Principal Bicycle Network
Fishermans Bend
Route Assessment

transportation planning, design and delivery

5/WALKING & CYCLING REPORT (GTA)
Principal Bicycle Network
Fishermans Bend
Route Assessment

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1.1 Background

The Fishermans Bend Urban Renewal Area (FBURA) is currently occupied by industrial uses and logistics-related businesses, and is located within close proximity to Melbourne’s Central Business District. The Victorian Minister for Planning has recently identified the Fishermans Bend precinct as a key urban renewal area, with Amendment C102 of the Port Phillip Planning Scheme and Amendment C170 of the Melbourne Planning Scheme rezoning major parcels of land within this area to Capital City Zone 1 (CCZ1). A number of precincts have been identified within the FBURA, including:

- Lorimer Precinct
- Montague Precinct
- Sandridge Precinct
- Wirraway Precinct

Future land uses within these precincts are expected to include medium to high density residential, commercial, industrial, recreational, business and leisure uses. Due to the increased densification within these precincts, it is anticipated that the existing transport network will need to be modified and expanded to accommodate the increased demand.

Places Victoria is preparing a Strategic Framework Plan and Development Contributions Plan to guide the future development of the FBURA. The Strategic Framework Plan aims to identify the strategic infrastructure required to support the urban development. Transport choice, accessibility and mobility within and connecting the Fishermans Bend precinct and metropolitan Melbourne are key components in the development of its urban fabric, and a sustainable transport network is vital for the precinct to achieve its full potential.

In this regard, the Department of Transport (DOT) is working on behalf of Places Victoria to coordinate the investigation into the future transportation requirements of, and the development of Transport Design Guidelines (draft document has been prepared) for, the FBURA, which includes the provision of dedicated bicycle facilities for specific destinations along nominated corridors and intersections. This involves the identification of optimum bicycle routes and a suite of connected treatments to assist cyclists in travelling between the given locations.

GTA Consultants was commissioned by the DOT in March 2013 to undertake a route options study and develop concept designs for five key corridors and two intersections as part of a PBN within the Fishermans Bend area.

While the corridors and intersections investigated as part of this project are not exhaustive, noting that internal networks, upgrades to existing facilities and the development of other major transport corridors are also being investigated, the purpose of this project is to identify preferred routes and facility types for initial costing and feasibility purposes. Further investigations and development of the designs can be expected, and no final decisions have been made at this point in time, except that a PBN will be developed within and connecting to the FBURA and surrounding areas.
1.2 Purpose of this Report

As part of developing a PBN within the FBURA, the following has occurred:
- identification of corridor options, including shortest route and alternative options
- selection of preferred cycling treatments for the five corridors
- selection of preferred pedestrian and cycling treatments for two key intersections
- development of concept designs for the preferred facility treatments.

1.3 References

In preparing this report, a number of references have been made, including:
- Melbourne and Port Phillip Planning Schemes and TravelSmart Maps
- VicRoads Cycle Notes (various)
- Cyclist Aspects of Austroads guides, 2011
- surveys undertaken by GTA Consultants as referenced in the context of this report
- various technical data as referenced in this report
- an inspection of the study area and its surrounds
- other documents as nominated.

2. Policy Background

2.1 Overview

There are a number of key policy documents applicable for the FBURA which provide guidance on the suitability of the proposed future bicycle network. Those which are most relevant in the context of transport planning are as follows:
- Fishermans Bend Urban Renewal
- Melbourne Transport Strategy
- Victorian Cycling Strategy
- Melbourne Bicycle Plan
- Port Phillip Bike Plan
- SmartRoads Policy.

These documents are discussed in further detail below.

2.1.1 Fishermans Bend Urban Renewal

The FBURA has been identified by the DOT as a key urban renewal area within close proximity to the Melbourne CBD. Fishermans Bend is currently occupied predominately by industrial and commercial land uses.

The Minister for Planning has identified a total land area of 240Ha for urban renewal, with four precincts nominated. These precincts are Montague, Wirraway, Sandridge and Lorimer, and are shown in Figure 2.1.
2.1.2 Melbourne Metropolitan Planning Strategy

A new Metropolitan Strategy is currently under development by the Department of Premier and Cabinet and the Department of Planning and Community Development, with input from the Department of Transport, VicRoads, the Growth Areas Authority and other agencies. The draft Strategy was open for public consultation until March 2013, with completion expected late 2013.

In the interim, planning policy guidance can still be taken from Melbourne@5million, which is a planning update of Melbourne 2030. It recognises that significant growth is expected throughout Melbourne and outlines a strategy to best accommodate this growth, by moving away from the "mono-centric" city towards a "poly-centric city" with the designation of six Central Activities Districts. These will act like mini-CBDs and are intended to contain significant jobs, housing and complementary services.

Melbourne 2030 was a plan for the growth and development of the metropolitan area developed by the Victorian State Government in 2002. The Melbourne 2030 Strategy focused on the development of activity centres to cater for metropolitan growth, and provide jobs and services closer to where people live.

While the direction of the new Strategy is not yet policy, it is clear that Fishermans Bend will be recognised as a major driver of growth within the Melbourne CBD and play a pivotal role over the next generation through increased retail, residential, educational and employment functions. The recent expansion of the Capital City Zone to incorporate Fishermans Bend by the Minister for Planning is an important indicator of State Government's intention.

2.1.3 Victoria’s Cycling Strategy – Cycling into the Future 2013-23

The Victorian Cycling Strategy was published in December 2012 by the Victorian Government. It outlines its core aim "to grow and support cycling and build a more bike-friendly state".

To achieve this end the strategy sets out the following six directions:

i. Build evidence – build a strong evidence base for the Victorian Government to make more informed decisions.

ii. Enhance governance and streamline processes – clarify accountability and improve co-ordination, planning and delivery.

iii. Reduce safety risks – reduce conflicts and risks to make cycling safer.

iv. Encourage cycling – help Victorians feel more confident about cycling and make cycling more attractive.

v. Grow the cycling economy – support opportunities to grow and diversify Victoria’s economy through cycling.

vi. Plan networks and prioritise investment – plan urban cycling networks to improve connectivity and better target investment in urban networks, regional trails and specialist cycle sport infrastructure.

For each of the above directions, an action plan has been prepared with an initial two year outlook of likely projects, as well as potential sources of funding, where available. Beyond this, ongoing development of potential actions and funding is indicated, which is likely to be based on the fiscal position of the government in power at the time, noting that the previous government prepared their own cycling strategy in 2009.

2.1.4 Melbourne Bicycle Plan, 2012 – 2016

The Bicycle Plan 2012-16 is the City of Melbourne’s plan for bicycle infrastructure and programs to make Melbourne safer and more attractive for current and future cyclists. The plan focuses on creating a strong bicycle network and improving links between existing routes, particularly in the central city, and encouraging people of all ages and abilities to take up cycling or cycle more frequently for local trips.

The plan provides a status on current cycling and lists potential strategies and actions to achieve the vision of a cycling city. It outlines actions for infrastructure, facilities, services and programs for investment by the City of Melbourne and partners.

The goals of the Bicycle Plan are to:

- plan and deliver a connected cycling network
- build high quality routes for local cycling trips
- increase participation in cycling
- make cycling safer.

More than 50 large and small-scale projects are proposed in the plan to strengthen the bike network both on-road and off-road over the next four years.

The City of Melbourne will construct and upgrade a number of significant on-road routes, such as La Trobe Street, Princes Bridge, St Kilda Road, and Elizabeth, Exhibition and Clarendon Streets. The plan also identifies off-road works that will improve transitions from off-road to on-road paths and particularly from the popular Yarra River Trail to the central City.

The plan commits to increasing bicycle parking throughout the municipality and working with peak groups and businesses to improve end-of-trip facilities to encourage more people to cycle to work.

2.1.5 Port Phillip Bike Plan, 2011 – 2020

The City of Port Phillip Bike Plan 2011-2020 Pedal Power: Making bike riding better capitalises on the growing popularity of cycling within our City by prioritising cyclists over vehicles, carefully planning bicycle infrastructure and encouraging people from all backgrounds to ride more frequently. The Plan recognises the successes already achieved in terms of increasing ridership in Port Phillip and identifies four key goals and associated strategies to achieve them. These goals are:

- enhanced bike riding infrastructure
- integrating bike riding
- changing travel behaviour
- creating a bike riding culture.

2.1.6 SmartRoads Policy

SmartRoads is a VicRoads policy which sets ‘modal’ priorities on the road network and underpins many of the strategies significant to the Victorian Transport Plan surrounding the issue of public transport prioritisation.

"SmartRoads is an approach that manages competing interests for limited road space by giving priority use of the road to different transport modes at particular times of the day."
All road users will continue to have access to all roads. However, certain routes will be managed to work better for cars while others will be managed for public transport, cyclists and pedestrians. ¹

The VicRoads SmartRoads Network Operating Plan for the FBURA and the area surrounding the FBURA has been reproduced in Figure 2.2.

Figure 2.2: VicRoads SmartRoads Network Operating Plan

**Source:** http://maps.vic.gov.au/TransMaps/ui/DotmapUI.jsp

Figure 2.2 illustrates that Lorimer Street, Ingles Street, Bay Street, City Road and sections of Williamstown Road are all nominated bicycle priority routes.

### 2.2 Other Policy Directives

The "Austroads National Cycling Strategy, 2011-2016" proposes the following objective with respect to Infrastructure and Facilities:

**Objective:** “Create a comprehensive and continuous network of safe and attractive routes to cycle and end-of-trip facilities.”

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¹ Sourced from VicRoads

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In achieving this objective, local government authorities are encouraged to adopt the following action items:

- “Continue to invest in developing local on-road and off-road cycling networks to key destinations in both urban and rural areas that are consistent with national standards, and commit to the identification of required funds in the relevant budget processes.
- Continue to develop end-of-trip facilities that make it possible for people to cycle, including considering the introduction of regulations, such as planning policies and building standards, to mandate the provision of facilities.”

The development of the proposed principal bicycle corridors is consistent with the above policy directives.
3. Existing Conditions

3.1 Study Area, Corridors and Intersections

The study area is generally located in the south and north of the Melbourne and Port Phillip Municipalities respectively, and is bound by the Yarra River to the north, Todd Road to the west, Bay Street and Dorcas Street to the south, and St Kilda Road to the east.

Within the study area are the five corridors that bicycle facilities are to be investigated along. These corridors have been chosen as part of the overall development of the transport network in the connecting the FBURA. They do not represent the full extent of or the eventual bicycle principal network for the area. Rather, they represent a number of potential principal bicycle routes that have been identified as part of the current planning being undertaken for the area.

The five corridors are as follows:

- **Corridor 1.** Lorimer Street – between Montague Street and Todd Road.
- **Corridor 2.** Waterfrontages (Yarra River to the Hobsons Bay Foreshore) – between Lorimer Street and The Boulevard, generally along Salmon Street.
- **Corridor 3.** Docklands / Domain Connection – between Collins Street and St Kilda Road, generally along Montague Street and Dorcas Street.
- **Corridor 4.** South Melbourne Market – between the suburb of South Melbourne and the South Melbourne Market.
- **Corridor 5.** Bay Street Precinct – between Williamstown Road and Bay Street.

In addition, the two intersections within the study area that pedestrian and bicycle facilities are to be investigated at are listed as follows:

i. **Wurundjeri Way / Lorimer Street / Montague Street / West Gate Freeway intersection.**

ii. **Clarendon Street / Normanby Road / Whiteman Street intersection.**

The study area, the five corridors, and the two intersections are depicted in Figure 3.1.

Figure 3.1: Study Area and Proposed Bicycle Corridors

Source: Port Phillip Travel Smart Map

3.2 Bicycle Network

Within and connecting to the study area, there are a number of existing on-road, off-road and segregated bicycle facilities. Figure 3.2 has been prepared to identify the existing bicycle facilities within the study area.

Figure 3.2: Existing Bicycle Facilities

Source: Port Phillip Travel Smart Map

Further to the existing bicycle facilities is the current PBN that exists in the area. Figure 3.3 provides a map showing the current PBN within the study area.
3.4 Accident Statistics

A review of the reported casualty accident history for the study area has been sourced from VicRoads CrashStats accident database. This database records all accidents causing injury that have occurred in Victoria since 1987 (as recorded by Victorian Police) and categorises these accidents as follows:

- Fatal injury: at least one person was killed in the accident or died within 30 days as a result of the accident.
- Serious injury: at least one person was sent to hospital as a result of the accident.
- Other injury: at least one person required medical treatment as a result of the accident.

A summary of the accidents in the vicinity of the study area for the last available five year period (1 July 2007 to 30 June 2012) is presented in Figure 3.5.

Figure 3.5: Casualty Accident Summary (2007 – 2012)

Source: VicRoads Website

Figure 3.5 indicates that there have been a number of black spots and lengths within and connecting to the study area. Most notably, along the West Gate Freeway, within the Melbourne CBD, St Kilda Road, Kings Way, Clarendon Street, City Road, Ingles Street and Beach Street / Beaconsfield Parade.

Furthermore, a review of the reported casualty accident history of accidents involving cyclists causing injury that have occurred for the last available five year period (1 July 2007 to 30 June 2012) is presented in Figure 3.6.
3.5 Intersection Surveys

Surveys of pedestrians and cyclists were undertaken during the following periods at the Clarendon Street / Normanby Road / Whiteman Street intersection:

- Thursday 21 March 2013 between 7:00am and 9:00am (AM Peak Period)
- Tuesday 23 April 2013 between 4:00pm and 6:00pm (PM Peak Period)
- Saturday 23 March 2013 between 10:00am and 2:00pm (SAT Peak Period)

Based on these surveys, the AM, PM and Saturday peak hour pedestrian and bicycle volumes have been identified.

Pedestrian Volumes

The AM, PM and Saturday peak hour pedestrian volumes are presented in Figure 3.7, Figure 3.8 and Figure 3.9 respectively.
Off-Road Bicycle Volumes

The AM, PM and Saturday peak hour off-road bicycle volumes are presented in Figure 3.10, Figure 3.11 and Figure 3.12 respectively.

Figure 3.10: Weekday AM Peak Hour Off-Road Bicycle Volumes

off-road Bicycle Volumes

The AM, PM and Saturday peak hour on-road bicycle volumes are presented in Figure 3.13, Figure 3.14 and Figure 3.15 respectively.

Figure 3.11: Weekday PM Peak Hour Off-Road Bicycle Volumes
Figure 3.13: Weekday AM Peak Hour On-Road Bicycle Volumes

Figure 3.14: Weekday PM Peak Hour On-Road Bicycle Volumes

Figure 3.15: Saturday Peak Hour On-Road Bicycle Volumes
4. Corridor Investigations

4.1 Overview

Of the five proposed corridors only the Lorimer Street and the northern end of the Waterfrontages (between Lorimer Street and Williamstown Road) corridors were fixed. For the remaining corridors, it was required that the shortest (or most direct) route, and up to two other feasible routes, were to be identified and assessed, to determine the specific routes that concept designs would be developed for.

The process for identifying the specific routes for each corridor is discussed below.

4.2 Identification of Potential Routes

In order to gain an initial understanding of the study area and identify the potential routes for each corridor, the following activities were undertaken:

i. An initial desktop inspection of the study area.
ii. Review of aerial photos and TravelSmart plans to identify the most direct and other potential routes for each corridor.
iii. Visits to the study area and each of the potential routes to identify any significant opportunities and constraints with each of the corridors.
iv. Consideration of the following attributes:
   - total distance
   - travel time
   - directness of route
   - potential facility type
   - types of users the facility would likely support
   - interaction with other modes of transport
   - speed, volumes and make-up of traffic
   - on-road “Stop” or “Give Way” treatments
   - intersection cycle times and phasing
   - impacts of side streets on route
   - locale of route to differing land uses i.e. schools, retail and leisure facilities
   - ecological, access, civil and cultural alignment constraints
   - other identified site constraints

Three potential routes for each corridor were identified based on the above. A summary of the identified route options is presented as follows.
4.2.2 Waterfrontages Corridor (Corridor No. 2)

The Waterfrontages Corridor is aligned in a north-south direction, extending between Lorimer Street to the north and The Boulevard to the south. This corridor’s alignment was already identified for its northern section between Lorimer Street and Williamstown Road, and essentially consists of the Salmon Street road reserve.

Between Williamstown Road and The Boulevard the potential corridor options were identified as follows:

- most direct route going along Emery Street, through Cyril Letts Reserve, Rosny Street and Barak Road (Option 1)
- to the east along Williamstown Road and Beach Road (Option 2)
- to the west along Williamstown Road, Centre Avenue and through Fred Jackson Reserve (Option 3).

Figure 4.2 shows the potential corridor alignments between Williamstown Road and The Boulevard.

Figure 4.2: Waterfrontages Corridor – Route Identification

4.2.3 Docklands/Domain Connection (Corridor No. 3)

The Docklands/Domain Connection extends between Harbour Esplanade in Docklands to the north and the intersection of St Kilda Road and Park Street to the west.

Between Docklands and St Kilda Road the potential corridor options were identified as follows:

- most direct route going along Wurundjeri Way, Montague Street and Dorcas Street (Option 1)
- to the east along Charles Grimes Bridge, South Wharf Promenade, Wurundjeri Way, fire vehicle route around the southwest side of the Melbourne Convention Centre, Normanby Road, Whiteman Street, Cecil Street and Albert Road (Option 2).

Figure 4.3 shows the potential corridor alignments between Docklands and St Kilda Road.

Figure 4.3: Docklands / Domain Connection – Route Identification
4.2.4 South Melbourne Market Precinct (Corridor No. 4)

The South Melbourne Market Precinct extends between the suburb of South Melbourne in the northwest and the South Melbourne Market to the southeast.

Between South Melbourne and the South Melbourne Market the potential corridor options were identified as follows:

- most direct route going along Montague Street and York Street (Option 1)
- to the east along the existing shared path within the 109 tram corridor, Normanby Road, Whiteman Street and Cecil Street (Option 2)
- to the west along Ingles Street and Dorcas Street (Option 3).

Figure 4.4 shows the potential corridor alignments between South Melbourne and the South Melbourne Market.

4.2.5 Bay Street Precinct

The Bay Street Precinct extends between Williamstown Road to the north and Bay Street to the south.

Between Williamstown Road and Bay Street the potential corridor options were identified as follows:

- most direct route going along Bridge Street (Option 1)
- to the west along Farrell Street and Liardet Street (Option 2)
- further to the west along Graham Street (Option 3).

Figure 4.5 shows the potential corridor alignments between Williamstown Road and Bay Street.
4.3 Evaluation of Potential Routes

A comparative performance evaluation was undertaken of the potential routes for those corridor alignments not already defined, to help identify which would be the more preferable for cyclists. The evaluation was based on Section 12 of the NSW Bicycle Guidelines, which determines the comparative suitability of each route option against the others. The evaluation ranks each of the potential routes by applying a relative factor to each cyclist related impediment and summing their scores. The associated factors and impediments are listed as follows:

- the nature of the bicycle facility (segregated bicycle lane = 0.5 per 100m, shared path = 1 per 100m, and on-road = 2 per 100m)
- climbs and sharp turns (1 per 10m climb and 1 per sharp turn)
- give-way/stop points along on-road facilities (1 per give-way/stop point)
- number of intersecting roads and driveways along off-road facilities (1 per intersecting road and 1 per 10 intersecting driveways).

This enables any number of routes between two points to be compared. The route that accumulates the lowest score is generally considered to be the best performing route.

The factors considered as part of this evaluation do not holistically cover all the factors that should be considered in determining the recommended route alignment for a given corridor. Rather, the evaluation should be used as a basis for understanding what elements lead to a preferred route for cyclists, and why one performs better than another, to help guide discussion and make a decision on two routes when stakeholders cannot come to an agreement.

Also, a facility type was assumed for each of the route options. These were based on what facilities were considered to be feasible within the available road corridor, and at a minimum, the proposed facilities were to be generally compliant with Figure 2.1 of Cycling Aspects of Austroads Design (2011) which recommends a minimum level of 'separation' between cyclists and motor vehicles on urban roads based on the volume and speed of traffic.

Analyses for corridors that have route options are presented as follows.
4.3.1 Waterfrontages Corridor (Corridor No. 2)

A summary of the results of the evaluation of the potential routes between Williamstown Road and The Boulevard for the Waterfrontages Corridor are given in Table 4.1.

Table 4.1: Waterfrontages Corridor – Evaluation of Potential Routes

<table>
<thead>
<tr>
<th>Corridor Number</th>
<th>Waterfrontages (Option 1)</th>
<th>Waterfrontages (Option 2)</th>
<th>Waterfrontages (Option 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section</td>
<td>Williamstown Rd to The Blvd via Emery St, Rosny St &amp; Barak Rd</td>
<td>Williamstown Rd to The Blvd via Williamstown Rd and Beacon Rd</td>
<td>Williamstown Rd to The Blvd via Williamstown Rd and Centre Ave</td>
</tr>
<tr>
<td>Length</td>
<td>130m</td>
<td>1200m</td>
<td>800m</td>
</tr>
<tr>
<td>Proposed Facility</td>
<td>On-Road (except through park)</td>
<td>Shared Path</td>
<td>Shared Path</td>
</tr>
<tr>
<td>Facility Impact</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Loss of Traffic Capacity</td>
<td>Yes</td>
<td>Close median on Howe Pde</td>
<td>No</td>
</tr>
<tr>
<td>Loss of Parking</td>
<td>Yes</td>
<td>To Enable Widening of Footpath</td>
<td>Yes</td>
</tr>
<tr>
<td>Introduction of Bike Phasing</td>
<td>No</td>
<td>Yes</td>
<td>Sig Xing on Williamston Rd</td>
</tr>
<tr>
<td>Acquisition of Land Required</td>
<td>No</td>
<td>No</td>
<td>Utilise Murphy Reserve</td>
</tr>
<tr>
<td>Removal/Relocation of Services</td>
<td>No</td>
<td>Yes</td>
<td>Lighting against footpath</td>
</tr>
<tr>
<td>Removal/Relocation of Vegetation</td>
<td>Yes</td>
<td>Within Letts Reserve</td>
<td>No</td>
</tr>
<tr>
<td>Characteristic Input Score</td>
<td>Input Score</td>
<td>Input Score</td>
<td>Input Score</td>
</tr>
<tr>
<td>Separated Bike Distance (m)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Shared Path Distance (m)</td>
<td>80</td>
<td>0.8</td>
<td>1200</td>
</tr>
<tr>
<td>On-Road Distance (m)</td>
<td>450</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Climbs (m)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sharp Turns</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Off-Road Side Streets</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>STOP</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GIVE WAY</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>No. of Driveways</td>
<td>0</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>14.8</td>
<td>18.3</td>
<td>Total</td>
</tr>
</tbody>
</table>

Table 4.1 indicates that the route between Williamstown Road and The Boulevard and utilising Beacon Road (Option 2), performs the best. However, the route that uses Emery Street, Rosny Street and Barak Road (Option 1) is also comparable.
4.3.2 Docklands/Domain Connection (Corridor No. 3)

A summary of the results of the evaluation of the potential routes between Docklands and St Kilda Road for the Docklands/Domain Connection are given in Table 4.2.

Table 4.2: Docklands/Domain Connection – Evaluation of Potential Routes

<table>
<thead>
<tr>
<th>Corridor Number</th>
<th>3</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corridor Name</td>
<td>Docklands / Domain Connection (Option 1)</td>
<td>Docklands / Domain Connection (Option 2)</td>
</tr>
<tr>
<td>Section</td>
<td>Cecil/Dorcas to St Kilda Rd (via Montague St and Dorcas St)</td>
<td>Cecil/Dorcas to St Kilda Rd (via Cecil St and Albert Rd)</td>
</tr>
<tr>
<td>Section Length</td>
<td>1600m</td>
<td>2180m</td>
</tr>
<tr>
<td>Proposed Facility</td>
<td>Shared Path/Segregated Bicycle Facility</td>
<td>Shared Path/Segregated Bicycle Facility</td>
</tr>
<tr>
<td>Is it compliant with Austroads?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
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<table>
<thead>
<tr>
<th>Facility Impact</th>
<th>Corridor Performance</th>
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</thead>
<tbody>
<tr>
<td>Loss of Traffic Capacity</td>
<td>Yes</td>
</tr>
<tr>
<td>Loss of Parking</td>
<td>Covert angle to parallel</td>
</tr>
<tr>
<td>Introduction of Bike Phasing</td>
<td>Early start</td>
</tr>
<tr>
<td>Acquisition of Land Required</td>
<td>Yes</td>
</tr>
<tr>
<td>Removal/Relocation of Services</td>
<td>Yes</td>
</tr>
<tr>
<td>Removal/Relocation of Vegetation</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Input</th>
<th>Score</th>
<th>Input</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>Separated Bike Distance (m)</td>
<td>1250</td>
<td>6.25</td>
<td>1930</td>
<td>9.65</td>
</tr>
<tr>
<td>Shared Path Distance (m)</td>
<td>350</td>
<td>3.5</td>
<td>250</td>
<td>2.5</td>
</tr>
<tr>
<td>On-Road Distance (m)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Climb (m)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sharp Turns</td>
<td>13</td>
<td>13</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Off-Road Side Streets</td>
<td>STOP</td>
<td>GIVE WAY</td>
<td>No. of Driveways</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 4.2 indicates that the route between Docklands and St Kilda Road that utilises Montague Street and Dorcas Street (Option 1) performs the best.
4.3.3 South Melbourne Market Precinct (Corridor No. 4)

A summary of the results of the evaluation of the potential routes between South Melbourne and the South Melbourne Market for the South Melbourne Market Precinct are given in Table 4.3.

Table 4.3: South Melbourne Market Precinct – Evaluation of Potential Routes

<table>
<thead>
<tr>
<th>Corridor Name</th>
<th>Corridor Number</th>
<th>Section</th>
<th>Section Length</th>
<th>Type of Treatment</th>
<th>Is it compliant with Austroads?</th>
<th>Loss of Traffic Capacity</th>
<th>Loss of Parking</th>
<th>Introduction of Bike Phasing</th>
<th>Acquisition of Land Required</th>
<th>Removal/Relocation of Services</th>
<th>Removal/Relocation of Vegetation</th>
<th>Corridor Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Melbourne Market (Option 1)</td>
<td>4</td>
<td>Normanby Rd to South Melbourne Market (via Montague St and York St)</td>
<td>1000m</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>1530m</td>
</tr>
<tr>
<td>South Melbourne Market (Option 2)</td>
<td>4</td>
<td>Normanby Rd to South Melbourne Market (via Shared Path and Cecil St)</td>
<td>1680m</td>
<td>Convert angled to parallel</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>18.6</td>
</tr>
<tr>
<td>South Melbourne Market (Option 3)</td>
<td>4</td>
<td>Normanby Rd to South Melbourne Market (via Ingles, Dorcas &amp; Cecil)</td>
<td>2530m</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>30.9</td>
</tr>
</tbody>
</table>

Table 4.3 indicates that the route between South Melbourne and the South Melbourne Market that utilises Montague Street and York Street (Option 1) performs the best.
4.3.4 Bay Street Precinct (Corridor No. 5)

A summary of the results of the evaluation of the potential routes between Williamstown Road and Bay Street for the Bay Street Precinct is given in Table 4.4.

Table 4.4: Bay Street Precinct – Evaluation of Potential Routes

<table>
<thead>
<tr>
<th>Corridor Name</th>
<th>Corridor Number</th>
<th>Section</th>
<th>Section Length</th>
<th>Proposed Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Street Precinct (Option 1)</td>
<td>1</td>
<td>Williamstown Rd to Bay St</td>
<td>1025m</td>
<td>Shared Path / Segregated Bicycle Facility</td>
</tr>
<tr>
<td>Bay Street Precinct (Option 2)</td>
<td>2</td>
<td>Williamstown Rd to Bay St</td>
<td>1215m</td>
<td>Shared Path / Segregated Bicycle Facility</td>
</tr>
<tr>
<td>Bay Street Precinct (Option 3)</td>
<td>3</td>
<td>Williamstown Rd to Bay St</td>
<td>1300m</td>
<td>Segregated Bicycle Facility</td>
</tr>
</tbody>
</table>

Table 4.4 indicates that the route between Williamstown Road and Bay Street that utilises Bridge Street (Option 1) performs the best.
4.4 Stakeholder Consultation

On Thursday 14 March 2013 a stakeholder workshop was held to discuss and confirm the preferred alignments for each corridor. Representatives from the following organisations were in attendance:

- Department of Transport
- Places Victoria
- VicRoads
- Melbourne City Council
- Port Phillip City Council
- GTA Consultants.

During the workshop, each route option was considered, along with what facilities and impact on the existing network could be supported.

Generally the preferred alignments were consistent with the route evaluation findings, except for the following:

- The preferred route for the section of the Waterfrontages Corridor between Williamstown Road and The Boulevard was the route along Emery Street, Rosny Street and Barak Road, as it was significantly more direct than the others.
- The preferred route for the South Melbourne Market Precinct was the route along Ingles Street and Dorcas Street, as the majority of the Montague Street and York Street was already included as part of the Docklands / Domain Connection route, and the significant constraint associated with going under the tram line on York Street.

4.5 Preferred Corridor Routes

Based on the above analysis and discussion the preferred route alignments for each corridor are presented in Figure 4.6 and outlined thereafter.
5. Identification of Facility Types

5.1 Facility Considerations

Given the context of this project, it is anticipated that the development of bicycle facilities along the nominated corridors will be primarily aimed at servicing the expected future number of commuter cyclists within, and connecting to, the urban renewal area of Fishermans Bend. There is also an opportunity to encourage recreational cycling along the water’s edge of the Yarra River and a potential rail trail to the west along Todd Road. In this regard, the broad level design considerations that have been considered as part of this project are that the bicycle facilities should:

- Utilise best practices and leading innovations in bicycle facility design.
- Be safe and encourage potential users of all abilities to use them.
- Provide competitive travel times compared to other potential routes in the area.
- Be able to accommodate current and future bicycle volumes.
- Connect with existing facilities and local trip generators/destinations.
- Be intuitive to cyclists.

This section sets out broad level design directives and criteria for the development of the bicycle facilities for application within the five identified bicycle corridors.

5.1.1 Types of Users

Types of cyclists are understood along two continuums. The first being those associated with the major trip types. This is presented within Table 5.2 of Cycling Aspects of Austroads Design (2011), which has been reproduced below within Table 5.1.

Table 5.1: Categories of Cyclists and their Characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Rider Characteristics</th>
<th>Riding Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary school children</td>
<td>Cognitive skills not developed, little knowledge of road rules, require supervision.</td>
<td>Off-road path, footpath or very low volume residential street. [1]</td>
</tr>
<tr>
<td>Secondary school children</td>
<td>Skill rates, developing confidence.</td>
<td>Generally use on-road facilities or off-road paths where available.</td>
</tr>
<tr>
<td>Recreational</td>
<td>Experience, age, skills vary greatly.</td>
<td>Decide off-road or on-road.</td>
</tr>
<tr>
<td>Commuter</td>
<td>Vary in age, skill and fitness, some highly skilled and able to handle a variety of traffic conditions.</td>
<td>Some prefer paths or low-stress roads, willing to take longer to get to destinations, others want quick trips regardless of traffic conditions, primarily require space to ride smooth riding surface, speed maintenance.</td>
</tr>
<tr>
<td>Utility</td>
<td>Ride for specific purposes (shopping), short length trips, route unpredictable.</td>
<td>Not on highly trafficked routes, needs to include comprehensive, low-stress routes, appropriate end of trip facilities.</td>
</tr>
<tr>
<td>Sporting</td>
<td>Long distance journeys, may be heavily equipped, some travelling in groups.</td>
<td>Often route is similar to that of other tourists.</td>
</tr>
</tbody>
</table>
| [1] Children under the age of 12 and an accompanying adult are permitted to cycle on footpaths in Victoria.

Table 5.1 indicates that there are seven major rider types, along with their general riding characteristics and preferred riding environment. This gives a basic understanding of what facility types are required to support each of these user groups.

However, even within each of these major rider types, there is a wide range of skills and level of confidence that has a major influence on whether individuals chose to cycle or use other forms of transport to commute or for recreational activities, even if they would like to cycle. This natural variation in an individual’s comprehension of whether cycling is a viable form of transport and recreation is the second continuum. In this regard, Roger Geller of the Portland Bureau of Transportation (2010) has identified four main groupings of individuals within the general community, based on how they comprehend the viability of cycling. Explanation of each of these groupings is provided as follows:

- **Strong and the Fearless** - ride regardless of road conditions: riding is a strong part of their identity and they are undeterred by cycling conditions.
- **Enthusied and Confident** - are, and could be, attracted to regular riding by continuing to address the barriers to cycling: shorter trip distances, better bicycle facilities, better end-of-trip facilities.
- **Interested but Concerned** - hear messages about how easy it is to cycle, but they are afraid to ride. They don’t like the cars speeding down their streets. They get nervous thinking about what will happen to them on a bicycle when a driver runs a red light, or guns their cars around them, or passes too closely and too fast.
- **No Way, No How** - not interested in cycling at all, for reasons of topography, inability, or simply a lack of interest.

Figure 5.1 illustrates the proportions of these four main groupings.

Figure 5.1: Four Types of Cyclists
With this understanding, there is a large proportion of the population (nearly two-thirds) that have the potential to consider cycling as a viable form of transport and recreation. This would not be for all trips or recreational activities, but cycling could become a regular part of their commute and recreational activities if the barriers associated with their decision making are overcome.

It is noted that these percentages may not be strictly applicable to Metropolitan Melbourne, given that they are a function of many factors, such as land use mix, population densities, social norms, etc., and that surveys of other populations, such as in the UK (64%), NZ (41%) and Chile (87%), have indicated different percentages for those that are not interested in cycling at all. However, what is evident is that there is a significantly larger section of the population interested in cycling than actually currently partake in it on a daily basis.

Moreover, the likely percentage of potential cyclists in Australia has been identified within the published research by the Cycling Promotion Fund and Australian Heart Foundation (2011), which showed that of the 60% of the Australians with access to a bicycle, approximately 70% were not considering using it as a primary means of transport for safety related reasons only ("interested but concerned").

Given the above, it is recommended that commuter and recreational cyclists be considered based on a more user-ability categorization. This is outlined in Table 5.2. Such an approach is used with great success in countries with high levels of cycling such as the Netherlands and Germany (TU-Delft, 2000) as a method for including the broadest range of users. The four user groups listed in Table 5.2 encompass the Cycling Aspects of Austroads Guides categories and consideration of individual's comprehension of the viability of cycling.

### Table 5.2: Bicycle User Group Categories and Characteristics

<table>
<thead>
<tr>
<th>Group</th>
<th>Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Vulnerable to traffic</td>
<td>Children between the ages of 10 and 16, the elderly, the hard of hearing, very</td>
</tr>
<tr>
<td></td>
<td></td>
<td>short trips, slow speeds (less than 15km/h), traffic shy, slower reaction times.</td>
</tr>
<tr>
<td>B</td>
<td>Borderline “fair weather” cyclists</td>
<td>Infrequent adult cyclists, alert but lacking confidence, low to average riding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>skill, short to medium trips.</td>
</tr>
<tr>
<td>C</td>
<td>Active adults</td>
<td>Speeds between 15 and 30 km/h, alert and ‘road aware’, able to handle low to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>medium level of riding skill and proficiency, all trip purposes.</td>
</tr>
<tr>
<td>D</td>
<td>Sports and fitness</td>
<td>Speeds higher than 30 km/h, prefers ‘main road’ environments.</td>
</tr>
</tbody>
</table>

5.1.2 Types of Facilities

There are a range of cycling facilities that can be implemented. These are sometimes based on the available corridor width, intersection operations, traffic volumes and speeds, continuity of an overall route, transport network hierarchy (i.e., SmartRoads) and bicycle user-ability characteristics.

While this can all be relevant, it can cloud the understanding and the ability to identify what facilities are required to accommodate and encourage cyclists and result in sub-standard facilities that do not encourage any new cyclists, but at best redirect existing users to use them. Safety is key in the determination of what facilities are perceived as being viable by cyclists, and one of the major ways that safety is perceived by cyclists is through the level of separation provided to motorised traffic. This varies between each of the four user categories outlined in Table 5.2, but as a good starting point, reference is made to Figure 2.1 of Cycling Aspects of Austroads Design (2011), which is presented in Figure 5.2.

![Figure 5.2: Minimum Levels of Separation](image)

Figure 5.2 recommends a minimum level of separation between cyclists and motor vehicles on urban roads based on the volume and speed of traffic. At low traffic speeds and volumes, a shared road environment is considered appropriate, and at high traffic speeds and volumes, separated bicycle paths are considered appropriate.

These minimum separation guidelines are considered appropriate for the development of a bicycle network within an urban environment to support the “borderline “fair weather” cyclist” and “active adult” cyclists, which makes up the majority of current and the potential users (approx. two-thirds of a community). It is further noted that DOT and Bicycle Network recommend that the “bicycle lane or shoulders” area should be shifted to align with 45km/h and 70km/h to further support the “borderline “fair weather” cyclist”.

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5 Sourced from Assessment of the type of cycling infrastructure required to attract new cyclists, NZ Transport Agency research report 491, October 2011
“Vulnerable to traffic” cyclists require almost complete separation of bicycle facilities to motorised traffic throughout their associated trips. ‘Sports and fitness’ cyclists do not require or desire the same level of separation as other groups, as they are more concerned with maintaining speeds and travelling long distances. Furthermore, they generally do not choose to ride within urban environments for exactly these reasons.

Further to Figure 5.2, which shows the relationship between the minimum level of separation required given the prevailing traffic speeds and volumes, the three methods of separation are described as follows and illustrated in Figure 5.3:

- **Physical separation.** Paths, shared or exclusive-use, separated from the roadway.
- **Visual separation.** Line marked space on roads, bicycle lanes or shoulders.
- **Mixed traffic.** Rides share lane space on the road with motor vehicles and off-road with pedestrians. There are two categories of shared space:
  - **Spacious profile** shared space is where there is a consistently wide kerb lane to allow riders and drivers to comfortably share space according to the prevailing road speed (i.e. minimum kerbside traffic lane width of 3.7m within a 60km/h speed zone – refer to Table 4.2 of the Cycling Aspects of Austroads Guides, 2011 for further guidance).
  - **Tight profile** shared space can be used for bicycle routes in low-speed, low motorised traffic volume environments such as residential streets and laneways. In very low speed environments such as residential areas and on very narrow inner-city streets, where the aim is to keep all vehicle speeds low, it is preferable to restrict the lane width so that vehicles cannot pass riders and must follow each in turn (i.e. maximum traffic lane width of 3.2m).

**Figure 5.3: Methods of Separation**

Source: RTA 2003, p14

5.2 Application within the Study Area

With significant levels and density of development expected within the FBURA, the types of bicycle facilities to be used need to not only give consideration to the types of users as mentioned above, but also give consideration to how they might best support the future potential development in the area. In this regard, the types of bicycle facilities should aim to provide a higher density and more sustainable transport mode choice, when compared to traditional private car use. Also, given the principal nature of the routes being considered as part of this study, they are likely to exist within mixed modal transport corridors with low speeds and high volumes. Furthermore, the adjacent property frontages can be expected to be active and generate high pedestrian volumes.

As such, the bicycle facilities can generally be expected to be required to be segregated from other vehicle types, except where it is not feasible or desired to have a mixed / shared environment. This should help encourage their use by potential users of all abilities, support full activation of the adjacent properties and provide a level of future proofing through the provision of dedicated transport space.

This has been reinforced by both Melbourne City Council and Port Phillip City Council, who have indicated that they do not support the use of shared paths for the ultimate facility types within the study area. As such, the following mid-block and intersection facilities have been applied.

5.2.1 Mid-Block Bicycle Facilities

The following mid-block bicycle facilities have been proposed and applied based on the current corridor conditions:

- Mixed traffic lanes
- On-road bicycle lanes
- Segregated two-way bicycle lanes
- Segregated one-way bicycle lanes.

Further discussion about each of the above facilities types and their application within the study area is provided as follows.

**Mixed Traffic Lanes**

Mixed traffic facilities have only been used along local roads with abutting residential land uses where the existing road carriageway widths do not make it possible to accommodate on-road bicycle facilities. Further, they are at locations which are expected to experience low traffic volumes and speeds, with on-going local area traffic management measures expected to be provided to further achieve equitable speeds between bicycles and vehicles, and limit through traffic volumes.

**On-Road Bicycle Lanes**

On-road bicycle lanes have been used along local roads that experience low traffic volumes and speeds, and/or adjacent to off-road bicycle facilities to provide an alternative facility for the more confident cyclists that are concerned with travel time.

**Segregated Two-Way Bicycle Lanes**

Segregated two-way bicycle lanes have been used where existing road carriageway widths do not provide sufficient space for one-way bicycle lanes in each direction. Furthermore, they have only been applied along extended lengths (i.e. not short-lengths requiring users to cross the road, with connecting facilities to other principal bicycle facilities at each end and there being low turning volumes across the facilities at unsignalised intersections.)
Segregated one-way bicycle lanes  

Segregated one-way bicycle facilities have been provided in each direction along the majority of the corridors where a traffic lane is considered to be able to be reduced in width, removed and/or through the conversion of angled kerbside parking to parallel parking.

5.2.2 Intersection Treatments

Proposed intersection treatment arrangements for the bicycle facilities along each of the corridors are essentially either give-way controlled or signalled intersections. No roundabouts are proposed, and any existing roundabouts along the routes are proposed to be converted to a give-way control or signalised intersections. The main reason for this is due to the majority of the proposed bicycle facilities being segregated, which are difficult to incorporate into a roundabout, unless they are directed to mix with the traffic lanes a proximate distance from the roundabout and vehicle speeds can be suitably slowed (i.e. Cecil Street / York Street roundabout), or the roundabout is of sufficient size that the bicycle lanes are treated as separate approaches (roundabouts of this size do not typically exist in such a built-up urban environment).

However, there were two types of give-way controlled intersections utilised along the corridors where the segregated one or two-way bicycle facilities had priority across an intersecting road. The two types of give-way controlled intersections vary based on the level of intersecting or turning traffic volumes that need to be accommodated. Each of the intersection treatments and their application within the study area is discussed as follows.

Straight Through Crossing

The Straight Through Crossing treatment of a segregated bicycle facility across an intersecting road that is under Give Way control has been used where the traffic volumes accessing the intersecting road are low and/or there is an inability to set-back the bicycle facility from the priority carriageway due to impacts on adjacent properties and sightlines.

Generally the segregated bicycle facilities are on a raised table across the intersecting road with standard speed table ramps on each approach to slow vehicles crossing the segregated bicycle lanes.

Where pedestrian movements also exist across the intersecting road, the raised speed table has been widened and a marked zebra crossing provided.

The main limitation of the Straight Through Crossing treatment is ensuring that vehicles turning traffic volumes that need to be accommodated. Each of the intersection treatments and their application within the study area is discussed as follows.

Straight Through Crossing

The Straight Through Crossing treatment of a segregated bicycle facility across an intersecting road that is under Give Way control has been used where the traffic volumes accessing the intersecting road are low and/or there is an inability to set-back the bicycle facility from the priority carriageway due to impacts on adjacent properties and sightlines.

Bend Out Crossing

The Bend Out Crossing treatment of a segregated bicycle facility across an intersecting road that is under Give Way control has been used where the traffic volumes accessing the intersecting road are low, but can be higher than those where the Straight Through Crossing treatment is used, and there is an ability to set-back the bicycle facility from the priority carriageway.

The setting back of the crossing location does provide vehicles with an opportunity to access the priority roadway in two stages, as there is sufficient space (at least 6.0m) provided between the crossing and the priority road. Obviously, this is only suitable for passenger cars, with larger commercial vehicles likely to straddle the crossing while waiting for a suitable gap in the traffic stream on the priority road, or extend back out into the priority road while they wait for a suitable gap in the traffic stream on the segregated bicycle lane (and pedestrian crossing in most instances). The setback can be increased to accommodate commercial vehicles, but given the additional distance users are required to travel and potential impact on adjacent properties, this should only be considered where there is a high volume of commercial vehicles accessing the road and no other alternative to access the associated properties in the area.

Give Way signage is usually sufficient in these instances to clearly indicate that vehicles on the road are required to give way to cyclists on the segregated bicycle facility as long as the raised speed table ramps are steep enough that they require vehicles to sufficiently slow down (additional speed cushions on approach to the O’Hea Street segregated bicycle and pedestrian facilities in Coburg have been introduced as vehicles were not sufficiently slowed by the gradually raised speed tables), and the Give Way signage is repeated on the approach to the raised speed table and priority roadway.
In the event that there are higher volumes of traffic accessing the intersecting road and a Bend Out Crossing facility is unlikely to provide sufficient intersection capacity, the intersections have been signalised, which should enable specific bicycle phasing and/or turn restrictions to be provided to help prioritise bicycle use, as well as being able to allocate the amount of green time on each approach to control any through traffic concerns.

5.2.3 Naked Street / Shared Space

While not specifically used along any of the preferred bicycle routes, namely due to bicycle facilities being the focus of this project, there is a strong emerging theme of creating streets for people, rather than roads for cars, within mixed use activity centres with high pedestrian volumes. This does not necessarily mean banishing cars entirely, but rather it involves reorganising space and designing to create a place for people to interact, rather than an efficient space designed for the efficient movement of vehicles and services.

The key influences on this movement are the “Naked Streets” (negotiated space) and “Shared Streets” which were pioneered in the Netherlands by Hans Monderman. The underlying psychology seeks to change behaviour and culture “from priority to equality”, and inks with the Crime Prevention through Environmental Design (CPTED) design philosophy.

Shared space relies on removing almost all delineation from the road space, and leaving only subtle cues as to the priority of the various modes. A key premise is that increasing uncertainty (creating ambiguity) for motorist’s increases certainty and safety for pedestrians. Traffic will move slowly enough for pedestrians and drivers to make eye contact, whereas the traditional highly delineated street does not allow for any negotiation over priority.

There are many examples of highly successful shared zones in Victoria, including the Melbourne CBD, Bendigo CBD, and other major centres such as Footscray, Clayton, Dandenong and others. An important feature of these spaces is that they generally have many other positive economic and social benefits apart from the obvious transport benefits created by giving equal priority to pedestrians.

It is expected that such facilities would be desirable in areas such as proximate to the South Melbourne Market, and potentially retail cores within Fishermans Bend as it develops.

5.3 Proposed Facilities

5.3.1 Corridors

For each of the five corridors, the proposed bicycle facilities are indicated as follows. These are also presented graphically in the plans included in Appendix A.

Lorimer Street Corridor

- Two-way off-road bicycle path on the north side of the road between Todd Road and Graham Street within the existing railway corridor. This is also potential for the provision of a pedestrian footpath within the northern road reserve, subject to their impact on the existing trees.

- A connection through to the Yarra River waterfront has been indicated next to the City link overbridge. Its final location and the length of the facilities within the northern road reserve will be dependent on the proposed development in this area.

- On-road wide kerbside lane in each direction between Todd Road and Graham Street.

- Two-way off-road bicycle path on the south side of the road between Graham Street and Montague Street. A pedestrian footpath is also provided along this length, where land acquisition will be required.

- On-road kerbside bicycle lanes between Graham Street and Montague Street.

- Two-way segregated bicycle facility along the eastern side of the Salmon Road carriageway between Lorimer Street and Williamstown Road. A DDA compliant pedestrian and bicycle bridge over the West Gate Freeway is also proposed.

- Signalised bicycle and pedestrian facilities across Williamstown Road to connect Salmon Road and Emery Street.

- On-road mixed traffic facilities along Emery Street between Williamstown Road and Cyril Lets Reserve.

- Off-road bicycle path through Cyril Lets Reserve between Edwards Avenue and Howe Parade.

- Restricting access through the median break on Howe Parade to cyclists to connect Cyril Lets Reserve and Rosny Street.

- On-road mixed traffic facilities along Rosny Street between Howe Parade and Barak Road.

- On-road mixed traffic facilities along Barak Road between Rosny Street and The Boulevarde.

- Off-road shared path connecting Barak Road and Westport Reserve across the Boulevarde.

Docklands/Domain Connection

- Widened existing shared paths on both sides of Wurundjeri Way between Navigation Drive and Lorimer Street.

- Two-way off-road bicycle path and footpath between Wurundjeri Way and the DFO Shopping Centre between South Wharf Promenade and access road to the DFO Shopping Centre.

- Two-way off-road bicycle path and footpath on each side of Montague Street between Lorimer Street and Normandy Road.

- On-road kerbside bicycle lane in each direction along Wurundjeri Way and Montague Street between Navigation Drive and the southern on and off ramps to the West Gate Freeway.

- One-way kerbside segregated bicycle facilities in each direction along Montague Street between Normandy Road and York Street.

- Two-way bicycle path and footpath along the west side of Montague Street between York Street and Dorcas Street.

- One-way kerbside segregated bicycle facilities in each direction along Dorcas Street between Montague Street and St Kilda Road.
South Melbourne Market Precinct
- One-way kerb side segregated bicycle facilities in each direction along Ingles Street between Normanby Road and Dorcas Street.
- One-way kerb side segregated bicycle facilities in each direction along Dorcas Street between Ingles Street and Cecil Street.

Bay Street Precinct
- One-way kerb side segregated bicycle facilities in each direction along Bridge Street between Plummer Street and Bay Street.

5.3.2 Intersections
For each of the two intersections, the proposed pedestrian and bicycle facilities are indicated as follows. These are also presented graphically in the plans included in Appendix A.

Wurundjeri Way / Lorimer Street / Montague Street / West Gate Freeway Intersection
- Two-way off-road bicycle path and footpath on the south side of Lorimer Street to the west of Montague Street.
- On-road kerbside bicycle lane in each direction along Lorimer Street to the west of Montague Street.
- Widened existing shared paths on both sides of Wurundjeri Way to the north of Lorimer Street.
- Two-way off-road bicycle path and footpath between Wurundjeri Way and the DFO Shopping Centre, to the north of the DFO Shopping Centre.
- Two-way off-road bicycle path and footpath on each side of Montague Street to the south of Lorimer Street.
- On-road kerbside bicycle lane in each direction along Wurundjeri Way and Montague Street to the north of the southern on and off ramps to the West Gate Freeway.

Clarendon Street / Normanby Road / Whiteman Street Intersection
- One-way kerb side segregated bicycle facilities in each direction along Clarendon Street to the north of Normanby Road.
- Two-way off-road bicycle path and footpath on the north side of Normanby Road to the west of Clarendon Street.
- On-road kerbside bicycle lane in each direction along Normanby Road to the west of Clarendon Street for a short distance before connecting with the adjacent off-road facilities.
- On-road kerbside bicycle lane in each direction along Whiteman Street to the east of Clarendon Street, with the initial distances segregated.
- Shared crossing facility to the west of the tram stop between the paths on the north side of Whiteman Street and south side of Normanby Road.
- Separate pedestrian and bicycle crossing facilities on the west approaches of the intersection.
- Increased shared area adjacent to the tram stop on the north side of Whiteman Street to the west of Clarendon Street, with a tram ramp connecting eastbound cyclists on Whiteman Road.

5.4 Alternative Facility Options
As part of the development of the facility types for each of the five corridors and specific intersections, there have been a number of suggestions put forward by the stakeholders that were consulted as part of the development of the draft and final concept designs. While the majority of the suggestions received on the draft plans were included in the final plans, a summary of the additional suggestions and any specific comments on their impact are provided below. Sketches and written submissions for some of the alternatives have also been provided and are contained in Appendix B. During the next stage of the design development of these corridors it is important that these comments are considered.

Lorimer Street Corridor
- Within the Lorimer Street corridor there is an opportunity to provide multiple facilities to cater for different cycling groups. There is room for an off-road (3m) clearly marked bike path on the northern side of the road reserve (within the current railway reserve) and then along the river front. It is proposed that this be supplemented with either on-road bike lanes or an off-road bicycle path on the southern side of the road. The current drawings indicate there is limited carriageway width to accommodate on-road bicycle lanes and that the off-road facility on the southern side of the road will require land acquisition. An alternative would be to provide higher quality dedicated and continuous on-road lanes. To provide for sport cyclists and commuters it may not be desired to provide segregated facilities that limit the bicycle lane width and restrict the ability to overtake other cyclists.
- City of Melbourne has requested that the pedestrian footpath widths proposed along Lorimer Street be 2.0m wide to provide ability for two pedestrians to comfortably pass each other. The impact of this would be additional land acquisition, especially along the southern side of Lorimer Street.
- One-way kerb side segregated bicycle facilities in each direction along Lorimer Street have been suggested by the City of Melbourne. In order to accommodate this facility the loss of a traffic lane in each direction is required. Alternatively the central median or kerbside parking would need to be removed. City of Melbourne would prefer the traffic lanes be reduced. However, the role of Lorimer Street in the future may require two lanes in each direction.
- With the current layout of the Lorimer Street and Ingles Street intersection the off-road bicycle and pedestrian facilities need to cross two carriageways. It has been recommended by the City of Port Phillip to close the western carriageway from Ingles Street and straighten the off-road facilities. This would impact on access to one property and require widening of the eastern carriageway to accommodate left-turn commercial vehicle movements. In addition, this has the potential to allow for the development of a small public park.
- The removal of pedestrian bus bays to provide a wider footpath along Lorimer Street should be considered as part of any kerb line changes.
- The removal of the slip lanes at Rogers Street should be considered as part of a bike path on the southern side of Lorimer Street, especially given the likely reduction in heavy vehicle movements needing local access as this precinct develops.
Waterfrontages Corridor

- One-way kerb-side segregated bicycle facilities in each direction along Salmon Street have been recommended by the City of Melbourne. However, this was investigated and deemed not to work within the current carriageway width. The resulting bicycle lanes would each be 1.4m wide, well below the Transport Guidelines being developed for Fishermans Bend. In addition, there would need to be an additional bridge over the West Gate Freeway, or cyclists in one direction would need to cross Salmon Street. This, in this instance, given the long distance and the low number of driveways, it was considered that a bi-directional path would be a more efficient option.
- The midblock through traffic lane widths could be reduced to 3.5 metres with the extra space allocated to a wider bike path and/or car parking bays that are clearways during peak traffic periods.
- The southbound bus stop on Salmon Street to the north of Plummer Street has been recommended by the City of Port Phillip to be relocated to the south side of Plummer Street. This will require the loss of at least a further three car parking spaces, but should reduce the extent of the bend-out bicycle treatment to go round the bus stop.
- It has been proposed to provide a signalised pedestrian crossing facility on the west approach of the Salmon Street / Williamstown Road / Emery Street intersection as part of the signalisation of the intersection. However, it is not appropriate to run the west approach pedestrian crossing and left-turn only movement from Emery Street at the same time (green left-turn arrow when pedestrians are permitted to cross). As such, the movements would need to be split, which can be expected to add in the order of an additional 25-30 seconds per cycle the pedestrian crossing is called. Such a significant time period that is only processing pedestrians (and perhaps left-turn movements out of Salmon Street) is expected to significantly impact on the intersection’s capacity, and so has not been provided at this time.
- Consideration should be given to providing kerb extensions on Howe Parade to provide better protection for the cyclists as they cross the road.
- At the intersection of The Boulevard and Barak Road it has been recommended by the City of Port Phillip to remove the splitter island on Barak Road to move the bicycle crossing on The Boulevard over. Also, it has been recommended to split cyclist and pedestrians along the path to the existing path along the waterfront.

Docklands/Dominion Connection

- At the Wurundjeri Way / Montague Street / Lorimer Street intersection, it has been recommended by the City of Port Phillip to remove a traffic lane in each direction to provide for wider bus and bike shared lanes. This is expected to impact on the capacity of the intersection and the downstream interchange with the West Gate Freeway. This could provide bus priority if warranted by operations and a slightly improved on-road facility for cyclists.
- Alternative cross-sections for Montague Street have been provided by the City of Port Phillip, and are attached in Appendix B. They look to reduce the number of traffic lanes to one lane in each direction, potentially with a raised central median, and provide kerb-side parking and one-way segregated bicycle lanes in each direction. This can be expected to downgrade Montague Street and restrict the number of vehicles accessing the West Gate Freeway. Intersection and bus stop designs have not been considered as part of the provided cross-sections. These are more appropriate south of Normandy Road.

South Melbourne Market Precinct

- An on road bicycle lane on the south approach of the Dorcas Street / Montague Street intersection has been recommended by the City of Port Phillip.
- Consideration of a pedestrian crossing on the southern approach of the Ferrars Street / Dorcas Street intersection should be undertaken as part of any modifications to the phasing for cyclists.
- The intersection of Stuart and Dorcas Street requires further analysis to determine if it is safe for cyclists without signals. Modification to the intersection layout may be required to minimise conflicting turning movements.
- This corridor has the highest level of proposed car parking reduction. Angle parking is not possible in some locations, as previously suggested by Council, therefore opportunities to increase car parking in the precinct by reviewing other restrictions and even creating new off-street parking maybe required.

An on road bicycle lane on the south approach of the Dorcas Street / Montague Street intersection has been recommended by the City of Port Phillip. Consideration of a pedestrian crossing on the southern approach of the Ferrars Street / Dorcas Street intersection should be undertaken as part of any modifications to the phasing for cyclists. The intersection of Stuart and Dorcas Street requires further analysis to determine if it is safe for cyclists without signals. Modification to the intersection layout may be required to minimise conflicting turning movements. This corridor has the highest level of proposed car parking reduction. Angle parking is not possible in some locations, as previously suggested by Council, therefore opportunities to increase car parking in the precinct by reviewing other restrictions and even creating new off-street parking maybe required.
6. Concept Designs and Impacts

6.1 Preamble

Concept designs of the bicycle facilities for each of the five corridors, and the pedestrian and bicycle facilities for the two intersections have been prepared.

Draft concept designs were provided to the stakeholders that attended the workshop outlined in Section 4.4 of this report for their review and comment. Following the receipt of comments, the majority of the suggestions where incorporated within the final concept designs, which are provided in Appendix A of this report.

With the level of change that the proposed bicycle facilities would have on the existing transport network, consideration of the major impacts is outlined as follows.

6.2 Loss of Car Parking

One of the major impacts with the proposed bicycle facilities would be the loss of car parking. There are significant lengths of road for which it is proposed to convert the existing angled car parking to parallel car parking, and in some places, the parallel car parking is proposed to be removed altogether.

Table 6.1 has been prepared to indicate the approximate order of magnitude of the loss of car parking that can be expected as part of the proposed bicycle facilities.

### Table 6.1: Estimates of Car Parking Losses

<table>
<thead>
<tr>
<th>Route Location</th>
<th>Change to Parking</th>
<th>Distance [m]</th>
<th>Existing [spaces]</th>
<th>Pool [spaces]</th>
<th>Loss [spaces]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorimer Street Corridor</td>
<td>Removal of Parallel</td>
<td>540</td>
<td>91</td>
<td>0</td>
<td>91</td>
</tr>
<tr>
<td>South Melbourne - Docklands Domain Connection</td>
<td>Proposed Bridge Structure on Salmon St</td>
<td>160</td>
<td>27</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>Docklands / Domain Connection</td>
<td>Removal of Parallel</td>
<td>125</td>
<td>48</td>
<td>21</td>
<td>27</td>
</tr>
<tr>
<td>South-Melbourne Mall Precinct</td>
<td>Removal of Parallel</td>
<td>54</td>
<td>9</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Waterfrontages Corridor</td>
<td>Removal of Parallel</td>
<td>580</td>
<td>97</td>
<td>0</td>
<td>97</td>
</tr>
<tr>
<td>Docklands / Domain Connection</td>
<td>Angled to Parallel</td>
<td>160</td>
<td>33</td>
<td>12</td>
<td>21</td>
</tr>
<tr>
<td>Docklands / Domain Connection</td>
<td>Angled to Parallel</td>
<td>350</td>
<td>12</td>
<td>56</td>
<td>94</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1,189</td>
<td>418</td>
<td>771</td>
<td></td>
</tr>
</tbody>
</table>

[1] Angled car spaces assumed to be 2.6m wide and parallel car spaces assumed to be 6m wide.

Table 6.1 indicates that in the order of 770 car spaces may need to be removed to accommodate the proposed bicycle facilities. While this number of car parking spaces is significant as a total, spread out over the network, it has the potential to not have a major holistic impact if coupled with other initiatives to reduce the use of private cars, such as what is happening in the FBURA given its expected significant change in land use and development. However, some areas, especially external to the FBURA, will be sensitive to the loss of parking and these will need to be considered on a case-by-case basis.

Further consideration could also be given to the ability to utilise 45 and/or 30 degree angled car parking spaces instead of parallel car spaces to reduce the impact, such as for Dorcas Street and Bridge Street.

6.3 Intersection Capacity and Operation

The other major impact of the proposed bicycle facilities will be their impact on the operation and capacity of intersections. Generally the proposed bicycle facilities reduce the number of approach lanes (often only short lengths of turn lanes) and at signalised intersections will require the introduction of specific bicycle phases and/or turn restrictions.

Each of these reduces the capacity of the existing intersections, some of which are already near or at capacity. However, given that cycling has a lower space requirement compared with traditional single occupant private car travel, this loss of motorised vehicle capacity at the intersections can be expected to be at least offset by the increased bicycle capacity.

The specific changes to the operation of given intersections will be dependent on the ultimate facility type being used and interaction treatment. Segregated bicycle facilities, typically require separate phases, or at least turn restrictions across their travel paths through the intersection while their movement is supported. The use of head-starts for cyclists might be considered if the turning and/or bicycle volumes are low, but to minimise the potential for conflict and in supporting increasing bicycle volumes, they will have limited use.

At this time the capacity and operational impacts of the proposed bicycle facilities have not been considered any further than where traffic capacity is clearly at a premium (e.g. Wurundjeri Way, Montague Street, Kingsway, etc) and to ensure that each interaction can be expected to continue to provide for the current movements. Specific analysis and coordination with nearby movements will be required, and is expected to be undertaken as part of future development stages of the design of these facilities.

6.4 Services

Where possible, consideration has been given to the existing above ground services along the corridors. However, impact on some services is expected, especially where changes to the kerb alignment, provision of off-road facilities and/or introduction of bridge structures are proposed.

A summary of the above ground services expected to be impacted as part of accommodating the proposed facilities along each corridor and intersections is provided as follows.

### 6.4.1 Lorimer Street Corridor

- Power lines along the north side of Lorimer Street between Graham Street and Montague Street.

### 6.4.2 Waterfrontages Corridor

- Street lighting and power lines at the Williamstown Road / Salmon Street intersection.

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**Fishermans Bend - Final Report - Background Documents**
6.4.3 Docklands/Domain Connection

- Traffic signal hardware and street lighting at the Wurundjeri Way / Montague Street / Lorimer Street intersection.
- Street lighting and power lines on the northeast side of Montague Street between West Gate Freeway and Normanby Road.
- Power lines along the west side of Montague Street between City Road and Dorcas Street.
- Power lines on the corners of the Cecil Street / Dorcas Street intersection.
- Power lines on the corners of the Moray Street / Dorcas Street intersection.
- Street lighting and tram poles at the Kingsway / Dorcas Street intersection.
- Power lines and street lights on the corners of the Wells Street / Dorcas Street intersection.
- Street lighting and tram poles at the St Kilda Road / Dorcas Street intersection.

6.4.4 South Melbourne Market Precinct

- Street lighting, power and tram poles, and tram crossing infrastructure at the 109 tram line intersection with Ingles Street.
- Traffic signal hardware and street lighting at the Ingles Street / Pickles Street / Montague Street intersection.

6.4.5 Bay Street Precinct

- Power lines and drainage along the west side of Bridge Street between Williamstown Road and Plummer Street.
- Power lines and street lights on the corners of the Evans Street / Bridge Street intersection.
- Street lighting, power and tram poles, and tram crossing infrastructure at the 109 tram line intersection with Bridge Street.
- Power lines and street lights on the corners of the Princes Street / Bridge Street intersection.

6.4.6 Clarendon Street / Normanby Road / Whiteman Street Intersection

- Street lighting, power and tram poles, and tram crossing infrastructure at the tram stops between Normanby Road and Whiteman Street.
- Signal infrastructure, power lines and street lights on the corners of the intersection.
- Drainage within the slip lanes on the corners of the intersection.

6.5 Land Acquisition

Land acquisition is expected to be required for at least the proposed facilities along the southern side of Lorimer Street. Beyond this, no other specific locations have been identified at this time. However, as the designs develop and there are other transport and development needs that are required to be accommodated, it is likely that additional areas of privately held land will need to be acquired. The earlier this is identified the more likely it will be able to be obtained.

6.6 Loss of Vegetation

The majority of the proposed facilities are expected to be accommodated within the existing carriageways. However, where they do not, such as Lorimer Street, Montague Street and a number of local parks/reserves, there is likely to be the loss of vegetation. Where feasible, this should be avoided. But where it cannot, the loss should be offset.
7. Next Steps

This project sets out the initial alignment of a number of key routes that will form part of the principal bicycle network within and connecting to the FBURA, and what bicycle facilities could be accommodated within the existing transport network for initial costing and feasibility purposes. There can be expected to be significant additional analysis and discussion to be undertaken before the ultimate bicycle facilities are designed and constructed. Below is an outline of some of the additional works that will need to be undertaken to get to this stage of development.

Transport Planning

It is noted that the following sections of the five preferred corridors are not indicated as preferred bicycle routes within the associated SmartRoads Operating Plans:

- Lorimer Street between Williamstown Road and The Boulevard
- Montague Street between City Rd and Dorcas Street
- Bridge Street between Plummer Street and Bay Street.

It is expected that through consultation with VicRoads that above corridors will be indicated as preferred bicycle routes within SmartRoads.

Costing / Feasibility

This is to be undertaken based on the concept designs, which are preliminary, and therefore can be expected to include a significant level of contingency included at this stage and detail of the facilities. Furthermore, at additional points in the development of the designs, costing and feasibility exercises will be undertaken to confirm the facilities can be achieved.

Car Parking Assessment

Further consideration of the impact on car parking and what alternatives exist to minimise the impact can be expected to be considered. Also, surveys of the car parking spaces to be removed and those in the proximate area are required to understand the current level and type of utilisation, and available capacity in the area to redistribute the current demands.

Policy outlining how car parking will be provided within and proximate to the FBURA will be critical to how this issue is approached, noting that significant areas of the City of Melbourne have upper car parking provision limits, and the City of Port Phillip utilises sustainable transport and car parking rates.

Furthermore, suitable initiatives to reduce the use of private motor vehicles, and the associated car parking demands, can be expected. As the shifts in transport occur opportunities to reduce the number of on-street car parking spaces, especially from angled to parallel spaces through the introduction of additional off-street car parking supplies within developments are provided.

Traffic Analysis

For each of the intersections to be impacted by the proposed bicycle facilities, suitable analysis to determine the most appropriate design and operation is required. This will at a minimum require traffic volume surveys, modelling (multi-modal on a micro, meso and macroscopic level) and an iterative design approach to determine the most appropriate layout and operation to manage the demands of the overall transport network.

It should be noted that no specific intersection type has been confirmed. Only a preliminary indication of what intersection treatment is considered to be the most feasible to support cyclists and other modes of transport has been provided at this stage.

A ‘network fit assessment’ approach, as part of VicRoads SmartRoads Policy, can also be expected to be applied as part of determining the most appropriate facility types and intersection treatments. With the proposed facilities currently or proposed to form part of the PBN in the area, it should be expected that they will hold a high priority in which mode should be supported.

Review against Final Fishermans Bend Infrastructure Proposals

This project is not occurring in isolation, even in regards to the FBURA and connecting to Fishermans Bend. Consideration will need to be given to all exiting and proposed transport infrastructure in the area, and how they will combine and best service the expected development in the area. Further, consideration will also need to be given to upgrades of existing transport facilities outside of the FBURA and how they may change travel patterns and mode splits in the area.

Functional and Detailed Design Development

It is expected that the concept designs will be used, along with input from the initial costing and feasibility review, to develop functional and detailed designs. This will require higher levels of detail in terms of feature and level survey data, on-site measurements of resulting sight distances, as well as input from other specialists, such as town planners, landscape architects and structural, civil and services engineers.

Traffic signal plans will also need to be prepared for any upgrades to and introduction of signalised facilities. They will identify the resulting timing and phasing to optimise the interaction and prioritisation of the various mode types interacting. They will also identify the location of required signal infrastructure, including detection loops, push buttons, lanterns, poles, lighting, etc., as well as other items, such as carse, head-start boxes, pram ramps, signage and line markings.

Stakeholder Consultation

Significant levels of stakeholder consultation will need to occur as part of developing the designs and gaining ‘buy-in’ and approval from the relevant authorities. At a minimum, consultation is expected to occur with VicRoads, Melbourne City Council, Port Philip City Council, tram and bus Operators, the general public and within the DOT and Places Victoria.

A community engagement and consultation plan can be expected to be developed for these and other transport facilities proposed in the area.

Bicycle Infrastructure Investment Plan

The outlining of how and when the bicycle infrastructure is going to be implemented has significant bearing on the costing / feasibility and with consulting the stakeholders. With the overall level of development anticipated in the study area, this is expected to be completed in the context of all the transport infrastructure projects, not just for the bicycle facilities proposed as part of this project, as well as the upgrading of the existing bicycle facilities in the area.

As such, it is expected that a Bicycle Infrastructure Investment Plan will be developed and coordinated with the overall transport infrastructure projects for the FBURA and the upgrading of the existing bicycle facilities in the area through VicRoads and the associated Councils.
Development of Transport Design Guidelines

DOT, with input from relevant stakeholders, is currently developing Transport Design Guidelines for the FBURA. At this time, interim Transport Design Guidelines for the FBURA have been prepared. These guidelines will need to be taken into consideration when further developing the proposed corridors and facilities. It is also noted that the Transport design Guidelines will influence the overall public transport network for the FBURA, so is likely to impact other interacting transport infrastructure as well as the proposed bicycle facilities.

Other Supporting Facilities / Programs

In addition to the above considerations and activities that will need to be completed as part of further developing the proposed bicycle routes and facilities, the below are also expected to be considered:

- Use of 40km/h and 30km/h speed zones, mixed / shared traffic environments.
- Expansion of the Melbourne Bike Share Scheme.
- Trials of different techniques to separate cyclists and motorists, especially where a minimum 0.6m wide raised island cannot be provided.
- Use and extent of green surfacing and raised line marking (i.e. rumble strips, vibra line, riley kerb, BikeFLOW, etc).
- Wayfinding signage, infrastructure and landscaping.
- End-of-trip facilities, including publicly available bicycle parking.
- Educational and Behavioural Change Programs.

Concept Designs

Appendix A
Appendix B

Council Submission on Alternative Facility Options
24 April 2013
Ms Emma Nicholson
Central City Transport
Transport Planning & Programs Division
Department of Transport
By Email: Emma.Nicholson@transport.vic.gov.au

Dear Ms Nicholson

FISHERMANS BEND – PBN DEVELOPMENT INVESTIGATION

Thank you for your e-mail seeking a review and comments on GTA’s draft concepts for the cycling corridors in the Fishermans Bend Precinct.

It is noted that GTA’s report investigates five (5) corridors of which only corridor (1) is totally within the City of Melbourne municipality, while corridors 2 & 3 are located across two (2) municipalities, City of Melbourne and City of Port Phillip.

We are aware that Fishermans Bend redevelopment aims to demonstrate best practice in sustainable transport, where the Department of Transport has expressed that movement strategies will be determined by the following hierarchy (with priority given from the top of the list):

- Pedestrian movement;
- Cycle movement;
- Public transport movement (in the case of Fishermans Bend this will focus on buses in the early stages of development and, in due course focus on trams and a Metro);
- Local servicing movement; and
- Private automobile.

The City of Melbourne supports the above approach and requests that this approach be applied to the draft PBN routes detailed in the draft concept plans for each corridor.

Accordingly, pedestrians should have the greatest ease of movement throughout Fishermans Bend including those streets forming the proposed PBN routes within the City of Melbourne boundaries, namely Lorimer Street, Salmon Street and Montague Street / Docklands Highway / Dorcas Street.

With this priority in mind shared paths are less than ideal and should be avoided. The space allocated for pedestrians should have a minimum width of 2 metres to allow for passing pedestrians to pass one another with ease. Cyclist routes should be dedicated paths that are not in conflict with motor vehicle movements. A preference is for separated bicycle lanes with widths ranging from 2 to 3 metres. Signalised intersections should incorporate bicycle signals with priority over motor vehicles.

Lorimer Street (Corridor 1)

The central median should be retained wherever there is no right turning lane. The bicycle lane should be on street separate from the pedestrian footpath.

Salmon Street (Corridor 2)

It is unclear from the plans if the proposal requires the narrowing of the existing grassed verge to accommodate bicycle lanes and traffic lanes as dimensioned. Notwithstanding this the City of Melbourne’s preference is for one dedicated northbound cycle lane parallel to the northbound traffic lane, and one dedicated southbound cycle lane parallel to the southbound traffic lane. This varies from the Corridor 2 proposal, where a 1.5m northbound and a 1.5m southbound cycle lane are located on one side of the street. We also suggest the intersections are safe cycle junctions to avoid bicycle and motor vehicle conflicts.

Docklands Highway / Montague Street / Dorcas Street (Corridor 3)

Wurundjeri Way / Charles Grimes Bridge

It is desirable to provide on road facilities by reducing the width of the traffic lanes. Shared paths are not supported.

Montague Street

There may be opportunities to increase the width of the bicycle lane by the fine tuning of adjacent traffic lanes. Retaining the existing shared path between Normanby Road and Munro Street as part of Corridor 3 upgrade is not supported as both pedestrian and bicycle volumes will increase significantly; bicycle facilities should be on-road. The separated bicycle lanes in the section between Normanby Street and City Road are supported.

Dorcas Street

Removal of angle parking from both sides of the street reduces the servicing and access opportunities to abutting properties. Traffic volumes on Dorcas Street are relatively low, therefore it is suggested that angle parking only be removed from one side of the street and the installation of an off-set centre line.

Intersection Concept Plans

Normanby Road / Clarendon Street

The City of Melbourne supports the proposed treatment in principle, however the following comments are provided:

- Cyclists travelling south along Clarendon Street have no facility to turn right onto the path within the light rail reserve. A signalised hook turn may be appropriate.
- It is assumed that the pedestrian crossing over the tram tracks connects to the shared path on Whiteman Street; however this is not clearly documented.
The Normanby Road westbound on-road facility conflicts with the existing bus zone. It is suggested that the bus zone be relocated further west and the on-road bicycle lane be detoured onto the path before reaching the bus zone.

Any new treatment at or near this intersection particularly the proposed signalised crossing should be integrated with any proposed treatments associated with the Tram Route 96 upgrade.

The proposal should indicate how the bicycle lane would link to any future Clarendon Street bicycle lanes north of the intersection.

Montague Street / Docklands Highway / Lorimer Street

The City of Melbourne does not support shared paths as indicated on the first page of this letter and consideration should be given to reducing the width of the existing traffic lanes to provide safe on-road facilities.

For further enquiries, please contact Mr Andrew Cron or Mr Sam Donato on tel. 96558439 / 96589149 respectively.

Yours sincerely

Haig Poulson
Principal Engineer – Traffic Engineering

[Signature]

CoM Ref: 7841075
SP2237/89

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28 May 2013

Mr Neil Hutchinson
Central City Transport
Transport Planning & Programs Division
Department of Transport

By Email: Neil.Hutchinson@transport.vic.gov.au

Dear Mr Hutchinson

FISHERMANS BEND – PRINCIPLE BICYCLE NETWORK (PBN) DEVELOPMENT INVESTIGATION

Thank you for your e-mail seeking comments on GTA’s route options study and development of concept designs for five (5) key corridors as part of the PBN within the Fishermans Bend area. It is noted that only corridor (1) is totally within the City of Melbourne municipality, while corridors 2 & 3 are located across the City of Melbourne and City of Port Phillip.

It is understood that the Fishermans Bend redevelopment aims to demonstrate best practice in sustainable transport, where the Department of Transport has expressed that movement strategies will be determined by the following hierarchy (with priority given from the top of the list):

- Pedestrian movement;
- Cycle movement;
- Public transport movement (in the case of Fishermans Bend this will focus on buses in the early stages of development and, in due course on trams and a Metro);
- Local servicing movement; and
- Private automobile.

Engineering Services supports the above approach and once again requests that this approach be applied to the draft PBN routes detailed in the draft concept plans for each corridor. Furthermore generation rates for each road user should be based on future abutting land use of each corridor and associated anticipated traffic generation rates (which includes pedestrians, cyclists, public transport patrons and motor vehicle use) for the whole area.

Adopting the above approach should ensure that residential properties are designed and built for low car ownership rates with no provision for on-street resident priority parking to meet residents parking needs.

We wish to reiterate that pedestrians should have the greatest ease of movement throughout Fishermans Bend including those streets forming the proposed PBN routes within the City of Melbourne boundaries, namely Lorimer Street, Salmon Street and Montague Street / Docklands Highway / Doris Street.
With this priority in mind, shared paths are less than ideal and should be avoided. The space allocated for pedestrians should have a minimum width of 2 metres to allow for passing pedestrians to pass one another with ease. Cyclist routes should be dedicated paths that are not in conflict with motor vehicle movements. A preference is for separated bicycle lanes with widths ranging from 2 to 3 metres. Signalised intersections should incorporate bicycle signals with priority over motor vehicles.

The City of Melbourne has no objection to designating Lorimer Street (Corridor 1), Salmon Street (Corridor 2) and Docklands Highway / Montague Street / Dorcas Street (Corridor 3) to form part of the Principal Bicycle Network.

The following specific comments on proposals within the City of Melbourne are provided on the understanding that the proposals are only interim measures until public transport infrastructure, in the form of heavy rail or light rail, has been developed. Having regard to the hierarchy outlined above, the heavy rail proposals should incorporate on-road bicycle facilities. The bicycle facilities on Lorimer Street should be separated from vehicular traffic and well clear of pedestrian facilities even if it results in reducing the roadway to one motor vehicle through lane in each direction.

**Lorimer Street (Corridor 1)**

It is noted that the proposal is as follows:

- Two-way off road path on the north side of Lorimer Street between Todd Road and Graham Street within the existing rail corridor.
- On-road wide kerbside lane in each direction, together with bicycle symbols placed at 200 metre intervals between Todd Road and Graham Street and between Graham Street and Ingles Street.
- On-road bicycle lane in each direction between Ingles Street and Montague Street.
- Two-way off road bicycle path on the south side of the road between Graham Street and Montague Street.
- A connection from Lorimer Street to Yarra River water front along the edge of City Link Bridge with its final location dependent on the proposed development in the area.

**Comment**

- VicRoads SmartRoads Network Operating Plan for the FURA recommends a Bicycle Priority Route be adopted for Lorimer Street in the Road Use Hierarchy. It is considered that the wide kerbside lane is inadequate in an environment where significant numbers of heavy vehicles travel on the street.
- The proposed footpath width of 1.5 metres along the north side of Lorimer Street is inadequate. The space allocated for pedestrians should have a minimum width of 2 metres to allow pedestrians to pass one another with ease.
- Based on the above hierarchy, should the bicycle facilities be installed off-road, then they must be physically separated from pedestrians and be 3 metres in width. If the lanes are provided on-road then they should be physically separated from motor vehicles.

If the current proposal for Corridor 1 is an interim measure, the City of Melbourne favours the removal of the proposed two-way off-road bicycle path once on-road separated facilities are installed on Lorimer Street, as this path would be replicated along Yarra’s Edge.

**Salmon Street (Corridor 2)**

It is noted that the proposal is as follows:

- Two-way segregated bicycle facility along the east side of Salmon Street between Lorimer Street and Willimstown Road.
- A DDA compliant bridge over the West Gate Freeway to the east of the existing road overpass.

**Comment**

- It is appreciated why the bicycle facilities are confined to one side of the street to align with the proposed bridge over the West Gate Freeway, however one-way segregated bicycle lanes on the east and west side of Salmon Street is preferred. Cyclists could cross salmon Street to get to bridge facility over West Gate Freeway or alternatively the existing bridge could be altered to accommodate a cantilevered section with new DDA compliant ramps from the road surface to cantilevered sections.
- Midblock through traffic lane widths could be reduced to 3.5 metres where the lanes abut a kerb and could be increased to 4.0 metres maximum where they abut indented parking where the proposed parking lane width is at absolute minimum width of 2.1 metres.

**Docklands Highway / Montague Street / Dorcas Street (Corridor 3)**

It is noted that the proposal is as follows:

- Widen existing shared paths on both sides of Wurundjeri Way between Navigation Drive and Lorimer Street.
- Two-way off road bicycle path and footpath between Wurundjeri Way and the DFO Shopping Centre between South Wharf Promenade and access road to the DFO Shopping Centre.
- Two-way off road bicycle path and segregated footpath on each side of Montague Street between Lorimer Street and Normanby Road.
- On-road kerbside bicycle lane in each direction along Wurundjeri Way and Montague Street between Navigation Drive and the southern end on and off ramps to the West Gate Freeway.
- One-way segregated bicycle facilities in each direction along Montague Street between Normanby Road and York Street.
- Two-way bicycle path through Solar Green Reserve between York Street and the closure at the north end of Montague Street.
- Separated bicycle lanes (2.0 metre wide) on each side of Montague Street between Solar Green Reserve and Dorcas Street.
- One-way kerbside segregated bicycle facilities in each direction along Dorcas Street between Montague Street and St Kilda Road requiring the conversion of angle parking to parallel parking in the municipalities of Melbourne and Port Phillip.

Comment

- Bicycle facilities should also be included on the north side of Wurundjeri Way between Charles Grimes Bridge Road and Flinders Street similar to what is proposed on the south side of this section of Wurundjeri Way.

- The conversion of angle parking to parallel parking on both sides of Dorcas Street significantly reduces the servicing and access opportunities to abutting properties. Having undertaken some on-site measurements, it is acknowledged that the retention of angle parking on one side of the road with an off-set centre line, as suggested in Council’s earlier letter is not possible due to inadequate road width. The study should therefore investigate opportunities to increase the parking stock in the precinct by reviewing existing No Stopping restrictions, which may be obsolete following Victorian Road Rule changes in 1998 and, incorporate permissible parking areas (subject to VicRoads approval) in the communication strategy to the local community when seeking their views.

For further enquiries, please contact Mr Andrew Cron or Mr Sam Donato on tel. 96588439 / 96589149 respectively.

Yours sincerely

Haig Poulson
Principal Engineer – Traffic Engineering

CoM Ref: DOCS/ 7924031
SR2237168
AMENDMENT PER DOT COMMENTS 4. SPECIFIC SIGNAL PHASING FOR CYCLISTS TO BE DETERMINED AS PART OF FUTURE DESIGN STAGES.

INTERSECTION CAPACITY HAS NOT BEEN ASSESSED.
RELOCATE BUS STOP AND BUS SHELTER AS SHOWN PROVIDE ZEBRA CROSSING

SALMON STREET / PLUMMER STREET

STUDY AREA (CORRIDOR 2) - FIGURE 4

1. RELOCATE BUS STOP TO REARNING SIDE OF PLUMMER ST. INTERSECTION. IT SHOULDN'T FLUCTUATE CROSSING POINT TO FRONT METER SIDE.
2. SIGNALISE BI-DIRECTIONAL. 50 MM LANE AT RSC OF PLUMMER ST.
3. PROVIDE GREATER CAPACITY FOR VEHICLES AT ENTRANCE TO SALMON STREET.

ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.

BASE INFORMATION OBTAINED FROM NEARMAP.

OTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE ON WHICH THE SETOUT DETAIL IS BASED.

PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.

SPECIFIC SIGNAL PHASING FOR CYCLISTS TO BE DETERMINED AS PART OF FUTURE DESIGN STAGES.

INTERSECTION CAPACITY HAS NOT BEEN ASSESSED.

DESIGNED P.PHAM / DRAWN P.PHAM / T.NAPIORKOWSKI

APPROVED BY
AMENDMENTS

- P2 AMENDMENTS AS PER COMMENTS
  28  13 INITIAL ISSUE AO.

ISSUE DATE

GENERAL NOTES

- ALL DIMENSIONS RADII ARE IN METRES AND ARE TO FACE OF KERB AND CHANNEL.
- BASE INFORMATION OBTAINED NEARMAP.
- OTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF EXISTING CONDITIONS BASE ON WHICH THE SETOUT DETAIL IS BASED.
- PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SHOULD BE VERIFIED ON SITE.
- SPECIFIC SIGNAL PHASING FOR CYCLISTS TO BE DETERMINED AS PART OF FUTURE DESIGN STAGES.
- INTERSECTION CAPACITY HAS NOT BEEN...
1. **GENERAL NOTES**

1.1 All dimensions and radii are in metres and are to the face of kerb and channel.

1.2 Base information obtained from NEARHAP.

1.3 OTA Consultants does not take any responsibility for the accuracy of the existing conditions on which the setout detail is based. Prior to commencement of construction, the existing conditions including underground services should be verified on site.

1.4 Specific signal phasing for cyclists to be determined as part of future design stages.

1.5 Intersection capacity has not been assessed.

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**DESIGNED**
P.PHAM / T.NAPIORKOWSKI

**DRAWN**
P.PHAM / T.NAPIORKOWSKI

**APPROVED**

28 March

**SCALE** 5:10

**CAD FILE NO.** A3

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**FISHERMANS BEND**

**PREFERRED PBN ROUTES**

1. BARAK ROAD / THE BOULEVARD

STUDY AREA (CORRIDOR 2) - FIGURE 7

REF. 42 & 57

**DRAWING NO. ISSUE** P2
AMENDMENTS

P2 1013.11 NEW INTERSECTION DESIGNS

P1 INITIAL ISSUE

DATE 3Y

3. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.

A. SPECIFIC SIGNAL PHASING FOR CYCLISTS TO BE DETERMINED AS PART OF FUTURE DESIGN STAGES.

5. INTERSECTION CAPACITY HAS NOT BEEN ASSESSED.
Preferred Routes

On – Road Facility
Off – Road Facility
Segregated Facility