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Infrastructure Victoria 30-year Strategy

Priority Cycling Corridor Investment Analysis

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Client Infrastructure Victoria

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Executive summary

Infrastructure Victoria engaged Trafficworks to undertake an assessment of the feasibility and cost to construct priority cycling corridors in Melbourne and regional cities over a 10-year period.

In completing this assessment, Trafficworks:

- confirmed the existing cycling infrastructure along corridors using Nearmaps, Google maps Streetview and Mapillary
- determined a suitable strategic cycling corridor treatment for segments of the corridor, primarily focusing on providing separated and direct facilities
- engaged with council officers to confirm cycling corridor priorities and treatment assumptions with Councils who had engaged with Infrastructure Victoria in the draft 30-year infrastructure strategy.
- estimated the cost of the upgrades, using a range of unit rate costings based on the level of construction complexity
- forecast investment for a 10-year period
- estimated the cost of ongoing maintenance of the new infrastructure.

The table below summarises our recommendations.

Total program costs	Total investment range - $397 million to $652 million Total likely investment - $525 million
Program timeline	Program of works can be achieved in 10 years
Annual Maintenance cost	Approximately $3.2 million per year

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1 Introduction

Infrastructure Victoria engaged Trafficworks to undertake an assessment of the existing cycling facilities along priority cycling corridors throughout Victoria, and to determine upgrades required to provide high-quality strategic cycling corridors.

A key recommendation in Infrastructure Victoria's draft 30-year Infrastructure Strategy (the Strategy) is a significant investment in cycling infrastructure to improve safety, encourage cycling and reduce congestion, particularly in strategic growth areas. The Strategy suggests building a network of cycling corridors in the next 10 years, including 10 cycling corridors in Melbourne and a network of cycle corridors in six regional cities, including Geelong, Ballarat, Bendigo, Castlemaine, Wangaratta and Wodonga. This includes creating safe cycling connections, separated bike lanes, and protected intersections. The strategy also recommends exploring incentives for cycling to work and setting 30 km/h speed limits in local streets.

Following initial feedback on the Strategy, Infrastructure Victoria prioritised and identified additional corridors to investigate, and included additional network lengths in regional cities, additional strategic corridors in Melbourne's east, and investigating connections into key activity centres in Melbourne's west. This assessment considers the investment required for 206 km of high-quality cycling networks within metropolitan Melbourne, and 72 km in regional Victoria.

Trafficworks completed an assessment of each of the corridors, aligning cycling facility choice with the current guidance provided in the Improving Austroads Guidance for Cycling and Mobility Planning (March 2025) document. The routes were assessed using Google Streetview, Mapillary, aerial images from Nearmap and discussions with Councils to:

- identify existing cycling infrastructure
- consider the road environment and potential cycling users
- determine a preferred cycling infrastructure treatment
- determine the feasibility of installing the cycling infrastructure
- determine streetlighting and wayfinding upgrades
- determine suitable cycling crossing points, including increasing safety and priority whilst reducing delays.

The high-level assessment of all the routes identified the preferred treatments to be installed along the corridors, and included approximately:

- 56 km of new or upgraded shared paths
- 83 km of new or upgraded protected bike lanes
- 33 km of new or upgraded bicycle boulevards

- 56 km of new streetlighting for paths
- 200 new or upgraded raised priority crossings or pedestrian operated signal sites
- 184 upgrades to traffic signal intersections
- 12 new signalised intersections
- 28 new or upgraded protected roundabouts
- New or upgraded bridges, railway crossings and land acquisition.

For each corridor, these recommended treatments were assessed for construction complexity, with cost ranges estimated for varying levels of construction complexity.

To complete the construction of the cycling infrastructure identified, the total program cost range is between $397 million and $652 million, with a likely cost of $525 million (2025 nominal costing).

Recommendations have also been provided regarding the staging of planning activities and construction works in the 10-year strategy, with the forecast expenditure shown in Figure 1.

Figure 1 - 10-year priority cycling infrastructure forecast (likely costs (P50))

An assessment of the yearly maintenance costs of the proposed upgrades has also been completed. Using indicative maintenance costs sourced from DTP and Councils, an estimated routine maintenance cost of the upgrades to the cycling network is approximately $3.2 million per year, with approximately 85 % of the cycling facilities likely to be assets managed by Councils and 15 % managed by the State Government.

Referenced documents

References used in the preparation of this report include the following:

- Strategic Cycling Corridor Network Overview, Department of Transport (Dec 2020)
- Victorian Cycling Strategy 2018-28, Department of Transport
- VicRoads Traffic Engineering Manual, Volume 3 – Design Guidance for strategically important cycling corridors (2016)
- Transport for NSW, Cycleway Design Toolbox (2020)
- Maribyrnong Bicycle Strategy 2020-2030
- Brimbank Cycling and Walking Strategy (August 2016)
- Benefit Cost Ratio calculation spreadsheet - Department of Transport and Planning (2025)
- Designing for the 'Interested but Concerned', Transport for NSW (Dec 2021)
- Austroads Research Report AP-R724-25, Improving Austroads Guidance for Cycling and Mobility Planning (March 2025)

2 Cycling corridors assessed

Infrastructure Victoria's draft 30-year Infrastructure Strategy (the Strategy) identifies a significant investment in cycling infrastructure to improve safety, encourage cycling, and reduce congestion, particularly in strategic growth areas.

Victoria has identified strategic links in Melbourne and in regional cities that are required to support a direct, connected, efficient and safe cycling network. These corridors represent the ideal network, with two categories of classification provided, being Strategic Cycling Corridors (SCC) and the Principal Bicycle Network (PBN). The broader cycling network plan maps are available at **www.vic.gov.au/strategic-cycling-corridors**.

The Strategy recommends building a network of strategic cycling corridors in the next 10 years, including 10 cycling corridors in Melbourne and a network of cycle corridors in six regional cities, including Geelong, Ballarat, Bendigo, Castlemaine, Wangaratta and Wodonga. This includes creating safe cycling connections, separated bike lanes, and protected intersections. The strategy also recommends setting 30km/h speed limits in some local streets, which can be combined with high quality cycling corridors to encourage more cycling.

The prioritised corridors determined by Infrastructure Victoria to assess are shown in Figure 2. Prioritisation of the strategic cycling corridors to assess included the following:

- Focus on key destinations:

  The strategic cycling corridors were strategically prioritised to connect important destinations like growing activity centres, schools, and public transport interchanges, making it easier for people to cycle to these locations.

- Priority for connections:

  The corridors emphasised connecting to existing bike infrastructure, ensuring a more connected network.

- Protected cycleways:

  The corridors were more likely to be able to prioritise the construction of protected cycleways, which provide a greater degree of safety and comfort for cyclists compared to shared lanes.

Strategic Cycling Corridors provide guidance to the preferred alignment of cycling infrastructure. Through detailed planning and design, it is common for cycling facilities to deviate from the alignment to provide a feasible and connected corridor. Where appropriate, Trafficworks has identified and costed alternative parallel routes where we believed a more suitable route was available.

Figure 2 - Initial corridors for assessment

Infrastructure Victoria refined high priority corridors to investigate following feedback on the Strategy from councils and stakeholders. Additional network connections were included in the assessment, being:

- extended strategic cycling corridors in Ballarat and Bendigo
- extended strategic cycling corridors in Melbourne's east
- cycling connections into key activity centres in Melbourne's west

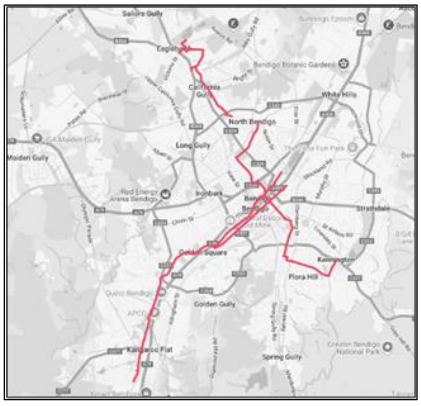
The metropolitan corridors assessed are shown in Figure 3 and the regional city corridors assessed are shown in Figure 4.

Figure 3 – Metropolitan routes assessed

Geelong

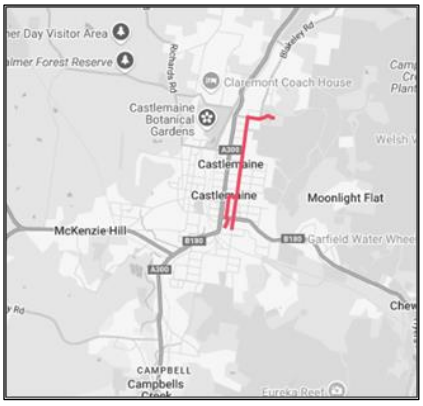
Ballarat

Wodonga



Bendigo

Wangaratta



Castlemaine

Figure 4 - Regional routes assessed

Infrastructure Victoria and Trafficworks engaged with regional Victorian councils to confirm the local planning and desired cycling treatments for the identified strategic cycling routes.

Trafficworks was presented council's current planning and investment priorities for new cycling infrastructure. Although initial route assessments completed by Trafficworks were different to current council priority routes, the level of investment for either corridor was similar.

Trafficworks consider that our assessment of the corridors, the treatment types and scale of construction can allow for minor variations to cycling corridor alignments where better outcomes can be demonstrated, without significant increases in program costs.

3 Preferred cycling facilities

The Victorian Government aims to increase the number, frequency and diversity of people cycling for transport, by investing in safer, lower stress cycling corridors to make cycling more appealing. Research shows that between 60 % and 70 % of people will consider cycling for short trips if cycling facilities are connected and separated from vehicles, with safe and prioritised road crossings provided. (Level of traffic stress - an Australian approach, 2025)

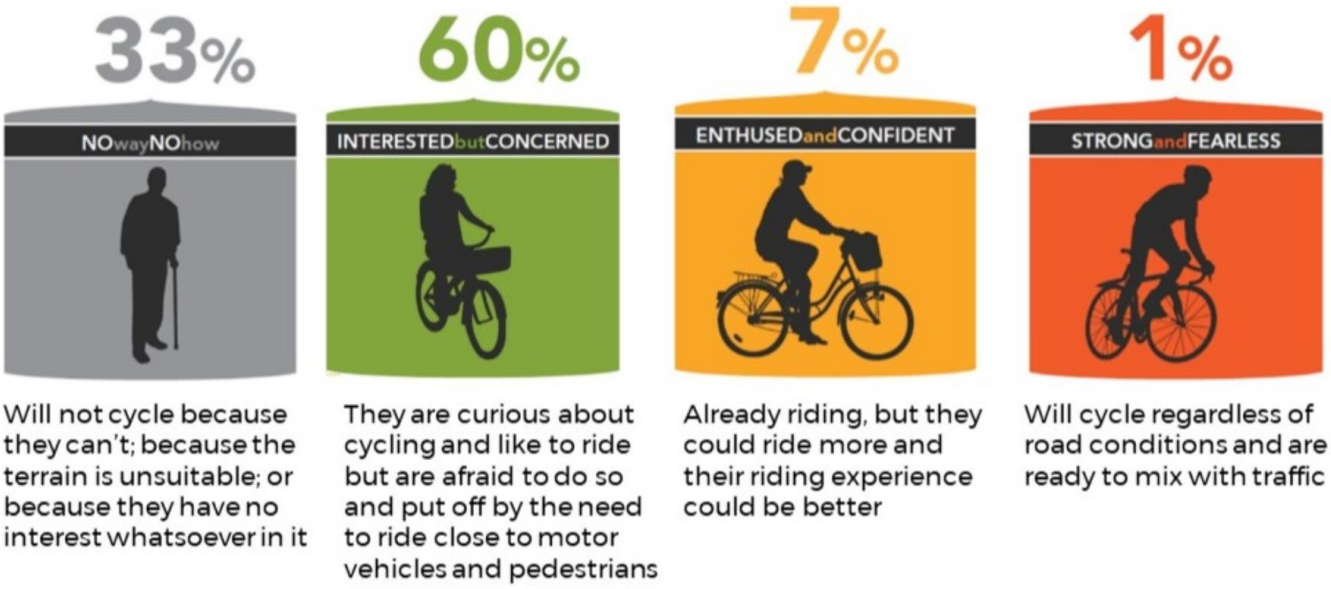


Figure 5 - Propensity to ride (**Level of Traffic Stress - an Australian approachl**)

Trafficworks understands that the preference is to provide protected cycling facilities, however, riders will consider riding near traffic when both traffic speed and volumes are low.

Trafficworks has adopted recent guidance from Austroads, identifying the suitability of on road cycling facilities, separated on-road cycling lanes and fully separated cycling treatments, shown in Figure 6. (Huggins, 2025)

Austroads guidance also discourages the use of shared paths as a treatment where high cycling and pedestrian conflict can occur. However, when assessing regional cities and corridors along train lines, Trafficworks noted that a shared path could continue to provide a suitable level of service along the corridor, due to the lower potential for pedestrians along the path.

Speed Limit[1]	Two-way traffic flow (peak hour pcus)	Off-road cycle track	Raised cycle track adjacent to kerb	On-road Protected Cycle Lane	Painted Cycle Lane	Mixed Traffic
20 km/h	< 200					
	200-400					
	> 400					
30 km/h	< 200					
	200-400					
	> 400					
40 km/h	< 200					
	200-400					
	> 400					
50 km/h	< 200					
	200 - 400					
	> 400					
60 km/h	Any					
≥ 80 km/h	Any	*				

Provision should be suitable for most users.

Provision is not suitable for all ages and abilities, and will exclude some users.

Provision not recommended because it will not be suitable for most users.

Provision not suitable.

Figure 6 - Austroads Guidance for new cycling infrastructure (AP-R724-25, page 34)

Where Infrastructure Victoria had received feedback on the initial draft of cycling network upgrades, Infrastructure Victoria and Trafficworks engaged with council officers to confirm the suitability of assumptions of the current strategic cycling corridors and proposed treatments. In most cases, the treatment identified by Trafficworks aligned with council planning investigations, and Trafficworks assumptions of construction complexity generally aligned with initial concept design work and community engagement completed by the councils.

Trafficworks also identified locations of cycling facilities that were under construction or have funding allocated for construction. Where we considered the planned upgrade to be suitable, these sections of path were excluded from the costing assessment. Examples of this include:

- the Veloway and planned cycling connections constructed as a part of the West Gate Tunnel project
- the Bendigo Low Lines cycling connection upgrade which Council has funding to construct components of the project.

4 Bicycle facility assumptions

Trafficworks completed a review of each cycling corridor using aerial images, Streetview and Mapillary to determine the most appropriate cycling facility for homogenous segments of a corridor. The most cost-effective cycling facility and an assessment of the construction complexity was assessed at a high level.

To simplify the cycling facility assumptions, Trafficworks created 3 categories of cycling treatments, including:

- bike boulevards (on road lanes)
- protected on road lanes
- off road paths (including shared paths and dedicated bike lanes).

Each segment of a corridor was assessed to determine a suitable cycling treatment which best aligns with the location. Further details of the cycling facility assumptions are listed in section 4.

The complexity and cost for each segment was also assessed. Assumptions for treatment complexity and cost are noted in section 6.

4.1 Bike boulevards

Trafficworks has combined the use of mixed traffic lanes and painted on road cycling lanes next to traffic into a category called ‘bike boulevards’.

Bike boulevards are typically located on urban residential streets with low traffic speeds volumes. To reduce traffic speeds, traffic calming devices such as speed humps, road narrowing and street closures are implemented to achieve a travel speed of 30 km/h or less.

A corridor is recommended to be upgraded if traffic calming measures are not installed at 80 m spacings or no linemarking is in place.

Figure 7 – Examples of bicycle boulevards, bicycle sharrows (left) and bicycle lanes (right)

Although providing landscaping and tree planting can enhance the amenity of the cycling corrior, the scale and cost of landscaping has not been completed by Trafficworks.

4.2 Protected on-road cycle lanes

Protected on road cycling lanes can be installed beside traffic lanes or behind parked vehicles and can operate as one-way lanes or two-way cycling lanes. Vehicle speeds on the road beside the bicycle lanes should remain below 60 km/h for these facilities to be considered comfortable for riders. Our analysis assumes physical separation with concrete kerbing to limit car parking encroaching on the cycling lane and to reduce ongoing maintenance costs.

Street constraints such as utility services, trees and road width influence the design and cost of protected on road cycle lanes, and Trafficworks has considered these when determining the complexity of construction.

Trafficworks has also recommended a corridor to be upgraded if the current cycling lane appeared temporary.

Figure 8 – Examples of temporary protected on road cycling lanes proposed to be upgraded

4.3 Shared path and off-road separated corridors

Trafficworks has combined shared path and dedicated off road cycling lane segments as ‘shared path’ corridors. These corridors include treatments that are to be constructed off road.

Trafficworks has identified the need to provide bicycle lanes separate to the footpath where pedestrian activity appeared high.

Trafficworks has also assumed that existing shared path upgrades would be required if the path appeared narrow.

Figure 9 – Example of a one-way separated off-road facility

Figure 10 - Example of a two-way separated off-road facility

Figure 11 - Example of separated cycling and pedestrian facilities

4.4 Street lighting

Trafficworks assessed adequacy of street lighting for off road paths. Where no street lighting exists, an allowance was made for either solar powered (35 metre spacing) or mains powered street lighting (50 metre spacing), to increase the feeling of safety and, therefore, the willingness to use the path at night.

Figure 12 – Example of a shared path with no streetlighting (Federation trail shared path)

Trafficworks has assumed that lengths of on road cycling facilities are suitably lit as part of roadway streetlighting schemes.

Each intersection and crossing point proposed to be installed or upgraded has included a street lighting upgrade cost.

4.5 Intersections, roundabouts and road crossings

A key element in providing high functioning cycling facilities is the provision of safe and efficient cycling road crossings. Trafficworks has used Austroads guidance to determine the type of crossing facility suitable for the corridor (Huggins, 2025).

These treatments have been identified and costed separately from the cycling facility, as the complexity and cost for each crossing can vary.

Speed Limit[1]	Two-way traffic flow (peak hour pcus)	At-grade Cycle Priority Crossing*	Uncontrolled Crossing*	Raised Priority Crossing*	Signal-controlled Crossing	Grade-separated Crossing
30 km/h	< 200		**			
	Any		**			
40 km/h	Any		**			
50 km/h	< 200		**			
	200-400		***			
	> 400					
60 km/h	< 200					
80 km/h	Any					
> 80 km/h	Any					

Provision should be suitable for most users.

Provision is not suitable for all ages and abilities, and will exclude some users.

Provision not recommended because it will not be suitable for most users.

Provision not suitable.

Figure 13 - Austroads guidance for appropriate cycling road crossing facilities (AP-R724-25, page 39)

4.5.1 Signalised intersections

Where a cycling corridor crosses a signalised intersection, Trafficworks has completed an assessment of the required upgrades to the traffic signal poles, bicycle lanterns, detectors, programming, bicycle lanes and traffic lanes to connect the bicycle corridor. The complexity of the upgrade has been considered for each location.

Trafficworks assumed a new signalised intersection would be installed to provide a safe crossing where a cycling corridor crosses a multi traffic lane or high-speed road at an uncontrolled intersection (Give Way or Stop control).

Trafficworks has also identified locations for new or upgraded midblock pedestrian operated signals. Existing traffic lights were assessed for any required upgrades to lanterns, poles or adjustments to traffic lanes and bike lanes to connect the bicycle corridor.

Figure 14 - Example of a change to traffic signal infrastructure to cater for separated cycling lanes

Figure 15 - Example of a high traffic volume and speed location identified for traffic signal installation

Figure 16 - Example of a pedestrian operated signal crossing requiring upgrade

4.5.2 Priority crossings

Where a cycling corridor crosses a low speed and traffic road, raised priority crossings have been selected as a suitable treatment. The complexity of construction at each location has been assessed.

Figure 17 - Example of a priority crossing

4.5.3 Protected roundabouts

Where a protected cycling lane crosses a roundabout, or an intersection at which a roundabout upgrade would be suitable, a protected roundabout treatment has been identified as a preferred treatment. The complexity of construction at each location has been assessed.

Figure 18 - Example of a protected roundabout

4.6 Bridges and railway crossings

There are some locations where a cycling corridor crossed a waterway or railway.

Where a bridge or underpass did not appear to be wide enough to provide the bicycle facility, the location was assessed for an upgrade. Trafficworks assessed the complexity and assumed cost at each location individually.

Where a cycling facility crossed a railway line, Trafficworks assessed the need to modify railway crossing hardware, and costed this as a special item.

Figure 19 - Example of a railway crossing requiring a modification to cater for a separated cycling facility

Figure 20 - Example of a bridge that was considered too narrow to provide a separated cycling facility. A separate structure was recommended as a potential solution at this location.

5 Infrastructure quantities

The high-level assessment of the infrastructure required to complete the cycling corridors upgrades in this analysis include approximately:

- 56 km of new or upgraded shared paths
- 83 km of new or upgraded protected bike lanes
- 33 km of new or upgraded bicycle boulevards
- 56 km of new street lighting
- 175 new or upgraded raised priority crossings
- 25 new or upgraded pedestrian operated signal sites
- 184 upgraded signalised intersection upgrades
- 12 new signalised intersections
- 28 new or upgraded protected roundabouts
- upgrades to bridges, railway crossings and land acquisition.

A map of each corridor's recommended treatments is provided in Appendix 1.

6 Infrastructure Costs

6.1 Overview

Trafficworks determined a range of construction costs based on the complexity of the corridor segment for each cycling treatment. Factors assessed when determining construction complexity include:

- the width available for the facility
- the need to relocate assets such as drainage, kerb lines, trees and utility services
- the required upgrade to an existing cycling lane.

Four levels of construction complexity were adopted, including Low, Medium, High and Very High for each treatment type. Assumptions for each level are detailed in the sections below.

An assessment of the likely cost rate of each construction complexity level has been determined using:

- cost estimates completed by Trafficworks for similar projects in the past 2 years
- construction constraints identified through project designs completed by Trafficworks
- recently completed project experience which council's and the Department of Transport and Planning (DTP) shared with Trafficworks during engagement.

Note that these costs include the design and construction costs for the project, and excludes any program management overhead costs.

As this is a high-level assessment, a risk profile has been applied for the cost of each treatment. For lengths of cycling lanes and crossing points, a range of -20% and +30% has been applied to the likely cost, to develop a lower (base), likely (P50) and an upper (P90) cost for the treatment.

Separate contingencies have been provided to wayfinding and street lighting costs detailed below, to reflect construction risk.

6.2 Cost rates for bicycle facilities

To align a cost with the construction complexity level, a set of criteria was developed for each treatment. Trafficworks identified examples of recently completed projects to determine a likely cost rate to complete the treatment. Table 1 shows the likely cost rates adopted for each infrastructure type for the level of construction complexity.

Table 1 - Summary of cost rates for bicycle infrastructure by complexity level

Infrastructure Type	**Likely (P50) cost per km**			
	Construction complexity			
	Low	**Medium**	**High**	**Very High**
Protected on-road	$500,000	$1,000,000	$1,500,000	$2,500,000
Shared use path / separated off-road	$500,000	$900,000	$1,500,000	$2,000,000
Bike sharrows	$25,000	$350,000	-	-
Bike lane	$50,000	$450,000	-	-

Trafficworks has developed the construction complexity range and cost per km rates by using examples of simple and complex bicycle projects we have developed, designed and completed risk-based cost estimates (RBCE) for both councils and DTP.

Trafficworks has also been provided engineers estimates of example cycling projects currently being delivered by councils, to confirm the application of complexity costs align with recent project delivery costs.

A description of the construction complexity criteria is provided for each treatment below.

6.2.1 Protected on-road bicycle lanes

Table 2 - Protected on road lane cost rates

Infrastructure Type	Likely (P50) cost per km			
	Low	Medium	High	Very High
Protected on-road	$500,000	$1,000,000	$1,500,000	$2,500,000

Low complexity

- Abundance of road width, concrete kerbing can be placed with minimal traffic lane or parking lane adjustments
- No kerb line or drainage adjustments required.

Medium complexity

- Abundance of road width with some constraints along the segment
- Parking may need to be relocated at some locations to allow for kerbside protected lane
- Removal of kerb outstand or trees required at some locations

High complexity

- Road width has many constraints along the segment
- Parking will need to be relocated at many locations to allow for kerbside protected lane
- Requires removal of a traffic lane at some locations
- May require road widening at some locations
- High volume and/or speed road.

Very high complexity

- Limited road width with consistent constraints along the segment
- High demand parking will need to be relocated to allow for kerbside protected lane
- Requires removal of a traffic lane and road widening at many locations
- High traffic volume and/or speed road / major road
- There is public transport along the route, requiring upgrades to bus and tram stops.

6.2.2 Shared use path / separated off road path

Table 3 - Shared use and separated off-road path cost rates

Infrastructure Type	Likely (P50) cost per km			
	Low	**Medium**	**High**	**Very High**
Shared use path	$500,000	$900,000	$1,500,000	$2,000,000

Low complexity

- Existing footpath or shared path, upgrade such as minor path widening, pavement resurfacing or linemarking
- New shared path with abundance of space for construction with little to no constraints.

Medium complexity

- New shared path with minor civil works required and abundance of space for construction with some constraints at some locations along the path
- May require low level of tree removal.

High complexity

- New shared path with extensive civil works required and limited space for construction with many constraints at many locations along the path
- May require verge widening and some space along the road reserve to be taken to allow space for the path
- Considerable tree removal required
- Some bus stop adjustments may be required.

Very high complexity

- New shared path with extensive civil works required and little to no space for construction with significant constraints along the path
- Will require road narrowing and significant space along the road reserve to be taken to allow space for the path
- Significant tree or utility asset relocation
- Feasibility may be difficult, and a parallel route may be required to be investigated
- Driveway and intersection conflict points, requiring construction of crossings and new crossovers.

6.2.3 Bicycle boulevards

Table 4 - Bicycle boulevard cost rates

Infrastructure Type	Likely (P50) cost per km			
	Low	**Medium**	**High**	**Very High**
With bike sharrows	$25,000	$350,000	-	-
With painted bike lane	$50,000	$450,000	-	-

Low complexity

- Traffic calming exists along the route
- Only new linemarking is required (i.e. sharrows or bicycle lane linemarking).

Medium complexity

- Some form of speed reduction treatment / traffic calming will be required every 80 to 100 m along the route.

6.3 Cost rates for intersections and crossings

Table 5 shows the range of cost rates adopted for each intersection, crossing type and construction complexity.

Table 5 – Cost rates for intersections and crossings

Infrastructure Type	Likely (P50) cost per location			
	Low	**Medium**	**High**	**Very high**
Protected roundabout	$200,000	$800,000	$1,500,000	$3,000,000
Signalised intersection	$200,000	$500,000	$1,000,000	$5,000,000
Pedestrian operated signal	$50,000	$500,000	$1,500,000	$2,000,000
Raised priority crossing	$60,000	$100,000	$160,000	$200,000
Bridges	$200,000	$500,000	$2,000,000	$15,000,000
Intersection upgrade (general)	$200,000	$300,000	$1,000,000	$3,000,000

Trafficworks has developed the cost rates and complexity for each treatment type, using multiple examples of simple and complex pedestrian and bicycle crossing treatments we have developed, designed and completed risk-based cost estimates (RBCE) for councils and DTP.

Councils have also provided Trafficworks recent feedback on projects currently under construction, including construction complexity and updated construction industry costings. We have used this information to align the complexity and costs assumptions, detailed below.

6.3.1 Protected roundabout

Table 6 – Protected roundabout cost rates

Infrastructure Type	Likely (P50) cost per location			
	Low	**Medium**	**High**	**Very High**
Protected roundabout	$200,000	$800,000	$1,500,000	$3,000,000

Low complexity

- Existing roundabout with adequate space for protected lanes
- Low speed and low volume road.

Medium complexity

- Existing roundabout with acceptable space for protected lanes
- Low speed and low volume road
- Minor constraints on site.

High complexity

- Existing roundabout with limited space for protected lanes
- Relocation of some service utilities
- High speed and volume corridor
- Complex roundabout design, requiring geometry changes to the roundabout layout.

Very high complexity

- New protected roundabout at unsignalised intersection, or
- An existing roundabout with little to no space for protected lanes, requiring service relocations and significant changes to the roundabout geometry.

6.3.2 Traffic signal intersections

Table 7 – Traffic signal cost rates

Infrastructure Type	Likely (P50) cost per location			
	Low	Medium	High	Very High
Signalised intersection	$200,000	$500,000	$1,000,000	$5,000,000

Low complexity

- Existing traffic signal-controlled intersection
- Minor upgrades to lanterns including bicycle lanterns, loop detection and early start phasing
- No civil works at the intersection proposed.

Medium complexity

- Existing traffic signal-controlled intersection
- Minor upgrades to lanterns including bicycle lanterns, loop detection and early start phasing
- Minor civil works at the intersection proposed
- Inclusion of additional treatments, such as a priority crossing on a left turn slip lane.

High complexity

- Existing traffic signal-controlled intersection, requiring a major upgrade to signal hardware
- Major civil works at the intersection required
- Service utility relocation required.

Very high complexity

- New traffic signal installation.

6.3.3 Pedestrian Operated Signals

Table 8 – Pedestrian operated signal cost rates

Infrastructure Type	Estimated cost per km			
	Low	Medium	High	Very High
Pedestrian operated signal	$50,000	$500,000	$1,500,000	$2,000,000

Low complexity

- Existing pedestrian operated signal site
- Minor upgrades to lanterns including bicycle lanterns, loop detection and phasing
- No civil works proposed.

Medium complexity

- Existing pedestrian operated signal
- Minor upgrades to lanterns including bicycle lanterns, loop detection and phasing
- Minor civil changes are required.

High complexity

- New pedestrian operated signal or major upgrade to signal hardware required
- Civil works at the intersection required
- Service utility relocation required.

Very high complexity

- New pedestrian operated signal
- Major civil works required
- Significant service utility relocation required.

6.3.4 Raised priority crossings

Table 9 – Priority crossing cost rates

Infrastructure Type	Likely (P50) cost per location			
	Low	Medium	High	Very High
Raised priority crossing	$60,000	$100,000	$160,000	$200,000

Low complexity

- Narrow road with no kerb outstands required
- Low speed and low volume road or service road
- May be installed without raised platform
- Minor streetlight modifications.

Medium complexity

- Wide local road with possible need for kerb outstands
- Low speed and low volume road or service road.

High complexity

- Very wide local road with need for kerb outstands
- Constraints on the site, including drainage or utility services
- Major streetlighting upgrades.

Very high complexity

- Very wide local road with need for kerb outstands
- Major constraints on the site, including drainage and utility services.

6.3.5 Bridges

Table 10 – Bridge cost rates

Infrastructure Type	Likely (P50) cost per location			
	Low	Medium	High	Very High
Bridges	$200,000	$500,000	$2,000,000	$15,000,000

Low complexity

— Small creek crossing, light weight construction (10 metres long)

Medium complexity

— Large creek crossing (20 metres long).

High complexity

— Minor widening of existing structure, or new structure (40 metres long).

Very high complexity

— New long structure required, the existing bridge cannot accommodate cycling lanes.

6.3.6 Uncontrolled intersections

Table 11 – Uncontrolled intersection cost rates

Infrastructure Type	Likely (P50) cost per location			
	Low	Medium	High	Very High
Intersection Upgrade (General)	$200,000	$300,000	$1,000,000	$3,000,000

Low complexity

— Minor safety improvements to an intersection, including traffic islands or turn bans.

Medium complexity

— Moderate changes to an intersection, including minor road widening

High complexity

— Major changes to intersection arrangement, including new turning lanes.

Very high complexity

— New roundabout with speed humps.

6.4 Cost rates for lighting and wayfinding

Table 12 shows the cost rates adopted for lighting and wayfinding

Table 12 – Cost rates for lighting and wayfinding

Infrastructure Type	Likely (P50) cost per km
Street lighting (Solar)	$450,000
Street lighting (Mains)	$500,000
Wayfinding (On-road)	$2,000
Wayfinding (Off-road)	$10,000

A separate contingency has been allocated to lighting and wayfinding, due to the many factors that can influence the cost. These are detailed below:

Street lighting (Solar): -20%, +20%

- The cost variation in solar street lighting is lower as the installation complexity is low
- Sites where dense vegetation exists were excluded from solar lighting.

Street lighting (Mains): -20%, +100%

- This allows for the complexity of supplying power to streetlights in some locations.

Wayfinding (On-road and Off-road): -20%, +500%

- This variation allows for the different style guides and standards each Council applies in wayfinding signage
- Pavement marking may be adopted in addition to current signage strategies.

6.5 Cost for land acquisition

Some locations were identified as potentially requiring land acquisition to construct an off-road path. These scenarios could include:

- where there is a preference to continue an off-road path which requires the alignment to pass through private property
- where there are no feasible alternative routes
- avoiding the path to cross major roads

In our assessment, we have minimised the extent of land acquisition, and have only identified this as a last resort. During the development of the projects, a more detailed assessment of an alternative route which avoids land acquisition can be determined.

Where land acquisition is identified, Trafficworks has allowed indicative costs for investigations, legal fees and compensation.

6.6 Complexity and cost example– Sunshine activity centre

To demonstrate how the cycling facility selection, complexity and cost have been determined for each corridor, the Sunshine activity centre has been provided as an example. Figure 21 – 26 shows the cycling facility length assumptions and Figure 27 - 31 shows crossing upgrade assumptions.

6.6.1 Sunshine - Bicycle corridors

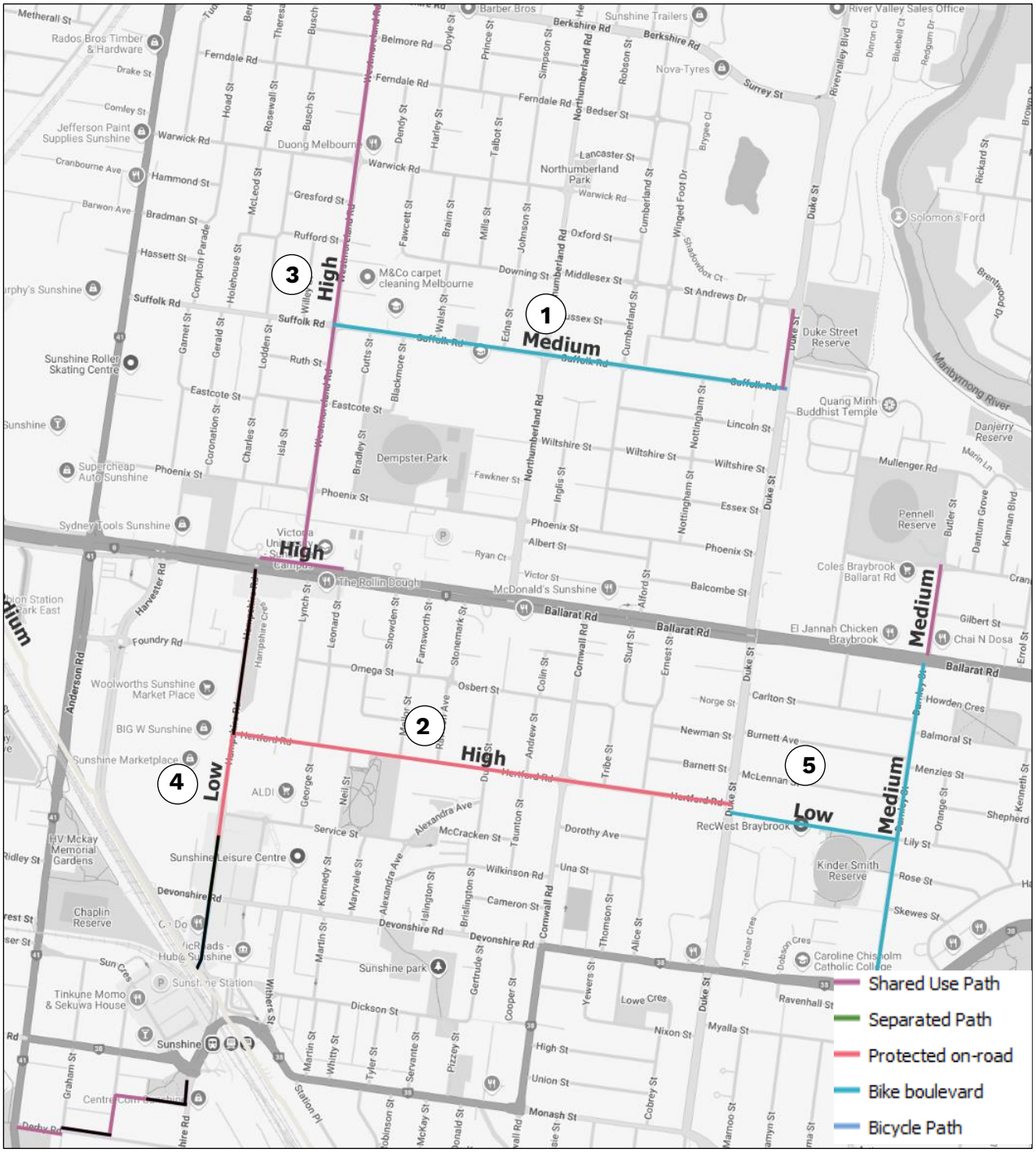


Figure 21 – Bicycle facility examples - Sunshine

1: Suffolk Road - Bike boulevard - Medium complexity

Suffolk Road currently has painted bicycle lane on both sides of the road. There are speed humps at various locations along the road, however most are spaced more than 120 m apart. It is assumed that more frequent speed reduction devices would be required to achieve safe operating speeds to mix cyclists and traffic. Due to these reasons, the proposed treatment along the subject length was identified as a medium complexity bike boulevard.

Figure 22 - Suffolk Road

2: Hertford Road - Protected on road bicycle lanes – High complexity

Hertford Road currently has a shared parking bicycle lane on both sides. The road was considered too busy for a bicycle boulevard, and too difficult to achieve off-road bicycle lanes.

Protected on road bicycle lanes on Hertford Road will require parking removal, traffic lane adjustments and bus stop modifications. Due to these reasons, the proposed treatment along the subject length was identified as a high complexity.

Figure 23 – Hertford Road

3: Westmoreland Road - Shared use path – High complexity

Westmoreland Road currently has a mix of on-road painted cycling lanes and shared parking/bicycle lanes. Due to the presence of schools and the traffic volume on the road, it was determined that a shared path would be an appropriate facility along the corridor. To construct a shared path, a considerable amount of tree removal or modifications to the kerb lines would be required. Due to these reasons, the proposed treatment along the subject length was identified as a high complexity shared use path.

Figure 24 – Westmoreland Road

4: Hampshire Road - Protected on road bicycle facility – Low complexity

Hampshire Road currently has a painted bicycle lane on both sides, separated from the traffic lanes with a painted buffer. A high quality protected on road facility could be constructed by placing a concrete buffer within the painted buffer. No kerb works would be required. Due to these reasons, the proposed treatment along this road section was identified as a low complexity, protected on-road facility.

Figure 25 – Hampshire Road

5: Lily Street - Bike boulevard - Low complexity

Figure 26 – Lily Street

There are no existing bicycle facilities on Lily Street. There are speed humps along the entire subject length which are spaced approximately 80-90 m apart. This level of traffic calming would likely achieve operating speeds which are suitable for mixing cyclists and traffic. Therefore, to convert this corridor into a bike boulevard, linemarking is likely the only works required. Due to these reasons, the proposed treatment along the subject length was identified as a low complexity bike boulevard.

6.6.2 Sunshine - Intersections and crossings

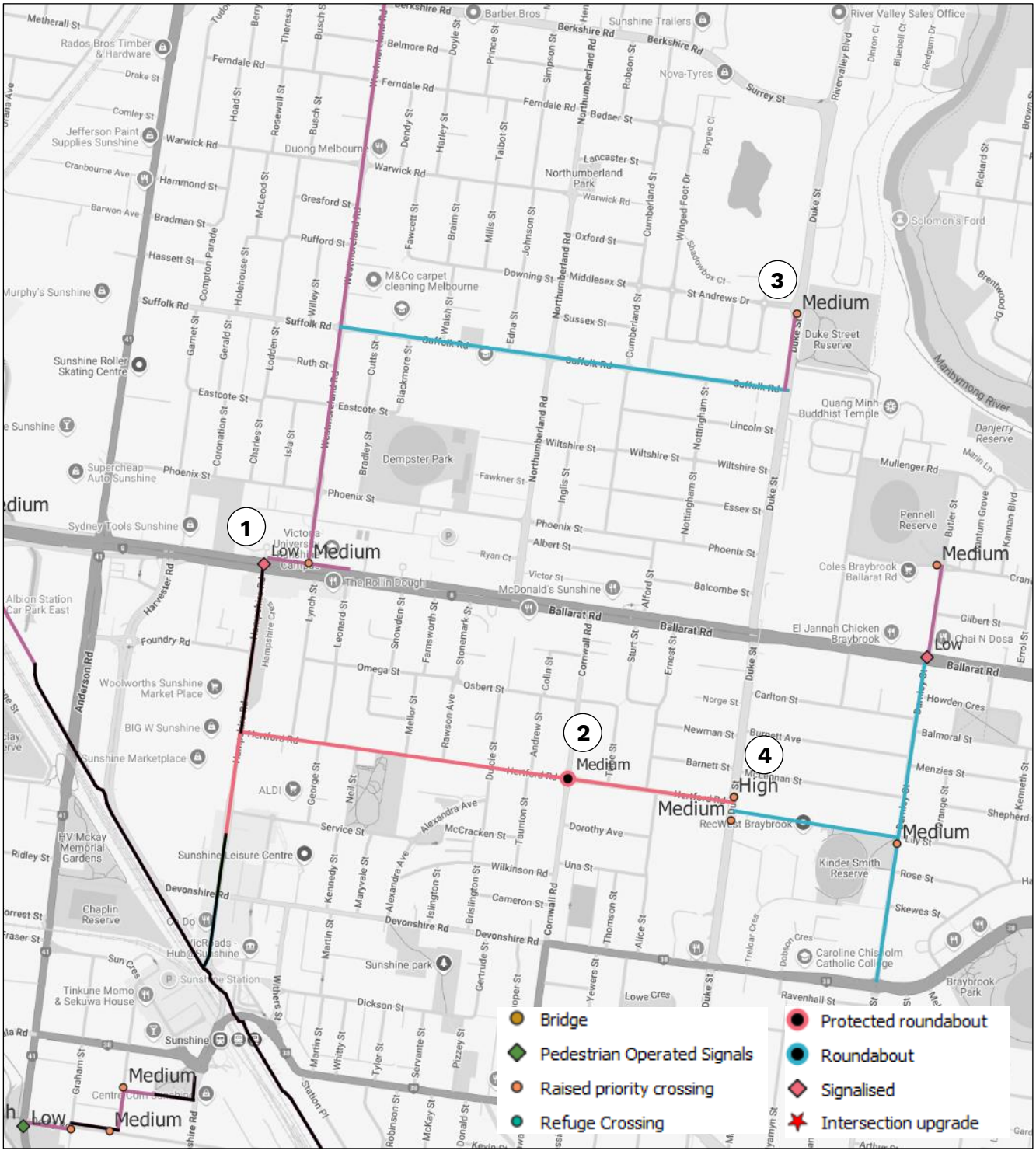


Figure 27 - Intersection and crossing examples - Sunshine

1: Ballarat Road/Hampshire Road - Traffic signal upgrade – Low complexity

The pedestrian cross walks do not have cyclist lanterns at this intersection, which requires cyclists to dismount. To make this crossing suitable for cyclists, widening the crossings and installing bicycle lanterns would be required. This is considered a low complexity signal upgrade.

Figure 28 – Ballarat Road/Hampshire Road

2: Hertford Road/Cornwall Road - Protected roundabout – Medium complexity

The existing roundabout will need to be upgraded to accommodate new cycling lanes. This could be achieved by making minor adjustments to the kerbs, providing dedicated cycling lanes and installing traffic calming devices on the approaches, which could include wombat crossings. The implementation of this treatment is considered a medium complexity protected roundabout, due to the existing size of the roundabout.

Figure 29 – Hertford Road/Cornwall Road

3: Cranwell Street, west of Butler Street – Raised priority crossing - Medium complexity

There is currently a refuge crossing at this location, however Trafficworks has assumed a safer priority crossing would be provided to complete the shared path connection to the reserve. Given the current traffic volumes and speeds, a raised priority crossing is considered appropriate. To construct this crossing, footpath adjustments, moderate kerb works, drainage works and streetlighting would be required. This is considered a medium complexity priority crossing.

Figure 30 – Cranwell Street

4: Duke Street, north of Hertford Road - Raised priority crossing – High complexity

A raised priority crossing was identified as a suitable treatment across Duke Street to provide a smooth connection along Hertford Road into Lily Street. To construct the crossing on Duke Street, kerb extensions, new shared path connections, driveway modifications, complex drainage and street lighting upgrades would be required. Service relocations may also be required. This site is considered a high complexity raised priority crossing.

Figure 31 – Duke Street

A second priority crossing was also assumed on the south side of the intersection, to provide a smooth connection for cyclists travelling east to west.

6.6.3 Sunshine – Cost range

By applying the cost rates determined above, a summary of the quantity and likely (P50) cost for each treatment in the Sunshine activity centre is provided in Table 13.

Table 13 – Quantity and cost of infrastructure by complexity (P50 cost)

Infrastructure Type	**Quantity and cost (P50) of infrastructure by complexity**				
	Low	Medium	High	Very High	Total Infrastructure P50 Cost
Protected on-road	0.25 km ($127,216)	- -	1.23 km ($1,848,812)	- -	$1,976,028
Shared use path	- -	0.51 km ($460,773)	1.60 km ($2,402,168)	- -	$2,862,941
Bike boulevard	0.41 km ($10,256)	1.91 km ($669,099)	- -	- -	$679,355
Protected roundabout	- -	1 ($800,000)	- -	- -	$800,000
Signalised intersection	2 ($400,000)	- -	- -	- -	$400,000
Pedestrian operated signal	- -	- -	1 ($1,500,000)	- -	$1,500,000
Raised priority crossing	1 ($60,000)	7 ($700,000)	1 ($160,000)	- -	$920,000
Lighting	0.22 km ($100,848)	- -	- -	- -	$100,848
Wayfinding	5.99 km ($11,974)	0.79 km ($7,895)	- -	- -	$19,869

Given the high-level assessment of cycling facilities and likely costings, Trafficworks has provided an indicative cost range, by applying a risk profile to the likely cost of each item, as identified in Section 6.1 and Section 6.4. which provides a lower cost (Base) and an upper cost (P90) for the potential cycling facility upgrades for Sunshine. This summary is provided in Table 14.

Table 14 – Base, P50 and P90 costs for Sunshine activity centre cycling upgrades

Infrastructure Type	**Cost estimate ($)**		
	Lower (Base)	Likely (P50)	Upper (P90)
Protected on-road (-20%, +30%)	$1,580,823	$1,976,028	$2,568,837
Shared use path (-20%, +30%)	$2,290,353	$2,862,941	$3,721,824
Bike boulevard (-20%, +30%)	$543,484	$679,355	$883,162
Protected roundabout (-20%, +30%)	$640,000	$800,000	$1,040,000
Signalised intersection (-20%, +30%)	$320,000	$400,000	$520,000
Pedestrian operated signals (-20%, +30%)	$1,200,000	$1,500,000	$1,950,000
Raised priority crossing (-20%, +30%)	$736,000	$920,000	$1,196,000
Solar path lighting (-20%, +20%)	$80,679	$100,848	$121,018
Wayfinding (-20%, +500%)	$15,896	$19,869	$119,217
Total Sunshine activity centre cost	**$7,407,235**	**$9,763,647**	**$12,120,059**

7 Program costing

7.1 Corridor cost

Adopting the assumptions outlined in Section 6, the lower, likely and upper cost for each priority cycling corridor is shown in Table 15. A summary of the identified treatments proposed for each of the corridors is shown in Appendix A. Trafficworks cost estimate is based on 2025 costs and have not been subject to escalation.

Table 15 - Corridor cycling upgrade costs (2025 costs)

Corridors	**Cost estimate ($ million)**		
Metropolitan corridors	**Lower (Base)**	**Likely (P50)**	**Upper (P90)**
B1 - Northcote to Moonee Ponds	$13.5	$17.7	$22.0
B2 - Essendon to La Trobe University	$25.3	$33.4	$41.5
B3 - St Kilda Rd to Clayton	$15.9	$21.1	$26.3
B4 - Box Hill to Docklands	$43.6	$57.4	$71.3
B5 - Werribee to West Footscray	$25.2	$33.3	$41.5
B6 - Johnston Street to Anzac Station	$8.7	$11.4	$14.2
B7 - Anzac Station to Sandringham	$30.8	$40.6	$50.4
B8 - St Albans to Docklands	$7.5	$10.3	$13.0
B9 - Highpoint to Footscray	$8.9	$11.7	$14.6
B10 - Essendon to Southbank	$27.6	$36.2	$44.9
B17 - Caulfield to Auburn	$9.9	$13.1	$16.2
B18 - Murrumbeena to Southland	$18.7	$24.7	$30.7
B19 - Chadstone Link	$3.9	$5.1	$6.4
TOTAL METRO	**$239.6**	**$316.2**	**$392.9**

Corridors	Cost estimate ($ million)		
Regional Corridors	**Lower (Base)**	**Likely (P50)**	**Upper (P90)**
B11 - Wodonga	**$15.7**	**$20.6**	**$25.6**
CR21 - Beechworth Rd and High St	$5.8	$7.6	$9.5
CR22 - Felltimber Comm. Centre to Murray Valley Hwy	$9.8	$13.0	$16.1
B12 - Wangaratta	**$12.6**	**$17.0**	**$21.5**
CR17 - One Mile Creek Trail - South	$3.9	$5.6	$7.2
CR19 - Phillipson Street	$2.6	$3.5	$4.3
CR20 - Bachelors Green to Apex Park	$6.1	$8.0	$9.9
B13 - Bendigo	**$30.4**	**$40.7**	**$50.9**
CR8 - Bendigo to Kangaroo Flat	$6.2	$8.8	$11.4
CR9 - Bendigo to North Bendigo	$15.6	$20.5	$25.4
CR10 - Bendigo to Latrobe University	$1.6	$2.2	$2.7
CR29 - Long Gully Trail to Eaglehawk	$7.0	$9.2	$11.4
B14 - Castlemaine	**$4.2**	**$5.5**	**$6.8**
CR28 - Castlemaine Secondary College to Western Reserve	$4.2	$5.5	$6.8
B15 - Ballarat	**$34.8**	**$45.8**	**$56.8**
CR5 - Ballarat Central to Victoria Park	$0.5	$0.7	$1.0
CR6 - Ballarat Central to Sebastopol	$25.7	$33.8	$41.9
CR30 - Ballarat to Ballarat North	$8.5	$11.2	$13.9
B16 - Geelong	**$21.6**	**$28.5**	**$35.4**
CR1 - Western Link Cycling Route	$1.6	$2.1	$2.6
CR3 - Geelong City to Newcomb	$5.5	$7.2	$9.0
CR4 - Southern Cycling Route	$14.5	$19.2	$23.8
TOTAL REGIONAL	**$119.3**	**$158.1**	**$197.0**

7.2 Activity centre connections in Melbourne's west

In addition to assessing strategic cycling corridors, Trafficworks assessed the cycling network around activity centres in Melbourne's west. A well-connected cycling network increases the propensity to cycle, particularly where connections to activity centres and train stations are available.

Trafficworks completed an assessment at 4 activity centres in the west of Melbourne, including St Albans, Sunshine, Footscray and Werribee. The assessment considered the existing cycling connections, the Principal Bicycle Network (PBN), council cycling strategies and major development zones to determine appropriate cycling infrastructure investment around key train stations and target growth areas.

Trafficworks assessed the cycling facilities for a 2 km radius around each activity centre.

Common themes identified in the assessment include:

- inner city activity centres required a closer spaced network of cycling facilities, with narrow road reserves increasing deliverability complexity
- implementing cycling facilities on inner Melbourne areas will require removal of car parking and road space allocation
- outer suburb activity centres have a higher tendency to deliver shared path facilities, particularly along creeks and train lines
- as densification of outer suburbs occur, there is an opportunity to plan strong connections through the development areas, and it will be possible to reduce on street parking to create separated bicycle lanes in the future
- the PBN in the outer suburbs appears to be planned with on road bicycle lanes on higher speed, higher volume roads. Trafficworks identified and costed facilities away from the PBN where the corridor did not appear to provide a safe cycling connection or routes needed to connect to new developments.

Any new development areas which are proposed to have high quality cycling connections to be built within the site have been excluded from this cost assessment, particularly around Sunshine.

The cost estimates for the preferred infrastructure in the activity centres is provided in Table 16.

Table 16 - Activity centre cycling upgrade costs (2025 costs)

Activity centres	Trafficworks (2025) cost estimate ($million)		
	Lower (Base)	Likely (P50)	Upper (P90)
Footscray	$16.2	$21.3	$26.4
St Albans	$7.5	$9.9	$12.4
Sunshine	$7.4	$9.8	$12.1
Werribee	$6.8	$9.2	$11.6
TOTAL	**$37.9**	**$50.2**	**$62.4**

7.3 Total construction cost

The total program cost (2025) to upgrade 13 metropolitan corridors, 6 regional cities and local connections to 4 activity centres in the west of Melbourne is estimated to be between $397 million and $652 million (2025 costs), with a likely program cost of $525 million.

The cost estimate is strategic in nature. Further design, project development and community consultation would be required to confirm project scope and cost for each corridor.

Table 17 - Total program upgrade costs (2025 costs)

Corridors	Trafficworks (2025) cost estimate ($million)		
	Lower (Base)	Likely (P50)	Upper (P90)
Metro (13 corridors)	$239.6	$316.2	$392.9
Regional (6 regional cities)	$119.3	$158.1	$197.0
Activity centres (4 centres)	$37.9	$50.2	$62.4
TOTAL PROGRAM	**$396.8**	**$524.5**	**$652.3**

8 Delivery agency and risks

8.1 Asset ownership

Trafficworks completed a high-level assessment of the likely asset ownership of the cycling infrastructure using guidance in the Road Management Act. Trafficworks determined that approximately 85 % of the cycling infrastructure proposed for construction would become a council asset.

Trafficworks has assumed that most of the upgrades will be delivered by councils, with the remaining infrastructure likely to be delivered by DTP.

8.2 Delivery timeframe

Trafficworks has assessed the feasibility of constructing the cycling treatments over a 10-year period, in line with the aim of the Strategy.

Based on our professional experience and knowledge gained from similar projects, the following project delivery assumptions were made:

- planning funding of 20 % of the project to occur 2 years prior to construction for large projects
- low and medium complexity treatments to be completed in the earlier years of the program
- proposals replacing existing facilities to be completed in later years
- delivery timeframes of between 2 and 4 years for corridors, depending on the scale of investment along the corridor.

Trafficworks forecast for the likely costs of each corridor over a 10-year period, with the summary provided in Table 18. Details of the forecast expenditure for each corridor is provided in Appendix 3.

Table 18 - 10-year investment forecast (likely costs (P50) – 2025 costs)

Year	1	2	3	4	5	6	7	8	9	10
$ (million)	$21.1	$32.6	$83.1	$94.2	$80.0	$54.4	$35.9	$54.2	$48.9	$20.0

8.3 Program risks

In completing this assessment, Trafficworks identified risks other than the construction cost that may impact the successful delivery of high-quality strategic cycling corridors, including:

- changes to existing strategic cycling network plan, including changes to corridors and road user priorities

- community concern with broader transport impacts, including the perceived or real impact on vehicle travel times and on street parking
- increased costs to council in maintaining higher-quality cycling facilities.
- as most treatments identified for installation will be assets that are managed by councils, additional state government support is likely to be required to manage the program. Programs of this scale typically have a 10 % program management overhead cost. This has not been allowed for in the costings.

9 Maintenance costs and treatment life

To support the economic analysis of the cycling infrastructure upgrades, Trafficworks identified the annual maintenance cost and treatment life for each type of cycling treatment using the following guidance:

- DTPs Benefit Cost Ratio spreadsheet for road safety treatments, which identifies annual maintenance costs and treatment life for traffic signal, street lighting, linemarking and priority crossing treatments
- Australian Road Research Board (now National Transport Research Organisation - NTRO) costings for road and bridge maintenance costs
- examples of completed maintenance audits of shared paths by Trafficworks, including an assessment of the cost of remedial treatments.

Engagement with councils was undertaken on the maintenance of shared path and separated on road cycling lanes. Councils indicated that annual maintenance costs range from approximately 0.5 % of the project capital cost, increasing to 2.5 % towards the end of the life of the project. To simplify the assessment, an average rate has been applied to individual treatments.

For this assessment, Trafficworks has assumed maintenance costing for lengths of cycling facilities to align with the likely medium construction complexity costing, as the complexity to build cycling facility does not typically relate to the ongoing maintenance costs.

Table 19 - Infrastructure maintenance costs – crossings and intersections

Infrastructure type	Treatment life (years)	Annual cost ($ per site)
New protected roundabout	25	4,500
New roundabout	25	4,000
New signalised intersection	15	6,500
Pedestrian operated signal	15	4,500
Raised priority crossing	20	1,500
Upgrade of existing signals	15	200
Small bridge	20	3,000
Large bridge	100	20,000

Table 20 - Infrastructure maintenance costs - paths

Infrastructure type	Treatment life (years)	Annual cost ($ per km)
Protected on-road	25	7,500
Separated off-road	30	12,000
Shared use path	30	13,500
Bike boulevard	15	7,000
Street lighting	20	12,000
Wayfinding	10	1,000

Trafficworks has estimated the annual maintenance cost of the proposed infrastructure upgrades to be **$3.2 million per year**.

The yearly maintenance cost for each corridor is provided in Appendix 2.

Council officers consulted advised that maintenance budgets are typically low for cycling infrastructure and this often results in delayed maintenance, including sweeping, tree trimming, surface repairs and linemarking. Ensuring maintenance funding is available for strategic cycling corridors would ensure the level of service and safety provided can be maintained.

10 Findings

Trafficworks has completed a high-level review of Infrastructure Victoria's cycling recommendation in Victoria's 30-year infrastructure strategy. It aims to upgrade the higher priority strategic cycling corridors in Melbourne and Victoria's regional cities.

Trafficworks assessed the feasibility and cost of installing cycling treatments on 13 metropolitan corridors, 6 Regional cities and local connections to 4 activity centres in the west of Melbourne.

The likely cost to complete cycling upgrades on these corridors is $595 million, with a range $396 million to $652 million (2025 costs).

Trafficworks completed an assessment of the likely ownership of the proposed cycling facilities in this analysis. Approximately 85 % of the cycling infrastructure identified by Trafficworks will likely be assets managed by councils as defined in the Road Management Act. As a result, councils will be a suitable delivery agency for the majority of these assets.

Trafficworks treatment and cost assessment is strategic in nature. Further design, project development and community consultation will be required to confirm the project scope and cost for each corridor. This has been considered in the staging of works over a 10-year period.

Further investigations could result in councils identifying alternative parallel corridors.

The additional annual maintenance costs as a result of upgrading or constructing new cycling lanes is approximately $3.2 million per year (2025 costs), which will increase as the assets age.

Appendix 1 – Corridor treatment maps

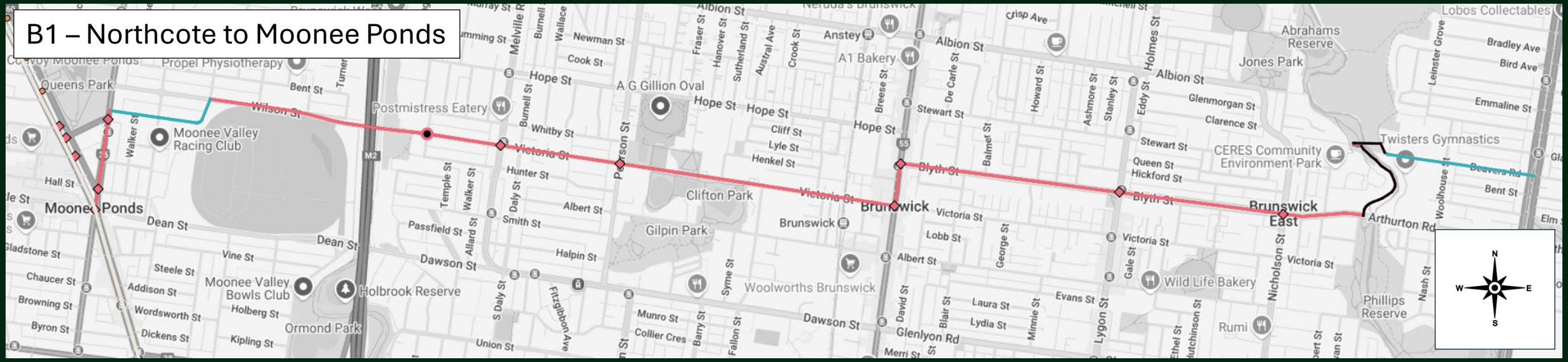
Priority Cycling Corridor Maps

New or Upgraded Infrastructure

240775 – Infrastructure Victoria

TRAFFICWORKS™

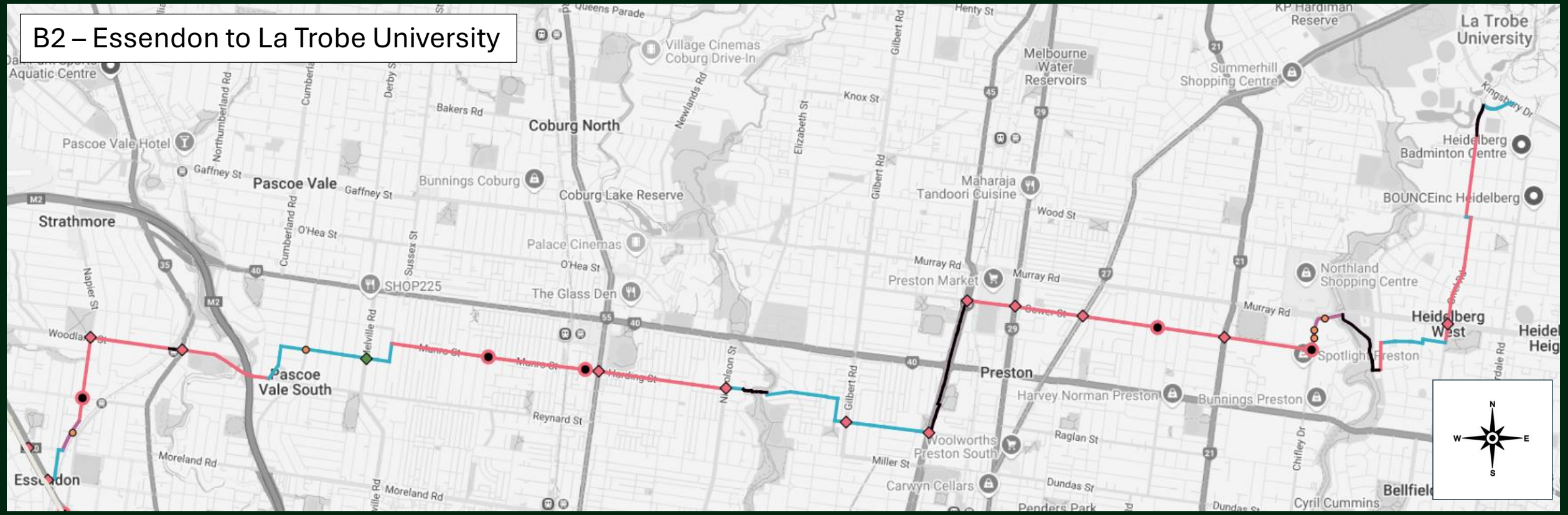
B1 – Northcote to Moonee Ponds



Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

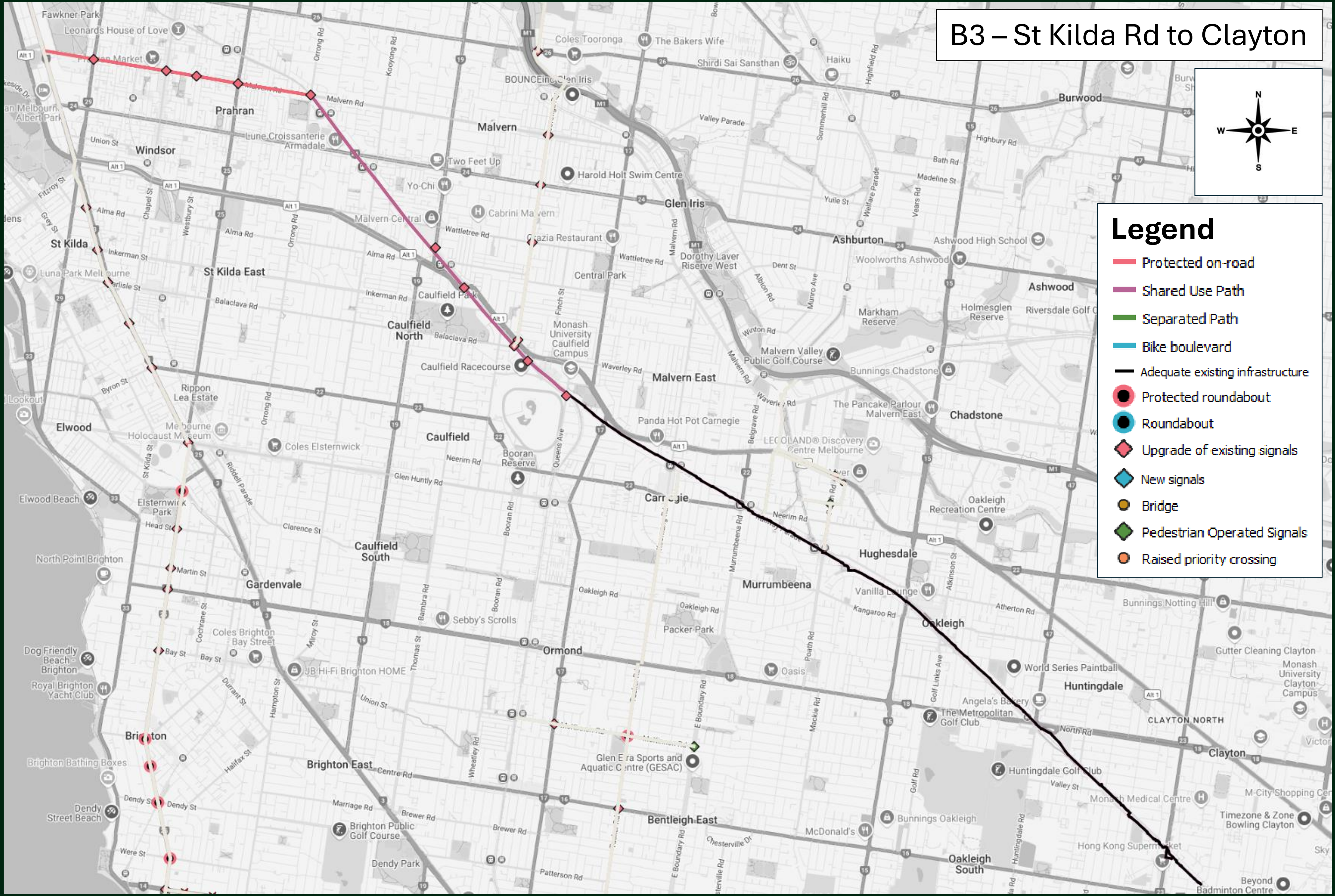
B2 – Essendon to La Trobe University



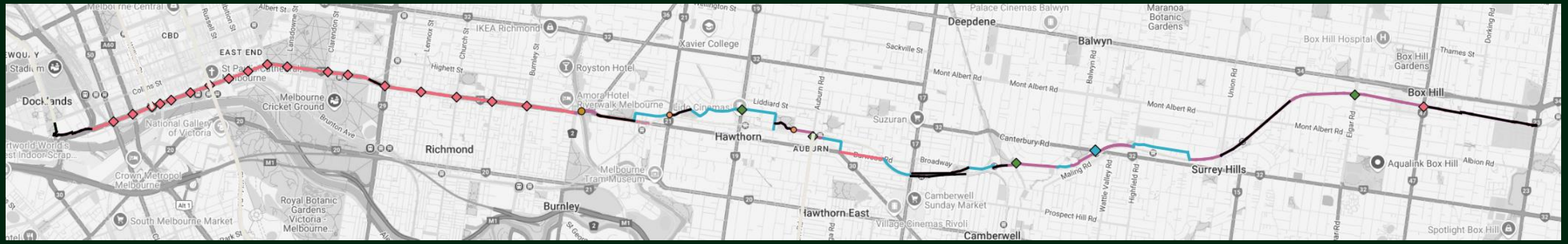
Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

B3 – St Kilda Rd to Clayton



B4 – Box Hill to Docklands



Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

N
W
E
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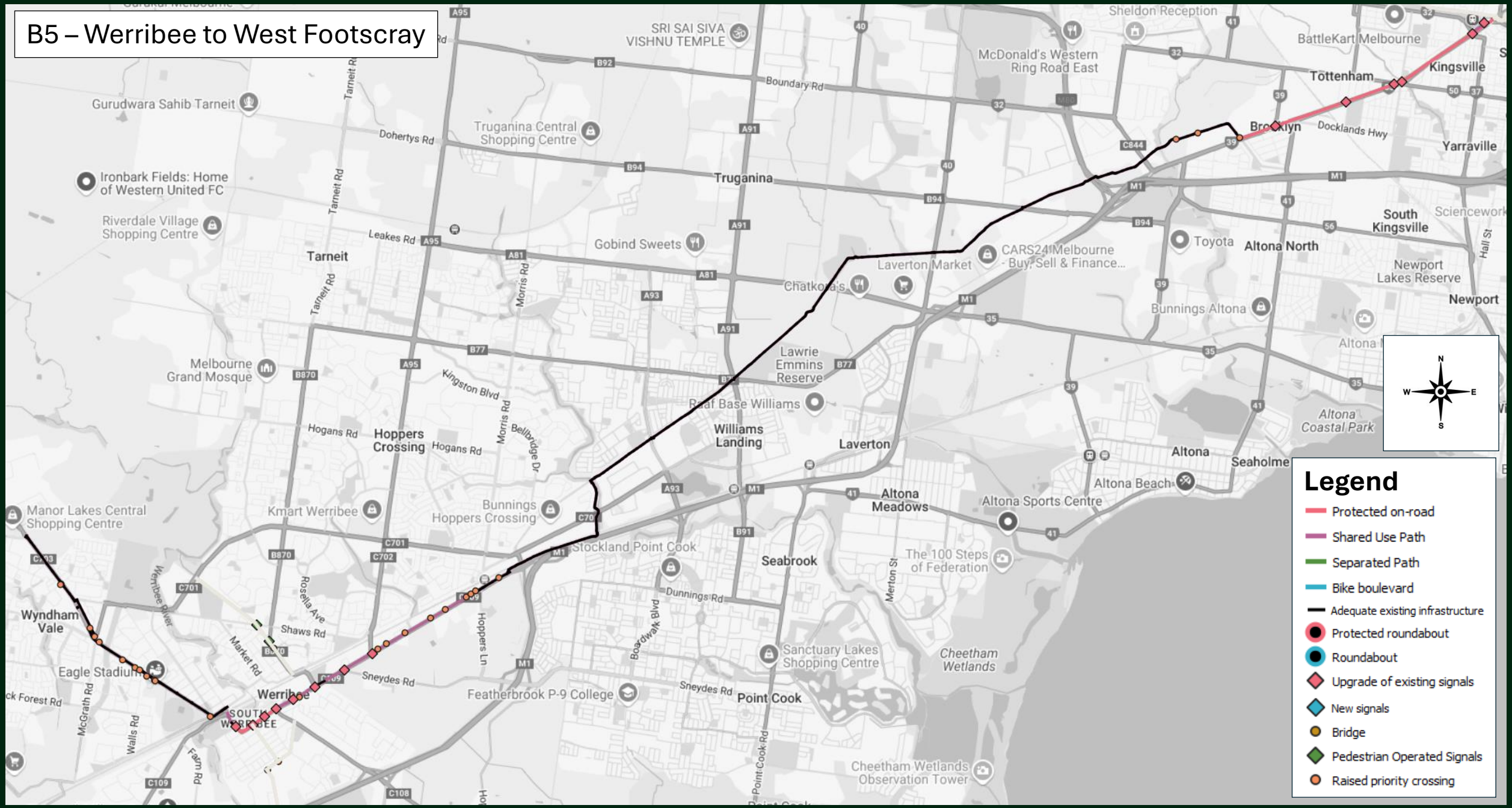
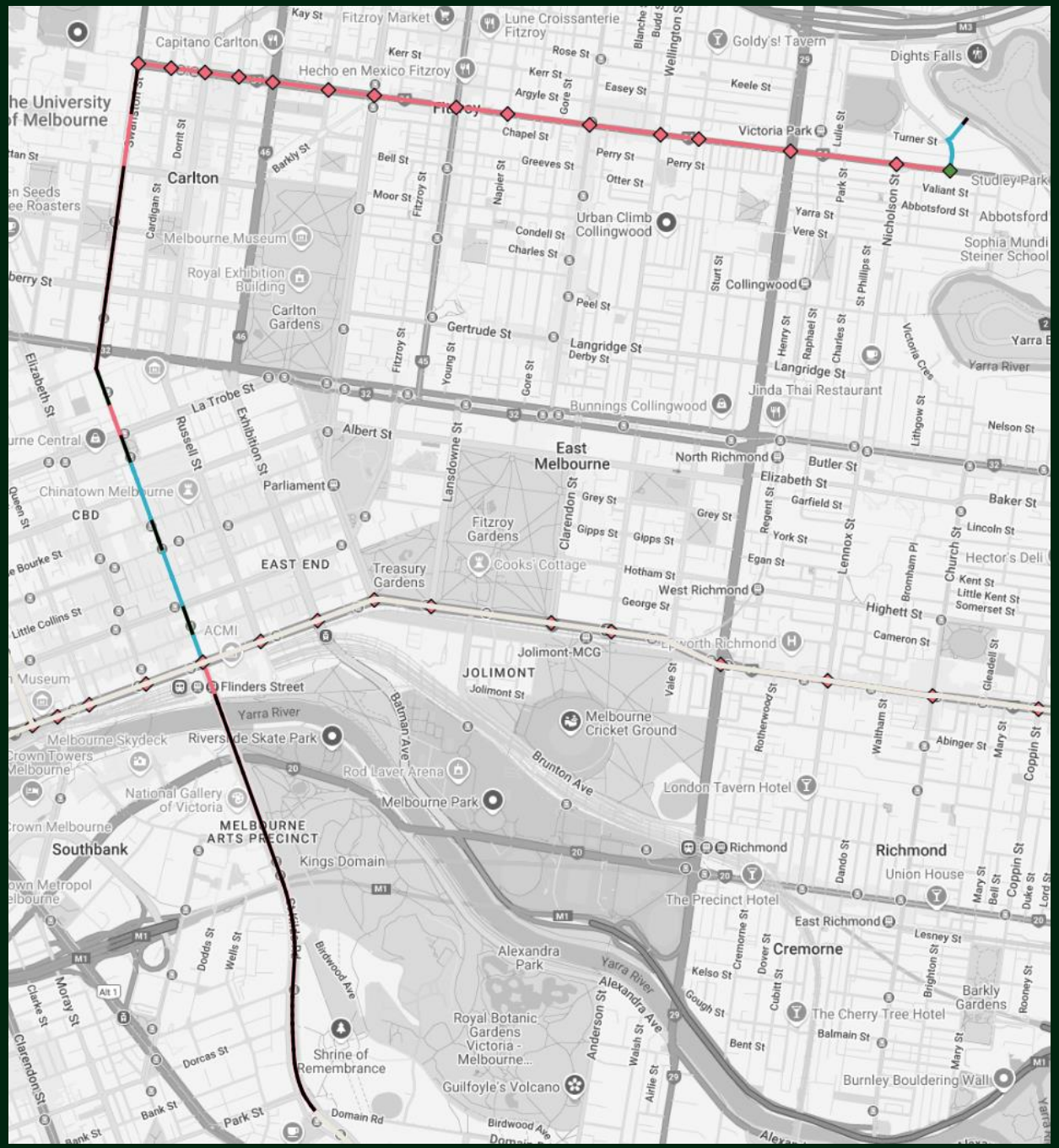
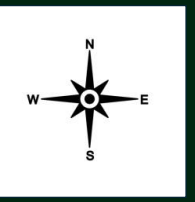
B5 – Werribee to West Footscray



B6 – Johnston Street to Anzac Station

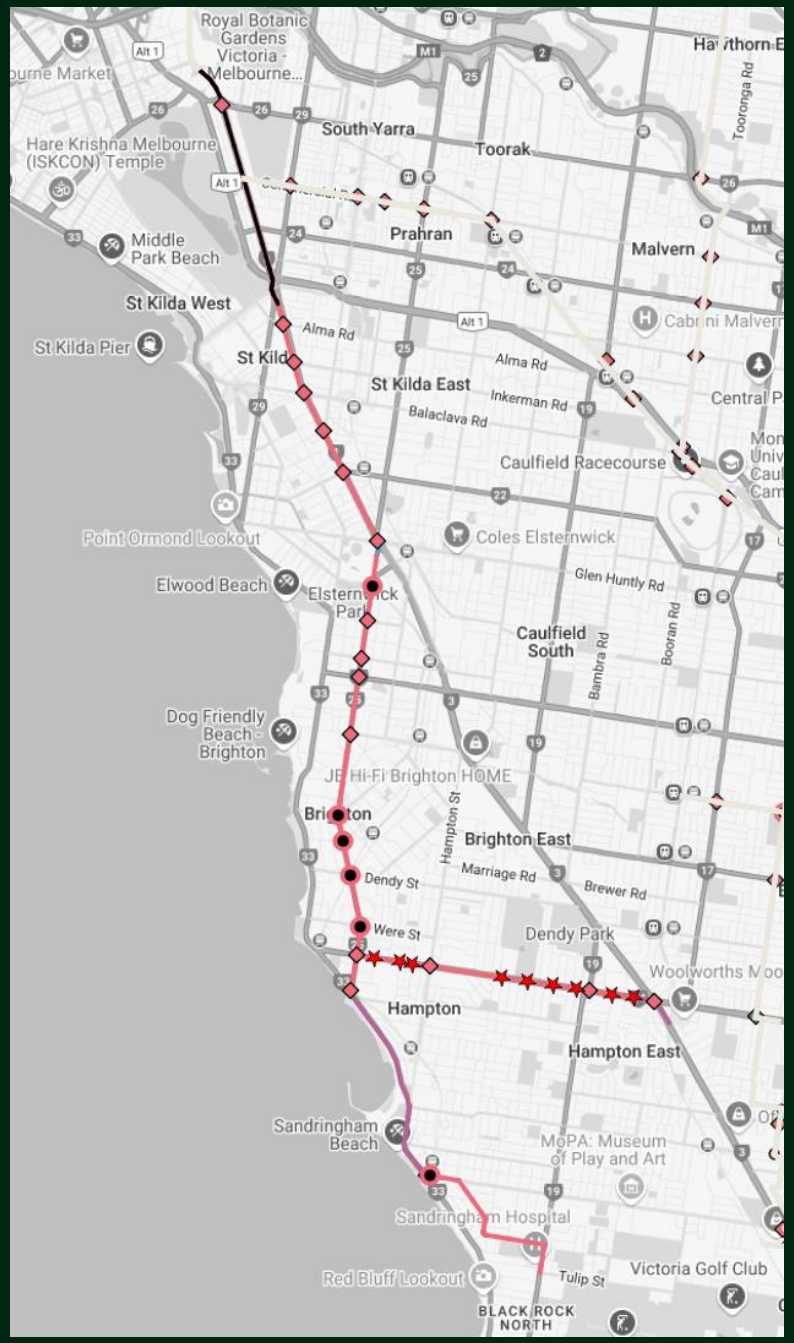




Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

B7 – Anzac Station to Sandringham



N
W E
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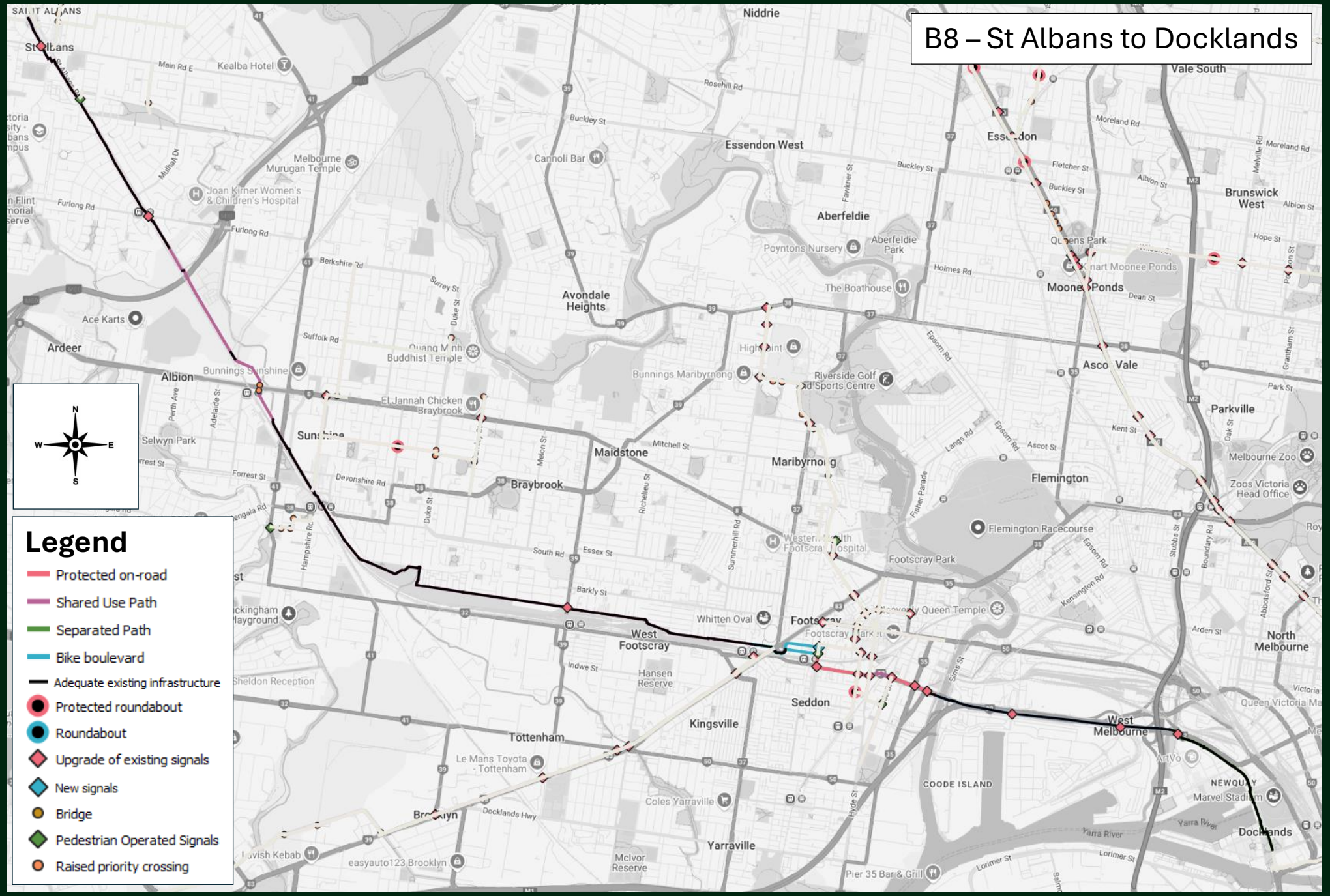
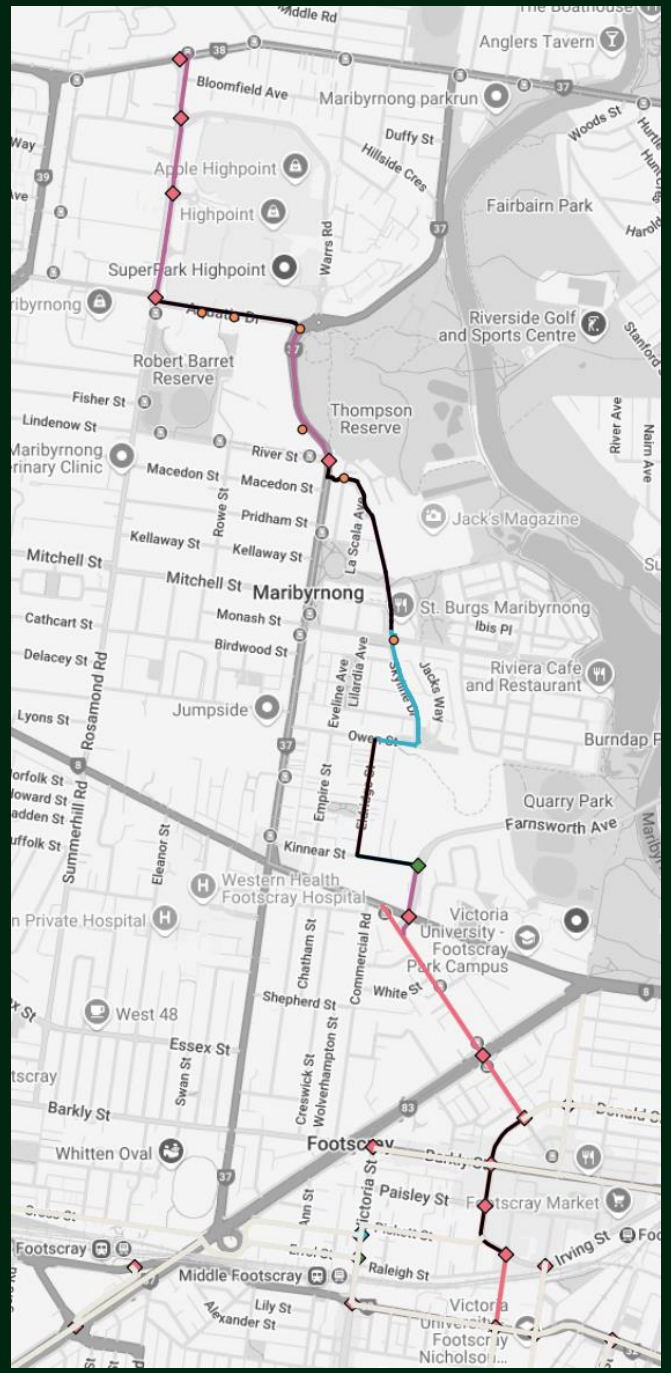
Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- Intersection upgrade
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

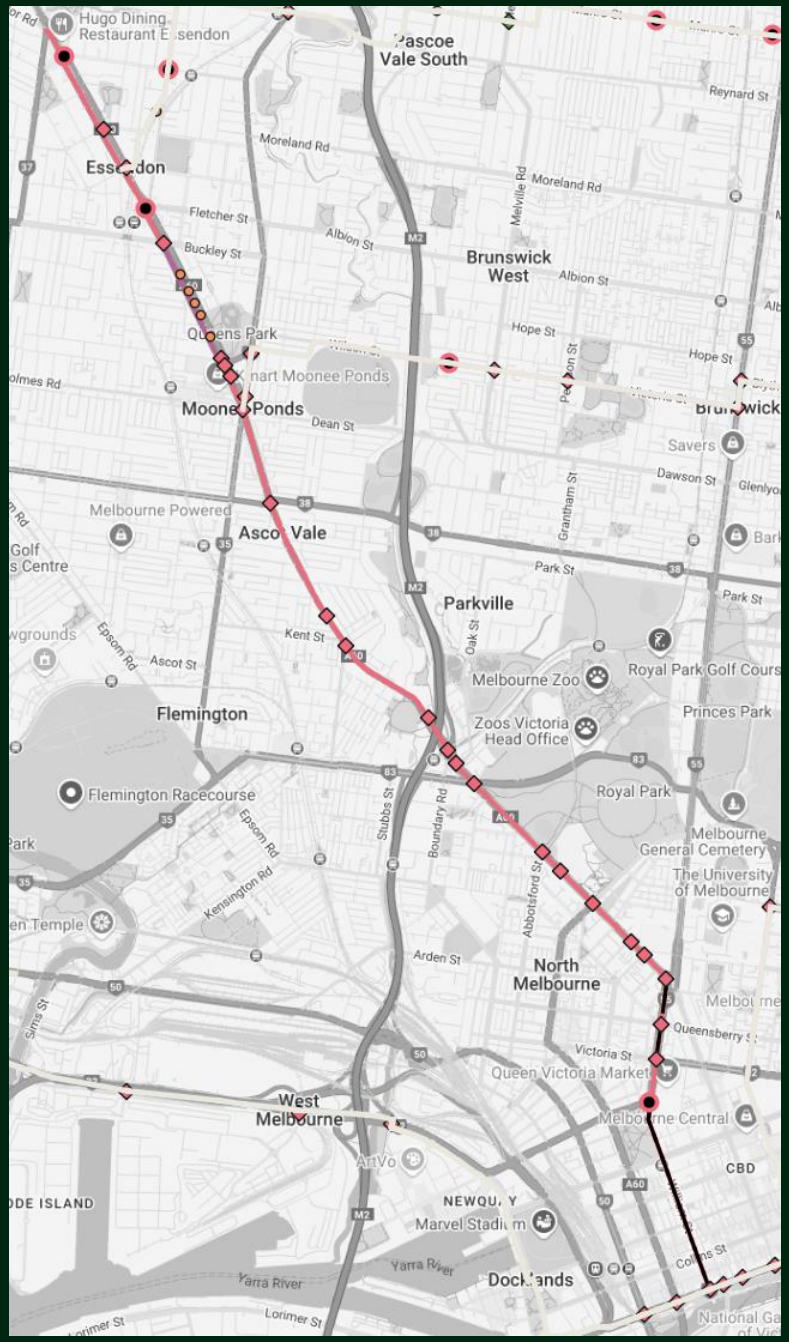
B8 – St Albans to Docklands



B9 – Highpoint to Footscray



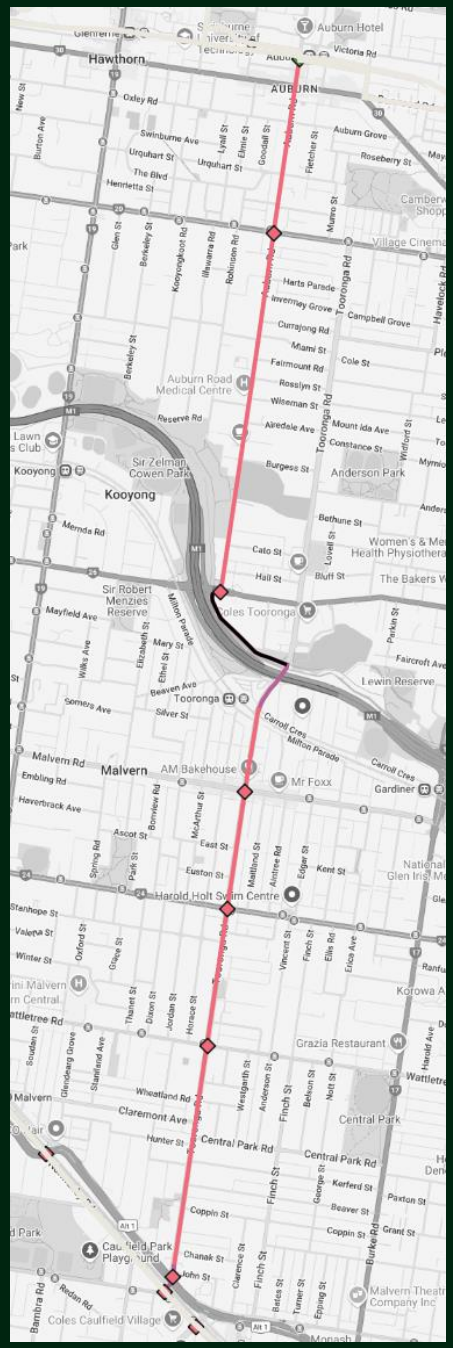
B10 – Essendon to City



Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

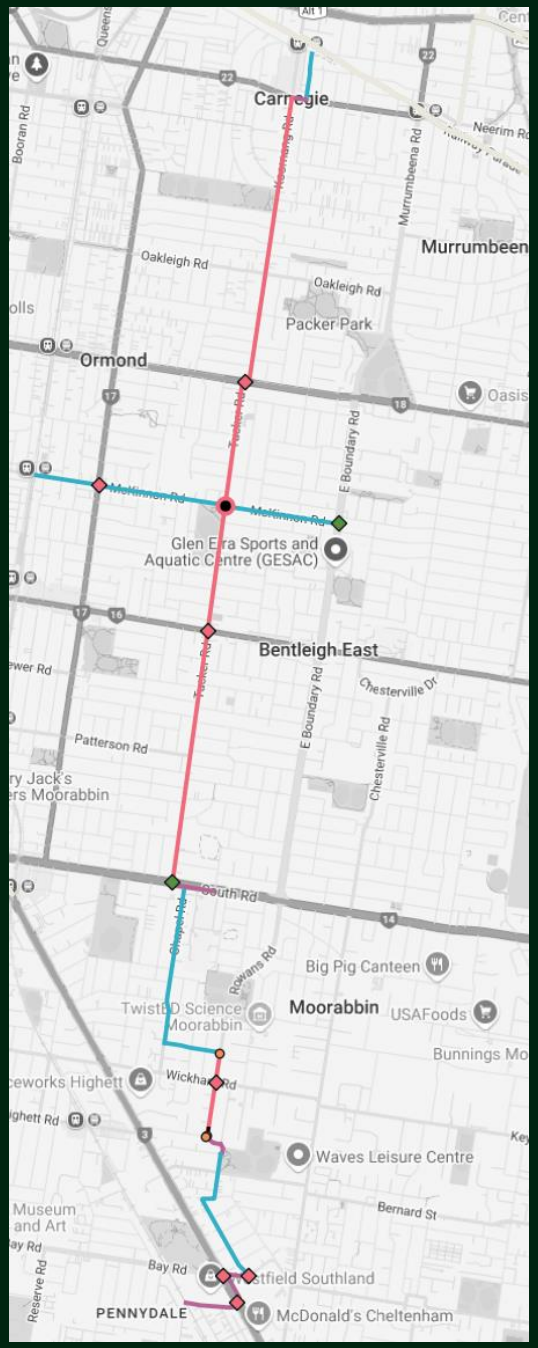
B17 – Caulfield to Auburn



Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

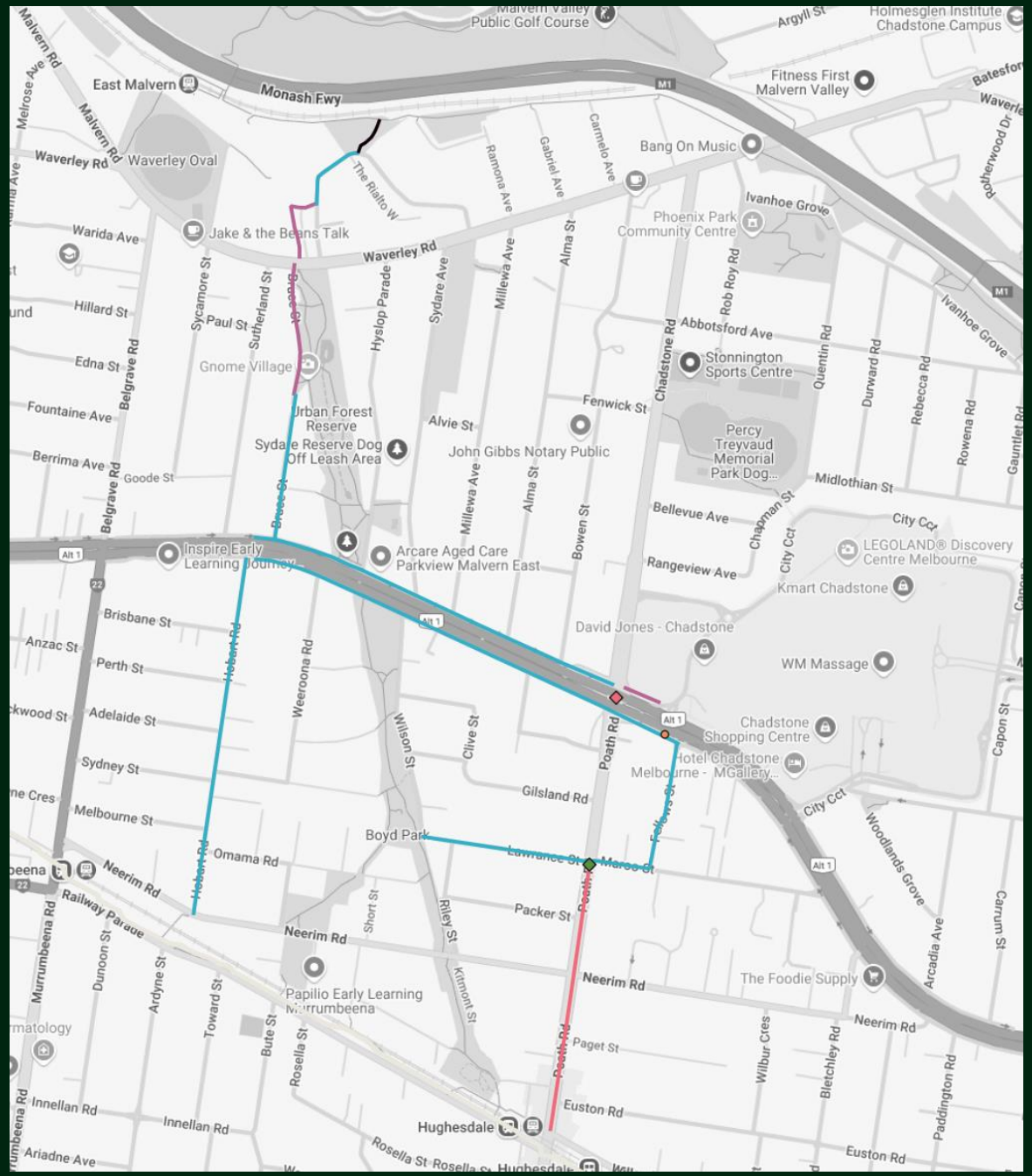
B18 – Murrumbeena to Southland



Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

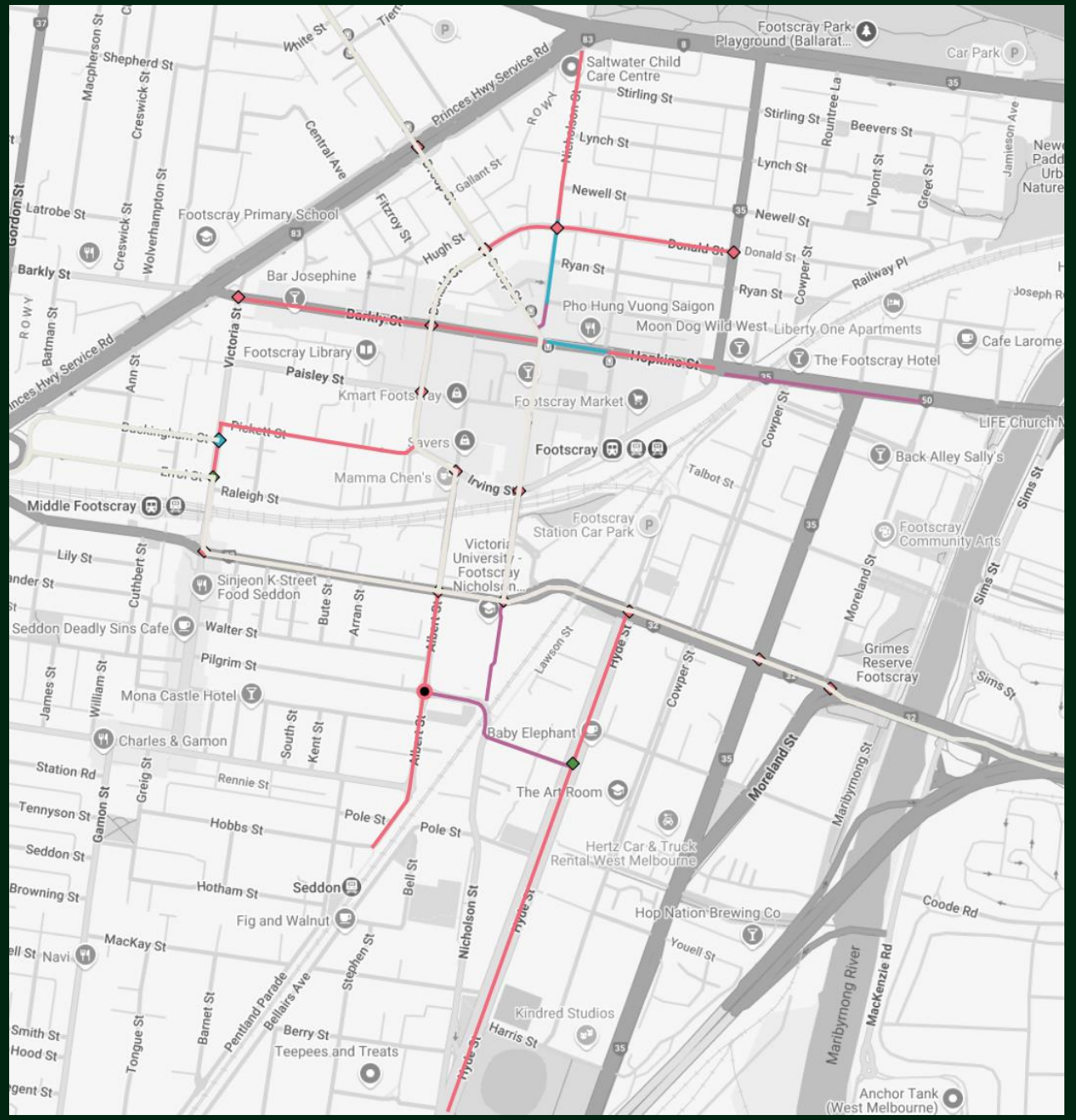
Chadstone Link



Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

Footscray Local Links



Legend

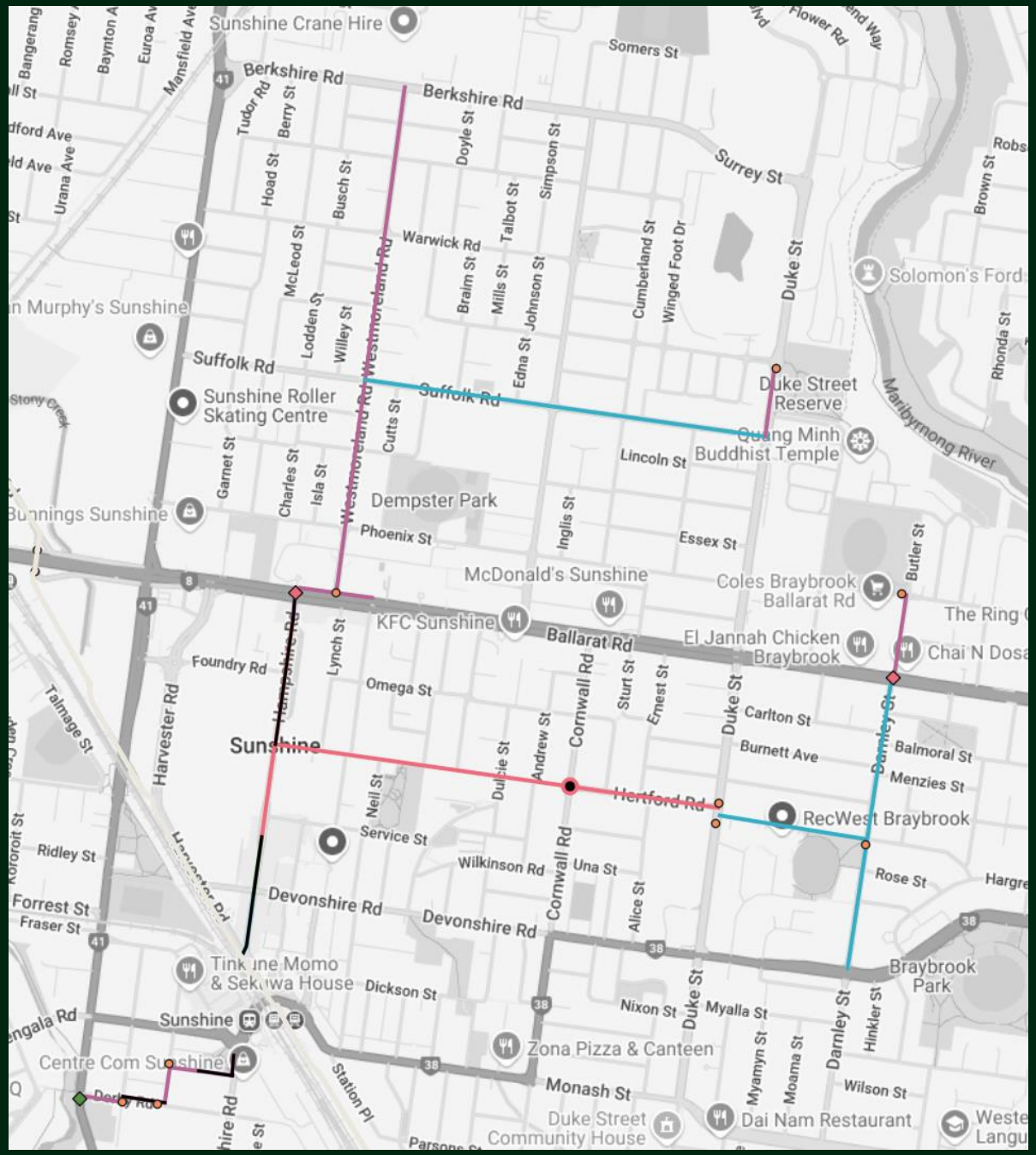
- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

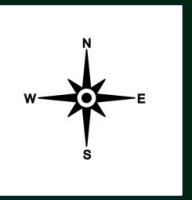
St Albans Local Links

Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

Sunshine Local Links

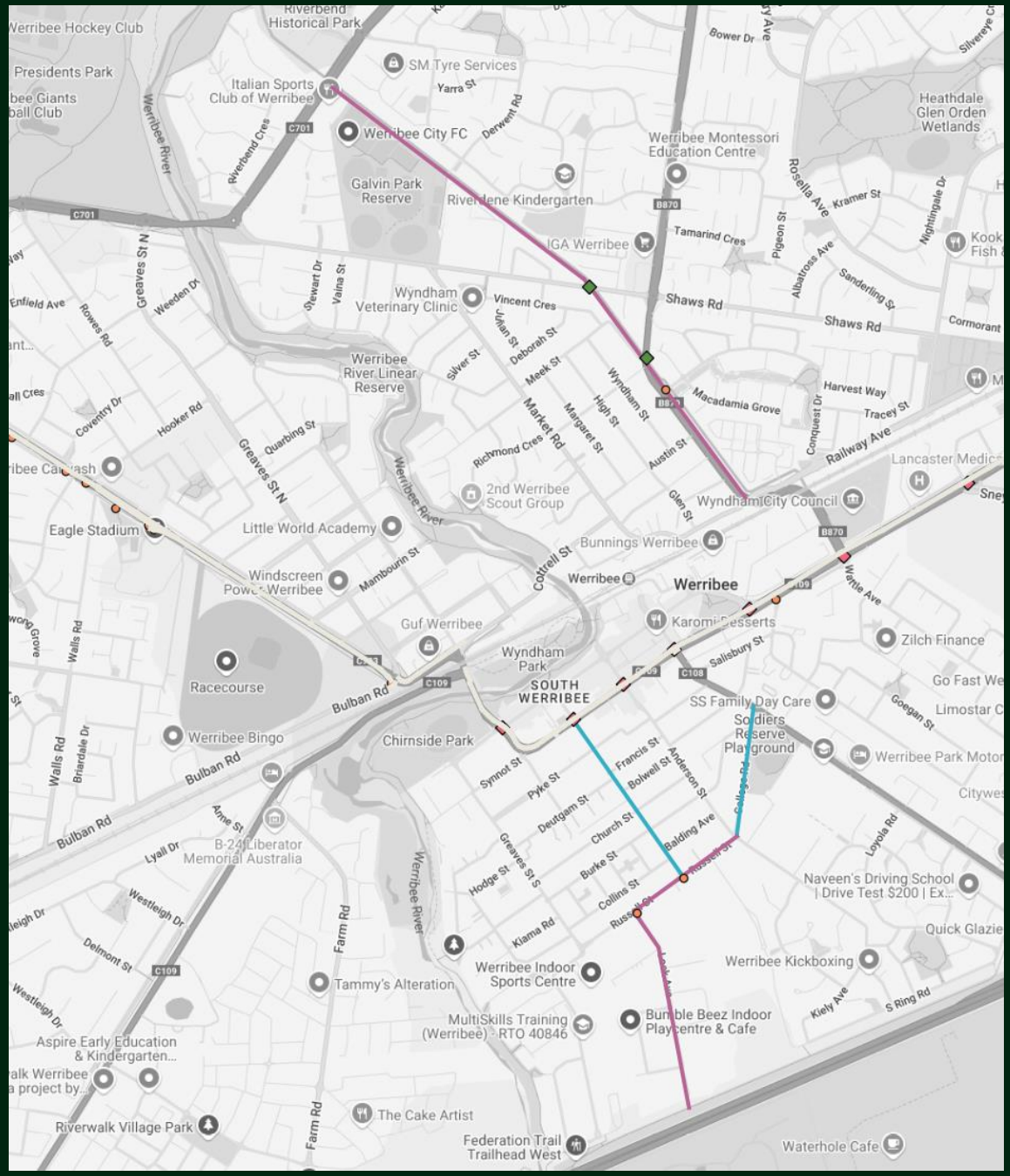




Legend

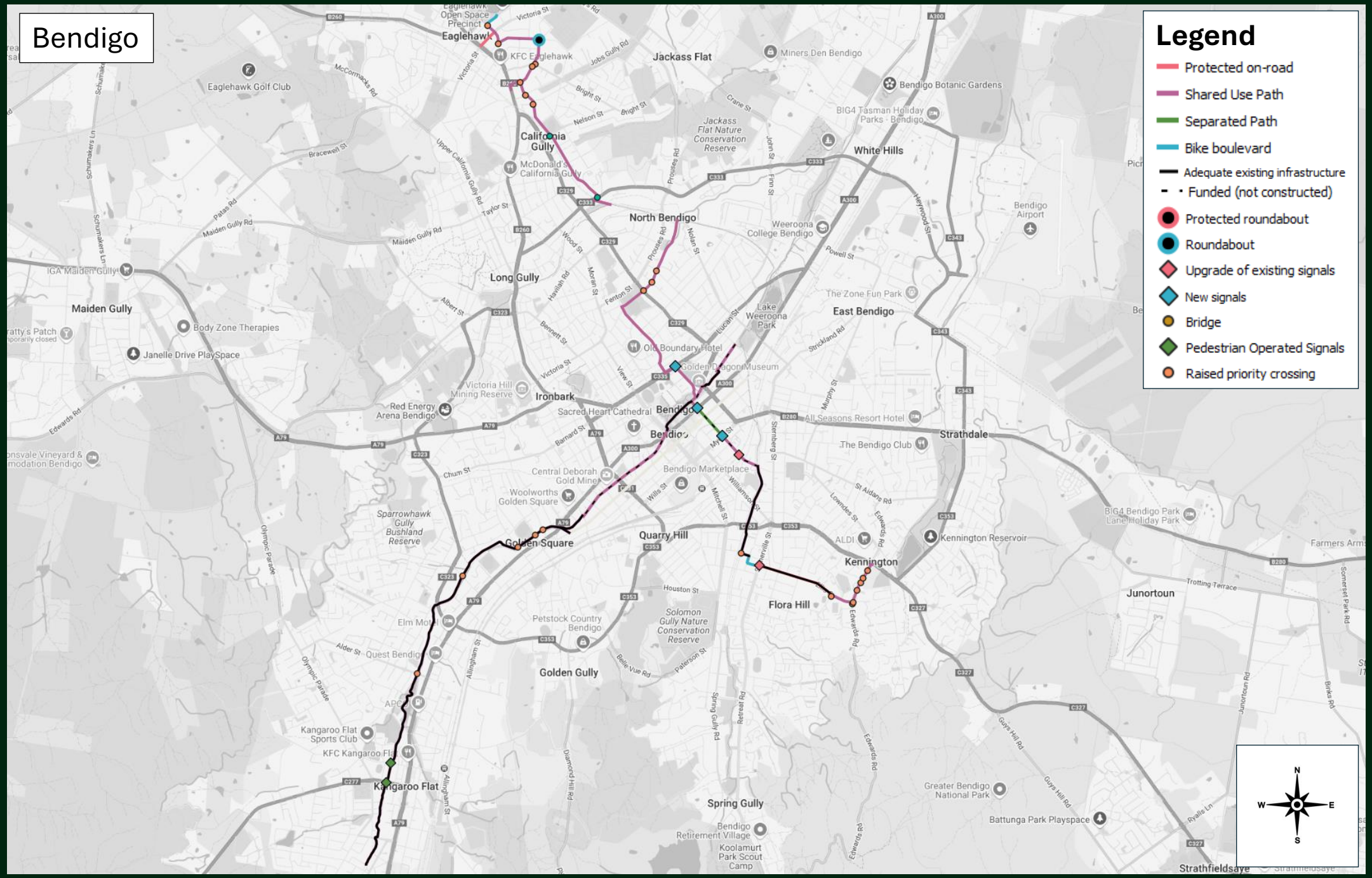
- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

Werribee Local Links



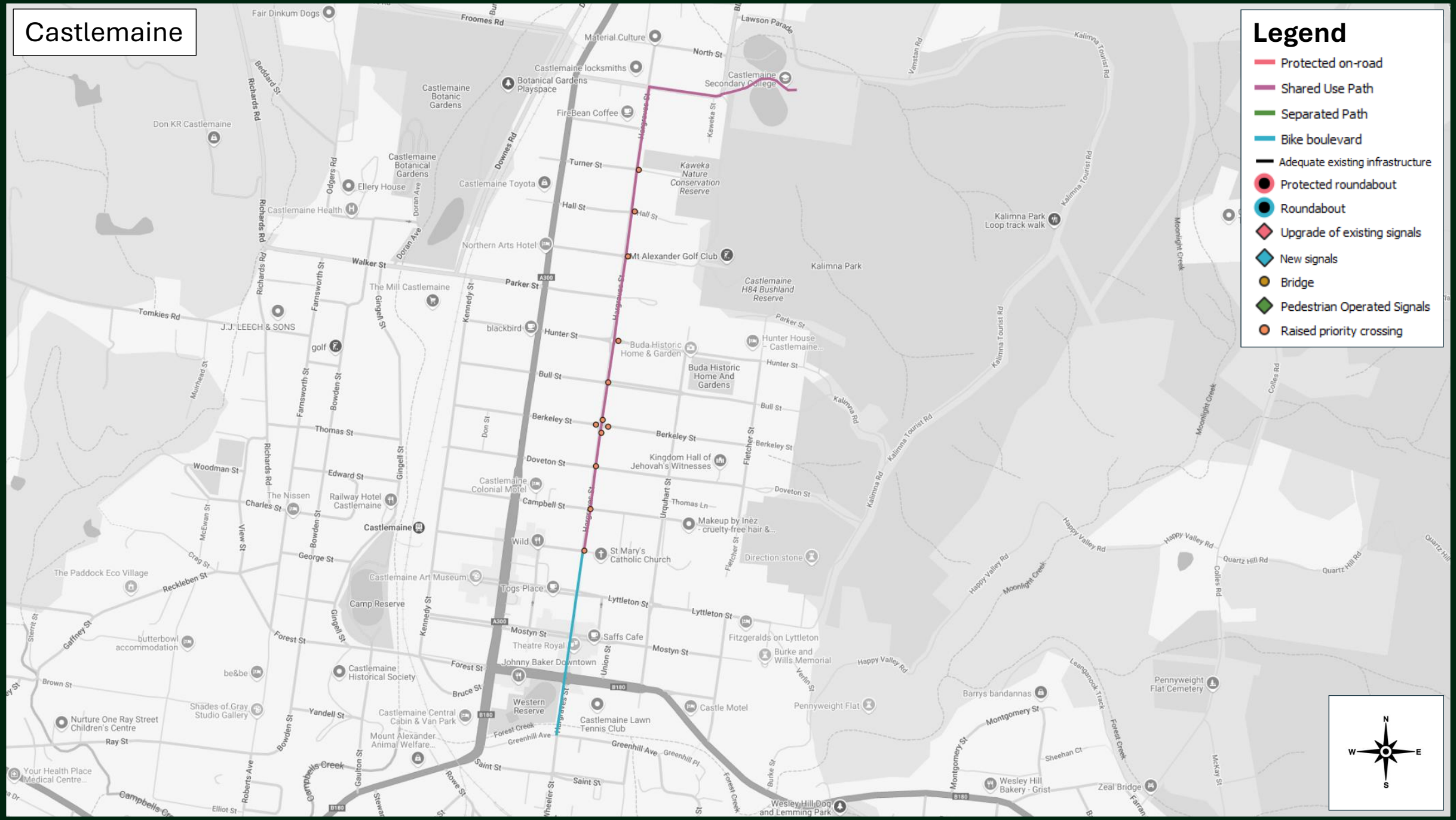
Legend

- Protected on-road
- Shared Use Path
- Separated Path
- Bike boulevard
- Adequate existing infrastructure
- Protected roundabout
- Roundabout
- Upgrade of existing signals
- New signals
- Bridge
- Pedestrian Operated Signals
- Raised priority crossing

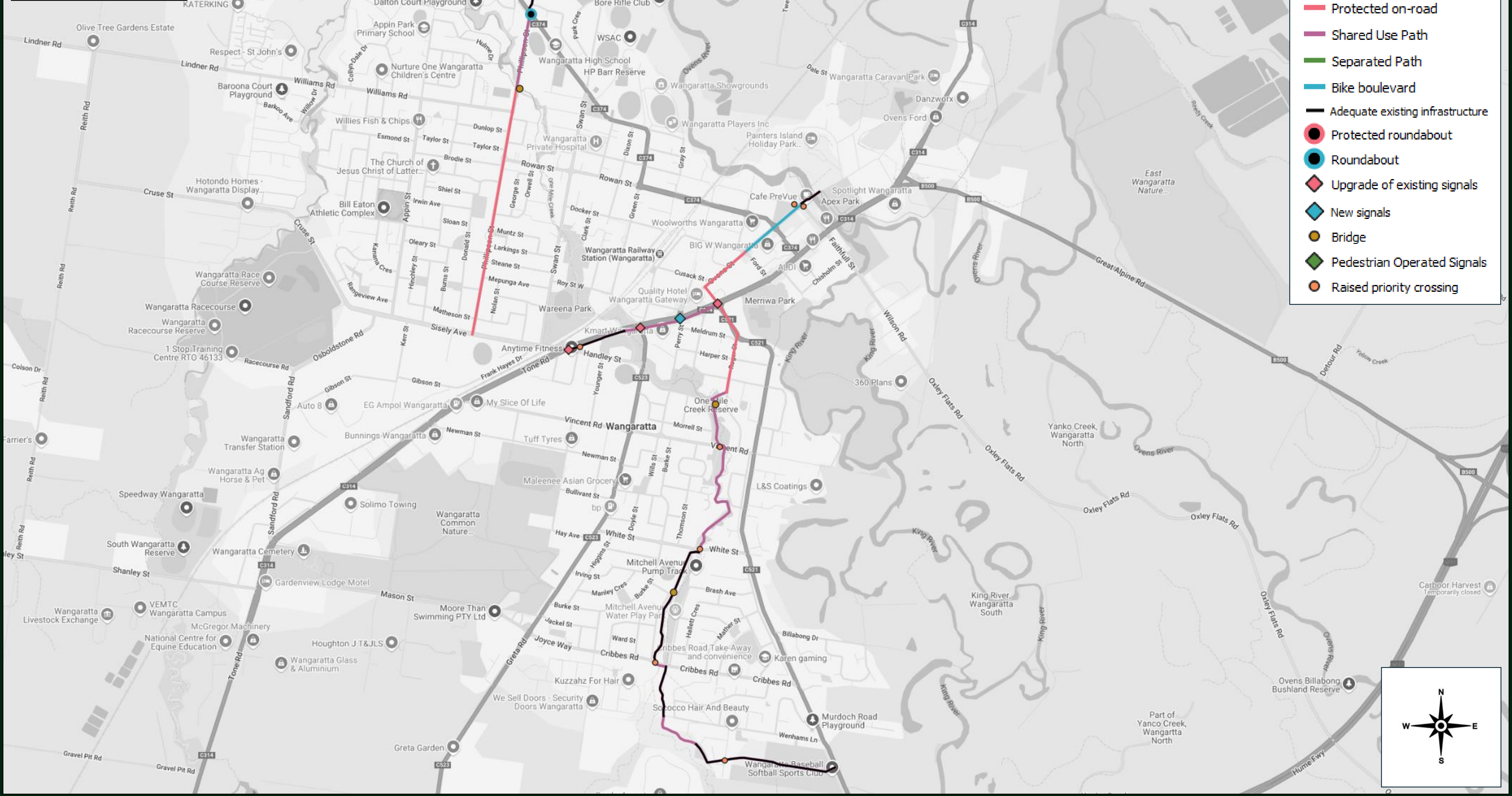

Bendigo
Legend
Protected on-road
Shared Use Path
Separated Path
Bike boulevard
Adequate existing infrastructure
Funded (not constructed)
Protected roundabout
Roundabout
Upgrade of existing signals
New signals
Bridge
Pedestrian Operated Signals
Raised priority crossing
Eaglehawk
Jackass Flat
California Gully
North Bendigo
White Hills
Long Gully
East Bendigo
Maiden Gully
Ironbark
Bendigo
Strathdale
Quarry Hill
Golden Square
Kennington
Flora Hill
Junortoun
Golden Gully
Spring Gully
Kangaroo Flat
Strathfieldsaye
Eaglehawk Golf Club
Miners Den Bendigo
Bendigo Botanic Gardens
Bendigo Airport
Weeroona College Bendigo
The Zone Fun Park
Lake Weeroona Park
Old Boundary Hotel
Golden Dragon Museum
Sacred Heart Cathedral
Red Energy Arena Bendigo
Victoria Hill Mining Reserve
Bendigo Marketplace
Woolworths Golden Square
Central Deborah Gold Mine
All Seasons Resort Hotel
The Bendigo Club
Kennington Reservoir
ALDI
Petstock Country Bendigo
Elm Motel
Quest Bendigo
Kangaroo Flat Sports Club
KFC Kangaroo Flat
Greater Bendigo National Park
Battunga Park Playspace
Bendigo Retirement Village
Koolamurt Park Scout Camp
Farmers Arms
Body Zone Therapies
Janelle Drive PlaySpace
IGA Maiden Gully
Jackass Flat Nature Conservation Reserve
Solomon Gully Nature Conservation Reserve
Sparrowhawk Gully Bushland Reserve
N
W
E
S

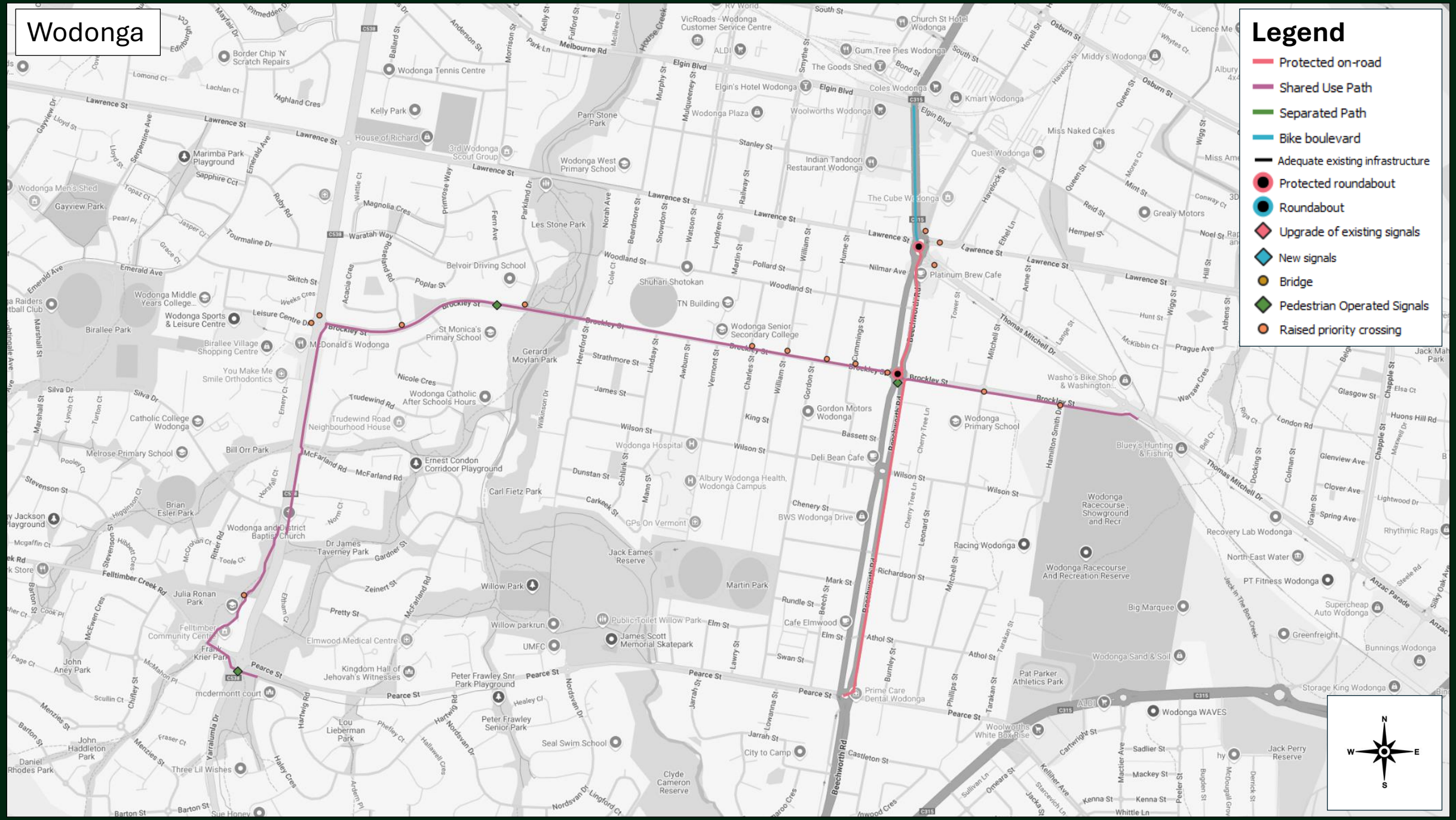

Geelong
Legend
Protected on-road
Shared Use Path
Separated Path
Bike boulevard
Adequate existing infrastructure
Protected roundabout
Roundabout
Upgrade of existing signals
New signals
Bridge
Pedestrian Operated Signals
Raised priority crossing
Fyansford
Geelong West
Newtown
Geelong
East Geelong
South Geelong
Belmont
Highton
Newcomb
Whittington
Breakwater
Moolap
St Albans Park
Marshall
Grovedale
Stingaree Bay
N
W
E
S

Ballarat
Legend
Protected on-road
Shared Use Path
Separated Path
Bike boulevard
Adequate existing infrastructure
Protected roundabout
Roundabout
Upgrade of existing signals
New signals
Bridge
Pedestrian Operated Signals
Raised priority crossing
N
W
E
S


Castlemaine
Legend
Protected on-road
Shared Use Path
Separated Path
Bike boulevard
Adequate existing infrastructure
Protected roundabout
Roundabout
Upgrade of existing signals
New signals
Bridge
Pedestrian Operated Signals
Raised priority crossing
N
W
E
S
Fair Dinkum Dogs
Froomes Rd
Material Culture
North St
Lawson Parade
Castlemaine locksmiths
Botanical Gardens Playspace
Castlemaine Secondary College
Castlemaine Botanic Gardens
FireBean Coffee
Don KR Castlemaine
Richards Rd
Beddard St
Downes Rd
Hargraves St
Kaweka St
Turner St
Kaweka Nature Conservation Reserve
Castlemaine Botanical Gardens
Ellery House
Castlemaine Toyota
Hall St
Castlemaine Health
Doran Ave
Odgers Rd
Northern Arts Hotel
Mt Alexander Golf Club
Walker St
Parker St
A300
The Mill Castlemaine
Kennedy St
Farnsworth St
Gingell St
Tomkies Rd
J.J. LEECH & SONS
golf
blackbird
Hunter St
Buda Historic Home & Garden
Hunter House – Castlemaine...
Buda Historic Home And Gardens
Bull St
Berkeley St
Thomas St
Don St
Fletcher St
Kingdom Hall of Jehovah's Witnesses
Doveton St
Woodman St
Edward St
Bowden St
Muirhead St
Castlemaine Colonial Motel
Campbell St
Urquhart St
Thomas Ln
Makeup by Inèz - cruelty-free hair &...
The Nissen
Railway Hotel Castlemaine
Charles St
Castlemaine
McEwan St
View St
Wild
St Mary's Catholic Church
Direction stone
George St
Crag St
Reckleben St
The Paddock Eco Village
Castlemaine Art Museum
Togs Place
Lyttleton St
Camp Reserve
Stern St
Gaffney St
butterbowl accommodation
Mostyn St
Saffs Cafe
Theatre Royal
Fitzgeralds on Lyttleton
Forest St
Johnny Baker Downtown
Burke and Wills Memorial
be&be
Castlemaine Historical Society
Bruce St
Brown St
Shades of Gray Studio Gallery
Yandell St
Western Reserve
Castle Motel
Nurture One Ray Street Children's Centre
Ray St
Castlemaine Central Cabin & Van Park
Castlemaine Lawn Tennis Club
Forest Creek
Greenhill Ave
Greenhill Pl
Mount Alexander Animal Welfare...
Saint St
Your Health Place Medical Centre...
Campbells Creek
Gaulton St
Roberts Ave
Rowe St
Elliot St
B180
Wheeler St
Wesley Hill Dog and Lemming Park
Kalimna Park
Kalimna Park Loop track walk
Castlemaine H84 Bushland Reserve
Kalimna Tourist Rd
Kalimna Rd
Moonlight Creek
Colles Rd
Happy Valley Rd
Quartz Hill Rd
Barrys bandannas
Pennyweight Flat
Pennyweight Flat Cemetery
Montgomery St
Leanganook Track
Sheehan Ct
Wesley Hill Bakery - Grist
Zeal Bridge
McKay St
Vanstan Rd
Kalimna Tourist Rd

Wangaratta


Legend
Protected on-road
Shared Use Path
Separated Path
Bike boulevard
Adequate existing infrastructure
Protected roundabout
Roundabout
Upgrade of existing signals
New signals
Bridge
Pedestrian Operated Signals
Raised priority crossing
N
W
E
S


Wodonga
Legend
Protected on-road
Shared Use Path
Separated Path
Bike boulevard
Adequate existing infrastructure
Protected roundabout
Roundabout
Upgrade of existing signals
New signals
Bridge
Pedestrian Operated Signals
Raised priority crossing
N
W
E
S

Appendix 2 - Maintenance costs per corridor

		Total Maintenance Cost Per Annum ($)		
		Infrastructure Maintenance Cost	Intersection/Crossing Maintenance Cost	Total Maintenance Cost
METRO	B1 - Northcote to Moonee Ponds	$62,506	$6,100	$68,606
	B2 - Essendon to La Trobe University	$136,889	$43,200	$180,089
	B3 - St Kilda Rd to Clayton	$130,124	$1,800	$131,924
	B4 - Box Hill to Docklands	$173,083	$51,100	$224,183
	B5 - Werribee to West Footscray	$329,858	$38,800	$368,658
	B6 - Johnston Street to Anzac Station	$40,409	$7,500	$47,909
	B7 - Anzac Station to Sandringham	$134,218	$30,400	$164,618
	B8 - St Albans to Docklands	$63,279	$9,500	$72,779
	B9 - Highpoint to Footscray	$40,697	$16,300	$56,997
	B10 - Essendon to Southbank	$86,523	$25,200	$111,723
	B17 - Caulfield to Auburn	$49,837	$1,400	$51,237
	B18 - Murrumbeena to Southland	$102,411	$25,700	$128,111
	B19 - Chadstone Link	$41,614	$6,200	$47,814
	Footscray Local Links	$50,331	$22,400	$72,731
	St Albans Local Links	$93,911	$31,500	$125,411
	Sunshine Local Links	$65,403	$22,900	$88,303
	Werribee Local Links	$100,870	$13,500	$114,370

		Total Maintenance Cost Per Annum ($)		
		Infrastructure Maintenance Cost	Intersection/Crossing Maintenance Cost	Total Maintenance Cost
REGIONAL	CR1 - Western Link Cycling Route	$10,992	$0	$10,992
	CR3 - Geelong City to Newcomb	$37,442	$16,200	$53,642
	CR4 - Southern Cycling Route	$73,270	$20,000	$93,270
	CR5 - Ballarat Central to Victoria Park	$9,853	$4,500	$14,353
	CR6 - Ballarat Central to Sebastapol	$98,775	$52,200	$150,975
	CR8 - Bendigo to Kangaroo Flat	$93,411	$16,500	$109,911
	CR9 - Bendigo to North Bendigo	$59,526	$24,200	$83,726
	CR10 - Bendigo to Latrobe University	$29,079	$12,200	$41,279
	CR17 - One Mile Creek Trail - South	$78,933	$12,000	$90,933
	CR19 - Phillipson Street	$26,121	$9,000	$35,121
	CR20 - Bachelors Green to Apex Park	$16,865	$11,600	$28,465
	CR21 - Beechworth Rd and High St	$16,525	$13,500	$30,025
	CR22 - Felltimber Community Centre to Murray Valley Hwy via Brockley Street	$76,545	$31,500	$108,045
	CR28 - Castlemain Secondary to Western Reserve	$56,494	$18,000	$74,494
	CR29 - Long Gully Trail to Eaglehawk	$91,130	$18,000	$109,130
	CR30 - Ballarat to Ballarat North	$84,239	$31,900	$116,139

Appendix 3 – Forecast expenditure (P50, 2025 costs)

High-Level Program Timeframes

	Column1	Total Corridor P50 Cost	Approximate design and preconstruc	Approximate timeframe (additional 2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
METRO	B1 – Northcote to Moonee Ponds	$17,749,368	$3,549,874	3		$1,774,937	$1,774,937	$4,733,165	$4,733,165	$4,733,165				
	B2 – Essendon to La Trobe University	$33,427,438	$6,685,488	4	$3,342,744	$3,342,744	$6,685,488	$6,685,488	$6,685,488	$6,685,488				
	B3 – St Kilda Rd to Clayton	$21,097,882	$4,219,576	3					$2,109,788	$2,109,788	$5,626,102	$5,626,102	$5,626,102	
	B4 – Box Hill to Docklands	$57,446,828	$11,489,366	6			$5,744,683	$5,744,683	$7,659,577	$7,659,577	$7,659,577	$7,659,577	$7,659,577	$7,659,577
	B5 – Werribee to West Footscray	$33,328,252	$6,665,650	5		$3,332,825	$3,332,825	$5,332,520	$5,332,520			$5,332,520	$5,332,520	$5,332,520
	B6 – Johnston Street to Anzac Station	$11,414,411	$2,282,882	3		$1,141,441	$1,141,441	$3,043,843	$3,043,843	$3,043,843				
	B7 – Anzac Station to Sandringham	$40,590,322	$8,118,064	4	$4,059,032	$4,059,032	$8,118,064	$8,118,064	$8,118,064	$8,118,064				
	B8 – St Albans to Docklands	$10,264,091	$2,052,818	3	$1,026,409	$1,026,409	$2,737,091	$2,737,091	$2,737,091					
	B9 – Highpoint to Footscray	$11,738,412	$2,347,682	3			$1,173,841	$1,173,841	$3,130,243				$3,130,243	$3,130,243
	B10 – Essendon to Southbank	$36,244,091	$7,248,818	4			$3,624,409	$3,624,409	$7,248,818	$7,248,818		$7,248,818	$7,248,818	
	B17 – Caulfield to Auburn	$13,061,389	$2,612,278	2			$1,306,139	$1,306,139	$5,224,555	$5,224,555				
	B18 – Murrumbeena to Southland	$24,703,527	$4,940,705	3	$2,470,353	$2,470,353	$6,587,607	$6,587,607	$6,587,607					
	B19 – Chadstone Link	$5,144,718	$1,028,944	2	$514,472	$514,472	$2,057,887	$2,057,887						
ACTIVITY CENTRES	Footscray Local Links	$21,300,822	$4,260,164	2	$2,130,082	$2,130,082	$8,520,329	$8,520,329						
	St Albans Local Links	$9,931,556	$1,986,311	2	$993,156	$993,156	$3,972,622	$3,972,622						
	Sunshine Local Links	$9,763,647	$1,952,729	2	$976,365	$976,365	$3,905,459	$3,905,459						
	Werribee Local Links	$9,177,110	$1,835,422	2	$917,711	$917,711	$3,670,844	$3,670,844						
REGIONAL	CR1 – Western Link Cycling Route	$2,114,185	$422,837	1		$211,419	$211,419	$1,691,348						
	CR3 – Geelong City to Newcomb	$7,203,542	$1,440,708	2					$720,354	$720,354	$2,881,417	$2,881,417		
	CR4 – Southern Cycling Route	$19,184,600	$3,836,920	4	$1,918,460	$1,918,460	$3,836,920	$3,836,920					$3,836,920	$3,836,920
	CR5 – Ballarat Central to Victoria Park	$742,689	$148,538	1			$74,269	$74,269	$594,151					
	CR6 – Ballarat Central to Sebastapol	$33,807,803	$6,761,561	3					$3,380,780	$3,380,780	$9,015,414	$9,015,414	$9,015,414	
	CR8 – Bendigo to Kangaroo Flat	$8,790,325	$1,758,065	2	$879,032	$879,032	$3,516,130	$3,516,130						
	CR9 – Bendigo to North Bendigo	$20,504,158	$4,100,832	4		$2,050,416	$2,050,416	$4,100,832	$4,100,832			$4,100,832	$4,100,832	
	CR10 – Bendigo to Latrobe University	$2,157,624	$431,525	1	$215,762	$215,762	$1,726,099							
	CR17 – One Mile Creek Trail – South	$5,563,876	$1,112,775	2	$556,388	$2,225,550					$556,388	$2,225,550		
	CR19 – Phillipson Street	$3,480,923	$696,185	1	$348,092	$348,092	$2,784,739							
	CR20 – Bachelors Green to Apex Park	$8,001,600	$1,600,320	2	$800,160	$800,160	$3,200,640	$3,200,640						
	CR21 – Beechworth Rd and High St	$7,649,694	$1,529,939	2		$764,969	$764,969	$3,059,878	$3,059,878					
	CR22 – Felltimber Community Centre to Murray Valley Hwy via Bro	$12,984,946	$2,596,989	3				$1,298,495	$1,298,495	$3,462,652	$3,462,652	$3,462,652		
	CR28 – Castlemain Secondary to Western Reserve	$5,516,122	$1,103,224	2		$551,612	$551,612	$2,206,449	$2,206,449					
	CR29 – Long Gully Trail to Eaglehawk	$9,218,963	$1,843,793	2					$921,896	$921,896	$3,687,585	$3,687,585		
	CR30 – Ballarat to Ballarat North	$11,223,222	$2,244,644	3					$1,122,322	$1,122,322	$2,992,859	$2,992,859	$2,992,859	