

# Transport Strategy refresh

## Background paper

### Increasing the Use of Bicycles for Transport

May 2018

Phillip Boyle & Associates

## Contents

Executive Summary.....	3
1. How everyone can benefit from increased bicycle riding.....	4
2. What is happening today? .....	8
2.1 Two types of bicycle trips .....	8
Extended walking .....	10
Congestion cutting.....	10
2.2 The number of people who ride bicycles for transport .....	13
Travel within the municipality (Bicycles as Extended Walking).....	13
Travel to the municipality (Bicycles as Congestion Cutters) .....	14
2.3 Why people do not ride bicycles for transport .....	19
Risk.....	19
Other barriers .....	22
3. How the City of Melbourne can increase the level of bicycle use .....	24
Direction One: Shrink motor vehicle ownership and use and grow the alternatives .....	25
3.1 Remove the requirement for private off-street car spaces .....	26
3.2 Reduce access and lower the priority provided to people in cars.....	26
3.2 Develop more high mobility streets in the City centre .....	27
3.3 Develop high mobility corridors leading to the Centre.....	31
Direction Two: Improve bicycle facilities.....	35
3.4 Implement regular upgrades of existing facilities that are successful .....	35
3.5 Increase protection from turning motor vehicles & introduce protected 'Dutch-style' intersections...	39
3.6 Include 'movement' in the design of places and open spaces .....	43
3.7 Require more bicycle parking in the planning scheme.....	51
3.8 Move bicycle parking from the footpath to kerb-extensions to underground .....	53
3.9 Increase investment in bicycle infrastructure and provide incentives .....	55
4. Summary of the discussion .....	57

## Executive Summary

The current and forecast surge in population and jobs presents the City of Melbourne a transport strategy challenge. The new Transport Strategy must show how an ever-increasing number of people can move in a fixed space. This apparent paradox can be overcome by increasing the use of the space efficient modes. One of the space-saving solutions, alongside walking and transit, is bicycle riding.

Space saving bicycle trips are both useful and necessary. Useful because they are more space efficient than car trips and necessary because bicycle trips complement the other alternatives. Bicycles allow trips that are further than people like to walk and provide a cost-effective complement for longer transit-based trips.

The benefits from an increased number of bicycle trips will be felt by everyone. The transport system will expand to cope with the greater load and people will be able to flow in, around and through the municipality without the delays and frustration caused by congestion. By reducing the number and proportion of motor vehicle trips, space can be released from the transport system and reallocated to expand cramped footpaths and bicycle facilities as well as providing car-free transit corridors. Surplus space can be moved out of the transport system to increase the space available for sitting, standing and meeting people as well for trees and open space.

As the urbanist Jan Gehl says 'if you have people walk and bicycle more, you have a more lively, more liveable, more attractive, more safe, more sustainable and more healthy city.'

This discussion paper considers the two main types of bicycle transport trips: short local trips in and around the municipality described as 'extended walking' and longer 'congestion cutter' trips to and from the municipality. Data suggests that there are many local bicycle trips of both types. The short trips are declining in number. The longer trips are increasing in line with the increase in population but not enough to increase the bicycle's overall share of the transport task.

The paper outlines how the City of Melbourne can expand the level of bicycle riding for transport.

An increase in bicycle trips is suppressed by several factors, the most significant of which is risk. For cautious riders to use their bicycles for transport, they will need the confidence provided by facilities that feel safe to ride on because are separated from motor vehicles. When the bicycle route is on the road, the separation will need to be provided not only in the midblock but also at intersections.

The paper highlights the importance of reducing motor vehicle ownership and use as well as increasing alternatives. To increase bicycle use the paper reaffirms the concept of high mobility streets in the 2012 Transport Strategy. These high-mobility streets can be extended into high-mobility corridors that reach to the boundaries of the municipality. These streets and corridors would provide an integrated transport solution combining all alternative transport modes. Along these streets and corridors bicycle riders would be protected (and encouraged) by fully separated bicycle facilities.

Increased bicycle use needs to be supported by revisions to the planning scheme which increase the space in buildings where bicycles can be parked and stored. Out on the street increased bicycle use will put pressure on footpath parking. Bicycles will need to be parked on kerb outstands and eventually moved underground to allow other uses of public space. The City of Melbourne will also need to provide for the flow of people and people on bicycles in the 'places' and open spaces it creates.

The paper concludes by discussing capital investments and other financial incentives that help establish higher levels of riding. Substantial and regular investment in facilities is the necessary condition to establish the targets set by the City of Melbourne that bicycle trips should account initially for 7% and then 10% of all trips.

## 1. How everyone can benefit from increased bicycle riding

An increase in bicycle riding along with walking and transit will allow us to reshape our transport system so that it moves more people and releases space for purposes that will benefit everyone.

Population, visitation and employment in the City of Melbourne are growing strongly. This growth means that an increasing number of people are trying to move around. This movement is increasingly difficult because the roads and the road network do not (and will not) expand in response to the growth.

Although our roads are often full and congested, the flow of people on our roads – what VicRoads calls ‘person lane occupancy’<sup>1</sup> – is relatively weak. The people flow is weak because most road space is used for storing, parking and moving motor vehicles. Of all the modes, motor vehicles occupy the most space and provide the lowest flow-of-people rate. Flows of people in motor vehicles thicken into congestion under small amounts of growth.

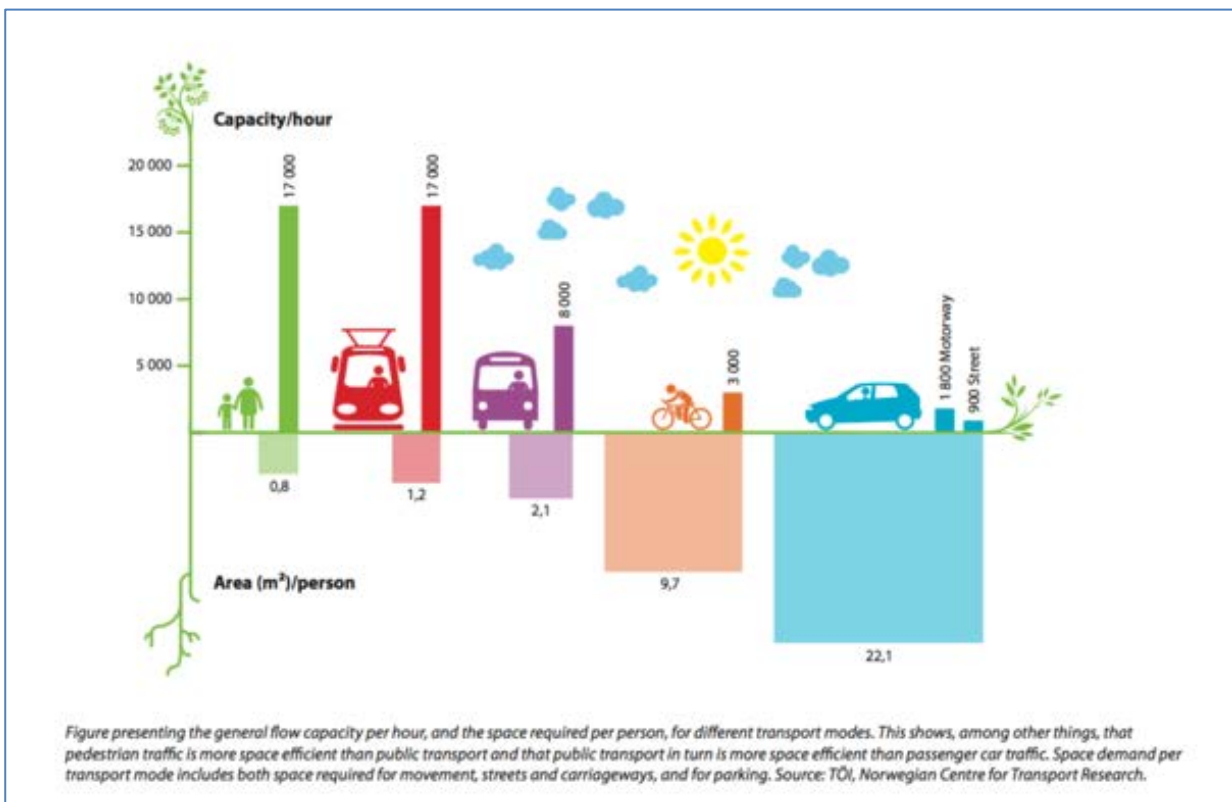


Figure 1: The chart shows the maximum people flow and space required for various modes  
Source: Sustainable Urban Mobility Plan Malmö 2016

We cannot know when all the imagined technological advances of motor vehicles will be in operation. What we do know is that a road full of electric vehicles with robot drivers and multiple passengers will still have the lowest rate of people-flow of any road transport. In areas where a high intensity of residents, visitors and jobs generate significant economic benefits, the cars of the future will not be appropriate.

On the other hand, walking and transit both have low space requirements and allow for high people-flows. Bicycles are not as space efficient as walking and transit but are more efficient than cars.<sup>2</sup> To cope with growth these space-efficient modes must become more important and make a greater contribution than they do today. In recognition of their high people-flow rate we will need to give on-road transit and walking greater priority. The transport task cannot be provided by walking and transit alone.

High quality, high frequency transit routes are expensive to provide. Limited transit funding and the time taken to establish new routes means that we can expect there to be gaps in the transit network and diluted

frequencies compared to the ideal. The gaps between what we have and the ideal transit system can be filled by bicycle trips.

Walking too has its weaknesses, especially distance. Trips cannot be extended much beyond one kilometre. We cannot expect people to make up for all the shortfalls in transit by walking further and more often. We can expect bicycle trips to substitute for what would otherwise be a long walk.

The cost of a high-quality bicycle network would be relatively low. 'Bicycle infrastructure 'can be very cost competitive in comparison to motor vehicle and public transport infrastructure' says the traffic engineers key guidance document *Traffic Engineering and Management*.<sup>3</sup> A basic separated bicycle facility such as the La Trobe Street bicycle lanes costs around \$1m a kilometre. These facilities are also relatively easy to implement and the 'service' is available at all hours of the day. Such a facility can carry thousands of people in peak times.

Australian and International studies have found that bicycle infrastructure typically yields benefit cost ratios in the range from 1.3:1 to 14:1. The range relates largely to how congested the local area is and the density of development around the cycling corridor, with more congested and dense areas yielding higher benefit cost ratios.

Detailed economic analysis has shown that in congested areas every cycling transport trip generates over \$0.50 of benefits per kilometre travelled. Over half this benefit is from reduced congestion, received by people who can continue drive and experience lower congestion.<sup>4</sup>

The role of the bicycle will be strengthened further by electric power-assisted bicycles. E-bikes have doubled the range of a traditional 'push bike' extending it from 7km to 15km while simultaneously reducing the effort required to travel.

To sum up, bicycle trips are worthwhile because – compared to car trips – they save space. Bicycle trips are also necessary because they complement the other two alternative modes – offering longer 'walking' trips and cheaper 'transit' trips. By increasing the use of these three modes and reducing the use of motor vehicles we will be able to release space in the transport system.

We can spend the space we save in two ways.

Some of the space we save through a more efficient transport system can be reallocated to the alternative modes. The current transport system compromises the free movement of transit and cramps people who are walking or riding bicycles into tight, uncomfortable corridors. With fewer people moving in motor vehicles, we will be able to provide separated space for transit corridors, generous platforms for transit as well as wider footpaths and wider bicycle facilities. Because the motor vehicle is so space hungry and because the alternatives are so space efficient, we will be able to let the alternatives spread out and simultaneously move more people through the system.

The rest of the surplus space can be moved out of the transport system. It is not only the transport system that is cramped. Our current transport layouts constrict the space that we use when we arrive at our destination. An important dividend from a more space-efficient transport system will be to put expand the places where we can stand, sit, meet people, play a tune, chalk a picture and watch a juggler. Other surplus ex-transport space can also be turned into areas where plants and trees can work their magic.

Unless we can increase the level of bicycle use, the space savings that lead to these transport and non-transport benefits cannot be fully achieved. On the other hand, successful efforts to increase bicycle use will pay off for everyone, including for people who do not ride a bicycle themselves.

### **Complementary benefits**

It is useful to consider other the well-known and valuable benefits of bicycle riding.

Bicycle use has many positive characteristics. The urbanist Jan Gehl said 'if you have people walk and bicycle more, you have a more lively, more liveable, more attractive, more safe, more sustainable and more healthy city.'<sup>5</sup> As Gehl indicates, bicycle riding is a doorway to many worthwhile outcomes. Nor has he listed all the benefits which also include independence and self-determination for children, saving time and money, random social interaction and (probably) increased absorption of Vitamin D. Any and all of these benefits are the reasons that people give for riding. However not all of them are a reason for an investment of limited transport funds or the setting aside of space on a road that is already 'full'.

The strongest individual benefit of bicycle riding is perhaps that bicycle riding is fun. Most – possibly all – bicycle riders enjoy the sensation of riding. In addition, many riders report that their ride home after work helps them unwind. This perception of enhanced well-being is well founded. There is strong evidence at a population scale that the physical activity generated by higher levels of bicycle use lead to higher levels of public health including longer life spans and reduced levels of chronic disease. 'If we had a pill that conferred all the confirmed health benefits of exercise', says Dr Sallis, 'would we not do everything humanly possible to see to it that everyone had access to this wonder drug?'<sup>6</sup>

We can put a financial value on enhanced public health. Assessments suggest that 'the net health benefit (adjusted for injury) for each kilometre cycled is 75 cents – about half the total economic benefits of a typical bikeway project'. The environmental benefits of bicycle kilometres have also been estimated: each kilometre ridden is worth 5.9 cents to the community.<sup>7</sup>

Based on these financial estimates we can see that it is in everyone's interest that as many people as possible ride (and walk) as much as possible. Importantly these financial benefits accrue to the non-riders sitting in their trams, buses and cars. The riders that go past are saving everyone else money by not adding to pollution, avoiding health costs and keeping taxes lower.

The new Transport Strategy however must focus on the key reason that the City of Melbourne should seek to increase the number of bicycle trips. To accommodate tomorrow's higher populations and increased density, we need to use our city space and our transport routes more efficiently. One of the main ways we can do that is to increase the number of bicycle trips.

## Data around people flow

The Transport Strategy 2012 imagined a future in which trips by public transport, walking and bicycle riding grow by a combined share of 20% while trips by motor vehicles drop an equivalent amount.

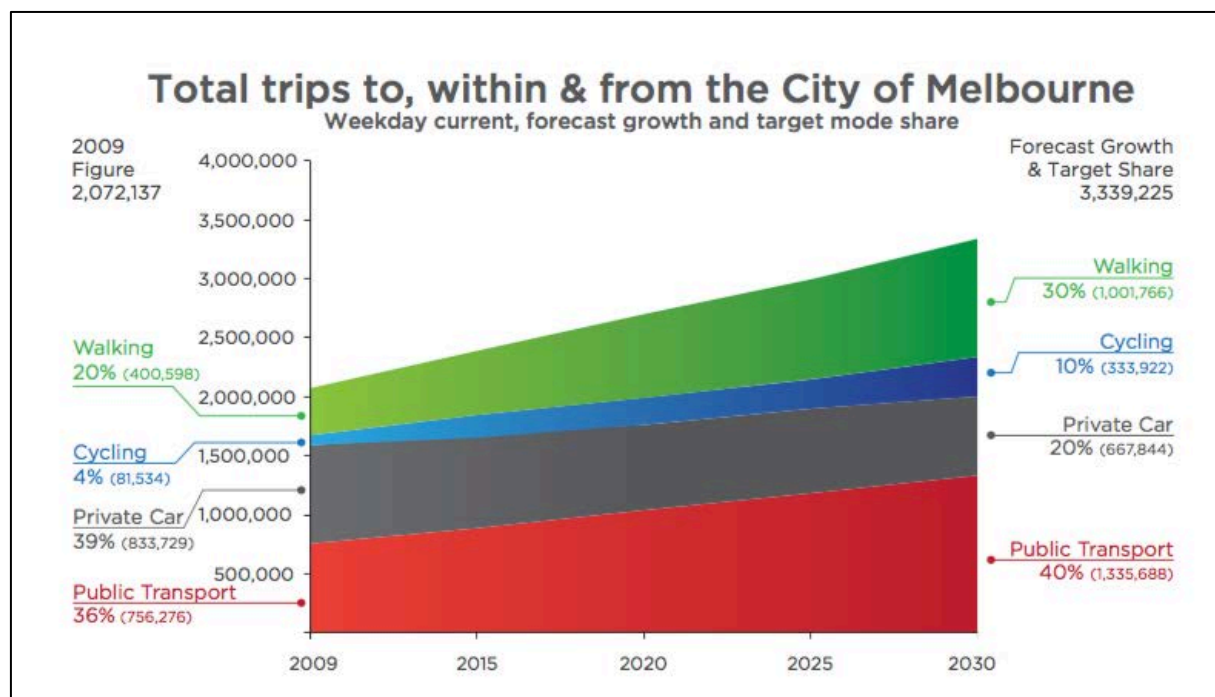


Figure 2: Forecast travel to, within and from the City of Melbourne

Source: City of Melbourne Transport Strategy 2012

**Table 1 – Space used by 100 people travelling in the modes proportions of 2009 and 2030**

	Area per mode (m <sup>2</sup> )	Mode share (2009)	Road area (m <sup>2</sup> ) in 2009	Mode share (2030)	Road area (m <sup>2</sup> ) in 2030
Walk	0.8	20%	16	30%	24
Ride	9.7	4%	38.8	10%	97
Transit	1.2	36%	43.2	40%	48
Motor vehicle	22.1	40%	884	20%	442
Total	-	100%	982	100%	611

PBA

Table 1 shows that when we change the modes we use, we can reduce the space we need for people flow. On the left-hand side, we can see that if 40% of trips are by car, 100 people need around 1,000 m<sup>2</sup> of space (red column). On the right-hand side we can see that 100 people only need 600 m<sup>2</sup> of space to flow if 20% of the trips are by car (blue column). The space that is freed up can be used to move more people or used outside transport.

## **2. What is happening today?**

### **2.1 Two types of bicycle trips**

If we are going to try to increase the level of bicycle riding for transport, it is useful to understand why people choose to ride. The short explanation is that people use a bicycle to get somewhere because for them, for that trip, at that time, to that place, the bicycle is the best option. If we step back we can see that these varied individual choices begin to fall into a pattern. The most obvious feature of the pattern is that there appear to be two main types of trips: short and long. Generally, the short trips are taken to many local destinations and are taken at a slower speed. Most of the long trips can be categorised as trips to work and education.

For the purposes of this discussion the two types of trip have been linked to their 'complements' – walking and transit. The longer transit-like bicycle trip is more familiar to people who do not use a bicycle. We have all seen the flows of people on bicycles into the central city area. When people think about bicycle transport, they tend to think of these longer trips. The shorter trips get less attention partly because they are hard to see. What can be observed is the bicycle that someone has parked at their destination. If you look around you will see bicycles parked outside Council facilities, doctors' surgeries, restaurants and places of entertainment – evidence of these short trips. Both types of trip need the attention and support of the City of Melbourne.

This paper focuses on these two broad categories of bicycle transport trips:

- 'Walking trips' which can be done on a bicycle. In this paper, this type of trip will be called 'extended walking' as a bicycle enables an active transport trip to be faster and further than when on foot. In the City of Melbourne these trips are made in and around the municipality by residents, and people working or visiting the municipality.<sup>8</sup>
- 'Car or transit trips' that can be done on a bicycle: In this paper, this type of trip will be called 'congestion cutting'. These trips are usually made by people who live outside the municipality. These people use the bicycle to travel to and from the municipality usually for work or study.





Figure 3: There are two key types of bicycle transport trips.

Top: People who have used bicycles to get to the Carlton Baths on a Wednesday morning.

Source: PBA

Below: People who travelling into the centre of the municipality on Royal Parade, Parkville.



Table 2 – Two types of bicycle trip

Audiences	Trip Types	Transport benefits
People based in town or visiting	Extended walking	Take pressure off public transport and motor vehicle congestion and parking Reduce car use, reduce and avoid car ownership
People travelling into the centre of the municipality regularly	Congestion cutter	Take pressure off public transport and motor vehicle congestion and parking

PBA

## **Extended walking**

'Extended walking' refers to the bicycle's ability to move people at 15kph – double or triple walking speed and for less effort. When a long walking trip is taken by bicycle, the user can travel to further destinations in the same time or reach 'walkable' destinations in less time with less effort.

The transport competition for these 'extended walking' trips in inner Melbourne includes free tram rides, traditional taxis and the subsidised taxi trips provided by companies such as Uber.

An 'extended walking' trip is usually longer than 600m. Any shorter than this distance and it is less trouble to walk. Extended walking trips do not go further than a couple of kilometres. When faced with a 5km trip to meet a friend or to pick something up, many people who will happily make a shorter trip on a bicycle, will switch to another mode.

When someone chooses an 'extended walking trip' they generate private value. The rider saves time and cost and experiences convenience (and enjoyment). The exercise they get is valuable in preventing disease. 'Efficient walkers' who also use public transport will be able to reduce the amount they use their car and may be able to reduce or avoid car ownership altogether. This might save them \$8,000 a year.

Extended walking also creates public value. By choosing to cycle, people reduce demand for limited seats on public transport or space on the road to drive, park and store a car. This supports the strategic aim of increasing people-flow in the limited space available.

Extended walking trips also strengthen the customer base of the services at the destination – more people are in easy reach of the service. People who can get to the service by 'extended walking' are also likely to become regular and frequent customers. People who cut their transport budget, have more to spend locally on other things and accelerate local economic activity. Of \$0.50 of benefits per kilometre travelled figure mentioned above, a third of the benefit is direct financial savings to the cyclist. Analysis shows that 80% of those savings tend to be spent in the local economy.<sup>9</sup>

When many people can avoid car ownership, then housing prices can be lower and the scale of buildings can be reduced (as fewer car storage spaces are required).

There are two audiences in the City of Melbourne for 'extended walking' – people who live in the municipality and people who spend time in the municipality at work or play. Both groups need to be sure that they are not increasing their risk by choosing to use a bicycle. Otherwise they will walk and lose time or join the competition for seat space on transit and road space in a motor vehicle.

The local resident will make their 'extended walking' trips from home. They will need to be able to quickly and easily get on their bike and get under way. The visitor will be away from home and may not have a bicycle with them. They will need to be able to obtain a bicycle easily otherwise they may choose to use public transport, catch a taxi or not make the trip at all.

## **Congestion cutting**

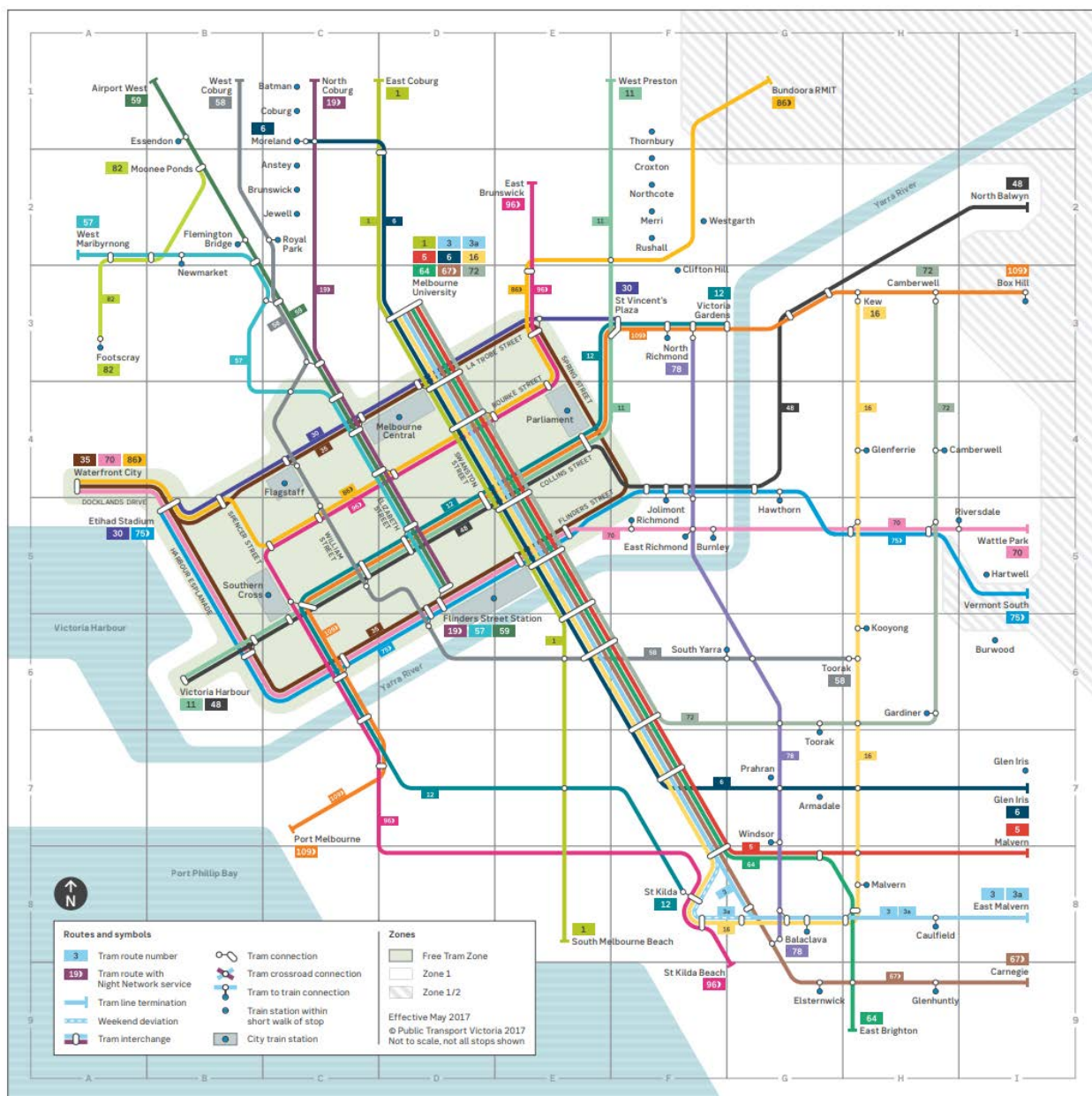


Figure 4: Melbourne Tram network. Source: Public Transport Victoria (PTV) 'Congestion cutting' refers to the bicycle's ability in congestion to match the speed of other modes – these bicycle trips are done at 20 to 25kph – while providing excellent travel time reliability and destination access. In the inner city, bicycle use has an equivalent average speed to transit and motor vehicles because it does not get stuck in congestion. E-bikes offer increased speed and significantly less effort, making them even more competitive with transit and motor vehicles. At the destination the bicycle offers convenient, high quality and low-priced access. While transit passengers and drivers typically require a significant walk to reach their destination. Drivers typically also need to pay for parking either with their time or money.

'Congestion cutting' trips are generally used to reach jobs or education destinations and occur on weekdays. 'Congestion cutting' is practiced in a catchment that reaches from around 7km (push bikes) to 15km (e-bikes and high-intensity riders) from the destinations. For Melbourne, this is broadly equivalent to the area covered by the tram network (excluding longer routes that have been extended since the 1980s).



'Congestion cutting' bicycle travel typically occurs in corridors rich with other options including trains, trams and freeways. Bicycle riders in this area are cutting the congestion which would otherwise occur on roads and inside transit vehicles.

When someone chooses 'congestion cutting' they generate private value. Travel time anxiety is reduced. Some riders may save time door-to-door but all gain a high level of reliability in journey time and protection from system faults such as closed lanes and cancelled transit services. They get some exercise which is valuable in preventing disease. Financial savings are also possible.

The public value generated by people who switch to bicycle transport for 'congestion cutting' is substantial. People who switch from car or transit trips release space on the road and passenger space. While these benefits occur in a specific space and time, they are accrued by all, as people from further away can use the space (and experience less congestion).

The Transport Strategy 2012 included a 2030 scenario that envisaged an increased transit load of 600,000 people each day and an increased bicycle load of 250,000 people a day. If the bicycle does not pick up this additional load, then investments would have to be made to move even more people by transit. Bicycle transport can have a significant impact on Victorian Government budget allocations to transport.

The ability of the bicycle to provide high volume routes away from main roads and in ways not supported by the road grid is also valuable. One example is the bicycle route through Fawkner Park that adds to the people-flow capacity of the bicycle and transit routes on Toorak and St Kilda Roads.

The 'congestion cutting' type of trip grows significantly as development and travel demand intensifies. Each year in spring and autumn the City of Melbourne conducts a 'cordon count' around the central area. The number of vehicles including bicycles are recorded. In 2006 the first year the count was conducted 4,369 bicycle riders were observed and 11,889 in March 2017. This threefold growth occurred over a period in which the number of jobs and students in the municipality increased by 21%.

Research suggests that the number of riders will increase further as congestion constrains other modes. The Near-Market research discussed below found that 25% of people who ride bicycles recreationally and therefore could use the bicycle for travel to the municipality (but currently do not), would consider using a bicycle to reach the municipality. The survey also highlighted that these potential 'congestion cutters' have a key need. They must be confident they would face a low risk of a crash or collision. Without this confidence, they will remain in the competition for space in transit and on the road. (See below)

The 'congestion cutter' group will use push bikes and e-bikes. It is likely that the current level of use of e-bikes will increase as price comes down, the machines become easier to use and awareness of their capabilities becomes more widely understood.

## **2.2 The number of people who ride bicycles for transport**

Some data is available on the two types of bicycle trip.

### **Travel within the municipality (Bicycles as Extended Walking)**

## **Weekday trips WITHIN the City of Melbourne** VISTA estimate | 2009-10 compared to 2015-16

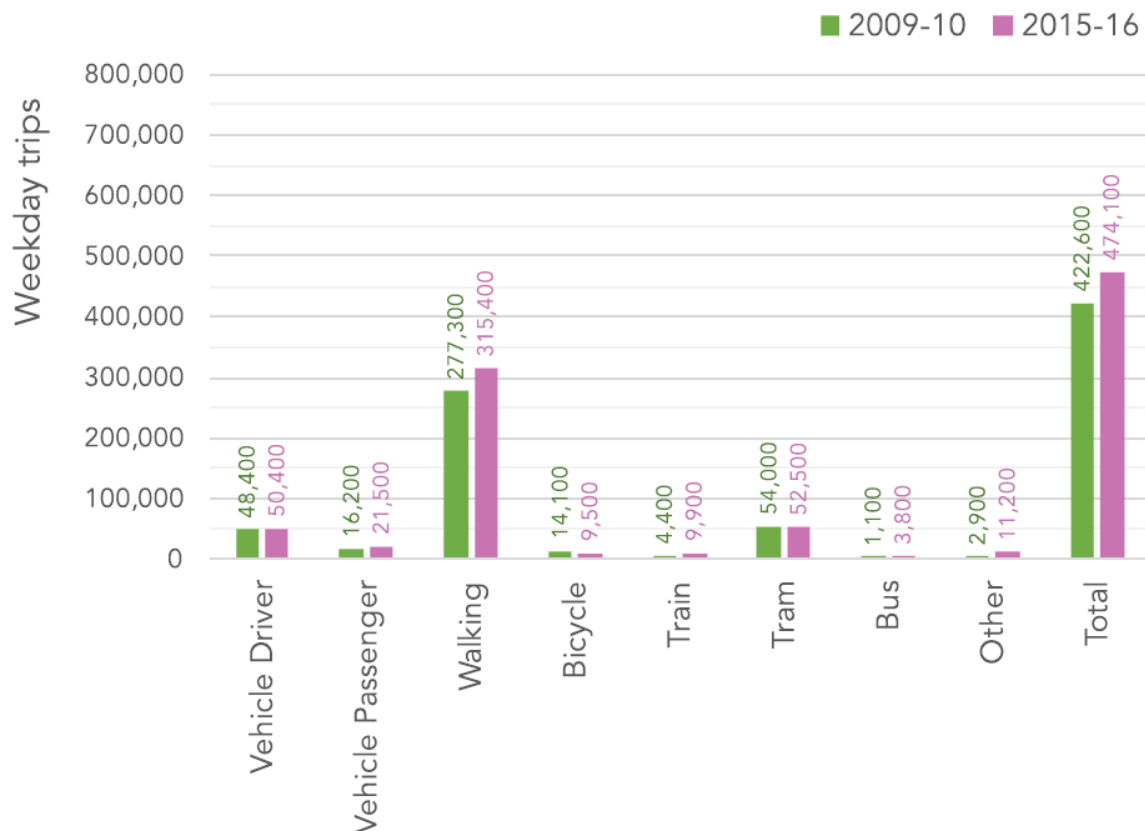


Figure 5: Number of weekday trips within the City of Melbourne. Source: VISTA data presented by Sift Research

In the municipality, the places where people live and work are close to the destinations they travel to. This makes walking trips (and extended walking trips by bicycle) achievable. Around the municipality we can see signs of bicycles used for 'extended walking':

- Bicycles parked outside popular destinations such as gyms, pools, libraries and cinemas
- Bicycles in apartment basements and on apartment balconies.
- The blue (and other coloured) public bikes around the municipality
- Bicycles 'at work' for example micro load couriers, food delivery bikes and 'pool bikes' like the e-bikes in the Council headquarters.

These sights might suggest that the 'extended walking' type of bicycle use is growing in popularity in the municipality. It also might be expected that as the number of employees, visitors and residents in the municipality increases, and congestion increases, that we would see an increase in the use of alternatives to

the motor vehicle. This has occurred in London over the last ten years where the share of motor vehicle trips has gone down, while the transit share has grown. Walking and riding have held a steady share.<sup>10</sup>

In Melbourne, this growing congestion does not appear to have caused an increase in the space efficient modes. Two VISTA<sup>11</sup> diary surveys 2009-10 and 2015-16 show that between these periods the overall number of trips taken within the municipality grew by 11%. During this period, trips by private car (including passengers) grew twice as fast. Some space efficient modes (bus and train) grew strongly but others (trams and bicycles) lost ground. The number of walking trips grew, but walking did not take a larger share. Over this period the 'extended walking' bicycle trips fell in number and share. Overall the space efficient modes lost negligible share, down from 84% of trips to 82.5%.

The fall in share of 'extended walking' bicycle trips was not prevented by the launch of the first bike share network in 2010 even though these services have proven successful in other cities. In Melbourne, bike share probably has a role linking destinations poorly served by transit around the edge of the central city area. However, these 'transport tasks' for bike share will not be revealed while the fleet is so small, so widely dispersed and the pick-up and drop-off points are poorly located. It appears that the alternative system of randomly-located, short-term-hire bicycles has not been able to fill gaps in the transport system either.

Despite the fall in number and share, the VISTA data above show that 'extended walking' bicycle trips within the municipality still support 9,500 trips a day (2.0% of mode share) – equivalent to around a fifth of the tram service.

The current contribution of the bicycle as 'extended walking' to the growth challenge faced by the City of Melbourne could be rated as 'worthwhile'. The report card related to bicycle use for extended walking would read 'could do better'.

### **Travel to the municipality (Bicycles as Congestion Cutters)**

People who live within 5 – 7km of the Melbourne CBD are within riding distance of the jobs and other destinations in the municipality – especially if they use an e-bike. These trips are competitive with the transit and motor vehicle alternatives. It is not surprising that large 'tidal' flows of 'congestion cutter' bicycles can be seen in the morning and evening peaks following routes on main roads, minor roads and open space corridors such as the along the Yarra River.

These flows have been tracked over several years by the City of Melbourne in biannual visual counts in a cordon around the CBD and by VicRoads using in-ground automatic counters.

The data from the 24-hour counters below shows that major corridors cater for around 2,000 trips each day (total of inbound and outbound). The long-term trend is increasing use, but growth in the last few years has not been as strong.

Some of the rise and fall in the counts can be explained by major construction and other interruptions of the routes. Data is not available for 2014. Consistency of data collection is a critical issue that needs to be addressed.

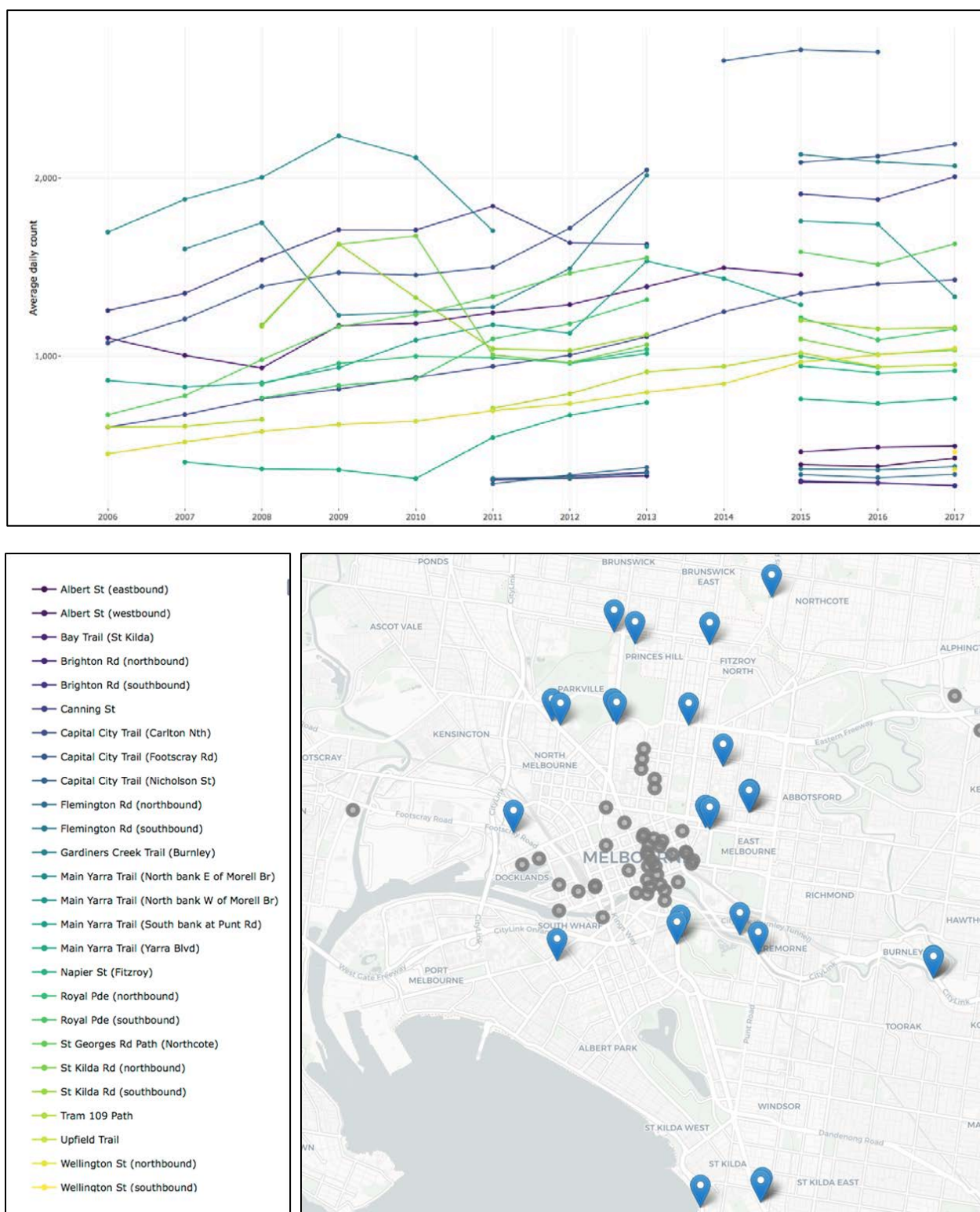


Figure 6: Results from 24-hour in-ground counters (top). Location of counters (bottom).

Source: VicRoads 24-hour in-ground counters. Charts and data sourced from CDM Research.

The in-ground counters can be compared to the City of Melbourne cordon counts. These observations are made on a day in autumn and a day in spring each year. The 2007 – 2017 results are shown in the figure below. More people are riding in the autumn (top two lines) than in the spring. The riders on the road are recorded separately from those using off-road facilities. Results from the roads are in blue and shared paths in grey.

The long-term trend is positive, but the recent years have recorded a fall in the number of riders. (These counts can be affected by the weather conditions on the day of the survey).

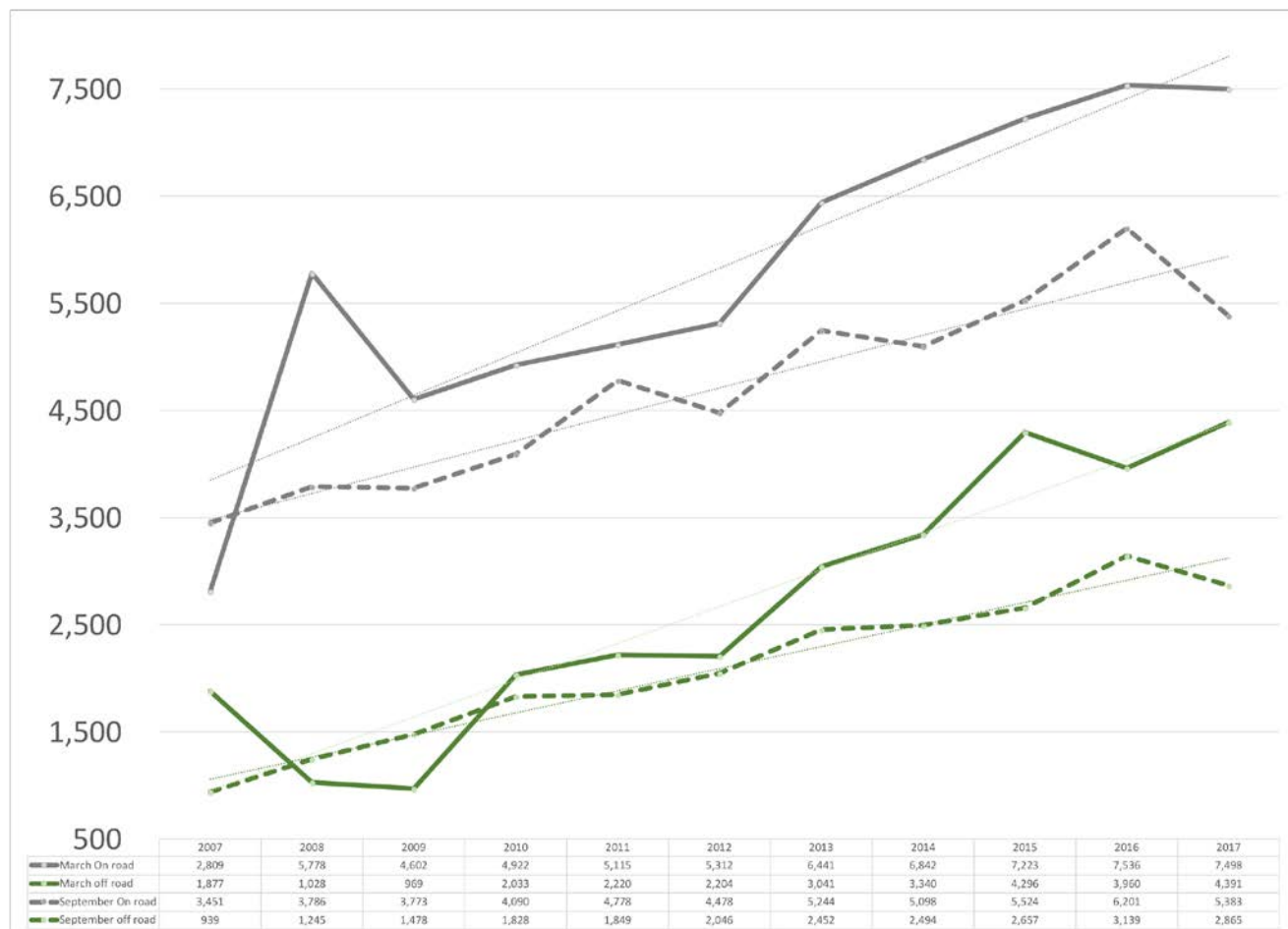


Figure 7: City of Melbourne cordon counts 2007 to 2017. The top two lines are from the observations in March. Bicycles on the road (blue) on off-road facilities (grey). The bottom two lines are from observations in September. Bicycles on the road (blue) on off-road facilities (grey). Source: City of Melbourne

VISTA data provides a snapshot of travel changes over a six-year period. This survey is more comprehensive than the cordon count or VicRoads counter data. The figure below shows that bicycle trips increased by 4,600 to 28,600 increasing the share slightly to 4.5%. For these to-and-from journeys the bicycle is transporting around half the number of people using trams and slightly less than the number of people walking.



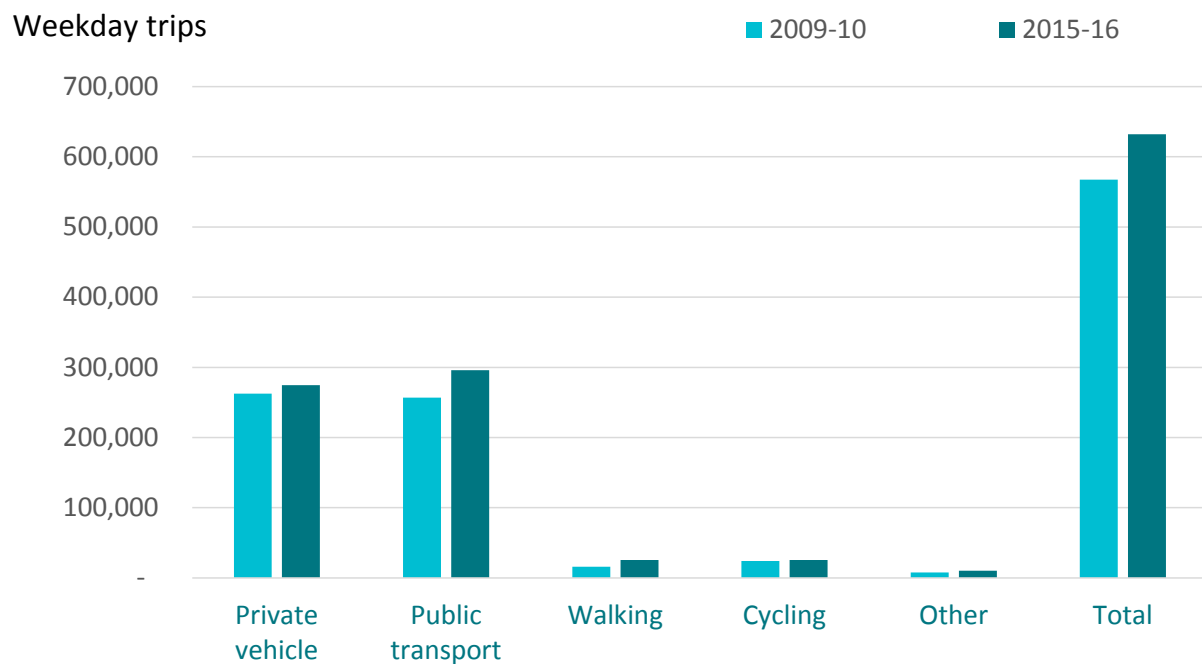


Figure 8: Number of weekday trips to City of Melbourne Source: VISTA data presented by Sift Research

**Table 3 – The contribution made by the two types of bicycle riding**

Trip Types	Contribution (based on VISTA data)	Report card
Extended walking trips within the municipality	2.0% of trips 9,500 trips Equivalent to one third of all tram journeys for this purpose	Trending down in numbers and share Could do better
Congestion cutter trips to the municipality	4.1% of all trips 26,090 trips Equivalent to more than half of all tram journeys for this purpose	Trending up in numbers and share Could do better

Source: PBA Analysis

For trips to the municipality congestion has benefited the space efficient modes. In 2016, most trips to the municipality were by alternatives to the car. The space efficient modes supported 57% of the trips and the motor vehicle 43%. Over the period, the motor vehicle share shrank by 3%. Walking grew by 89% and increased to a mode share of 4.8%. Bus (0.2%) and bicycle (0.3%) added users and increased their share.

Despite the increases in other modes, the number of tram trips and mode share fell over the six-year period. The reasons for this are unclear.

The current contribution of the bicycle as 'congestion cutter' in the growth challenge faced by the City of Melbourne could be rated as 'valuable', increasing the capacity of the tram service by 50%.

The 2016 report card for bicycle transport to the municipality would still read 'could do better'.

## **2.3 Why people do not ride bicycles for transport**

Both types of bicycle use for transport should be booming. For many people and many trips in a high density urban environment the bicycle offers faster and more reliable trips than any other mode. Trips by bicycle also offer the rider other benefits such as physical activity and cost savings.

However, as we have seen above, despite its advantages and benefits and despite the favourable context, the proportion of local bicycle trips is low and recently shrank, while the growth in 'congestion cutter' trips has been modest, growing slightly faster than the population.

The main reason for the modest results are that the 'plus' of a favourable context is counterbalanced by the 'minus' of a number of barriers, the most significant of which is risk.

### **Risk**

The main barrier to participation in bicycle trips is the fear of being hit by a motor vehicle. For some people this fear, and the actual degree of risk, can be reduced by simple measures such as a painted line on the road. But most people will not ride on the roads unless the separation from motor vehicles is physical and substantial.<sup>12</sup>

Research by the City of Melbourne on the Near Market has confirmed that the key barrier is risk.<sup>13</sup> This project surveyed people who live near the municipality – the 'near market' – who ride a bicycle and make regular trips to the City of Melbourne but do not use their bicycles for these trips. These people describe themselves as 'cautious'. They prefer off-road paths and low stress roads and will take a longer route if it keeps them away from motor vehicle traffic.<sup>14</sup>

These cautious riders can be convinced to ride for transport by providing separated bicycle facilities in the midblock and at intersections. In fact, such facilities would make a significant proportion of the group feel 'extremely confident'.

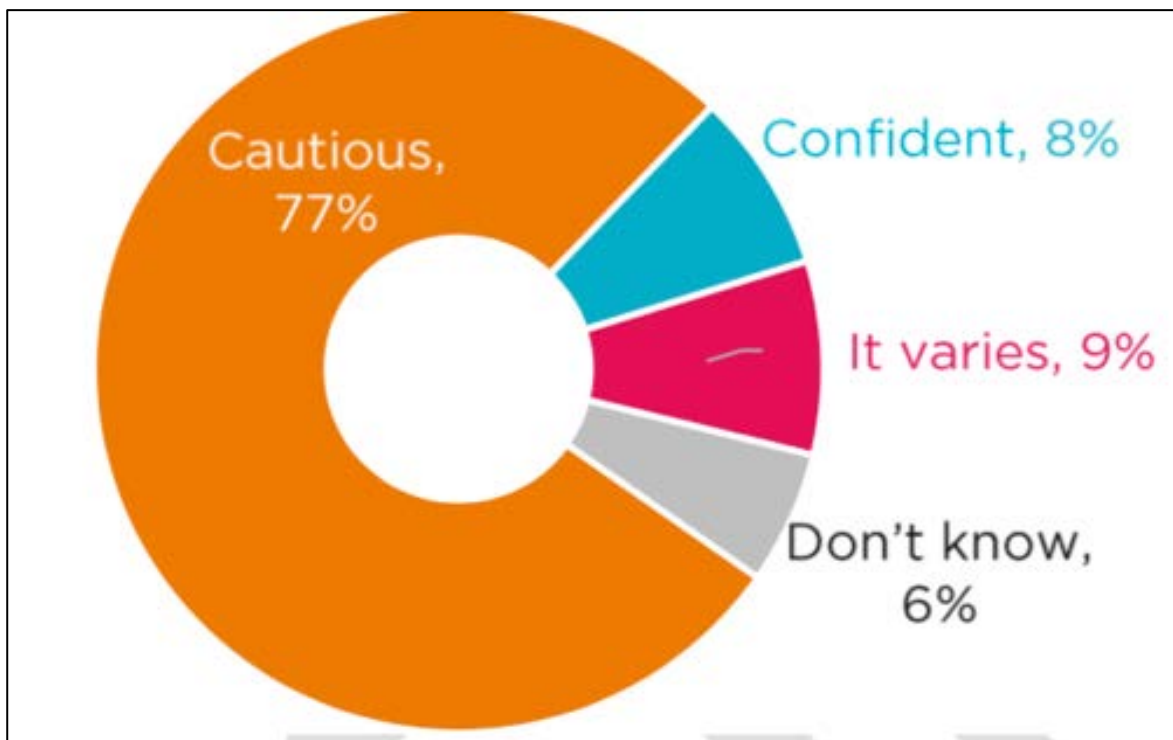


Figure 9: Near Market Research: This chart shows the self-assessment of the respondents own cycling ability

Figure 17: Rating of midblock confidence by concept

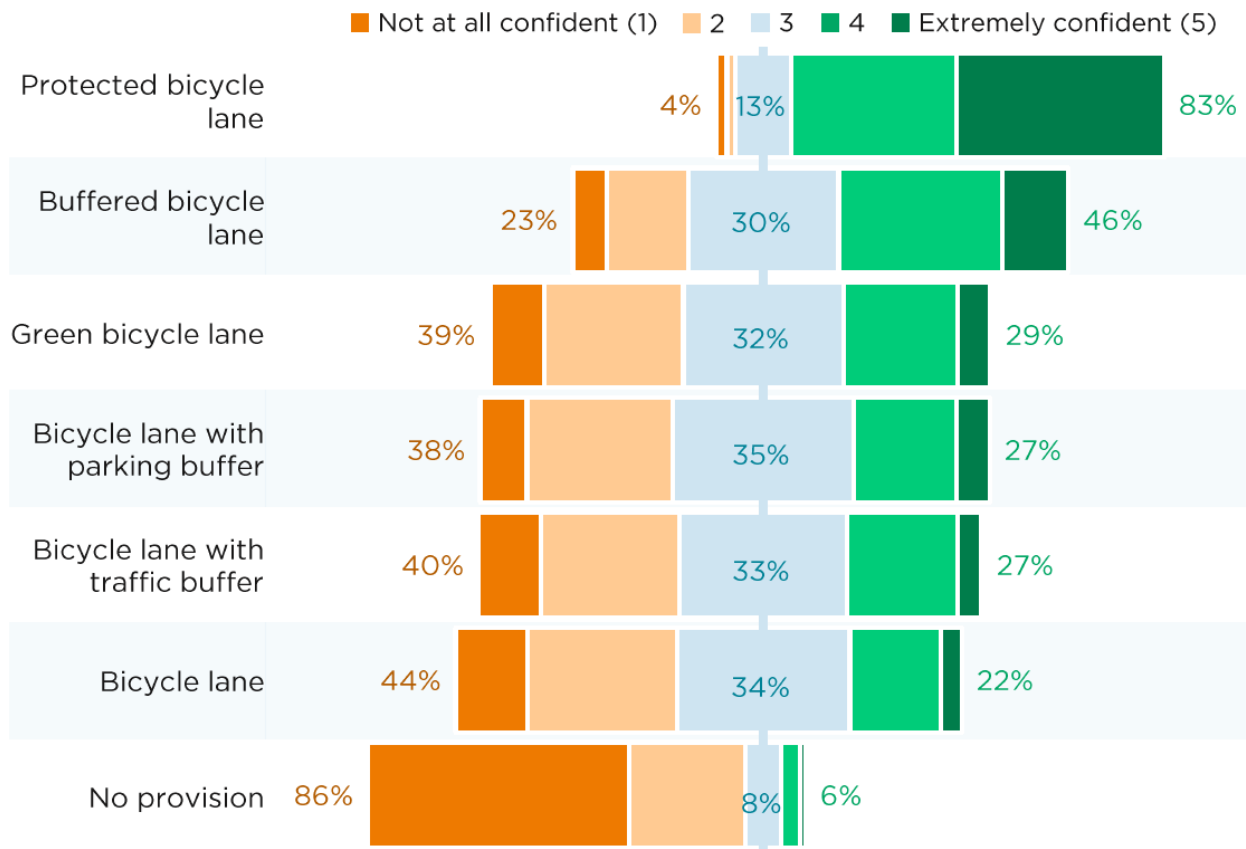


Figure 10: Near Market Research: This chart shows that confidence levels vary relative to the degree of separation in the midblock.

Figure 18: Rating of intersection confidence by concept

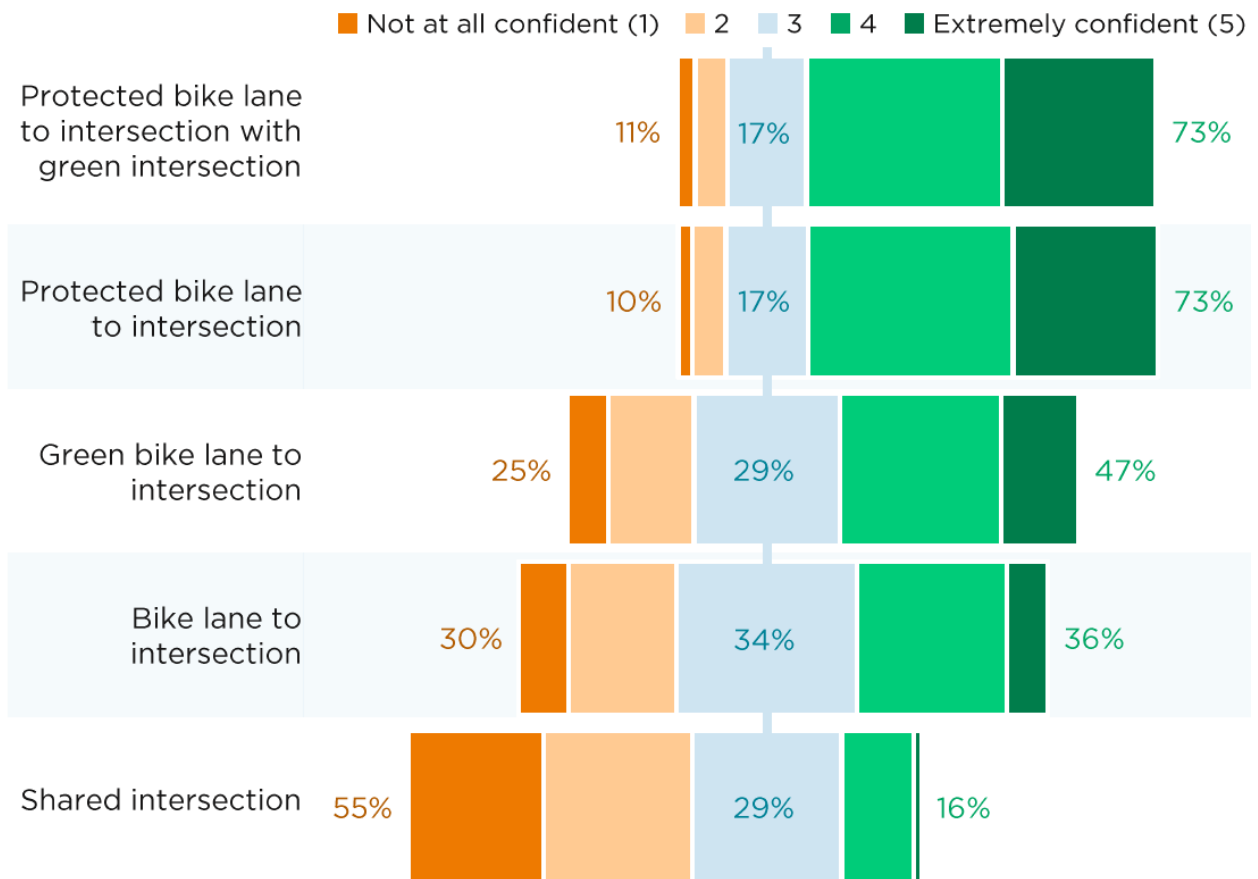


Figure 11: Near Market Research: This chart shows that confidence levels vary relative to the degree of protection at intersections.

Source: Near-market Research CDM Research 2017

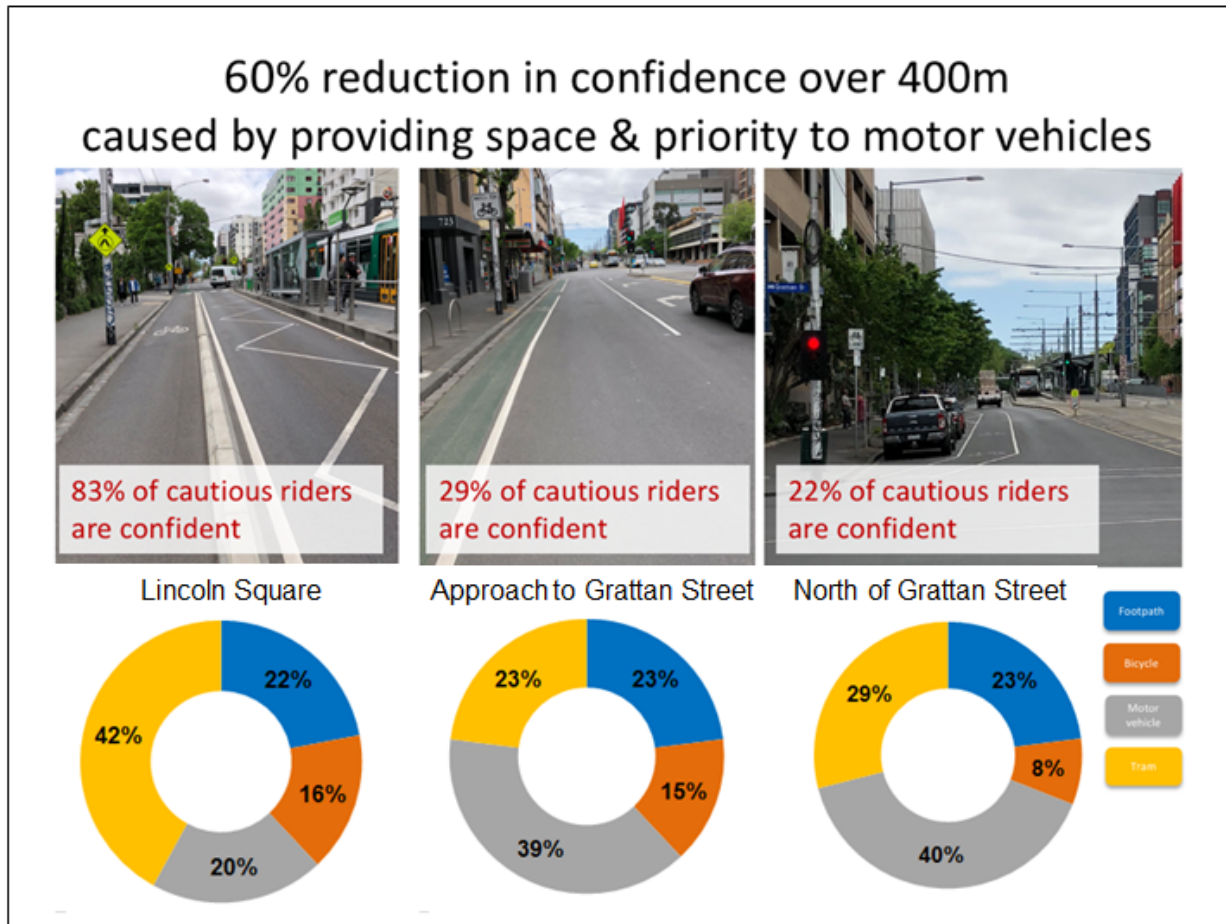


Figure 12: Level of confidence for cautious riders compared to facilities on Swanston Street north. Source: PBA

### **Other barriers**

It is useful to identify the second order barriers that stand in the way of increased participation. Although they are less significant, these other barriers will become important when the barrier of risk is reduced or removed.

#### **A limited audience**

As bicycle use increases, we can expect the pool of riders and people ready to ride will grow. Today the pool of potential bicycle transport riders is limited and much smaller than the general population. Only one third of the population has ridden a bicycle in the last year and only half that number (17%) have ridden in the last week. Nor does every bicycle rider use their bicycle for transport. Three quarters of bicycle riders ride only for recreation.<sup>15</sup> However, the limited number of participants does not fully explain the low levels of 'extended walking'. If one quarter of 17% of the people who lived in or visited the City of Melbourne made an 'extended walking' trip, then there would be twice as many trips by bicycle.

#### **Ownership and access to a bicycle**

As bicycle use increases we can expect that ownership will increase. Today there are bicycles in half the households in the City of Melbourne. One third of households have more than one. However, we do not know whether these bicycles are available for transport – some or all may be children's bikes or bicycles used for recreation or sport. Nor do we know if the bicycle is useable. Small mechanical problems, even punctures, can put a bicycle off the road for long periods of time while people 'get around to fixing it'.

#### Lack of end of trip facilities

Participation is limited by the effort required to pedal a bike. Generally, bicycle trips are up to 10km long.<sup>16</sup> The in-ground counters report average speeds of around 25kph. The effort required and the speed that riders travel in Australia – higher than the average in Copenhagen – means that a significant proportion of ‘congestion cutter’ riders will not use the bicycle unless they can shower at their destination.<sup>17</sup>

Changes to behaviour, including more relaxed dress codes, slower riding or use of e-bikes could stabilise the need for end of trip facilities as well as making ‘congestion cutter’ trips feasible for others. The small electric motors on e-bikes make it possible to ride for 15km and not raise a sweat. The range of today’s e-bikes means that a commuter does not need to charge their battery while they are at work.

#### Lack of convenient access

Participation is limited when people do not have convenient access to a bicycle or somewhere to park. We do not know if people who own bicycles in the municipality can keep them in a convenient location and therefore likely to be used. The ‘rate’ in the planning scheme requires one bicycle space for every five dwellings in which there would be, on average, around ten people. Determined apartment dwellers keep their bicycles on balconies or in bedrooms and take them upstairs and downstairs in the lift. These inconveniences are likely to suppress usage.

Bicycle users are sometimes at a loss to find a suitable and secure parking location, especially in the CBD, as the formal bicycle parking is often full and the availability of informal opportunities provided by poles is reduced in some locations in line with the Council goal of ‘decluttering’ the streets.

#### Strong competition from other modes

Growth in participation will be limited when the bicycle trip is not optimised or when competition from other modes is strong. Walking trips can be more convenient than ‘extended walking’ (particularly when the bike share alternative requires a walk at either end). Factors such as long delays at signals and poor road surfaces reduce the competitiveness of a bicycle trip. People will be attracted to trams (especially free trams) which offer air-conditioning and effortless travel while subsidised and efficient new era taxi services like Uber offer luxury and convenience beyond all mode competitors.

### 3. How the City of Melbourne can increase the level of bicycle use

In the first section we began by considering why it is important, necessary and valuable to increase the level of bicycle use for transport. Today's transport system based on the private motor vehicle travel is unable to cater for a significantly increased population. Fortunately, transit, walking and bicycle riding are more space-efficient than private motor vehicles. By switching the emphasis from one to the other, we can simultaneously increase the capacity of the transport system and release space for other purposes.

We identified two main roles for the bicycle in a space-efficient system – 'extended walking' and 'congestion cutter' trips. We saw that these two types of trips are valuable because they 'expand' walking and transit – providing 'longer walking trips' and 'cheaper transit services'.

We found that today short trips by bicycle are substantial but shrinking, while longer 'commuter' trips are growing but no faster than the growth in the population. We saw that bicycle trips are suppressed by several factors among which, risk is the main reason that people do not use bicycles for transport trips. We saw that the way to reduce risk and the perception of risk is to provide separated facilities. Other general barriers were identified.

We turn in this section to the two ways the City of Melbourne can use its powers and influence to switch the transport system over to more space efficient modes and make conditions more favourable and supportive for 'extended walking' and 'congestion cutter' trips by bicycle.<sup>18</sup>

Interventions are suggested under two headings. The first and most important is to continue a strategic direction in the Transport Strategy refresh to shrink vehicle ownership and use and grow the alternatives. The idea that we can support 'both' has been appropriate but under the pressure of growth we must make the alternative modes our priority.

The next section suggests some of the ways that a shrink-and-grow strategy could be implemented including:

- Remove the requirement for private off-street parking bays
- Reduce access by motor vehicles and lowering the priority provided to people in cars
- Increase the number of high mobility streets – such as Swanston Street where many people move by tram, bicycle and on foot.
- Extend the high mobility streets into high mobility corridors that reach out to the municipal boundary and support high levels of walking, riding and transit

The second half of the next section suggests bicycle-specific interventions:

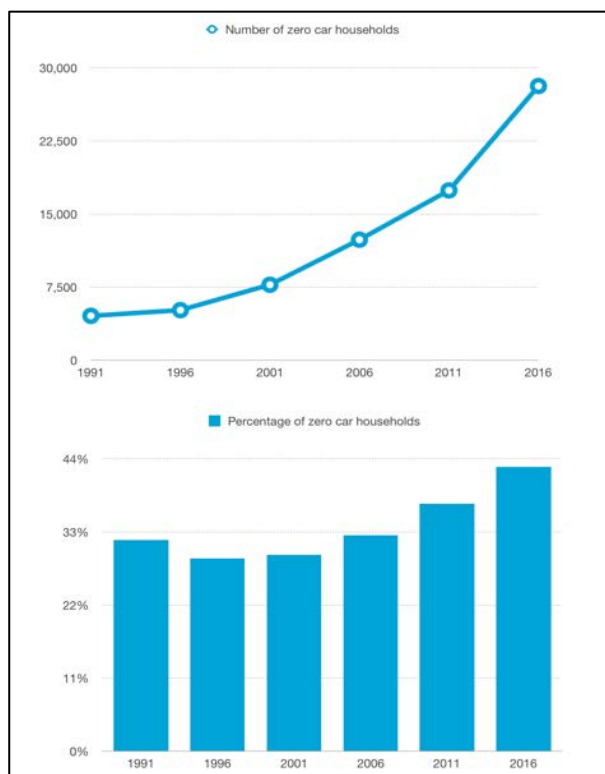
- Steadily upgrade the current bicycle facilities turning successful part time lanes into full time lanes and full-time lanes into separated kerbside lanes. Separated lanes can evolve into high mobility streets or corridors.
- Strengthen the separation along bike routes at intersections – especially where two bikeways cross – by constructing Dutch-style separated intersections
- Design low key flows of bicycles through open space and 'places' across the municipality. The riverbank for example – needs to be designed to welcome and accommodate bicycle trips
- Move bicycle parking in popular public spaces off the footpath and onto kerb outstands and then underground allowing the freed-up space to be used for higher purposes
- Improve the planning scheme so that suitable and convenient bicycle parking is 'standard issue' with all apartments
- Substantially increase the City of Melbourne's bicycle infrastructure budget.



## **Direction One: Shrink motor vehicle ownership and use and grow the alternatives**

Under the current Transport Strategy in the City of Melbourne there have emerged – after considerable effort – places where alternative modes, including the bicycle, have substantial advantages of separation and priority. Away from these areas and across most of the municipality the private motor vehicle retains the highest priority.

These localised areas of priority are valuable and stand in contrast to most other places in Victoria where ‘the car is king’. To cope with coming growth however, localised priority for space efficient modes will not be enough. Instead, it will be necessary to shrink the ownership and use of the motor vehicle so that space can be provided to space-efficient modes (including the bicycle) that can move more people in the same area.



*Figure 13: The number and proportion of zero car households in the City of Melbourne has been rising for the twenty years. (ABS 2016) PBA*

Fortunately, such a transition is feasible. In fact, a trend away from motor vehicle ownership and use by people visiting and living in the municipality has been quietly and steadily underway for some time. As we have seen above, even though the number of jobs in the municipality has been rising, the share of motor vehicle-based trips has fallen (by 3%). People who live in the municipality have also been moving away from car ownership. The number and proportion of zero car households in the municipality has been growing over the last twenty years. Today there are nearly 30,000 zero car households, just under half (44%) of the total. The level of motorisation in the municipality (cars per hundred residents) has fallen over five years from 33 to 27 vehicles per one hundred residents.

These trends can be strengthened through the planning scheme and through road management – areas in which the City of Melbourne has strong influence and a measure of direct control.

### **3.1 Remove the requirement for private off-street car spaces**

It is vital that the requirement for developments to include off-street car parks is removed.

The current Transport Strategy identifies the financial penalty imposed by the current planning scheme requirements noting that private off-street parking bays significantly increase the cost of housing. The Strategy notes that many of the residents receive nothing in return for these higher costs – up to one third of the bays that have been built are empty. These concerns remain valid and can be carried into the new Strategy.

The consequences of 'compulsory' parking bay ownership need to be identified. These consequences include:

- An incentive to own a car. Once people have bought or are paying for a parking bay, people are more inclined to own a car – although the number of empty bays suggests that some people are prepared to take a loss on the parking bay cost. Once people own a car, they are likely to use it including for trips that would otherwise be taken on foot, by bicycle or on transit.
- A financial incentive to use a car. People in the municipality who live in zero car households have a financial incentive to choose to walk, ride a bicycle or catch transit. Their car trip options – taxi, hire car or car share vehicle – all cost more than any of the alternatives. Car owners on the other hand are predisposed to use their car as they have paid a substantial sum to own the car and the option is sitting there – registered, insured and fuelled – offering the next trip 'for free'. These people have no financial incentive to leave 'the car at home'.
- A disincentive to leave car ownership. Compulsory parking bay ownership makes it less likely that people will leave car ownership. Some people find after living in the inner city for a period, that they do not use their car very much. In a system with neutral settings these people would consider selling their car and using car services along with alternatives to the car. In the City of Melbourne, people can sell their car but they cannot sell their car park. This makes the exit from car ownership less likely.
- A penalty on people who do not want to own a car. The current system makes it harder for someone who would like to avoid car ownership to find an apartment that comes not come with an attached parking bay. One-bedroom apartments without car parks are available, but it is hard to find an apartment of two bedrooms or more that does not have one or two car parks attached. If an apartment without a parking bay cannot be found, the resident will have to pay for something they do not want.

The behavioural pressure that the compulsory parking bay rule applies is analogous to that provided by the tax on cigarettes. The difference is that the car park tax is levied on the 'non-smoker'. If the 'tax' were removed, the level of car ownership and use in the inner city is allowed to find its natural level. It can be expected that this 'natural level' will be lower in car ownership and vehicle kilometres travelled than the current system.

The effort to reform the planning scheme does not need to eliminate parking bays. An important part of the solution to this problem is avoiding the isolation of parking bays on private title and ensuring that any bays are owned collectively and available to the public. This is envisaged in the proposed planning scheme conditions in the Fishermans Bend redevelopment. Parking bays should be available for people who want them but they do not have to be on site and they certainly should not be a compulsory feature but an option.

### **3.2 Reduce access and lower the priority provided to people in cars**

It is important that the City prepare for the impact of 'free' or very cheap car trips as, over the period of the next Transport Strategy, it is likely that the cost of car trips will fall significantly.

Today, for people with low annual vehicle kilometres travelled, car ownership is cheaper than hiring a driver (taxi or Uber) or a short-term rental (car share). In the future, the cost per kilometre of car services is anticipated to fall as further efficiencies are applied to traditional taxi services. The replacement of the human taxi driver will bring the cost per kilometre down further. Combined with advertising and destination subsidies – similar to the parking subsidies paid by businesses today – it is possible to imagine free or extremely low-cost trips.

A fall in the per-kilometre price for a car trip from 60c per kilometre to 'free' will have a profound effect on car ownership. Free or cheap car services will reduce the financial incentive to own a car. (This is likely to make apartments with off-street parking bays attached less attractive than unencumbered alternatives.)

While car ownership is likely to fall, cheap or free trips are likely to make car usage grow. Faced with the choice between effortful and potentially inconvenient options of walking, riding and transit, many people will choose a free or cheap car trip. There are signs that these trends are already visible as people switch from transit to car-based services in New York City.<sup>19</sup>

An increase in cars-for-hire that are on the move and an increase in car trips will have a profound effect on the available road space. A recent report for New York City found that the growth in the number of Uber and similar vehicles outweighed a steady reduction in private vehicles entering the island.<sup>20</sup> The taxi-like vehicles have increased in number and spend long periods unoccupied. Travel speeds have fallen by nearly 40% and congestion is now described as 'untenable'.

In this new context, some existing strategies that the Council uses to control motor vehicle use will become ineffective. Currently kerbside parking controls reduce motor vehicle use. But robot taxis and their passengers will be indifferent to these controls. They will pull over to the kerb but will not need to park. Vehicles that are not in use will not need to be stacked in parking facilities but can be stored by circulating on the roads.

The refreshed Transport Strategy will need to identify how the road space for space-efficient vehicles will be protected from circulating car services so that trips by space-efficient modes are preferred.

Available measures include allocating priority by time and space. Steps towards this approach can already be observed across the municipality and in the CBD:

- Time based controls on motor vehicles operate on more than three dozen streets. Little Collins Street is exclusively for walking and bicycle riding on weekdays for two hours over lunch. The time available for kerbside parking in Exhibition Street has been reduced to allow a peak hour bicycle lane.
- Speed controls are now in place across the CBD and the 40kph limit is spreading beyond the Hoddle Grid.
- Price and time controls apply to parking bays.
- Space on roadways has been reallocated for walking, bicycle, bus and tram trips. Some roadways have been interrupted with road and median closures. Kerbside parking bays have been removed and the space repurposed for other transport modes or taken out of the transport system altogether to serve as parkland or space for trading.
- Priority controls rank alternative modes above motor vehicles in some locations. Signal lanterns allow early starts for trams, buses, bicycle riders and pedestrians. Turn bans prevent some motor vehicle movements in some locations. Roadways have been made into shared space zones with lower motor vehicle speeds and priority. The closure of Canning Street at Princes Street to motor vehicles has provided the foundation for one of the busiest on-road bicycle routes in the municipality.

These measures all come together in Swanston Street where people on trams, walking and on bicycles flow along a street free of most motor vehicles (authorised vehicles excepted).

In exploring new controls, the City of Melbourne should grasp opportunities provided by building construction, the Melbourne Metro and big events. These short-term constraints provide 'natural experiments' revealing the impact of lower motor vehicle flows and identifying suitable locations for permanent full or partial road closures.

### **3.2 Develop more high mobility streets in the City centre**

The other side of the coin of 'constraint' of the motor vehicle trip is the expansion of space and priority for alternatives. It is important that the City of Melbourne increase the use of space efficient modes, including the

bicycle, by implementing more widely the concept launched in the 2012 Transport Strategy of 'high mobility streets'.

The 2011 redesign of Swanston Street was a success in many dimensions. Along the street land values have risen, businesses have benefited from more passing trade, the street has been enhanced as a place to be and the capacity of the street as a transport corridor has been expanded. This success was based on the integration of many separate transport and non-transport 'parts' into a greater whole.

The 2012 Transport Strategy labelled the result a 'high mobility street' and listed the component parts:

- A high density and diversity of destinations
- A high-quality streetscape including shade trees, good pedestrian lighting, street furniture and materials and comply with the Disability Discrimination Act.
- Excellent pedestrian thoroughfares and high-quality spaces for stationary activities.
- High frequency and high priority transit services
- Infrastructure (including level access) and signalling that enables pedestrians to move safely and seamlessly from footpath to transit.
- Bicycle routes that are separated from the traffic<sup>21</sup>
- 'Early starts' at signals for transit, walkers and bicycle riders
- Motor vehicle traffic at low speeds

It is perhaps not surprising that the 2012 Transport Strategy has yet to give birth to another high mobility street. The effort behind (and against) Swanston Street was considerable. Nor should the difficulty of multi-disciplinary efforts, including multi-disciplinary budgeting, be underestimated. Overall it took twenty years for success to emerge. (In some ways the street is still a work in progress. Some sections have not been reconstructed. Appropriate access arrangements and appropriate interactions between users are still evolving and being shaped.) On the other hand, it is likely that the experience gained from the Swanston Street project would make a second and subsequent high-mobility streets easier to achieve.

There are many potential high-mobility streets. The obvious candidates are the streets where some of the elements are already in place.

Tram platforms have been installed in many roads including Bourke Street and Elizabeth Street. Unfortunately, these improvements, while they have helped tram passengers and the tram service, have been neutral for walking and negative for bicycle riding. The section of Elizabeth Street next to the tram platforms have now become a challenge for confident riders. When the platforms were installed in Bourke Street at Swanston Street the bicycle access was 'uninstalled'. These tram platforms and others like them could become the focus for the development of high-mobility blocks and streets.

A high mobility street could begin to evolve on Elizabeth Street north. Here the introduction of separated bicycle facilities between Victoria Street and the Haymarket roundabout has been positive for bicycle trips but neutral for the 'place' and the other alternative modes. Progressive upgrades can improve the pedestrian facilities, public amenity and links to the tram route in the centre of the road, absorbing the single mode intervention into a 'whole' solution.

At the southern end of Elizabeth Street, a new layout is being trialled. The experimental layout emphasised an improved 'place'. It was neutral for walking and tram passengers. Bicycle parking was not included and bicycle travel eliminated.

These separate parts of Elizabeth Street and their one-mode improvements can be connected and combined into a 'high mobility street' stretching from Flinders Street to the Biomedical Precinct to the north.

The new Transport Strategy needs to articulate and reinforce the concept of high mobility streets, identify the benefits of this approach and commit to their implementation and evolution.<sup>22</sup>





Figure 14: Following the success of Swanston Street in 2011, the 2012 Transport Strategy included the holistic, multi-disciplinary concept of 'high mobility streets' such as Swanston Street where motor vehicles have been excluded and ride-over tram platforms have been provided (left). This approach is like that used in Copenhagen where riders use a separated facility with ride-over bus platforms.

Photo: Georgia Scott (left) <http://bostonbiker.org/2010/07/29/livable-streets-street-talk-denmark-sweden-and-the-netherlands/> right)

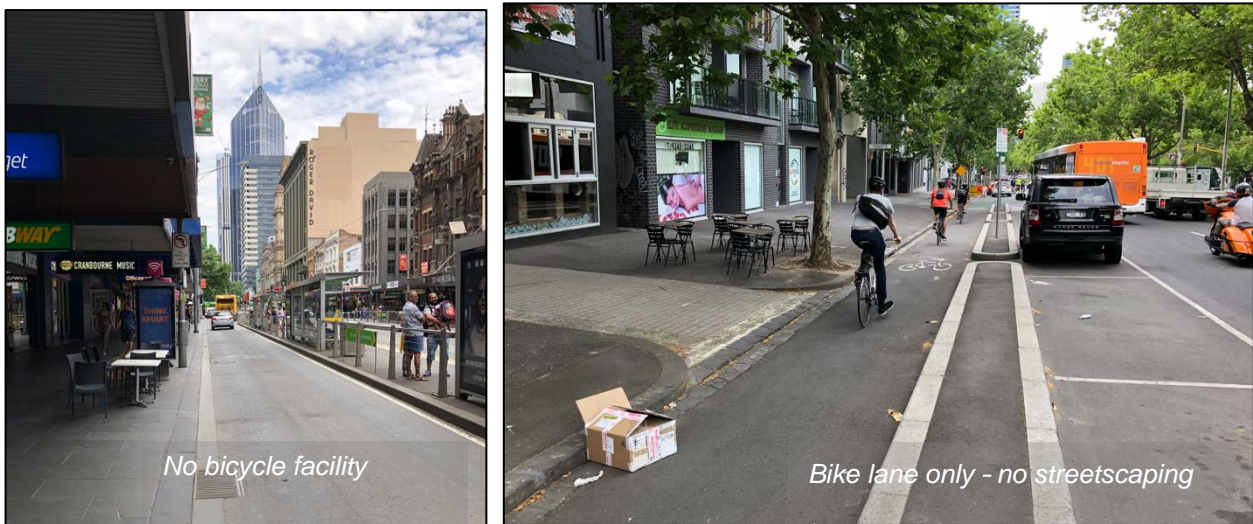


Figure 15: Unfortunately, since 2011 no new high mobility blocks or streets have been developed. Opportunities to do so have not yet been taken. The challenge is to take single mode interventions and develop holistic solutions. Source: PBA

(Top) A ride-over platform was provided in Swanston Street at Bourke Street (left). The tram platform in Bourke Street at Swanston (right hand side) does not include a ride-over facility for people on bicycles.

(Bottom left) The tram platform in Elizabeth Street improved access for passengers was neutral for pedestrians and people spending time in the street. The change made access along the block a challenge even for confident riders.

(Bottom right) The new bike lane in Elizabeth Street improved access for cautious bicycle riders significantly. The change was neutral for tram passengers, pedestrians and people spending time in the street.

### **3.3 Develop high mobility corridors leading to the Centre**

The new Transport Strategy can endorse the extension of the concept of high-mobility blocks and streets into 'high mobility corridors' that reach out from the CBD to neighbouring municipalities.

The concept of high mobility corridors extends the 'high mobility' approach to areas with lower density and fewer destinations. These transformations can be begun along all the sections of road where the bicycle routes pass alongside parks, gardens and other public open space in the municipality.

A definition of a high mobility corridor could be:

- High frequency and high priority transit services with buses and trams sharing a corridor separated from motor vehicles (Queensbridge Street is an example).
- Roads where the buses run like trams in the centre of the road in separated facilities with platform stops
- 'Early starts' at signals for transit, walkers and bicycle riders
- Priority settings for heavy in and outbound flows of transit, walkers and bicycle riders
- Motor vehicle traffic at low speeds.
- Bans on motor vehicles crossing separated transit corridors between signals. This should include crossing to centre road parking bays. (The centre road parking in Spring Street between Victoria and Lonsdale Streets is an example.)
- Constraints on right and left turns by motor vehicles at signals across transit, walking and riding routes.
- Parking bans on bus lanes at all times
- A high-quality streetscape that encourages longer walking trips and complies with the Disability Discrimination Act including shade trees, good pedestrian lighting, 'auto-on' pedestrian signal lanterns, raised crossings
- 'Blue' and 'green' infrastructure to optimise stormwater management and urban tree canopy
- Infrastructure (including level access) and signalling that enables pedestrians to move safely and seamlessly from footpath to transit.
- Bicycle routes that are separated from motor vehicles (except where they are permitted to use bus lanes)





Figure 16: (Left) A short section of a long road that leads to the centre of Amsterdam has been taken out of the motor vehicle network and turned into a high mobility corridor for walking, riding and transit.

Photo: Plantage Middenlaan Amsterdam [schlijper.nl/151212-img-9525-plantage-middenlaan.photo](https://schlijper.nl/151212-img-9525-plantage-middenlaan.photo)

(Right) Space has been taken from the roadway alongside the Thames Embankment to provide a 'congestion cutter' bicycle route. Pedestrian amenity has been improved by relocating the traffic and removing bicycle riders from the riverside walk.

Photo: [velovoice.blogspot.com](https://velovoice.blogspot.com)

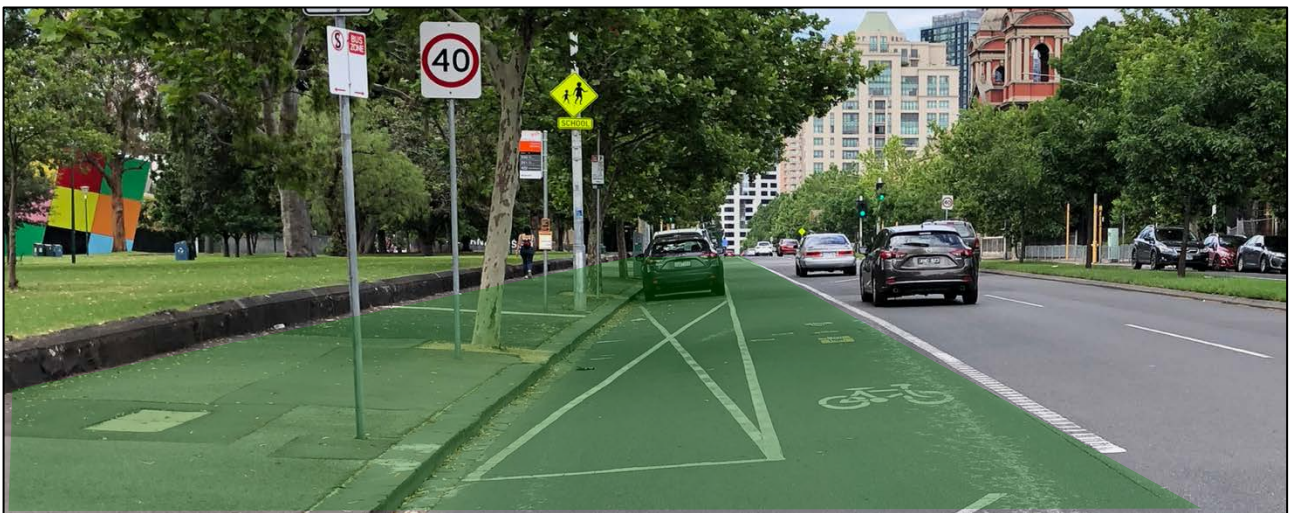


Figure 17: Rathdowne Street south of Grattan looking south to the central city area. Here the parkland can be extended to the right-hand side of the current bicycle lane. The bicycle space would be raised and placed behind the kerb. The change would allow a wider 'walk to work' path and additional plantings irrigated by stormwater capture. The walk to work route alongside the park would be improved by the relocation of the cautious riders that are currently using the footpath.

Source: PBA



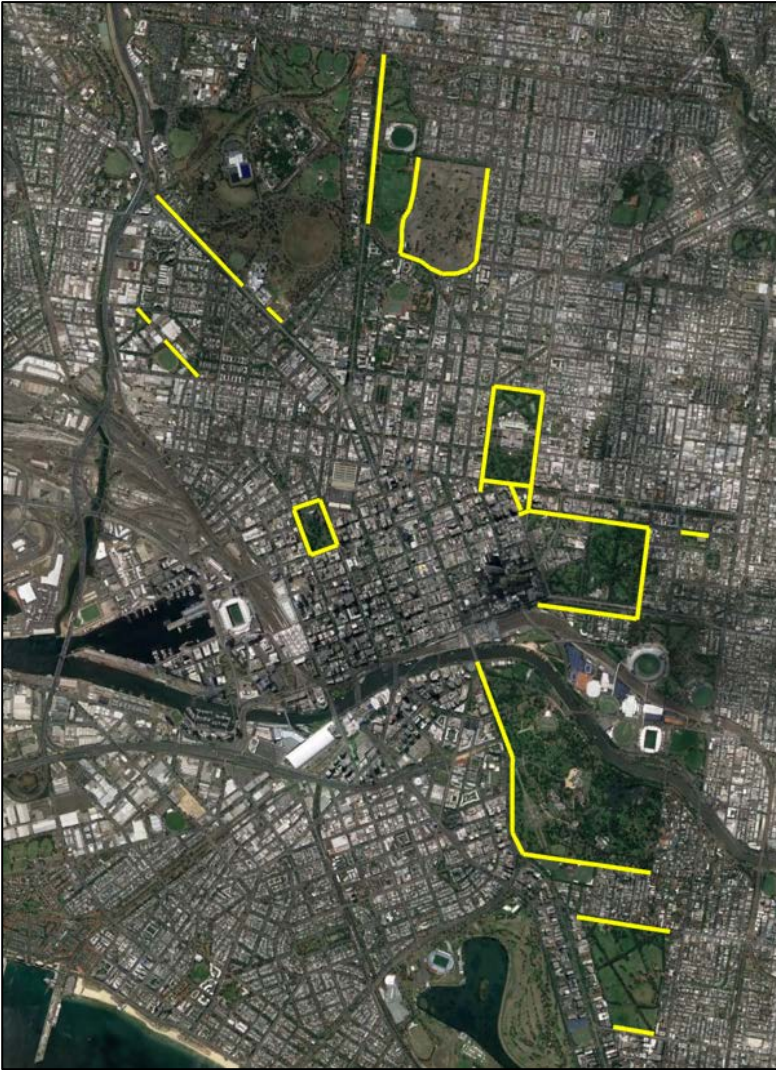


Figure 18: Potential locations of high mobility corridors (shown by yellow lines) alongside parkland and open space.

Source: NearMap, PBA

These transformations can be begun along all the sections of road where the bicycle routes pass alongside parks, gardens and other public open space in the municipality. Examples include Princes Park, Carlton Gardens, Fitzroy Gardens, St Kilda Road, Flagstaff Gardens and Royal Park. Around 16km of facilities could be developed in these locations.

Routes that stand out as potential high mobility corridors from a bicycle transport perspective include:

- The busy route alongside Princes Park between the City of Moreland, Melbourne University and the Haymarket Roundabout
- The west, south and east sides of Flagstaff and Carlton Gardens.

Other busy bicycle routes alongside parkland include St Kilda Road and Albert Street

In these locations, the open space can be extended to the right-hand side of the current bicycle lane. Kerbside car parking would be removed. The bicycle lane would be raised from the road level to the level of the current footpath. In the new space behind the kerb, a generous bicycle lane of 3m or more can be provided. The additional space would allow for a wider footpath and additional plantings to reinforce or extend the tree canopy. During the works stormwater capture and passive irrigation facilities could be installed.

Many short 'kerb extension opportunities' exist including alongside pocket parks and where medians on a cross street would allow the bicycle lane to be behind a kerb for a short distance.



The standard template of the typical City of Melbourne central median with grass and trees can be reviewed. The open space could be more valuable at the kerb than in the centre of the road. Alternative templates are in place for example in Roden Street West Melbourne where the median space is placed on one side of the street. The grassy medians could be split and the kerbs on both sides extended. A central or offset roadway would allow trees to be added on both sides as well as allowing high quality bicycle and pedestrian facilities.



Figure 19: Public space in the City of Melbourne, Source: PBA

(Top left) public space could be located at the kerb rather than in the middle of a road. Cathedral Place looking east from Gisborne Macarthur Streets

(Top right) The kerb has been extended across the parking lane. It could have been extended to the car-side of the bicycle lane to support this busy bicycle corridor. Rathdowne Street looking north from Palmerston Street.

(Bottom) In Roden Street West Melbourne the 'median' has been established next to the footpath rather than in the middle of the road reserve.

## **Direction Two: Improve bicycle facilities**

Underneath the umbrella of the approach described above in Direction One, the Transport Strategy will need to provide direction for bicycle-only initiatives.

### **3.4 Implement regular upgrades of existing facilities that are successful**

The City of Melbourne can increase the use of the bicycle by repeatedly upgrading bicycle routes that are proving popular.

The 'upgrade' concept needs to be added to the 'network and gap' concepts in the current Strategy and given more prominence in Bicycle Plans.

One reason to introduce a systematic upgrade approach is that there are diminishing returns from the 'network and gap' concepts. Over several years, the City of Melbourne (and VicRoads) have set aside space on roads in the municipality to support bicycle trips. This effort has been guided by the concept of 'completing a network'. At each review the 'gaps' in the network are identified and missing sections and absent routes compete with each other for funding. The current City of Melbourne Bicycle Strategy reflects this approach.

This 'gap filling' approach is highly productive when most of the desired network remains to be built and only a few routes are available. In this circumstance, each section or link adds to the overall value of the emerging network, each part adding to a more valuable 'whole'. However, when a network is mostly complete, it is less likely that the addition of missing sections and links will significantly increase the value of the overall network.

The risk at this stage is that great efforts are made to 'complete the network' when other investments such as upgrades of existing sections could have more impact. As the bicycle network in the City of Melbourne is largely 'complete', in that most routes have at least been marked out or established to some standard, it is now appropriate to emphasise the concept of 'upgrading existing routes'.

Repeated upgrading is the pathway to success. The growth of use of a bicycle route is a process of releasing pent up demand. However, it is not possible to accurately forecast the potential usage of a bicycle route. This leads to two risks. One risk is overinvestment. In this situation a major investment results in a disappointing number of riders. The other risk is underinvestment. This risk is to be preferred. In the worst case little has been lost and little gained. In the best case the initial investment reveals that there is pent up demand on the corridor.

Small upgrades can have a big impact because it is generally true for bicycle facilities that 'something is better than nothing'. Much of the growth on the bicycle routes in the City of Melbourne has occurred through the provision of relatively low-quality space. Examples include:

- Space allocated for limited time periods. (On most of Exhibition Street, lanes are only available in the peak in the direction of the tidal flow of vehicles.)
- Space provided in the space where drivers open their doors (St Kilda Road)
- Space where the separation from traffic is provided by a single white line (St Kilda Road)

It is a measure of the pent-up demand along the St Kilda Road corridor that such a weak facility should now carry twenty times the number of riders that were on the road initially.

Even on a successful route, one small increase in the quality of the facilities will not release all the pent-up demand. For this to occur a successful route needs to be repeatedly upgraded. Painted lanes can be widened, provided with buffers on one and then both sides, supported by tactile or 'bumpy' paint. The next step is separation in sections and finally separation from end to end.

This process could be imagined as an upgrade ladder. Investments that lifted routes up the ladder will enable routes to evolve until they draw in the cautious riders who are waiting for separation. Separated routes could then be upgraded into high-mobility streets and corridors.

There are indications that this approach would be practical for the City of Melbourne as – to some extent – it can be observed in practice.

In Exhibition Street, the first rung of the ladder was to open the bicycle lane in the peak direction. This improvement proved relevant to (confident) users. As ridership grew, the value of the one-side-with-the-peak-flow Exhibition Street lane became higher than the kerbside parking on the non-peak side. The facility was then moved one rung up the ladder and in one block the lane was opened in both directions in both peaks.

Looking ahead the next step up the ladder might include keeping the lane open on weekends and extending the time it is open each day. Then might come the step identified in the Bike Plan – a full-time lane. There are steps beyond this. The Exhibition Street route could be separated from traffic. Further steps would evolve the route into a high-mobility corridor running from Flinders Street to the municipal boundary at Princes Street.

The development of the Albert Street route began in 2010. The first facility began with a jump up several rungs from no facilities at all to separated kerbside lanes in some sections. Since then the route has been completed from end to end to various standards. The Bike Plan envisages completing the kerbside facilities from end to end. The Plan also indicates the intention to install 'green wave' signals that make stopping less likely.

For the route to meet its potential, other measures will be necessary including protected intersections, improvements to the surface, extensions of the kerb that raise the riding area above the roadway. The final step would be the establishment of a high-mobility corridor from Spring Street to the municipal boundary at Hoddle Street.

Under the proposed approach investment would be linked to performance. Successful routes would repeatedly draw in additional investments and improvements making them progressively and increasingly popular. Investments will tend to flow to the projects and routes where they will do most good. The development of a route would not be halted by it being rated as 'finished' or because it had been improved recently.

With these examples in mind, the planning of upgrades can be illustrated. When considering a four-year plan or an annual capital works budget the following questions can be asked:

- What are the next steps that could be taken on this route?
- How much would the interventions cost in time, effort and money?
- How many riders would they be likely to generate?
- Which interventions are likely to generate the greatest increase for the least cost?
- Are there better returns on effort and investment available on other routes?

By following the ladder approach, the right tool can be placed in the right place and funded at the right stage of development. This is likely to change the interventions that are considered and deployed. For example, it is unlikely that 'green wave' signals in Albert Street will emerge as the next 'best buy' for Albert Street. The approaches to the intersections along Albert Street are still unprotected. Dutch-style intersections would appeal to the cautious. The installation of a 'green wave' would not overcome their caution. When considering potential signal upgrades, 'auto on' and 'early starts' are not in place for pedestrians and riders. These changes would probably be more straight forward and have more value than a green wave.

Nor is a 'green wave' in Albert Street likely to be the best buy across the network. Extending the hours of operation of the lane in Exhibition Street to the weekend is likely to be a higher value. Of course, both improvements might prove worthwhile and possible in one year.

This is not to say that 'green wave' signals are always a 'bad buy'. The Bike Plan also includes 'green wave' signals in the design for Southbank Boulevard. In this case, as the whole street is to be reorganised, the addition of a green wave will be a low-cost feature. Other places where a 'green wave' might be best next step are not in the Plan. Certainly, the signal timing on Queensberry Street is not favourable for maintaining

momentum. Even if a green wave were suitable for Queensberry Street, there may be other interventions for that route with a higher cost benefit. With practice and performance-based evaluations the City of Melbourne would become more skilled at investments and receive a higher return.

Finally, it is suggested that this approach to upgrading key routes be used for all alternative modes: trams, buses and pedestrians.



An example of the impact of an upgrade of a successful route is the popular North Bridge route in Copenhagen. The busy separated route was popular and congested. When it was widened, ridership increased by a third as shown in the figure below. This suggests that there is no such thing as a network or single bicycle facility that is 'finished' and that successful routes need to be regularly upgraded in response to increasing use.

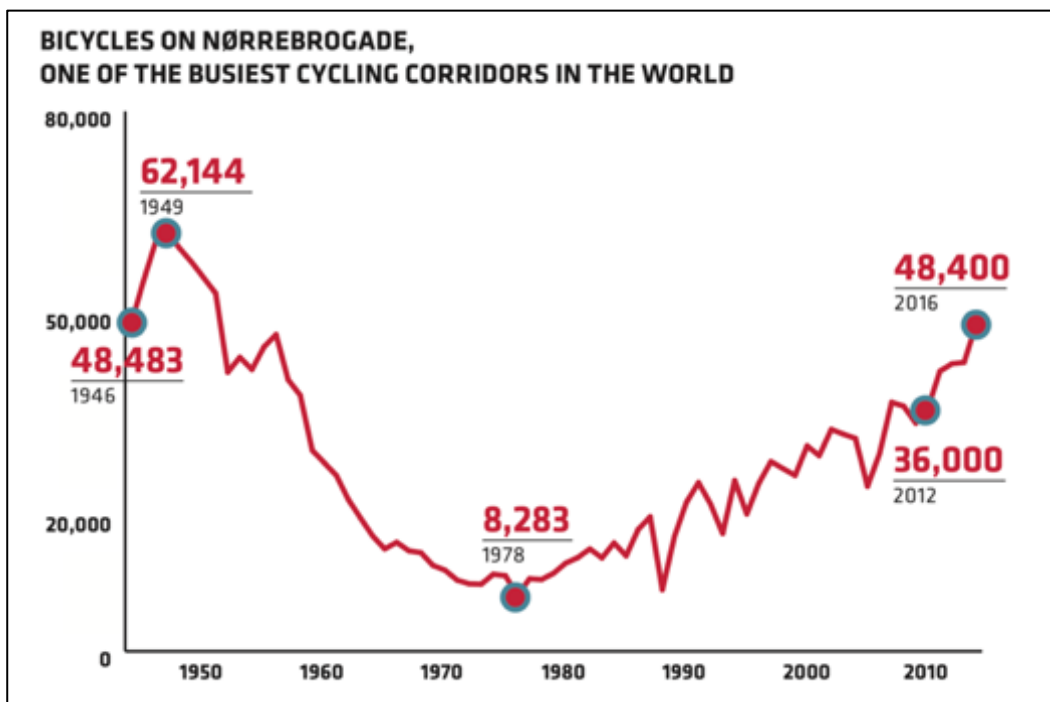


Figure 20: The bicycle route North Bridge Copenhagen was widened in 2013. The chart shows the increase in ridership when the wider route opened. Photo: Copenhagenize Chart: Danish Cycling Embassy

### **3.5 Increase protection from turning motor vehicles & introduce protected 'Dutch-style' intersections**

The City of Melbourne can increase the use of the bicycle on popular routes by providing protection from turning motor vehicles at intersections through the construction of 'Dutch-style' intersections.

For many good reasons the development of the bicycle network in the municipality has concentrated on introducing and improving facilities in the mid-block. As a result, in many locations as the rider arrives at the intersection, the lane or separation is removed, leaving the rider no defined space and little protection from the risk of turning motor vehicles.<sup>23</sup>

This emphasis on the mid-block means that today the weakest links in Melbourne's bicycle routes (including the highest quality kerbside separated bicycle lanes) are at intersections. The weakness of the intersections means that the attraction of the whole network is weak. We have seen above in the Near Market research that the cautious rider is looking for separated intersections as well as separation in the mid-block.

The cautious riders are right to be concerned about protection at intersections as at intersections there are several risks from turning motor vehicles. Riders proceeding straight ahead are at risk (and can feel at risk) from drivers turning left. Riders are also exposed to collisions with cross traffic and on-coming vehicles turning right across the riders' path.

Nor do these risks occur only at four-way intersections. Riders in the mid-block are exposed to turns and U-turns. On streets like St Kilda Road or Royal Parade all along the mid-block there are mini-intersections. Gaps in the outer median separators enable motorists to turn left from the centre lane into a cross street or driveway. In some locations on boulevards it is possible for a motorist to make a turn from one side of the road from the outer lane across the outer separator, travel lanes and tram tracks, through the other outer separator and across the kerbside travel lane into a cross street. On roads without separators or central medians motorists can often make a wide, high-speed turn across a multi lane road into a cross road on the other side.

These turning movements are not only a risk for riders but also for tram services and pedestrians. Work for the West Melbourne precinct plan found that turning motor vehicles were associated with most collisions and injuries.





Figure 21: The northbound bicycle facilities along Swanston Street north are mostly separated from traffic. 70m south of Grattan Street the separation ends and the lane narrows (see above). This loss of separation increases actual and perceived risk and reduces the attraction of the route to the cautious rider – even though much of it is separated. Risk could be reduced by providing ‘early start’ lanterns to allow riders to clear the intersection before drivers can turn left. Riders have been protected by the ‘red arrow’ on the signals from oncoming vehicles turning right across their path.

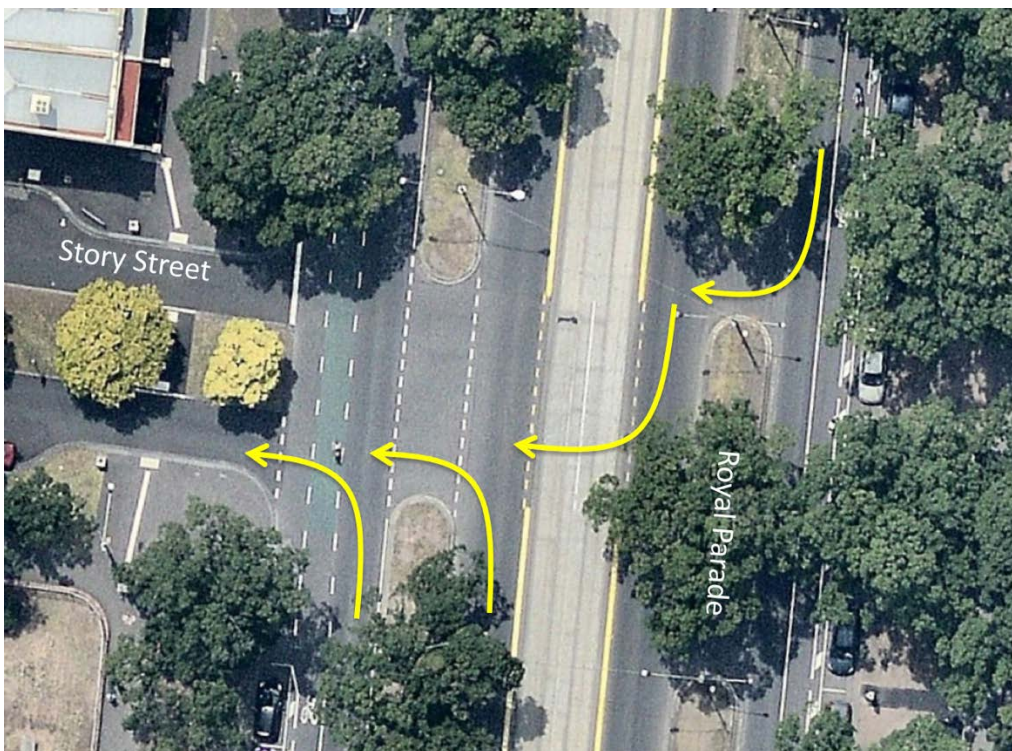


Figure 23: The rider is at risk of bicycle/motor vehicle collisions at this intersection. The risk has been reduced by marking the lane in green paint. The yellow arrows show how vehicles can cut across a rider's path by making turns from the inside and outside lane as well as from the opposite direction. Turns from the centre and the opposite direction can be eliminated by extending the outer median separator. Other measures would emphasise the riders' priority and slow left turns from the inside lane.

Source: PBA



The actual and perceived risks for riders at intersections can be reduced – and the level of riding increased – in two main ways: physical measures and traffic signal controls.

A key physical measure is the 'protected intersection'. This design can be borrowed from the Netherlands where a standard approach has emerged over time.

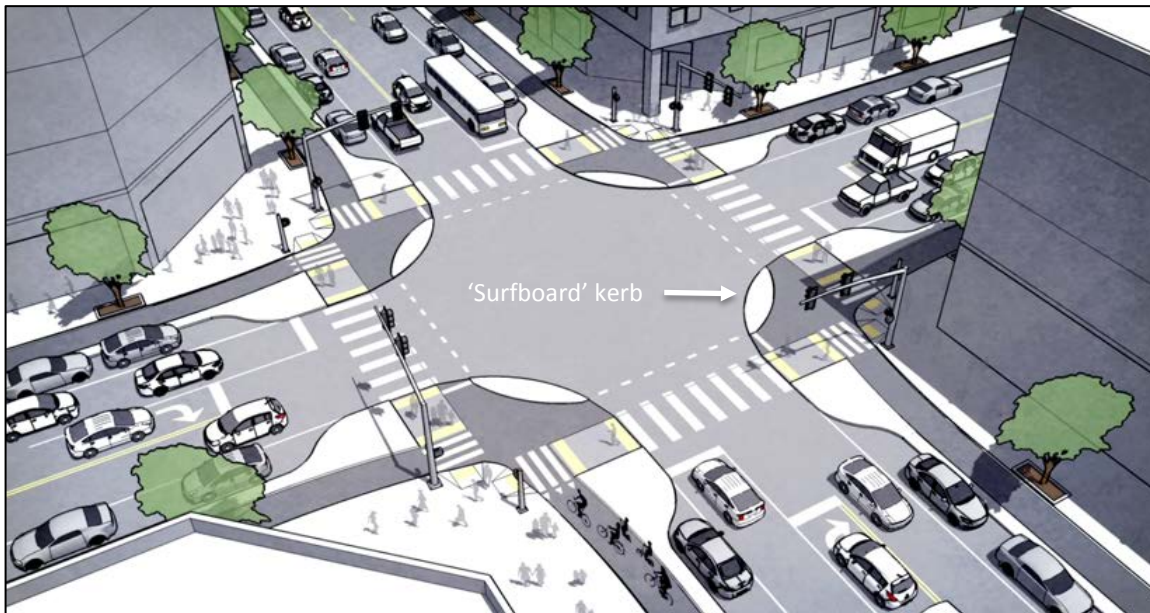


Figure 24: The layout of a typical protected intersection. The 'surfboard' kerb is indicated. – Nick Falbo [vimeo.com/86721046](https://vimeo.com/86721046)

The standard protected intersection has the following key features:

- The lane separation continues up to the pedestrian crossing area (which is in line with the footpath)
- Four surfboard-shaped kerbs provide three benefits:
  - The surfboard kerb forms a holding area beyond the pedestrian crossing where the rider can wait. This puts the rider out in front of the driver's windscreen without requiring the rider to be directly in front of the car. The forward position gives the rider a head-start when the signal changes or a gap opens in the cross traffic.
  - The surfboard kerb 'tightens' the turn and slows drivers turning left. The tighter turn also puts people crossing the road in front of the left turning driver's windscreen (rather than behind their passenger door).
  - The surfboard kerb formalises the 'hook' turn, allowing riders to cross to the far side of the intersection and turn into the advanced storage area in the new direction.

The current Bike Plan identifies some trial sites and a trial is underway. It is not clear why the approach needs to be 'trialled' when it has become a standard approach overseas. A working example will however be useful as a demonstration. The next Transport Strategy and Bicycle Plans should emphasise the installation of 'Dutch' intersections on the main bicycle routes. The highest priority locations would be where two busy bicycle routes cross, such as the intersection of Albert and Clarendon Streets in East Melbourne. Examples of other route intersections are where the east west route along Queensberry Street crosses north south routes such as Peel, Elizabeth and Swanston Streets.

Alongside the 'Dutch' intersection other physical interventions are available:

- Slip lanes can be removed. Some left turns in the municipality are facilitated by 'slip lanes'. These facilities interrupt the footpath or bicycle lane and encourage higher speed turns.
- Kerbs can be reinstated and extended. Over time kerbs have been cut back to allow easy and faster turns. These turns speed up left turning motor vehicles which can increase the risk for pedestrians and bicycle riders as well as reducing kerbside space for people on foot and on bicycles. The easy left turn

from Princes Bridge outside Flinders Street Station into Flinders Street is an example of a location where the few drivers turning left disadvantage many other road users.

- Gaps in separators and central medians – including gaps across tram tracks – can be closed. These gaps allow for fast right turns and U-turns and turn mid-block sections into a series of informal intersections. In these circumstances, the driver's attention is likely to be on other moving motor vehicles rather than people walking or riding.

Traffic signals can also be used to reduce risk at intersections. Measures include allowing early (and simultaneous) starts for walkers, transit and bicycle riders as well as controlling access to motor vehicle turns through permanent left and right turn bans including requiring 'hook' turns. Part time turn bans are also valuable when flows of riders are high. These risk reduction measures should have priority over other valuable signal adjustments such as 'green waves' that are intended to reduce travel times rather than risk.

Above all the next Transport Strategy should emphasise the multi-modal value of 'early starts'. This intervention (if correctly deployed) can simultaneously reduce journey time and risk for all modes. It is important that these measures are steadily implemented along whole routes rather than at select intersections.

### **3.6 Include 'movement' in the design of places and open spaces**

The City of Melbourne can increase the use of the bicycle by allowing low-key 'extended walking trips' by bicycle through 'places' and open space.

There is currently no general City of Melbourne policy banning bicycle use from 'places' and open space. Indeed, some of the current policies, such as the City of Melbourne's Open Space Technical Report of 2012, make positive statements.<sup>24</sup>

Nonetheless in some locations the City of Melbourne's actions, suggest that the administration considers bicycle use in 'places' and 'spaces' as detrimental. The expression of this approach can be seen in some of the bicycle bans and infrastructure downgrades that have been implemented as well as the unintentional oversights (or perhaps intentional exclusion) of bicycles from some spaces and places.

Some of these unfortunate and unnecessary measures have probably been put in place to regulate, prevent or pre-empt inappropriate behaviour by bicycle riders. There is no doubt that people on bicycles can and do perform antisocial and thoughtless acts that put themselves and others at risk and inconvenience. Similarly, people who travel by car, transit and on foot act in foolish and inconsiderate ways.

Rather than manage behaviour (which is a difficult and continual task) the City of Melbourne has in some places preferred to implement bicycle bans and barriers. This approach is unsound. It leads to contradictory outcomes and, perhaps most importantly, these actions by their arbitrary and unreasonable nature undermine the development of 'good behaviour' by people when they are pedalling.

Examples of bans, downgrading of bicycle routes and overlooking bicycle use include bans on riding in the Bourke Street mall and Carlton Gardens, positive and negative interventions along the riverbanks and the lack of access for people on bicycles in the recent 'pop up' place at the intersection of Elizabeth and Flinders Streets.

In the Bourke Street mall 'place making' has excluded bicycle use. Permitted vehicle access is allowed for 8.5 hours each day. The ban on bicycle use is for 24-hours a day, 7 days a week. This bears no relation to the activity in the mall. The bans are visually contradicted by the placement of bicycle parking rails in the centre of the mall. One contradictory consequence of the bans is that the City of Melbourne issues penalties to people making deliveries in the mall on bicycles while permitting deliveries by car.

In the Carlton Gardens open space management has 'removed' bicycle use. Long standing bicycle access through the Carlton Gardens was first restricted to families with children under 12. This partial ban was then extended in 2010 to a full ban on any bicycle riding. Meanwhile on Museum land in the centre of the Carlton Gardens, riders filter across the forecourt of the Museum through the crowds of school children and adults visiting the Museum. A consequence of the ban in the Gardens is that riders have been moved off the 5m wide paths through the gardens and channelled onto a heavily used 2.5m wide two-way shared bicycle pedestrian footpath. The pedestrians could use the 5m paths through the park but do not because they are longer. The riders would use them but are fined if they do. As a result, the park paths lie idle and conflict builds along the kerb.

Similar mixed messages can be observed along the riverbanks of the Yarra. Paths are being developed and improved upstream and downstream on the Yarra. The remarkable Jim Stynes Bridge west of the Spencer Street bridge is one example. As a result, an increasing number of riders flow into the CBD section of the Yarra River on the north and south banks. It can be expected that these flows will increase.

In a contradictory move, on the north bank, when Batman Avenue was removed to establish Birrarung Marr, the riverside bicycle path was also removed and the alignment blocked. People still ride bicycles through Birrarung Marr Park but now, rather than being channelled predictably on one alignment, they scatter unpredictably across the whole area creating bottlenecks and multiplying potential conflict points. Downstream from Princes Bridge on the north bank a 'Dismount' sign has been installed. The rationale for this sign is unclear.

Along the southern bank of the Yarra River, incremental development has produced a riverbank space in which trees, seats, structures and flow paths for pedestrians and bicycle riders are all jumbled together. It is difficult for a responsible rider to know where to place themselves in this environment. Nor is it reasonable to expect people to ride predictably in a straight line at a speed below 10km/h.

The recent 'pop-up' park at the end of Elizabeth Street created a barrier for cyclists. Riders have always been permitted in this block but, while the park allowed for tram movements and walking, it included a bicycle ban along with the motor vehicle ban. Nor were any bicycle parking arrangements included. The number of bicycles parked at the State Library suggests that bicycle parking is part of what people want in these places.

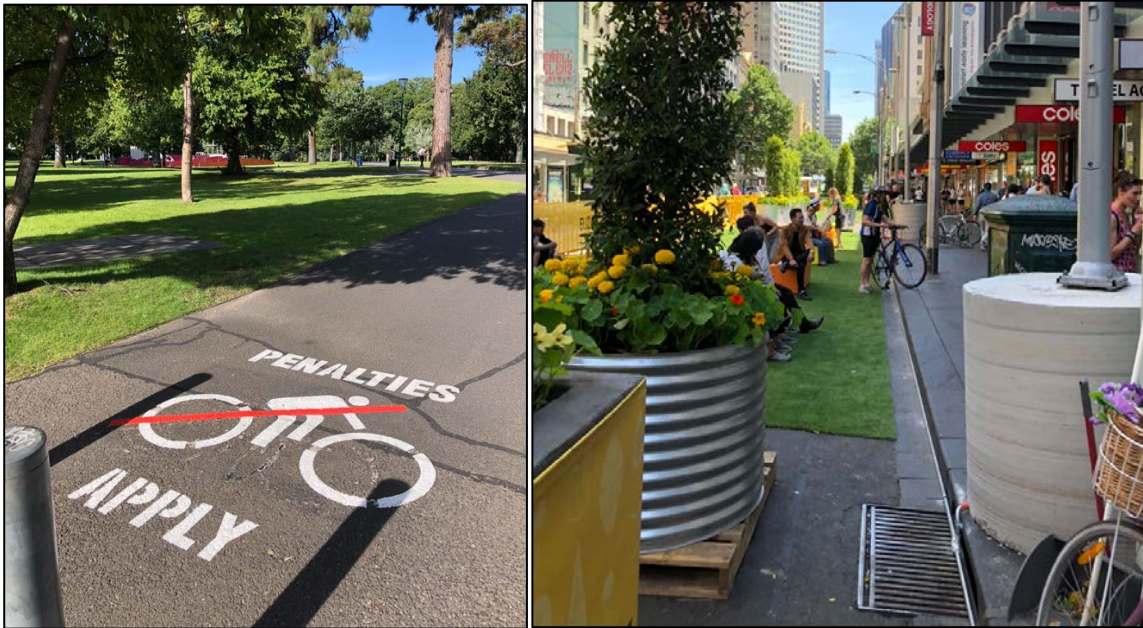


Figure 25: (Left) The City of Melbourne bans bicycle use in some areas including the Carlton Gardens. (Right) Bicycle use has not been included within or alongside the pop-up park at the intersection of Elizabeth and Flinders Streets.

Source: PBA





Figure 26: (Top) Halfway along this section of the north bank of the Yarra River (which functions as a road) there is a 'Dismount' sign. It is not clear why this instruction is appropriate and why it is in this location. (Bottom) It is not clear where someone riding a bicycle should travel along this section of the south bank of the Yarra River. A sign in the distance sets a speed limit of 10kph. It is extremely difficult to ride for any distance at 10kph.

Source: PBA



What approach should the City of Melbourne take?

The answer along the river bank can be found in Vancouver. This city is also suffering the consequences of the success and popularity of its river and waterfront paths. Alongside False Creek on a summer's day around 4,000 people use the path – half riding bicycles and half on foot. The current path is not fit for this purpose (although, like the paths along the Yarra it has been good enough to generate a high level of activity). To cope with success, the False Creek path in Vancouver is being replaced with two 3m separated paths one for people on foot and the other for people on wheels. Faster riders will be encouraged to use a bypass.



*Figure 27: The False Creek path in Vancouver is being replaced with two 3m separated paths. Faster riders will be encouraged to use a bypass.*

*Source: City of Vancouver*

A similar approach can be found in past City policies and initiatives along the riverbank that have, for whatever reason, failed to be implemented. It is recommended that the City of Melbourne return to a leadership role for the river bank and develop concepts and a public consensus on a redevelopment that will make it a great place for people to flow through as well as to pause and enjoy. The rethinking will need to include bypasses where possible and methods to express the change from higher speed 'congestion cutter' type of riding along the river corridor into the lower key 'extended walking' style of riding that is appropriate in a busy space. An up-to-date and relevant path system along the Yarra River can be a goal identified in the new Transport Strategy.

The answer in the other locations – whether urban places or open spaces – is to relax the bans and allow low key 'extended walking' type bicycle trips to flow with pedestrian flows.

Examples of this more open approach can be found in other cities where riders flow through special places without degrading them. The photos below show pedestrians and bicycle riders travelling through the State Museum (Rijksmuseum) in Amsterdam and the Meadows in Edinburgh. Another area where riders and pedestrians mingle is on the river side of the Railway Station in Amsterdam where the ferry passengers, bicycle riders and train passengers flow through and across the space. The formal recognition of these flows of bicycle riders was controversial in some cases but time has proven that coexistence is possible.





Figure 28: Pedestrians and bicycle riders travel through the State Museum (Rijksmuseum) Amsterdam.

Photo: <https://ilovebikingsf.com/tag/amsterdam/> 25 November 2014



Figure 29: Riders and walkers on one of the paths through the Meadows Edinburgh

Photo: Richard Webb North Meadow Walk Edinburgh <http://www.geograph.org.uk/photo/4720690>





Figure 30: The photos show the space between the railway station in Amsterdam and the ferry. This space is crossed by a bicycle route (top photo) which merges with a cross flow of people (some on bikes) moving between the station (on the right of the right-hand photo) and the ferry terminal (on the left of the right-hand photo). Photos: Acitymadepeople.com (top) Schlijper.nl (bottom)





*Figure 31: Signs that people have pedalled to the Carlton Gardens*  
Source: PBA

Looking beyond the ban signs in Melbourne, peaceful coexistence can be found in many places. The photo above shows people in the Carlton Gardens who arrived by bicycle without causing any negative impact to the place or space or other users. The new approach would need to include the aim of strengthening the culture of respectful mingling that already exists. A strong culture would not emerge overnight but, judging by approaches used overseas, it is a realistic goal. Penalties, including social disapproval, would target poor behaviour – just as we target littering and other inappropriate behaviours – and not be applied to people just because they are on a bicycle.

It is appropriate that there is an effort to resolve the issue of behaviour and bans in the directions in the new Transport Strategy. A table is provided below that suggests a framework that could apply.

**Table 4 – Bicycles in places and open space**

<b>Type and speed of bicycle trip</b>	<b>Lightly used open space</b>	<b>Heavily used open space</b>	<b>Heavily used places</b>
Low speed 'extended walking' bicycle trips	Acceptable	Acceptable  The Yarra River banks are an example	Acceptable  Bourke Street Mall is an example
Higher speed 'congestion cutter' bicycle trips	Acceptable  Fawkner Park and Yarra Park are examples	Not acceptable	Not acceptable

PBA

### **3.7 Require more bicycle parking in the planning scheme**

The City of Melbourne can increase the use of the bicycle by changing the planning scheme so that more bicycle parking spaces are required in new developments.

The current planning scheme provides strong support for car ownership and use but its support for bicycle ownership and use is weak. This unequal treatment occurs because the requirements for the construction of off-street car parking bays are strong and the requirements for bicycle storage and parking are weak. The requirement for car parking spaces is usually one per dwelling – roughly one bay for two people. The requirement for bicycle parking is one bicycle space for every five dwellings – roughly one bicycle storage space for ten people. Similar unequal rules apply for offices and commercial developments such as supermarkets.

These settings are back to front. The bicycle spaces in housing need to be guaranteed by the planning scheme at the rate of one per person. As discussed above, car spaces should be an option that an owner or renter can avoid if they do not have a car or find that they no longer need one.

The rate of bicycle storage and parking provision in the planning scheme needs to be generous. In one building in Brunswick, 60 bicycle parking spaces were provided for 24 apartments. This proved not be enough and there are now over 70 bicycles owned by residents of the building (almost 3 bicycles per dwelling).

It is important that the planning scheme requires the bicycle storage to be provided in convenient locations so the bicycle is ready to go. You are unlikely to 'jump on your bike' to go somewhere if you need to fetch your bicycle from the balcony, carry it through the bedroom, down in the lift and out through the foyer. On the other hand, two 'plips' – one to get in the car and one to exit the building – are all that is required to initiate a car trip.

There is little that can be done about the buildings that do not have adequate bicycle parking spaces. It would be appropriate for the City of Melbourne to offer people who find themselves in an apartment without bicycle parking, a subsidy or zero interest loan for a folding bicycle. A similar subsidy or loan could be provided to people who choose an apartment without a car space to enable the household to purchase an e-bike.

Bicycle parking at large scale destinations needs to be guaranteed by the planning scheme. If destinations are providing off-street parking, then a significant proportion of that space should be available for staff and visitors who arrive by bicycle. Hospitals and universities in the municipality, to a greater or lesser extent, outsource their bicycle parking to the City of Melbourne to put aside public space at the kerb or on the nature strip space and install parking rails. This is not necessarily the best outcome for the street and the community. As well as minimum provision for bicycle parking the planning scheme should require provision for 'overflow' bicycle parking. One solution might be contributions to, or leasing of, off-site facilities. This is how 'overflow' staff parking car parking is often handled.

Smaller destinations also need to look after people who arrive by bicycle. The planning scheme only requires a shop to provide bicycle parking for its customers if it is larger than 1,000 square metres (Clause 52.34) whereas a shop of that size is required to provide 40 car spaces (Clause 52.06). Research in Lygon Street suggests that retail destinations are likely to benefit more from bicycle riders than people who arrive by car (Lee; 2010).<sup>25</sup> Some of these spaces can be provided on kerb outstands which replace kerbside car parking bays. These 'corrals' were endorsed in the current Transport Strategy and the implementation could be expanded in the new Strategy.

Investigations by the City of Melbourne suggest that in Melbourne office building owners are going beyond the minimum requirements in the planning scheme for employee bicycle parking. Office refurbishments including end-of-lease refits often include significant upgrades in the quantity and quality of bicycle parking. Some end of trip facilities – the showers and lockers – are of 'hotel' quality. Many employers regularly expand their bicycle parking area to keep up with the level of use. It has been claimed that in the Sydney CBD between 2015 – 2017 more than \$35m was spent by Sydney businesses on 35 bicycle end of trip facilities.<sup>26</sup> However, the investigation in the City of Melbourne found that some building managers have not provided the facilities required by their permit, and the facility design in most buildings is poor when compared with best practice.



It is time to raise the base level of provision in the planning scheme to a higher minimum standard of quantity and quality. Upgrades to on-site bicycle storage and parking could be supported by access to financial arrangements similar to Energy Upgrade Agreements.



Figure 32: The person in this apartment in the City of Melbourne keeps their bicycle on the balcony. This is an inconvenient location for regular or spontaneous use.

Source: PBA



### **3.8 Move bicycle parking from the footpath to kerb-extensions to underground**

The City of Melbourne needs to take steps to ensure that areas of bicycle parking do not reduce the width of busy footpaths or occupy valuable open space. If bicycle use continues to grow, it will be necessary to consider moving large areas of bicycle parking underground.

Today bicycles are locked up to formal parking rails and other street furniture along many footpaths. Low levels of bicycle parking on footpaths are usually unproblematic. However high levels of footpath bicycle (and motorcycle) parking create clutter on the path, impede pedestrian flow and can create safety hazards.

Where bicycles are beginning to reduce footpath capacity and amenity it is appropriate to move them from the 'footpath furniture zone' to kerb outstands. A kerb outstand that replaces a couple of car parks can accommodate a couple of dozen bicycles. The kerb outstand solution was endorsed in the 2012 Transport Strategy. The Strategy indicated that there was a 'good opportunity' to replace kerbside car parking with kerbside bicycle parking. The success of the bicycle parking kerb extension in Lygon Street mentioned above was referenced. This type of facility has been replicated in a few locations (Pelham Street Carlton is an example) but is yet to become the norm.

The shift from footpath to kerb outstands will need to accelerate as bicycle parking threatens high use footpaths (such as Flinders Lane) and is overflowing in popular places (such as around the State Library).

In Europe, municipalities are recovering scarce and valuable public space from the bicycle by providing underground parking. The cost of underground structures illustrates the value that these cities place on the contribution of the bicycle and the value of the public space that is recovered.

Münster, Germany, has been building underground parking for bicycles for nearly twenty years. The largest underground bicycle park in the world (12,500 bays) is being developed in Utrecht, Netherlands as part of the railway station redevelopment. The Utrecht bike station includes a bike share service and a bike shop. (Many bicycle trips in the Netherlands are to the train or on an onward journey from the train.)



Figure 33: Underground bicycle parking station in Münster was built to 'recover' the public space above which had become occupied by bicycle parking.

Source: City of Münster [https://www.radstation.de/de/360-ansicht/4\\_18.html](https://www.radstation.de/de/360-ansicht/4_18.html)

Many train passengers in Melbourne use bicycles to reach railway stations. As a result, bicycle parking is building up around Flinders Street Station for example. More people would probably ride to the stations, but the informal parking areas are constrained by the limited space and lack of facilities. The Flinders Street station precinct is likely to become more attractive to people on bicycles when the Melbourne Metro Station opens. Rather than continuing to expand bicycle parking on the surface, the space under the City Square – when it becomes available again – could be repurposed as underground bicycle parking for the central area.

Bicycle parking is even more limited for people riding to (or from) Southern Cross Station. Inbound commuters have nowhere to store a bicycle at the station overnight so that it is available for their onward journey in the morning. One solution could be to provide underground parking in the Station precinct. A Utrecht-style bicycle area near Southern Cross Station could offer to store private bikes and rent share bikes. Such a facility would enable Southern Cross Station to serve all the western end of the central area out to the edges of Docklands through 'extended walking trips'.

Underground facilities should also be considered in the Parkville Biomedical and Melbourne University precincts as well as in the area around the RMIT University and the State Library of Victoria.

### **3.9 Increase investment in bicycle infrastructure and provide incentives**

The City of Melbourne can increase the use of the bicycle by increasing its investment in the mode.

The Council has net assets of \$4 billion and spends nearly \$200 million on capital works each year. This financial power has enabled the City of Melbourne to shape the transport system in several ways. In the case of Swanston Street, it was able to achieve significant improvements to the transport network including supporting bicycle use. Investments such as these are how the intentions and directions expressed in Strategies are realised.

The City of Melbourne's intentions for bicycle use are positive and unambiguous. The 2012 Transport Strategy spoke of a 400% increase in bicycle use including 'reinforcing it as a mode of choice for moving around the central city' for trips within and to the City, noting that 'a shift of public transport passengers onto bicycles would help alleviate overcrowding.'

The strategy was reflected in the 2012-16 Bicycle Plan which aimed to deliver 'a 50 per cent increase in bicycle trips to, from and within the municipality on weekdays' and raise the bicycle share of trips from 4% to 6%. The 2016 – 2020 Bicycle Plan established a target of '7% total trips to, within and from the City by bike, and a 10% target by 2030.'

The 2012 Transport Strategy did not identify annual financial commitments to increasing bicycle use. These decisions are made each year by the Council in the context of the Strategy. It is possible however to look back at the published City of Melbourne budget allocations over the period of the current Transport Strategy to see what has been spent.

On average the annual budget allocation for the bicycle improvement program has been \$2.5m and \$154,000 for bicycle lane maintenance. Between 2004 and 2013 the capital works allocation fluctuated between zero and \$5m (2012-2013). The data on bicycle trips provided above reveals the return on this investment. Over the period the number of bicycle trips has grown by 7.5% or three thousand riders a day. However, the share of trips has fallen from 3.8% in 2009 -10 to 3.6% in 2015-16. The data suggests that to reach the 2020 strategic target of 7% of trips, the current level of riding in the City will have to more than double.

On this basis, we can say that the successive annual investments achieved positive outcomes. The investments showed that improved facilities appear to increase the number of bicycle trips and the total number of trips has gone up. However, the scale of the investment appears not to have been large enough to secure strategic success as the bicycle lost share in 'extended walking' trips and only gained slightly in 'congestion cutting' trips. To lift the share of bicycle trips enough to meet its strategic goals, the City of Melbourne will have to increase its investment. A doubling of the capital works budget would be, on average, \$5m a year, a fourfold increase would be in the order of \$10m a year.

Another way to use the City's financial power is through incentives that seek to establish new behaviours. Transport behaviour has been influenced in other places through financial mechanisms such as feebates, hypothecated revenue, subsidies and loans. These are discussed below.

#### **Feebates & hypothecated revenue**

Feebates are fees charged to one person and rebated to another. In France, Germany and Ontario (Canada) feebates have been used to influence new motor vehicle purchases. The fee applies to the low efficiency vehicle and the rebate is received by the purchaser of a high efficiency vehicle. In the City of Perth, parking revenue is used to fund mode shift initiatives including facilities for cyclists and pedestrians. Some of the funds raised by the Victorian Government's Congestion Levy on certain off-street parking bays are used in this way.

Feebates could be introduced in the areas of the municipality where households are permitted to store a second vehicle at the kerb. This second kerbside permit fee could be raised and revenue returned to residents who purchase an e-bike. Such a feebate would tip the balance away from motor vehicle ownership and use and towards use of alternatives including bicycle riding.

It is recognised that the City of Melbourne treats revenue from parking meters as general revenue and spends the revenue on needs and opportunities beyond the transport sector. Within this overall approach it would be possible to follow the Perth model and set aside a proportion of parking revenue and direct it to strengthening alternative modes of travel including bicycle infrastructure. It would make sense to people that a portion of the parking fees were allocated to initiatives that helped people switch away from car trips as that will reduce traffic congestion and competition for car parking spaces.

### **Other Incentives**

In the early days of solar panels financial incentives played a key role in building the scale of production and widening the group of people with direct experience of solar power. Today, for solar panels, these incentives are not as necessary and other financial mechanisms are being used to drive renewable energy, including the environmental upgrade finance provide through the City of Melbourne.

Similar incentives are rarely applied in the transport sector in Australia. However, in other countries there are subsidies for electric motor vehicles and electric cargo bikes (Norway). Disincentives for car ownership and use have also being introduced.

The City of Melbourne has the capacity to provide purchase incentives for e-bikes and folding bicycles (for apartment dwellers without bicycle parking space). These vehicles can cost around \$3,000 – around ten times the cost of a basic bike. The City of Melbourne could provide the interest payments on these bicycles allowing people to pay them off over a couple of years at the rate of a public transport ticket. This would enable people to get a loan (personal loans are not usually issued below \$4,000) and avoid credit card interest. The RACV has just introduced such a loan but it is only available for some models through some retailers.

Eligibility or priority access to the available funds could be linked to households that do not own a car or have reduced the number of kerbside permits that they use or who live some way out of the centre such as in Fishermans Bend or Kensington.

The quality and quantity of bicycle parking provided in housing, offices and commercial destinations can be improved and increased through financing partnerships and incentives for building owners and managers. The City of Adelaide currently provides a \$5,000 financial incentive to building managers who install electric car charging infrastructure. Similar 'transport upgrade agreements' could also be used to stimulate retrofitting of facilities that increase the use of alternative modes, including bicycle riding.

## 4. Summary of the discussion

This section summarises the issues and recommendations made in this paper.

- The City of Melbourne's next transport strategy should emphasise and prioritise space efficient transport modes so that more people can flow along the roads in the municipality.
- A space-efficient transport system will also release space for purposes outside the transport system.
- Bicycle trips are important because they complement trips made on foot and by transit.
- Bicycle trips also provide valuable benefits outside the transport system.
- There are two main types of bicycle trips: short trips that complement walking trips – 'extended walking' and longer trips that complement transit – 'congestion cutting'.
- In recent times the shorter trips have fallen in number while the longer trips have grown, but only as fast as the growth in population.
- There are people who are 'ready to ride' but they are cautious about traffic and need bicycle facilities that are separate in the mid-block and at intersections.

The City of Melbourne can increase the number and proportion of bicycle trips by:

- Neutralising the measures in the planning scheme that support car ownership and use
- Reducing access and priority for motor vehicles
- Increasing the number of high-mobility streets where walking, transit and bicycle trips are strengthened
- Extending high-mobility streets into high mobility corridors that reach to the boundary of the municipality
- Improving bicycle facilities by:
  - A regular investment program that continually upgrades popular routes
  - Strengthening popular bicycle routes with Dutch-style separated intersections
  - Allowing low-impact bicycle flows through open space and 'places' across the municipality.
  - Moving high levels of bicycle parking from the footpath to kerb outstands and eventually underground
  - Changing the planning scheme so that there is always space for people to park their bicycle and that the space is in a convenient location where the bicycle is ready for use
  - Increasing the level of investment in bicycle infrastructure.

## 5. References

---

<sup>1</sup> Person lane occupancy (PLO) measures how efficiently the road network moves people. Analysis shows that where high quality on road transit is provided, PLO has increased even traffic volumes [private cars] and car occupancy reduces. For example, between 2007 and 2010 on Bridge Road, Richmond the PLO increased by approximately 4% in the morning peak despite a 7% reduction in the number of people being moved by car.

Traffic Monitor 2011 – 2012 VicRoads July 2013

<sup>2</sup> Bicycles are 'a very space efficient means of providing transport in space constrained urban areas: in other words, for a given road width, it is possible to move more people by bicycle per hour than motor vehicles. Traffic Engineering and Management ed Delbosc & Young Monash 2017

<sup>3</sup> Traffic Engineering and Management ed Delbosc & Young Monash 2017

<sup>4</sup> Evaluation of the costs and benefits to the community of financial investment in cycling programs and projects in New South Wales. Roads and Traffic Authority of NSW and the Department of Environment and Climate Change 2009

<sup>5</sup> Jan Gehl <https://www.theguardian.com/environment/bike-blog/2013/dec/03/london-cycling-provisions-laughable-bike-blog>

<sup>6</sup> If we had a pill that conferred all the confirmed health benefits of exercise, would we not do everything humanly possible to see to it that everyone had access to this wonder drug? Would it not be the most prescribed pill in the history of mankind? I think we all know the answer to these questions. We know that the immensely powerful pharmaceutical machine that exists in the world at present would see to it that everyone knew about this pill and that the healthcare systems of the world would pay for it, no matter what the cost.

Sallis Exercise is medicine and physicians need to prescribe it! Br J Sports Med 2009

<sup>7</sup> Walking, riding and access to public transport: supporting active travel in Australian communities Commonwealth of Australia 2013

<sup>8</sup> While most contemporary bicycle facility design does well to allow cyclists to move like an automobile, little effort has been made to study or understand how to design for cyclists experiencing the world like pedestrians...when properly designed for, cycling can provide the additional benefits of contributing to the vitality and liveability of a city.

Gehl Blog <http://gehlpeople.com/blog/designing-for-the-social-experience-of-bicycling/>

<sup>9</sup> Evaluation of the costs and benefits to the community of financial investment in cycling programs and projects in New South Wales. Roads and Traffic Authority of NSW and the Department of Environment and Climate Change 2009

<sup>10</sup> Travel in London Report 9 Transport for London 2016

<sup>11</sup> VISTA 2009 – 2010 The Victorian Integrated Survey of Travel and Activity (VISTA) is a continuing survey of household travel activity. Randomly selected households are asked to complete the VISTA travel diary for a single specified day. Data is collected across the year and conducted across Greater Melbourne, Geelong and, periodically, in selected regional centres.



---

<sup>12</sup> The final and most significant barrier to participation is that people do not find it comfortable to ride a bicycle in traffic. On roads, the key to encouraging bicycle use is '*to provide cycling infrastructure that is safe and attractive*' Traffic Engineering Manual; 2017

<sup>13</sup> Near – market Research 2017 CDM Research, ASDf Research, City of Melbourne

<sup>14</sup> 'I'd love to ride to work however really lack confidence when it comes to riding on the roads. I'm noticing more and more that drivers are distracted and using mobile phones a lot. Dedicated and protected would definitely go a long way to helping with my confidence in riding on the roads.' (*Near – Market Research respondent*)

<sup>15</sup> National Cycling Participation Survey 2017: Victoria. Australian Bicycle Council

<sup>16</sup> Traffic Engineering and Management ed Delbosc & Young Monash 2017

<sup>17</sup> European bicycle riders travel at an average of 15kph. To some extent this speed reflects the type of bicycle and the quality of the surface. The Copenhagen 'green wave' signal phases were set at 20kph to speed riders up and increase the flow per hour.

<sup>18</sup> This paper considers the barriers to bicycle use that the City of Melbourne can directly influence. Commonwealth and Victorian Government regulatory settings (such as tax regulations and helmet laws) are not discussed as they are beyond the City of Melbourne's control.

<sup>19</sup> UNSUSTAINABLE? The Growth of App-Based Ride Services and Traffic, Travel and the Future of New York City

<sup>20</sup> Fix NYC Advisory Panel Report January 2018

<sup>21</sup> Cycling along high mobility streets

High mobility streets have high frequency tram and priority bus services and excellent pedestrian access to and around stops. These streets will generally have the highest density and diversity of destinations along them. They will provide a primary network for cycling within the municipality. On these streets, the infrastructure and signalling will enable pedestrians to move safely and seamlessly from footpaths to public transport stops, providing level access to trams and buses, interchanges between public transport services and along the approaches to the stops. Safe cycling will be integrated, with a combination of separated lanes, early starts at signals and low speed mixed traffic zones.

Transport Strategy 2012

<sup>22</sup> As these projects include changes to intersections with arterial roads, traffic signals and other measures under the control of VicRoads they will need to be advanced in consultation with VicRoads.

<sup>23</sup> For those who wonder why the bike lanes 'disappear' at the intersections it is because the motor vehicle mode depends on intersections more than the mid-block. More motor vehicles will be able to travel along a single lane road with wide intersections, than along a multi-lane road that narrows at the intersection to a single lane.

<sup>24</sup> 'In Melbourne, some of the existing major gardens exclude cycling access to encourage walking and strolling in these contemplative spaces. The community via the surveys identified this as a key issue, with comments that the gardens should be made accessible for cyclists in the future. This strategy supports unstructured recreational use, however resolving the issue of cycling access in the major historical gardens needs to be considered at the master plan level to ensure all issue are carefully considered. City of Melbourne Open Space Strategy Technical Report June 2012

<sup>25</sup> Recognising the economic role of bikes: sharing parking in Lygon Street, Carlton Lee, March June 2010 Australian Planner

---

<sup>26</sup> Investment in end of trip facilities in Sydney. PFL Spaces Press release 30 May 2017