

Board

Date: 5 February 2014

Item 6: Cycling Vision Portfolio

This paper will be considered in public

1 Summary

- 1.1 The Board is asked to note the paper and approve the Project Authority being sought for two key programmes: Cycle Superhighways and Better Junctions.
- 1.2 At its meeting on 23 January 2014, the Finance and Policy Committee considered a paper on this project and supported the recommendations to Board.

2 Recommendations

2.1 The Board is asked to:

- (a) note the paper and the approach taken in developing the Cycling Vision Portfolio and the approach to seeking authorities for different elements of the programme; and
- (b) grant additional Project Authority relating to two key programmes: additional Project Authority of £13m, giving a total Project Authority of £66.6m, for the Cycle Superhighways programme and additional Project Authority of £11.9m, giving a total Project Authority of £28.4m, for the Better Junctions Programmes, as summarised in Section 3 (and in greater detail in Appendices 4 and 5). Further Project Authority will be sought in due course for further stages of these programmes, from the Board (with reference to the Cycle Superhighways) and from the TfL Commissioner (with reference to the Better Junctions programmes).

3 Summary Tables

ST-PF67 Cycle Superhighways				
Financial Authority in Business Plan £174,200k	Estimated Final Cost £174,200k	Existing Project Authority Granted £53,600k	Additional Project Authority Requested £13,000k	Total Project Authority £66,600k
Authority Approval	Project Authority to take the following routes to the end of detailed design (Pathway stages 1 to 4): <ul style="list-style-type: none">• East-West Cycle Superhighway• North-South Cycle Superhighway• Delivery of new Cycle Superhighways• Upgrades to existing Cycle Superhighways			

Outputs and Schedule

Cycle Superhighways are a key component of the ambition to create a *Tube Network for the Bike* in London. They will provide safer, fast, direct, continuous and comfortable ways of getting into and across central London by bicycle along recognised commuter routes - often running in parallel with key public transport routes.

The Mayor's Vision states that Cycle Superhighways will '*be delivered to much higher standards, closer to international best practice*'. The programme has therefore been revised to include two major substantially segregated routes extending north/south and east/west across London, to create a number of other new higher-quality routes and to upgrade existing routes to higher standards, in line with the Vision commitment to '*do things at least adequately, or not at all*' .

Cycle Superhighways comprise a joined-up package of measures to break down the barriers that stop people commuting by bike. The primary objectives are as follows:

- (a) Improve conditions for existing cycling commuters;
- (b) Encourage people to cycle; and
- (c) Improve the image and perception of cycling.

The new Cycle Superhighway routes, including the East-West and North-South routes, are scheduled for completion by 2016.

The current scope of the programme is still being finalised, including the number of cycle superhighways and the extent of interventions. As a result the Estimated Financial Cost of £174.2m will need to be further validated as part of the detailed design work. The indications from the recently completed Cycle Superhighway route 2 extension are that to achieve the required service standards costs may need to increase. This is further discussed in Appendix 4 and how any potential cost increase would be accommodated.

ST-PJ36 Better Junctions				
Financial Authority in Business Plan £99,800k	Estimated Final Cost £99,800k	Existing Project Authority Granted £16,500k	Additional Project Authority Requested £11,900k	Total Project Authority £28,400k
Authority Approval	Project Authority to take 18 junctions to the end of detailed design (Pathway stages 1 to 4)			
Outputs and Schedule	<p>The Better Junctions programme aims to reduce the number of serious and fatal cycle collisions occurring at high profile junctions and gyratories in London, and contributes to the Mayor’s cycling growth strategy as set out in the Mayor’s Transport Strategy (MTS) and his casualty reduction target. The aim is not only to provide improved facilities for existing cyclists but also to attract new cyclists by breaking down negative perceptions associated with the dangers of cycling, and improving safety.</p> <p>TfL has identified 33 major junctions where significant improvements can be delivered for cyclists (and other vulnerable road users). 15 of these junctions are within the scope of existing Major Projects or are locations along the Barclays Cycle Superhighways, and improvements in these cases will be delivered and managed through those programmes. The remaining 18 junctions are part of the Better Junctions programme.</p> <p>The £11.9m additional authority is to fund the 18 junctions to the end of detailed design. The programme is scheduled to deliver improvement schemes at 10 locations (in addition to the 15 tackled by the Superhighways and Major Projects programmes) prior to 2016, with the outstanding eight junctions completing between 2016 and 2022.</p> <p>In addition to these 18 sites, the programme has already received £16.5m Project Authority to conduct off-street trials of innovative junction layouts and to deliver lower value ‘quick win’ schemes at more than 60 other junctions. Of these, 17 will be complete by the end of 2013/14 financial year.</p>			

4 Background

- 4.1 The investment in cycling outlined in this paper will take place against the background of a significant programme of activity on London’s road network over the next 5-10 years, as identified in the report from the Mayor’s Roads Task Force. An important part of this programme is TfL’s own investment in London’s roads, with TfL’s 2012 Business Plan earmarking £4bn new investment by 2022. This represents a doubling in previous investment levels and aims to improve the experience of travelling by road in London significantly – by all modes. It includes new investment to repair and sustain our road assets; to improve London’s public spaces and streets; to provide safe and reliable journeys for all road users;

and to continue to improve the opportunities for sustainable transport, especially by bike, foot and bus. There are also significant investments planned by the boroughs – in part using TfL Local Implementation Plan funding – and also major developer-led projects, all of which will have implications for management and operation of the road network. Delivering these improvements, while keeping London working and moving and enabling new developments to further support London’s economy, is a major challenge.

- 4.2 A number of organisational and governance changes are therefore underway to ensure that Surface Transport is appropriately organised and adequately resourced to deliver TfL’s investment programme and to support the aspirations of boroughs and developers. These changes include: a major internal reorganisation, including creation of a new Project and Programme Delivery Directorate; pan-TfL activity to enhance sponsorship capabilities; and new governance arrangements, including a clear distinction between the roles of “sponsorship” and “delivery” for Investment Programme projects and programmes. A full presentation on these developments will be brought to the next meeting of the Finance and Policy Committee.
- 4.3 Cycling has an important role to play in delivering a sustainable transport system to meet the goals of the MTS. This paper outlines how the £913m investment set out in TfL’s Business Plan (2012), will be taken forward via a Cycling Vision Portfolio of programmes and projects. The paper details the analysis informing TfL’s understanding of how the Mayor’s target to increase cycling to a five per cent mode share by 2026 can be achieved. It presents the strategic case for significant investment in cycling through an evidence-based approach; sets out an analysis of existing and potential cycling levels in London; and outlines the programmes targeted at delivering the growth in cycling.
- 4.4 Annual progress reports on delivery of the Cycling Vision Portfolio will be brought back to the Committee and the Board to ensure ongoing overview of the entire portfolio and to agree any substantial changes to the base programme.

The Mayor’s Vision

- 4.5 The Mayor published his Vision for Cycling in March 2013. In it he outlined his aspirations to improve conditions for cycling in London and how the substantial increase in investment identified in the TfL Business Plan would be directed over the next 10 years.
- 4.6 The Mayor re-stated his commitment to delivering the cycling vision in an article in the Evening Standard on 9 December 2013, responding to criticism that he and TfL were taking insufficient action following a spate of cycling deaths. In the article the Mayor stated:

“this is not the time to slacken off. It is time to speed up. If we get this right, the prize is huge. London should be a perfect city to ride a bike... If we can get Londoners on to bikes we can take the pressure off public transport, we can reduce traffic, and we can help people to be fitter, calmer and happier... It can and must be done.”¹
- 4.7 With actual increases in population already well ahead of previous forecasts, the challenges facing the transport system are even greater than envisaged in the MTS.

¹ Johnson, Boris. *I’m not the Pied Pedaller but I can help cyclists*, (London) Evening Standard, Monday 9 December 2013, page 15.

4.8 Cycling has an important role to play in delivering a sustainable transport system to satisfy this demand and to meet the overall goals of the MTS. Cycling can help relieve demand at peak periods on other modes, particularly public transport to and from central London, and short car trips in outer London. It can cater for the growth in trips from new people living and working in London.

Understanding the existing levels of cycling in London

4.9 Cycling is already a well-established mode of transport in the capital. It currently accounts for nearly 600,000 trips a day in London. This is almost as high as the daily trips made by London Overground and the DLR combined.²

4.10 While cycling's mode share is only two per cent of all trips in London, a recent survey showed that it accounted for 16 per cent of all road based traffic in central London³. In the morning peak, cycling was the second largest mode, after car/LGV, accounting for 24 percent of traffic. There were a number of locations where cycling levels are particularly high; in the morning peak, cycles made up 30 per cent of traffic on all central London bridges, and were the single largest road-based mode on six of them.

4.11 As with journeys by other modes, levels of cycling fluctuate across the seasons. This is shown in Figure 1. However, even with these fluctuations the overall increase in cycling means that winter cycling levels continue to be significant. For example, the level of cycling last winter (2012/13) was higher than the summer peak of cycling in 2004/05.

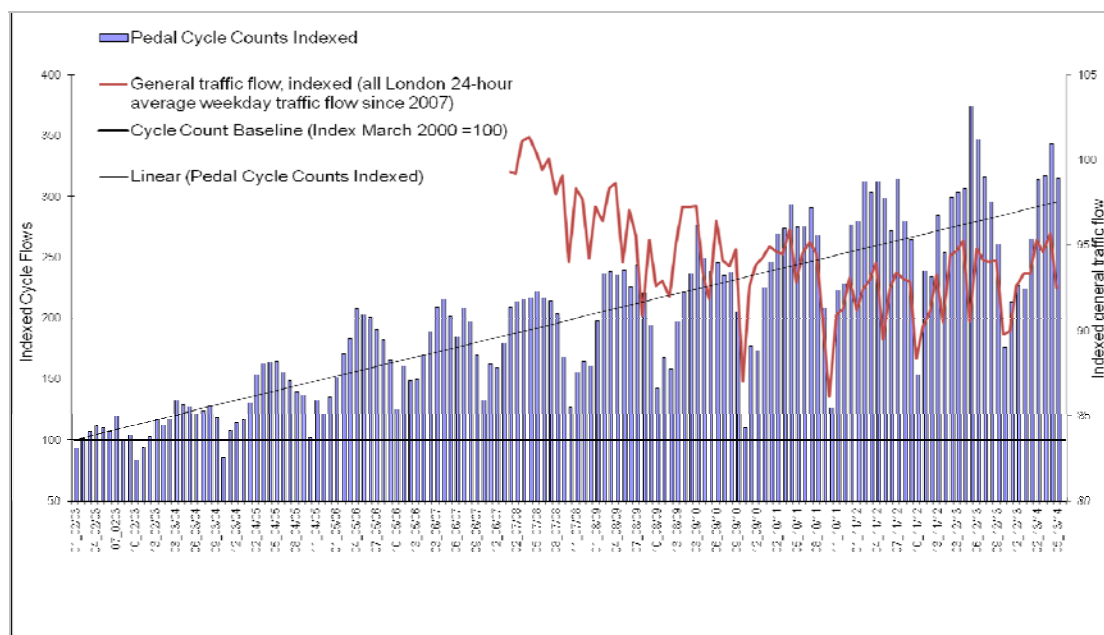


Figure 1: Cycle flows and general traffic flow on the TLRN by period, indexed

² In 2012, daily average journeys were 6.4m on Buses, 3.4m on LU and 720k on London Rail modes. The split of daily London Rail journeys is 80k on Trams, 270k on DLR and 370k on London Overground.

³ TfL Central London Cycle Census April 2013

Analysing the potential for cycling

4.12 In 2010, TfL published its work⁴ on two new analytical tools to inform the planning of new cycling investment in London. These were:

- (a) **The 'Analysis of Cycling Potential' tool** derived from TfL's **London Travel Demand Survey** which sought to identify current trips which could reasonably be cycled all the way, but are not at present. This showed that there is a large number of trips (around 4.3 million) made daily in London that could potentially be cycled. This accounts for approximately one quarter of trips by all modes and one third of trips by mechanised modes, such as cars and buses.
- (b) **The Cycle Market Segmentation tool** provides a more sophisticated method of understanding *who* cycles at present and *who* is most amenable to cycling in future. The tool is derived from a wide range of survey and demographic data and identified that postcodes classified as 'Urban Living' can be expected to generate over four times as many cycling trips as a postcode of comparative population classified as 'Comfortable Maturity', the group least likely to cycle. ('Urban Living' makes up 23 per cent of London's population and is concentrated in inner and central London).

4.13 TfL has combined the datasets from these two analytical tools to identify potentially cyclable trips made by those people in the segments most amenable to cycling. This can be considered the 'near market' for cycling. Figure 2 shows the cycling potential 'heat map'.

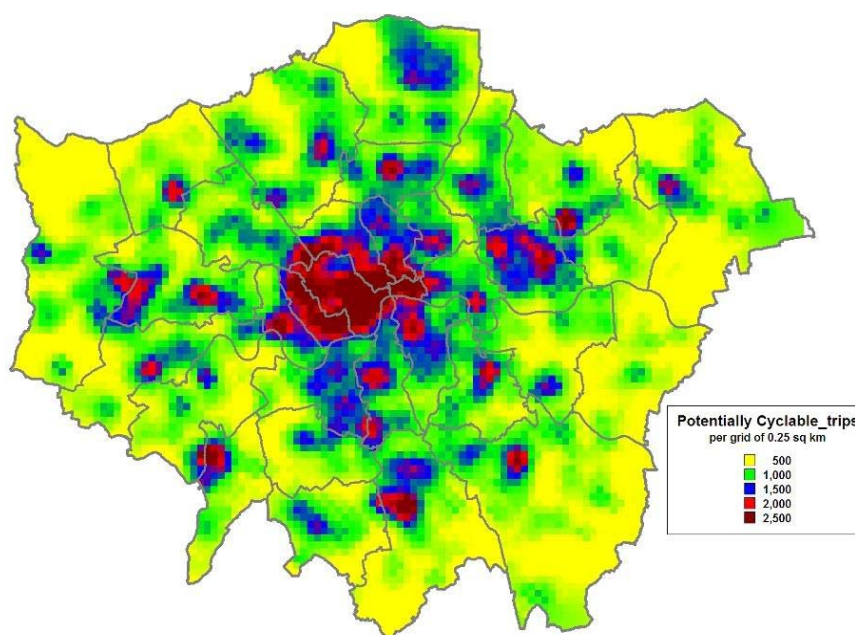


Figure 2: Potentially cyclable trips by trip destination, London residents⁵

4.14 This map shows a high density of potentially cyclable trips in some central and inner London boroughs, particularly the City of London, Westminster, Kensington and Chelsea, Camden, Islington, Lambeth and Hammersmith & Fulham. It also shows

⁴ The Analysis of Cycling Potential, London Travel Demand Survey 2005/06 to 2007/08.

⁵ Source: Analysis of Cycling Potential, London Travel Demand Survey 2005/06 to 2007/08

important cycling demand 'hotspots' in and around a number of outer London town centres.

- 4.15 By analysing areas with a high density of potentially cyclable trips and understanding the nature of such trips and the people making them, it is possible to identify places where new interventions, including targeted infrastructure investment, could provide best value for money in terms of impact on cycling journeys achieved for expenditure.
- 4.16 It also shows the 'hotspots' (in yellow and green) where there is dispersed potential in inner and outer London that requires 'area-wide' interventions (such as marketing, education and training). These interventions are more appropriate to targeting potential cycle journeys that are more widely dispersed.

The Mayor's Target for Cycling

- 4.17 In his 2010 Transport Strategy, the Mayor set an ambitious target to increase levels of cycling in London by 400 per cent by 2026 (from 2001) and to achieve a five per cent mode share of all journeys in the capital.⁶
- 4.18 The target was based on analysis undertaken by TfL and draws on the cycling potential work outlined above. It reflects a number of factors, including: the levels of existing cycling journeys (around 510,000 journeys a day (based on the then 2009 figures)); population growth (estimated to deliver a further 240,000 daily cycle journeys by 2026); and the potential for new journeys to be made by bike, that are currently made by another mode (realising a proportion of the 4.3m potentially cyclable journeys referred to above).
- 4.19 With reference to the latter, a 'conversion rate' is assumed of approximately one in every six potentially cyclable journeys (i.e. one in six journeys that *could* be made by bicycle subsequently being made by bicycle) and thereby generating around 750,000 new daily cycle journeys. By 2026, therefore, to achieve the Mayor's target, there should be 1.5 million journeys by bike a day (see figure 5). This is viewed as a realistic, but ambitious, level of behavioural change at which to aim.
- 4.20 The Cycling Vision Portfolio is concurrent with the TfL Business Plan and runs until 2022. As such, approximately 1.2m journeys by bike per day will be needed in 2022 to remain on track to achieving the target.⁷

⁶ A journey can be part of a trip or a journey all the way. A trip is a complete one-way movement from one place to another for a single purpose. A trip may include the use of several modes of transport and hence be made up of more than one journey stage. The target is that 5% of journey stages should be cycled by 2026, reported in TfL's Travel in London report in December of each year

⁷ Of the circa 1.2 million total cycle journeys expected a day in 2022, compared to the 510k in the base year (2009), we expect 160k of these additional journeys will result from population growth, while circa 530k cycle journeys will result from modal shift.

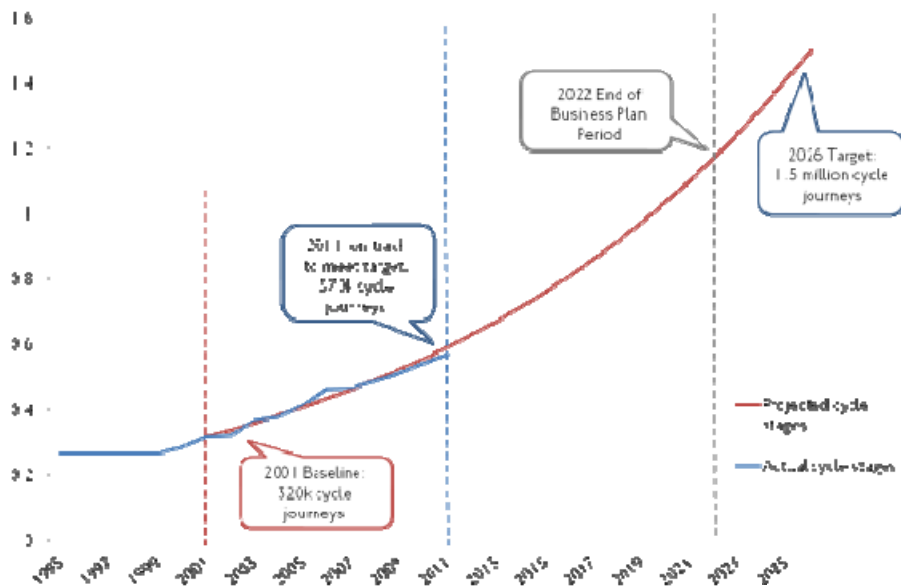


Figure 5: Forecast growth in cycling trips in London to 2026⁸

Informing the Cycling Vision Portfolio

- 4.21 The target is to reach a five per cent modal share for cycling averaged across all of London over the whole year. While levels of cycling are currently significantly higher in central than outer London, there is still considerable untapped potential in all areas to further increase levels of cycling.
- 4.22 This untapped cycling potential exists in different parts of London outside the centre, especially concentrated in pockets around the outer London metropolitan town centres and some inner London major centres. Boroughs in these locations are well placed to deliver radical change. Over half of car journeys made in outer London are short, less than two miles in length and are eminently cyclable. With encouragement the bike can play a major role in capturing the kind of car driver who would not consider public transport. It shares many of the advantages of the car. It is door to door, it is personal, it is individual and on a short journey it is just as quick.
- 4.23 To increase the number of cycling journeys in London, the appeal of cycling needs to be increased to a wider audience. Research into the motivations for behaviour change suggests that encouraging more people to cycle in the ‘easier to reach’ audiences (such as high income white men between 25 and 44 years old) will influence the ‘harder to reach’ groups through a normalisation in behaviour.⁹
- 4.24 The Cycling Vision Portfolio has been directly informed by the analysis outlined in this section and includes a range of measures aimed at influencing different audiences in a range of locations in order to achieve maximum impact. This is shown further in relation to the individual programmes in Table 1 in section 5.

Barriers to Cycling

- 4.25 Research suggests that around seven in 10 non-cyclists are prepared to consider cycling – if the barriers currently preventing them from cycling can be addressed.

⁸ Source: TfL Group Planning, Strategic Analysis.

⁹ Exploring the journey into cycling with new cyclists (TfL – 2CV, 2009)

- 4.26 There are a number of reasons why people who could cycle in London currently choose not to. The main way we can persuade people to cycle is for cycling to be seen as at least as good as or a better option than other modes. This might be because it is faster, cheaper, more reliable or more pleasant than their current mode.
- 4.27 Potential cyclists face a mix of barriers¹⁰ in relation to the attractiveness of cycling relative to their current transport choices. These can be grouped into three main categories:
- (a) **Physical** or environmental factors are generally external to the individual and outside of their direct control. They include issues like the physical environment for cycling, traffic volumes and speeds, and the availability of secure cycle parking. In general, resolution requires action being taken by one or more public authorities (e.g. TfL, the police or the boroughs);
 - (b) **Cultural**, social or societal expectations / norms come in the form of pressure from external sources, including representation in the media, lack of experience in the community, or views held by others such as family and friends telling them it is too dangerous; and
 - (c) **Personal** attitudes towards or beliefs about cycling, including skills, personal identity or knowledge about cycling. These can be targeted with information, education, training and/or experience.
- 4.28 These general types of barriers can then be further described via seven specific barriers which are known from attitudinal research to be particularly important to cyclists and non-cyclists. These include fear and vulnerability, access to a bike and lack of confidence. (Further information is provided in Table 1 and Appendix 2.)
- 4.29 With individuals often facing more than one barrier to taking up cycling, a package of programmes is needed to overcome these multiple impediments.¹¹ This understanding has been important in helping inform the range and type of interventions most appropriate to target an increase in cycling and is reflected in the range of measures outlined in the Cycling Vision Portfolio.

5 Delivery of the Cycle Vision Portfolio

- 5.1 The overall aim of the Cycling Vision Portfolio is to realise the potentially cyclable trips in London, discussed in section 4, in order to achieve the Mayor's target. These trips are shown broken down by area in Figure 3.¹²

¹⁰ Identified through various research including annual *Attitudes to Cycling surveys; Cycling in London (2008)* and *Cycling behavioural survey (2010)*

¹¹ NICE Public health guidance, PH41 - Issued: November 2012 Walking and cycling: local measures to promote walking and cycling as forms of travel or recreation.

¹² N.B. there are a higher number of potential trips in Outer London than elsewhere, but these are dispersed over a wider area and therefore are not densely grouped.

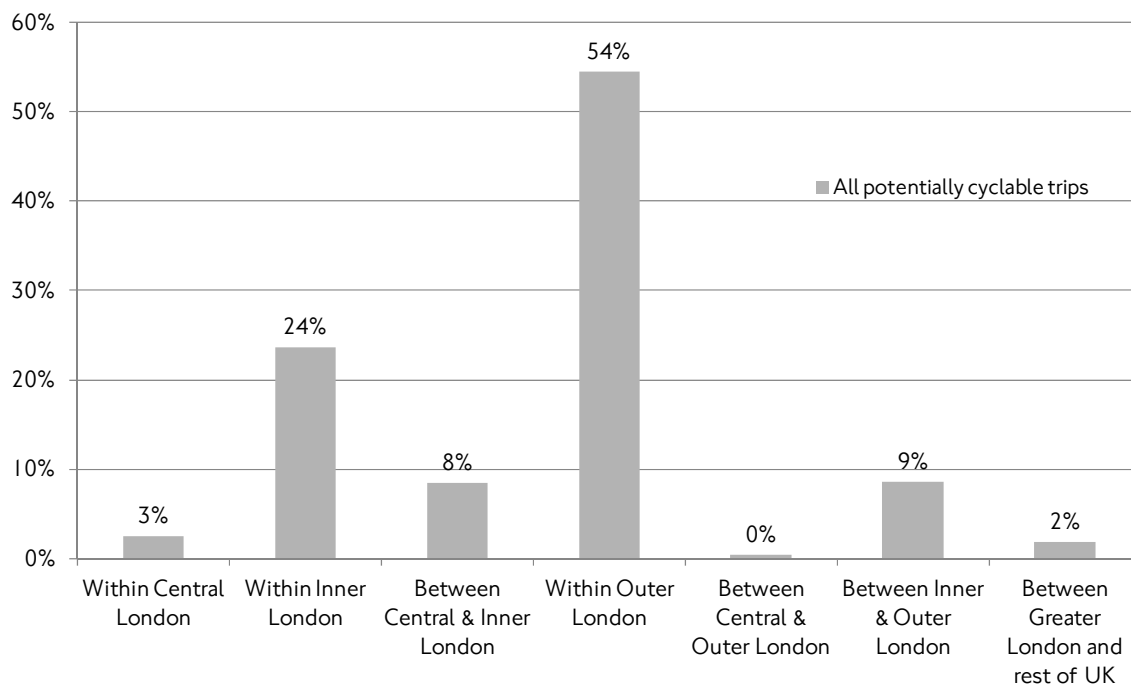


Figure 3: Potentially cyclable trips by location, all London residents¹³

5.2 The Mayor's Vision for Cycling, published in March 2013, set out a comprehensive programme of measures to increase cycling and deliver four key outcomes. These are:

- (a) **A Tube Network for the Bike:** a network of direct, high-capacity, joined-up cycle routes;
- (b) **More People Travelling by Bike:** to 'normalise' cycling, making it something everyone feels comfortable doing;
- (c) **Safer Streets for the Bike:** streets and spaces will become places where cyclists feel they belong and are safe; and
- (d) **Better Places for Everyone:** improvements will help all Londoners, whether or not they have any intention of getting on a bicycle.

5.3 In developing the Cycling Vision Portfolio, a number of alternative approaches to implementation were considered. The interventions and initiatives now proposed to achieve the increase in cycling are explained and their underlying rationale is summarised in Appendix 1. The extent to which they address the individual barriers is shown in Table 1.

¹³ Cycle Market Segmentation, TfL 2010; Analysis of Cycling Potential (2010). NB. Although cycle trips do take place between central and outer London, the Cycling Potential Analysis assumes a maximum trip length of 8km.

Elements of the Mayor's Cycling Vision

		Fear and vulnerability *	Lack of infrastructure	Identification and attractiveness *	Feasibility and alternatives	Access to a bike	Physicality	Lack of confidence *
Tube Network for the Bike	Cycle Superhighways	✓✓	✓✓✓	✓	✓	✓	✓	✓
	Crossrail for the Bike	✓✓	✓✓✓	✓	✓	✓	✓	✓
	North-South Cycle Superhighway	✓✓	✓✓✓	✓	✓	✓	✓	✓
	Quietways	✓✓	✓✓	✓✓	✓	✓	✓	✓
	Greenways	✓	✓	✓	✓	✓	✓	✓
	Central London Cycling Grid	✓✓	✓✓	✓	✓	✓	✓	✓
	Mini Hollands	✓✓✓	✓✓✓	✓✓	✓✓	✓	✓	✓
More People Travelling by Bike	Cycle Hire	✓✓	✓	✓✓	✓✓✓	✓✓✓	✓	✓
	Cycle parking	✓✓	✓	✓	✓	✓✓	✓	✓
	Cycle to School Partnerships	✓	✓✓	✓✓	✓✓	✓	✓	✓
	TfL-led marketing - Growing cycling	✓	✓	✓✓	✓	✓	✓✓	✓✓
	Support for Ride London	✓	✓	✓✓	✓	✓	✓	✓
	Support for Tour of Britain	✓	✓	✓	✓	✓	✓	✓
	Support for Tour de France	✓	✓	✓	✓	✓	✓	✓
	Biking Boroughs & Borough Cycling Programme	✓	✓	✓	✓	✓	✓	✓
Police and company e-bikes trial	✓	✓	✓	✓	✓	✓	✓	
Safer Streets for Cycling	Better Junctions	✓✓	✓✓	✓	✓	✓	✓	✓
	Cycle safety: borough-led and cycle training	✓✓	✓	✓✓	✓✓	✓	✓	✓✓✓
	Cycle safety: marketing & campaigns	✓✓	✓	✓✓✓	✓✓	✓	✓✓	✓✓
	Cycle safety: TfL-led initiatives	✓	✓	✓	✓	✓	✓	✓
	Cycle safety: work with universities	✓	✓	✓	✓	✓	✓	✓✓
	Cycle safety: work with workplaces	✓	✓✓	✓	✓	✓✓	✓	✓✓
Enforcement and engagement operations	✓✓✓	✓	✓	✓	✓	✓	✓	
Enabling Works	Monitoring and research (TfL and borough)	✓	✓	✓	✓	✓	✓	✓
	Wayfinding improvements	✓✓	✓	✓	✓	✓	✓	✓
	London Cycling Design Standards	✓✓	✓✓	✓	✓	✓	✓	✓

* Barriers considered most important for non-cyclists

Table 1: Summary of the proposed interventions in the Cycling Vision Programme, and their contribution to overcoming the main physical, cultural and personal barriers to cycling

- 5.4 Different interventions have been identified to meet the range of needs that exist amongst different groups and for different journey purposes, mindful of the barriers outlined above.
- 5.5 For example, in locations where there are high cycle flows with high levels of demand, such as central and inner London, safety fears about interacting with traffic may require changes to the highway, including physical segregation or other measures to reduce conflict between cyclists and motor vehicles, particularly at junctions. However, training and safety awareness campaigns will also play an important complementary role.
- 5.6 In other locations with more dispersed trip patterns and less threatening environments to cycle - such as parts of outer London - a combination of awareness raising, wayfinding improvements and targeted highway improvements (e.g. to allow safe and convenient crossing of busy roads) may be sufficient to enable people to overcome the barriers to cycling.

Cycle infrastructure: the role of physical segregation

- 5.7 The main infrastructure programmes within the Cycling Vision portfolio are:
- (a) Cycle Superhighways; including East-West and North-South;
 - (b) Quietways;

- (c) Central London Grid;
- (d) Cycle Hire;
- (e) 'Mini Hollands'; and
- (f) Better Junctions.

- 5.8 The key characteristics of these infrastructure programmes are set out in Appendix 1.
- 5.9 There has been a high level of public interest in the potential role of physical separation or segregation between cyclists and general traffic in order to encourage more people to cycle. This partly reflects public concern regarding recent cycling fatalities. It also follows on from the Mayor's commitment to adopt "Go Dutch" design standards for new cycling facilities on London's roads.
- 5.10 Separation or segregation between cyclists and general traffic can take a number of different forms and can vary in extent. Cyclists can be physically separated from traffic through measures ranging from off-road routes, the use of advisory or mandatory cycle lanes, through to full physical segregation via a second kerb line. Separation can also be achieved through the use of road layouts and signal timings at junctions, which can reduce or avoid conflicts between cyclists and turning traffic. TfL data shows that 89 per cent of all cyclist collisions resulting in injuries in 2012 occurred at junctions¹⁴. Physical separation in time or space can also eliminate or substantially reduce the incidence of other types of cycle collisions (e.g. sideswipes, rear shunts or motorists changing lanes into cyclists) which accounted for around 40 per cent of cyclist fatalities and 35 per cent of serious injuries in London between 2010 and 2012.¹⁵
- 5.11 The issue of physical separation or segregation of cyclist from general traffic relates directly to overcoming the most significant barrier to increase cycling. Safety, or *perception* of safety, is highlighted as the main reason both would-be and existing cyclists give about why they don't cycle, or don't cycle more.¹⁶ Cyclists willing to ride in 'unprotected' heavy traffic represent a small proportion of the population and these individuals are likely to already be out on the roads.¹⁷ The mainstream population – which must be attracted to cycling in order to reach the Mayor's five per cent mode share target – is characterised as 'traffic-intolerant'. The 'traffic-intolerant' population is estimated to represent nearly 90 per cent of all current and potential cyclists¹⁸. As such, if we are to attract more people to cycling in London, in line with the Mayor's vision, it is important that the routes we implement on busier sections of the network, are safe and are perceived to be safe.
- 5.12 The degree of traffic intolerance will vary by individual, but those who are less tolerant respond well to cycle ways with physical separation from traffic and quiet streets with slow-moving traffic.¹⁹ Research has shown that female and less confident cyclists are

¹⁴ TfL STATS 19 data

¹⁵ Internal analysis of pedal cycle conflict types for all London KSIs 2010-2012.

¹⁶ Mekuria, Maaza, Peter Furth and Hilary Nixon. *Low-Stress Bicycling and Network Connectivity*. Mineta Transportation Institute Report 11-19, May 2012.

¹⁷ Geller, Roger. *Four Types of Cyclists*. City of Portland, Oregon Office of

Transportation, circa 2007. <http://www.portlandonline.com/transportation/index.cfm?a=158497&c=44671>

¹⁸ Furth and Mekuria. 'Network Connectivity and Low-Stress Bicycling'. Paper presented at the 2013 Transportation Research Board meeting

¹⁹ Mekuria, Maaza, Peter Furth and Hilary Nixon. *Low-Stress Bicycling and Network Connectivity*. Mineta Transportation Institute Report 11-19, May 2012.

particularly likely to prefer cycling on routes that feel safer or more pleasant, which includes off-carriageway and segregated routes²⁰. Internationally, the correlation between high levels of cycling and widespread provision of infrastructure that separates cyclists from heavy and fast traffic is very strong²¹ – it is the norm in the Netherlands and Denmark for example, on busier urban roads.

- 5.13 The detailed designs of the new cycling infrastructure are still being developed but it is anticipated that complete segregation (in terms of segregated cycleways) will not be required on the majority of the routes on the Central London Grid and Quietways, which will primarily be deployed on low traffic flow side roads and back streets. Segregation will, however, be a more significant feature on the East-West, North-South and upgraded Cycle Superhighway routes where it is deemed necessary by virtue of the higher levels of general traffic flows on these routes.
- 5.14 In such situations, there is good evidence to support the use of segregation. Cyclists are vulnerable road users with large speed and mass differentials from motor traffic, especially large vehicles such as HGVs. Research indicates that in cities where implemented segregated cycle facilities are associated with substantial increases in the number of cyclists using those routes²² and a lower relative risk of cyclist injury. This includes reductions in total cyclist injuries on segregated cycle tracks on streets in New York City, ranging from a 30 per cent decrease on 8th Avenue to a 62 per cent decrease on Prospect Park West.²³ Overall, there has been a 73 per cent decrease in the rate of cyclist KSIs across the city between 2000 and 2011.²⁴ In Vancouver and Toronto, injuries on segregated cycle lanes were just 11 per cent of the comparative rate on busy roads without cycling facilities.
- 5.15 The use of segregation, where appropriate, or significant junction improvements through the Better Junctions programme, will reduce both the real and perceived level of conflict faced by cyclists and therefore increase the numbers of people who are willing to cycle.
- 5.16 The modelling results summarised in section 7 of this paper also indicate that the provision of dedicated cycling infrastructure, including segregated facilities, has the effect of lowering resulting traffic congestion by reducing delays caused by traffic and cyclist interactions.

Cycling Infrastructure: meeting different demands across London

- 5.17 Table 1 shows how the specific barriers currently discouraging people from cycling will be targeted by the Cycling Vision Portfolio. The next section focuses on how the *infrastructure* programmes (the Tube Network for the Bike element of the Vision Portfolio) are designed to provide for the cycle demand identified in different parts of London. This is shown in Figure 4.

²⁰ Cycle Route Choice Survey, TfL 2012

²¹ Pucher and Buehler. 'Making Cycling Irresistible: Lessons from the Netherlands, Denmark, and Germany,' Transport Reviews, Vol. 28, No. 4, 2008, pp. 495-528

²² City stats from 'How to Increase Cycling for Daily Travel: Lessons from Cities across the Globe' webinar, presented by John Pucher, Jennifer Dill, Susan Handy and Ralph Buehler on 14 August 2013. Slides available at http://policy.rutgers.edu/faculty/pucher/ITE_Webinar_14August2013_05August2013.pdf

²³ 'How to Increase Cycling for Daily Travel: Lessons from Cities across the Globe' webinar, presented by John Pucher, Jennifer Dill, Susan Handy and Ralph Buehler on 14 August 2013. Slides available at http://policy.rutgers.edu/faculty/pucher/ITE_Webinar_14August2013_05August2013.pdf

²⁴ New York City Department of Transportation. *Bicyclists: Network and Statistics*. <http://www.nyc.gov/html/dot/html/bicyclists/bikestats.shtml>

	Within Central London	Within Inner London	Between Central & Inner London	Within Outer London	Between Central & Outer London	Between Inner & Outer London
Major infrastructure programmes						
Cycle Superhighways	✓	✓	✓		✓	✓
E-W and N-S Cycle Superhighways	✓	✓	✓		✓	
Central London Grid	✓	✓	✓			
Cycle Hire	✓	✓	✓			
Quietways		✓	✓	✓	✓	✓
Mini-Hollands				✓		✓
Better Junctions	✓	✓	✓			

Figure 4: Cyclable trips in London facilitated by different elements of the cycling infrastructure programme

- 5.18 To help realise the potentially cyclable trips, Figure 4 indicates where the infrastructure programmes are designed to exploit this potential, by removing physical barriers to cycling. In addition, the non-infrastructure complementary programmes contained in the Portfolio (comprising the ‘More People Travelling by Bike’ and ‘Safer Streets for Cycling’ elements of the Portfolio) will help address the remaining cultural and personal barriers to cycling in London, as outlined in Appendix 2.
- 5.19 Figure 5 shows the total number of potentially cyclable journeys that will be accessed by each programme. These have been broken down into cycle market segments, based on the propensity of different socio-demographic groups to cycle. The three segments with the greatest propensity to cycle are marked in green.
- 5.20 While the total number of potentially cyclable trips that could be converted is very high for some programmes (e.g. ‘Mini Hollands’), the proportion of the trips likely to be made by the socio-demographic groups with the greatest propensity to cycle is higher for other programmes (e.g. Quietways and Central London Grid). Hence the effective conversion in terms of the absolute increase in cycling trips will be higher for these latter programmes than for the former.

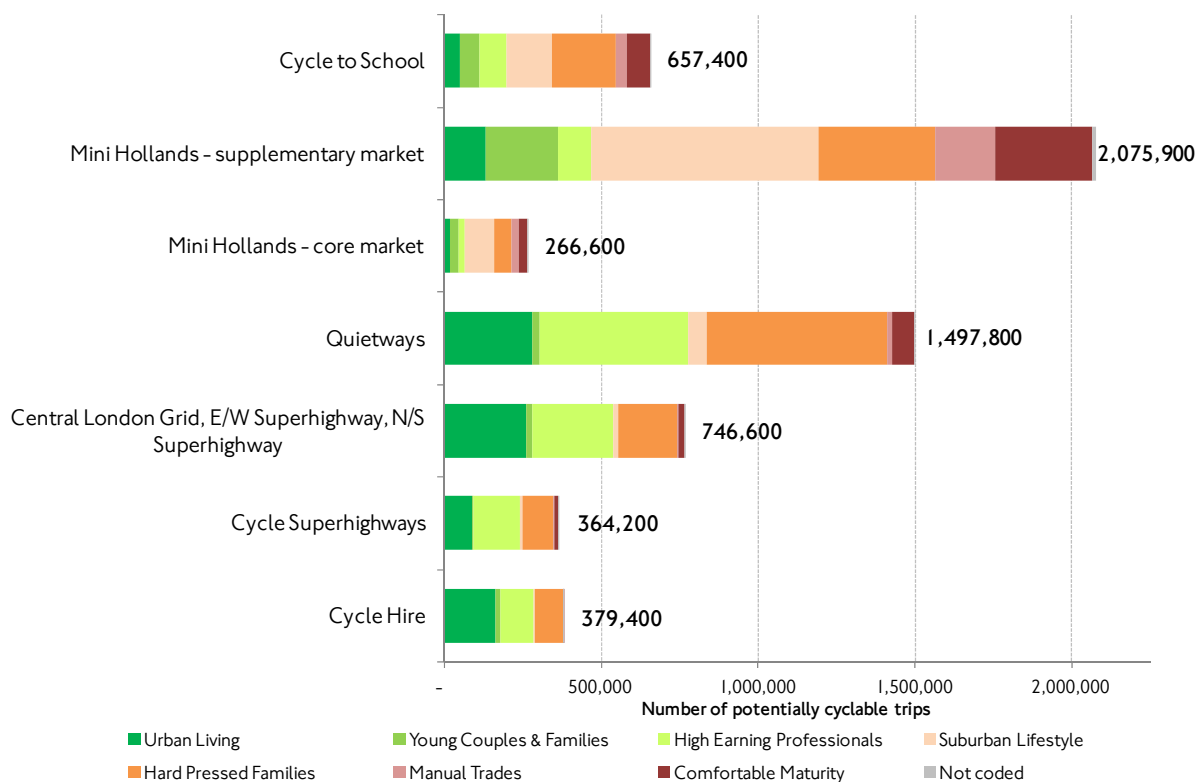


Figure 5: Potential market by scheme and by cycle market segment, London residents

- 5.21 There is some overlap between the markets for each intervention, so the total market for all interventions shown in Figure 5 exceeds the 4.3 million potential cyclable trips discussed above. Excluding this overlap, nearly all the potentially cyclable trips are still catered for by at least one of the schemes (currently 92 per cent).
- 5.22 Some assumptions have been made in this initial analysis which will be refined as the schemes progress which will cause the markets to be narrowed, in particular:
- (a) the 'Mini Hollands' core market is defined as all metropolitan centres, but the scheme will only take place in 3-4 of these; and
 - (b) the supplementary market for 'Mini Hollands' is defined as all trips in outer London that do not originate or finish in a metropolitan town centre.
- 5.23 This is an emerging area of transport planning and conventional modelling and analysis tools are not as well developed as they are for other modes. As such, the analysis shown here, while being based on comprehensive journey and socio-demographic data, should not be seen as an exact science. Further work is underway to improve the modelling and analytical tools available to inform analysis of cycling in London; this will be used to further refine our base programme in future and to direct the Cycling Vision Portfolio as it evolves.

6 Benefits

- 6.1 The Mayor's Vision for Cycling in London aims to deliver transformative change. At its heart is the concept that investing in cycling will benefit everyone:

*'I want cycling to be normal, a part of everyday life. I want it to be something you feel comfortable doing in your ordinary clothes, something you hardly think about. I want more women cycling, more older people cycling, more black and minority ethnic Londoners cycling, more cyclists of all social backgrounds – without which truly mass participation can never come.'*²⁵

- 6.2 As with other transport investments, it is not possible to monetise all of the direct and wider benefits of investing in cycling, but many can be captured in this way. The non-monetised benefits are often qualitative but are no less important. However, for the purposes of the Cycling Vision Portfolio the benefits have been broken down into categories such as business benefits, health benefits, environmental benefits, public realm benefits, and transport benefits. Where it is possible to quantify and monetise the benefits and costs, these are noted below and included in the overall Benefit Cost Ratio (BCR) summarised in Table 2.

Business benefits

- 6.3 Cycling can be a key mode of access to London town centres.²⁶ Further enhancing the attractiveness of the urban realm for walking and cycling is likely to strengthen the economic vitality of town centres and is seen as an important means of sustaining London's competitiveness as a place to do business. For example, the City of London reports strong demand from businesses for office premises with cycle facilities.
- 6.4 Employees who cycle also provide direct benefits to businesses through reduced absenteeism: on average, cyclists take 1.3 fewer sick days per year than non-cyclists. The monetised benefit of such savings has been calculated for the Cycling Vision portfolio which is estimated to deliver savings of over £30m p.a. for London businesses once the five per cent mode share is achieved; this is included in the BCR table. Lost productivity has not been included in this calculation, only the employment costs borne by businesses.

Health benefits

- 6.5 From TfL's research on the reasons why people cycle, London cyclists (and non-cyclists) consistently identify health and fitness as the top reason for travelling by bike. Physical activity has beneficial effects on many aspects of morbidity (illness), including coronary heart disease, stroke, diabetes, and some types of cancer.²⁷ Reduced morbidity benefits parts of society (e.g. the NHS, employers) as well as the individual, although it is not currently possible to robustly quantify or monetise these benefits. The effect of physical activity on reducing mortality (death) has been calculated for the BCR using the TfL – and the Department for Transport (DfT) – approved World Health Organisation Health Economic Assessment Tool (HEAT). This uses the standard HEAT £1.3m value of a statistical life and provides a conservative but high-quality estimate of the value of reducing mortality. Achieving a five per cent cycling mode share is

²⁵ Foreword to the Mayor's Vision for Cycling in London (2013)

²⁶ Town Centre Study 2009 (TfL)

²⁷ Physical Activity Guidelines Advisory Committee. *Physical Activity Guidelines Advisory Committee Report 2008*. Washington, DC, US Department of Health and Human Services, 2008.

expected to generate over £183m per year in financial benefits in London as a result of reduced mortality.

Environmental benefits

- 6.6 It is not just those cycling that experience health benefits. Every trip switched from a mechanised mode to a bike will see a reduction in emissions, both local pollutants and greenhouse gases. Environmental benefits to London will arise from the estimated 360,000 daily trips that are expected to switch to cycling from private car and taxi once the five per cent mode share is reached, which equates to around 921,000 km per day not driven.
- 6.7 Some of London's air quality benefits from mode shift may be offset by potential negative impacts on air quality arising from slower traffic speeds and congestion in some locations (due to road space reallocation and/or the physical presence of cyclists). It is not possible to estimate the congestion-related air quality disbenefits at this time, but the overall impact of the Cycling Vision Programme on air quality is anticipated to be positive.

Public realm benefits

- 6.8 One of the most positive impacts of the Cycle Vision Portfolio is likely to be in improving the urban realm – the look and feel of London. By providing more space to support physically active modes of transport, restricting motor vehicle access where necessary, and creating safe routes to schools, people from all walks of life will feel safer, more relaxed and choose to walk and cycle.

Transport benefits

- 6.9 Much of the cycling mode shift will come from public transport, particularly in central and inner London. This could in principle provide benefits through reduced crowding levels and reduced demand for some services, which could lead to a reduction in kilometres required to be operated. However, it is important to note that this is against a background of substantial expected population and employment growth; the space freed up on public transport by passengers switching to bike is highly likely to be taken up by new demand. This allows TfL to take a least-cost planning approach to investing in other transport schemes and capacity increases, for example delaying or possibly removing the requirements for capacity increases on TfL services. Implemented as part of an integrated transport strategy, cycling can help relieve pressure on the public transport system, for example where capacity is limited (e.g. some bus routes), or where additional capacity programmes would be extremely expensive (Underground, rail). This is particularly important during the peak hours where cycling can cater for significant numbers of commuters.
- 6.10 Cyclists are able to make more efficient use of road space relative to all other modes of surface transport except buses. The average occupancy of a private car (One Passenger Car Unit (PCU)) in central London during the morning peak travel time is 1.3. At 0.2 PCU, cycling is substantially more efficient at transporting individuals within the same road space, particularly as the average speeds by mode during peak travel times are similar. The size and shape of a bicycle generally allows cyclists to make use of space on the road that would otherwise be unusable by larger vehicles, including bus lanes during their operational hours and filtering between cars in stopped traffic. This can substantially increase the overall capacity and flow rate of roads, even where

congestion slows down other vehicles.

Journey time savings

6.11 Cycling is the fastest mode for many journeys, particularly short journeys, offering substantial journey time savings. A rudimentary estimate of future mode shift to bike based on average speeds and journey lengths suggests a collective daily time saving of nearly 62,500 hours across all cycle journeys in London once the five per cent mode share is reached, with a value of time saved of more than £530,000 per day. This equates to savings of over £190m per year and has been monetised in the BCR calculations. Even longer cycle trips can save time over alternative modes: for example, in one case study a cyclist saved around 10-15 minutes a day on her 21-mile round trip commute into the Central Activities Zone (CAZ)²⁸ compared to public transport.

Journey cost savings and lost revenue

6.12 Cycling is an economical mode of travel and can generate substantial cost savings to individuals. Vehicle operating costs for a bike are in the region of 6p per mile, far less than a car mile (average 76p), bus fare (£1.40 single) or LU/rail fare (minimum £1.50). These direct journey cost savings for future trips resulting from a modal shift are estimated to collectively save London cyclists around £678,000 per day, which equates to £248m per year. However, as the price for a bus or LU/rail fare equates to lost revenue, this has not been used in the BCR. Only the social benefit of reduced vehicle operating costs to the user from a mode shift from car or taxi fare has been included in the BCR calculation; this amounts to £95m per year once the five per cent mode share has been reached.

Safety benefits

6.13 With the number of cycling journeys expected to more than double, there is also likely to be a rise in the absolute numbers of cycle casualties, which is reflected in the calculation of the net benefits used in the BCR. However, it is expected that the infrastructure in the Cycle Vision portfolio will reduce the rate of casualties per journey undertaken and improve cycle safety overall, as well as bringing wider health benefits.

6.14 National guidance (DfT TAG 3.14.1) suggests that the relationship between cycling journeys and collisions is not a linear one, i.e. the growth in collisions is less than the growth in cycling. The DfT approach has been used to calculate the safety costs used in the BCR. However, as with the traffic impacts discussed below in section 6.15, this does not take into account that in delivering the Cycling Vision Portfolio there will be a concerted effort to improve safety and reduce the number of casualties. This will be achieved through targeted investment in infrastructure, education, enforcement and training.

Traffic impacts and benefits

6.15 The impacts of cycling interventions on London have been modelled using the Central London Highway Assignment (CLoHAM) SATURN model. The modelling compared the outcome of a '2026 Reference Case' scenario (reflecting forecast growth in population, traffic levels and non-cycling Business Plan investments), versus a 'Cycling Vision'

²⁸ CAZ covers London's geographic, economic and administrative core (The London Plan, 2011)

scenario which included achieving a five per cent cycling mode share by 2026 and implementation of the Cycling Vision investment portfolio (more details on the modelling are provided in sections 7.6 to 7.8).

- 6.16 The results of both scenarios indicate that – with or without the Cycle Vision investment – population growth, increased cycling levels and increased traffic flows are likely to result in delays occurring for general traffic and buses in central London (if not mitigated). The modelling therefore provides an articulation of how change on the network may be experienced, and the impact of delays to traffic can be quantified in monetary terms to enable the scale of impact to be determined. For example, these are estimated to total around £10m per annum (undiscounted rate) for general traffic and around £9m per annum (undiscounted rate) for buses in central London - *if no mitigation was put in place*. This, of course, is not going to be the case in practice, as a substantial programme of improved network management and mitigation is planned, and elements of this already underway. Hence, these figures should only be viewed as illustrative. In addition, the Cycling Vision infrastructure schemes (the Central London Grid, Quietways and Cycle Superhighways) are shown by the modelling to mitigate some of these delays, by drawing cyclists onto quieter roads and through the provision of segregated facilities in some locations. In addition modal shift from car and other motorised vehicles to bicycles, while not able to be captured by the CLoHAM model used, in practice is likely to further mitigate these impacts.
- 6.17 As discussed, further mitigations beyond the Cycling Vision schemes are already in place or being planned that address the impacts highlighted. These are shown from paragraph 7.9 onwards. These will be implemented in parallel with the Cycling Vision Portfolio to manage the impacts on the road network and road users arising not just as a result of cycling schemes, but also other investments included in TfL's business plan and changes to the network required to support major developments.
- 6.18 This demonstrates that careful route design – considering the needs of cyclists, general traffic and buses – should enable some disbenefits to be reduced further. Nevertheless, to err on the side of caution, the full disbenefits have been quantified and their costs have been captured in the Benefit to Cost Ratio shown in Table 2.
- 6.19 While the modelling provides a detailed picture of changes in central London, its findings also enable an interpretation of the likely impacts on inner and outer London. These are estimated to be fairly small due to the lower density of cycle journeys and the wider distribution of trip destinations (impacting travel demand), on generally less congested roads.

Monetisable impacts of the Cycling Vision

- 6.20 A BCR has been prepared and provides the current estimate of the monetisable aspects of the portfolio as a whole, based on the best information and analysis currently available.
- 6.21 This BCR is necessarily an estimate due to the character of the portfolio in question, which is significantly different from other projects or programmes that would normally be subject to a BCR calculation. The Cycling Vision involves a number of different types of interventions being undertaken over a broad geographical area, over a relatively extended period. Both the benefits and disbenefits will be correspondingly chronologically and geographically dispersed.

6.22 The BCR calculation includes the 15-year period from 2026 – the year when the five per cent target is aimed to be achieved. It also incorporates an estimate of the intermediate benefits that would be gained from the incremental growth of cycling in the build-up to reaching the target. However, it excludes the estimate of natural growth in the number of cycling journeys resulting from population growth. The current overall BCR, using a number of conservative assumptions, is 2.9:1.

6.23 It should be noted that the costs of the parallel mitigation measures are not included in the BCR shown here, as they would be required even without the implementation of new cycling schemes. Nevertheless it should be noted that, while every effort has been made to capture all the relevant costs in the BCR, there are additional programmes underway or approved with spend relevant to the successful outcome of the Cycling Vision Portfolio.

		Net Present Value (£000m)	
<u>Net Benefits</u>	Total	3.1	*
<u>Costs</u>	Total	1.1	**

* Net Benefits include Journey Time, congestion, safety and other social impacts, such as health. The figure shown does not include any mitigation measures in place – see paras 6.16 to 6.19.

** Costs include £779.4m Net Present Value (NPV) of the Cycling Vision Portfolio (£913m), additional investment required to sustain the growth from 2022 to 2026, and ongoing net operational costs of Cycle Hire.

Current overall BCR = 2.9:1

Table 2: Cycle Vision Portfolio Benefits and Costs

BCR Conclusions

6.24 The benefits from the Cycling Programme are diverse and are generally very positive. It is difficult to monetise most of these through standard methods, but those that can be indicate substantial value to many parts of society, including TfL. The other quantitative and qualitative benefits are no less important when considering the value of implementing the programme. Congestion effects will differ depending on the scheme type and location and each route should be modelled separately. Cycling interventions are likely to reduce congestion in some cases, in part through shifting cycling away from busier roads, but also in outer London where a significant mode shift from private vehicles is expected.

7 Impacts on other programmes and organisations

7.1 The Cycling Vision Portfolio includes a variety of investment; including new infrastructure, complemented by education, enforcement and marketing initiatives. There are some aspects of the infrastructure programmes in particular that need to be carefully understood in terms of their potential impacts on other road users and the operation of the road network.

7.2 The likely impacts depend, in part, on the degree of highway intervention required. As described in Appendix 1, the **Central London Grid** and **Quietways** programmes (which represent the majority of investment in the Tube Network for the Bike), will not

involve substantial highway intervention and will include little physical segregation. Nevertheless, work is underway to better understand the specific impacts, and how these may be mitigated where they arise; for example, where a Quietway route meets the TLRN, requiring a new crossing point.

- 7.3 The **Cycle Superhighways** (including East-West and North-South routes), **Better Junctions** and '**Mini Hollands**' programmes, involve more substantial highway interventions, with segregation of cycle lanes being included in the design of the E-W and N-S routes in particular. As such, particular attention is being paid to understand the impacts of these programmes on the operation of the network and other road users.
- 7.4 On the **Better Junctions** programme TfL is working with interested parties, including London cycling, road user and safety organisations, to review and improve cycling and other vulnerable road user provision at 33 of London's biggest, busiest and highest profile junctions. However, a large number of these are on TLRN strategic network corridors including the Inner Ring Road and therefore any scheme to substantially improve cycling provision without mitigation could potentially have a negative impact on network operations, including bus journey times.
- 7.5 '**Mini Holland**' proposals include a variety of transformational infrastructure measures including segregated lanes, Dutch roundabouts and junction treatments. Eight boroughs have been shortlisted to progress to the final selection stage and will submit final proposals to TfL in December 2013. These will undergo internal assessment to review impacts on other road users and the operation of the road network, which will inform the selection of the final successful 3-4 boroughs. Full project business cases for each successful 'Mini Holland' bid will need to be submitted for approval in due course, in line with the current approach used for the Borough Major Schemes Programme.

Modelling impacts

- 7.6 An exercise to strategically model the impacts of the Cycling Vision Programme has been completed using the CLoHAM SATURN model. Two separate scenarios to 2026 have been modelled (see paragraph 6.15).
- 7.7 In summary, the modelling results demonstrate that:
- (a) Planned delivery of the TfL Business Plan, expected population growth, increased traffic and cycle flow, and other business as usual activity is shown to result in an impact on traffic and buses (if not mitigated).
 - (b) Achieving a five per cent mode share for cycling through the Mayor's Vision will result in further impacts on general traffic and buses.
 - (c) Delivery of the central London Cycle Vision infrastructure schemes is shown to mitigate some of these impacts.
 - (d) Careful route design - considering the needs of cycling, general traffic and buses - should enable these impacts to be reduced further.
- 7.8 This is the first time that a strategic modelling approach has been used to estimate the high-level impacts of cycling on the road network. The model represents changes in traffic congestion and bus speeds as delays which have been monetised for use in the BCR (see Table 2). In reality the impacts would not be as high as estimated due to the

package of mitigation measures which will be implemented alongside the Cycling Vision Portfolio.

- 7.9 **Mitigation measures** will be developed and key design options for central London routes can be addressed (e.g. by amending the alignment or design of any specific route options with disproportionate impacts). The Cycling Vision Portfolio is complemented by a parallel series of measures to mitigate against potential negative impacts on other road users, and enable the delivery of the Cycling Vision and other local and strategic priorities. This will be achieved through behaviour change and network management complementary work packages to balance competing demands on the road network, to facilitate the creation of new cycling infrastructure and to maintain bus priority at locations where needed. This includes Travel Demand Management (TDM); a road space management strategy (RSM), including Active Traffic Management (ATM); Corridor Improvement Programmes (CIPs); and Split Cycle Offset Optimisation Technology (SCOOT). Such interventions help reduce delay at junctions and improve journey time reliability and will enable the delivery of a programme of major investment in London's roads as set out in the TfL Business Plan including the work of the Roads Task Force, to support growth, improve public realm and keep London moving.
- 7.10 For example, SCOOT in particular, creates an increased capability to adapt to short, medium or long term changes in traffic flow, enabling a more reactive network. It is currently being developed to support pedestrian and cyclist movement and has the facility to prioritise buses based on selective criteria, including late buses. SCOOT also provides a rich source of real time network performance data that can be used to identify abnormal congestion, enabling modelling and research to further improve network operation.

Freight impacts

- 7.11 The freight sector, as a key user of the road network, is likely to be impacted by any increase in traffic congestion, including that associated with the delivery of cycle schemes. In addition to the RSM strategy outlined above, work is underway to identify the potential impacts on freight and service activity in central London and to identify specific mitigation measures.
- 7.12 In the interim, TfL's 'Delivering a Road Freight Legacy' document, published on 4 October 2013, sets out a programme of activity, working in collaboration with industry and boroughs, to meet the challenges of delivery and collection activity in London over the next two years. The plan outlines deliverables under seven key themes:
- Better planning
 - Improving safety
 - Re-timing deliveries and collections
 - Kerbside access
 - Increasing efficiency
 - Journey planning
 - Effective communications.

7.13 The early modelling results indicate that congestion disbenefits to other road users are in part due to the growth in numbers of cyclists as well as other traffic. However, the modelled cycling infrastructure interventions are shown to mitigate this impact and without these investments any growth in numbers of cyclists is likely to have greater impact.

Bus impacts

7.14 The strategic modelling indicates that increasing levels of cycling to the five per cent mode share will cause some delays to bus journeys in central London. However, it should be noted that the modelling does not include any of the mitigation measures that will be put in place, nor the impact of the mode shift to cycling. The modelling does show that the cycling infrastructure interventions will help mitigate the impact of additional cyclists on the network.

7.15 Other mitigation measures include the deployment of the ATM strategy (see paragraph 7.9), with specific bus priority points being introduced on the network. As well as other significant investment in the TfL Business Plan to ensure bus reliability, by addressing pinch-points across the network.

7.16 In implementing the Mayor's Vision for Cycling, significant care will be taken to avoid or minimise impacts on bus passengers and services. Future refinements of the modelling will enable more targeted mitigations to be identified.

8 Monitoring and review

8.1 TfL already employs a system of monitoring cycling journeys in London, and regular reports on cycling levels are included in TfL's Operational and Financial Performance Report, published quarterly. In future, a comprehensive pan-London monitoring strategy, including monitoring the growth in cycling on borough roads, is being developed to help track further progress. The resulting information will be valuable in ensuring TfL has an accurate picture of where cycling journeys are increasing (or not), and to understand fully the impacts of new investments.

8.2 It is proposed that annual reports on progress on delivering the Mayor's Vision for Cycling are brought back to the Finance and Policy Committee and Board in future to ensure ongoing overview of the entire portfolio and to agree substantial change to the base programme.

9 Finance

9.1 Financial Authority for cycling projects exists for an estimated final cost of £913m following approval of the TfL Business Plan in December 2012. This amount is also included in the 2013 TfL Business Plan. Future TfL Business Plans will have to provide for the additional investment required beyond 2021/22 to achieve the five per cent cycle mode share target by 2026.

9.2 Within the cycling portfolio some existing elements already have Project Authority; **notably** elements of the Cycle Superhighways (CS), Better Junctions and Cycle Hire programmes. An overview of the additional Project Authority requests for the CSH and Better Junctions programmes, to take them through Outcome Definition through to Detailed Design (Pathway stages 1 to 4), is set out in Appendix 4 and Appendix 5 respectively.

- 9.3 The CSH programme requests additional Project Authority of £13m on the new programme for escalation for approval from the Board. With this increase, the overall Project Authority for CSH will be £66.6m.
- 9.4 The Better Junctions programme requests additional Project Authority of £11.9m on the new programme for escalation for approval from the Board. With this increase, the overall Project Authority will be £28.4m.
- 9.5 The constituent projects which are to be directly by TfL delivered will be the subject of separate requests for Project Authority prior to commencing delivery (Pathway stage 5). These are summarised in Appendix 3.

10 Standing Orders

- 10.1 TfL's Standing Orders require that, as they are developed, projects (as defined) each have appropriate Financial and Project Authority, to be followed by appropriate Procurement Authority as contracts are let. The Cycling Vision Portfolio consists of a series of projects and other initiatives. Approvals will be sought for each of the projects in accordance with Standing Orders, some of which will have a value that requires approval at a level beneath that of the Committee and Board. Some elements of the Portfolio, such as borough training and other activities funded by TfL, as well as some highways improvement and maintenance works, may not require Project Authority and so would not require specific authority from the Committee or Board unless they required that level of Procurement Authority.

11 Commercial

- 11.1 A commercial strategy is being developed at a portfolio level, to complement and coordinate the individual procurement strategies for each scheme. The primary vehicle for infrastructure delivery will be the London Highways Alliance Contracts (LoHAC), which for highways improvement and maintenance works provide the best value for money, opportunities for innovation and returns on investment. Where delivery is to be undertaken by the boroughs, the recommended option for infrastructure delivery is for the boroughs to also use LoHAC, although they will have the opportunity to use their own contractors if they are able to demonstrate this offers a competitive cost.
- 11.2 The portfolio level approach will seek to exploit any potential economies relating to services which may be procured within multiple programmes, such as stakeholder, consultation and scheduling services. The portfolio level commercial strategy will also explore opportunities to leverage third party funding and sponsorship.

12 Views of the Projects and Planning Panel

- 12.1 At its meeting on 13 November 2013, the Projects and Planning Panel noted this portfolio and supported the recommendations to the Committee. The Panel was provided with details of recommendations and findings by TfL Programme Monitoring Office and the Independent Investment Programme Advisory Group; the Panel was satisfied with the management responses to the findings. Commentary from the Panel has been incorporated in this paper.

13 Views of the Finance and Policy Committee

13.1 At its meeting on 23 January 2014, the Finance and Policy Committee noted the proposals in this paper and supported the recommendation to Board. The Committee requested that further information be included in this paper to the Board on the modelling undertaken and the traffic impacts for other road users and this has been incorporated in paragraphs 6.15 to 6.18, and in paragraphs 7.6 to 7.8.

List of appendices to this report

Appendix 1: Detailed Description of the Cycling Vision Portfolio

Appendix 2: Summary of main physical, cultural and personal barriers to cycling for cyclists and non-cyclists

Appendix 3: Emerging Q2 forecast for the Cycling Vision Programme

Appendix 4: Cycle Superhighway Programme Scope

Appendix 5: Better Junctions Programme Scope

List of background papers to this report

Mayor's Transport Strategy

Mayor's Vision for Cycling (March 2013)

Delivering a Road Freight Legacy (October 2013)

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Description of the main elements of the Cycling Vision

1 Tube Network for the Bike

1.1 The Tube Network for the Bike is the collective name for a group of programmes to deliver the large scale, high profile network-wide infrastructure required to enable more people to cycle more safely. The measures in central London are designed to cope with, and encourage, the growth in numbers of cyclists; whereas the projects in outer London are aimed at transforming those parts of the capital where numbers of cyclists have remained fairly stable but where there is great potential for further growth.

1.2 The elements that make up the Tube Network for the Bike are:

- Cycle Superhighways programme
 - East-West Cycle Superhighway
 - North-South Cycle Superhighway
 - Delivery of new Cycle Superhighways
 - Upgrades to existing Cycle Superhighways
- Quietways programme
 - Quietways elements of the Central London Grid
 - Delivery of the remaining Greenways
 - New Quietways in inner and outer London
- 'Mini Hollands' programme
 - Transformation of three to four town centres in outer London.

1.3 Different approaches have been planned for areas of different cycling potential. Area-wide infrastructure is appropriate for central London or specific outer London town centres, where there is high density of potential and existing cycle journeys.²⁹ Outside these urban centres, the cycling potential is less concentrated than in central and inner London so planned infrastructure such as Superhighways and Quietway routes will be adapted accordingly.

²⁹ For example in Richmond upon Thames and Kingston more than 10 per cent of residents cycle at least twice a week.

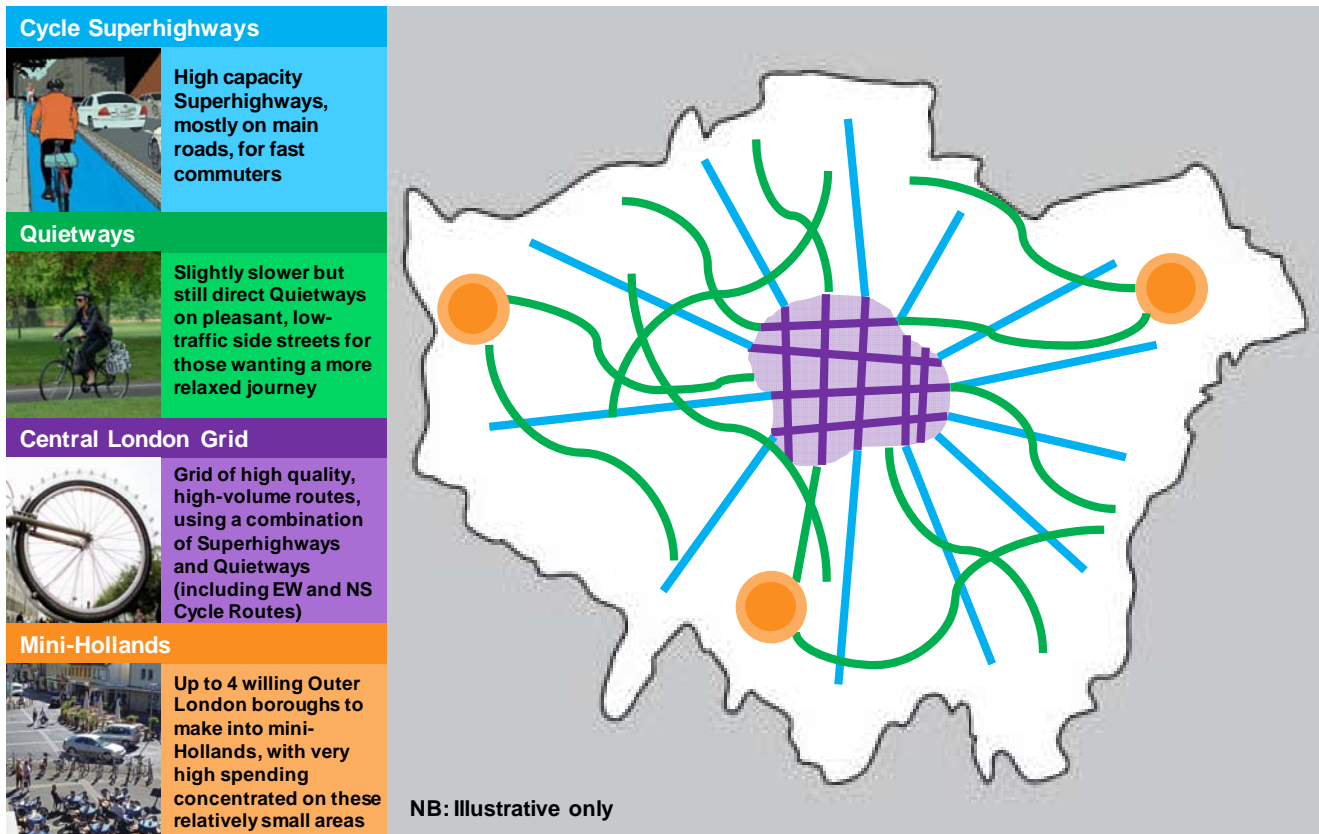


Figure 1: Illustration of the Tube Network for the Bike

- 1.4 Cycle Superhighways are a fast, direct, continuous way of getting from outer to central London by bike along recognised commuter routes. They are usually on busier roads and are made as wide as possible to accommodate large numbers of cyclists, with clear signage. They will include specific design features where appropriate such as segregation or semi-segregation, advanced stop lines or junction redesigns to improve cycle safety.
- 1.5 The East-West and North-South Superhighways will build on the radial movement of cycle journeys to central London and cater for high capacity flows, on substantially segregated tracks, across the central axis of London.
- 1.6 Quietways will use less heavily-trafficked streets and off-carriageway routes, and will appeal to new as well as existing cyclists. They will be direct and easy to follow, and generally not involve any segregation except where they have to join busier roads or pass through busy, complicated junctions. There will be both orbital and radial routes throughout London.
- 1.7 Quietways will offer route options for cyclists of all abilities but are particularly aimed at providing a quieter, calmer option for less confident existing cyclists and those who would like to start cycling in London. Most cyclists are prepared to change their route to travel through parks and green spaces or on routes with more provision for cyclists³⁰.

³⁰ Cycle Route Choice Survey, TfL 2012

- 1.8 Remaining Greenways (the programme to deliver routes in greener spaces) will be absorbed within the Quietways Programme
- 1.9 The Central London Grid will be a dense network of way-marked Quietways within central London with low infrastructure provision (e.g. making one way streets two-way for cycling, closing roads to through motor traffic) on quiet, low-trafficked streets. The Central London Cycle Superhighways, with a higher level of intervention will form important high volume routes in the Grid.
- 1.10 'Mini-Hollands' is a programme of high-levels of cycling interventions which will transform up to four outer London boroughs into areas with exemplar facilities for cyclists. This will result in an increased cycle mode share and an uplift in safe cycling associated with excellent cycle facilities and urban realm provision.

2 More People Travelling by Bike

- 2.1 These programmes and projects aim to encourage more people to cycle through a variety of initiatives including new non-route-based infrastructure such as parking or cycle hire, through to training, education and promotional marketing. More specifically this includes the following:
- 2.2 Cycle Hire is an infrastructure programme tackling potentially cyclable trips. Since its launch in 2010, its primary success has been in attracting new cyclists and encouraging more people to travel by bike, for example:
- 19 per cent of Cycle Hire Members have bought a bicycle as a result of the introduction of the scheme
 - Nine per cent of Members have increased the amount they cycle on their own bicycles as a result of the introduction of the scheme
 - 48 per cent of Members did not cycle in Central London before the introduction of the scheme.³¹
- 2.3 Cycle Parking – an annualised programme to increase the provision of on-street, station, residential and school cycle parking where needed most. An additional 80,000 spaces will be delivered by 2016.
- 2.4 Cycle to School Partnerships – Clusters of schools will work with their borough and the local community to identify barriers to cycling to school and solutions for overcoming them. TfL will work with the Cycle to School Partnerships to fund and deliver a combination of infrastructural solutions and supporting measures to overcome the barriers and enable safe cycling to school.
- 2.5 TfL-led cycle safety and promotion marketing – Targeted marketing campaigns delivered in partnership across TfL to promote an asset (such as Cycle Hire or new infrastructure) or change behaviour (such as the Cycle Safety tips campaign, www.tfl.gov.uk/cyclesafety).

³¹ Barclays Cycle Hire Members Survey, Wave 6 2013

- 2.6 Support for Ride London, Tour of Britain and Tour de France – These high profile cycling events offer a fantastic opportunity to inspire new cyclists. Ride London, Tour de France and Tour of Britain organisers are working with TfL to encourage an increase in cycling from the event, under the mantra ‘from Inspiration to Participation’.
- 2.7 Borough Cycling Programme - Funding for boroughs to deliver a range of cycling measures including cycle parking, cycle training, Safer Urban Driving courses, monitoring and support. £2.1m has been awarded for 2013/14, with an additional £23m available for 2014/15 – 2016/17.
- 2.8 Police and Company E-Bikes trial – A trial of electric bikes will commence in 13/14 with the Met Police and a high profile company with mobile staff that need to move around London.

3 Safer Streets for Cycling

- 3.1 Alongside the ambitious infrastructure plans, TfL is working to improve safety and security through a number of programmes, including infrastructure improvements, training and enforcement:
- 3.2 Better Junctions is an infrastructure programme targeting improvements at some of London’s worst junctions to overcome the safety barriers at these locations, which can include physical and/or temporal segregation. Current plans for Better Junctions are detailed in Appendix 5.
- 3.3 Cycle safety: borough-led and cycle training – funding is available to boroughs through the Borough Cycling Programme for cycle training for adults and children.
- 3.4 Cycle safety: marketing and campaigns – developed to educate both drivers and cyclists about the correct way to drive and ride in London, and reduce the number of collisions on the road. Messaging is even-handed and balanced in its approach and aims to bring about a better appreciation of the issues faced by other road users.
- 3.5 Cycle safety: TfL-led initiatives – A range of safety activities with schools, universities, workplaces and the freight industry, including the Fleet Operator Recognition Scheme, Safe Urban Driving training, taking forward recommendations from the Construction Logistics and Cyclist Safety report and researching the effectiveness of child cycle training.
- 3.6 Cycle safety: work with universities and workplaces – a package of measures to promote safe cycling to work, including cycle stands, cycle marking, safety talks and maintenance classes.
- 3.7 Enforcement and engagement operations - Funding will be provided for the expansion of the Cycle Task Force in 2014 including delivery of Exchanging Places events.
- 3.8 The Cycle Safety Action Plan 2 (CSAP2) will review progress of the actions in the first CSAP and set out new ones for the coming years. It is due for publication early 2014.

4 Enabling Measures

- 4.1 These are measures which will underpin the infrastructure programmes as well as monitor progress and research to better inform the development of the Cycling Vision Programme as it evolves.
- 4.2 Monitoring and research - A robust Pan London monitoring programme for cycling is being developed to capture the changes in cycling levels on the TLRN and borough roads. This, along with a targeted research programme, will be used to review the effectiveness of the cycling investment.
- 4.3 Wayfinding improvements - to develop a consistent and coherent wayfinding system for London's cycling network that will be rolled out as part of the infrastructure programmes
- 4.4 London Cycling Design Standards - The revised LCDS will set out how TfL will provide for cycling on the TLRN and best practice that we expect others in London to follow in their areas. TfL is drawing on international best practice in the preparation of this document developing, as part of the evidence base, an international benchmarking study of cycling infrastructure.

Summary of main physical, cultural and personal barriers to cycling for cyclists and non-cyclists

Summary	Description of barriers	Type of barrier					
		Physical		Cultural		Personal	
		Cyclist	Non-cyclist	Cyclist	Non-cyclist	Cyclist	Non-cyclist
Fear and vulnerability *	Danger arising from traffic / interaction with vehicles						
	Concern about bike theft						
	Personal security (including fear of crime) whilst cycling						
Identification and attractiveness *	Individuals don't identify as stereotypical 'cyclist'						
	Don't know anyone else who cycles / no support						
	See cycling as a 'solo' / lonely activity						
Feasibility and alternatives	Not seen as compatible with busy / complicated lifestyles						
	Potential for punctures / not knowing how to fix						
	Convenience of a car / other modes						
Access to a bike	Having ready access to a working bike						
	Cost of buying a bike / equipment						
Physicality	Repetitive, boring activity						
	Think you need to be physically fit to cycle						
	Need to look good / smart at destination						
	Exposure to weather (particularly rain, cold)						
	Need to carry items / have things at destination						
Lack of confidence *	Don't know how to ride a bike or cycling skills not up to scratch						
	Not knowing routes/where to cycle						
	Lack of knowledge of cycling rules / etiquette						
	Not knowing what equipment is needed						
Lack of infrastructure	Lack of specific cycling infrastructure						
	Lack of secure cycle parking (at home / at work)						
	Cycle routes less direct / severance / takes longer						
	Poor condition of roads and cycle facilities						
	Lack of supporting facilities at destination (showers, lockers, etc.)						

Barriers considered most important for non-cyclists

NB: Lighter colour shading denotes those factors considered less important by a group than their counterparts in the cycling or non-cycling group

Q2 forecast spend for the Cycling Vision Programme

		Total 2012/13 - 2021/22			
Cycling Vision Programme Total £913m	Infrastructure Total £652.6m	TLRN Total £303m	Cycle Superhighways Original Programme	83.5	} see Table 1 in appendix 4*
			Cycle Superhighways New routes & Upgrades	66.8	
			Better Junctions (approved)	17.7	} see appendix 5
			Better Junction (remainder)	82.1	
			Cycle Hire Phase 2 & CHEI	32.7	
			TLRN Improvement Schemes	10.1	
			Wayfinding Improvements	10.0	
		non-TLRN Total £349.6m	Greenways	5.4	
			Biking Boroughs	2.7	
			Mini Hollands	100.0	
	Central London Cycling Grid		54.4		
	Quietways (not central Grid)		114.8		
	Cycle to School Partnerships		33.0		
	Hireable E-bikes		3.6		
	Cycle Parking & Rail Superhubs	35.6			
	non-infrastructure Total £260.4m	Cycle Hire	148.7		
		TfL led marketing & Road events	25.7		
		Cycle Safety initiatives	51.5		
		Police and Company E-Bikes Trial	0.5		
Anti-social Enforcement Op		10.0			
Borough Staffing, Portfolio Mngt, Monitoring & Reseach		24.0			
Grand Total			913.0		

* Appendix 4 includes spend prior to 2012/13

Cycle Superhighway Programme scope

1 Background

The Mayor's Vision for Cycling in London, published in March 2013, describes an ambitious programme of work to deliver a step-change in the quality of provision for cyclists in London. Included in these plans are a number of key projects and programmes that will generate and support a large anticipated growth in cycling, with a target of a five percent modal share by 2026. Cycle Superhighways (CS) is one of these programmes.

Cycle Superhighways are a key component of the ambition to create a '*Tube Network for the Bike*' in London. They are routes that provide safer, fast, direct, continuous and comfortable ways of getting into and across central London by bicycle along recognised commuter routes - often running in parallel with key public transport routes. Cycle Superhighways sit alongside Quietways as cycle routes that will be delivered to provide options for everyone in London to cycle. The Mayor's Vision states that Cycle Superhighways will be delivered to high standards with international best practice in mind.

Cycle Superhighways comprise a joined-up package of measures to break down the barriers that stop people commuting by bike. The primary objectives are as follows:

- **Improve conditions for existing cycling commuters.** Attract existing cycling commuters to use the CS routes - generating a critical mass and therefore making the routes more attractive to others.
- **Encourage people to cycle.** Attract existing cyclists that do not cycle to work but could well do so.
- **Improve the image and perception of cycling amongst Londoners.** Attract people that want to cycle but have never tried it and promote good behaviour among all users

2 Current Status

The original CS Programme comprised 12 radial cycling routes from outer to central London along recognised commuter routes, with a package of supporting measures to encourage modal shift and break down the barriers to cycling. The Programme sought to deliver all 12 routes by 2015. The first two routes (CS3 and CS7) were completed in 2010, and the next two (CS2 and CS8) followed in 2011. The programme was paused in 2012 for the 'Junctions Review' project and during the London 2012 Games. In autumn 2013, some preparatory work on part of CS5 was undertaken along with the opening of an extension to CS2 from Bow to Stratford town centre. Typical infrastructure interventions delivered on the routes include cycle lanes (advisory and mandatory), junction modifications, blue coloured surfacing, carriageway surfacing, signage and on-carriageway patches.

Programme outputs to date include the following:

- An average 77% increase in cycling trips on the routes since they opened
- 30% of those cycling trips are new or switched from another mode
- 75% of users agree the CS improve safety for cyclists
- Users are most satisfied with visibility of the blue lanes, ease of way finding, and comfort of riding surface
- The main reasons for choosing to use CS are to improve fitness and save money
- Users agree that the CS help make London feel like a city for cycling and improve safety for cyclists.

3 The Cycle Superhighways network

The proposed Cycle Superhighway programme is as follows.

- East-West Cycle Superhighway
- North-South Cycle Superhighway
- Delivery of new Cycle Superhighways
- Upgrades to existing Cycle Superhighways

The alignments of the new Cycle Superhighways network will be subject to agreeing detailed design, public consultation and agreement with the relevant managing authorities. As is the case with other TfL investment programmes, the baseline network may change if and when issues arise. For instance if problems emerge on proposed routes or the aspirations for levels of cycling increase beyond five per cent mode share at a future date.

4 Programme Requirements

In line with the Mayor's Vision for Cycling, the programme is required to deliver the cycle superhighways by 2016.

Specific requirements for each route in terms of the measures necessary to be implemented to deliver the desired benefits will be specified for each individual route during the project's feasibility stage. This will take into account specific site conditions, physical constraints and stakeholder requirements – for example on main roads there will be a preference towards separated and segregated infrastructure, whereas quieter roads are unlikely to require such heavy engineering.

5 Benefits Overview

A separate CS Benefits Management Plan has been produced, as has an outline programme-level Business Case that sets out qualitative benefits and disbenefits (these are summarised below).

The wider Cycling Vision Portfolio sets the outline business and economic case for a substantial investment in cycling over the period of the TfL Business Plan,

and the benefits TfL's cycling portfolio will deliver as part of a portfolio of complementary investments. This sets the scene for future approvals for individual programme elements of the Cycling Vision Portfolio, including CS.

The anticipated benefits through CS include:

- Journey time and ambience improvements for cyclists;
- Catering for journeys at a low operational cost;
- Avoiding costs and delivering value for money alongside other investments (for example, by reducing or deferring investment in public transport assets);
- Getting more from the road network (cyclists use less road space than other single occupancy vehicles);
- Improving safety for cyclists (cyclists are disproportionately represented in those killed or seriously injured (KSI) in London);
- Improving the environment (including reductions in emissions of CO₂, air pollutants and noise, as well as improvements to the ambience and quality of the urban realm);
- Improving the health of Londoners (cyclists take one less sick day per year than non-cyclists – 7.4 days compared to 8.5, which also has wider economic benefits); and
- Increasing the attractiveness of London to businesses.

The East-West and North-South CS cover areas with the highest cycle flows in London, with a cyclist every two seconds in the busiest areas (peak hour, both directions). 2,650 cyclists in the AM peak have been counted at Blackfriars Bridge (northbound) on the proposed North-South route, and 2,270 at Parliament Square (eastbound) on the proposed East-West route.

At route level the degree of information required to undertake a quantified benefits assessment will only become available as each route is taken through its detailed design process when VISSIM outputs are available. Each route will be subject to its own Pathway Stage 5 and 6 reviews, where the results of the quantified assessment will be provided, in order to release the funding required for implementation.

Examples of benefits realisation can be found within the published CS Pilot Routes monitoring report (a 2012 update report is in progress).

6 Interfaces with other Projects and Organisations

Other projects and programmes

The CS programme is very closely linked to other infrastructure programmes within TfL's Cycling Portfolio which are also seeking to make changes to the road network for the benefit of cyclists. These include Quietways, 'Mini-Hollands', the Central London Grid and the Better Junctions programme. This requires the programmes to be joined-up in terms of delivery schedules, design specification and stakeholder management etc.

There are also numerous interfaces with other programmes of work including borough schemes, developer schemes, growth areas and major projects, and other TfL programmes of work aiming to improve / maintain conditions for pedestrians, buses and other road users.

As discussed above, the delivery of the CS programme is dependent upon a parallel series of 'enabling measures' to mitigate against potential negative impacts on other road users.

Other organisations

The programme has a large interface with the London Boroughs. In some cases CS are located on borough-owned roads and hence there is a need to work closely with the boroughs to obtain approvals and buy-in to any proposals. Even if the route is on TfL roads it is still important that boroughs are involved closely in the design process as the impacts of measures will usually not be contained within the TLRN highway.

There are many stakeholder and modal groups who have an interest in the programme and who are affected by the schemes it delivers. These groups are identified in the CS Stakeholder Management Plan.

7 Schedule

It is proposed to deliver the network set out in section 3 by 2016, with public consultations to take place throughout 2014 and the bulk of construction occurring in 2015.

8 Costs and Project Authority

EFC & Project Authority by Route

Table 1 provides a breakdown of the additional Project Authority being requested. Project Authority of £66.6m will cover the design and delivery of the original CS programme (CS2, CS8, CS2x and CS5) and other sunk costs (total £43.4m), plus the design of all future routes, programme costs, 40 per cent of supporting measures and 50 per cent of powers, consents and programme costs (total £23.2m). The total additional Project Authority requested is £13m.

Table 1

Estimated Financial Cost (EFC) and Project Authority

	EFC		Project Authority		
	Prev.	New	Prev.	New	Add.
Original Programme	113.1	106.9	53.6	54.3	0.7
New Routes & Upgrades	-	66.8	-	11.8	11.8
Programme Costs	0.5	0.5		0.5	0.5
Cycle Superhighways Total	113.6	174.2	53.6	66.6	13.0
<i>Pilots CS3 & CS7 *</i>	<i>18.0</i>	<i>18.0</i>	-		
Total Including Pilots	131.6	192.2			

* *Pilots were approved as a separate project*

	Spend to 11/12	Spend 12/13 and after	Grand Total
Original Programme	23.4	83.5	106.9
New Routes & Upgrades	-	66.8	66.8
Programme Costs	-	0.5	0.5
Total	23.4	150.8	174.2

Future Route Breakdown of Costs

Table 2 presents a summary of the costs for the future routes and the new programme. Quantified Risk Assessments will follow during the design stage, however an interim risk of 10 per cent has been applied to the Main Works costs.

Recent revised costing of the Cycle Superhighway Programme has been undertaken following the completion of Cycle Superhighway 2 Extension. This indicates that the overall costs for the programme are likely to increase by up to £50m to ensure adequate service standards are provided on all routes. These additional potential costs have not been included here at this stage, as they will be subject to further testing and informed by the detailed design work for the schemes which will be enabled following approval of this paper. In addition, we will undertake a rigorous programme of cost management, drawing on the expertise of IIPAG and others, to drive down costs. If, subsequent to this more detailed analysis taking place, it is concluded that final costs will be higher than the current budget, we will pursue two possible avenues:

- consideration of amending the number or length of CSH routes in the programme;

- consideration of reallocating monies from other areas of the cycling portfolio (either through cost reductions or through changes in scope), to ensure the overall costs of the portfolio do not increase.

Table 2

Budget overview for future Cycle Superhighway programme

£m	Total
Design Costs	17.7
Construction	90.3
Powers and Consents	2.3
Marketing & Comms	1.4
Supporting Measures	4.6
Staff Costs (Feasibility & Design)	2.3
TfL Staff costs (Construction & Close)	3
Spent*	43.4
<i>Total Base Cost</i>	165
Risk	8.7
Estimated Final Cost	173.7
Programme costs	0.5
Total*	174.2

* This includes the design and delivery of the “delivered” part of the original programme totalling £43.4m

Better Junctions Programme scope

1. Background

As part of the Mayor's broader strategy to transform London into a safe and pleasurable place for people to cycle, TfL is working with interested parties - including cycling, road user and safety organisations - to review and improve cycling and other vulnerable road user provision at some of London's biggest and busiest junctions. In addition to various Major Projects, and other key initiatives such as Barclays Cycle Superhighways, TfL has identified a number of other large junctions where significant improvements can be delivered for cyclists (and other vulnerable road users) and this work will be undertaken through the Better Junctions programme.

New infrastructure and investment in Better Junctions will improve the actual and perceived safety of cyclists on the road network and will help to ensure that all road users are better catered for at key junctions across London. TfL STATS 19 data shows that 89 per cent of all cyclist collisions resulting in injuries in 2012 occurred at junctions. The work will help to encourage more people to consider cycling and also ensure that junctions are made safer for those already using them.

2. Current status

In late 2011, The Mayor asked TfL to undertake a 'review' of all junctions on the four existing Barclays Cycle Superhighways as well as planned schemes on the TLRN Investment programme. Following this review (circa 500 junctions in total) a 'Top 100' list of junctions was announced where TfL committed to working with key stakeholders to review and deliver cycling and pedestrian improvements across London, under the remit of the 'Better Junctions' Programme.

The Mayor's Vision for Cycling in London published in March 2013 set out the need for the Better Junctions programme to target resources on a smaller number of larger junctions and gyratories in London. The programme has been re-scoped accordingly.

3. Programme scope

In public-facing terms, the revised Better Junctions programme now comprises 33 locations at which TfL shall deliver significant improvements for cyclists and other vulnerable road users.

It should be noted that of the 33 locations, 15 are already within the scope of existing programmes. This includes addressing the needs of vulnerable road users as part of wider aspirations of five stand-alone Major Projects as well as significant improvements at 10 major junctions on the planned Barclays Cycle Superhighways. Improvements at these locations will continue to be delivered and managed through those projects.

Better Junctions

TfL has identified 18 other major junctions where significant improvements can be delivered for cyclists (and other vulnerable road users) which do not fall into the Major Projects or Barclays Cycle Superhighways programmes, and hence will be delivered and managed through the Better Junctions programme.

In each Better Junction project TfL will continue to work closely with stakeholders as designs are developed. The already successful Design Review Group (DRG) brings together cycling, pedestrian, freight, road safety, motoring groups, boroughs and police on a monthly basis. All 33 named Better Junctions locations will be discussed at DRG to receive comments on proposals ahead of any planned public consultation.

Existing Better Junctions Programme

In addition to the junctions themselves, TfL has been working on a number of other measures as part of the Better Junctions Programme. For example, innovative junction layouts aimed at improving safety for cyclists, including 'Dutch-style' roundabouts, are being trialled at TRL's off-street facilities. Furthermore, by the end of financial year 2013/14, safety improvements for cyclists and other vulnerable road users, will have been delivered at 17 junctions, and small scheme activities are planned at an additional 46 junctions, all targeted to improved safety for cyclists and other vulnerable road users.

The existing programme is detailed below. Finance and Policy Committee approved Project Authority of £16.5m in January 2013 against a Financial Authority at the time of £18.9m. £1.2m has been transferred to other project budgets to deliver Better Junctions outcomes, leaving a Financial Authority of £17.7m.

Original Better Junctions Programme	Cost in £m
TRL Off Street Trials	4.9
Design & Build by end FY 13/14 [17 junctions]	5.6
Further delivery of ex-Better Junction improvements (under TLRN Improvement Programme and part-funded schemes) [46 junctions]	5.9
Programme Management Staff Costs	0.7
Initial design costs on revised programme	0.1
Junction Reviews	1.7
Total Financial Authority	18.9
Part funded schemes (transferred to other projects)	-1.2
Remaining Financial Authority *	17.7

** of which £16.5m project authority was approved in Jan 2013*

4. Benefits overview

The Better Junctions programme is aimed at reducing the number of KSIs at high profile junctions and gyratories in London, as well as contributing to the Mayor's cycling growth strategy. The aim is to break down the negative perceptions associated with the dangers of cycling and what are perceived 'barriers'. This will not only provide improved facilities for existing cyclists but attract new cyclists onto the road network. Specific cycling-related targets include:

- Contribute to the target to reduce the number of KSIs by 40% by 2020 (from 2005-09 base).
- Improve cycling conditions for existing cycling commuters with emphasis on enhancements that improve safety.
- Improve the image and perception of cycling that it is inherently dangerous amongst Londoners by introducing facilities that attract new cyclists to the network by :
 - Introducing segregated or mandatory cycle feeder cycle lanes
 - Removing potential for left turning conflicts by, for example, introduction of early starts
 - Aiding cyclists to turn right at a junction from the near side lane instead of having to cross multiple lanes of traffic by adopting Dutch / Danish infrastructure.

The Better Junctions programme is also aimed at improving the urban realm in order to improve junctions and gyratories for both pedestrians and cyclists alike in order to create an environment where people want to stay and visit.

There is good evidence that making changes to the urban realm, as recommended by the National Institute for Health and Clinical Excellence, can increase walking and cycling numbers by:

- reallocating road space to support physically active modes of transport (e.g. widening pavements, providing cycle lanes, new signalised crossings);
- restricting motor vehicle access (e.g. closing or narrowing roads to reduce capacity);
- specific demand management measures;
- introducing traffic calming schemes to restrict vehicle speeds (using signage and changes to highway design);
- creating safe routes to schools (e.g. traffic calming measures near schools, improving walking and cycling routes to schools).

For each of the 33 locations the degree of information required to undertake a fully quantified benefits assessment will only become available at the end of detailed design. Hence for each location a quantified cost/benefit analysis will be undertaken prior to and presented at Pathway Gate 5.

5. Schedule

Of the 18 'core' Better Junctions locations (i.e. those not associated with a standalone Major project or a Cycle Superhighway) the programme is scheduled to deliver improvement schemes at 10 locations prior to 2016, with improvements at the remaining 8 delivered between 2016 and 2022.

6. Costs

It should be noted that for the majority of Better Junctions locations, design and optioneering is at an early stage therefore the construction costs are indicative and subject to change. Quantified risk assessments will follow later during the design stage, however an interim risk of 10 per cent has been applied to the main works

costs. Detailed construction cost estimates will be provided at Pathway Gate 5 prior to construction. Value engineering and scope management and change control throughout the design and construction process will ensure that across the programme benefits are delivered within the budget available.

The table below shows the overall cost of:

- Delivering improvement schemes at the 33 named Better Junctions locations. As noted in section 3, some of the 33 locations fall within the scope of Cycle Superhighways or Major Projects and are therefore solely or primarily funded through those projects. In some cases the Better Junctions programme is contributing funding to these schemes.
- Delivering ‘early win’ schemes (within the existing Better Junctions £16.5m Project Authority).
- A package of major cycle safety research to trial new and innovative junction layouts and traffic technology that, if successful, could be introduced in London and potentially more widely across the UK. The trials are being carried out for TfL by the TRL (Transport Research Laboratory) and will examine a range of suggestions such as “Dutch style” roundabouts and low level cycle signals to assess their suitability for introduction on the UK’s roads, subject to Department for Transport (DfT) approval. This work is also within the existing Better Junctions £16.5m Project Authority.

The £82.1m Better Junctions funding above is broken down as below. New Project Authority of £11.9m is being sought. This will cover design costs, staff costs and 50% of Powers and Consents.

	£m	
Design	9.7	A
Construction	61.0	
Powers and consents	0.9	B
Marketing and communications	1.8	
TfL staff costs (Gates 1 to 4)	1.8	C
TfL staff costs (Gates 5 to 6)	0.9	
Total base cost	76.1	
Risk	6.0	
Cost to completion (see section 3 above)	82.1	
Existing budget (see section 3 above)	17.7	
Grand total	99.8	

Existing Project Authority	16.5	
New Project Authority (Gates 1-4)	11.9	A+(0.5*B)+C
Total Project Authority	28.4	