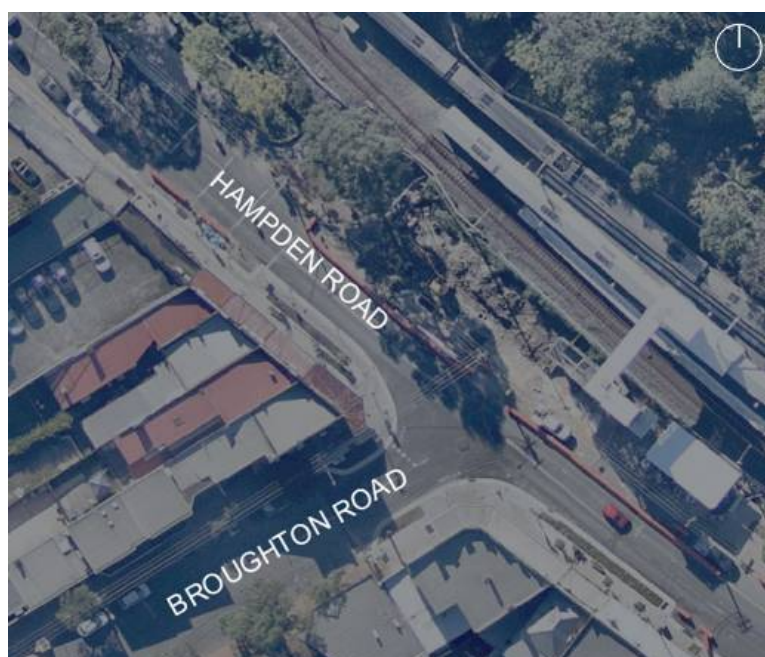


Figure 3.5 I03 intersection layout

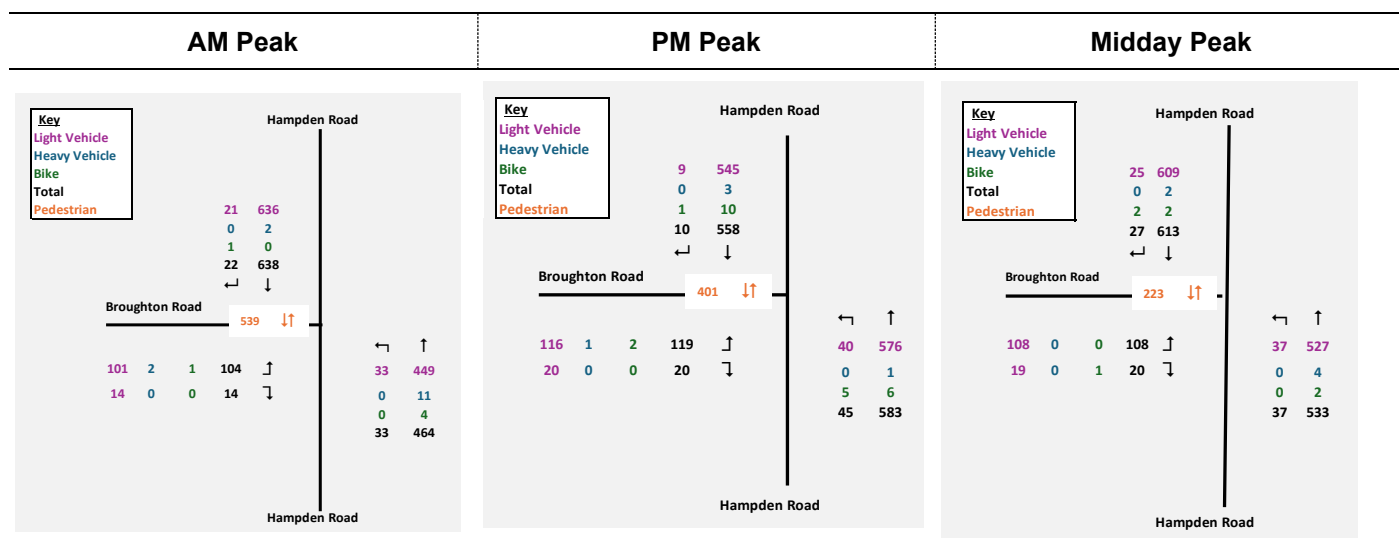
Intersection Counts

Results from the traffic survey have been summarised for the Hampden Road and Broughton Road intersection in Table 3.3. Traffic (light and heavy), cyclist and pedestrian volumes have been provided for the weekday AM and PM and weekend midday peak periods. Findings from the survey results indicate the following existing demand:

- Highest traffic volumes experienced north-south along Hampden Road across all peak periods analysed
- Highest demand on the Broughton Road approach for the left turn onto Hampden Road north and relatively low demand for Hampden Road south

Active travel demand is significantly higher at this intersection, particularly across Broughton Road, likely reflecting a large number of pedestrians travelling to and from the signalised pedestrian crossing to the north, which provides access to Artarmon station.

Table 3.3 I03 – weekday AM and PM peak and weekend midday peak volumes



3.1.3.4 Herbert Street and Cleg Street (I04)

The intersection of Herbert Street and Cleg Street (I04) is a signalised cross-intersection, located at the northern end of Herbert Street, just south of the Clarke Bridge over the Gore Hill Freeway. This intersection is surrounded by commercial and industrial land uses primarily and both Herbert Street and Cleg Street are local roads. Cleg Street west can be used by vehicles to access the Pacific Highway (via Reserve Road and Campbell Street), effectively avoiding the St Leonards precinct and Herbert Street / Pacific Highway intersection.

The intersection has two-lane approaches on each leg, with a single on-road cycle lane on both the northern and southern Herbert intersection legs. There are currently no restricted turning movements (light vehicles) at any of the intersection legs. The Herbert Street north leg inclines towards the Herbert Street south leg, continuing towards the Herbert Street and Frederick Street intersection. Similarly, the Cleg Street west approach inclines towards the Cleg Street east leg. Pedestrian crossings are provided on each intersection leg.

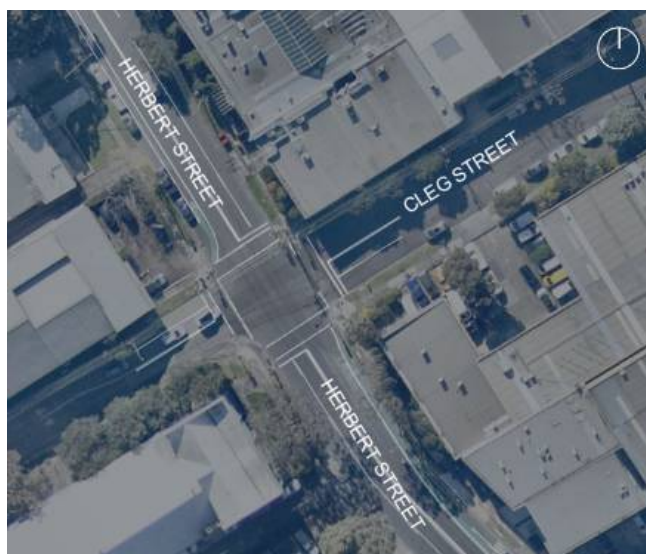


Figure 3.6 I04 intersection layout

Intersection Counts

Results from the traffic survey have been summarised for the Herbert Street and Cleg Street intersection in Table 3.4. Traffic (light and heavy), cyclist and pedestrian volumes have been provided for the weekday AM and PM and weekend midday peak periods. Findings from the survey results indicate the following existing demand:

- Highest traffic volumes experienced north-south along Herbert Street across all peak periods
- During the AM peak there is also a high demand for the right turn from Cleg Street west onto Herbert Street south

- Relatively low traffic volumes are experienced at all other leg turning movements, particularly the Herbert Street south right turn onto Cleg Street east and Herbert Street north left turn onto Cleg Street east
- Notably there is no heavy vehicle demand from Cleg Street east during all peak periods analysed and low demand at the other intersection approaches

Active travel demand is relatively lower at this intersection, with the highest pedestrian demand experienced north-south on Cleg Street east during the weekday AM and PM peaks. Cycling demand is also strongest north-south along Herbert Street.

Table 3.4 I04 – weekday AM and PM peak and weekend midday peak volumes

AM Peak		PM Peak		Midday Peak	

3.1.3.5 Herbert Street and Frederick Street (I05)

The intersection of Herbert Street and Frederick Street (I05) is a signalised cross-intersection, surrounded by commercial and industrial land uses. The eastern leg of this intersection provides an access road to the St Leonards Corporate Centre. Frederick Street can be used by vehicles to access the Pacific Highway (via Reserve Road and Campbell Street), effectively avoiding the St Leonards precinct and Herbert Street / Pacific Highway intersection.

The intersection has two-lane approaches on each leg, with a single on-road lane for cycling on both Herbert Street north and south. There are currently no restricted turning movements at any of the intersection legs. Inclines and declines are minimal at all intersection approaches. Pedestrian crossings are also provided on each intersection approach.



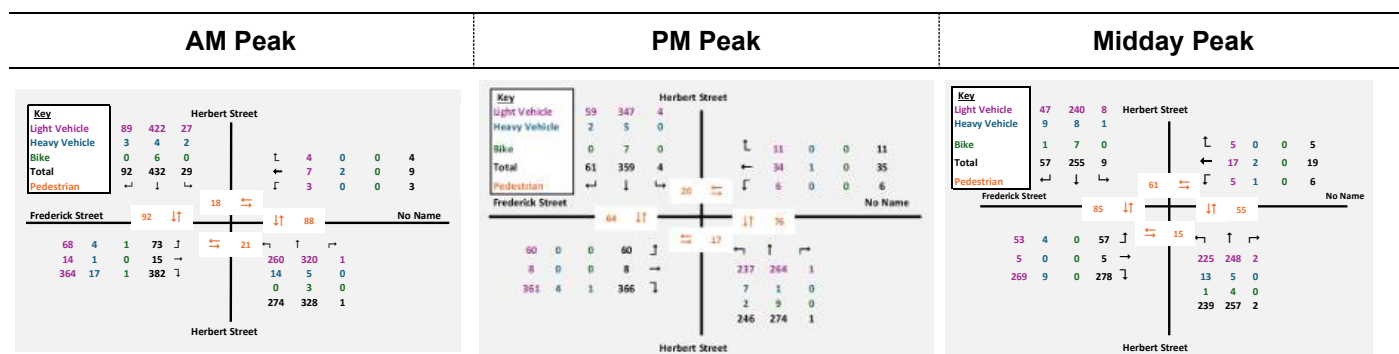
Figure 3.7 I05 intersection layout

Intersection Counts

Results from the traffic survey have been summarised for the Herbert Street and Frederick Street intersection in Table 3.5. Traffic (light and heavy), cyclist and pedestrian volumes have been provided for the weekday AM and PM and weekend midday peak periods. Findings from the survey results indicate the following existing demand:

- Highest traffic volumes for the north-south Herbert Street through movements as well as the right turn out of Frederick Street and left turn out of Herbert Street south
- Movements into and out of the St Leonards Corporate Centre ('No Name') are relatively low

Table 3.5 I05 – weekday AM and PM peak and weekend midday peak volumes



3.1.3.6 Herbert Street and Ella Street (I06)

The intersection of Herbert Street and Ella Street (I06) is a priority-controlled T-intersection, located just north of the St Leonards station precinct and Royal North Shore Hospital Hub. Ella Street includes an overpass connecting to the Naremburn residential area and parks. As will be discussed in Section 3.1.8, there is a heavy vehicle limit on the Ella Street overpass, limiting the types of heavy vehicles that can access this street.

The current intersection configuration comprises single lane approach and exit lanes on each intersection leg. Pedestrian crossing is facilitated by a refuge island on the Ella Street and Herbert Street south legs.

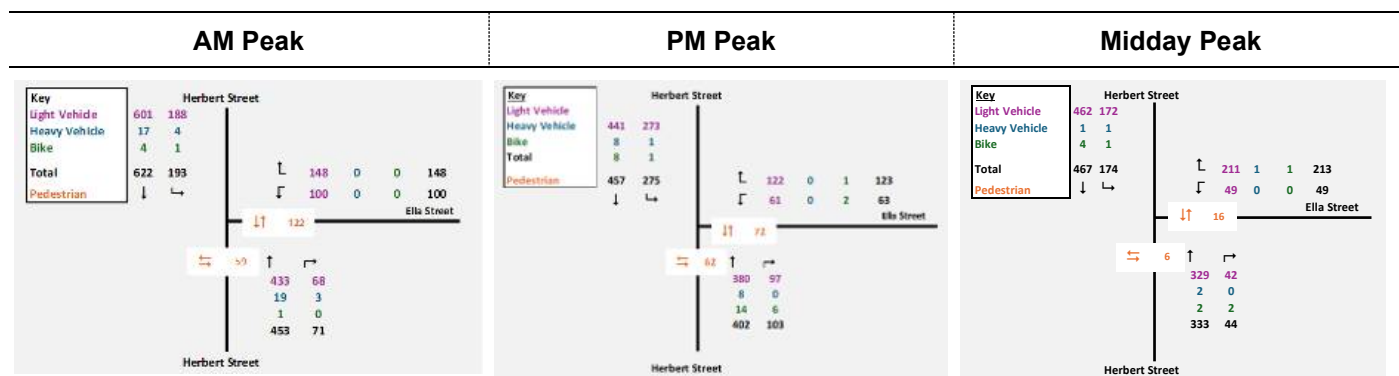


Figure 3.8 I06 intersection layout

Intersection Counts

- Results from the traffic survey have been summarised for the Herbert Street and Ella Street intersection in Table 3.6
- Traffic (light and heavy), cyclist and pedestrian volumes have been provided for the weekday AM and PM and weekend midday peak periods. Findings from the survey results indicate the following existing demand:
- Highest traffic volumes for the north-south Herbert Street through movements, particularly southbound movements towards St Leonards, followed by movements out of Ella Street
- The lowest traffic volumes are recorded for the right turn from Herbert Street south to Ella Street (maximum 97 vehicles in the AM peak)

Table 3.6 I06 – weekday AM and PM peak and weekend midday peak volumes



3.1.4 Active transport

3.1.4.1 Cycling

Marked on-road cycle lanes are available throughout the study area, extending from the south of Artarmon town centre to St Leonards station. These lanes, approximately 1.2 metres wide in each direction, lack physical separation from traffic and parked vehicles. The corridor connects with shared paths along the Pacific Highway and the Artarmon Reserve via marked on-road routes. Additionally, a separated cycling facility runs along the Gore Hill Freeway, accessible via Punch Street, providing connections for cyclists traveling to Artarmon, Lane Cove, Chatswood, Macquarie Park, and North Sydney. A summary of the existing cycling network is provided below in Figure 3.10.

As depicted in Section 3.1.3, the existing demand for cycling in the AM and PM peak periods is relatively low compared with general traffic and pedestrians, with the highest demand experienced in the PM peak at the intersection of Herbert Street and Ella Street (total of 32 cyclists). In general, there is a slightly stronger demand for through north-south movements along Herbert Street and Hampden Road, indicating some existing demand for a cycleway along this corridor.



Figure 3.9 Existing site infrastructure captured during the site visit

3.1.4.2 Walking

Throughout the study area, the walking network is complete and fairly connected, with footpaths running along both sides of Herbert Street and Hampden Road. Alongside residential areas, footpaths are 1.5 metres in width, increasing to 3 metres at key attractors such as Artarmon and St Leonards stations. As indicated in Figure 3.10, there are several crossing opportunities throughout the study area. Most zebra crossings are concentrated around the St Leonards station precinct, providing east-west or north-south connectivity. Just north of this precinct, the intersection of Ella Street poses challenges to pedestrian safety with only refuges provided on the southern and eastern legs. These treatments coupled with the limited sight distance from Ella Street, make it challenging for pedestrians to cross safely at the intersection.

At the southern end of the study area, pedestrian activity is relatively high due to the proximity of St Leonards station, the Royal North Shore hospital and surrounding medium to high-density residences and cafes. Pedestrian volumes are highest at the raised pedestrian crossing opposite the hospital, with 245 pedestrians in the AM peak and 239 in the PM peak. On the weekend however this significantly reduces to 21 pedestrians during the midday peak. On weekdays there is also an observed demand for north-south travel along the corridor, initiating near Ella Street in the AM peak specifically (122 pedestrians in the AM peak) continuing south towards St Leonards station. This likely reflects the commuters from surrounding residential blocks, who require a safe and connected path to St Leonards station.

At Artarmon station a signalised pedestrian crossing supports east-west connectivity at the front of the station. Pedestrian activity is relatively high in the AM and PM peak periods, with pedestrian movements across Broughton Road (just south of the pedestrian crossing) reaching 539 pedestrians in the AM and 401 pedestrians in the PM. On weekends, pedestrian movements across this intersection are slightly lower at 223 pedestrians during the midday peak hour.

North of the station, the intersection of Hampden Road and Brand Street poses a significant challenge for pedestrians. The wide approach lanes, especially on Hampden Road, and the presence of a refuge island only on the west leg of Hampden Road contribute to this difficulty. To cross Brand Street, pedestrians must walk an additional 40 meters east to reach a refuge island. At the northernmost point of the study area, the intersection of Hampden Road and Mowbray Road offers pedestrian crossing opportunities on the southern and eastern legs. However, due to high east-west traffic demand, the wait time for north-south pedestrian crossings across Mowbray Road is relatively long. In these northern parts of the study area, pedestrian volumes are significantly lower because of the limited attractions and the road traffic environment.

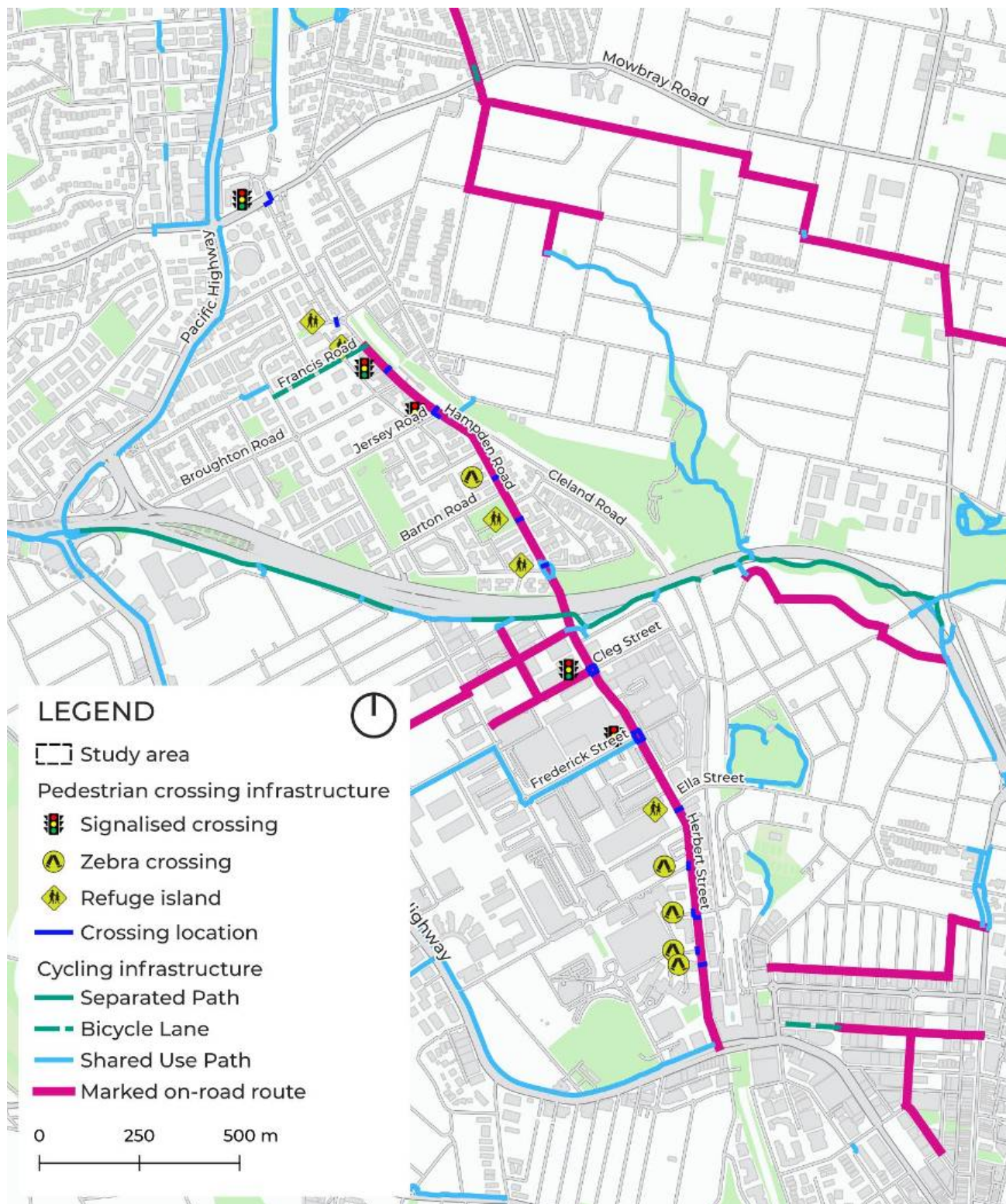


Figure 3.10 Existing active transport network

3.1.5 Public transport

There are three bus stops located within the study area (see Figure 3.11), two on Hampden Road near Artarmon station and one on Herbert Street near St Leonards station. The Artarmon bus stops are served by two night buses and train replacement bus services, whilst the St Leonards bus stop is served by a train replacement bus (22T1) only. There are

also two school bus services that support Artarmon Public School during school drop-offs and pick-ups, which use Jersey Road and McMillan Road to access the school.

Artarmon and St Leonards train stations are within the study area. Artarmon and St Leonards stations are serviced by the T1 Berowra to City via Gordon, T9 Hornsby to North Shore via City and the Central Coast Line. During peak periods, these services are fairly frequent as indicated in Table 3.7.

Table 3.7 Public transport service frequency within the Hampden Road and Herbert Street cycleway corridor

Route No.	Route	Type	Stops (in study area)	Service Frequency
N90	Hornsby to City Town Hall via Chatswood (Night Service)	Bus	2 stops: Artarmon Station & Hampden Rd at Jersey Rd	60 minutes (three to four services in the early morning)
N91	City Town Hall to Macquarie Centre (Night Service)	Bus	2 stops: Artarmon Station & Hampden Rd at Jersey Rd	60 minutes (three to four services in the early morning)
22T1	T1 Train replacement bus	Bus	2 stops: Artarmon Station & St Leonards Station	N/A
761w	Elizabeth and Mowbray Rd to Artarmon Public School	School bus	1 stop: Artarmon Public School	Single service arriving in Artarmon at 8:44 AM
762w	Artarmon Public School to Lane Cove Shops	School bus	1 stop: Artarmon Public School	Single service departing Artarmon at 3:00 PM
T1	North Shore line	Train	2 stops: Artarmon Station & St Leonards Station	3 – 4 minutes
T9	Hornsby to North Shore via City	Train	2 stops: Artarmon Station & St Leonards Station	15 minutes
CCN	Central Coast Line	Train	2 stops: Artarmon Station & St Leonards Station	15 minutes (AM and PM weekday peak only)



Source: TfNSW Open Data Hub

Figure 3.11 Existing public transport network

3.1.6 Road safety

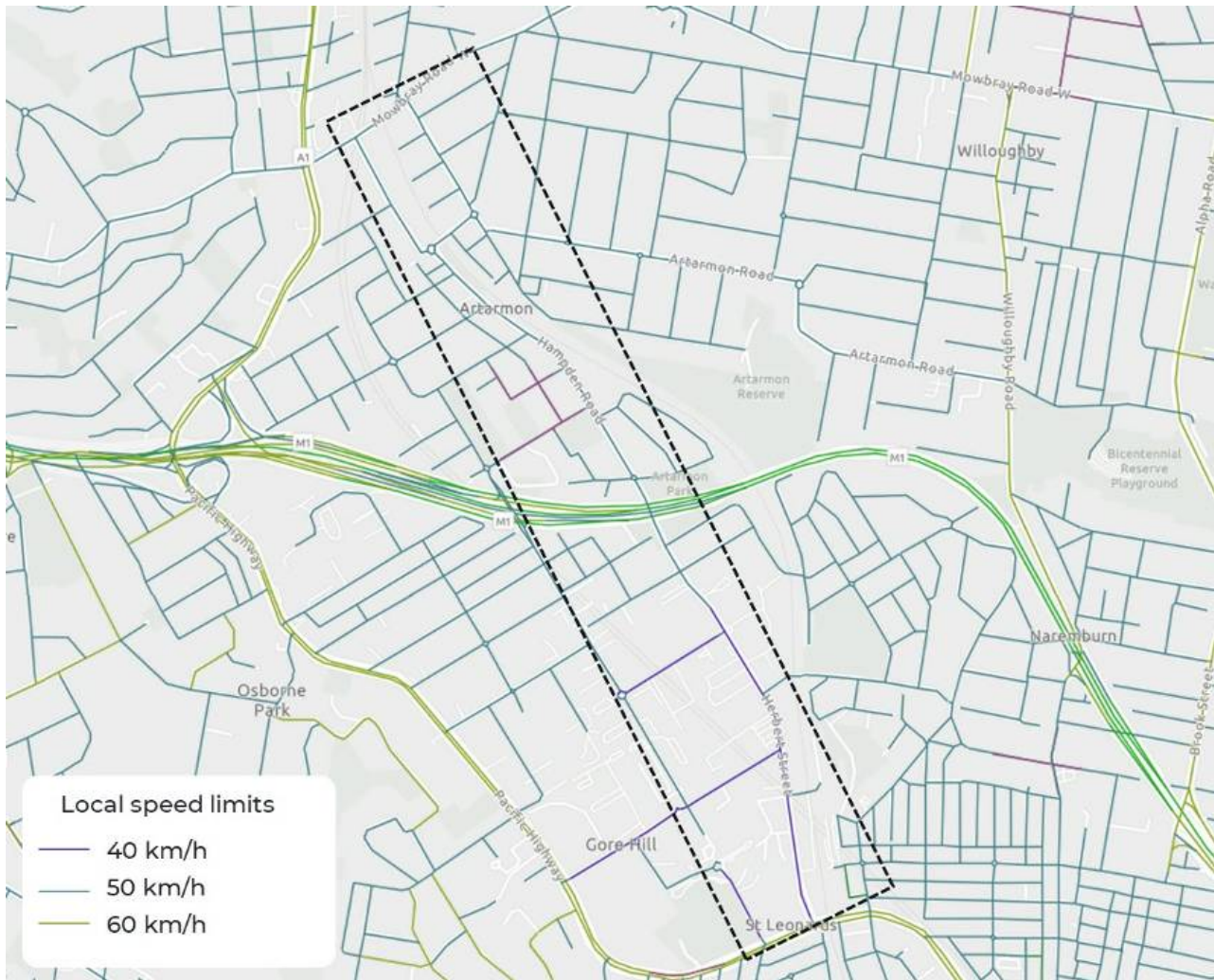
Crash analysis was conducted for the 5-year period between 2019 – 2023, whereby 26 crashes were reported within the extent of works (see Figure 3.12). Of the 26 reported crashes, four resulted in a serious injury, 14 resulted in a moderate injury, three resulted in a minor injury and five were non-casualty (towaways). Most injuries occurred in the middle of the roadway (15 collisions), followed by intersections (nine collisions total). Collision pinch-points are located at the Artarmon town centre and the St Leonards station precinct.

A total of seven collisions involved a pedestrian, cyclist or micromobility device (motor scooter), as visualised in Figure 3.12. Three collisions involved pedestrians, two involved cyclists (one collision and one roll-over) and two involved a motor scooter rolling over on the existing cycleway. It is important to note that a recent collision resulted in a fatality at the intersection of Ella Street and Herbert Street (not yet captured in the latest crash data set).



Source: NSW Crash data 2019 – 2023, TfNSW

Figure 3.12 Crash analysis for the study area

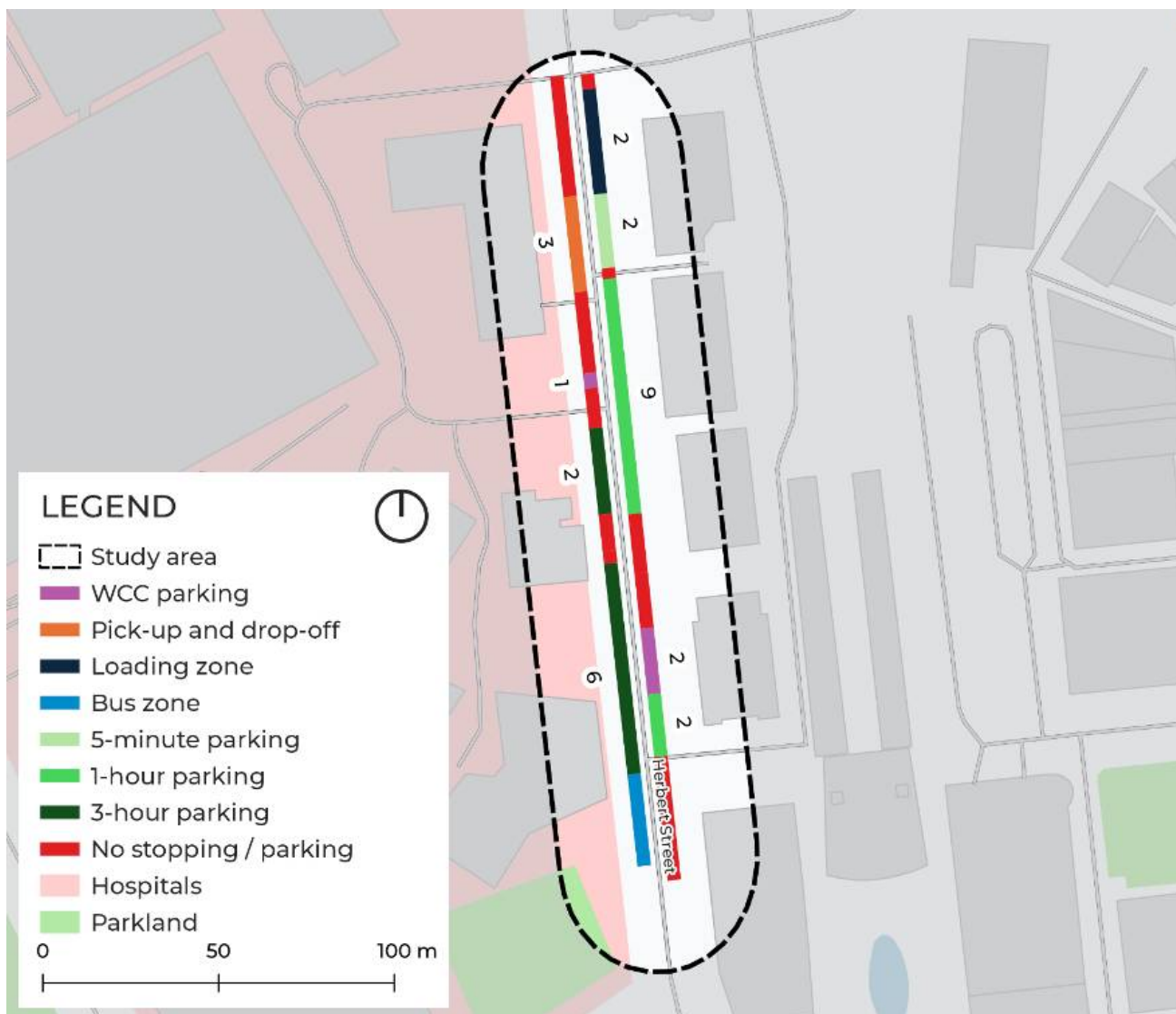


Source: Transport Open Data, TfNSW

Figure 3.13 Speed limits within and surrounding the study area

3.1.7 Parking study

A parking assessment has been undertaken on Herbert Street between St Leonards Station and Lanceley Avenue, to understand the level of parking provision and typical daily occupancy. This section of the corridor has been selected given its proximity to major trip attractors including St Leonards station, the Royal North Shore Hospital and nearby retail and residential areas. Surveys undertaken by Trans Traffic Survey between Wednesday the 29th of May and Tuesday the 4th of June identified a total number of 29 parking spaces between Lanceley Avenue and St Leonards station (refer to Figure 3.14).

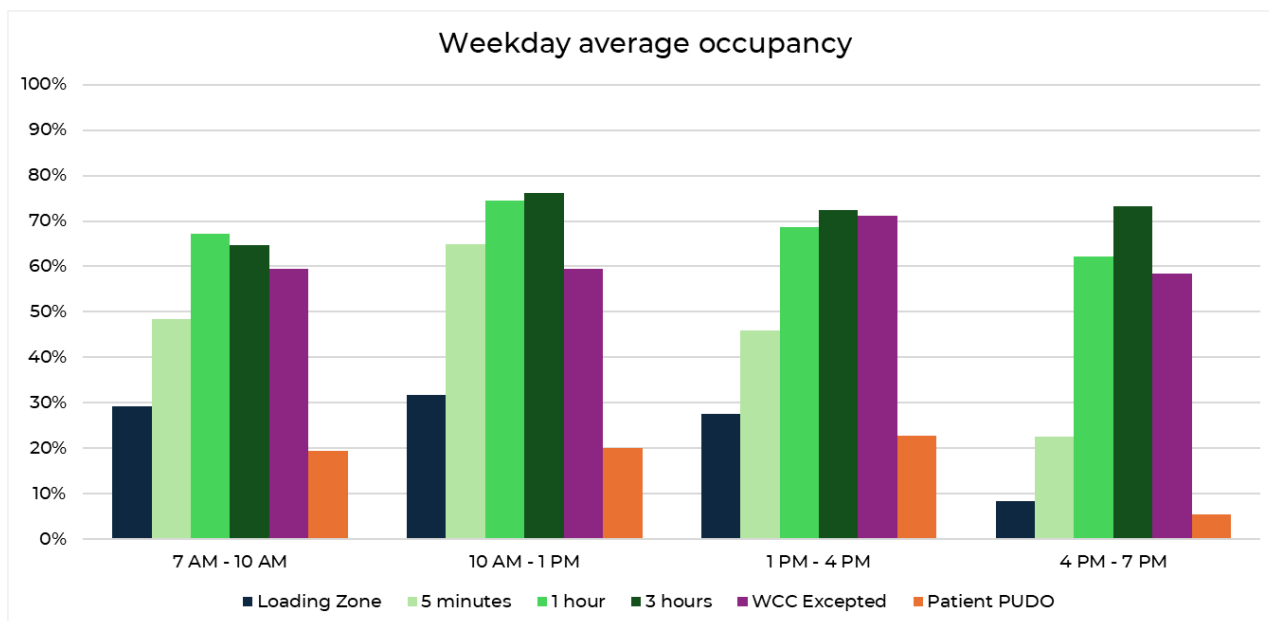


Source: Trans Traffic Survey, 2024

Figure 3.14 Parking provision between Herbert Street / Lanceley Avenue and St Leonards station

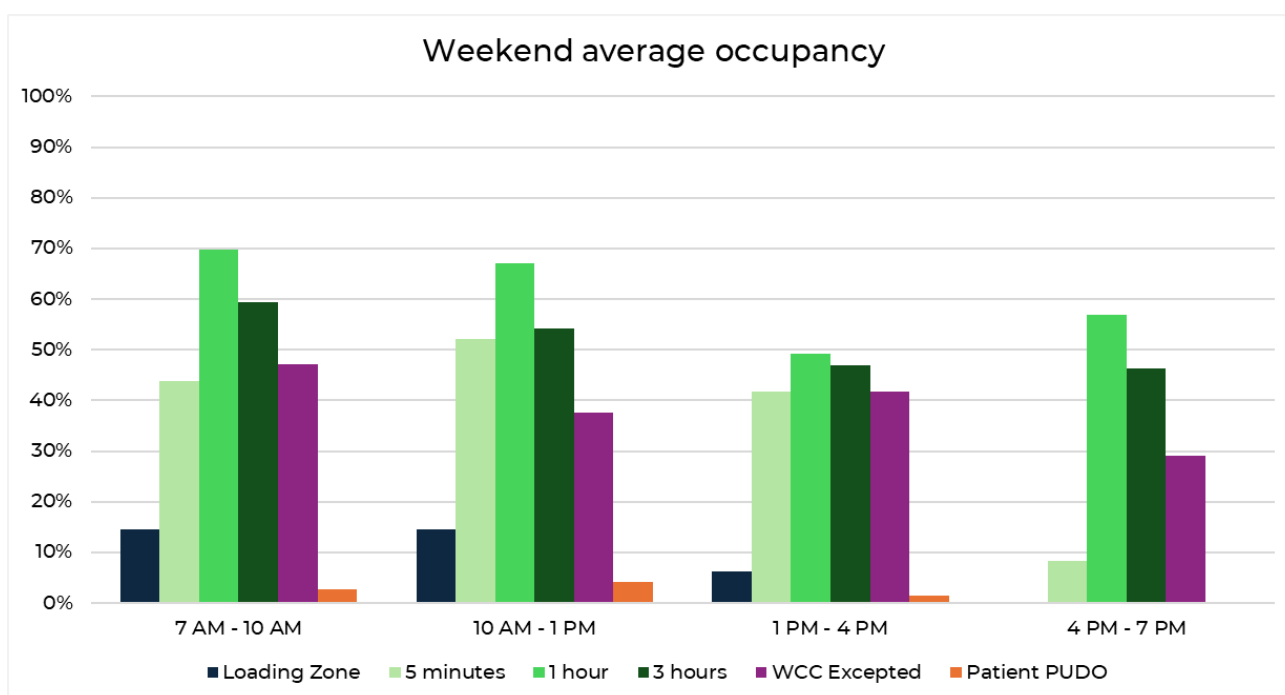
Overall, the survey results indicate that average parking occupancy does not reach or exceed capacity during the week or weekend (see Figure 3.15 and Figure 3.16). In general occupancy rates for 3-hour and 1-hour parking spaces are highest, with the maximum average occupancy rate at 76% for 3-hour parking on a weekday between 10AM – 1 PM. Notably, Loading Zone and Patient PUDO occupancy rates are relatively lower on the weekend compared with weekdays. In general, the busiest period for parking on a weekday occurs within the 10 AM – 1 PM period, whilst on the weekend it is earlier in the 7AM – 10 AM period.

Looking at the survey results in more detail, all parking areas reached 100% occupancy at some point throughout the seven-day survey. However, this is an infrequent occurrence with loading zones reaching 100% occupancy at 2% of the time, 5-minute parking at 17%, 1-hour parking at 0.3%, 3-hour parking at 1%, WCC parking at 12% and patient pick-up and drop-off at 0.3%.



Source: Trans Traffic Survey, 2024

Figure 3.15 Weekday average occupancy



Source: Trans Traffic Survey, 2024

Figure 3.16 Weekend average occupancy

A review of the average weekday and weekend occupancy for each parking type within the study corridor, indicates that approximately 10 and 14 spaces are typically unoccupied on weekdays and weekends respectively.

Table 3.8 Summary of average number of unoccupied parking spaces by parking restriction

Parking restriction	Capacity	Average weekday occupancy	Average weekend occupancy
Loading zone	2 spaces	24%	9%

Parking restriction	Capacity	Average weekday occupancy	Average weekend occupancy
5 minutes	2 spaces	45%	36%
1 hour	11 spaces	68%	61%
3 hours	8 spaces	72%	51%
WCC excepted	3 spaces	62%	38%
Patient PUDO	3 spaces	17%	2%

3.1.8 Heavy vehicle network

As depicted in Figure 3.17, 4.6-metre-high vehicles are accepted along the southern section of the study area (Herbert Street), as well as the surrounding road network through the Artarmon industrial area and on nearby state and regional roads. Three overpasses are located either within or in proximity to the study area, on Hampden Road over the Gore Hill Freeway, on Lambs Road connecting to Francis Street and on Ella Street. Each of these overpasses has a three-tonne mass limit for vehicles traversing.

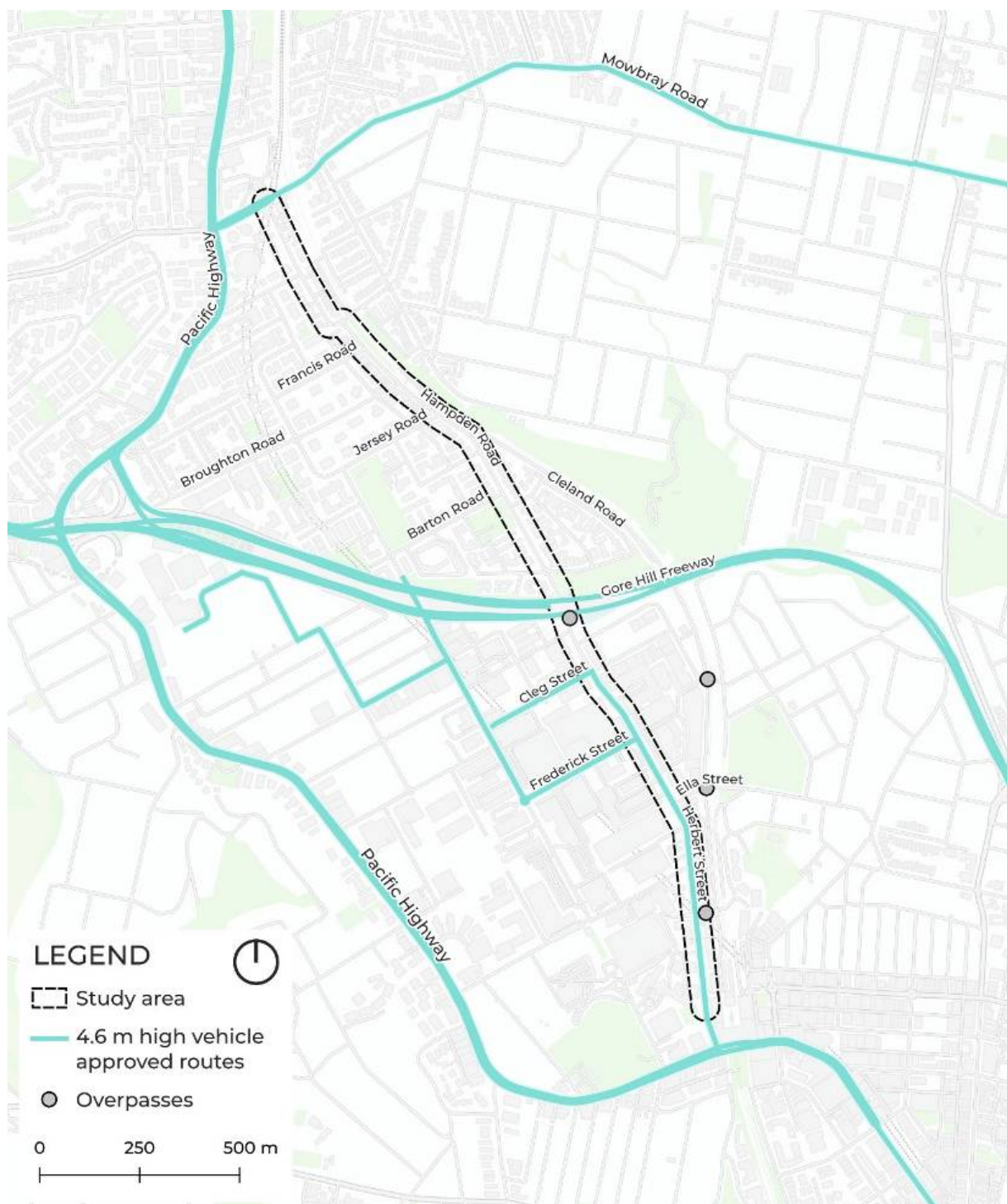


Figure 3.17 Hampden Road and Herbert Street cycleway – heavy vehicle network

4 Issues and Opportunities

Prior to the development of the cycleway and intersection designs, an issues and opportunities assessment was undertaken (see Appendix F for detailed summary). This assessment looked at existing conditions as well as issues and opportunities relating to the previous designs completed for this Hampden Road and Herbert Street cycleway. Table 4.1 summarises the key, traffic-related issues and opportunities for the 6 intersections.

Table 4.1 Key intersections summary of issues and opportunities

ID	Issues	Opportunities
I01	Changes to traffic signal operations at Hampden Road / Mowbray Road are sensitive to coordination with Mowbray Road / Pacific Highway Geometry issues on the Mowbray Road east approach Pedestrian crossing geometry does not align with footpaths and future cycleway, particularly on Mowbray Road east	Develop a direct connection to the Frank Channon Walk and Chatswood Opportunity to remove the slip lane to Mowbray Road from the Sydney Metro dive site (northern approach leg) Explore the addition of a crossing on the western leg of the intersection
I02	No existing safe pedestrian crossing points and sharp turn from Hampden Road west limits sight lines Large turn movements for buses need to be facilitated Steeper topography at Hampden Road west introduces safety issues for cyclists and pedestrians	Integrate bicycle and pedestrian crossing at intersection legs to improve access and safety Explore the signalisation of the intersection
I03	Existing layout does not provide a safe connection for cyclists entering the new shared path from the east	Investigate the provision of cycle lanterns at the intersection
I04	Some conflict points with local access / driveways	Review truck access and turning requirements at this intersection to accommodate space for the cycleway Consider kerb build-outs
I05	Potential conflicts between cyclists and heavy vehicles turning in and out from the industrial site Semi-trailers turning left out of the industrial site conflict with the proposed cycleway The existing location of the centreline on Herbert Street results in carriageway constraints with the addition of a cycleway	Explore a separated cycleway along this intersection Opportunity to ban left turns out of the industrial site (existing access / egress via a driveway further south) Investigate the feasibility of alternative routes to minimise traffic on Herbert Street north Adjust current lane configuration to maximise the carriageway and implement traffic calming measures
I06	Existing mature trees at this location impact the signalisation of the intersection, however their removal is unfeasible and not in the best interest of the project Unsafe pedestrian and cyclist environment with a recent fatality and unsafe pedestrian crossing facilities on Herbert Street South Existing conflicts between pedestrians crossing Ella Street and vehicles turning in and out onto Herbert Street	Maintain all / most of the existing mature trees Consider intersection treatments to improve pedestrian and cyclist safety Assess existing / proposed sight lines and ensure local access requirements are maintained

5 Proposed Design

5.1 Cycleway design

Willoughby City Council proposes to improve cycling and walking along Hampden Road and Herbert Street, from Chatswood to St Leonards. The Concept Design is included in Appendix A. Key features of the proposal include:

- New bi-directional cycleway, approximately 2 km in length
- New or modified medians separating cycleway from roadway and directional travel
- New wombat crossings along and across the study area
- New pavement markings including pedestrian markings and roadway line markings
- Kerb realignments and kerb connections
- New pavement and surface treatments at unsignalised intersections, approaches and kerb buildouts
- Modification of turn restrictions including turn bans for larger vehicles at key intersections
- Change to kerbside uses along Hampden Road and Herbert Street, including the removal of a total 129 parking spaces
- Closure of Punch Street and development of a parklet

The new bidirectional cycleway will be installed along the length of Hampden Road between Mowbray Road and Punch Street and Herbert Street between Punch Street and the Pacific Highway. This cycleway will range from 2.4 m to 3.0 m in width, primarily around 3.0 m along most of the corridor.

To accommodate the proposed cycleway, parking lanes will be removed along the corridor on both sides of the road, maintaining primarily one lane in each direction as per the existing conditions. Traffic lanes will range from 3.0 m to 3.5 m to accommodate bus services and parking lanes will range from 2.4 m to 3.2 m.

5.1.1 *Hampden Road between Mowbray Road and Brand Street*

- New cycleway installed, typically 3.0 m in width on the eastern side of the road north of Palmer Street, transitioning to the western side south of Palmer Street
- New wombat crossing just north of Palmer Street, facilitating crossing of cycleway from the eastern to the western side of Hampden Road
- Replacement of existing pedestrian refuges on both the northbound and southbound approaches of Hampden Road at the Brand Street roundabout with new wombat crossings
- Reconfiguration of the central island at the Brand Street roundabout to improve vehicle turning movements and tracking
- Removal of on-street parking spaces to accommodate the proposed design changes.



Figure 6-52 Existing Section A - North Hampden Road

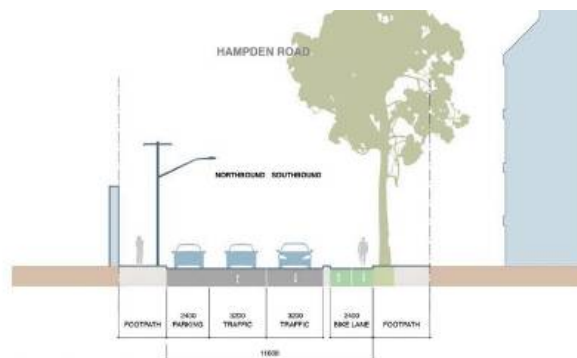


Figure 6-54 Proposed Section A - North Hampden Road

Source: SMM Urban Design Analysis & Concept Design Report (August 2025)

Figure 5.1 North Hampden Road: Existing (left) vs. Proposed (right)

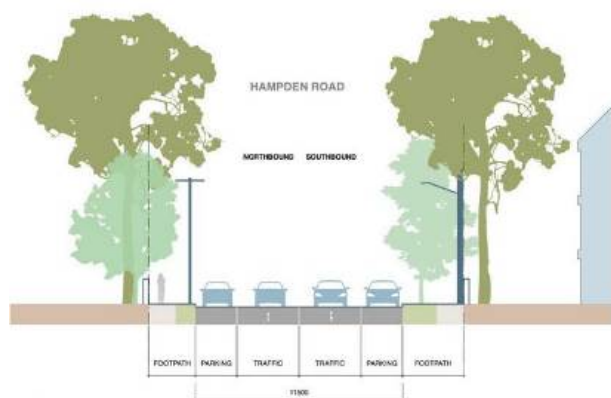


Figure 6-53 Existing Section B - Hampden Road near Palmer Street



Figure 6-55 Proposed Section B - Hampden Road near Palmer Street

Source: SMM Urban Design Analysis & Concept Design Report (August 2025)

Figure 5.2 Hampden Road near Palmer Street: Existing (left) vs. Proposed (right)

5.1.2 Hampden Road between Brand Street and Jersey Road

This section of Hampden Road falls outside the current cycleway design scope as it was recently upgraded. The only proposed modification for this section is:

- Eastern footpath between Brand Street and Jersey Road will become a shared path to accommodate cyclist movements through the Artarmon town centre

5.1.3 Hampden Road between Jersey Road and Cleg Street

- New cycleway installed, typically 3.0 m in width on the eastern side of the road between Jersey Road and Cleg Street
- New wombat crossings are proposed along Hampden Road at several key locations: just south of McMillan Road, at Barton Road, replacing the existing refuge south of Cleland Road, and on all approaches to the roundabout at Parkes Road
- Reconfiguration of the Parkes Road roundabout including the centre island to facilitate turning paths
- Closure of Punch Street access from Hampden Road and conversion to a parklet
- Removal of on-street parking spaces to accommodate the proposed design changes.



Figure 6-56 Existing Section C - Hampden Road near Jersey Road



Figure 6-58 Proposed Section C - Hampden Road near Jersey Road

Source: SMM Urban Design Analysis & Concept Design Report (August 2025)

Figure 5.3 Hampden Road near Jersey Road: Existing (left) vs. Proposed (right)



Figure 6-57 Existing Section D - Hampden Road near McMillan Road



Figure 6-59 Proposed Section D - Hampden Road near McMillan Road

Source: SMM Urban Design Analysis & Concept Design Report (August 2025)

Figure 5.4 Hampden Road near McMillan Road: Existing (left) vs. Proposed (right)



Figure 6-60 Existing Section E - Hampden Road Bridge



Figure 6-62 Proposed Section E - Hampden Road Bridge

Source: SMM Urban Design Analysis & Concept Design Report (August 2025)

Figure 5.5 Hampden Road Bridge: Existing (left) vs. Proposed (right)

5.1.4 Herbert Street between Cleg Street and Ella Street

- New cycleway, typically 3.0 m wide, is installed on the eastern side of the road between Cleg Street and Frederick Street. It transitions to a shared path at Frederick Street, returns to a cycleway south of Frederick Street, then transitions again to a shared path at Ella Street before reverting to a cycleway just south of that intersection
- Left turn ban proposed for vehicles over 8.8 metres in length from Cleg Street east into Herbert Street south and for Frederick Street east into Herbert Street south

- Right turn ban proposed for vehicles from Herbert Street south into Frederick Street east. Northbound vehicles will access the business precinct via an alternative entry point just south of Frederick Street
- Cycleway transition from bidirectional facility to shared path at the entrance to Frederick Street
- Conversion of the Ella Street intersection (currently priority-controlled) into a roundabout
- New wombat crossings proposed on Ella Street and Herbert Street south at their intersection with Ella Street
- Removal of on-street parking spaces to accommodate the proposed design changes.

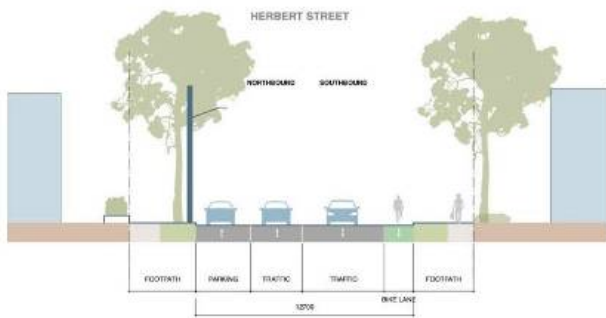


Figure 6-61 Existing Section F - Herbert Street near Cleg Street

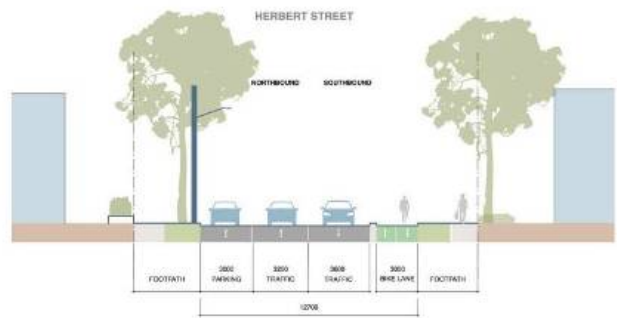


Figure 6-63 Proposed Section F - Herbert Street near Cleg Street

Source: SMM Urban Design Analysis & Concept Design Report (August 2025)

Figure 5.6 Herbert Street near Cleg Street: Existing (left) vs. Proposed (right)

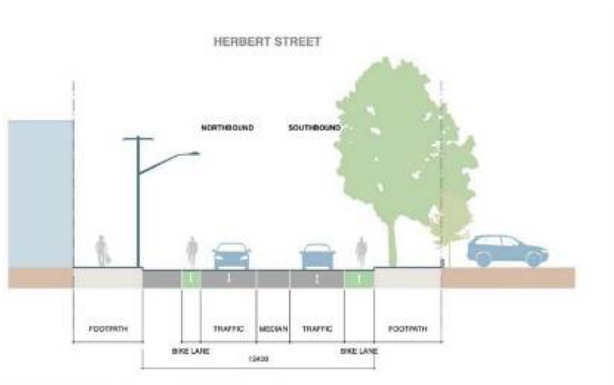


Figure 6-64 Existing Section G - Herbert Street near Ella Street

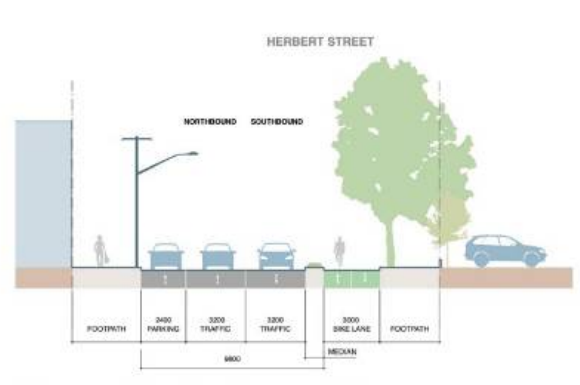


Figure 6-66 Proposed Section G - Herbert Street near Ella Street

Source: SMM Urban Design Analysis & Concept Design Report (August 2025)

Figure 5.7 Herbert Street near Ella Street: Existing (left) vs. Proposed (right)

5.1.5 Herbert Street between Ella Street and the Pacific Highway

- New cycleway installed, typically 3.0 m in width on the eastern side of the road between Ella Street and just north of the Pacific Highway
- New wombat crossings proposed on Herbert Street just north of Westbourne Street, Westbourne Street, Lanceley Avenue, Herbert Street just south of Lanceley Street, Eileen Street and Herbert Street just south of Eileen Street (existing crossing to be removed)
- Removal of on-street parking spaces to accommodate the proposed design changes.

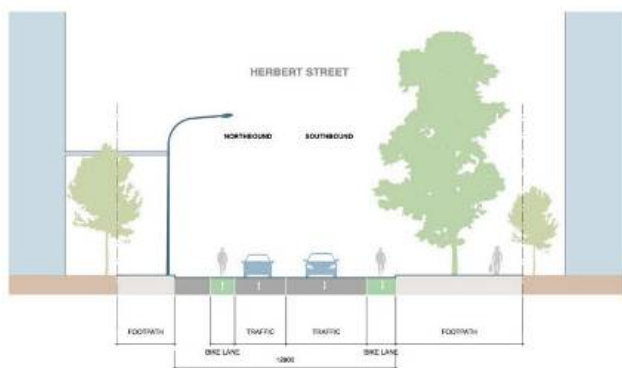


Figure 6-65 Existing Section H - Herbert Street near Lanceley Street

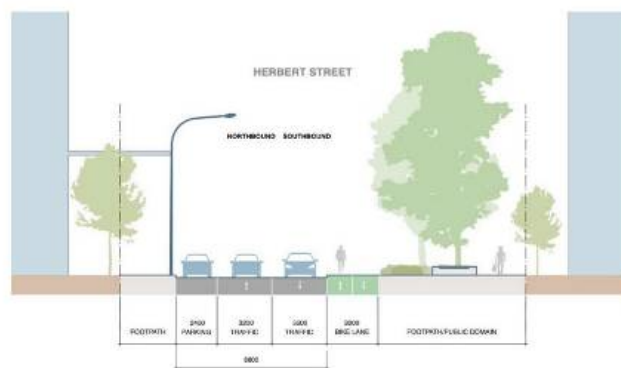


Figure 6-67 Proposed Section H - Herbert Street near Lanceley Street

Source: SMM Urban Design Analysis & Concept Design Report (August 2025)

Figure 5.8 Herbert Street near Lanceley Street: Existing (left) vs. Proposed (right)

6 Operational impact

The impact of the proposal on road network performance, access arrangements, active and public transport, the heavy vehicle network, kerbside uses and loading and servicing arrangements.

6.1 Road network impact

The impact of the proposal on traffic performance has been assessed using SIDRA 9.1 for both the AM and PM peak periods on the day with the highest traffic volumes recorded (Thursday 30th of May 2024). As part of the design process, we undertook SIDRA testing for different design arrangements, which is summarised in Appendix C. The results in this section apply to the final concept design outlined in Section 5.

6.1.1 Intersection performance

The LOS and change in average delay have been summarised for each intersection and scenario. Note that depending on location, some intersections have been modelled individually ('in') and as a network ('net') as indicated in Table 6.1.

Table 6.1 Peak intersection level of service

Intersection	AM Peak		PM Peak	
	Base	With cycleway	Base	With cycleway
Hampden Road / Mowbray Road (in)	B	B (no change)	B	B (+0.1 sec)
Hampden Road / Brand Street (in)	A	A (- 0.7 sec)	A	A (- 0.9 sec)
Herbert Street / Cleg Street (net)	B	C (+ 21.0 sec)	A	C (+ 8.5 sec)
Herbert Street / Frederick Street (net)	B	C (+14.7 sec)	B	C (+15.6 sec)
Herbert Street / Ella Street (net)	A	A (+ 1.1 sec)	A	A (+ 1.4 sec)

The details of the operational and performance changes at each intersection are summarised below.

6.1.1.1 Hampden Road / Mowbray Road

The cycleway has minimal impact on the performance of the Hampden Road / Mowbray Road intersection, as its configuration and signal phasing remain largely unchanged, apart from minor lane narrowing on the southern approach of Hampden Road.

6.1.1.2 Hampden Road / Brand Street

The factors impacting operations at the Hampden Road / Brand Street intersection, are the addition of the wombat crossing on the Hampden Road southern approach and the reduction in the speed limit through Artarmon Town Centre to 30 km/h. The performance of this intersection with the cycleway is anticipated to remain similar to existing conditions, operating at an LOS A in both the AM and PM peak periods, with a minor reduction in average intersection delay of 0.7 seconds and 0.9 seconds respectively.

6.1.1.3 Herbert Street / Cleg Street

The Herbert Street / Cleg Street intersection will experience operational changes with the introduction of the cycleway due to turning restrictions and modified signal phasing to accommodate a protected cycling movement. The northbound

approach on Herbert Street will be reduced from two lanes to a single lane to accommodate the proposed two-way cycle path along the eastern kerbside. With the inclusion of the cycleway, intersection performance would change as follows:

- **AM Peak:** LOS decreases from B to C, with an average delay increase of 21.0 seconds. The critical movement is the left turn from Cleg Street west into Herbert Street, which receives approximately 15 seconds less green time because of the added cycling phase.
- **PM Peak:** LOS decreases from A to C, with an average delay increase of 8.5 seconds. The critical movement is now the left turn from Herbert Street north into Cleg Street, which loses about 26.0 seconds of green time due to the cycling phase.

Additional impacts are expected from the closure of Punch Street, which will redistribute left-turning traffic into Cleg Street east. These effects have been assessed as part of the Punch Street Closure Traffic Management Plan.

6.1.1.4 Herbert Street / Frederick Street

The Herbert Street / Frederick Street intersection will undergo operational changes with the introduction of the cycleway due to:

- Redistribution of right-turning vehicles from Herbert Street north into Cleg Street to this intersection
- A right-turn ban from Herbert Street south into Frederick Street
- Modified signal phasing resulting from intersection reconfiguration

Under existing conditions, vehicles turning right from Herbert Street into Frederick Street west can filter during Phase A, with two additional phases serving opposing movements. The cycleway redesign removes the available storage space for these right-turning vehicles, necessitating a dedicated phase for this movement.

Impact on Intersection Performance:

- **AM Peak:** LOS decreases from B to C, with an average delay increase of 14.7 seconds. The critical movement is the right turn from Herbert Street north into Frederick Street west, operating at LOS E with an average delay of 67.6 seconds due to the removal of the filter and reduced phase time.
- **PM Peak:** LOS decreases from B to C, with an average delay increase of 15.6 seconds. The critical movement remains the right turn from Herbert Street north into Frederick Street west, affected by the same phasing changes.

6.1.1.5 Herbert Street / Ella Street

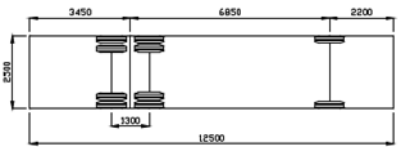
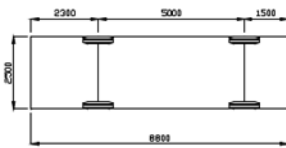
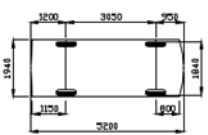
The Herbert Street / Ella Street intersection is proposed to be transformed from a priority-controlled intersection to a roundabout to support the cycleway. As such, intersection performance would change as follows:

- **AM Peak:** LOS remains A, with an average delay increase of 1.1 seconds. All movements would perform well under these proposed conditions.
- **PM Peak:** LOS remains A, with an average delay increase of 1.4 seconds. All movements would perform well under these proposed conditions.

6.1.2 Design review

As part of the Concept Design development, vehicle turn paths (refer to Appendix G) have been conducted along the corridor to ensure access is maintained (with the exception of planned access changes). The design vehicles selected for this assessment include:

Table 6.2 Design vehicles

Vehicle Type	Applicable locations
 12.5 metre heavy rigid truck / bus	Turning movements for a 12.5-metre rigid truck and bus were assessed at key intersections within the Herbert Street and Hampden Road industrial precinct, where these vehicle types regularly operate (e.g., commercial deliveries and bus routes). Intersections tested include Ella Street, Frederick Street, Cleg Street, Palmer Street, McMillan Road, Brand Street, and Mowbray Road. In addition, manoeuvres were evaluated at critical driveways within the precinct to confirm accessibility.
 8.8 metre medium rigid truck	All intersections, side streets and commercial driveways in the study area have been assessed using the 8.8 metre medium rigid truck.
 5.2 metre car	All property access in the study area has been reviewed using the 5.2 metre car.

A number of intersections are unable to facilitate concurrent turn paths with the addition of the cycleway, including:

- Palmer Street: Left in / right out and right in / left out of Palmer Street for 8.8 metre rigid trucks
- Barton Road: Left in / right out and right in / left out of Barton Road for 8.8 metre rigid trucks
- Cleland Road: Left in / right out and right in / left out of Cleland Road for 8.8 metre rigid trucks
- Driveway south of Frederick Street: Left in / right out of Frederick Street driveway for 12.5 metre heavy rigid trucks

Additional design considerations include:

- Roundabout island design: all three roundabouts within the study area (Brand Street, Parkes Road, and Ella Street) require mountable outer aprons to accommodate 12.5-metre heavy rigid buses.
- Stopping Sight Distance (SSD): landscaping design must also maintain the required SSD to the traffic signal lantern on the Herbert Street north approach to the Cleg Street intersection.

The following design updates will be required for the Detailed Design, to ensure access is retained along the corridor (refer to Appendix G for all):

- Updates to the centreline at several locations on the corridor where large design vehicles are required to track over to make their turn
- Kerb separator adjustments at several driveways and intersections to facilitate vehicle turn paths
- Kerb adjustments at several driveways and intersections to facilitate vehicle turn paths
- Minor relocation of the wombat crossing just south of Cleland Road to align with the position of the existing refuge, due to sight impacts from the steep grade
- Coordination with Transport for NSW to gain endorsement of the proposed design at Frederick Street, specifically with respect to the lateral shift across the intersection, which reduces the storage space for right turning vehicles.

- Widen the driveway splay north of the Ella Street intersection (western side) to enable 12.5-metre vehicles to turn left without encroaching over the intersection centreline
- Within the hospital precinct, kerb alignments will need to be modified to accommodate simultaneous movements of 8.8-metre medium rigid service vehicles, particularly at Westbourne Street, Lanceley Street, and Eileen Street

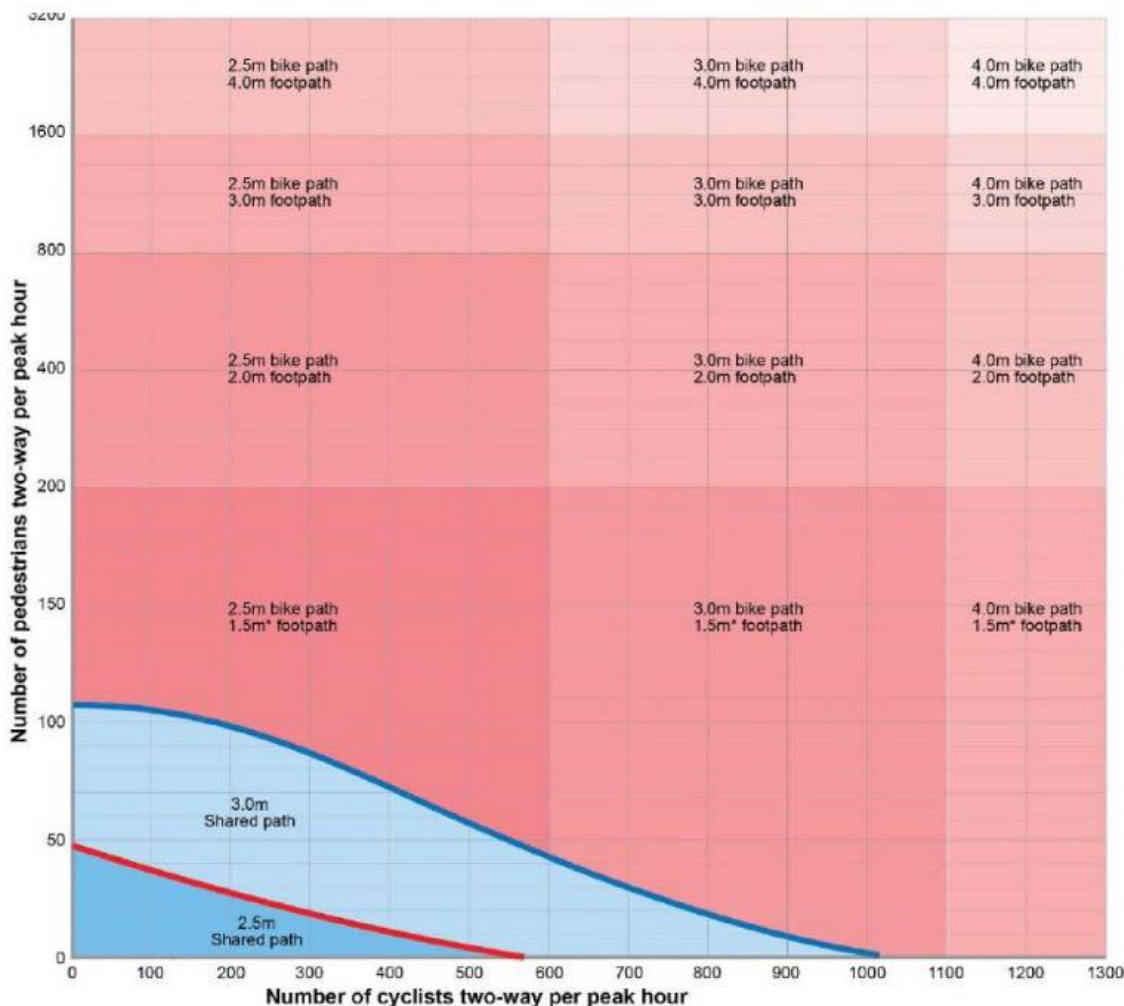
6.2 Active transport

The proposal will improve access and connectivity throughout the study area, for both cyclists and pedestrians.

6.2.1 Cyclists

The proposed Hampden Road and Herbert Street cycleway will provide cyclists with an improved cycling experience. This proposal consists of an approximately 2 km two-way cycleway with median providing a safety barrier from parked vehicles and general traffic. The separated facility offers improved safety compared with existing conditions, which include disjointed on-street bike lanes at some sections of the corridor.

Whilst there is not currently strong demand for cycling given the limited facilities the *Austrroads Guide to Road Design* indicates that for a 3.0 m bicycle path, up to 1,100 cyclists could be accommodated in both directions in the peak hour.



Access to the cycleway is facilitated across the corridor, both at intersection and additional midblock crossings which have been designed with cycle lanes. Key connections to the existing cycling network include:

- Connecting to the Frank Channon Walk rail trail towards Chatswood, where the cycleway meets the intersection at Mowbray Road
- Link at the Brand Street intersection to the existing cycling link on Hampden Lane
- Connecting to the Gore Hill Freeway cycleway, with the closure of Punch Street
- Connecting to the shared path on the Pacific Highway at the southern end of the corridor

Several locations along the corridor have been identified where the cycleway will transition to a shared path to accommodate site constraints and integrate with surrounding infrastructure:

- Artarmon Town Centre – On the eastern side of Hampden Road between Brand Street and Jersey Road, to align with the recent town centre redevelopment.
- Frederick Street Intersection – On the eastern side of Herbert Street, where limited roadway width necessitates a shared path configuration.
- Ella Street Intersection – To integrate with the planned roundabout upgrade and ensure continuity of the active transport network.

To maintain safety during these transitions, updated signage will be implemented in accordance with the approved Wayfinding **Plan**.

The cycleway is primarily located on the eastern side of the corridor, except for a short section between Palmer Street and Brand Street where it shifts to the western side to accommodate the steep grade and unsafe configuration at the Brand Street roundabout. Minimising transitions along the corridor reduces potential cyclist-vehicle conflicts.

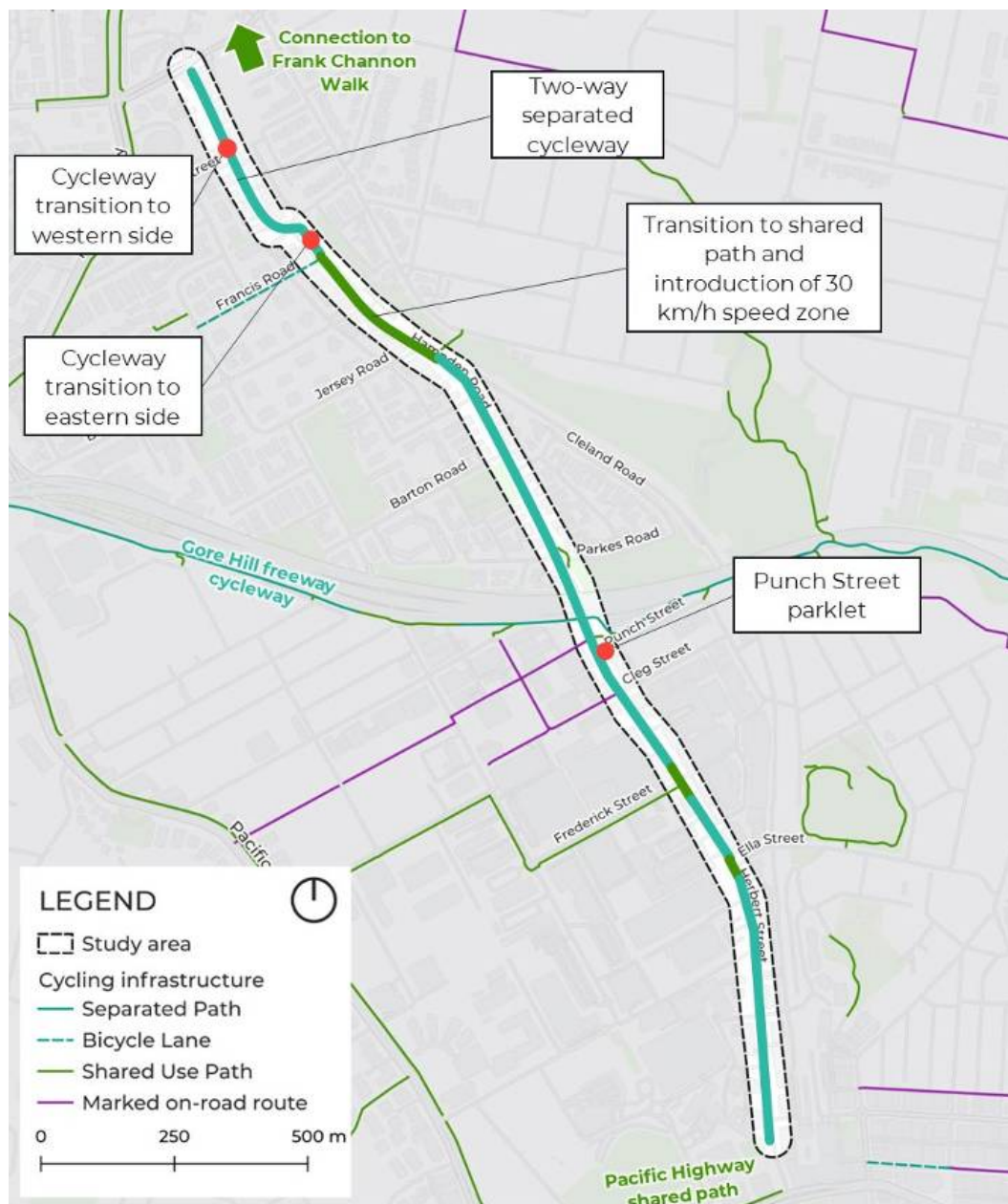


Figure 6.2 Proposal cycling facilities and connectivity to the network

6.2.2 Pedestrians

Amenity for pedestrians will be improved following the construction of this cycleway, including:

- 13 additional wombat crossings both along and across the corridor, at intersections and midblock
- Kerb buildouts and increased footpath widths to increase pedestrian storage at intersections and midblock crossings along the corridor, at the following locations:
 - Mowbray Road / Hampden Road southeast kerb
 - Brand Street / Hampden Road
 - Midblock crossing at McMillan Road
 - Barton Road and Cleland Road approaches
 - Parkes Road / Hampden Road

- Frederick Street (east)
 - Ella Street (east)
 - Westbourne Street / Herbert Street
 - Lanceley Avenue / Herbert Street
 - Eileen Street / Herbert Street
- Continuous footpath treatments proposed at side streets including Palmer Street, Cleland Road (shared zone proposed) and the Lanceley Avenue eastern approach
 - The closure of Punch Street and development of a parklet with seating and facilities
 - Increased tree canopy coverage and planting along the corridor reduces the urban heat effect and provides more separation between pedestrians and other modes

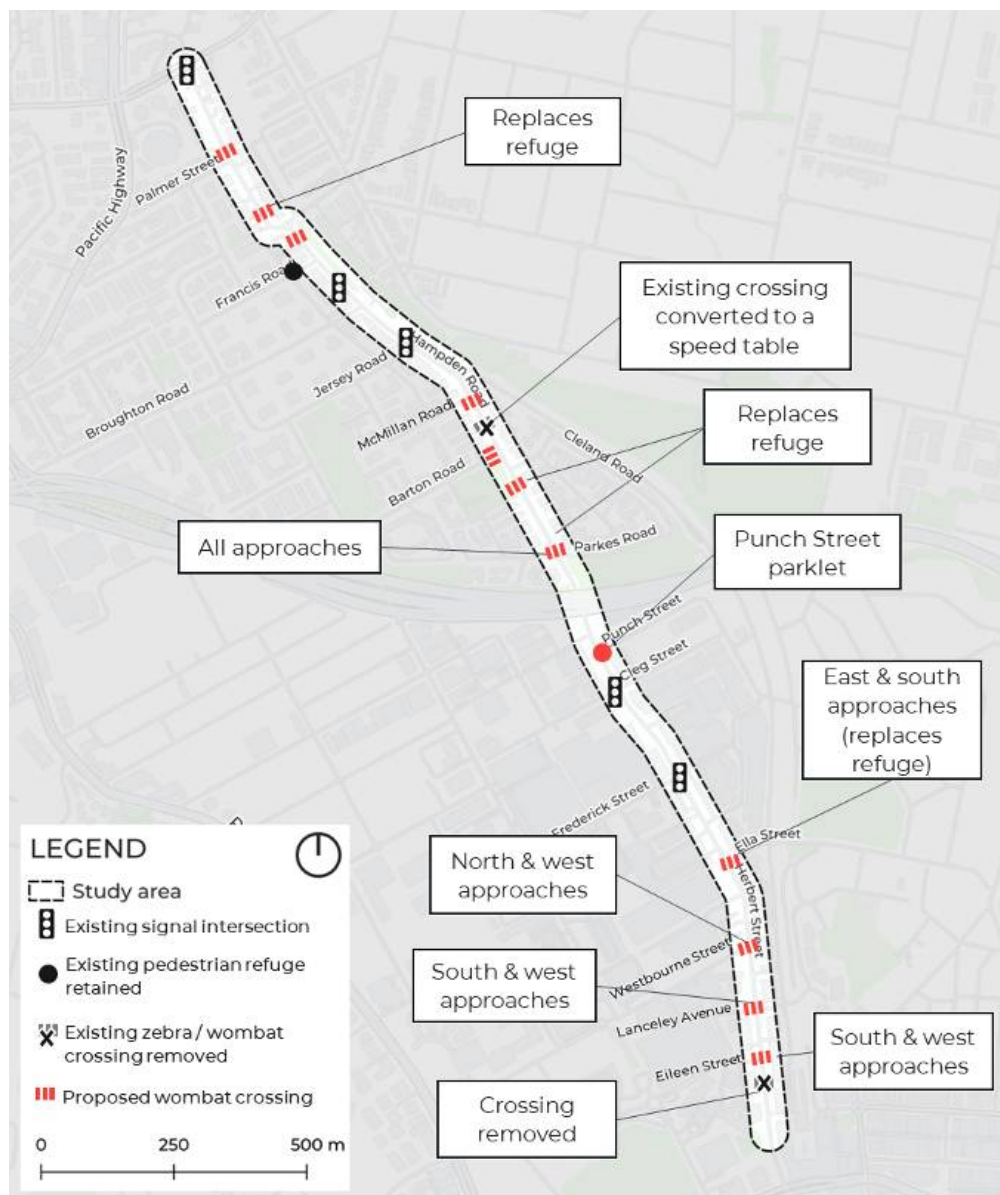


Figure 6.3 Updates to pedestrian facilities along the corridor

6.3 Public transport

As outlined in Section 3.1.5, bus services within the corridor are limited, consisting only of night routes and train replacement services, with three stops in total. Under the proposal, all existing bus stops will be retained. Additionally, travel lanes have been allocated a minimum width of 3.2 m to accommodate bus movements.

6.4 Road and lane access changes

The following changes to access arrangements are proposed to change for specific sections of the corridor to facilitate the inclusion of the cycleway:

- Right turn ban for vehicles over 8.8 m from Hampden Road (northbound and southbound) into Parkes Road, as the intersection angle does not comply with the turn path requirements for these vehicles.
- **Access to Punch Street removed from Hampden Road**, to support the continuation of the cycleway and provide safe access to the Gore Hill cycleway. Alternative access to Punch Street can be supported by Cleg Street.
- Left turn ban for vehicles over 8.8 m from Cleg Street east into Herbert Street, due to the turn path conflict with the cycleway.
- **Right turn ban from Herbert Street south into Frederick Street east**, to support intersection performance. Alternative access to the Frederick Street business site can be supported by the driveway entrance just south of this intersection. Peak-hour demand for this right-hand turn is 1 – 2 vehicles and therefore the impact of this change is deemed minimal.
- Left turn ban for vehicles over 8.8 m from Frederick Street east into Herbert Street, due to the turn path conflict with the cycleway.



Figure 6.4 Alternative access arrangements

Alternative access arrangements are outlined in Table 6.3.

Table 6.3 Alternative route choice

Access change	Origin-destination	Original route	Alternative route	No. vehicles impacted in AM Peak
Right turn ban into Parkes Rd (east) for vehicles over 8.8 m	2 – 3	Hampden Rd – Parkes Rd	Hampden Rd – Cleland Rd – Parkes Rd	Unknown
Right turn ban into Parkes Rd (west) for vehicles over 8.8 m	1 – 4	Hampden Rd – Parkes Rd	Hampden Rd – Cleland Rd – Parkes Rd	Unknown
Punch St closure	5 – 6	Herbert St – Punch St	Herbert St – Cleg St – Punch St	TBC Punch St TMP

Access change	Origin-destination	Original route	Alternative route	No. vehicles impacted in AM Peak
Left turn ban from Cleg St east for vehicles over 8.8 m	7 – 8	Cleg St – Herbert St	Cleg St – Waltham St – Taylor Ln (or Dickson Ave) – Reserve Rd – Frederick St – Herbert St	0 vehicles
Right turn ban into Frederick St east	9 – 10	Herbert St – Frederick St	Herbert St – Driveway entrance – Frederick St	1 vehicle
Left turn ban from Frederick St for vehicles over 8.8 m	10 – 9	Frederick St – Herbert St	Frederick St – Driveway entrance – Herbert St	0 vehicles

6.5 Kerbside uses

Introducing a cycleway within an already constrained corridor, where only a single travel lane operates in each direction, necessitates the removal of on-street parking to accommodate the new facility. A total of 145 parking spaces are proposed for removal, with 53 new spaces to be added, resulting in a net reduction of 92 kerbside parking spaces. A comprehensive **Parking Study** for the corridor is being prepared to assess the implications of this reduction and outline mitigation strategies. This study will also detail changes to parking restrictions within the project area.

Essential kerbside uses for businesses and the hospital – such as loading and unloading zones – will be retained or relocated to ensure these critical functions remain uninterrupted throughout construction and into operation.

6.6 Property accesses/access to loading and servicing

Except for the road access changes outlined in Section 6.4, all property accesses will be retained under the proposal. A minor adjustment to the driveway splay north of the Ella Street roundabout is required to ensure safe manoeuvrability for heavy vehicles entering and exiting the driveway without encroaching over the centreline at the roundabout.

7 Construction Impact

This section discusses the traffic and transport impact generated by the construction of the cycleway. As outlined in Section 5, the project will involve the inclusion of a two-way, two-lane cycleway along the Hampden Road and Herbert Street project corridor. The following construction activities will be undertaken as part of this project:

- Intersection upgrades including new signal infrastructure to include cycling movements
- Reallocation of kerbside uses to bicycle lanes along the corridor
- Kerbside build-outs for pedestrian storage, at intersections along the corridor
- New signs and linemarking to support cycling along the corridor
- New tree planting and landscaping

With the proposal involving modifications to the existing road network, it is envisaged that there will be partial road closure and interruption to traffic operations and footpaths within the corridor.

To minimise these impacts, the project will be constructed in stages, with on-street parking temporarily removed where necessary to accommodate construction activities. Additionally, any work affecting the road network will be scheduled outside peak periods to reduce disruptions. In addition to this, the following traffic delays are anticipated during the construction of the project:

- Temporary increase traffic delays resulting from the additional construction vehicles and hauling of materials
- Temporary partial road closure during the construction of the cycleway
- Closure of sections of footpath throughout the construction process, requiring pedestrians to be diverted around the closures

It is anticipated that the construction and traffic management methods may change subject to the constructability review in the detailed design stage. It is recommended that traffic delays and access arrangements are managed through the implementation of the Construction Traffic Management Plan (CTMP), developed prior to the initiation of construction activities.

7.1 Active transport

Pedestrian access will be temporarily restricted at key locations along the corridor where kerb widening and pavement reconstruction works are undertaken. These works will primarily occur at intersections and proposed wombat crossings, while footpaths between these points are expected to remain largely unaffected (locations identified in Section 6.2.2). Where pedestrian access is impacted, safe and clearly signed local detours will be implemented to maintain connectivity around the construction zone.

Cycling access will be maintained throughout construction via existing traffic lanes and on-road cycle facilities within the study area. Cyclists should be encouraged to use this infrastructure to reduce the likelihood of footpath travel and minimise potential conflicts with pedestrians. To enhance safety for all active transport modes, reduced speed limits (e.g., 40 km/h) and appropriate merging treatments should be applied near work areas.

Comprehensive pedestrian and traffic management measures, including advance notifications, will be deployed prior to commencement of works to ensure a safe environment for all road users. Variable message signage should be installed to alert cyclists and motorists to changed traffic conditions.

7.2 Impact on public transport

Construction impacts on public transport are expected to be minimal due to the limited number of bus routes and stops within the study area. Services operating through the corridor primarily consist of night routes (1:00 AM–5:00 AM) and train replacement buses. These services can generally be maintained during construction, given the available roadway widths that allow flexibility in traffic management. However, temporary disruptions may occur at intersections and mid-block locations where traffic control measures are implemented. As these routes operate overnight, any night-time construction activities will need to be carefully coordinated to avoid service interruptions.

School bus routes 761 and 762, which provide access to Artarmon Public School via Jersey Road and McMillan Road, require special consideration. McMillan Road is proposed for redesign to incorporate a cycleway, kerb buildouts, and centreline adjustments. Construction staging or temporary rerouting may be necessary to accommodate these services. Where possible, works should be scheduled during school holidays or weekends to minimise impacts.

No bus stop relocations are proposed under the current design. The main impact will be pedestrian access during pavement reconstruction near the stop adjacent to the Pacific Highway, while stops within Artarmon town centre will remain unaffected. Pavement works at this location should be programmed and managed to maintain safe pedestrian connectivity and minimise disruption.

The project will not affect the operation of the rail network or access to nearby stations (Artarmon and St Leonards), as construction activities do not interface with these facilities.

7.3 Road network impact

7.3.1 *Vehicle Movements*

Construction-related traffic will primarily consist of light vehicles used by workers and heavy vehicles for the delivery and removal of materials, as well as construction plant and equipment. The number of additional trips generated by these activities is expected to be low; therefore, a quantitative assessment of network performance through traffic modelling has not been undertaken.

To minimise potential impacts, construction will be staged across the study area, with work zones shifting progressively as works advance. Temporary lane closures will be assessed on a case-by-case basis, considering surrounding land uses and traffic conditions. As a result, impacts on the road network will be localised and are considered manageable through appropriate traffic management measures.

7.3.2 *Construction traffic (haulage) routes*

Heavy vehicle access to the construction site will prioritise the most direct routes to the arterial road network. It is anticipated that construction traffic will primarily utilise the Gore Hill Freeway and Pacific Highway to access the study area.

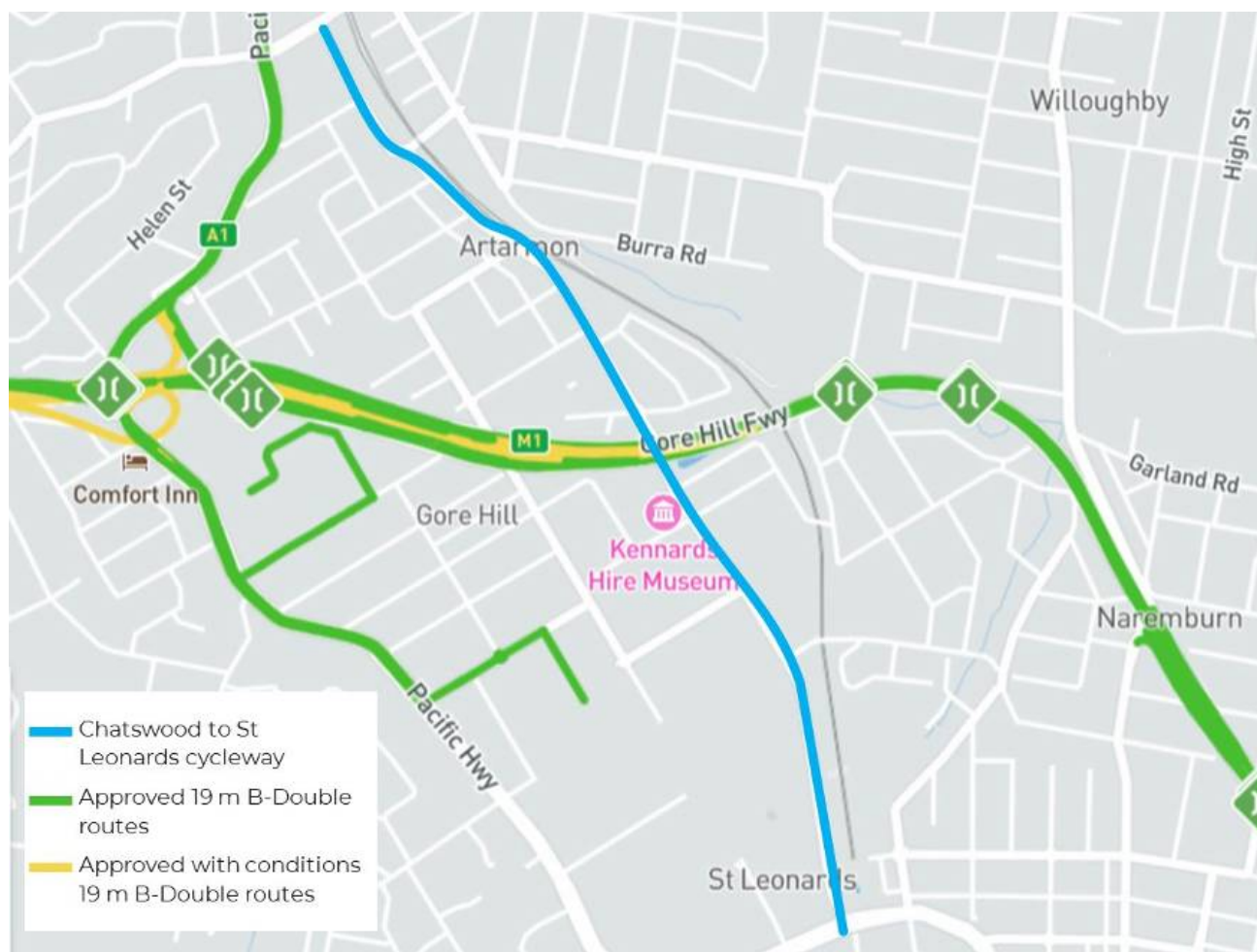
Southern Access

At the southern end, construction vehicles can enter the corridor via the Artarmon industrial precinct, specifically using Campbell Street for 19 m B-Doubles (refer to Figure 7.1). Approval will be required for these larger vehicles to travel on additional roads closer to the work zone, including Reserve Road, Frederick Street, and Herbert Street/Hampden Road.

Northern Access

At the northern end, vehicles over 3 tonnes are prohibited from crossing the Gore Hill Freeway overpass. Consequently, these vehicles must access Hampden Road via Mowbray Road. Furthermore, Hampden Road imposes a height restriction of 4.6 m, meaning over-height vehicles can only access the southern section of the corridor from Cleg Street south.

Haulage routes will avoid local streets wherever possible and will be planned to minimise impacts on sensitive receivers, such as residential areas and schools.



Source: National Heavy Vehicle Regulator

Figure 7.1 19 m B-Double approved routes

7.3.3 Road and lane closures

Temporary partial road closure would be required during construction to provide workers with safe working area and ensure adequate space for the works to be undertaken. Scenarios where this is likely to be needed include:

- where works are required adjacent to live traffic which may be safer to be completed at night when the traffic activities are low. This may include adjustments to some services, installation of kerb, median islands and bus infrastructure
- pavement milling and resurfacing
- installation of line marking and some sign posts

Figure 7.2 illustrates an example of traffic management for a partial road closure, showing the configuration of the work zone and the use of the adjacent lane for construction activities. One-lane traffic in both eastbound and westbound directions is maintained on Herbert Street to minimise disruption during works. Due to the constrained corridor width, parking lanes will generally need to be removed where required to accommodate construction activities safely.

7.3.4 Traffic management, control and signage

Where practicable, construction activities will be scheduled outside peak traffic periods to minimise impacts on both local and regional road networks.

Standard traffic management measures will be implemented to reduce disruption during works. These measures will be detailed in the Traffic Management Plan (TMP) and developed in accordance with Transport for NSW's Traffic Control at Work Sites Manual (2022). All temporary changes to traffic, cyclist, and pedestrian conditions will be supported by clear signage to inform road users of the arrangements.

Additional management documents, including detailed construction methodologies, Traffic Guidance Schemes (TGS), and a Construction Environmental Management Plan (CEMP), will be prepared to address potential traffic and access impacts.

As shown in Figure 7.2, work vehicles will be positioned at the start of the work zone and between the active work area and traffic lanes to provide worker protection. This arrangement will maintain two-way traffic flow and minimise network disruption. Temporary removal of on-street parking will be required during certain stages and will be managed through a staged construction approach.

Adjacent footpaths are expected to remain accessible during works; however, appropriate detours will be implemented where upgrades to existing paths are necessary.

Speed limits will be reduced to 40 km/h where workers on foot or operating plant are within 1.5 metres of live traffic without a physical barrier in place.

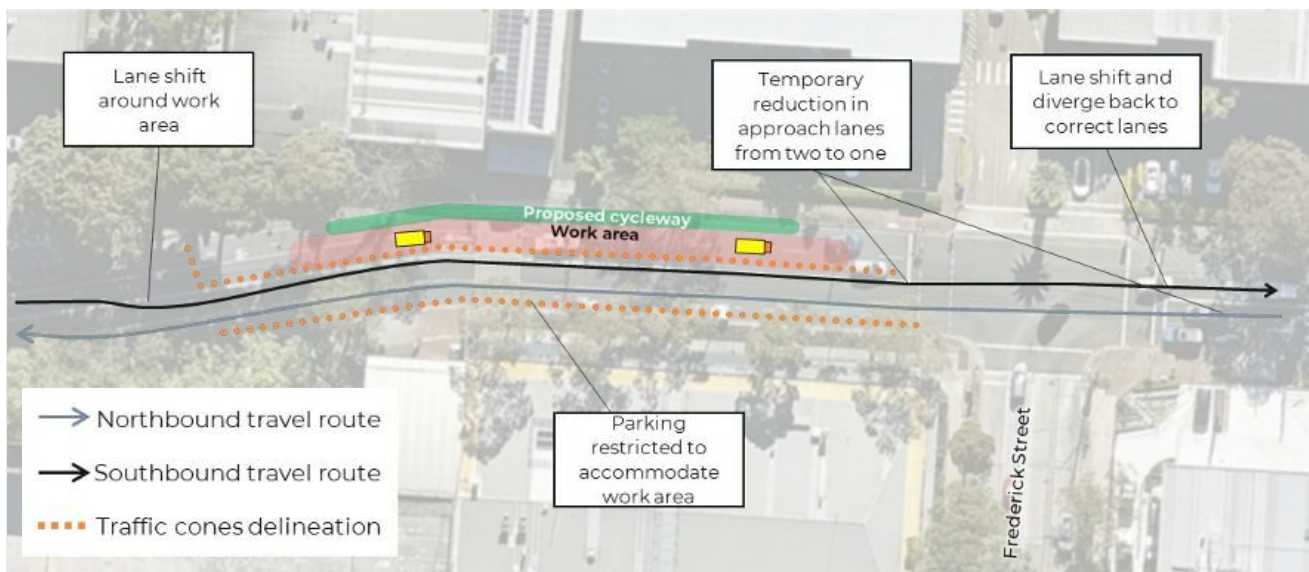


Figure 7.2 Example of traffic management during construction of the cycleway

7.4 Property access / access to loading and servicing

Access to loading and servicing for businesses and residents (including for emergency vehicle access and egress) would be maintained throughout the construction, unless permanently removed by the project (discussed in Section 6.6).

Intersections providing direct access to the Royal North Shore Hospital (Lanceley Street / Herbert Street and Eileen Street / Herbert Street), would be redeveloped as part of this proposal. Emergency vehicle access must be maintained during construction activities and therefore it is important that Willoughby City Council coordinates with the Royal North Shore Hospital to plan construction activities and identify alternative access routes where needed.

In limited cases, short-term restrictions on specific loading zones may be required. These will be managed through prior consultation with affected parties and supported by a clear communication process to keep property owners informed of construction staging and scheduling.

7.5 Kerbside uses

Changes and impact to kerbside uses would depend on the staging of works and will be considered in more detail in the development of the CTMP. It is likely that during construction that availability of on-street parking restrictions would be temporarily affected, however essential kerbside uses are to be maintained or relocated as appropriate in the order of priority with the following objectives:

- consider the safety and convenience of all road users
- encourage the use of alternative transport modes such as bus, train and walking
- promote equitable allocation of parking spaces across user groups
- facilitate consistent decision-making regarding parking infrastructure

Permanent changes to kerbside uses are proposed as part of the cycleway design, as outlined in Section 6.5.

Consequently, some adjustments introduced during construction may remain in place once the project is operational. It is essential that these changes are communicated clearly to stakeholders through advance notifications and signage to ensure awareness and minimise disruption.

In line with the Road User Space Allocation Procedure (TfNSW, 2021), essential kerbside uses on Hampden Road and Herbert Street ranked from essential to least important include on-street public transport (bus zone, taxi zone), freight and services (loading zone) and private vehicles (timed on-street parking).

8 Mitigation Measures

8.1 Operations

The potential operational impacts and mitigation measures are summarised in Table 8.1 below.

Table 8.1 Operational impact mitigation measures

Impact type	Measures	Applicable locations
Access changes due to proposed turn bans and associated notification	Several access changes are proposed as part of the cycleway and are detailed in Section 6.4 Road and lane access changes. These have been considered with available detour options on the road network as depicted in Figure 6.4. The impacts are considered minor to moderate, given that the majority of the turn bans would mainly impact local access and not a network-wide detour. The proposed turn bans are to be implemented during construction as the cycleway would include construction of traffic facilities required to physically restrict the proposed turn bans. To manage the impact, affected residents and businesses would be notified of the access changes prior to construction.	Impacted locations detailed in Section 6.4
Impacts to the heavy vehicle network	Several turn restrictions for heavy vehicles are proposed as part of the design. These vehicles will be required to follow the alternative access routes shown in Figure 6.4. Survey data indicates that only a small number of vehicles will be affected during peak periods; however, it is essential to consult with local businesses and ensure they are informed of these changes to reduce the potential for conflicts between drivers and cyclists.	Impacted locations detailed in Section 6.4
Loss of on-street parking	As identified in Section 6.5, a net reduction in 92 kerbside parking spaces is anticipated for the proposal. To address the impact of this reduction and prepare mitigation measures, a detailed Parking Study is being undertaken. This study includes: — Comprehensive parking utilisation surveys across weekdays and weekends for the corridor, surrounding street network, and off-street parking areas. — Mitigation measures developed from reviewing existing parking availability and adjusting parking restrictions to support higher turnover where required. — Redesign of on-street parking on adjacent local streets to improve space efficiency and offset some of the parking loss by creating additional parking opportunities. Loading zones and loading/unloading areas will be maintained throughout the corridor to ensure that existing freight tasks can continue. The pick-up and drop-off zone at the Royal North Shore Hospital will also be retained to ensure access to the hospital is maintained.	On-street parking on the Hampden Road / Herbert Street corridor

Impact type	Measures	Applicable locations
Traffic network capacity	The proposal's impact on the local road network has been assessed, with results indicating only minor reductions in intersection performance. The greatest increase in average delay occurs at the Herbert Street / Cleg Street intersection, primarily due to traffic volume redistribution from turning bans and signal phasing adjustments required to accommodate the proposal. Overall, intersection performance is expected to remain at satisfactory levels. However, ongoing monitoring and review of network operations by Willoughby City Council will be essential to ensure continued efficiency.	Cycleway corridor
External projects	At the time of writing, changes to the land uses within the vicinity of the area were being proposed in parallel. This includes: — The Landcom redevelopment of the Chatswood Metro Dive Site to a neighbourhood with up to 1,500 new homes (180 build-to-rent) and 1,300 additional apartments), as well as shops and services and walking and cycling connections. This redevelopment would impact the local traffic environment, particularly at the intersection of Mowbray Road / Hampden Road. It would also likely increase the walking and cycling demand locally. Assessments of the impact of this development are needed to inform the implications for the local transport network.	Mowbray Road / Hampden Road intersection
Detailed design	Several additional design refinements identified in Section 6.1.2 will need to be incorporated during the detailed design stage to ensure compliance with relevant standards and maintain safety and accessibility throughout the study area.	Design updates at key locations specified in Section 6.1.2

8.2 Construction

The potential construction impacts and mitigation measures are summarised in Table 8.2.

Table 8.2 Construction impact mitigation measures

Impact type	Measures	Applicable locations
Traffic management during construction	A Construction Traffic Management Plan (CTMP) is to be prepared by the appointed Construction Contractor in accordance to Transport for NSW <i>Traffic Control at Worksites</i> and relevant Austroads guidelines and in consultation with the road authority to identify the potential transport-related delays and disruptions that may arise during the works and plan for a suitable mitigation accordingly. The plan is to include (as a minimum): — Appropriate traffic management and signposting of access/egress points to minimise conflicts with vehicle movements on the road network. — Measures to minimise disruption to pedestrians, cyclists and motorists. — Development of Traffic Guidance Scheme (TGS) to manage traffic around, past or through the construction sites as appropriate. — Inclusion of a Vehicle Movement Plan (VMP) to manage safe vehicle access/egress from construction compounds and other construction work areas. — Measures to maintain and ensure safe access for emergency vehicles and to existing properties during construction, or provision of suitable alternatives. — Active liaison with relevant road authority and stakeholders and informs road users of the proposed works on the road network.	All construction sites

Impact type	Measures	Applicable locations
Access changes due to proposed turn bans and associated notification	Several access changes are proposed as part of the cycleway and are detailed in Section 6.4. These have been considered with available detour options on the road network as depicted in Figure 6.4, applicable during construction and operations. The proposed turn bans are to be implemented during construction as the cycleway would include construction of traffic facilities required to physically restrict the proposed turn bans. Affected residents and businesses would be notified of the access changes prior to construction.	Impacted locations as detailed in Section 6.4
Temporary lane closures or temporary road closures	Temporary lane closures to accommodate proposed construction works on Hampden Road / Herbert Street are to be undertaken at night time to minimise impact to the road network capacity during the peak operating hours. Road Occupancy Licences (ROL) are to be sought from the relevant road authority for all temporary partial or full closures and its conditions complied with, including the hours of operations.	All construction works interacting with road network
Property access during construction	Accesses to properties are proposed to be maintained during construction, however where short-term interruption is required, the Construction Contractor is to liaise with the relevant property owners and business owners as appropriate.	Access to properties affected by the construction
Public transport services	Although bus stops are not expected to be directly affected by the proposal, any construction activities that may disrupt local bus operations will require coordination with service providers and advance notification at affected stops before and during works. In particular, construction impacting access to McMillan Road should be scheduled during school holidays or weekends to minimise disruption to bus services supporting Artarmon Public School.	Bus routes along the study area corridor and specifically the intersection of McMillan Road / Hampden Road

Impact type	Measures	Applicable locations
Emergency access	Access for emergency vehicles must be maintained at all times, particularly within the hospital precinct where several intersections commonly used by emergency services will be redeveloped as part of the proposal. Close coordination between Willoughby City Council and the Royal North Shore Hospital is essential to identify and implement alternative access routes where required to support construction activities without compromising emergency response times.	All construction sites

9 Conclusion

WSP was engaged to undertake a Traffic Impact Assessment (TIA) for the proposed bidirectional cycleway, which will run primarily along the eastern kerbside of Hampden Road and Herbert Street, extending between Mowbray Road and the Pacific Highway.

This report outlines existing conditions on the local road network, assesses potential impacts during both construction and operations and identifies mitigation measures for consideration by Willoughby City Council.

The proposal includes a physically separated cycleway, achieved through medians and landscaped buffers, providing safe connectivity to the broader cycling network. It will link to the existing cycling network, providing continuous connections north to Chatswood CBD and east-west to Lane Cove and Artarmon. Pedestrian facilities will also be enhanced through footpath widening at key intersections, additional mid-block wombat crossings, increased tree canopy coverage and vehicle turn bans improving intersection safety.

Impacts on public transport are expected to be minimal due to the limited number of bus services and stops within the study area. Construction activities will require coordination with bus operators and careful scheduling to minimise disruption.

Freight impacts will primarily occur within the Herbert Street industrial precinct, where turn bans for vehicles over 8.8 m are proposed at specific approaches on Cleg Street and Frederick Street. Loading and servicing activities will be maintained where possible and Willoughby City Council should engage with local businesses to manage any short-term restrictions.

The proposal will result in a net reduction of 92 on-street parking spaces, resulting in relatively large changes to kerbside use in the study area. A comprehensive **Parking Study** is being prepared to identify mitigation measures and support equitable outcomes for residents, businesses and workers.

Traffic operations will largely remain consistent with existing conditions, retaining a single travel lane in each direction along most of the corridor. Modelling results indicate minor impacts to intersection performance, primarily due to signal phasing changes and turn bans. Ongoing monitoring of network operations by Willoughby City Council is recommended to manage potential changes in travel behaviour and route choice that may occur over time as a result of the proposal.

Works will occupy parking lanes or travel lanes as required, with centreline shifts implemented to maintain traffic flow. A detailed Construction Traffic Management Plan (CTMP) will be developed to guide staging and management strategies throughout the construction periods.

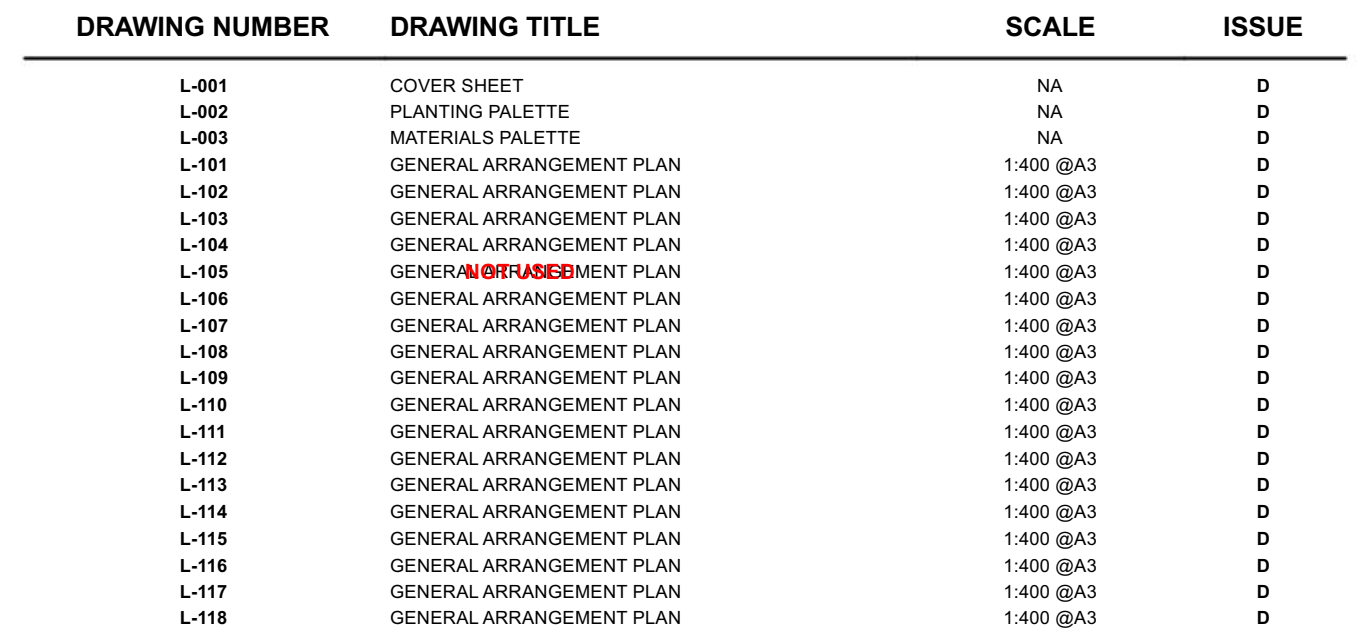
There are several design changes required to be implemented in the detailed design stage as outlined in Section 6.1.2 Design Review. It is important that these issues are addressed to ensure safe and equitable access along the corridor, in alignment with the Australian design standards.

Appendix A

Concept design



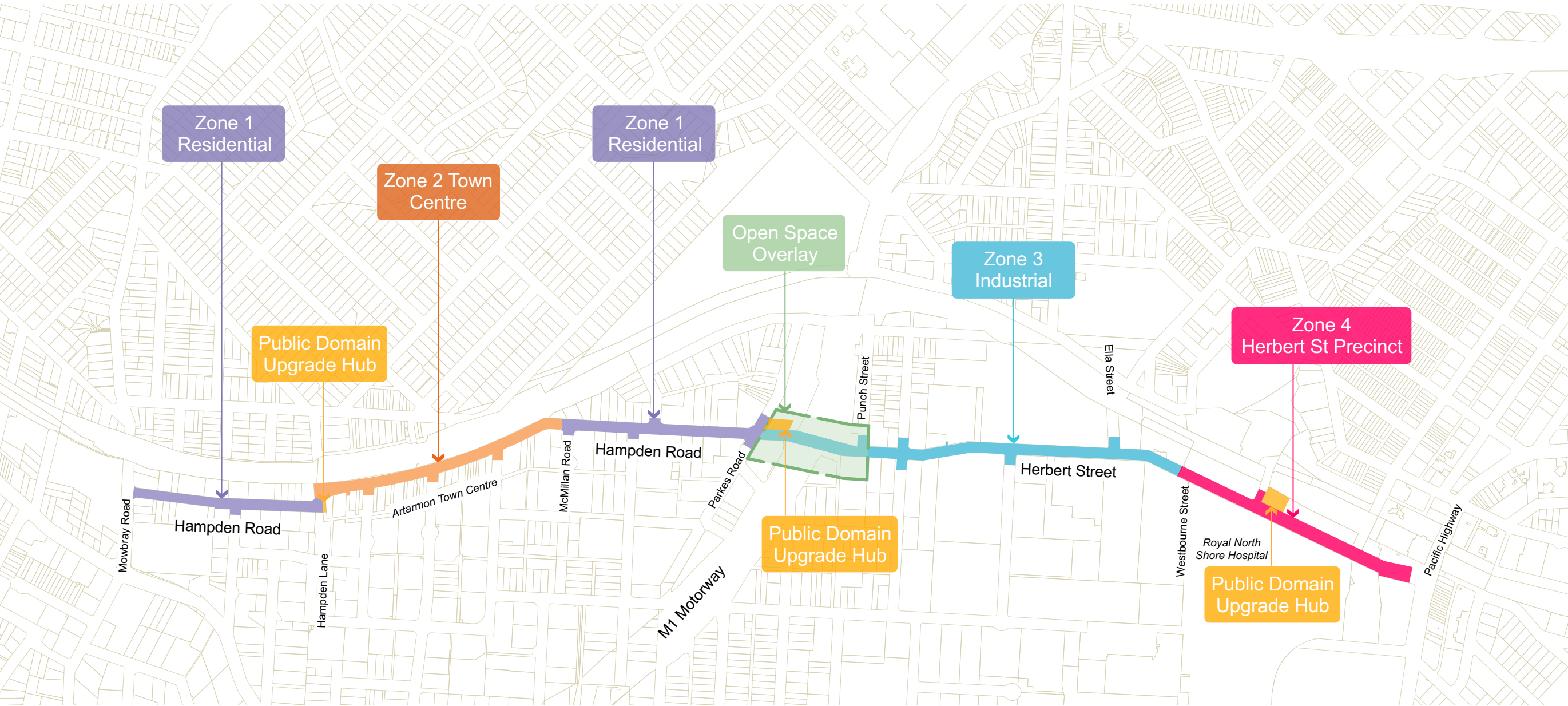
MOWBRAY ROAD, CHATSWOOD TO PACIFIC HWY, ST LEONARDS



V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:	PREPARED FOR	 LANDSCAPE ARCHITECTS P.O. Box 880 Darlinghurst NSW 1300  Woolacotts CONSULTING ENGINEERS  LAS Lighting, Art + Science			PROJECT	SHEET	
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A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25									

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C	FINAL CONCEPT DESIGN ISSUE 3	AC	HM	MD	22.08.25								
B	REVISED CONCEPT DESIGN ISSUE 2	AC	HM	MD	08.04.25								
A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25								

PRECINCT PLAN



Zone 1 - Residential: Hampden Road - Mowbray Road to Hampden Lane, Hampden Road - McMillan Road to Parkes Road

Zone 2 - Town Centre: Hampden Road - Hampden Lane to McMillan Road

Zone 3 - Industrial: Parkes Road to Westbourne Street

Zone 4 - Herbert Street Precinct: Westbourne Street to Pacific Highway

Special Open Space Precinct Overlay: Parkes Road to Punch Street

V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:	PREPARED FOR		LANDSCAPE ARCHITECTS				PROJECT	SHEET
E	FINAL CONCEPT DESIGN ISSUE 5	AC	HM	MD	23.04.26		1: 8000 @ A3		https://smm.studio/ PTY LTD ABN 65 065 578 985	P.O. Box 880 Darlinghurst NSW 1300 T: 02 9361 4549 F: 02 9361 4569 info@sm2group.com.au	WSP Level 27/680 George Street, Sydney NSW 2000	Woolacotts Suite 6.02, Level 6/67 Albert Avenue, Chatswood, Sydney NSW 2067	LAS Lighting, Art + Science Level 1/41 Hume Street, Crows Nest, Sydney NSW 2065	HAMPDEN ROAD & HERBERT STREET CYCLEWAY (CHATSWOOD TO ST LEONARDS)	L.003
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A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25										
DRAWING															REVISION
MATERIALS PALETTE															E

PROPOSED MATERIALS PALETTE

ZONE 1 - RESIDENTIAL: MOWBRAY ROAD TO BRAND STREET & MCMILLAN ROAD TO PARKES ROAD

CODE	LOCATION	DESCRIPTION	MATERIAL/FINISH	COLOUR
Pavement & Surfaces				
PV1	Road Vehicles Thresholds / Intersection Treatments	Granite Cobbles	Natural Split	Noosah
PC1	Footpaths	Standard Concrete Path	Broom Finish	Grey
PC2	Shared Zones / Footpath Continuations / Raised Pedestrian Crossings	Concrete Bi Pavers	Honed	Oatmeal

ZONE 2 - ARTARMON TOWN CENTRE: BRAND STREET TO MCMILLAN ROAD

CODE	LOCATION	DESCRIPTION	MATERIAL/FINISH	COLOUR
Pavement & Surfaces				
PC2	Shared Zones / Footpath Continuations / Raised Pedestrian Crossings	Concrete Bi Pavers	Honed	Oatmeal
PC3	Footpaths within the Artarmon Town Centre	Paving to Match Existing. Pebblecrete Pavers	Mix: 50% PPX 1836 & PPX 1793. Shotblast Finish	PPX1836 & PPX1793

Furniture

S1	Public Gathering Spaces	Seating Type 1. Seating to Match Existing.	Murray Grey Brick Wall Plinth with Spotted Gum Battens	Spotted Gum Battens
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ZONE 3 - INDUSTRIAL: WESTBOURNE STREET TO PUNCH STREET

CODE	LOCATION	DESCRIPTION	MATERIAL/FINISH	COLOUR
Pavement & Surfaces				
BR1	Pedestrian Key Nodes	Brick Paving Type 1 - Paving to Match Existing	Brick	Orange/Red
PC2	Shared Zones / Footpath Continuations / Raised Pedestrian Crossings	Concrete Bi Pavers	Honed	Oatmeal
RB	Tree Pits	Resin Bonded Aggregate	Porous Pavements or Approved equivalent	Cinnamon Colour

OPEN SPACE OVERLAY

CODE	LOCATION	DESCRIPTION	MATERIAL/FINISH	COLOUR
Pavement & Surfaces				
BR2	Pedestrian Key Nodes / Seating Areas	Brick Paving Type 2	Recycled Sandstock Brick Paving or Boral Pavers	Earthy Tones Recycled Bricks or Murray Grey
PC4	Footpaths	Concrete Pavers	URBANSTONE. Mix: 50% Honed, 50% Milled	River Topaz
PC5	Shared Path	Integral Oxide Exposed Aggregate Concrete Paving	Sandbalsted Pattern or Heavy Exposure	CCS Oxide 3% Drovers Dust TBC

Furniture

BP1	Public Gathering Spaces	Bicycle Parking Standard	Cyla Hoop Compact Bicycle Rack. Civiq Public Use Products. Code CY - HOCO. Dimensions: 800mm high x 550mm wide	Silver
S2	Public Gathering Spaces	Seating Type 2	Concrete Wall plinth with heritage text etching and SFA - Aria seating fixed to top	Charcoal Frame with Spotted Gum Battens
TA1	Public Gathering Spaces	Table Setting	RNR Timber Outdoor Picnic Table 1.8	Treated Pine
B1	Public Gathering Spaces	Bins	StraBe Wharf Bin surround	Mild Steel construction with powdercoated finish in Charcoal and Spotted Gum Battens
DF	Public Gathering Spaces	Drinking Fountain	Drinking Fountain Aquafil - Civiq Public Use Products Aquafil Bild 850BF with swinging dog drinking Bowl.	Material: Housing Frame: Stainless Steel, Housing Unit: Anodised Aluminium, Graphic Panels: Stainless Steel
BS	Public Gathering Spaces	Bicycle Fix Station	Deluxe Public Work Stand and Bicycle Pump with wheel chock. Bike Fixtation or Approved Equivalent.	Material: Housing Frame: Stainless Steel, Housing Unit: Anodised Aluminium, Graphic Panels: Stainless Steel

ZONE 4 - HERBERT STREET PRECINCT: PACIFIC HIGHWAY TO WESTBOURNE STREET

CODE	LOCATION	DESCRIPTION	MATERIAL/FINISH	COLOUR
Pavement & Surfaces				
PV1	Road Vehicles Thresholds / Intersection Treatments	Granite Cobbles	Natural Split	Noosah
PV2	Pedestrian Areas	Granite Paving	Mix: 60% Sandblasted, 40% Bush Hammered Finish	Honey Jasper
PC2	Shared Zones / Footpath Continuations / Raised Pedestrian Crossings	Concrete Bi Pavers	Honed	Oatmeal
RB	Tree Pits	Resin Bonded Aggregate	Porous Pavements or Approved equivalent	Cinnamon Colour

Furniture

BP2	Public Gathering Spaces	Bicycle Parking Precinct	SFA - Linea Bicycle Stand	Frame and Inserts in Monument
S3	Public Gathering Spaces	Seating Type 3	SFA - Linea Curved Bench (LIB6-C)	Monument Frame with Spotted Gum Battens

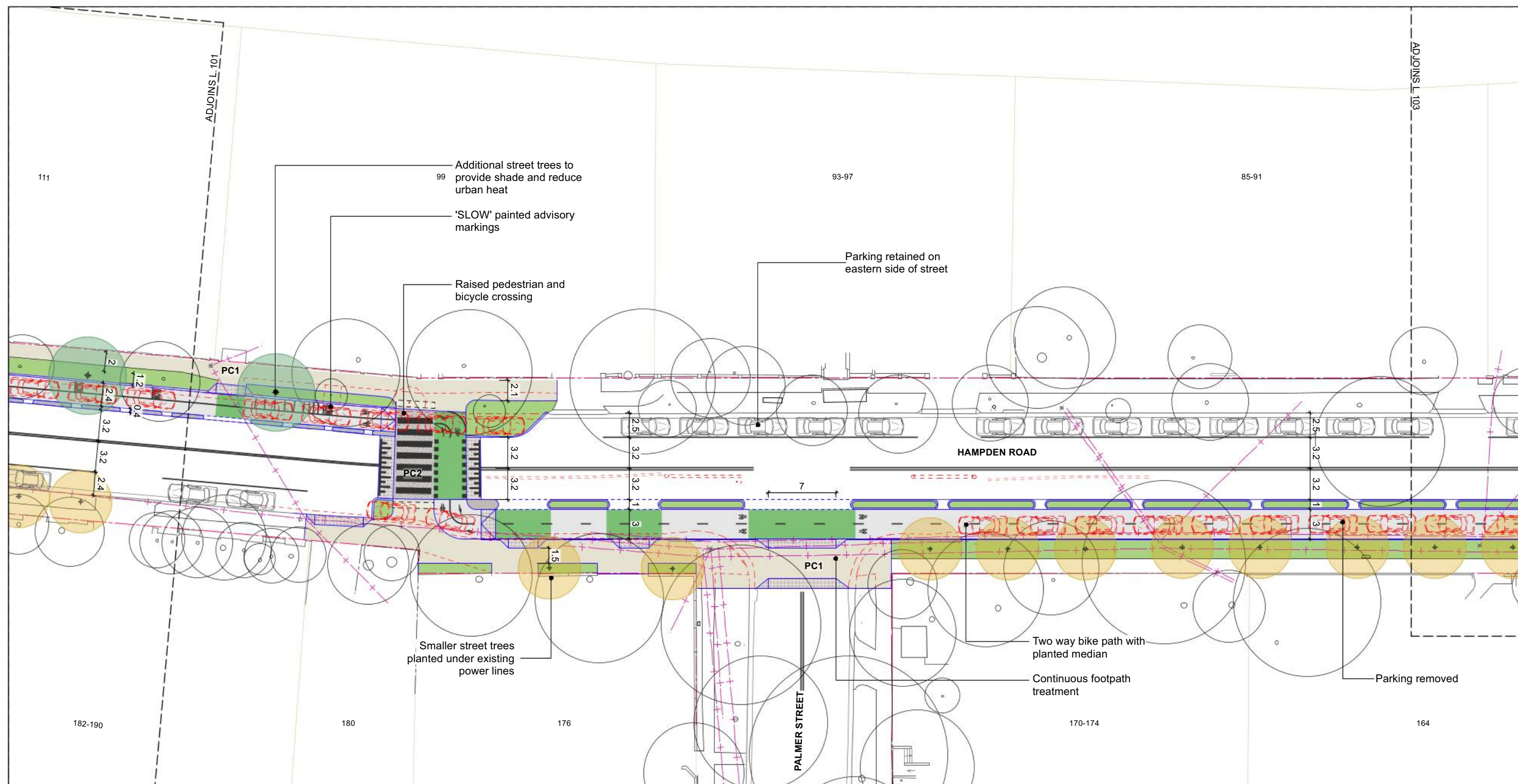
PAVEMENT & SURFACES



FURNITURE



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A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25								MATERIALS PALETTE	REVISION E



KEY

GENERAL

-  New Item
-  New Linemarking
-  Items Removed
-  Existing Light/Power Posts
-  Existing Overhead Lines
-  New Tactile Indicators
-  New Retaining Wall
-  Light Pole Removed

HARDSCAPE

- | | |
|------------|--|
| PC1 | New Standard Path Pavement |
| PC2 | New Feature Bi-Pave Concrete Pavers |
| PC3 | New Feature Concrete Pavement within Artarmon Precinct |
| PC4 | New Feature Concrete Pavement within Punch St Park |
| PC5 | New Shared Path Concrete Pavement within Punch St Park |
| PV1 | New Road Threshold Pavement |
| PV2 | New Granite Pavement St Leonards Precinct |

- | | |
|-----|------------------------------------|
| BR1 | New Brick Paving to match existing |
| BR2 | New Recycled Brick Paving |

SOFTSCAPE

-  New Turf
-  New Garden Bed - Shrubs, Grasses & Groundcover Species
-  New Rain Garden - Grass Species
-  New Green Surface Cycleway Paint
-  New Porous Pavement Pavement

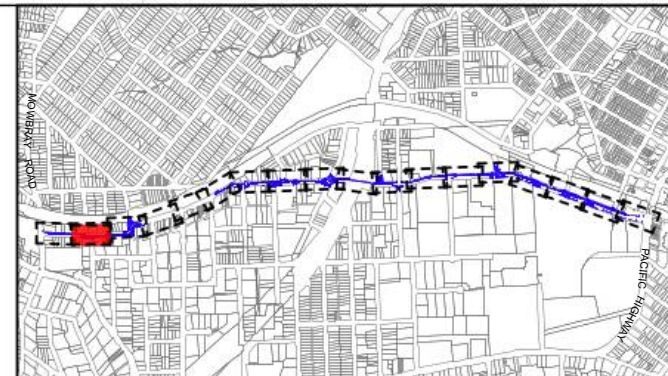
TREES

-
- The diagram illustrates a tree cross-section with various layers and components. The top layer is labeled 'Existing Trees - Retained' and shows a small white circle with a black outline. Below this is a layer labeled 'Existing Trees - Removed' showing a pink circle with a black outline. The next layer is labeled 'Fraxinus raywoodii' and shows a green circle with a black outline. Below that is a layer labeled 'Flindersia australis' showing a yellow circle with a black outline. The bottom layer is labeled 'Tristanopsis laurina' and shows a small black dot. The diagram also includes a central vertical axis with arrows pointing up and down, and a horizontal axis with arrows pointing left and right.

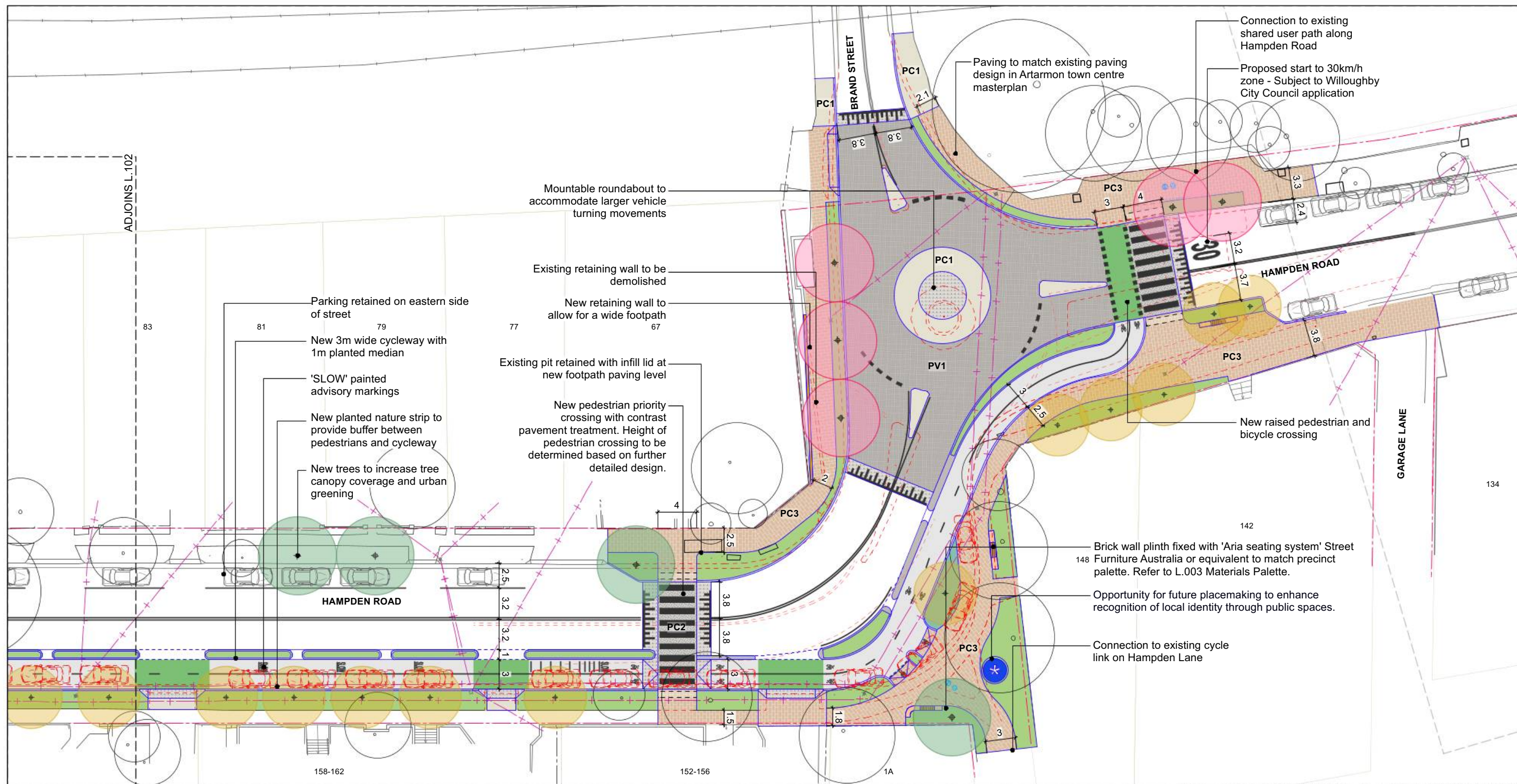
Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

-  Existing Parking
-  New/Relocated Parking
-  Removed Parking
-  Existing Parking Meter Retained
-  Existing Parking Meter to be relocated
-  Existing Parking Meter Relocated
-  Traffic Signal Removed
-  New Traffic Signal



V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:	PREPARED FOR	 LANDSCAPE ARCHITECTS P.O. Box 880 Darlinghurst NSW 1300 T: 02 9361 4549 F: 02 9361 4569 info@sm2group.com.au    WSP Level 27/680 George Street, Sydney NSW 2000 Woolacotts Level 14/111 Hurst Street, Chatswood, Sydney NSW 2067 LAS Lighting, Art + Science Level 14/111 Hurst Street, Crows Nest, Sydney NSW 2065			PROJECT	SHEET
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											DRAWING	REVISION	
											FINAL CONCEPT DESIGN ISSUE 5	E	



KEY

GENERAL

- New Item
- New Linemarking
- Items Removed
- Existing Light/Power Posts
- Existing Overhead Lines
- New Tactile Indicators
- New Retaining Wall
- Light Pole Removed

HARDSCAPE

- PC1** New Standard Path Pavement
- PC2** New Feature Bi-Pave Concrete Pavers
- PC3** New Feature Concrete Pavement within Artarmon Precinct
- PC4** New Feature Concrete Pavement within Punch St Park
- PC5** New Shared Path Concrete Pavement within Punch St Park
- PV1** New Road Threshold Pavement
- PV2** New Granite Pavement St Leonards Precinct

SOFTSCAPE

- BR1** New Brick Paving to match existing
- BR2** New Recycled Brick Paving
- New Turf
- New Garden Bed - Shrubs, Grasses & Groundcover Species
- New Rain Garden - Grass Species
- New Green Surface Cycleway Paint
- New Porous Pavement Pavement

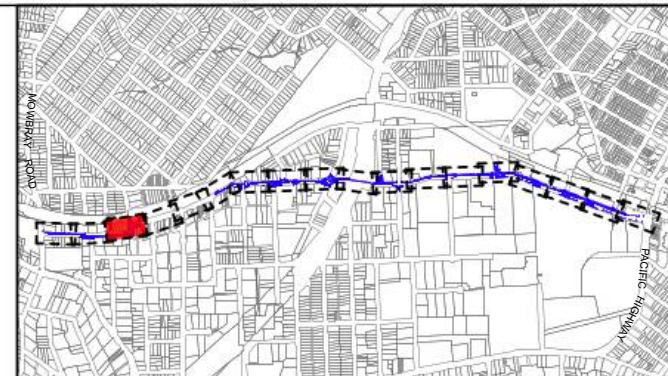
TREES

- Existing Trees - Retained
- Existing Trees - Removed
- Fraxinus raywoodii
- Flindersia australis
- Tristanopsis laurina

Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

- Existing Parking
- New/Relocated Parking
- Removed Parking
- Existing Parking Meter Retained
- Existing Parking Meter to be relocated
- Existing Parking Meter Relocated
- Traffic Signal Removed
- New Traffic Signal



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B	REVISED CONCEPT DESIGN ISSUE 2	AC	HM	MD	08.04.25		
A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25		

PREPARED FOR

WILLOUGHBY CITY COUNCIL
City of Opportunity

LANDSCAPE ARCHITECTS

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P.O. Box 880
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WSP
Level 27/680 George Street,
Sydney NSW 2000

Woolacotts

Woolacotts
Suite 6.02, Level 6/67 Albert Avenue,
Chatswood, Sydney NSW 2067

LAS

LAS Lighting, Art + Science
Level 14/11 Hume Street,
Crows Nest, Sydney NSW 2065

PROJECT

**HAMPDEN ROAD & HERBERT STREET
CYCLEWAY (CHATSWOOD TO ST LEONARDS)**

DRAWING

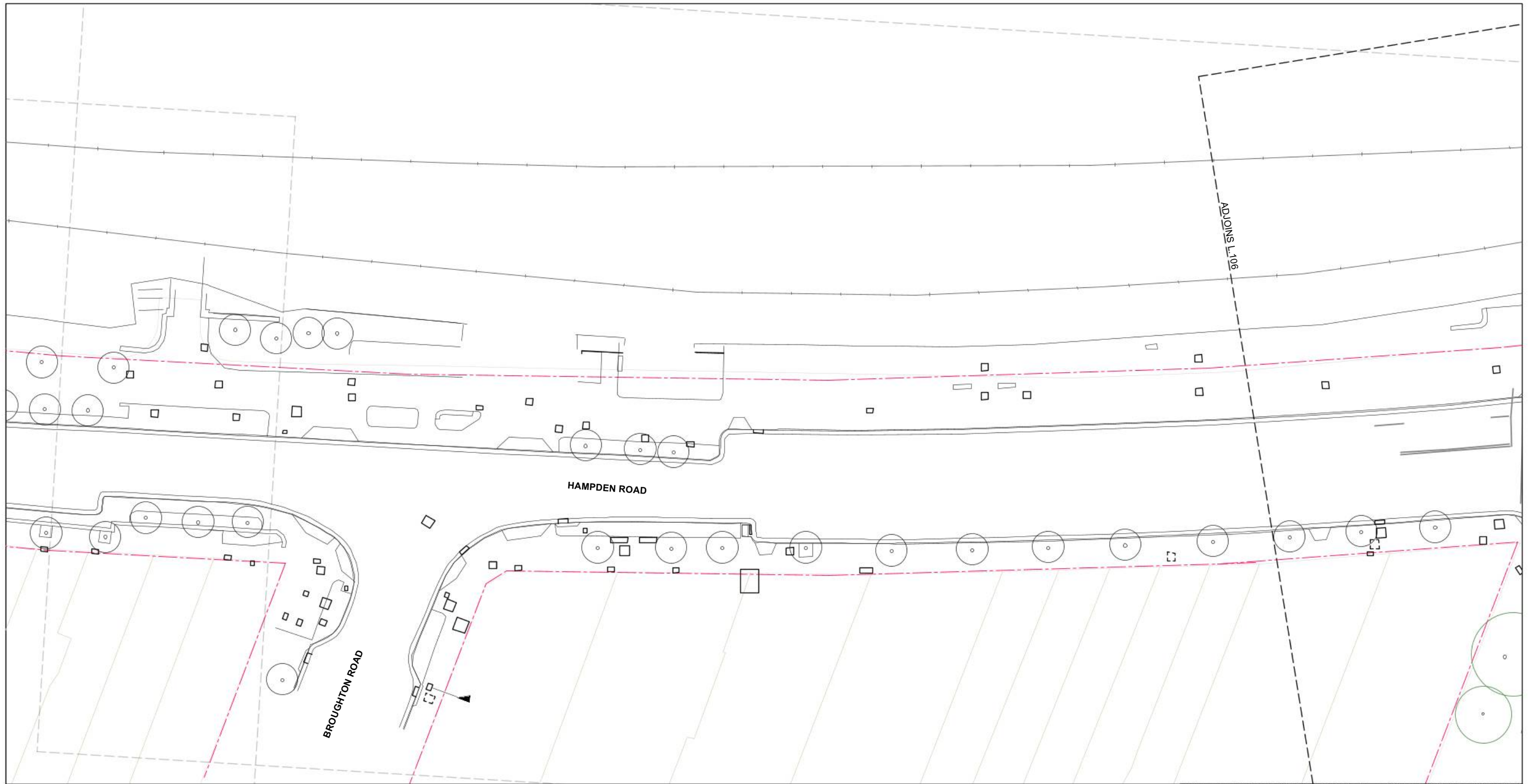
FINAL CONCEPT DESIGN ISSUE 5

SHEET

L.103

REVISION

E



KEY

GENERAL

- New Item
- New Linemarking
- Items Removed
- Existing Light/Power Posts
- Existing Overhead Lines
- New Tactile Indicators
- New Retaining Wall
- Light Pole Removed

HARDSCAPE

- PC1** New Standard Path Pavement
- PC2** New Feature Bi-Pave Concrete Pavers
- PC3** New Feature Concrete Pavement within Artarmon Precinct
- PC4** New Feature Concrete Pavement within Punch St Park
- PC5** New Shared Path Concrete Pavement within Punch St Park
- PV1** New Road Threshold Pavement
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SOFTSCAPE

- BR1** New Brick Paving to match existing
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- New Turf
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- New Rain Garden - Grass Species
- New Green Surface Cycleway Paint
- New Porous Pavement Pavement

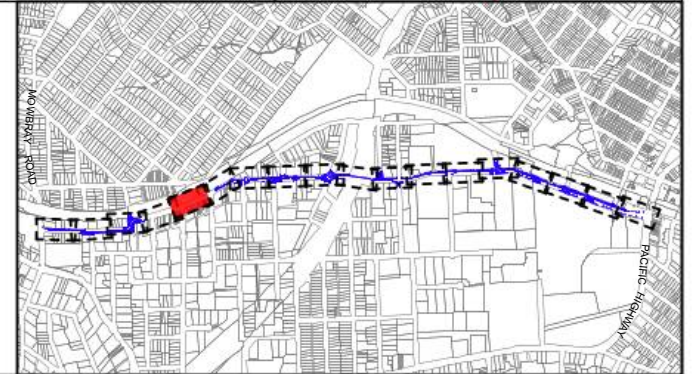
TREES

- Existing Trees - Retained
- Existing Trees - Removed
- Fraxinus raywoodii
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- Tristanopsis laurina

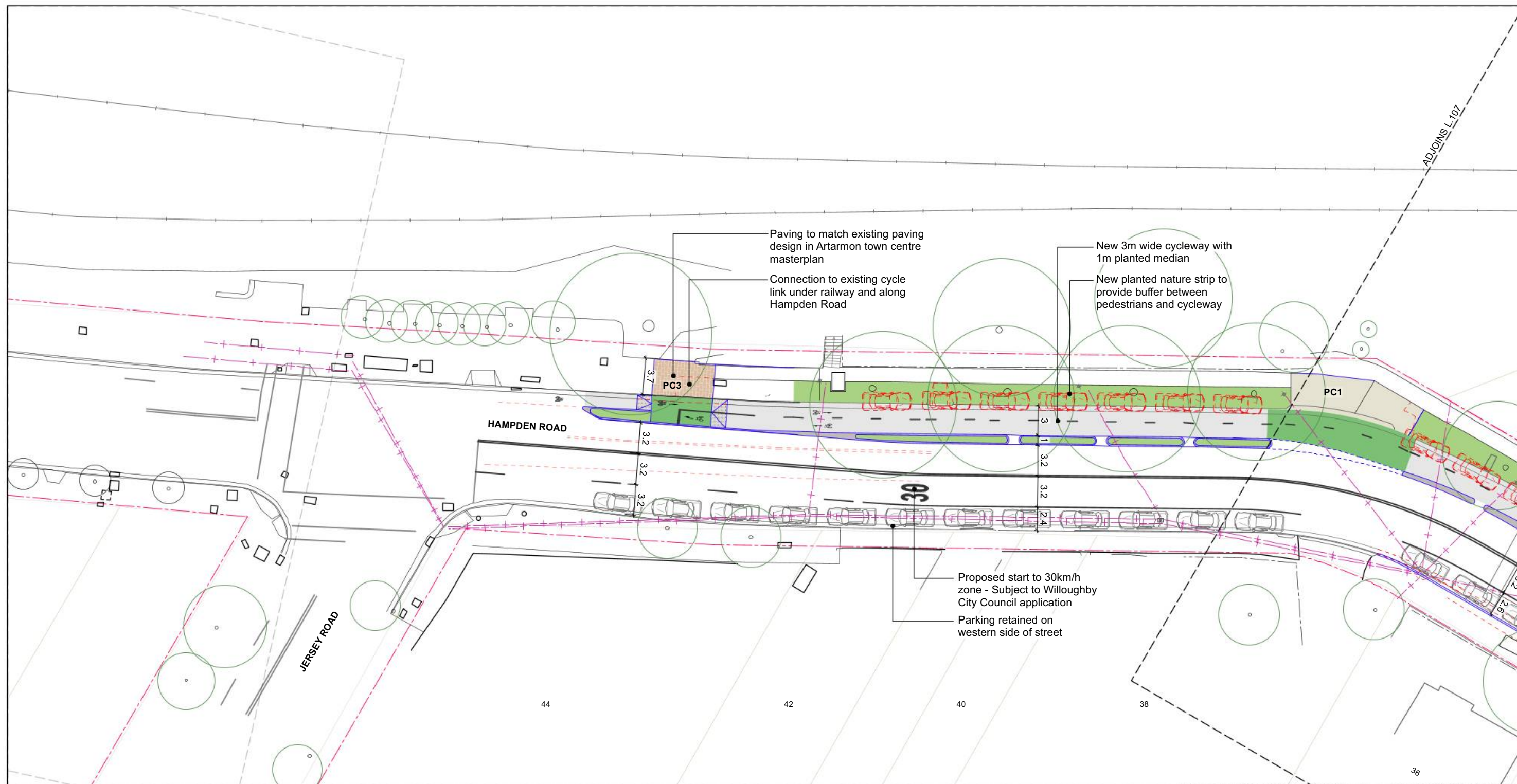
Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

- Existing Parking
- New/Relocated Parking
- Removed Parking
- Existing Parking Meter Retained
- Existing Parking Meter to be relocated
- Existing Parking Meter Relocated
- Traffic Signal Removed
- New Traffic Signal



V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:	PREPARED FOR	LANDSCAPE ARCHITECTS	WSP	Woolacotts	LAS	PROJECT	SHEET
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A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25									



KEY

GENERAL

- New Item
- New Linemarking
- Items Removed
- Existing Light/Power Posts
- Existing Overhead Lines
- New Tactile Indicators
- New Retaining Wall
- Light Pole Removed

HARDSCAPE

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SOFTSCAPE

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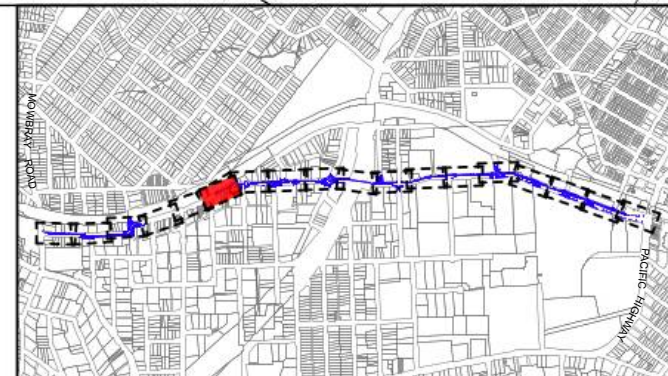
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- Tristanopsis laurina

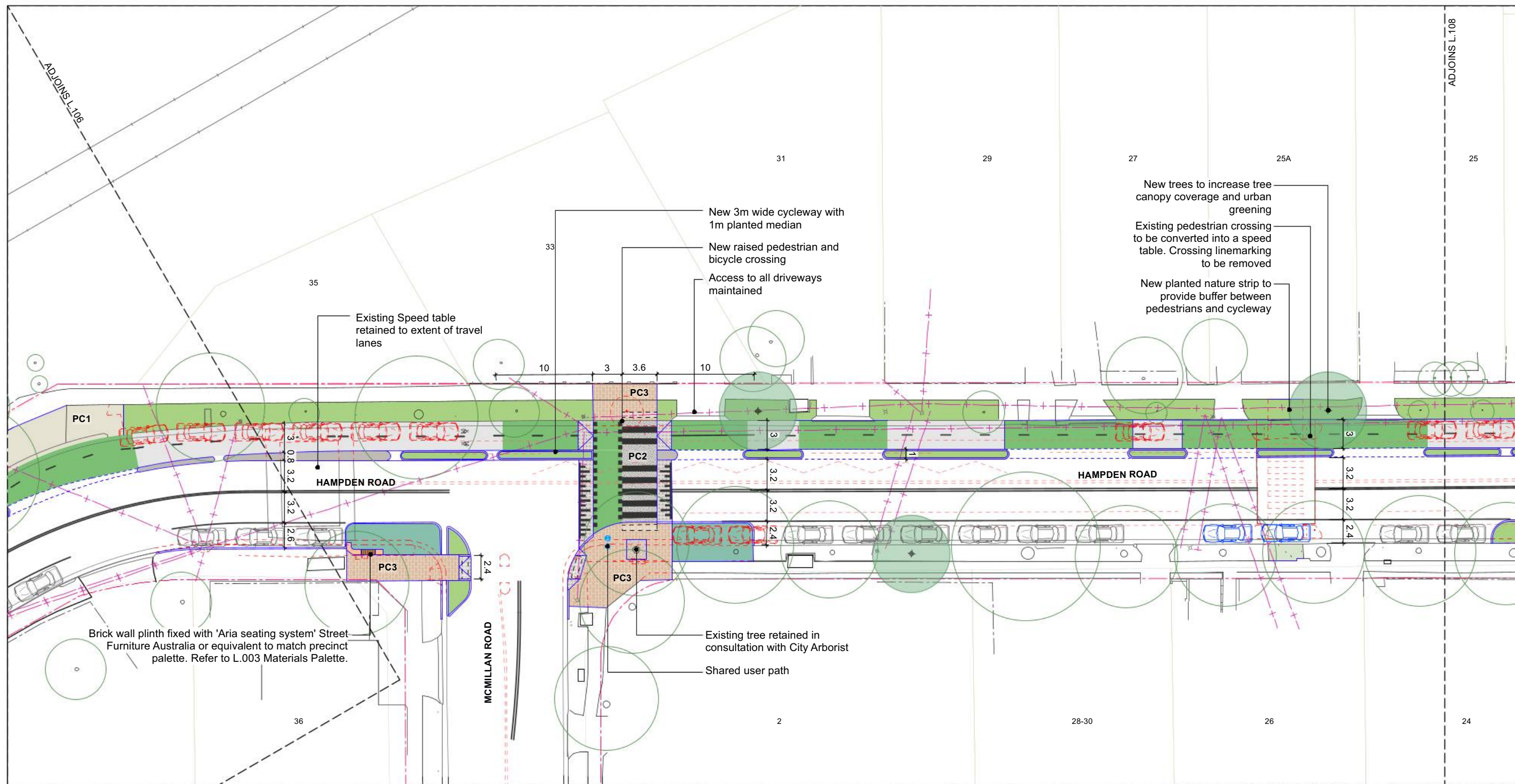
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TRAFFIC

- Existing Parking
- New/Relocated Parking
- Removed Parking
- Existing Parking Meter Retained
- Existing Parking Meter to be relocated
- Existing Parking Meter Relocated
- Traffic Signal Removed
- New Traffic Signal



V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:	PREPARED FOR	LANDSCAPE ARCHITECTS	WSP	Woolacotts	LAS	PROJECT	SHEET
E	FINAL CONCEPT DESIGN ISSUE 5	AC	HM	MD	23.04.26		1: 400 @ A3		smm P.O. Box 880 Darlinghurst NSW 1300 https://smm.studio/ PTY LTD ABN 65 065 578 985	 WSP Level 27/680 George Street, Sydney NSW 2000	 Woolacotts Suite 6.02, Level 6/67 Albert Avenue, Chatswood, Sydney NSW 2067	 LAS Lighting, Art + Science Level 14/11 Hume Street, Crows Nest, Sydney NSW 2065	HAMPDEN ROAD & HERBERT STREET CYCLEWAY (CHATSWOOD TO ST LEONARDS)	L.106
D	FINAL CONCEPT DESIGN ISSUE 4	AC	HM	MD	28.10.25								DRAWING	REVISION
C	FINAL CONCEPT DESIGN ISSUE 3	AC	HM	MD	22.08.25								FINAL CONCEPT DESIGN ISSUE 5	E
B	REVISED CONCEPT DESIGN ISSUE 2	AC	HM	MD	08.04.25									
A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25									



KEY

GENERAL

- New Item
- New Linemarking
- Items Removed
- Existing Light/Power Posts
- Existing Overhead Lines
- New Tactile Indicators
- New Retaining Wall
- Light Pole Removed

HARDSCAPE

- PC1** New Standard Path Pavement
- PC2** New Feature Bi-Pave Concrete Pavers
- PC3** New Feature Concrete Pavement within Artarmon Precinct
- PC4** New Feature Concrete Pavement within Punch St Park
- PC5** New Shared Path Concrete Pavement within Punch St Park
- PV1** New Road Threshold Pavement
- PV2** New Granite Pavement St Leonards Precinct

SOFTSCAPE

- BR1** New Brick Paving to match existing
- BR2** New Recycled Brick Paving
- New Turf
- New Garden Bed - Shrubs, Grasses & Groundcover Species
- New Rain Garden - Grass Species
- New Green Surface Cycleway Paint
- New Porous Pavement Pavement

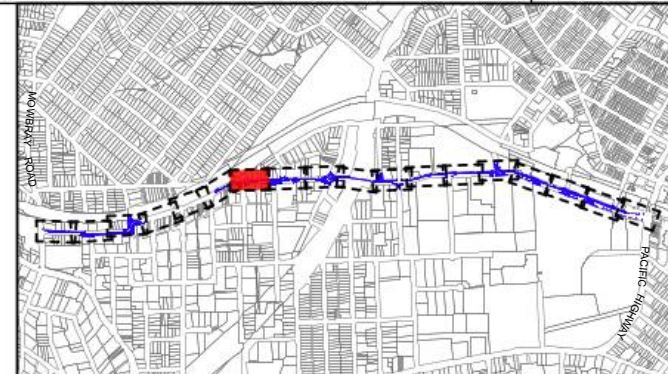
TREES

- Existing Trees - Retained
- Existing Trees - Removed
- Fraxinus raywoodii
- Flindersia australis
- Tristanopsis laurina

Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

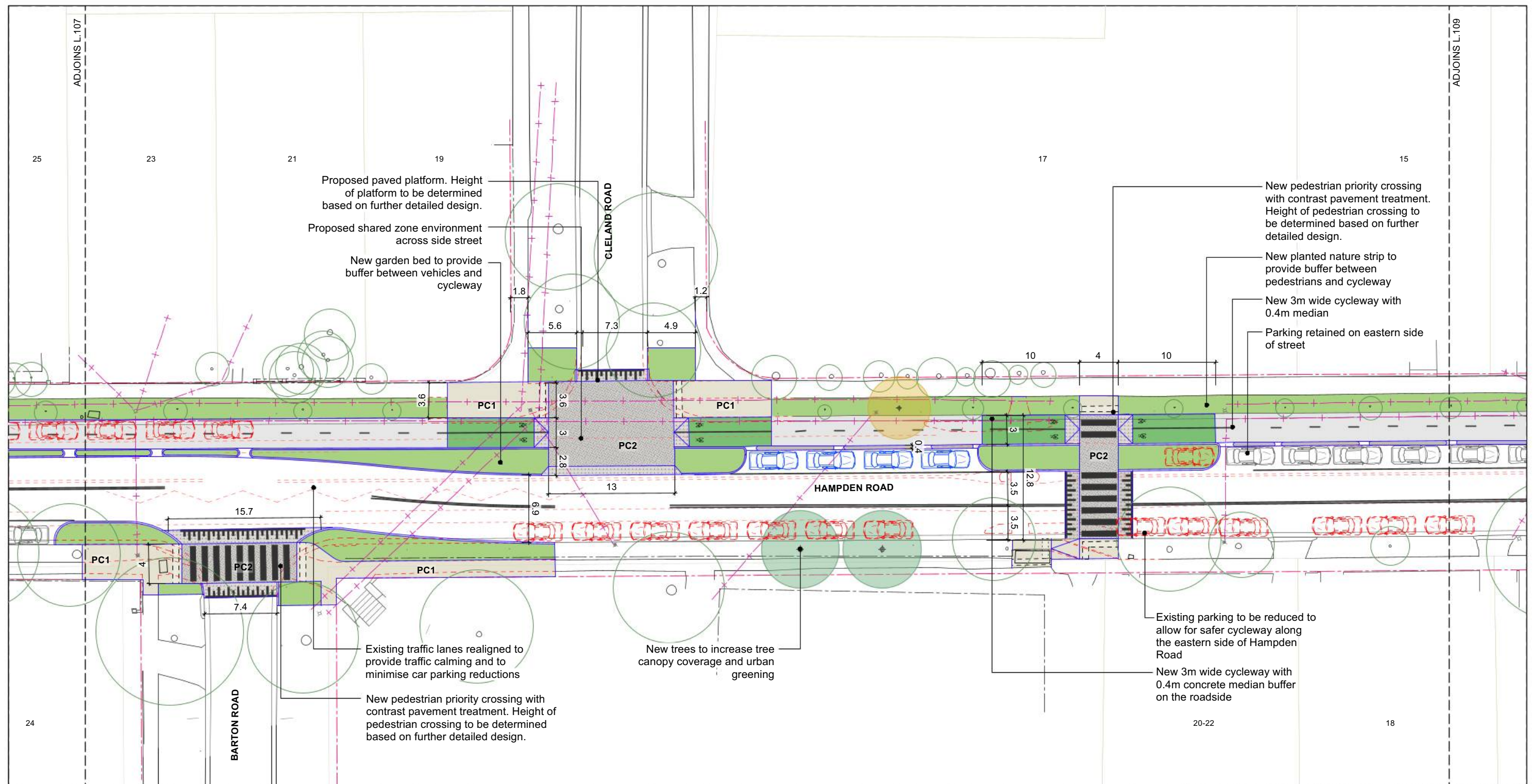
- Existing Parking
- New/Relocated Parking
- Removed Parking
- Existing Parking Meter Retained
- Existing Parking Meter to be relocated
- Existing Parking Meter Relocated
- Traffic Signal Removed
- New Traffic Signal



V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:
E	FINAL CONCEPT DESIGN ISSUE 5	AC	HM	MD	23.04.26		1: 400 @ A3
D	FINAL CONCEPT DESIGN ISSUE 4	AC	HM	MD	28.10.25		
C	FINAL CONCEPT DESIGN ISSUE 3	AC	HM	MD	22.08.25		
B	REVISED CONCEPT DESIGN ISSUE 2	AC	HM	MD	08.04.25		
A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25		



PROJECT	HAMPDEN ROAD & HERBERT STREET CYCLEWAY (CHATSWOOD TO ST LEONARDS)	SHEET	L.107
DRAWING	FINAL CONCEPT DESIGN ISSUE 5	REVISION	E



KEY

GENERAL

-  New Item
-  New Linemarking
-  Items Removed
-  Existing Light/Power Posts
-  Existing Overhead Lines
-  New Tactile Indicators
-  New Retaining Wall
-  Light Pole Removed

HARDSCAPE

- | | |
|------------|--|
| PC1 | New Standard Path Pavement |
| PC2 | New Feature Bi-Pave Concrete Pavers |
| PC3 | New Feature Concrete Pavement within Artarmon Precinct |
| PC4 | New Feature Concrete Pavement within Punch St Park |
| PC5 | New Shared Path Concrete Pavement within Punch St Park |
| PV1 | New Road Threshold Pavement |
| PV2 | New Granite Pavement St Leonards Precinct |

- | | |
|-----|------------------------------------|
| BR1 | New Brick Paving to match existing |
| BR2 | New Recycled Brick Paving |

SOFTSCAPE

-  New Turf
-  New Garden Bed - Shrubs, Grasses & Groundcover Species
-  New Rain Garden - Grass Species
-  New Green Surface Cycleway Paint
-  New Porous Pavement Pavement

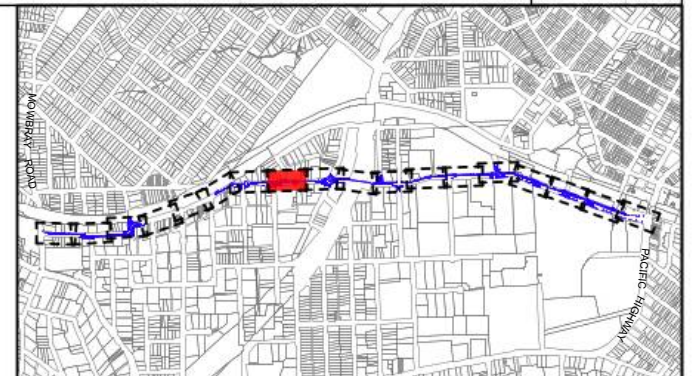
TREES

-
- The diagram illustrates a tree cross-section with a central trunk and a surrounding canopy. The canopy is divided into four colored regions, each representing a different species. The regions are labeled as follows:
- Existing Trees - Retained**: The top region, colored light blue, with a small blue circle in the center.
 - Existing Trees - Removed**: The second region from the top, colored light green, with a small green circle in the center.
 - Fraxinus raywoodii**: The third region from the top, colored light orange, with a small orange circle in the center.
 - Flindersia australis**: The bottom region, colored light purple, with a small purple circle in the center.
 - Tristaniopsis laurina**: The bottom-most region, colored light yellow, with a small yellow circle in the center.

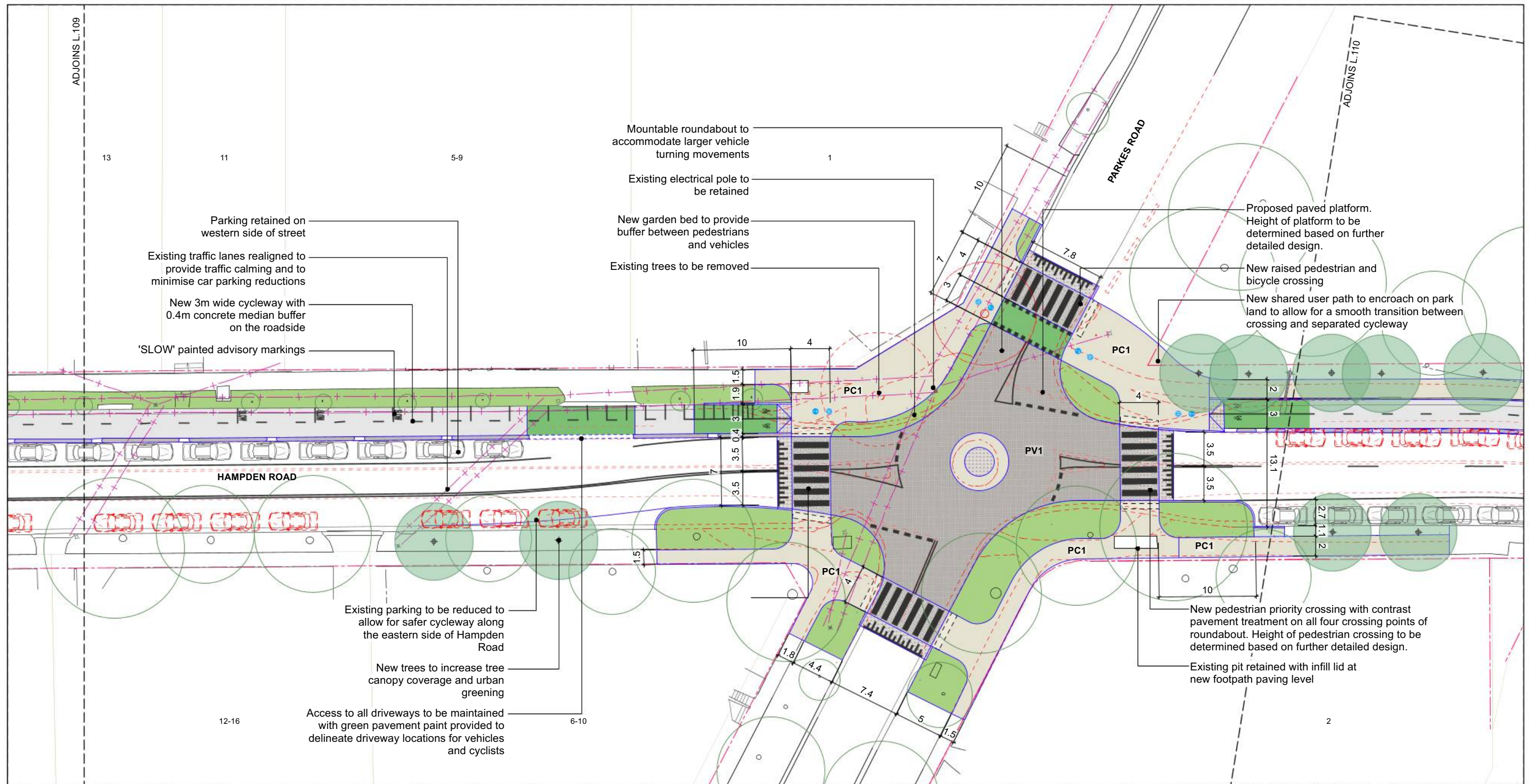
Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

-  Existing Parking
-  New/Relocated Parking
-  Removed Parking
-  Existing Parking Meter Retained
-  Existing Parking Meter to be relocated
-  Existing Parking Meter Relocated
-  Traffic Signal Removed
-  New Traffic Signal



V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:	PREPARED FOR	LANDSCAPE ARCHITECTS	WSP	Woolacotts.	LAS	PROJECT	SHEET
E	FINAL CONCEPT DESIGN ISSUE 5	AC	HM	MD	23.04.26		1: 400 @ A3		 P.O. Box 880 Darlinghurst NSW 1300 https://smm.studio/ PTY LTD ABN 65 065 578 985	 WSP Level 27/680 George Street, Sydney NSW 2000	 Woolacotts Suite 1/611 Hume Street, Chatswood, Sydney NSW 2067	 LAS Lighting, Art + Science Level 1/611 Hume Street, Crows Nest, Sydney NSW 2065	HAMPDEN ROAD & HERBERT STREET CYCLEWAY (CHATSWOOD TO ST LEONARDS)	L.108
D	FINAL CONCEPT DESIGN ISSUE 4	AC	HM	MD	28.10.25								REVISION	
C	FINAL CONCEPT DESIGN ISSUE 3	AC	HM	MD	22.08.25									
B	REVISED CONCEPT DESIGN ISSUE 2	AC	HM	MD	08.04.25									
A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25									



KEY

GENERAL

- New Item
- New Linemarking
- Items Removed
- ⬮ Existing Light/Power Posts
- Existing Overhead Lines
- New Tactile Indicators
- New Retaining Wall
- Light Pole Removed

HARDSCAPE

- PC1 New Standard Path Pavement
- PC2 New Feature Bi-Pave Concrete Pavers
- PC3 New Feature Concrete Pavement within Artarmon Precinct
- PC4 New Feature Concrete Pavement within Punch St Park
- PC5 New Shared Path Concrete Pavement within Punch St Park
- PV1 New Road Threshold Pavement
- PV2 New Granite Pavement St Leonards Precinct

SOFTSCAPE

- BR1 New Brick Paving to match existing
- BR2 New Recycled Brick Paving
- BR3 New Turf
- BR4 New Garden Bed - Shrubs, Grasses & Groundcover Species
- BR5 New Rain Garden - Grass Species
- BR6 New Green Surface Cycleway Paint
- BR7 New Porous Pavement Pavement

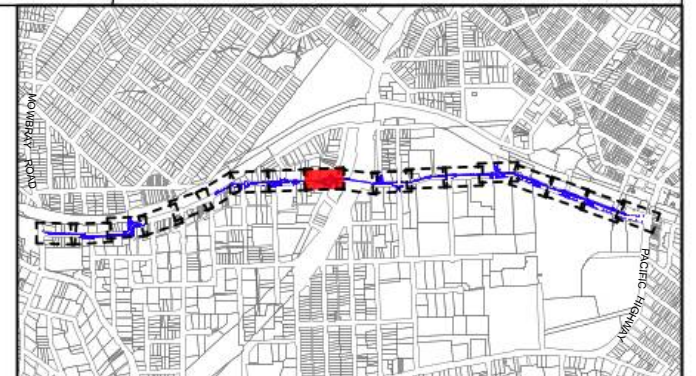
TREES

- Existing Trees - Retained
- Existing Trees - Removed
- Fraxinus raywoodii
- Flindersia australis
- Tristaniopsis laurina

Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

- ⬮ Existing Parking
- ⬮ New/Relocated Parking
- ⬮ Removed Parking
- ⬮ Existing Parking Meter Retained
- ⬮ Existing Parking Meter to be relocated
- ⬮ Existing Parking Meter Relocated
- ⬮ Traffic Signal Removed
- ⬮ New Traffic Signal



V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:
E	FINAL CONCEPT DESIGN ISSUE 5	AC	HM	MD	23.04.26		1: 400 @ A3
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C	FINAL CONCEPT DESIGN ISSUE 3	AC	HM	MD	22.08.25		
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A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25		



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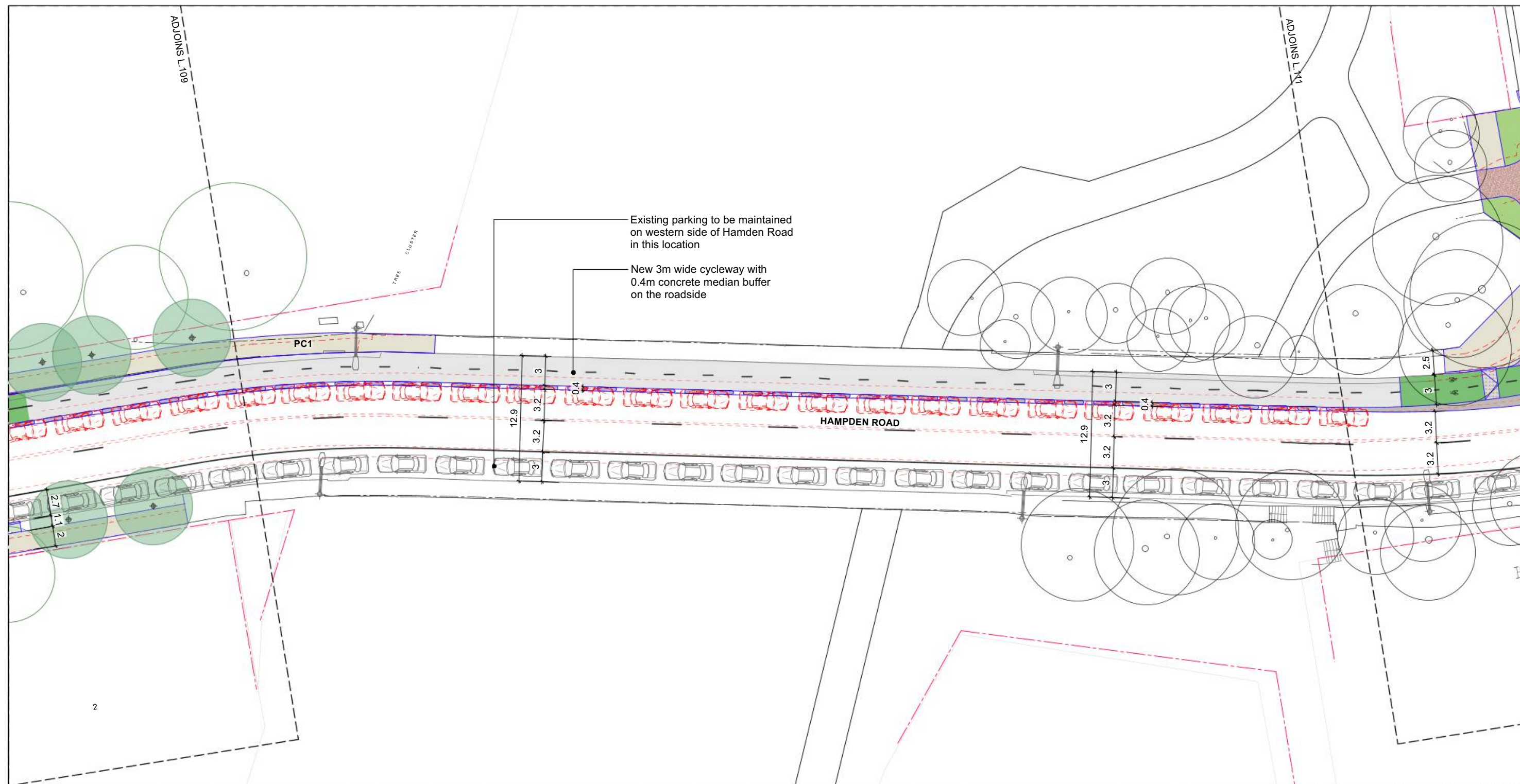


PROJECT
**HAMPDEN ROAD & HERBERT STREET
CYCLEWAY (CHATSWOOD TO ST LEONARDS)**

DRAWING
FINAL CONCEPT DESIGN ISSUE 5

SHEET
L.109

REVISION
E



KEY

GENERAL

-  New Item
-  New Linemarking
-  Items Removed
-  Existing Light/Power Posts
-  Existing Overhead Lines
-  New Tactile Indicators
-  New Retaining Wall
-  Light Pole Removed

HARDSCAPE

- | | |
|------------|--|
| PC1 | New Standard Path Pavement |
| PC2 | New Feature Bi-Pave Concrete Pavers |
| PC3 | New Feature Concrete Pavement within Artarmon Precinct |
| PC4 | New Feature Concrete Pavement within Punch St Park |
| PC5 | New Shared Path Concrete Pavement within Punch St Park |
| PV1 | New Road Threshold Pavement |
| PV2 | New Granite Pavement St Leonards Precinct |

- | | |
|------------|------------------------------------|
| BR1 | New Brick Paving to match existing |
| BR2 | New Recycled Brick Paving |

SOFTSCAPE

-  New Turf
-  New Garden Bed - Shrubs, Grasses & Groundcover Species
-  New Rain Garden - Grass Species
-  New Green Surface Cycleway Paint
-  New Porous Pavement Pavement

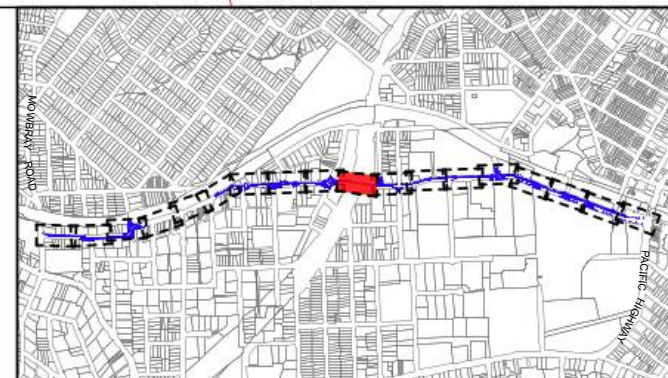
TREES

-
- Existing Trees - Retained
- Existing Trees - Removed
- Fraxinus raywoodii*
- Flindersia australis*
- Tristaniopsis laurina*

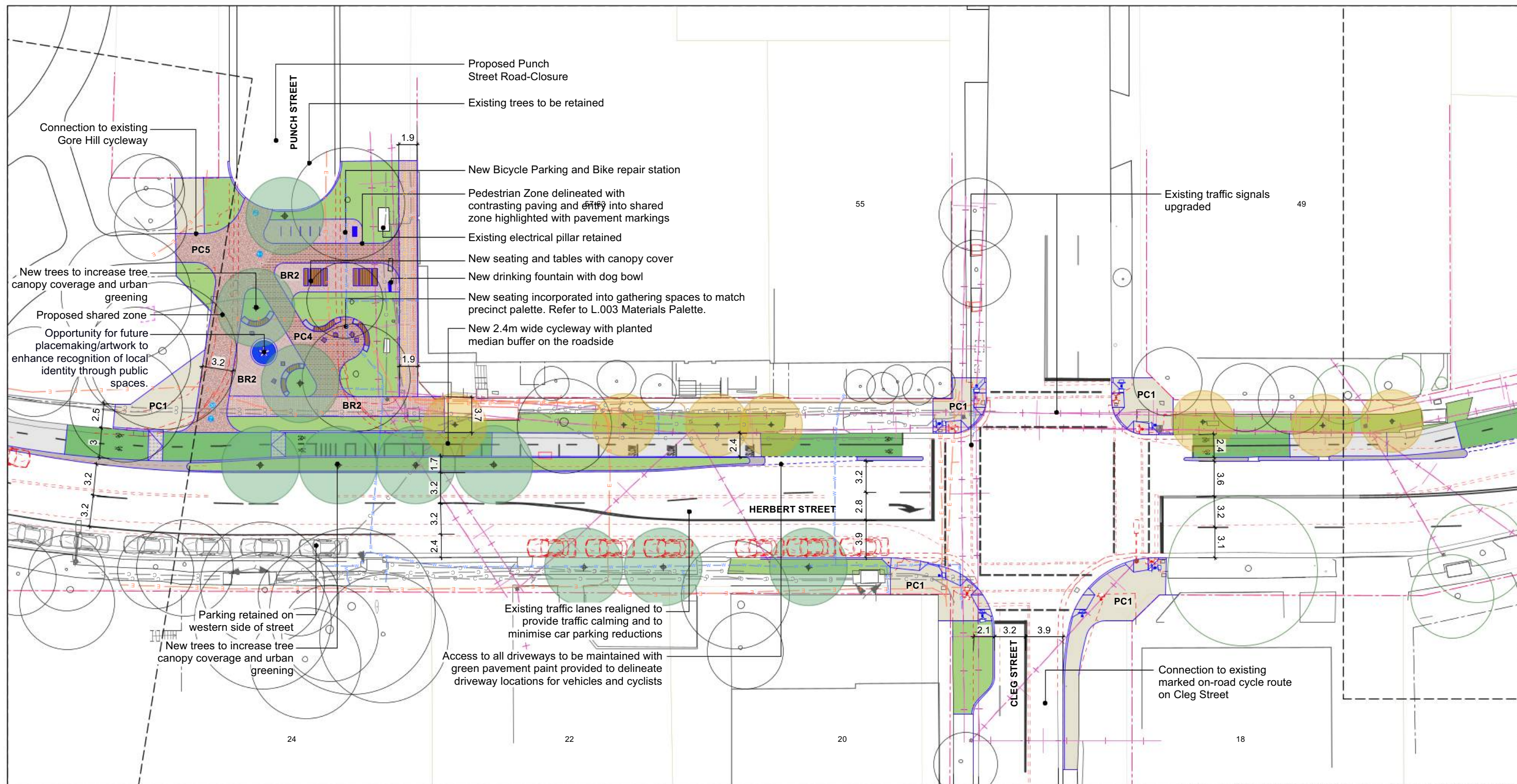
Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

- | | |
|---|--|
|  | Existing Parking |
|  | New/Relocated Parking |
|  | Removed Parking |
|  | Existing Parking Meter Retained |
|  | Existing Parking Meter to be relocated |
|  | Existing Parking Meter Relocated |
|  | Traffic Signal Removed |
|  | New Traffic Signal |



V AMENDMENT DESCRIPTION					DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:	PREPARED FOR	 LANDSCAPE ARCHITECTS P.O. Box 880 Darlinghurst NSW 1300			 Woolacotts. CONSULTING ENGINEERS			 LAS Lighting, Art + Science Level 14/14 Hume Street, Crows Nest, Sydney NSW 2065			PROJECT	SHEET					
E	FINAL CONCEPT DESIGN ISSUE 5	AC	HM	MD	23.04.26				 WILLETSHURST CITY COUNCIL City of Glenbury	1: 400 @ A3	 https://smm.studio/ PTY LTD ABN 65 065 578 985	T: 02 9361 4549 F: 02 9361 4569 info@sm2group.com.au	WSP Level 27/680 George Street, Sydney NSW 2000	Woolacotts Level 6/67 Albert Avenue, Chatswood, Sydney NSW 2067	LAS Lighting, Art + Science Level 14/14 Hume Street, Crows Nest, Sydney NSW 2065	HAMPDEN ROAD & HERBERT STREET CYCLEWAY (CHATSWOOD TO ST LEONARDS)			L.110								
D	FINAL CONCEPT DESIGN ISSUE 4	AC	HM	MD	28.10.25																						
C	FINAL CONCEPT DESIGN ISSUE 3	AC	HM	MD	22.08.25																						
B	REVISED CONCEPT DESIGN ISSUE 2	AC	HM	MD	08.04.25																						
A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25																						
											DRAWING			FINAL CONCEPT DESIGN ISSUE 5			REVISION	E									



KEY

GENERAL

- New Item
- New Linemarking
- Items Removed
- Existing Light/Power Posts
- Existing Overhead Lines
- New Tactile Indicators
- New Retaining Wall
- Light Pole Removed

HARDSCAPE

- PC1 New Standard Path Pavement
- PC2 New Feature Bi-Pave Concrete Pavers
- PC3 New Feature Concrete Pavement within Artarmon Precinct
- PC4 New Feature Concrete Pavement within Punch St Park
- PC5 New Shared Path Concrete Pavement within Punch St Park
- PV1 New Road Threshold Pavement
- PV2 New Granite Pavement St Leonards Precinct

SOFTSCAPE

- BR1 New Brick Paving to match existing
- BR2 New Recycled Brick Paving
- New Turf
- New Garden Bed - Shrubs, Grasses & Groundcover Species
- New Rain Garden - Grass Species
- New Green Surface Cycleway Paint
- New Porous Pavement Pavement

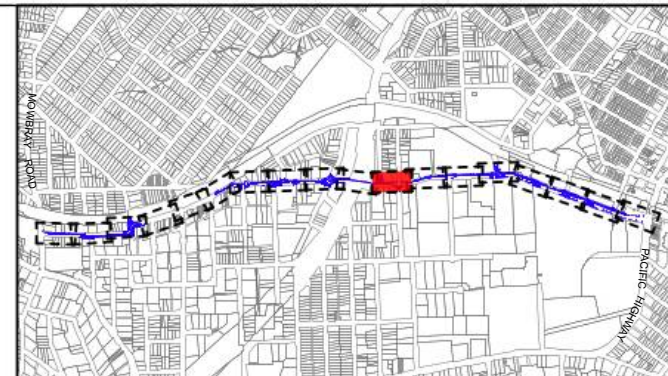
TREES

- Existing Trees - Retained
- Existing Trees - Removed
- Fraxinus raywoodii
- Flindersia australis
- Tristaniopsis laurina

Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

- Existing Parking
- New/Relocated Parking
- Removed Parking
- Existing Parking Meter Retained
- Existing Parking Meter to be relocated
- Existing Parking Meter Relocated
- Traffic Signal Removed
- New Traffic Signal



V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:
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A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25		

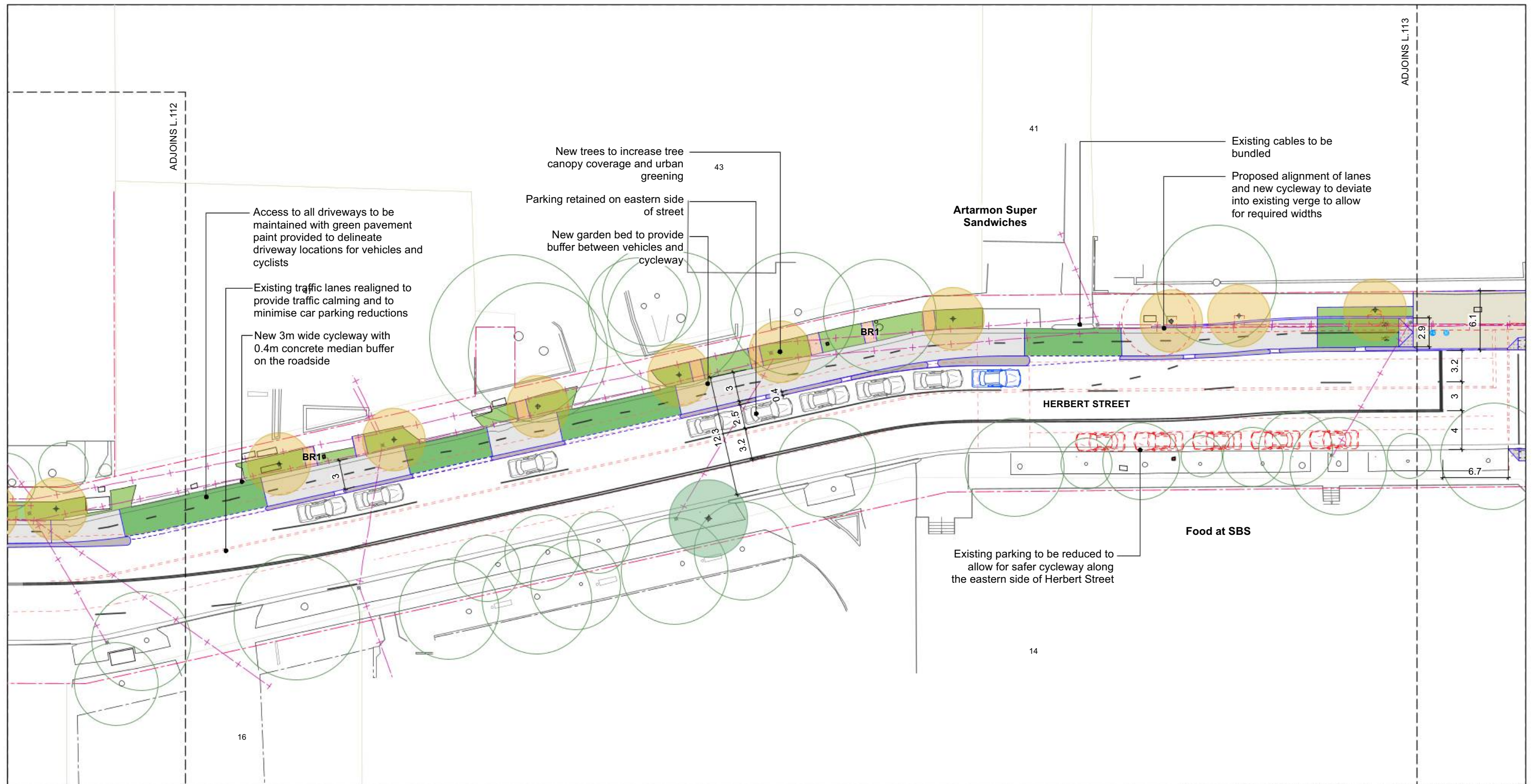


LANDSCAPE ARCHITECTS
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PROJECT
HAMPDEN ROAD & HERBERT STREET
CYCLEWAY (CHATSWOOD TO ST LEONARDS)
DRAWING
FINAL CONCEPT DESIGN ISSUE 5

SHEET
L.111
REVISION
E



KEY

GENERAL

- New Item
- New Linemarking
- Items Removed
- Existing Light/Power Posts
- Existing Overhead Lines
- New Tactile Indicators
- New Retaining Wall
- Light Pole Removed

HARDSCAPE

- PC1** New Standard Path Pavement
- PC2** New Feature Bi-Pave Concrete Pavers
- PC3** New Feature Concrete Pavement within Artarmon Precinct
- PC4** New Feature Concrete Pavement within Punch St Park
- PC5** New Shared Path Concrete Pavement within Punch St Park
- PV1** New Road Threshold Pavement
- PV2** New Granite Pavement St Leonards Precinct

SOFTSCAPE

- BR1** New Brick Paving to match existing
- BR2** New Recycled Brick Paving
- New Turf
- New Garden Bed - Shrubs, Grasses & Groundcover Species
- New Rain Garden - Grass Species
- New Green Surface Cycleway Paint
- New Porous Pavement Pavement

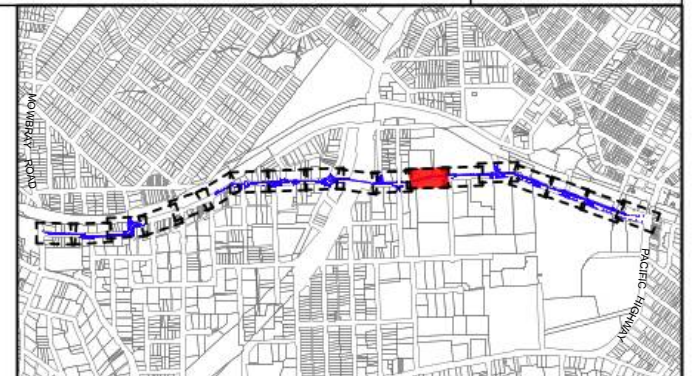
TREES

- Existing Trees - Retained
- Existing Trees - Removed
- Fraxinus raywoodii
- Flindersia australis
- Tristanopsis laurina

Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

- Existing Parking
- New/Relocated Parking
- Removed Parking
- Existing Parking Meter Retained
- Existing Parking Meter to be relocated
- Existing Parking Meter Relocated
- Traffic Signal Removed
- New Traffic Signal



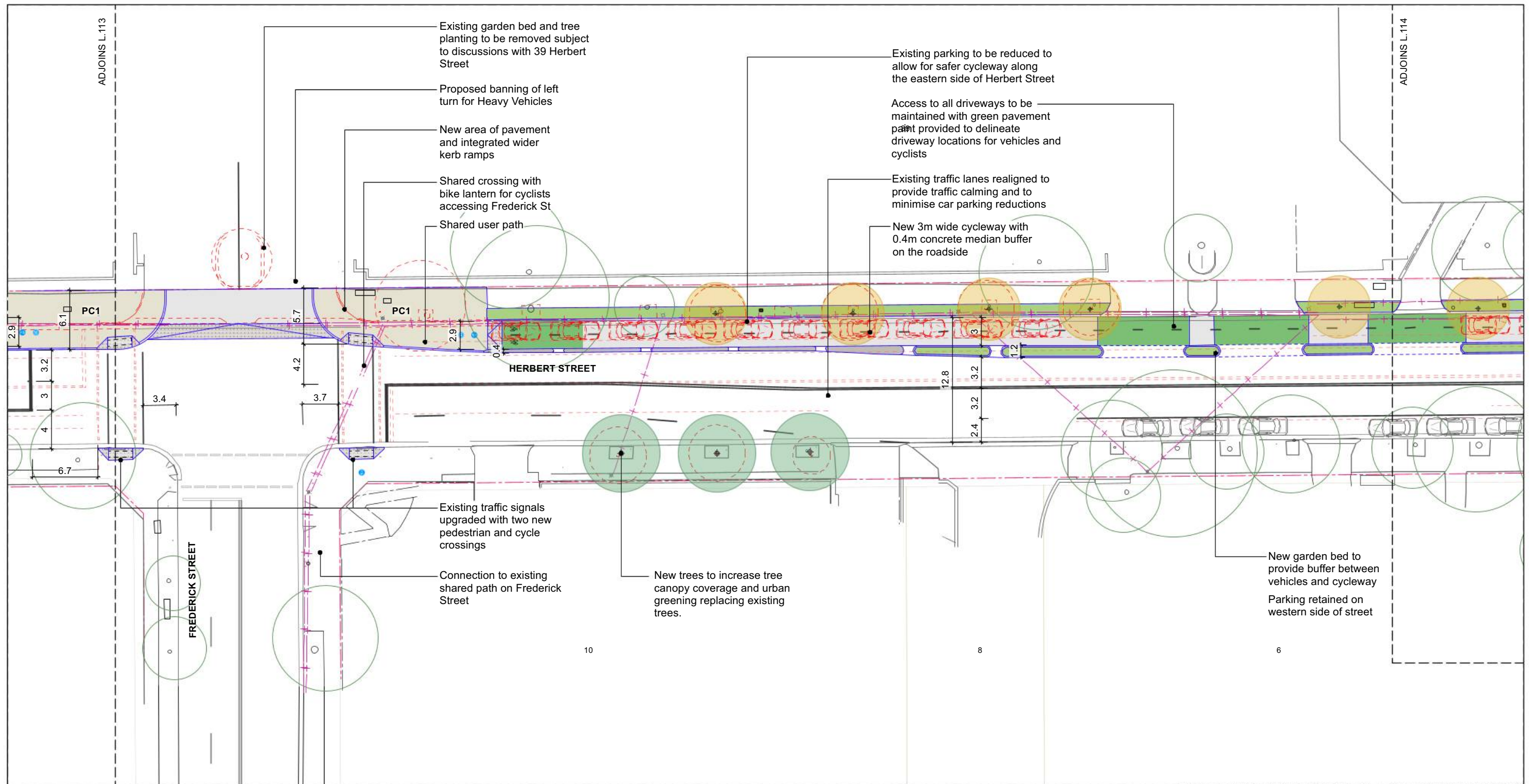
V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:
E	FINAL CONCEPT DESIGN ISSUE 5	AC	HM	MD	23.04.26		1: 400 @ A3
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A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25		



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PROJECT	HAMPDEN ROAD & HERBERT STREET CYCLEWAY (CHATSWOOD TO ST LEONARDS)	SHEET	L.112
DRAWING	FINAL CONCEPT DESIGN ISSUE 5	REVISION	E



KEY

GENERAL

- New Item
- New Linemarking
- Items Removed
- Existing Light/Power Posts
- Existing Overhead Lines
- New Tactile Indicators
- New Retaining Wall
- Light Pole Removed

HARDSCAPE

- PC1** New Standard Path Pavement
- PC2** New Feature Bi-Pave Concrete Pavers
- PC3** New Feature Concrete Pavement within Artarmon Precinct
- PC4** New Feature Concrete Pavement within Punch St Park
- PC5** New Shared Path Concrete Pavement within Punch St Park
- PV1** New Road Threshold Pavement
- PV2** New Granite Pavement St Leonards Precinct

SOFTSCAPE

- BR1** New Brick Paving to match existing
- BR2** New Recycled Brick Paving
- New Turf
- New Garden Bed - Shrubs, Grasses & Groundcover Species
- New Rain Garden - Grass Species
- New Green Surface Cycleway Paint
- New Porous Pavement Pavement

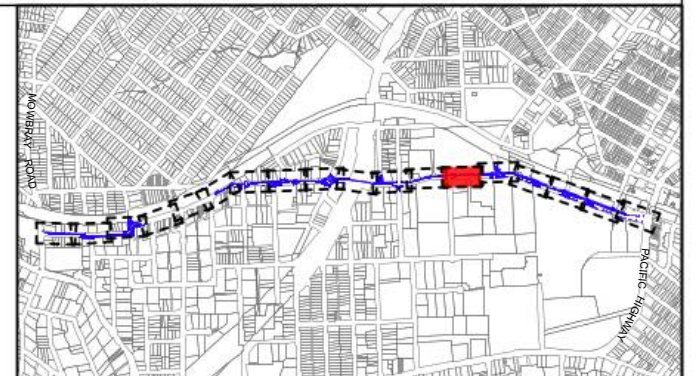
TREES

- Existing Trees - Retained
- Existing Trees - Removed
- Fraxinus raywoodii
- Flindersia australis
- Tristanopsis laurina

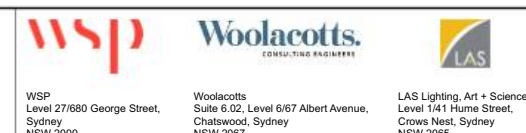
Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

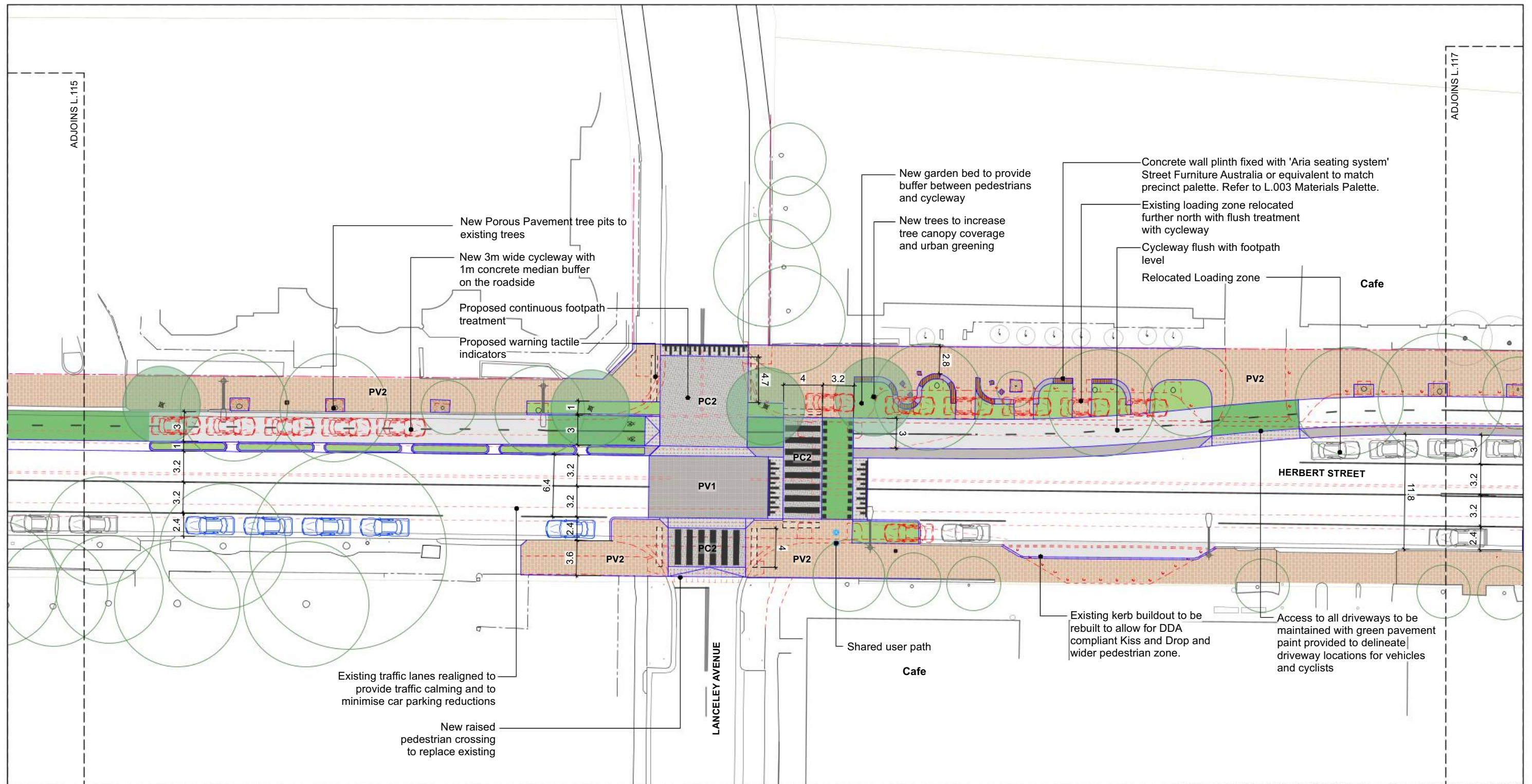
- Existing Parking
- New/Relocated Parking
- Removed Parking
- Existing Parking Meter Retained
- Existing Parking Meter to be relocated
- Existing Parking Meter Relocated
- Traffic Signal Removed
- New Traffic Signal



V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:
E	FINAL CONCEPT DESIGN ISSUE 5	AC	HM	MD	23.04.26		1: 400 @ A3
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A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25		



PROJECT	HAMPDEN ROAD & HERBERT STREET CYCLEWAY (CHATSWOOD TO ST LEONARDS)	SHEET	L.113
DRAWING	FINAL CONCEPT DESIGN ISSUE 5	REVISION	E



KEY

GENERAL

- New Item
- New Linemarking
- Items Removed
- Existing Light/Power Posts
- Existing Overhead Lines
- New Tactile Indicators
- New Retaining Wall
- Light Pole Removed

HARDSCAPE

- PC1** New Standard Path Pavement
- PC2** New Feature Bi-Pave Concrete Pavers
- PC3** New Feature Concrete Pavement within Artarmon Precinct
- PC4** New Feature Concrete Pavement within Punch St Park
- PC5** New Shared Path Concrete Pavement within Punch St Park
- PV1** New Road Threshold Pavement
- PV2** New Granite Pavement St Leonards Precinct

- BR1** New Brick Paving to match existing
- BR2** New Recycled Brick Paving

SOFTSCAPE

- New Turf
- New Garden Bed - Shrubs, Grasses & Groundcover Species
- New Rain Garden - Grass Species
- New Green Surface Cycleway Paint
- New Porous Pavement Pavement

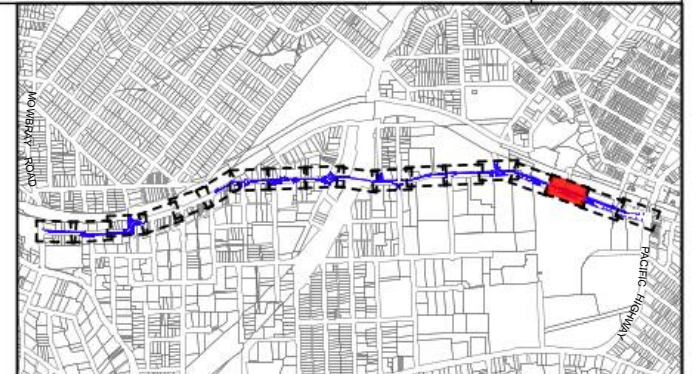
TREES

- Existing Trees - Retained
- Existing Trees - Removed
- Fraxinus raywoodii
- Flindersia australis
- Tristanopsis laurina

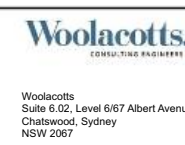
Please note: Tree locations are subject to change based on further investigations during the detailed design phase

TRAFFIC

- Existing Parking
- New/Relocated Parking
- Removed Parking
- Existing Parking Meter Retained
- Existing Parking Meter to be relocated
- Existing Parking Meter Relocated
- Traffic Signal Removed
- New Traffic Signal



V	AMENDMENT DESCRIPTION	DSGND	DRAWN	APRVD	DATE	NORTH	SCALE:
E	FINAL CONCEPT DESIGN ISSUE 5	AC	HM	MD	23.04.26		1: 400 @ A3
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B	REVISED CONCEPT DESIGN ISSUE 2	AC	HM	MD	08.04.25		
A	DRAFT CONCEPT DESIGN ISSUE 1	AC	HM	MD	19.02.25		



PROJECT	HAMPDEN ROAD & HERBERT STREET CYCLEWAY (CHATSWOOD TO ST LEONARDS)	SHEET	L.116
DRAWING	FINAL CONCEPT DESIGN ISSUE 5	REVISION	E

