

Transport for London

Feasibility study for a central London cycle hire scheme

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Prepared by Transport for London



Transport for London
and the Clear Zones Partnership



MAYOR OF LONDON

Transport for London



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Background

1. Transport for London (TfL) aims to achieve five per cent mode share for cycling by 2025, requiring a 400 per cent increase in cycling levels from the year 2000 daily cycle trips. London has already seen a significant rise in the number of people cycling with a 91 per cent increase on London's major roads since 2000
2. There is a pronounced increase in cycling usage across the Capital, more money is being spent on cycling facilities and more people are considering taking up this cheap, healthy and environmentally friendly form of transport. A cycle hire scheme would add further momentum to this trend and increase the accessibility of cycling for certain groups
3. For these reasons, TfL was asked to conduct a study to test the feasibility of introducing a cycle hire scheme in central London
4. The study has been initiated and produced by a partnership headed by the Clear Zones Partnership that consists of representation from the London Borough of Camden, the City of London, Westminster City Council, TfL and the Royal Parks
5. This report focuses on high-level issues, which are critical to determine the feasibility of a central London cycle hire scheme

Findings and recommendations

6. From a technical perspective, a cycle hire scheme in London is feasible and a bespoke system for London could be implemented
7. There appears to be a substantial market for a central London cycle hire scheme with around 55,000 potential daily trips by cycle hire based on existing information. There is an element of risk, however, in forecasting of this nature and the exact demand is difficult to estimate
8. It is recommended that a minimum of 10,200 docking points with 6,000 bicycles would be required. They would be located at anything between 300 and 400 docking stations. A minimum density of eight stations per km² should be pursued
9. There is significant market from 'after rail' commuters.¹ However, sufficient space to cater for the full demand is unlikely to be available. Hence, it is not recommended to cater for this market initially
10. The scale of any scheme is critical to its likely success. Cycle hire stations would need to be located at frequent intervals and placed at strategic locations. A phased implementation would allow the scheme to adapt to demand
11. A pilot should not be used to estimate demand
12. The current situation in London is identified as suitable for a cycle hire scheme. The recent pronounced increase in cycling, the reduction in cycling accidents (especially in the central London area), coupled with increased spending on cycling facilities and the perceived financial and health benefits are serving to encourage more people to take to their bicycles
13. Cycle hire in other cities has helped to increase bicycle modal share and encouraged more people to cycle on private bicycles
14. There is a wide range of compatible scheme types, management systems and technologies from which to choose from
15. A fixed docking station solution is more efficient for larger schemes
16. Access to the bicycles must be easy and fast. A period of free use may be an attractive option
17. Levels of theft and vandalism in the existing schemes that have been reviewed have generally not been as severe as predicted. It should be noted however, that London has high levels of bicycle theft. A deposit mechanism by users of the system is essential

1. After Rail commuters are those people who get the train to central London but could then cycle to reach their final destination

Findings and recommendations

18. Political buy-in from major landowners and authorities in central London would be essential for implementation, including TfL and the central London boroughs
19. Land availability (and competing demands on central London public realm) is one of the main issues facing successful implementation. Space is at a premium around key trip generators / attractors. The existing partnership (TfL and Clear Zones) provides a good base that could attempt to resolve this issue
20. It is not recommended to hand over advertising space to help finance the scheme as this is not supported by the central London boroughs, The Royal Parks or TfL. This would mean, however, that some share of the costs involved would fall on the public purse. It is recommended that other alternatives such as on-bike sponsorship are investigated
21. Complementary measures to mitigate some risks (where individual London borough policies allow) have been suggested, potentially including a safety campaign, 20mph zones, cycle training, improved way-finding, engineering measures and conversion of one way streets to two way for cyclists
22. The potential for generating revenue is low if a free rental period is recommended. (There is some revenue potential from registration fees to the scheme)
23. Integration of the systems to the wider public transport network would allow better accessibility and enhanced operation
24. Some barriers and issues still remain and need to be addressed properly. These include:
 - Safety concerns
 - Navigational issues (difficult to navigate in central London)
 - Use of a bicycle by inexperienced users
 - Allocation of resources to a cycle hire scheme could affect the delivery and implementation of other cycling measures
25. The lessons learnt from other European schemes suggest that a cycle hire scheme for central London should include the following:
 - A deposit mechanism
 - An annual subscription or registration process
 - A strategic pricing structure
 - A Smartcard system
 - Innovative docking points to make the most use of available space
 - Very secure and easy to use docking points
 - Robust bicycles
 - Minimum use of vehicles to re-distribute bicycles
 - Simple maintenance
 - A visible and easily identifiable scheme
 - Available for use by tourists
26. There seems to be enough 'potential' space available which could be used (if appropriate) for the implementation of docking stations. The study has not determined, however, whether this space is located in areas where there is likely to be specific local demand. There is also potential for finding spaces in workplaces and private developments
27. There are possible issues regarding the planning permission process and change in traffic orders that might be required to implement docking stations
28. Even after implementation, the location and size of some of the stations would be subject to change as it is difficult to precisely determine demand on a local area basis. It is recommended to identify more spaces than originally required in order to mitigate this risk
29. Flexibility is important to allow docking stations to be easily added or removed in times of fluctuating demand and during periods of building and infrastructure construction
30. Overall, the streets of central London have to accommodate an array of transport and street management needs, which would include facilities for a cycle hire scheme

Benefits

31. The following benefits of a cycle hire scheme for central London have been identified:

1. Provision of a new individual transport mode (accessibility, connectivity with other modes, resilience to the public transport network, options for users)
2. Increase in the levels of cycling through reduced barriers to cycling such as access to a bike, maintenance and theft
3. Help to create a more walking and cycling focused city with less motorised traffic
4. Health benefits associated with increased levels of cycling
5. Journey time and journey time reliability benefits associated with cycling when compared to other modes in central London
6. Reduction in overcrowding on buses and the underground in central London
7. Promote tourism

Risks

31. The main risks of a cycle hire scheme for central London are as follows:

1. Over/under estimation of demand
2. Theft and vandalism
3. Safety concerns and public liability issues
4. Space availability and planning permission process for the implementation of docking stations
5. Conflict with pedestrians
6. Conflict with other road users
7. Need for excessive re-distribution of bicycles, potentially increasing congestion and air pollution (albeit marginally)
8. Inefficient use of public infrastructure
9. Large investment required and inability to re-coup costs
10. Political, financial and PR fall-out caused by an unsuccessful scheme
11. Inadequate complementary measures, way-finding and routing to support successful scheme

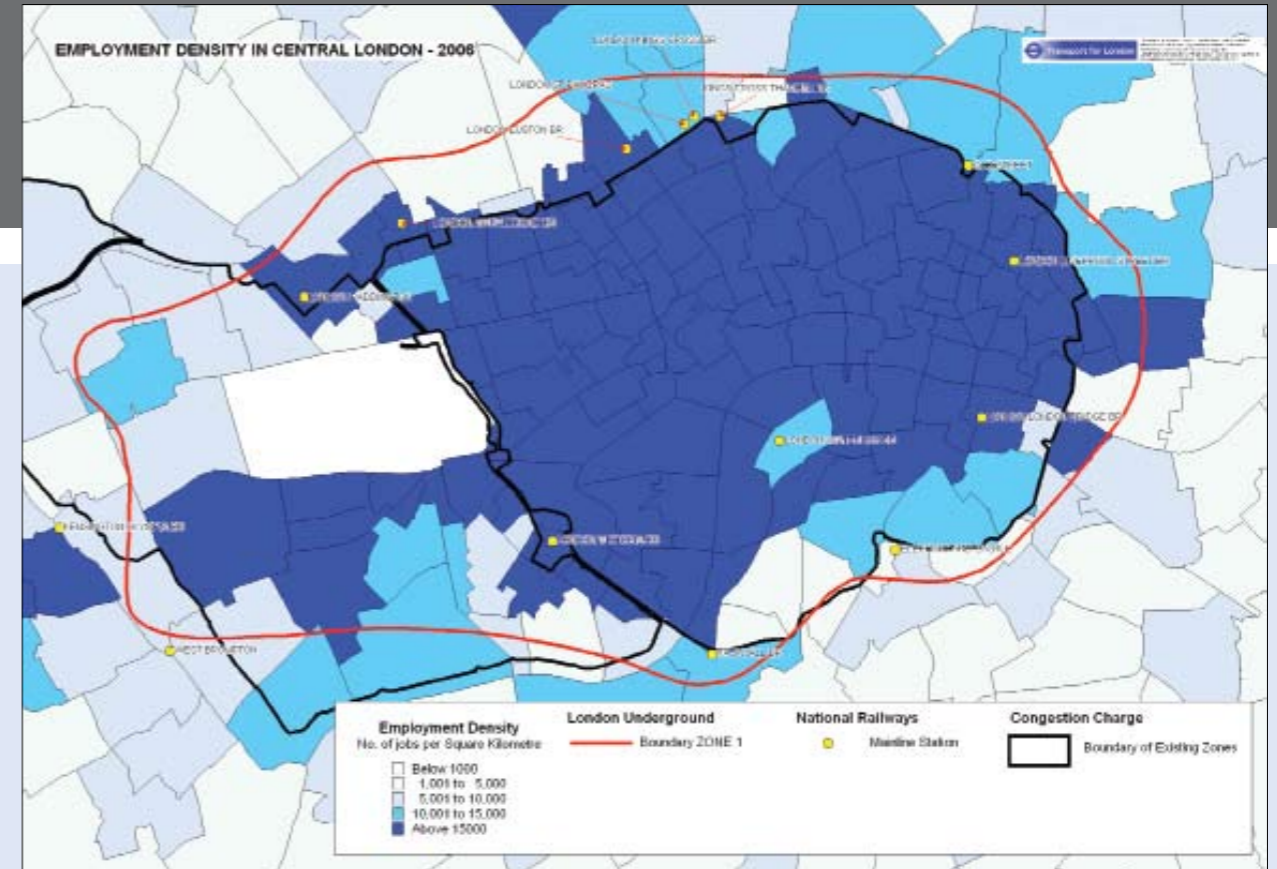
Introduction

Objectives and aims of this report

- 32. This report aims to inform decision makers on the feasibility of a central London cycle hire scheme. The report, however, is not an agreement mechanism between the Clear Zone boroughs, The Royal Parks and TfL for the implementation of the scheme
- 33. The report aims to provide information and recommendations for the implementation of a scheme. It does not, however, define all aspects of the scheme in sufficient detail so as to determine how it should be implemented

Scope

- 34. The feasibility of a cycle hire scheme in central London has been investigated based broadly on the following aspects:
 - State of the art review – to investigate the operation of schemes elsewhere and apply findings, where appropriate, to London
 - Demand analysis – to predict demand for a central London cycle hire scheme
 - Available land – to gain an indicative understanding of available land in central London required for the implementation of the scheme
 - Benefits, risks and opportunities - identify indicative benefits, risks and mitigations as well as potential opportunities
- 35. The study area is focused in central London, Travelcard Zone 1. The reason for choosing this area is the high employment density and concentration of trips, and it crosses through at least three borough boundaries and includes the Royal Parks. The following map (page 9) shows the study area and employment density. It also relates to the area of responsibility of the Clear Zones Partnership



Governance

- 36. An informal project board has been responsible for the overall direction and management of the study. If a scheme were to be developed, it is anticipated that the board will be amended in terms of lead, formality, structure and membership. The project board currently consists of:
 - The Clear Zone Partnership
 - The London Borough of Camden
 - The City of London
 - Westminster City Council
 - Transport for London
 - The Royal Parks

Section I

State of the art review

Background

37. The main objective of the state of the art review is to research existing cycle hire schemes (mainly in Europe) to determine if it is technically feasible for implementation in London. It also aims to identify best practice/lessons learnt from other schemes that could be considered for the implementation of a central London scheme. This section includes the following areas:

1.1 Overview of existing schemes:

Provides a brief history of the main schemes, their operational characteristics, political and geographical context and best practice

1.2 Current situation in London:

Gives an overview of cycling in London

1.3 Existing systems:

Brief summary of the different operation systems available

1.4 Conclusions of Section I

38. This section was collated based on existing available information and also from direct conversations with operators and city authorities. The authors also conducted a site visit of some of the schemes
39. The information in this section is considered to be accurate at the time of writing². However, some changes could have taken place subsequently to some of the schemes
40. The advantages and disadvantages of each scheme reflected in this report are based on the authors' opinions and should not be used as a basis to judge the effectiveness of each scheme. Each scheme works under different circumstances, with implementation based on particular requirements

1.1 Overview of existing schemes

41. The following European cycle hire schemes were reviewed in detail:
- Vélib', Paris
 - Vélo'v, Lyon
 - Cyclocity, Brussels
 - Bicing, Barcelona
 - Call a Bike, Berlin
 - Call a Bike, Stuttgart
 - OYBike, London
42. A brief review of cycle hire schemes in the Netherlands, Gothenburg, Beijing, Cambridge, Copenhagen and Vienna was also conducted
43. The schemes were selected on the basis of size, operational characteristics and because they provide a broad range of different characteristics

1.1.1 Vélib', Paris

(Operated by JCDecaux)

Scheme history

44. On 15 July 2007, the city of Paris launched the self-service cycle hire scheme known as Vélib'. Aiming to reduce pollution, help users to stay fit and raise the awareness of cycling, the scheme has been deemed very successful by Parisians (reflected in high levels of satisfaction in the latest polls). It has also had high usage and favourable press coverage. The system has been advertised as a quick and easy way to make short journeys
45. In its first year Vélib' had 198,913 annual subscribers, 277,193 seven-day subscribers and 3,683,714 one-day subscribers. The bicycles were rented 26 million times with an average journey time of 18 minutes
46. The number of cyclist in Paris has increased continuously over the last few years, with a rise of 48 per cent between April 2001 and December 2006 (Mairie de Paris, 2008)

Operational characteristics

47. The scheme began with 10,648 bicycles and 750 docking stations located strategically around the city centre, targeting public transport stations, tourist attractions and commuter routes. There is a docking station located approximately every 300 metres, although in the core of the area this is as low as every 50 metres. There is an average density of eight bike stations per km². There is a ratio of 1.7 docking points for every bicycle to ensure docking space is always available. Currently there are 16,000 Vélib' bicycles in circulation and there will be 20,600 bicycles and 1,451 docking stations by the end of 2008. This makes Vélib' the largest system of its kind in the world
48. Users access bicycles directly at the docking point through a smartcard that has previously been sent to their address, or via a user terminal located next to the docking station
49. A €150 deposit is held on the user's bank card when borrowing a bicycle and if the bicycle is not returned within 24 hours, the bank card is charged this amount in full
50. If a bicycle is hired and re-docked within two minutes, three times in a row, the bicycle is automatically identified as faulty and taken out of service
51. Ten electric vans and 400 staff are in charge of maintenance and re-distribution of the bicycles. Eighty per cent of maintenance is completed on site as there is an underground storage compartment at each docking station that holds maintenance equipment. A maintenance barge that travels along the river is also in operation

Tariffs

A subscription to use the system is required and prices vary as follows:

Annual subscription	€29
Seven-day subscription	€5
One-day subscription	€1

52. There is a 30-minute free period of use. For the first additional half hour €1 is charged and €2 for the second additional half hour. After this, the cost rises to €4 per additional half hour

Funding and political context

53. The scheme was implemented and is operated, free of charge to the city by JCDecaux, in return for rights to 1,600 advertising hoardings around Paris and space to allocate the cycle stations. JCDecaux also pays the City of Paris €3.5 million a year and a percentage of any revenue raised. JCDecaux neither invented nor pioneered cycle hire operations, but has applied it on a larger scale compared to any of its predecessors
54. Paris is broken down into 20 arrondissements, each having a directly elected council, which in turn elects an arrondissement mayor. A selection of members from each arrondissement council forms the Council of Paris, which in turn elects the Mayor of Paris

Geographical context

55. The Vélib' scheme covers an area of approximately 90 km² in the heart of Paris and is highly visible to visitors. The distinctive bicycles, the large stations and the sheer number of users are apparent across the centre of the city. The scheme is effectively targeting the 'near market' – those who might consider cycling but need some incentive or encouragement to do so. The scheme also promotes the potential for air quality improvements and is part of the 'urbanism' agenda in Paris



1.1.1 Vélib', Paris (Operated by JCDecaux)

Key learning points

- Politically popular, received very well by the media
- Robust and relatively easy to maintain
- JCDecaux as the operator bears the scheme risks and liability
- High visibility
- Increased political momentum for improving cycling in the city
- Phased implementation (increasing scale of scheme) to target demand with the ability to make adjustments to the positioning of stations
- Cheap, accessible public transport alternative for Paris
- High cost of implementation (capital expenditure)
- Paris handed over city assets to a private company in order to fund the scheme
- The scheme could have declining usage in winter months
- The scale of scheme requires significant land contribution
- Approximately 1,000 bicycles have been stolen from their base since the beginning of October 2007, in part due to incorrect attachment to the docking points
- A safety campaign on bicycle safety was launched alongside the scheme, with every subscriber receiving a bicycle safety leaflet
- The scheme is being implemented in phases, with extra bicycles and docking stations added to specifically target areas of high demand
- Every Sunday roads and bridges along the Seine are closed to motorised traffic. This further encourages the use of the bicycles on weekends
- Each terminal at the docking station has instructions in several languages
- All wires on the bicycle are internal, to reduce vandalism
- Eighty per cent of bicycles are located on former car parking spaces
- Bicycle redistribution is minimised by targeting specific demand
- Redistribution due to maintenance is reduced as 80 per cent of repairs are completed at the docking stations
- All re-distribution vans are powered by bio-fuels



1.1.2 Vélo'v, Lyon (Operated by JCDecaux)



Scheme history

56. The Vélo'v scheme in Lyon was implemented in May 2005. It was the first large scale cycle hire scheme to be operated in Europe and was a flagship for JCDecaux, providing it with added impetus for advertising in France. The scheme also provided JCDecaux with vital experience which it utilised for the Vélib' scheme in Paris by making a number of improvements

Operational characteristics

57. The scheme has 4,000 bicycles and 400 docking stations that were implemented gradually and located strategically around the centre of Lyon. The scheme has higher visibility than the Paris Velib' scheme because there was greater freedom to choose sites for docking stations. This resulted in the installation of large docking stations in prominent locations
58. There is a 30-minute free period of use (with an average time of use of approximately 16 minutes) and each bicycle is used on average eight times per day. One bicycle is rented every two minutes in Lyon, contributing to approximately 20,000 trips a day
59. Three vans redistribute bicycles although only 20 per cent of re-distribution by van is required since 60 per cent of redistribution occurs naturally and 20 per cent is forced; for example, when the docking station is full so the user re-docks at another station. In Lyon, there is a slightly lower ratio of 1.5 docking points per bicycle
60. Access to a bicycle is via a user terminal. The system has 60,000 registered users of which 50 per cent are below 30 years of age and 33 per cent are students.

Tariffs

61. The system offers the following tariff structures:

1. Long term card for which rental costs are as follows:

Registration fee	€5.00
First 30 minutes	free
Thirty to 90 minutes	€0.50
Each hour thereafter	€1.00

The card works like a pre-payment card

2. Short term card for which rental costs are as follows:

Registration fee	€1.00
First 30 minutes	free
Thirty to 90 minutes	€1.00
Each hour thereafter	€2.00

3. If the user has a Lyon public transport pass this can be used as a Vélo'v subscription card once a registration form has been completed. Rental costs are as follows:

Registration fees	€5.00
First hour	free
One hour to two hours	€0.50
Each hour thereafter	€1.00

This card works like a pre-payment card

62. A €150 deposit is held on the user's bank card when borrowing a bicycle and if the bicycle is not returned within 24 hours the card is billed

Funding and political context

63. The scheme was implemented and is operated by JCDecaux, giving it the rights to advertising in Lyon similar to the contract awarded in Paris. It seems that the contract awarded by the government to JCDecaux for Lyon was on a much smaller scale, with a lower prevalence of advertising around the city
64. Like Paris, Lyon is divided into a number of municipal arrondissements (nine in Lyon), each of which is identified by a number and has its own council and town hall

Key learning points

65. JCDecaux implemented the Lyon scheme two years prior to the Paris scheme, which allowed it to fine tune and improve the system in Paris. Below is a summary of the adjustments that it has made in response to the lessons learnt from the Lyon scheme:

1. Docking points: The points in Paris are more curved and 'sleek' (as shown in the pictures below) allowing the bicycle to be docked more easily. The pedal sometimes hits the docking station in Lyon and the docking point is more difficult to access. This issue has also been addressed in Paris



2. Bicycles: The bicycles used in the two schemes are quite similar but a number of improvements have been made in Paris such as reducing the number of parts, improving the strength of the bicycle and making the bicycle easier to fix. These changes significantly reduce the maintenance costs of the scheme. There are also better lights on the Vélib' bicycle, improving safety when cycling in the dark

3. Accessing bicycles: In Lyon, to obtain a bicycle a user needs to type in their details in the terminal at the docking station. In Paris, once the user is registered, they get a smart card, which they can use on the individual docking points to obtain the bicycle, allowing much easier access to the bicycles and significantly reducing queuing at the docking station terminals

1.1.3 Cyclocity, Brussels

(Operated by JCDecaux)

Scheme history

66. Launched in September 2006, Cyclocity is a small-scale scheme with only 250 bicycles and 23 stations. It was implemented in a single phase by JCDecaux following the experience gained from the scheme in Lyon

Operational characteristics

67. Registered customers may hire any of the 250 bicycles available from the 23 hubs downtown in a network of stations, which are around 300 metres apart. Members must be at least 14 years old to register for the scheme. Bicycles, (as in Paris and Lyon) are available 24-hours-a-day, seven-days-a-week.

Tariffs

Annual subscription	
Registration fee	€10
First 30 minutes	€0.50
Each additional hour	€1.50
Weekly ticket	
Registration fee	€1.50
First 30 minutes	€0.50
Each additional hour	€1

Key learning points

68. Since its implementation, Cyclocity has experienced relatively low levels of use. The reasons for this could be due to one of the following:
69. **1.** Scheme size is too small. Based on research undertaken by London Analytics (2007) on the network effect and the law of increasing



returns, the take-up of a cycle hire scheme increases at a greater rate than the extent of implementation. This means that scaling down a project would reduce demand much more rapidly than it reduces supply. With only 23 docking stations, the available origin destination pairs in Brussels are limited, hence the possible low up-take of the scheme

70. **2.** The bicycles are heavier than those used in Paris and Brussels has many cobbled areas which may discourage users
71. **3.** There is a charge for the first 30 minutes of use, (this period is free in Barcelona, Paris and Lyon). Customer research undertaken for London shows that a charge for the initial 30 minutes could reduce up-take by up to 15 per cent. However, in a smaller city and with limited network options this impact could be higher



1.1.4 Bicing, Barcelona (Operated by ClearChannel)

Scheme history

72. The Bicing scheme in Barcelona was implemented in May 2007. The tender process took nine months, including a three-month public consultation period, before Clear Channel was awarded the contract

Operational characteristics

73. The scheme began with 1,500 bicycles and 100 docking stations located strategically around the centre. The scheme has been increased to 6,000 bicycles and around 200 stations. The main aim of the scheme was to provide a new public transport mode to become the last leg of people's journeys. The objective was not to get people out of their cars but instead predicting a modal shift from other public transport modes and walking trips

74. By November 2007, the system had 90,000 registered users, contributing towards 22,000 trips a day on average, with 15 trips per bicycle. The average trip is 15 minutes duration and 3km long. Peak use periods are between 08:00-10:00 and 14:00-16:00, but most of all in the evening, around 20:00

75. Users access the bicycles by swiping a smartcard at the terminal located next to the docking station. The system then unlocks a bicycle and informs the user which bicycle to pick-up

76. The scheme has been extremely successful with a bike being used on average 15 times a day. The success of the scheme was not as predicted and as a result the demand has been underestimated. This has resulted in higher operational costs and sometimes bicycles not being available at some locations. Even so, the scheme is still extremely popular among users. This is reflected in the high level of subscriptions that has been maintained throughout the operation of the system.

Tariffs

Bicing operates a two-tariff structure:

Annual subscription

Registration fee	€24
First 30 minutes	Free
Additional 30 minutes up to two hours	€0.30
Penalty for exceeding two hours	€3 per hour

Cancellation of the service for exceeding two hours of use after three notices.

Weekly ticket

Registration fee	€1
First 30 minutes	Free
Additional 30 minutes up to two hours	€0.30
Penalty for exceeding two hours	€3 per hour

Cancellation of the service for exceeding two hours of use after the first notice.

77. An extra charge of €150 is applied to the user's credit card when they do not return the bicycle within 24 hours of taking it from a docking station

Funding and political context

78. The City of Barcelona decided to pay Clear Channel a fixed sum each year to implement, maintain, operate and expand the scheme, rather than fund it through advertising. Some of the funding comes from the on-street car parking charges. A third of the cost is also covered by the revenue generated from registration fees and extended time usage.

79. Barcelona is similar to London with respect to the governance of the city, with a central authority body and a number of districts working together. The city council has jurisdiction in the fields of city planning, transportation, municipal taxes and public highways. These competencies are shared with the Generalitat de Catalunya or the central Spanish Government

Geographical context

80. Barcelona's climate is evidently favourable for a cycle hire scheme. However, the topography is less so. A gradual but significant slope away from the coastline has led to a number of redistribution vans operating to move the bicycles from the coast back up the slope, as the demand characteristics result in the movement of all the bicycles down the hill.

81. Key learning points

- The scheme has been very well received by the media
- Good weather in Barcelona promotes use; weather can be a big factor in variations of use
- The scheme has helped to provide political momentum for improving cycling in the city
- Implementation has been phased in order to best meet demand (similar to Paris and Lyon)

- The scheme is integrated with smart ticketing
- The scoping process included a public consultation
- The scheme caused unrest among local cycle hire companies which led to the scheme being made open to residents of Spain only
- Topography causes a large number of vans to be required in order to re-distribute the bicycles. Ten vans re-distribute bicycles, the same number as in Paris but for less than a quarter the number of bicycles
- Some conflicts with pedestrians have been reported
- Demand has been higher than expected and as a result users are sometimes required to wait in order to be able to pick up or drop off their bicycle. Barcelona has implemented various measures to deal with this. In the first instance, the user is given 15 additional free minutes if the docking station is full. The user can also call the operation centre who will dispatch a van to pick up or deliver additional bicycles
- All of the relevant stakeholders were on board from the start, leading to the predicted land availability problems never materialising
- At the time of writing [T2]v[g3]ery few people had been injured with no fatalities reported
- There has been some vandalism

1.1.5 Call a Bike, Berlin

(Operated by Deutsche Bahn)

Scheme history

82. Call a Bike was implemented in Berlin in July 2002 with 2,000 bicycles located at intersections (of which there are approximately 3,400) across an area of 100km². The population of Berlin is 3,394,000, with approximately 800,000 living in the core area. Levels of cycling in Berlin are high with a large increase over the last 10 to 15 years



Operational characteristics

83. There are approximately 40,000 Call a Bike customers in Berlin, contributing to the 120,000 Call a Bike customers across the whole of Germany. This has been steadily increasing since October 2001. Usage is concentrated during the evenings and weekends, and the majority of customers tend to be occasional users

84. This system does not require docking stations. Instead the system uses a mobile phone to activate and de-activate the bicycles. Users register online. Once registered they call the phone number printed on the bicycle they wish to use (unique to the specific bicycle). They receive a four-digit code, which is then tapped into a tactile screen to unlock the bicycle. Once the trip is finished the user only needs to leave the bicycle at a junction and lock it. The system will then ask the user whether he or she wishes to continue using the bicycle later or wishes to 'free it up'. If the user wishes to free up the bicycle the locking device on the bicycle returns a four-digit code. The user then calls the unique number again, provides the code, and informs the provider where the bicycle was left

85. In Berlin, there are six, full-time staff (and a further four, part-time in the summer) using two vans to re-distribute and maintain the bicycles

Tariffs

86. Call a Bike costs eight cents per minute, with a daily tariff cap of €15 and a weekly tariff cap of €60

Funding and political context

87. The Berlin scheme is initiated and funded entirely by Deutsche Bahn with no financial commitment from the city authority. Permissions from the authority are not necessary, giving Call a Bike complete flexibility in locating its bicycles.

Geographical context

88. Berlin is relatively flat, and there are few natural obstacles, making it ideal for cycle hire. Berlin has, however, experienced economic decline since the fall of the Wall, and this has affected all walks of life in Berlin and may be a limiting factor in the scheme's success.

Key learning points

89. The scheme was implemented at no cost to the city authority and without handing over assets or space
- Booking is done entirely by telephone and the lock is attached to the bicycle, hence no on street infrastructure is required
 - Bicycles can be left literally anywhere, giving the scheme flexibility
 - However, there are no guarantees provided of a bicycle being available at a certain time or place
 - Bicycles are free standing and hence can potentially be knocked over (although this was not witnessed during site visit)
 - Very little re-distribution effort is required
 - The scheme experiences relatively low levels of use. This is primarily down to insufficient coverage, ie not enough bicycles for the areas covered by the scheme



1.1.6 Call a Bike, Stuttgart (Operated by Deutsche Bahn)



History of scheme

90. Stuttgart uses a slight variation of the Deutsche Bahn scheme. Due to concerns over streetscape clutter and the busy streets in Stuttgart, the city preferred a system that was fixed to stations, similar to the hire bicycle schemes mentioned previously. The system uses the same type of bicycle and uses a mobile phone for activation. However, the bicycle must be re-docked to a docking station before the bicycle can be 'signed off'

Operational characteristics

91. There are 52 docking stations spread over 40 locations housing 450 bicycles. Stuttgart uses an innovative concept for the operation of the system, named Neu-Arbeit or 'New Work'. It is a church organised system with a formerly unemployed mechanic and two young adults (with learning difficulties or in socially difficult circumstances) maintaining, cleaning and re-distributing the bicycles. The scheme enables

them to learn the value of a day's work, and provides them with an income during a six-month contract. A centrally controlled computer hub looks at where stations are full/empty and sends orders to the van. It is a successful and politically popular measure

Funding and political context

92. The City Council went to tender and chose Call a Bike over other providers. This was mainly due to cost, but it also saw Call a Bike as a successful, viable option. The city didn't want a single private company to control on-street advertising

93. The city wanted to increase levels of cycling, and saw cycle hire as a driving force. The initiative worked, and there is now plenty of political support for cycling with momentum for introducing more cycling measures and allocation of more funding

Geographical context

94. The 'bowl-shape' of Stuttgart has meant that the scheme is only available right in the heart of the city, with a few stations located up the hill in any direction. This bowl-shape also worsens the pollution in a particularly car heavy city, so cycle hire was seen as an opportunity to help address this problem

Key learning points

- The bicycles are docked using a flexible 'cable'. This option is easy to install and hence it is easy to expand the system if required in future
- The scheme was provided at a low cost to the city authority
- There were some objections by landowners to having a docking station located adjacent to their property

1.1.7 OYBike, London (Operated by OYBike)

History of scheme

95. OYBike was implemented in Hammersmith and Fulham in August 2004. Currently, there are 130 bicycles in operation; 100 are on the streets of west London, and 30 are located at the University of East London. In three years OYBike has had only 11 bicycles stolen (five of which have been returned and are now back on the street)

Operational characteristics

96. Bicycles are secured to Sheffield Stands which can accommodate up to three bicycles. This equates to approximately 12 bicycles per car parking space (making it the best scheme for space utilisation). Bicycles are locked by a cable connected to a station, attached to the Sheffield Stand

97. Users contact a phone number where a unique pin code is then read out to them and sent back by text messaging. This pin code is entered into the lock to release the bicycle. After use the bicycle is locked into any empty port on an available OYBike station. A unique pin will appear on the lock display that must be sent back to OYBike to end the hire period

98. The bicycles can incorporate other bicycle accessories, for example, kiddie trailers or trolleys. For a full scheme in London, OYBike believes that a system needs a density of 100 bicycles per km²

Tariff

99. Users have to pre-register with an initial usage credit of £10. Optional theft insurance is available at an additional cost of £10. It is currently paid by 10 per cent of users



100. The bicycles are free to use for 30 minutes and are then £2 per hour up to a maximum of £8 per day

101. Key learning points

- The docking solution utilised by OYBike means that a large number of bicycles can be housed in a small area (up to 12 in a car parking space compared to four or five if a Paris style docking post is used)
- The bicycles are not supported when docked and hence can potentially be knocked over quite easily
- The cost of implementation is relatively low because they make use of existing cycling infrastructure is used
- The scheme is in operation in London and has not experienced significant theft or vandalism problems
- The size of the scheme is still small and only covers a very specific geographical area

1.1.8 Other schemes

102. Other schemes are currently in operation across the world and are summarised as follows:

Netherlands

103. A cycle hire and parking scheme is in operation, run by Ned Rail, that allows customers to hire or park bicycles at major rail stations around Holland. There is a large store of bicycles in a building near to, or as part of, the main station. Users register to use the scheme and can then hire the bicycles from these stores, cycling them to their destination (usually workplace) and parking them on one of the existing cycle stands. The scheme is successful as a large number of cycle stands were implemented at the same time and the large number of commuters coming into the main stations provide ample demand for the scheme

104. Key characteristics of the Ned Rail scheme:

- There are 17,000 bicycle lockers (to store bicycles)
- Around 100,000 secure manned bicycle parking spaces
- Cost is €2.85 a day for hire of bicycle
- For hiring a luxury bicycle for longer distances the cost is €7
- Yearly membership is €91 (the majority use this method)
- A modal shift from car to bicycle and train has been witnessed
- The scheme operates in 90 buildings over the country
- A 1,000 customers a day makes the scheme profitable
- Storage is the scheme's primary function; rentals and repairs are additional services to attract extra customers

Gothenburg, Sweden

105. The cycle hire scheme in Gothenburg is purely for employees of companies signed up to the scheme. It works in a similar way to the Ned Rail scheme, with a store of bicycles around main stations. However, only employees from the companies that have signed up to the scheme can access the bicycles. There are stores for the bicycles at the member companies' offices. The scheme is funded through advertising and offers its members four hours of free use per day on the bicycles

Beijing, China

106. The city put 50,000 bicycles for rent across the city ahead and during the Olympic Games to curb pollution and ease congestion. Brand new bicycles were available at 230 outlets close to subway stations, commercial districts, Olympic venues, hotels and office buildings as well as in sizeable communities. These were offered by Beijing Bicycle Rental Services

Cambridge, England

107. In October 1993, Cambridge implemented a cycle hire scheme but it was considered to be a failure. Within 24 hours, all 300 bicycles had been stolen, ending up in rivers, ditches or used to smash windows. The main reason for its failure was the lack of deposit, providing no incentive for people to return the bicycles

Copenhagen, Denmark

108. Copenhagen Citybike has been in operation since 1995 and is one of the few (if not only) schemes to offer the service for free. Hire is undertaken on a deposit basis using a similar mechanism to that seen on supermarket trolleys in Britain (coin operated). Once the user wishes to stop using the bicycle, they take the bicycle to the nearest stand. However, this is not compulsory and they can elect to simply leave the bicycle anywhere at the cost of their 20DDK deposit (approximately €2.70) The bicycles are strictly available within a designated zone only – taking a bicycle outside is illegal, and will result in a fine

Vienna, Austria

109. Vienna initially operated the Viennabike scheme but this was a failure due to high levels of theft. The deposit mechanism used was similar to the Copenhagen Citybike system except, coincidentally, a nearby supermarket used the same mechanism, enabling thieves to steal the bicycles using supermarket tokens. Citybike now operates a JC Decaux system whereby credit card details are given, and the customer pays for the time they have had the bicycle for. Since improvements have been made the system has been successful. Vienna has also implemented a bicycle system to redistribute bicycles



Other cities

110. In 2001, Oslo installed a 1,200 bicycle program for the Norwegian capital, and in 2006, Stockholm implemented a 1,000 bicycle system. Drammen and Trondheim in Norway, Seville in Spain and Rennes and Caen in France have also implemented cycle hire programmes for their cities
111. Washington, San Francisco, Milan, Tel-Aviv, Montreal and Chicago are currently all tendering, or investigating the possibility of implementing a cycle hire system
112. Appendix I is a table of all known systems in Europe as well as proposed systems throughout the rest of the world

1.1.9 Lessons learnt from the review of existing schemes

113. Looking at the examples of cycle hire schemes across Europe, a number of themes can be identified that are consistent with each:

1. In cities with a low modal share of cycling, cycle hire has helped to address this and has also led to more people cycling on regular bicycles
 2. There is a relatively high population living or working in the centre of the city, predominantly where the bicycle stations are located. This provides a blanket demand helping to ensure the scheme's success
 3. Each scheme has had a pronounced funding stream. Whether it is through advertising hoardings, revenue from car parking spaces or the direct funding from the city authority
114. Finally, it must be stressed that the schemes are all very different, making comparisons difficult. They differ in size, funding, strategic objectives and style of bicycles and docking mechanisms. No one scheme is the best, they all offer different advantages and disadvantages that should be considered when exploring the possibilities for London

115. The following summarises the lessons learnt and key recommendations for London:

- Annual subscription or registration promotes ownership of the scheme for the general public. Witnessed most notably in Stuttgart, residents actually feel a sense of responsibility for the bicycles and feel they need to look after them. Registration also enables the deposit system to work and eases the charging mechanism allowing accounts to be billed directly
- A strategic pricing structure is required, which may differ depending on the business model. The length of the free period of use, the scale of price increases and the type of charge can all be used to manage demand and promote usage in accordance with the type of scheme, as defined in the business model
- Smart card usage makes it particularly easy to access bicycles, as seen with the difference between the Lyon and Paris schemes. Queues at docking terminals are unpopular and may limit the success of the scheme
- Station location choice is imperative to create an effective, safe, usable network and to minimise the requirement for bicycle re-distribution. Where re-distribution is required, this should be done in an environmentally friendly and efficient way
- Innovative methods to identify land to locate stations will be needed, such as the car parking utilisation seen in Barcelona and Paris
- The bicycles need to be robust and able to docked easily into a secure docking station. They could potentially be used up to 10 times a day. They will be outside at all times and open to vandalism and being bumped around. They must be sturdy, strong and secure, while at the same time be easy to manoeuvre. They also need to be as difficult to steal and vandalise as practicably possible
- Maintenance must also be easy, with as much work completed on site as possible. Standardised parts, on site storage facilities and versatile trained staff will help this process run smoothly
- The scheme needs to be visible and easily identifiable to its customers. Any potential scheme would be self-promoting, with more and more people using the scheme increasing its visibility, promoting further growth in usage
- ‘Teething’ problems should be ironed out as soon as possible after the introduction of a scheme as users will switch away quickly if the scheme is problematic. This can be achieved with the targeting of demand through a phased introduction of the system
- Finally, project governance should be made clear from the start. The implementation of schemes in cities which have established strong, effective working relationships has been far quicker and smoother

1.2 Current position in London

1.2.1 Background

116. London’s population was 7.5 million in 2005 and is growing by approximately 90,000 people per year. There are approximately 10 million journeys by public transport and a further 17.2 million by car each day in London. Some 22 per cent of trips in London are completed by walking or cycling, with these modes experiencing more growth than any other. In 2004, 0.4 million journeys were made by bicycle, while walking accounted for 5.6 million journeys. London’s geography is ideal for cycling, as central London and many parts of Inner and Outer London are relatively flat. Journeys in central London alone account for four per cent of the total journeys across London, but three quarters of these trips in central London are completed by cycling or walking. There are also 14,000 people entering London by bicycle in the morning peak each day
117. London had been experiencing a long-term decline in cycling since 1950. However, in recent years, particularly in central and Inner London, cycling has been steadily increasing, with an 83 per cent growth in the number of cyclists over the past seven years³. TfL’s data shows that cycle usage is increasing significantly, and the demand for cycle parking and other infrastructure has steadily increased as a result of this increased demand. The modal share of cycling in London is currently around 1.9 per cent
118. Bicycle ownership is high, with about 17 per cent of Londoners owning a bicycle with approximately 1.4 million bicycles owned in the city. Just under one in three Londoners have access to a bike, with one in ten cycling

- at least once a week. Four in ten 11-15 year olds cycle at least once a week. Men aged 25-44 are the demographic group most likely to cycle, accounting for 40 per cent of all cycle trips
119. There is a noticeable gap in attitudes between cyclists and non-cyclists. Cyclists think the bicycle is fast, convenient, reliable, healthy, good value and enjoyable, giving a sense of control and freedom. However, non-cyclists perceive cycling as dangerous and something which they wouldn’t wish to be associated with, although the idea of cycling is appealing from an environmental, health and enjoyment point of view
120. The barriers to cycling or cycling more often are either infrastructure related, which can be addressed by hard measures such as cycle lanes; or image related barriers which require a softer approach such as training and advertising
121. The poor image of cyclists (which is even held by many cyclists themselves) is highlighted as an important, but possibly underestimated, barrier to continued growth in cycling. Many parents do not support their children cycling to school because they are concerned about their child’s safety

I22. The following diagram shows the percentage of cycle trips by purpose (London Annual Travel Survey 2001)

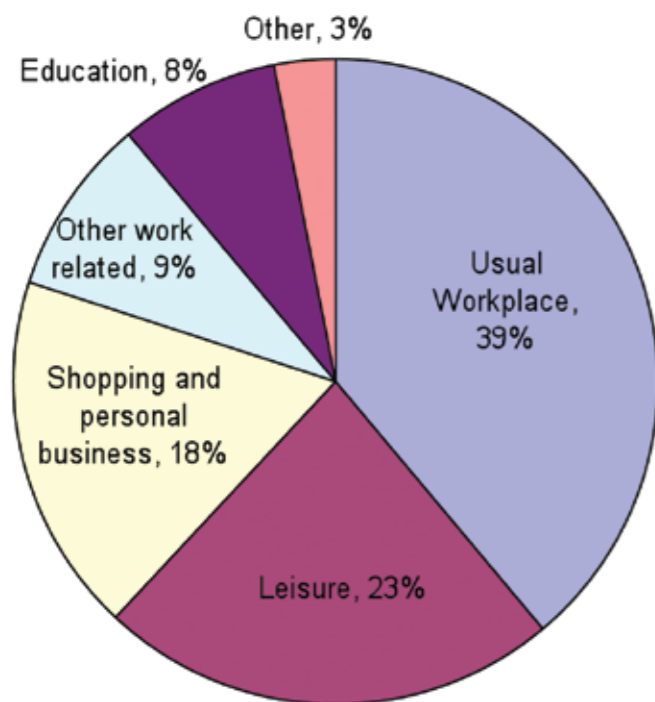


Diagram I.2.1 Source: London Travel Report, 2005

I23. The following table shows the distribution of cycle trips between different areas of London on a typical weekday:

Table I.2.1
Cycle trips made by inhabitants of Greater London (2001)

Number of cycle trips	Trips	%
Within central London	5,934	2
Within Inner London	84,430	30
Within Outer London	117,145	41
Between central and Inner	43,194	15
Between central and Outer	7,268	3
Between Inner and Outer	20,711	7
Between Greater London and rest of UK	6,483	2

Source: LATS 2001

- I24. The cycle hire study area is restricted to Central London; cycle trips made within this area account for just two per cent of the total trips made (based on 2001 data)
- I25. TfL aims to achieve five per cent mode share for cycling by 2025, requiring an additional 60,000 daily cycle trips. There is a significant 'near market', with a predicted ten per cent of people who are likely to start or increase cycling
- I26. Congestion Charging has had a very positive effect on cycling levels in central London. Cycle flows into the charging zone have increased by around 30 per cent. Overall baseline data on cycling levels in 2000/2001 is limited. However, TfL's London Travel Report 2003 (TfL 2004) shows that of the

26 million journeys made every day in London, including people commuting, 300,000 are made by bicycle. Roughly the same numbers of journeys are made by taxis, minicabs and the Docklands Light Railway (DLR) together. There has been an overall increase of 49 per cent of inbound pedal cycles into the central London charging zone. Modal share for bicycles has increased from four per cent in 2002 to seven per cent in 2006 inside of the central London charging zone. Cycling kilometres have increased by 43 per cent during the same period.

I.2.2 Collisions involving pedal cyclists

I27. Casualty figures are highly variable, but there were approximately 3,000 people slightly injured in casualty related accidents involving cyclists and 500 killed or seriously injured in greater London in 2006 (which is a 50 per cent decline on baseline figures). The following table shows the number of accidents occurring in each of the London boroughs, which are either wholly or partially in central London Travelcard zone 1:

Table I.2.2

Pedal cyclists involved in casualty related accidents - London boroughs which are either wholly or partially in central London Travelcard Zone 1 - 2006

Borough	Number of casualty related incidents			
	Fatal	Serious	Slight	Sum
City Of London	0	21	102	123
Westminster	1	39	235	275
Camden	2	16	151	169
Islington	1	16	144	161
Hackney	3	16	122	141
Tower Hamlets	1	16	98	115
Southwark	0	21	191	212
Lambeth	1	26	174	201
Kensington & Chelsea	1	22	121	144
Total	10	193	1338	1541

Source: London Road Safety Unit

1.2.3 Bicycle theft in London

128. The following table shows the numbers of recorded bicycle thefts in each of the London boroughs which are either wholly or partially in central London Travelcard Zone 1

Table 1.2.3

Recorded bicycle thefts in each of the London boroughs which are either wholly or partially in central London Travelcard Zone 1

Theft/Taking of Pedal Cycles

Borough	2005/06	2006/07
Westminster	1,453	1,277
Camden	1,521	1,329
Islington	1,821	1,682
Hackney	1,111	1,167
Tower Hamlets	1,307	1,061
Southwark	1,191	1,248
Lambeth	1,196	1,022
Kensington & Chelsea	919	758
Total	10,519	9,544

Source: London Metropolitan Police

129. It is likely that the figures presented are an underestimation of the true total as, according to the Metropolitan Police, up to 50 per cent of bicycle thefts go unreported

1.2.4 Clear Zones Partners position on cycling

(information taken from borough Local Implementation Plans)

Westminster

130. Westminster City Council is fully supportive of TfL's Cycling Action Plan⁴. The City council is committed to the current London Cycling Network Plus (LCN+) programme, as well as developing certain routes through the Royal Parks as 'Green Corridors' in partnership with the Royal Parks. The Council is also dedicated to increasing the amount of cycle parking in the borough. The borough has concerns over matters such as street clutter and competition rules that all local authorities are bound by in terms of developing a possible cycle hire scheme through a formal procurement process. The Council is also committed to the London road safety target of a 50 per cent reduction in the number of cyclists killed or seriously injured in road accidents

131. With regard to a potential cycle hire scheme, if implemented, the Council has made it clear that consideration will be made to docking stations replacing small areas of visitor car parking, especially in squares, of which there is an ongoing space rationalisation programme

The City of London

132. Cycles now make up one in ten of the vehicles on the streets of the City of London and numbers continue to grow. The local cycling programme seeks to ensure that conditions in the city for cycling are further enhanced so that cycling becomes a common and popular mode of choice for journeys around the city. The City of London has identified a need to introduce areas that are free from motor-vehicle traffic and hence friendlier to cyclists.

It has also identified the following, which would help to make the cycling a more attractive option:

- Low volumes and speeds of traffic
- Much greater permeability through removal of, or exemptions from, one-way streets and gyratories
- A clean, tidy, vandalism and graffiti-free and obviously cared-for environment
- Good lighting provision
- A safe, crime-free environment

133. The city is developing cycle audit procedures to formally assess the impact of schemes on cyclists. The City of London has also identified that the greatest need for cycle parking in the city is at railway stations

Camden Council

134. Camden Council is fully supportive of promoting cycling as a sustainable form of transport that has both environmental and health benefits. It has made great strides in introducing cycle training for both young people and adults. A number of promotional events are carried out throughout the year including a staff 'bike to work day' and training. Camden aims to encourage cycling within

the workplace through leading by example. Camden Council has, for a number of years, operated a scheme of pool cycles for council staff. Camden is also committed to improving safety and providing cycle facilities such as cycle parking and cycle lanes. The needs of cyclists are considered when designing and implementing any scheme. Camden has a cycling plan that outlines the Council's objectives and targets, including reducing cyclist casualties, monitoring and the implementation of cycle facilities and cycle parking

135. Perhaps the greatest barrier to cycling in Camden is cycle theft. In the year 2004/05 there were 1,517 reported cycle thefts in Camden, one of the highest cycle-theft rates in London. It is estimated by the Metropolitan Police that the actual figure is approximately 50 per cent higher, as many bicycle thefts are not reported

The Royal Parks

136. The Royal Parks allows access to its green spaces for cyclists. This is determined by ensuring that the safety and enjoyment of other park users are not adversely affected. Wherever possible, cycle routes in the park link with designated cycle routes outside the park. Generally, cycle routes in the parks tend to be kept to the perimeter. This is because the parks get very crowded. It also helps preserve the landscape character and quality
137. The Royal Parks is implementing projects for improving cycling provision, both for commuters and cyclists who do not currently use the parks. Their participation in the feasibility study for cycle hire is welcomed and gives an indication of their commitment to cycling

1.2.5 Is there potential for cycle hire in London?

138. There is a pronounced increase in cycling usage across the Capital, more money is being spent on cycling facilities and more people are considering taking up this cheap, healthy and environmentally friendly form of transport. A cycle hire scheme would add further momentum to this trend and increase the accessibility of cycling for certain groups
139. Safety is improving and traffic is lower in central London mainly, as a result of the Congestion Charge, although it should be noted that congestion in the original zone has slightly increased since the western extension. There are still some issues that need to be addressed to improve the chances of success of a scheme. Cycle routes are improving all the time, but this must continue, alongside increasing the number and legibility of signs. A cycle hire scheme is likely to increase the number of inexperienced cyclists on the roads. Appropriate safety advice should be given to a potential scheme operator if such a scheme were to go ahead. It is proposed that sections of highway network should also be examined and where appropriate, engineering measures are implemented in order to improve safety for cyclists. Location of docking stations must take into account conflict with other users (mainly pedestrians) and also urban realm and site heritage issues

1.3 Existing systems

I40. The following section summarises the main operation systems in use across Europe, and a brief analysis of their main strengths and weaknesses

Fixed docking stations

I41. Docking stations are located at regular intervals across the city, with a capacity of between five to 50 bicycles at each. This model is conducive to large-scale schemes with high numbers of bicycles. The scale of the scheme itself and its high-visibility, produces a knock-on effect increasing the success of the scheme. Such schemes are robust, and relatively secure, however relatively expensive. They require a significant commitment from all parties involved

Flex system

I42. Bicycles are located across the city with no fixed locations. They are stand alone, and need a telephone system to unlock and use. The bicycles must be returned at road intersections. Such schemes are highly flexible and adaptive to the needs of the city and are relatively inexpensive to implement. The schemes lack a level of visibility, especially as they tend to be smaller in size. It can also look untidy and the freestanding bicycles may create indemnity issues or not fit in with the streetscape

Train station orientated

I43. This is a scheme based purely on demand at and around mainline rail stations. Pricing allows longer-term hire, typically one day. It could offer a bicycle option for mainline commuters, which can be combined with secure conventional cycle parking and cycle shops. This would not be the wide scale scheme seen in other cities and may suffer as a result. Tourists would not be likely to use the scheme and it would also be dependant on procuring space around train stations, which is in very short supply. There is also likely to be much lower demand for such an option as it does not remove the barrier of cycle theft which people experience when parking their bicycle on the street

Bike library

I44. This is a scheme that loans bicycles out for longer periods of time (ie half a day or more). This would be more appropriate for the after rail trips and for tourists but may be problematic regarding competition with private firms. They will have far fewer trips per bicycle than a docking station type scheme as they are hired for longer periods of time. They are also more susceptible to theft

Pool bikes

I45. This scheme would focus on providing bicycles to large employers across the capital. Membership would orientate around which company people worked for, and provisions for parking and showering would be required at offices

1.3.1 Analysis of different docking mechanisms

I46. The following table provides details on the main types of docking mechanisms that have been utilised in existing schemes:

Table 1.3.1

Analysis of different docking mechanisms

	How does it work?	Strengths	Weaknesses
Fixed	Fixed 'posts' to which the bicycle is attached	Easy to locate, a visible sign of the location of stations and the extent of the scheme	Expensive and relatively inflexible
Semi-flex	Hire stations equipped with cables (attached to a wall or existing cycle stand), which are attached to bicycles when docked. Bicycles are taken out and returned by use of telephone and pin code	Able to accommodate up to ten bicycles in a single car parking space (compared to four with the fixed system)	Bicycles are prone to falling over and being regarded as untidy on the streetscape
Flex	Bicycles are self-locking; a metal pole is locked through the spokes. Bicycle is then left in a specific area and accessed by telephone and pin code	Extremely flexible and convenient for the user once they have accessed a bicycle	Difficult to find bicycles and the system relies on trust in terms of returning bicycles and communicating to the system the location of a returned bicycle

1.4 Conclusions of this section

147. A detailed review of existing schemes has led to the identification of best practice, the definition of success factors and specific recommendations for London. The next sections of this report will address questions on existing demand, space requirements and other key factors. However, a number of conclusions can be made from the review of existing schemes:

1.4.1 Main findings

148. From a technical perspective a cycle hire scheme in London may be feasible and, subject to the results of the demand analysis in the next section, a bespoke system for London could be created

149. Theft and vandalism in the existing schemes that have been considered have generally not been as severe as predicted. However, the relative levels of bicycle theft compared to cycle hire theft in these cities was not covered by this study

150. Cycle hire has helped to increase bicycle modal share and encouraged more people to cycle on private bicycles

151. Delivery of any comprehensive scheme will require full support (institutional and political) from TfL, the London boroughs / local authorities, the Greater London Authority and other stakeholders such as Network Rail and the Royal Parks

152. The current situation in London is identified as suitable for a cycle hire scheme. The recent pronounced increase in cycling, the reduction in cycling accidents (especially in the central London area) coupled with increased spending on cycling facilities and the perceived financial and health benefits are serving to encourage more people to take to their bicycles. A cycle hire scheme could increase the momentum of this trend and break some of the existing barriers to cycling in London including:

- Access to a bicycle
- Theft
- Parking and storage
- Maintenance

153. Some barriers and issues will still remain and need to be addressed properly. These include:

- Safety concerns
- Navigational issues (difficult to navigate in central London)
- Use of a bicycle by inexperienced users
- Allocation of resources to a cycle hire scheme could affect the delivery and implementation of other measures
- Payment mechanisms for hiring the bicycles (payment, deposits, smart cards, credit cards etc)

154. The lessons learnt from other European schemes suggest that a cycle hire scheme for central London should include the following:

- A deposit mechanism
- An annual subscription or registration process
- A strategic pricing structure
- A Smartcard system
- Strategic location of docking stations
- Innovative docking points to make the most use of available space
- Robust bicycles
- Minimum use of vans to re-distribute bicycles
- Simple maintenance
- A visible and easily identifiable scheme
- Available for use by tourists

155. On street advertising space is not supported by the London boroughs, the Royal Parks or TfL as a funding option for central London. However, there may be opportunities from sponsorship and discreet advertising that is not on street

156. A pilot scheme is not recommended as it would fail to estimate demand adequately as the success of the scheme depends on the correct number and density of stations to cater for the potential demand

157. The implementation of a scheme has to be undertaken as part of an integrated package of measures to improve cycling; hence it will need to include, or link into, existing additional measures such as:

- Marketing and communications campaigns (with the various partners and stakeholders involved)

- Training
- Additional infrastructure (cycle parking, cycle lanes, improvement to junctions)
- Safety and cyclist responsibility campaigns
- Signage / legibility

158. Given the experiences learnt from schemes elsewhere, and having examined the current situation in London, then the objectives of a cycle hire scheme in central London could be as follows:

- Provision of a new emissions-free individual transport system that will enable short-trips within central London
- Address barriers to cycling such as access to a bicycle and theft
- Increase modal share of cycling and contribute to TfL and borough-wide objectives on cycling
- Help create a more walking and cycling focused city with less motorised traffic
- Health benefits associated with increased levels of cycling
- Journey time and journey time reliability benefits
- Reduction in overcrowding on buses and the Underground in central London
- Promote tourism

Section 2

Demand analysis and customer research

Background

159. It is crucial to know if sufficient demand exists to ensure a scheme is feasible and represents value for money. The successful implementation of other schemes around the world provides the opportunity to learn from their experiences in terms of provision of service (density of docking stations, number of bicycles etc) and usage of bicycles. Average daily use of the bicycles is a critical success factor for the scheme, both in terms of efficient use of the infrastructure and in promoting cycling. Being able to forecast demand will also help match the potential number of users with sufficient bicycles and docking stations. Furthermore, it will improve understanding of potential markets

160. This section includes the following areas:

2.1 Differences between central London and Paris:

Highlights the main geographical and socio-demographic differences of the two cities. This allows the central London cycle hire scheme to be placed within the context of the city's specific characteristics

2.2 Tourists and visitors:

Provides an estimate of daily tourist and visitor trips made in central London suitable for cycle hire.

2.3 The after rail market and additional business trips:

Provides an estimate of trips made by after rail commuters from rail terminals to their final work destination in central London. It also provides an estimate of additional trips made by after rail commuters (in addition to their journeys to and from Zone 1)

2.4 Market research:

Provides an estimate of the likely uptake of a cycle hire scheme for the various markets

2.5 Demand analysis:

Provides an estimate of potential demand for a cycle hire scheme in central London

2.6 The night time market and seasonality:

Provides a brief explanation of the night time economy and possible seasonality

2.7 Why a pilot fails:

Explains in detail why a pilot scheme is not recommended

2.8 Impact to taxi trips:

Brief analysis of potential modal shift from taxis to cycle hire

2.9 Conclusions of this section

161. An analysis of existing data was undertaken to provide a realistic overall estimate of potential demand. This allowed the calculation of potential cycle hire trips from the total number of trips currently made within central London

162. More specifically, an analysis was made of all trips which have an origin and destination within London's Travelcard Zone 1. This is based on the results of the London Annual Travel Survey 2001 (LATS 2001)⁵, which includes all residents from within the M25. Tourist and visitor trips were estimated from other sources, while after rail commuter trips were taken from LATS rail data. This analysis was then combined with the market research data to calculate the proportion of trips likely to switch to a cycle hire scheme. Appendix B shows data sources used for this study

163. It is worth mentioning that prior estimates of demand for cycle hire made by other cities have been exceeded by actual uptake (Barcelona, Lyon, Paris). This does not mean that this will necessarily be the case in London, although a risk of underestimating demand might be present

⁵ At the time of writing LATS 2001 data was the most recent available source

2.1 Differences between central London and Paris

164. London Analytics was commissioned to look at the elements of the Parisian success from the demand analysis point of view. Paris was selected as it is the biggest scheme currently in operation. Also the city of Paris shares some characteristic with London as a 'world city' (similar population, number of visitors, public transport provision, etc). The findings were then compared to the study area in London
165. The main differences between the study in London and the existing scheme in Paris are as follows:
- Smaller deployment area – 40 km² in London compared with 87 km² in Paris
 - Lower population within the deployment area – 400,000 in London compared with 6,500,000 in Paris
 - Lower population density – 12,000 people per km² in central London compared to 24,000 in Paris
 - Fewer trips are made by the inhabitants of the metropolitan area – 815,000 (Zone 1 to Zone 1) in London compared to 6.5 million in Paris.
 - Fewer trips above 1 km – 256,000 trips in London compared to 3.25 million in Paris (average weekday)
 - Higher cycling mode share in Central London (increase of 86 per cent since 2000 in London compared to 46 per cent in Paris in the same period up to the introduction of Vélib')
 - Much greater employment density in London than Paris. Paris has 1.6 million jobs with a density of 18,390 jobs per km²

– London has 1.53 millions jobs with density 45,000 jobs per km². By 2025 London is expected to have 1.89 million jobs with a density of 55,588 jobs per km²

166. The observed uptake in Paris is around three per cent (including trips by tourists and visitors). Of all existing trips, three per cent are made by cycle hire. The majority of these trips are made by residents within the deployment zone (the Boulevard Périphérique)
167. Based only on trips made by residents London has fewer potential trips than Paris, resulting in a possible lower predicted usage of cycle hire. However, in addition to resident trips, many thousands of trips in London will be made by tourists, business visitors and rail commuters

2.2 Tourists and visitors

168. London has a significant number of visitors and tourists – 26 million a year in greater London (compared to 15 million in Paris). They also stay longer with an average length of stay of 4.6 nights (compared to 2.1 nights in Paris).
169. Based on tourist and visitor data from the London boroughs, it has been assumed that 75 per cent of trips are made in central London. For example, even if a tourist or a visitor stays in Outer London they are likely to travel into central London for some of their stay. Many tourists will stay (and make trips) within central London for the entirety of their stay
170. Assuming a conservative rate of three trips per day and a trip length distribution profile similar to that of trips made by residents (around 30 per cent of trips are longer than 1 km) this gives an estimated 230,000 daily trips of more than 1 km by tourists and visitors to London
171. The calculation is as follows: 26 million visitors and tourists a year equates to around 71,233 arriving daily. Each staying 4.6 days and undertaking three trips per day equates to around 983,000 daily trips. Of these, 75 per cent are undertaken in central London and around 31 per cent are of more than 1 km. This equates to 230,000 daily trips of more than 1 km by visitors and tourists to London

2.3 The after rail market and additional business trips

172. Around 522,000 trips terminate in central London at National Rail stations, most of which take place in the morning peak. The busiest eight stations produce approximately 300,000 trips, for which the journey between the station and the final destination, within Zone 1, is in the range 1 km–8 km (LATS 2001)
173. LATS data indicates that the average Zone 1 commuter makes 0.56 trips per day in Zone 1 (in addition to their journeys to and from Zone 1). Commuters coming from outside the greater London (not included in LATS) area are bound to make additional trip throughout the day, in addition to their journey to and from work
174. If we assume same travel patterns, 58 per cent of the 522,000 trips terminating at a central London National Rail station would make 0.56 additional trips throughout the day. This equates to 168,000 additional journeys during the working day. This figure is used in table 2.5.1 to estimate total demand

2.4 Market research

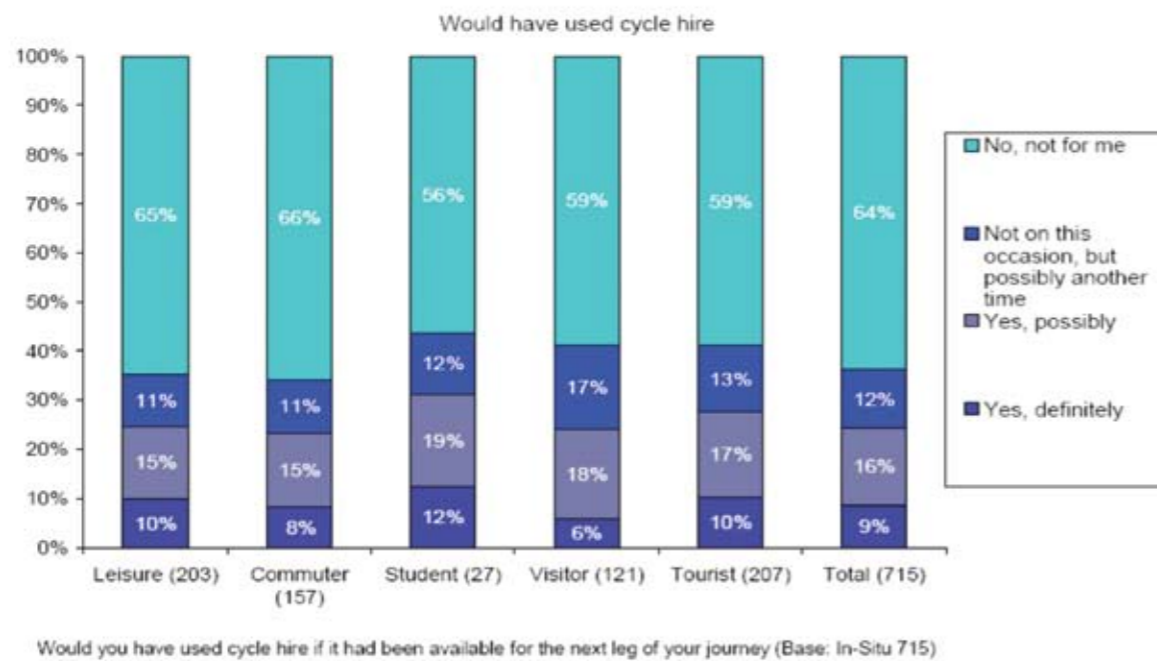
175. The key output required from the market research was an estimate of the likely uptake of a cycle hire scheme on an average day
176. Supplementary aims were to:
- Identify the segments most likely to use a scheme and the characteristics of scheme users
 - Explore the relative importance of different barriers to use
 - Examine the sensitivity to some key aspects of the design of the scheme

177. Steer Davies Gleave was commissioned to undertake the research to understand the potential uptake of each market segment. Five key market segments were identified:
- Leisure – residents making predominantly local leisure trips
 - Commuters – people working in the area
 - Students – people at college / university in the area
 - Visitors – non-London residents coming into central London
 - Tourists – people staying overnight in London, including from overseas

Business trips during the working day were not specifically considered.

178. The market research involved two complementary surveys: 720 face-to-face interviews conducted 'in-situ' (on street or at station in central London) and 2,009 on-line / web surveys. The research was carried out in December 2007. Figure 2.4.1 and table 2.4.1 show the potential uptake of trips as predicted by the market research

Figure 2.4.1
Market research results



179. **Table 2.4.1**
Uptake predicted by customer research for different user groups who would 'definitely' use the system

	Leisure	Commuter	Student	UK Visitor	Overseas visitor	Average
% Uptake predicted in customer research	10%	8%	12%	6%	10%	9%

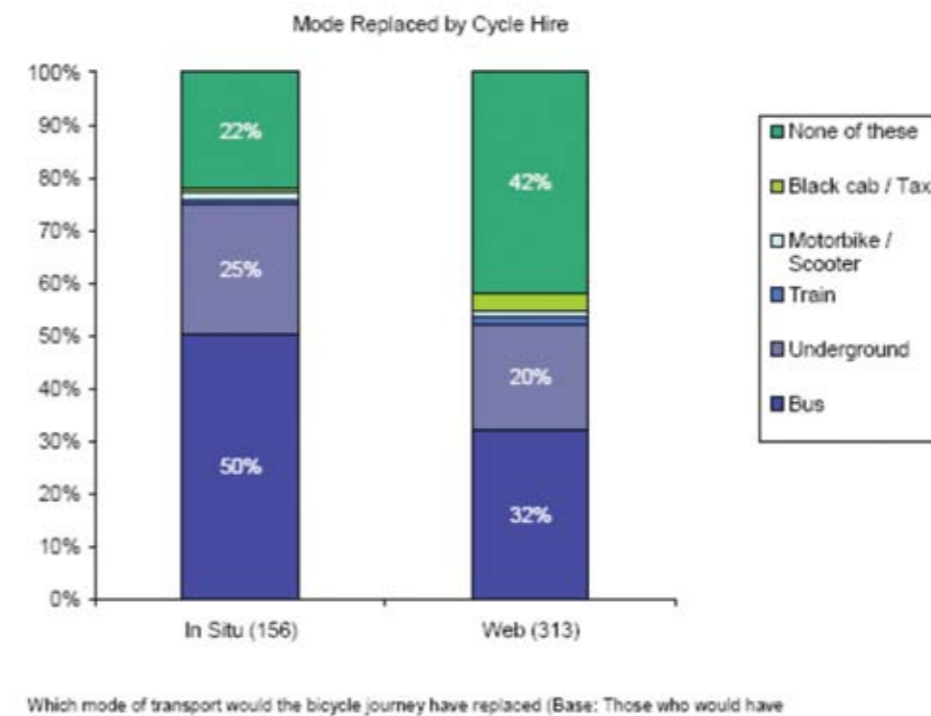
180. The uptake is fairly consistent across all the different user groups. The average percentage uptake, nine per cent, is significantly higher than the observed uptake in Paris of approximately three per cent

181. The reason for a higher uptake in London could be explained by the following factors:

- The cost and level of congestion on the public transport network is higher in London than in Paris and hence a mode shift to bike might be a more attractive option. A weekly Travelcard in London costs approximately 50 per cent more than in Paris
- From the recent increase of levels of cycling in London it could be said that Londoners have a better disposition to cycling than Parisians
- The age profile for the comparable metropolitan populations of Ile de France and Greater London shows that 50 per cent of the population of Greater London, compared to 45 per cent of the population of Ile de France is between 15 and 44 years old – the age group most likely to cycle

182. Although there is a natural tendency to be affirmative in stated preference surveys, only those respondents that said they would 'definitely' use the system were included in the uptake figures. Also, the study was conducted during the winter months, so figures are considered to be realistic. The following figure (2.4.2) shows the mode of transport that the cycle hire journey would have replaced in both the in-situ and web survey. Both surveys show that the majority of the mode shift would be likely to come from bus and the underground. The vast majority of the 'none of these' responses are referring to trips that are currently walked

Figure 2.4.2
Customer research; Mode replaced by cycle hire



2.4.1 Other findings from the market research

183. Supplementary information was captured from the market research. This includes the following:
- Accessing bicycles by telephone was seen as a minor deterrent – 14 per cent of respondents said that they would definitely not use these types of system
 - There was some interest in hiring for a whole day: 26 per cent of respondents said they would prefer to hire for the whole day. This reflects the fact that a cycle hire scheme could complement longer day hire schemes provided by private companies
 - Scheme uptake is likely to be around 20 per cent less after dark
 - A free period of use is a significant incentive

Table 2.5.1

Estimated breakdown of cycle hire trips by journey purpose (except after rail market)

		Zone 1 to Zone 1 daily trips over 1km	Uptake predicted by customer research	Estimated number of potential daily cycle hire trips
trips by residents of greater London (inside M25) excluding after rail (LATS 2001)	Usual workplace	70,400	8%	5,632
	Other work related	21,760	8%	1,741
	Education	11,776	12%	1,413
	Shopping and personal business	75,008	10%	7,501
	Leisure	67,328	10%	6,733
	Other (inc escort)	28	9%	876
Total trips in zone 1 over 1 km		256,000		23,896
Additional business trips		168,000	8%	13,440
Visitor trips based on visitor numbers and length of stay data *		230,000	8%	18,280
Total daily trips (excluding after rail)		616,160		55,616

Data provided by Visit London

2.5 Demand analysis

184. Altogether, 815,000 trips occur entirely within Zone 1 on a typical weekday (LATS 2001). However, 1km to 8km is considered to be the distance over which cycling is time-competitive with all other modes. Any trip of less than 1 km can be walked in less than 12 minutes (at a speed of 5 kph), hence cycling might not be competitive. On the other hand, an 8km trip would take more than half an hour by bike (at an average speed of 15 kph), at which point bus or underground becomes a better alternative. As the entire study area is within the 8km range, only trips that are less than 1 km should be discounted. Of the 815,000 daily trips, 256,000 of these are over 1 km
185. If the predicted uptake from the market research is applied to all trips (of more than 1 km), which have an origin and destination within London's Travelcard Zone 1, it is possible to estimate the number of trips by journey purpose that would be undertaken by cycle hire. This is shown in table 2.5.1 below:

186. Based on the total number of 55,616 potential daily trips by cycle hire; the following estimation can be made on the provision of bicycles.

Table 2.5.2

Bicycle provision vs. daily average use per bicycle

Number of bicycles	Daily average use per bicycle	Max number of daily trips (based on 15 trips per bicycle)
5,000	11.1	75,000
6,000	9.2	90,000
7,000	7.9	105,000
10,000	5.5	150,000

187. The table above shows the average use per bicycle, per day, given a certain bicycle provision. It also shows the potential number of daily trip the whole bicycle fleet could undertake
188. Operators consider that the optimum average use per bicycle per day should be between eight and ten. This reflects, in their opinion, the optimum balance between demand and supply. Although bicycles have been known to undertake up to 15 trips per day this implies higher operation costs and more re-distribution. Also, if a bicycle is being used for eight trips a day there is enough resilience to cover fluctuations in demand or to mitigate the risk of underestimation of demand. Operators also consider that less than five trips per bike is, perhaps, reflecting over provision of bicycles

189. Based on the calculations presented above and the recommendations by various operators (Paris, Barcelona, Lyon), it is concluded that there is enough demand to make a central London scheme feasible. It is recommended that a minimum of 6,000 bicycles should be provided. This analysis does not include the after rail market

2.5.1 The after rail demand

190. The reason why the after rail market is not included in the analysis above is that the service patterns for this market are significantly different. For the after rail market around 300,000 trips (suitable for cycling - in the range 1km to 8kms) terminate at the eight central London mainline stations. Assuming an uptake of eight per cent, this would mean that around 24,000 trips would be by cycle hire
191. Of these 24,000 trips, 90 per cent of them would take place in the morning peak (between 07:00 and 10:00). This equates to 21,600 trips concentrated in a three-hour period. In principle this means that to cater for this market 21,600 bicycles would be required (as the demand is concentrated over a short period of time)
192. Even if a significant re-distribution effort took place that could turn around bicycles in one hour this would mean that around 7,200 bicycles would be required along with the necessary logistics and equipment to re-distribute them
193. Another issue is that this large number of bicycles would then need to be located in the centre of London but not all would be used until the afternoon peak (as a return journey to the rail station). This means that a significant number of bicycles would only make two trips per day. This would bring down the average use per bicycle per day, making a potential scheme less cost effective

194. Finally, the space necessary to allocate 21,600 bicycles or even 7,200 bicycles at the main railway stations is not available in the short-term. Even allocating bicycles immediately adjacent to the railway station would be a significant challenge
195. In Paris the cycle hire stations are intentionally located away from the mainline stations. From the rationale above it is suggested that London follows the same principle and that the after rail market is not catered for in the initial implementation of a potential scheme in London
196. There is the opportunity to cater for this market but its implementation needs to be over a longer period of time. The complex and substantial redevelopment plans for main railway stations such as Victoria and Cannon Street, coupled with the different on-street logistics needed for a scheme that caters for the after rail market, means that further studies will be required

2.5.2 Number of docking stations

197. The exact number of docking stations within the deployment area will be determined during the implementation of the scheme. It has, however, been decided that a similar density to the one provided in Paris should be pursued. This is a minimum of eight docking stations per km². Of course, the number of stations varies depending on the average number of bicycles per station
198. Operators have suggested that a ratio of 1.7 spaces per bicycle should be provided as a minimum, as is the case in Paris. Based on this, and the initial provision of 6,000 bicycles, it equates to 10,200 docking points

199. Again, there is no exact figure as to the number of points per docking station. Paris has an average of 24 but this varies depending on each site. Some sites will have more than 24 docking points, some will have less. Some sites have up to 75 spaces. In London this will be determined when the scheme is implemented and experience elsewhere shows that adjustments will need to take place once the scheme is operational
200. It is, however, recommended that enough bicycles are concentrated at each docking station. This is preferred to having too many docking stations with few bicycles as this would make re-distribution more difficult. The following analysis is provided based on 6,000 bicycles and 10,200 spaces in a deployment area of 40 km²

Table 2.5.3

Number of stations and density based on 10,200 spaces required on a deployment area of 40km²

Average number of docking points per docking station	Average number of docking stations required	Average number of stations per km ²
22	464	12
24	425	11
26	392	10
28	364	9
30	340	9
32	319	8
34	300	8

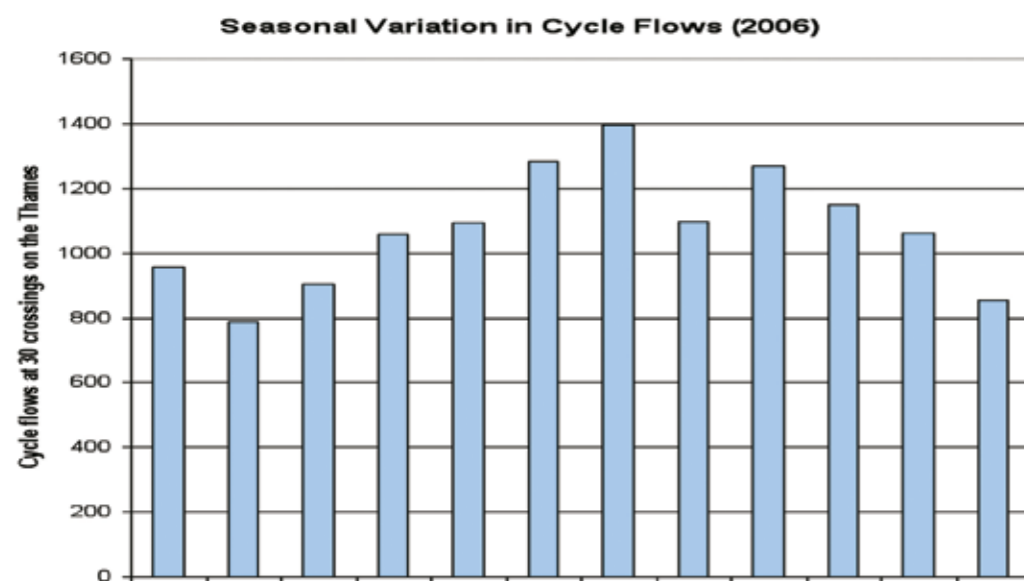
201. As can be seen above, the minimum density required is achieved with 300 stations. On the other hand, 392 stations provide good density with a good concentration of bicycles. Finally, 425 docking stations might be difficult to achieve (based on space availability). Based on the assumptions and the calculations above it is recommended that anything between 300 and 400 stations are provided

2.6 The night time market and seasonality

202. The pattern of use through the day in Paris largely mirrors the use of the metro and buses. This study has not examined in detail how cycle hire trips would be distributed throughout the day in London, but it is expected that usage will be high at peak times. It is forecast that demand from tourists will result in usage outside peak hours. Use of the scheme is likely to drop off significantly after dark as this was identified in the customer research as a barrier to use

Chart 2.6 shows the seasonal use of bicycles in London. It highlights that the flow in the highest month, July, is 77 per cent higher than that in the lowest month, February. Use of cycle hire is likely to be less variable according to season and more dependent on day-to-day weather conditions. This is because users are able to make opportune trips without 'committing' to take their own bicycle out. However, seasonal variation can be expected and it will probably follow the same pattern observed as with private bicycle use

Chart 2.6
Seasonal variation in cycle flows (2006)



TfL Thames Screenline Cyclists Count

2.7 Why a pilot fails

203. A small-scale pilot should not be used to estimate demand. Due to the network effect of increasing returns, the success of a scheme cannot be determined by a reduced-scale initial implementation. A pilot, if used to test demand, would fail. Sustrans (2005) consulted an expert panel from people who had already set up schemes. The first recommendation from the report stated that:

'A large scale launch of a central London cycle hire scheme is important. If a scheme is to become part of the public transport system there needs to be sufficient bicycles at frequent intervals, much as is the case for bus stops. Bicycles need to be available not only at stations and major interchanges but at intervals frequent enough to make it possible to easily access a bicycle if one is not immediately available at the first choice location.'

204. It is not recommended to implement a disperse scheme, for example with cycle hire stations at strategic locations only. The success of schemes elsewhere has been reliant on having a critical density of stations. This gives people the security to realise that as long as they stay within the deployment zone they will be able to find somewhere to pick up or drop off a bicycle

2.8 Impact to taxis and business travel in general

205. The customer research suggested that one per cent of people from the in-situ interviews and three per cent of people in the web-based survey said that they would definitely use

cycle hire instead of the taxi they were about to take. This reflects primarily the fact that very few people surveyed were about to use a taxi. This sample is not of an adequate size to reach any generalised conclusions about the potential for cycle hire to replace taxi trips. It is reasonable to assume, however, that there may be barriers to the use of hire bikes instead of taxis. These include the need to carry large items of luggage

206. Although more market research would be required to provide a more accurate figure this would be expensive, difficult and time consuming (due to the nature of taxi trips)

207. As with the taxi market, further research would be required to determine how important cycle hire could be for general business travel during the working day. This market could be particularly important for any scheme, as much of the other usage may be restricted to peak hours only. Business trips may complement visitor trips in maintaining a reasonable level of usage outside peak hours, but the impact of this has not been assessed due to budgetary and time restrictions on this study

2.9 Conclusions of this section

2.9.1 Main findings

208. Market research has shown that the potential uptake for a cycle hire scheme is on average nine per cent. The breakdown by each market sector is as follows:

- Leisure – eight per cent
- Commuters – eight per cent
- Students – 12 per cent
- UK visitors – six per cent
- Overseas visitors (tourists) - 10 per cent

209. There are around 55,000 potential daily trips by cycle hire based on existing information (excluding the after rail market). There is always an element of risk, however, in forecasting and the exact demand is difficult to estimate

210. Based on the information available it is concluded that there is enough demand to make a central London scheme feasible

211. It is recommended that a minimum of 6,000 bicycles would be required, located at anything between 300 and 400 stations. A minimum density of eight stations per km² should be pursued

212. Due to space availability and operational issues it is suggested that the after rail market is not catered for in the initial implementation of any scheme

213. Due to the network effect of increasing returns, the success of a scheme cannot be determined by a reduced scale initial implementation – a trial would not work

214. Mode shift from taxis to cycle hire is undetermined due to the very small sample size returned. Equally, cycle hire for general business travel during the working day has not been estimated in detail

2.9.2 Demand analysis – limitations

215. Location specific demand has not been investigated in detail. This should be done during implementation in order to work out the optimum location and size of cycle hire docking stations

216. Key cycling routes have also been excluded from the analysis thus far. Although it should not be crucial for the implementation of the scheme, a potential cycle hire scheme would influence where cycle route improvements should be prioritised

Section 3 Available land

Background

217. To gain an indicative understanding of the available land in central London required for the implementation of the scheme, a brief exercise was conducted with the different partners

218. The objective of this exercise was to test, in a simple and practical way, how difficult it would be to identify available land for the location of cycle hire docking stations. The exercise did not aim to identify specific locations or to gain commitment from the London boroughs to use suggested sites for the implementation of the scheme

219. This section includes the following areas:

3.1 Land availability exercise:

Brief explanation of land availability exercise undertaken with the central London boroughs

3.2 Space requirements:

Description of requirements for allocation of docking stations

3.3 Conclusions of this section

3.1 Land availability exercise

220. Individual short meetings took place with transportation officers in the London Borough of Camden, the City of London, Westminster City Council and the Royal Parks. The main findings from the available land study are as follows:

- One hundred and forty-nine off-street spaces had been identified fairly easily with no significant gaps in coverage of the study area
- There seems to be enough potential space available, which could be used (if appropriate) for the implementation of docking stations
- There is potential for finding spaces in workplaces and private developments

221. Although the exercise fulfilled the objective of the feasibility study it did not cover the following issues:

1. No political commitment could be given to the provision of these spaces as this study was intended to enable this position to be reached
2. The exercise did not cover space availability at mainline railway stations.
3. The exercises did not highlight possible issues regarding the planning permission process that might be required to implement docking stations
4. The exercise did not highlight possible issues regarding competition for space in the highway

5. Some of the spaces identified might not be suitable due to road safety concerns, location or other technical issues
6. No attempt was made to match available space to specific demand as it was not part of the scope of the study. However it remains unproven how good is the fit between the selected sites and local demand. This remains a risk and further work would be required if a scheme was to be implemented.

223. The information provided on possible and probable locations for cycle hire docking stations are shown in Appendix D. An extract of the map is shown in figure 3.1 overleaf as an example

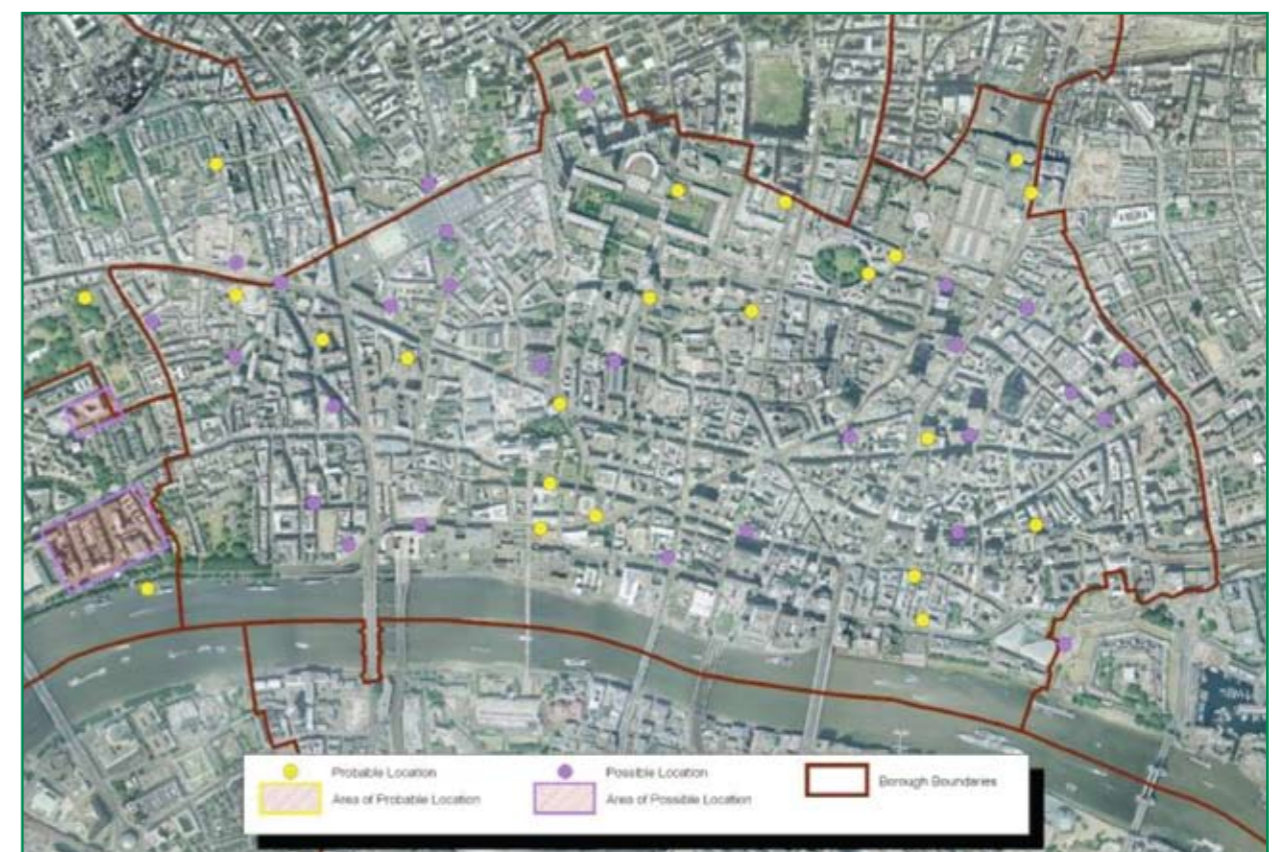
3.2 Space requirements

224. The demand study has identified a requirement for between 300 and 400 spaces throughout central London to place docking stations, if a scheme were to go ahead. Due to implementation issues the exact number of stations is subject to change (although not significantly). However, from conversations with the various scheme operators the following requirements for space allocation have been captured:

- The precise location of the stations will not be determined until the scheme is defined in detail
- Even after implementation, the location and size of some of the stations is subject to change as it is difficult to precisely determine demand on a local area basis
- Flexibility is important to allow docking stations to be easily added or removed in times of fluctuating demand
- It is likely (as expressed by existing operators) that some stations will need to be re-positioned. It is recommended to identify more spaces than originally required in order to mitigate this risk

- It is essential that stations are located near to key areas of high demand such as at visitor attractions, underground stations and large offices. The key visitor attractions for Westminster, Camden, the City of London and the Royal Parks are provided in Appendix C
- A good coverage is required throughout the whole deployment area so that people know that they are close to a docking station

Figure 3.1
Probable and possible available land in the City of London (extract of full map)



3.3 Conclusions of this section

225. There seems to be enough 'potential' space available, which could be used (if appropriate) for the implementation of docking stations
226. There is potential for finding spaces in workplaces and private developments
227. Institutional and political buy-in from the various stakeholders is crucial to secure the space required to implement a cycle hire scheme. This is currently not secured with the boroughs
228. Some issue may arise with local residents as a result of potential loss of private vehicles parking space if a docking station is provided at parking bays
229. Any decision to allocate space to docking stations will have to consider that this space will be lost to other potential uses, including conventional cycle parking, car club bays, and charging points for electric vehicles
230. There are potential risks regarding the planning permission process and changes in traffic orders that might be required to implement docking stations
231. From conversations with the various operators the following recommendations were identified:
- Even after implementation the location and size of some of the stations is subject to change as it is difficult to precisely determine demand on a local area basis
 - Flexibility is important to allow docking stations to be easily added or removed in times of fluctuating demand
 - It is likely that some stations will need to be re-positioned. It is then recommended to identify more spaces than originally required in order to mitigate this risk
 - It is essential that as often as possible, stations are located near to key areas of high demand such as at visitor attractions, Underground stations and large offices
 - A good coverage is required throughout the whole deployment area so that people know that they are close to a docking station

Section 4 Benefits, risks and opportunities

Background

232. The aim of this section is to explore potential benefits and risks of a cycle hire scheme. This will inform decision makers and also steer the implementation of the scheme. This section is not exhaustive but focuses on the main topics

233. This section includes the following areas:

4.1 Benefits of a cycle hire scheme:

Brief explanation of the potential benefits in relation to existing barriers to cycling, as well as additional benefits exercise undertaken with the central London boroughs

4.2 Risks and mitigations:

Description of the main risks associated with the implementation of a cycle hire scheme, as well as a brief description of possible mitigation measures

4.3 Opportunities:

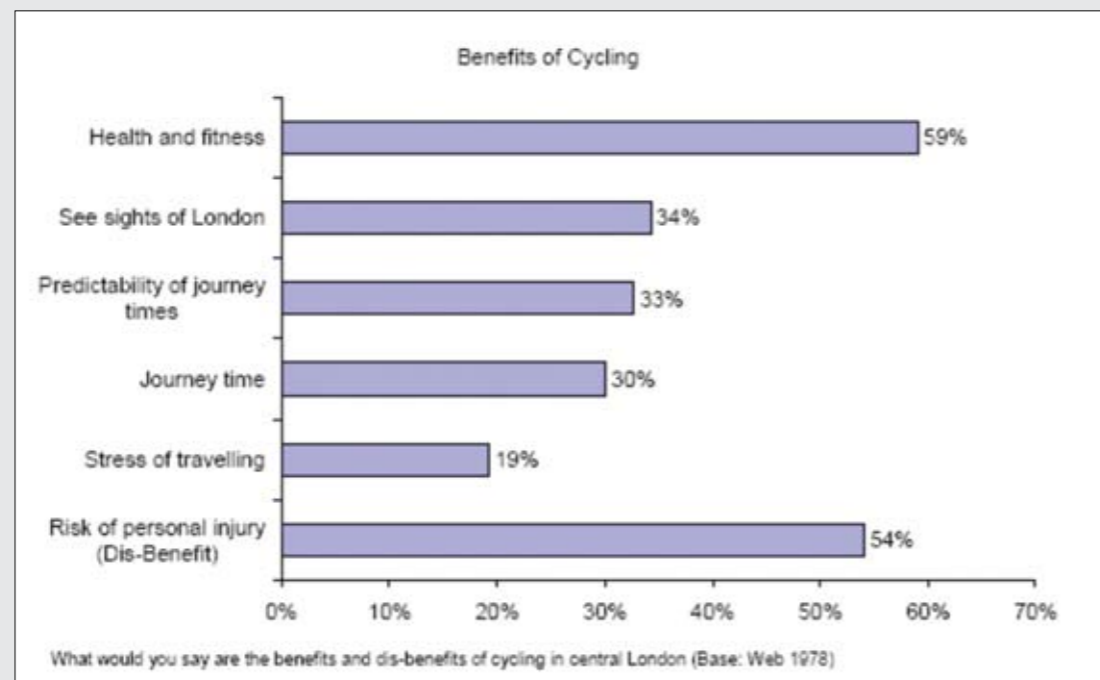
Brief description of existing opportunities associated with a cycle hire scheme

4.4 Conclusions of this section

4.1 Benefits of a cycle hire scheme

234. The perceived benefits of cycling in central London as identified by the customer research are as follows:

Figure 4.1
Benefits of cycling in central London as identified by customer research



235. It is interesting to note that 'risk of personal injury' scores highly with 54 per cent of people mentioning it as a detrimental factor

236. Potential benefits related to a cycle hire scheme might be as follows:

1. Providing a new individual transport mode (accessibility, connectivity with other modes, resilience to the public transport network, options for users). A cycle hire scheme would provide a new mode of public transport to central London. This would serve to raise the profile of cycling and also to demonstrate a significant political commitment by the city towards cycling. It could help to fill 'gaps' in the public transport network and ensure connectivity to and between other modes. It would also add more resilience to the system by providing a third option when there are problems with the Underground or buses

2. Increasing levels of cycling through reduced barriers to cycling: access to a bike, maintenance and theft. The provision of a cycle hire scheme in central London would allow people who were otherwise put off owning a bicycle, due to concerns over theft or maintenance, to try cycling in central London. Experience elsewhere has also suggested that once people start using a cycle hire scheme a high proportion of them decide to start using their own bicycle

3. Helping create a more walking and cycling focused city with less motorised traffic. While mode shift from cars is predicted to be quite low, a cycle hire scheme can help create momentum to introduce additional measures to benefit cyclists. These will help to create a much more cycle and walking friendly city

4. Health benefits associated with increased levels of walking and cycling. Cycling has been demonstrated to cause significant health benefits. According to the BUPA "One rough calculation" suggests that new cyclists covering short distances can reduce their risk of death (mainly due to the reduction of heart disease) by as much as 22 per cent. This is taken from Rutter H. Modal shift. Transport and health.

5. Journey time and journey time reliability benefits associated with cycling when compared to other modes in central London. According to a UKDOT Journey Times Survey (1996):

'For journeys entirely within central London, the average time was 33 minutes by car, compared with 18 minutes by bike. By public transport the journeys took, on average, 31 minutes by rail and 38 minutes by bus. Taxi journeys took 20 minutes on average.'

6. Reducing overcrowding on buses and the Underground in central London. A cycle hire scheme in central London would help to marginally reduce overcrowding at peak times on the Underground and bus network in the area of London where congestion is at its worst. It also has the potential to reduce overcrowding in other areas if, as has been experienced in other cities, the cycle hire scheme causes an increase in levels of private cycling

7. Promoting tourism. Implementing a cycle hire scheme would also enable greater freedom and accessibility for tourists who would be able to experience the sights of London by bicycle at a low cost

4.2 Risks and mitigations

237. The main risks and potential mitigation measures which have been identified as part of the study are shown in the following table:

Table 4.2.1
Main risks and potential mitigation measures

Risk	Mitigation
1. Inaccurate demand forecast	Phased approach, flexibility of delivery, flexible contractual arrangements
2. Theft and vandalism	Deposit, unique design, CCTV, sense of ownership, robust docking technology
3. Safety concerns (public liability issues)	Cycle training, starter packs, targeted safety campaign, quiet routes, minimise risk to tourists
4. Political buy-in land contribution / planning permission	Project to include all partners in the process as early as possible, start the process as soon as possible, political buy-in, use expertise available within TfL and boroughs
5. Conflict with pedestrians (expected)	Safety campaign, enforcement, review clarity of cycle/ pedestrian areas
6. Excessive re-distribution of bicycles	Detailed matching of supply and demand, detailed tender development process
7. Poor uptake of the scheme	Good design, maintenance, pricing and marketing and communications

4.2.1 Underestimation of demand

238. Several cities have underestimated demand – notably Barcelona, which has more than 200,000 registered users for a scheme of just 6,000 bicycles. The bicycles are used an average of 15 times per day and queues at docking stations can be common

239. As a result of this the demand study for central London has focused on using market research as the main factor on which to base potential use of the scheme. Despite this, some uncertainty does remain. The risk that this poses to the project can be mitigated by the following actions:

- Flexible delivery and contractual arrangements allowing a demand responsive roll-out
- A phased implementation that allows the rapid expansion of the system or particular stations in order to meet unexpected demand
- The use of pricing in order to manage demand
- Not to cater for the after rail market initially. This means not placing docking station immediately adjacent to railway terminals (as is the case in Paris)

4.2.2 Theft and vandalism

240. Levels of theft and vandalism have not been as high as predicted in many of the schemes implemented across Europe. In Barcelona, for example, less than five per cent of bicycles were either stolen or vandalised in the first year of operation. In Paris the percentage has been higher at around ten per cent.

However, part of the reason for this is that some people didn't dock their bicycle properly. This allowed opportunist thieves to take bicycles without using force. Such occurrences have, however, become less frequent as people have got accustomed to using the scheme. London is in a fortunate position to be able to learn from examples such as this and ensure that the design is ideally suited to the demands that the Capital will place on it

241. Experience learned from OYBike has been very positive. OYBike currently has 130 bicycles, 100 of which are on the streets of west London. In three years it had 11 bicycles stolen (five of which have been returned and are now back on street). OYBike also commented that the majority of problems of this nature occur in the first few weeks after implementation and can be easily minimised by avoiding locations adjacent to pubs and schools. Although all available evidence suggests that this will not be so serious so as to jeopardise the viability of the scheme. However, given the high level of theft of ordinary pedal cycles in the Capital, theft could still be an issue in London.

4.2.3 Safety concerns

242. There are concerns that the introduction of a cycle hire scheme in central London would cause an increase in the accident rate for cyclists. The introduction of schemes elsewhere has not had this effect. In Lyon, for example, while cycling levels have more than doubled, the number of recorded accidents has increased only marginally. This corresponds to a significant reduction in the accident rate

243. Early figures from Paris also indicate that the accident rate for cyclists has reduced since the introduction of Vélib'. This is demonstrated in the following charts:

Chart 4.2.1 Accident rates in central London, Paris and Paris after Vélib'

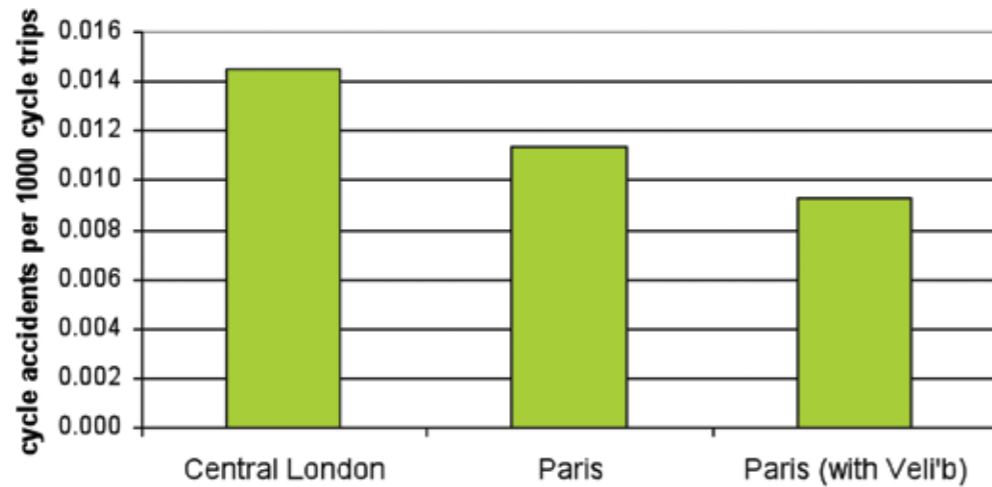
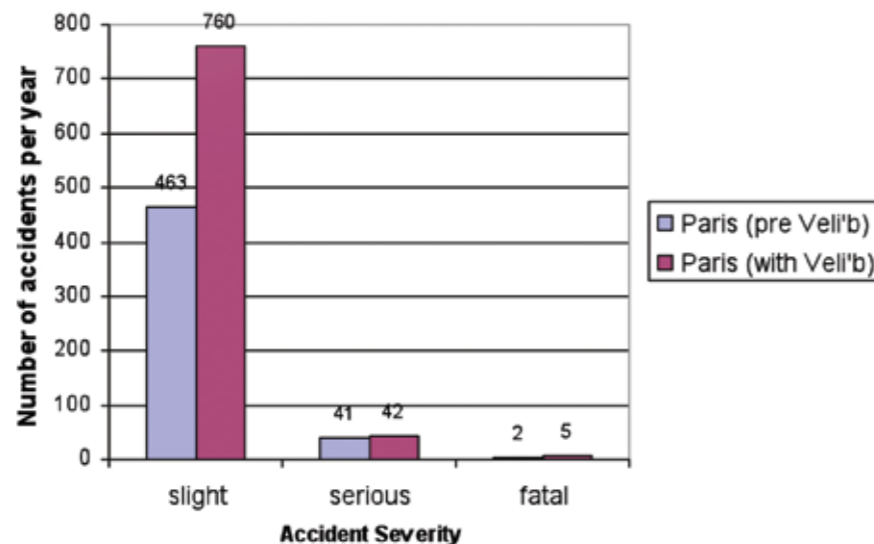


Chart 4.2.2 Number of cycling related accidents by severity pre and post Vélib'



244. Chart 4.2.1 shows that the accident rate in Paris has reduced by approximately 18 per cent since the introduction of Vélib'. This is broken down further in Chart 4.2.2, which shows how the number of accidents of different types has varied. It shows that the vast majority of the increase in accidents is made up of slight injuries.

245. Chart 4.2.1 also shows that accident rates for cyclists are 28 per cent higher for central London than they are for Paris (pre Vélib'). For this reason it is possible to assume that cycling is statistically more dangerous in central London than in Paris. All evidence suggests, however, that by increasing the number of cyclists on London's streets the accident rate will go down (critical mass effect). An examination of the trend in accident rates in London over the last five years shows that as the number of cycling trips has increased the accident rate has decreased

246. There has been a rise in cycle usage of 86 per cent between 2001 and 2006 (screen line counts). Despite this, collisions resulting in injury to cyclists fell by 38 per cent between 1986 and 2006 (London Road Safety Unit). The casualty rate has therefore reduced significantly. Trends in reported accidents in the Congestion Charge zone showed an even greater decline (Congestion Charging Impacts Monitoring Annual Report Monitoring Report August 2008). Experience in Paris and Lyon suggests that the introduction of a cycle hire scheme has the potential to further lower the accident rate for cyclists. This can be explained by the fact that driver awareness of cyclists increases and hence driver behaviour towards cyclists improves

247. However, not all collisions involving cyclists can be blamed on poor driver behaviour. They can also be caused by cyclist error or poor highway design. In order to minimise the incidence of accidents, various complimentary measures should be introduced in the run up to, and during, the introduction of a potential cycle hire scheme

4.2.4 Political buy-in – land contribution / planning permission

248. As discussed in the demand section, the scheme would not work if implemented as a small-scale trial. Therefore, it is essential to get political buy-in from all the major landowners in central London. This will include the London boroughs, TfL, the Royal Parks, Network Rail and private land owners. This feasibility study will provide the evidence required for these key players to decide whether or not they want to progress the scheme
249. There are also a number of practical considerations that could, if not managed properly, jeopardise the successful delivery of a cycle hire scheme in central London. Issues such as planning permission and conflicts with underground statutory utilities need due consideration

4.2.5 Conflict with pedestrians

250. There is a tendency in some parts of central London for cyclists to ride through red lights and to cycle on footways instead of on the carriageway. Although this has not proved to have a significant impact on safety, it is illegal and considered undesirable and antisocial, especially by pedestrians. Its causes are likely to be a mixture of poor cyclist behaviour and poor conditions for

cyclists. The poor conditions may be either perceived or actual concerns (usually around safety, access or the rider finding it hard to determine which route to take)

251. The introduction of a cycle hire scheme is likely to increase the number of traffic offences committed by cyclists. This would cause an increase in the risk of collisions between cyclists and pedestrians, and for this reason is undesirable. It could also cause the image of the scheme to suffer. In order to mitigate this risk it is necessary to treat the likely causes: poor cyclist behaviour and poor conditions in the carriageway. The former can be reduced by providing the correct information to the user i.e. at the hire terminal, on the website or through the post. The latter can be reduced by introducing traffic calming measures, or by providing more road space for cyclists in the form of cycle lanes. Alongside these measures problem areas can also be targeted for enhanced enforcement in order that cyclists realise that this behaviour is not acceptable

4.2.6 Excessive re-distribution of bicycles

252. As discussed in the demand section, it is essential that bicycles be distributed as naturally as possible. This can be achieved in London by focusing the scheme on central London rather than Inner London as it contains the greatest density of origins and destinations. By providing 6,000 bicycles throughout central London it is envisaged that they will be cycled to a diverse number of destinations. Work related trips would take place in the morning peak, followed by students a little later. It is assumed (as it has been observed in other cities) that a proportion of the market, namely tourists, will then be able to use the bicycles for their trips throughout the day, thereby helping to re-distribute the bicycles across the central area

253. This is obviously a crude assessment of predicted trip patterns. A more detailed assessment should take place during the implementation of the scheme. This will inform key decisions about the precise location and size of individual stations

4.2.7 Poor uptake of the scheme leading to a damaged image of cycling and even the credibility of TfL and the partners

255. If the scheme is under utilised then there is a risk that it will not provide good value for money and that there will be a lot of cycle hire docking stations which effectively become redundant space instead of being used for other street management needs, such as parking. Such areas could become a target for crime in the form of theft and vandalism. The demand study findings suggest that the scheme would be well utilised. This might not be the case, however, if the scheme is poorly designed or implemented incorrectly. Potential causes of poor scheme uptake could include the following:
- Poorly maintained bicycles
 - A complicated and time consuming pick-up / docking system
 - Docking stations in the wrong locations
 - High tariffs
256. The likelihood of the issues occurring can be kept to a minimum by conducting a thorough scheme definition process that fully engages all the relevant stakeholders in order to ensure all the details are considered

4.3 Recommended additional measures

257. The following additional measures are recommended in order to further enhance the success of a potential cycle hire scheme in central London:
- **Engineering measures (conversion of one way streets to two way, alterations to road layout, etc.):** This would have benefits for all cyclists in Central London. It would improve way-finding and safety
 - **Additional cycle parking (Sheffield stands):** In certain parts of central London there is an acute shortage of cycle parking spaces for privately-owned bicycles. The implementation of a cycle hire scheme may allow the opportunity to install additional cycle parking alongside new cycle hire docking stations. This is likely to be more cost effective than installing them under separate programmes. There are also additional benefits in terms of security. This is of course subject to available space, which is in acute shortage in part of central London. It should be noted, however, that in many central London locations the provision of docking stations will make it more difficult to find space for on street cycle parking

- **Marketing and communications campaign:** It is suggested that the scheme is launched with sufficient publicity in order to ensure that the public are aware of it. Anecdotal evidence from other schemes suggests that they generated positive coverage in the press and that the use of the scheme increased as a result. For this reason it is also essential that the launch of the scheme is highly successful and that every effort is made to ensure that there are sufficient well maintained bicycles available. It may be necessary to employ additional staff in the early stages to ensure that everything runs smoothly
- **Safety campaign:** Every effort must be made to ensure users are aware of the risks that they face when cycling in central London, as well as what is required of them in terms of adhering to the rules of the road. This can be done by sending starter packs to subscribers who reside in the UK and making promotional material / information available to overseas visitors who use the scheme. Cycle training should also be offered to all those who register for the scheme
- **Way-finding:** Information should be made available to users about routes which are encouraged / discouraged for cyclists to use. This could be facilitated through the provision of maps on a website, leaflets at newsagents, or on screen at the hire terminals
- **Training for operational staff and awareness for other users of the road network:** This would allow extended awareness of the system not only to cycle hire users but also to other road users. In the case of TfL, awareness or

a training campaign to existing staff would be highly beneficial especially for bus and taxi drivers as they share the road with cyclists. TfL has ways to extend this beyond its staff and possibly cover other drivers as well, especially those in the freight and servicing industry

- **Cyclist behaviour:** A cycle hire scheme would generate a significant increase in the number of cyclists on central London's roads. This could potentially create an additional requirement for enforcement, particularly of cyclists encroaching onto pedestrian space
- **Traffic Calming:** In terms of cyclist safety it would be extremely beneficial if traffic calming could be implemented
- **Integration with other TfL policies:** The cycle hire scheme should be integrated with existing transport policies and measures. This could be, for instance, through adding details of cycle hire stations to the Legible London6 way-finding maps or perhaps linking to other cycling initiatives or travel demand management measures. Such proposals would be defined in more detail during the scheme definition phase

4.4 Opportunities

258. The implementation of a cycle hire scheme in central London brings with it additional opportunities as described below:

- To involve Londoners in developing the scheme characteristics in order to ensure that the Capital's unique requirements are met. This could involve working with landowners who have signed up to the scheme, as well as cycling groups and residents. In this way, any potential issues over the management and design of the scheme can be addressed or mitigated
- Integrate society, for example, young offenders and existing operators. This has been done with great success in Stuttgart. Young offenders have been given placements where they are required to carry out bicycle repairs and maintenance.

The scheme has resulted in a reduction in bicycle theft as the previous culprits are reformed and more respectful to people's ownership of a bicycle. There is also an opportunity to involve existing small private operators with the maintenance, repair and re-distribution requirements

- Potential transferability to London 2012 Olympic and Paralympic Games and Outer London town centres. A partly permanent, partly temporary scheme could be implemented for the 2012 Games. There is also potential to introduce cycle hire in other parts of London, possibly in town centres. It is essential that any future expansion is made interoperable with any existing scheme. A separate feasibility study will be required in order to investigate the likely success and key requirements of any additional locations
- Expand cycle hubs and docking stations into economically disadvantaged communities. In the future, the scheme could also be extended into economically disadvantaged communities. This would provide an improved level of accessibility for residents in the area. A separate feasibility study is required before extending the scheme away from central London
- Link to section 106 / Planning applications through the London Plan and Local Development Frameworks: If the scheme is progressed beyond feasibility it is essential that all funding and implementation avenues are explored fully. This could include incorporating docking stations in new developments and also integration to section 106 opportunities that might exist

- Integration with Oyster. There is potential to link the scheme to the existing Oyster ticketing system which operates on London's public transport network. This would allow full integration of a cycle hire scheme with other public transport modes
- Implement 'cycle points': The introduction of a cycle hire scheme gives the opportunity for central London to improve cycle parking conditions for existing cyclists. Alongside each cycle hire docking station additional cycle parking could be installed. In addition, these cycle points could provide a high level of security through surveillance and improved lighting. This solution is attractive because it links private cycling to the hire scheme. Due to space constraints and the need to accommodate other street management needs, this may not be possible at every docking station

4.5 Conclusions of this section

259. The following main benefits arising from a potential cycle hire scheme in London have been identified:

- Provide a new individual transport mode
- Increase levels of cycling by reducing barriers to cycling
- Help create a more walking and cycling focused city with less motorised traffic
- Health benefits associated with increased levels of walking and cycling
- Journey time and journey time reliability benefits associated with cycling when compared to other modes in central London
- Reduction in overcrowding on buses and Underground in central London
- Promote tourism
- The main risks and potential mitigation measures which have been identified as part of the study are shown in the following table

Table 4.5.1
Main risks and potential mitigation measures

Risk	Mitigation
1. Inaccurate demand forecast	Phased approach, flexibility of delivery, flexible contractual arrangements
2. Theft and vandalism	Deposit, unique design, CCTV, sense of ownership, robust docking technology
3. Safety concerns (public liability issues)	Cycle training, starter packs, targeted safety campaign, quiet routes, minimise risk to tourists
4. Political buy-in land contribution / planning permission	Project to include all partners in the process as early as possible, start the process as soon as possible, political buy-in, use expertise available within TfL and boroughs
5. Conflict with pedestrians (expected)	Safety campaign, enforcement, review clarity of cycle/ pedestrian areas
6. Excessive re-distribution of bicycles	Detailed matching of supply and demand, detailed tender development process
7. Poor uptake of the scheme	Good design, maintenance, pricing and marketing and communications

260. The following additional measures have been suggested as part of the implementation of a cycle hire scheme:

- Engineering measures (conversion of one way streets to two way, alterations to road layout, etc.) to improve safety and way-finding
- Additional cycle parking (Sheffield stands) adjacent to cycle hire docking stations where possible and desirable
- Marketing and communications campaigns
- Safety campaign aimed at cycle hire users
- Measures to improve way-finding for users of a cycle hire scheme
- Training for operational staff and awareness for other users of the road network
- Enforcement and traffic calming
- Integration with other TfL policies

261. The following has been identified as part of the possible implementation of a cycle hire scheme:

- To involve Londoners in developing the scheme characteristics in order to ensure that the Capital's unique requirements are met
- Integrate society – eg young offenders
- Potential transferability to London 2012 Olympic and Paralympic Games and Outer London town centres
- Expand cycle hubs and docking stations into economically disadvantaged communities
- Link to section 106 / Planning applications
- Integration with Oyster
- Implement secure cycle points with additional cycle parking, maps, and improved urban realm at specific locations

Section 5

Main findings and recommendations

262. From a technical perspective, a cycle hire scheme in London is feasible and a bespoke system for London could be implemented
263. There appears to be a substantial market for a central London cycle hire scheme with around 55,000 potential daily trips by cycle hire based on existing information. There is an element of risk, however, in forecasting of this nature based on stated preference surveys and the exact demand is difficult to estimate
264. It is recommended that a minimum of 10,200 docking points with 6,000 bicycles would be required. These would be located at anything between 300 and 400 docking stations. A minimum density of eight stations per km² would be recommended
265. There appears to be significant demand from after rail commuters. However, sufficient space to cater for the full demand is unlikely to be available. Hence, it not recommended to cater for this market initially
266. The scale of any scheme is critical to its likely success. Cycle hire stations would need to be located at frequent intervals and placed at strategic locations. Any scheme should be implemented in phases in order to target demand.
267. A pilot should not be used to estimate demand
268. The current situation in London is identified as suitable for a cycle hire scheme. The recent pronounced increase in cycling, the reduction in cycling accidents (especially in the central London area), coupled with increased spending on cycling facilities and the perceived financial and health benefits are serving to encourage more people to take to their bicycles
269. Other schemes show that cycle hire has helped to increase bicycle modal share and encouraged more people to cycle on private bicycles
270. There is a wide range of compatible scheme types, management systems and technologies from which to choose from
271. A fixed docking station solution is more efficient for larger schemes
272. Access to the bicycles must be easy and fast. A period of free use may be an attractive option
273. Levels of theft and vandalism in the existing schemes that have been reviewed have generally not been as severe as predicted. It should be noted, however, that London has high levels of bicycle theft, a deposit mechanism by users of the system is essential
274. Political buy-in from major landowners and authorities in central London would be essential for implementation, including TfL, and the central London boroughs
275. Land availability (competing demands on central London public realm) is one of the main issues facing successful implementation. Space is at a premium around key trip generators / attractors. The existing partnership (TfL and The Clear Zones Partnership) could provide a good base, which could attempt to resolve this issue
276. It is not recommended to link a potential cycle hire scheme with an advertising contract to help finance the scheme, as this is not supported by the central London boroughs or TfL. It is recommended that other alternatives such as on bike sponsorship and discreet sponsor advertising are investigated
277. Complementary measures to mitigate some risks have been suggested, potentially including a safety campaign, 20mph zones (where individual London borough policies allow), cycle training and engineering measures and conversion of one way streets to two way streets for cyclists
278. The potential for generating revenue is low if a free rental period is recommended (there is some revenue potential from registration fees to the scheme)
279. Integration of the systems to the wider public transport network would allow better accessibility and enhanced operation

280. Some barriers and issues will still remain and need to be addressed properly. These include:

- Safety concerns
- Navigational issues (difficult to navigate in central London)
- Use of a bicycle by inexperienced users
- Allocation of resources to a cycle hire scheme could affect the delivery and implementation of other cycling measures

281. The lessons learnt from other European schemes suggest that a cycle hire scheme for central London should include the following:

- A deposit mechanism
- An annual subscription or registration process
- A strategic pricing structure
- A Smartcard system
- Innovative docking points to make the most use of available space
- Robust bicycles
- Minimum use of vans to re-distribute bicycles
- Simple maintenance
- A visible and easily identifiable scheme

- Available for use by tourists

282. There seems to be enough 'redundant' space available that could be used (if appropriate) for the implementation of docking stations. It has not been determined, however, whether this space is located in areas where there is likely to be specific local demand. There is also potential for finding spaces in workplaces and private developments

283. There are possible issues regarding the planning permission process that might be required to implement docking stations

284. Even after implementation, the location and size of some of the stations would be subject to change as it is difficult to precisely determine demand on a local area basis. It is recommended to identify more spaces than originally required in order to mitigate this risk

285. Flexibility is important to allow docking stations to be easily added or removed in times of fluctuating demand

Appendices

Appendix A

Table of all known cycle hire schemes

Appendix B

Key sources

Appendix C

Key visitor attractions in Westminster, Camden, the City of London and the Royal Parks

Appendix D

Locations of possible and probable cycle hire docking stations

Appendix A – table of all known cycle hire schemes

Country	City / town	Start Year	Bike Count
Australia	Melbourne	2008	n/a
Australia	Sydney		
Austria	Vienna	May-03	500
Austria	Neusiedel (3)	Jul-07	Not available
Austria	Mörbisch (1)	Aug-07	Not available
Austria	St. Andrä (1)	Aug-07	Not available
Austria	Eisenstadt (4)	Aug-07	Not available
Austria	130 Stations	Pre 1990	Not available
Belgium	Brussels	Sep-06	250
Canada	Montreal		
Czech Republic	Prague	2005	23
Denmark	Copenhagen	1995	2500
Denmark	Aarhus	May-05	400
Finland	Helsinki	May-00	400
France	Lyon	Oct-04	4000
France	Aix-en-Provence	Oct-06	200
France	Marseille	Oct-06	1000
France	Mulhouse	Jan-07	200
France	Besancon	Apr-07	200
France	Paris	Jul-07	20,600
France	Rouen	Aug-07	250
France	Toulouse	Sep-07	2400
France	Rennes	Jun-98	200
France	Orleans	Jun-07	300
France	Montpellier	Jun-07	600
France	La Rochelle	Jun-05	110
Germany	Munich	(2000)2001	1000
Germany	Berlin	Jul-02	1650
Germany	Frankfurt	May-03	800
Germany	Stuttgart	Jul-07	400
Germany	Karlsruhe	Aug-07	350
Germany	Koln	Jun-04	800
Germany	Berlin (3)	Jun-07	n/a
Germany	Bielefeld (2)	Apr-07	Not available
Germany	Cottbus (6)	May-07	Not available
Germany	Dresden (5)	May-07	Not available
Germany	Düsseldorf (1)	May-07	Not available

Country	City / town	Start Year	Bike Count
Germany	Erlangen (1)	Sep-07	Not available
Germany	Frankfurt (5)	Apr-07	Not available
Germany	Friedrichshafen (7)	Jun-07	Not available
Germany	Halle (Saale) (2)	n/a	Not available
Germany	Karlsruhe (4)	Jun-07	Not available
Germany	Köln (2)	n/a	Not available
Germany	Leipzig (8)	2005	Not available
Germany	Nürnberg (10)	Sep-07	70
Germany	160 Stations	Pre 1990	Not available
Ireland	Dublin City	2008	450
Ireland	Dublin Port	2007	2
Israel	Tel-Aviv		
Italy	Rome	2008	250
Italy	Parma	Jul-07	100
Italy	Savigliano	Jul-07	50
Italy	Cuneo	May-06	40
Italy	Pistoia	Jul-07	40
Italy	Novara	Sep-07	22
Italy	Chivasso (TO)	Jul-07	21
Italy	Settimo Torinese (TO)	Jul-07	53
Italy	Pinerolo (TO)	Jul-07	22
Italy	Bari	2007	28
Italy	Prato (LM)	Oct-07	60
Italy	Bra (CN)	Sep-07	4
Italy	Alba	Sep-07	25
Italy	Borgomanero	2007	Not available
Italy	Cameri	2007	Not available
Italy	Mt val Vigezzo	2007	Not available
Italy	Fossano	2007	40
Italy	Milan		
MY	Singapore	2000-2003	125

Appendix A – table of all known cycle hire schemes

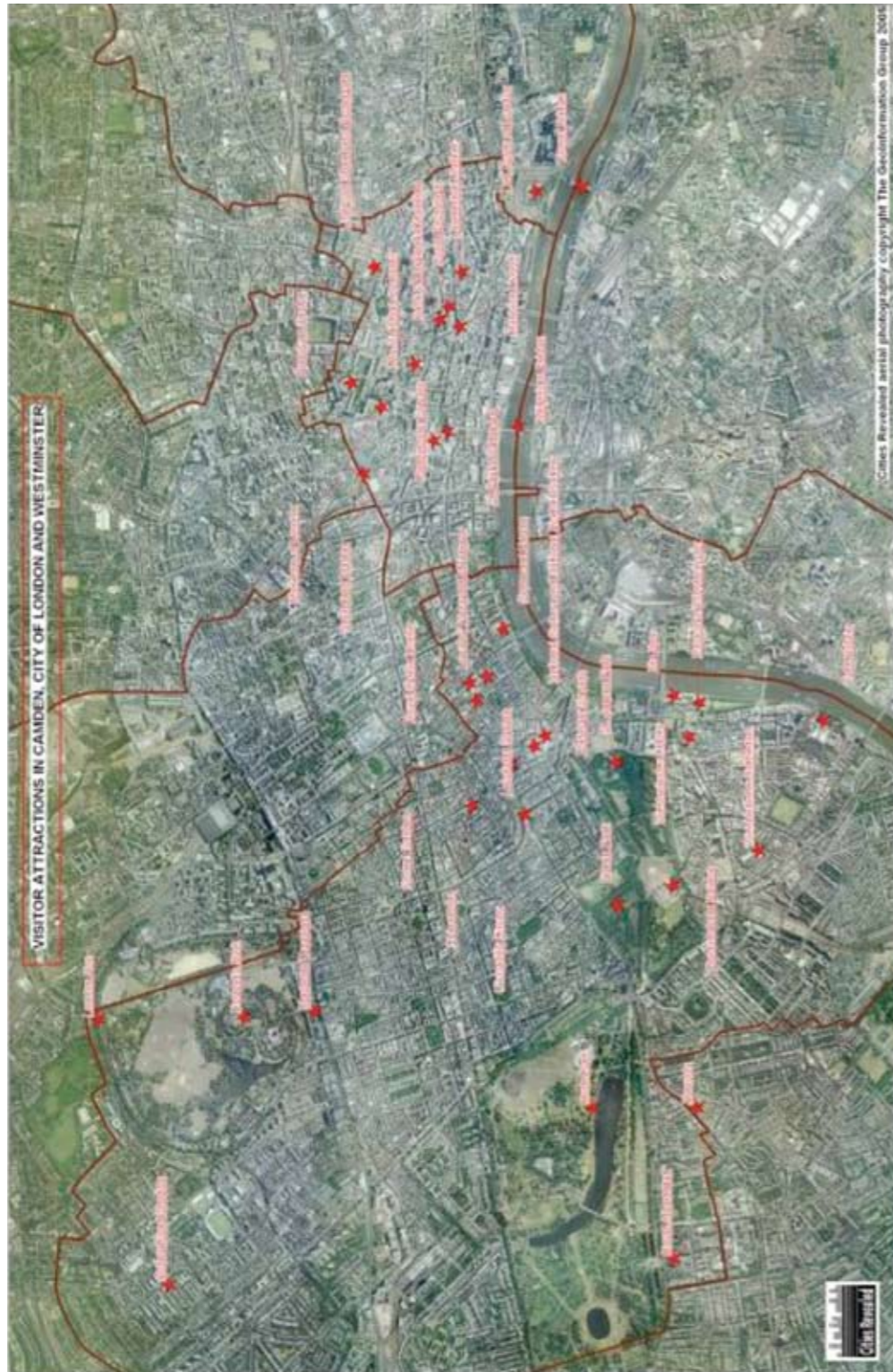
Country	City / town	Start Year	Bike Count
Netherlands	Arnhem	2007	50
Netherlands	Nijmegen	2007	100
Netherlands	100 Stations	2004	3000
Netherlands	Rotterdam	1997	25
Netherlands	Amsterdam	1968	n/a
Netherlands	Amsterdam	1999	750
Netherlands	80 Stations	Pre 1990	Not available
New Zealand	Franchising	Aug-07	Not available
Norway	Porsgrunn	2003	50
Norway	Oslo	2003	1200
Norway	Trondheim	2006	110
Norway	Drammen	Apr-01	250
Norway	Bergen	2002	100
Norway	Sandnes	1996	75
Portugal	Aveiro	Sep-05	Not available
Spain	Gijon	Jun-03	64
Spain	Cordoba	Jun-03	35
Spain	Seville	Oct-2007	2500
Spain	Seville	Mar-07	2500
Spain	Barcelona	2007	6000
Spain	Pamplona	Jun-07	350
Spain	Burgos	Not available	Not available
Sweden	Stockholm	2006	500
Sweden	Gothenberg	Not available	125
Sweden	Orebro	1980	1400
Switzerland	250 Stations	Pre 1990	Not available
UK	Inverness	2007	20 (..)
UK	Bristol	Not available	Not available
UK	LB H'smith & Fulham	2004	70
UK	Accord Hotels (Lon)	2006	4
UK	Park Royal Estate	2005	12
UK	Reading (Green Pk)	2007	14
UK	Farnborough (RAE)	2007	8
UK	LB Brent	2007	4
UK	LB Tower Hamlets	2007	10
UK	W. End Lane Appts.	2007	4
UK	Southampton Uni.	2007	14
UK	University E London	2007	16
UK	Plantation Wharf	Stalled (SWT)	Stalled (SWT)
UK	Northwick Pk NHS	Use too low	-
UK	2 London Locations	2008	n/a
US	Washington DC	2007	120

Appendix B – Key sources

Source	Description
LATS Household	Major household travel survey last conducted in 2001
LTDS	LTDS is the reincarnation of LATS as a continuous survey (rather than being conducted once every ten years)
LATS Rail	A survey of rail travellers using trains into London undertaken alongside the main LATS household survey
London Underground users survey	Regular survey of a representative sample of London Underground trips
London Buses users survey	Large scale survey of a representative sample of trips on buses in London last conducted in 2003
London Travel Report	A report which collates key sources of data concerning travel in London
National Travel Survey	Continuous travel survey across Great Britain
Visit London	Visit London collates data to estimate the number of tourists visiting London

Appendix C

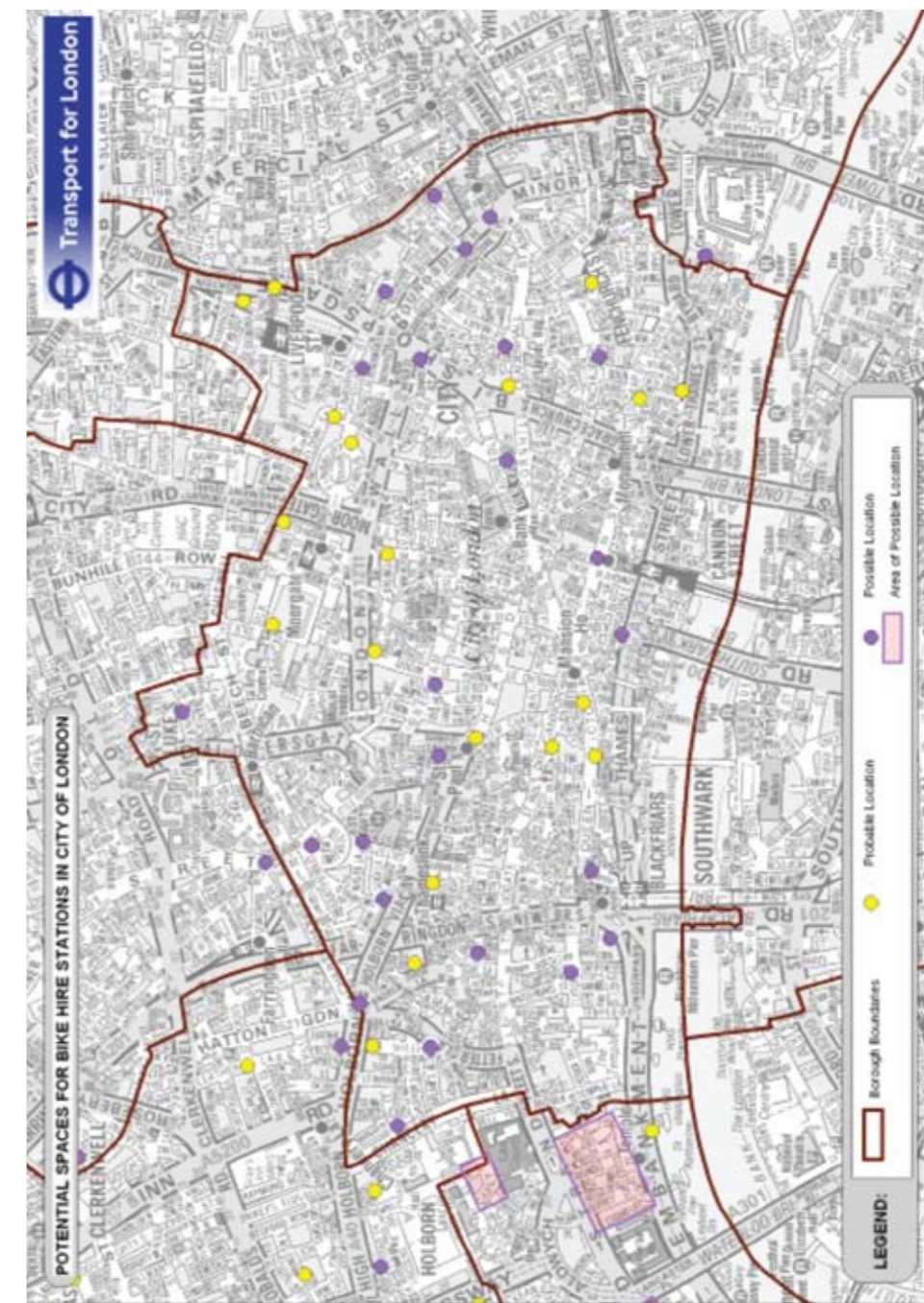
Key visitor attractions in Westminster, Camden, the City of London and The Royal Parks



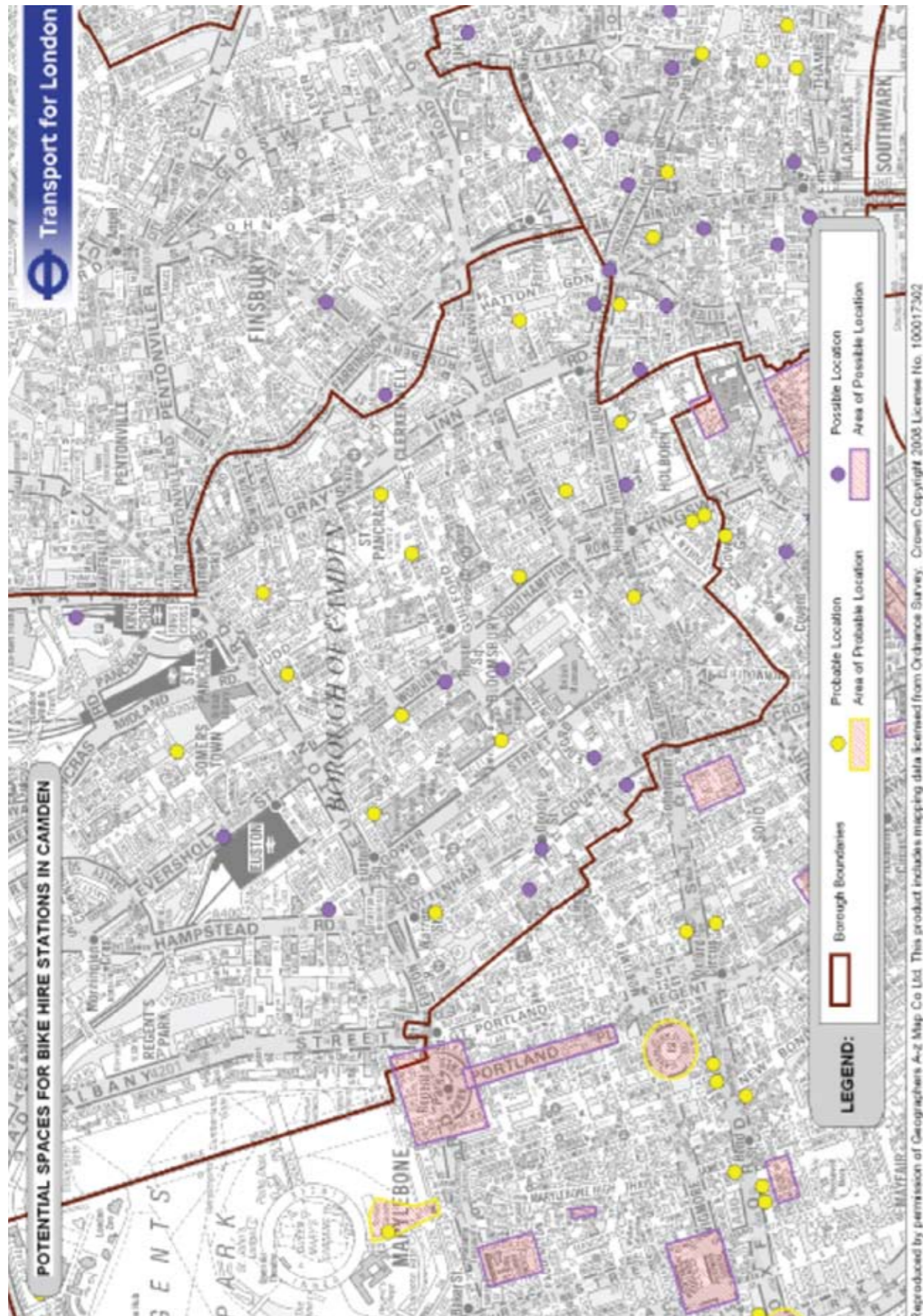
Appendix D (i to iv)

Locations of possible and probable cycle hire docking stations in the City of London (i), Camden (ii) Westminster and the Royal Parks (iii) and the remaining areas of Westminster (iv). (No political commitment to these spaces).

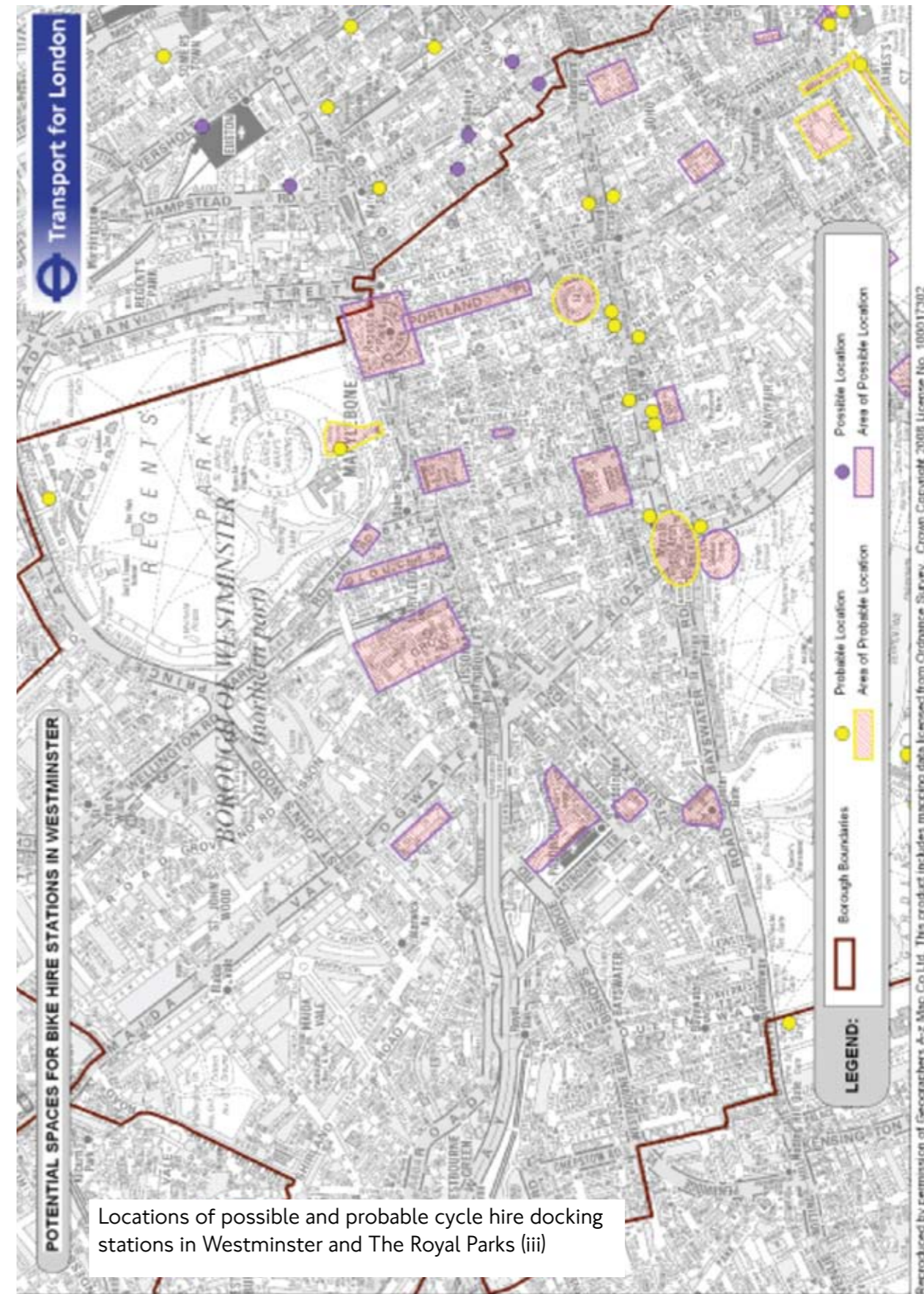
Locations of possible and probable cycle hire docking stations in the City of London (i)



Locations of possible and probable cycle hire docking stations in Camden (ii)



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Locations of possible and probable cycle hire docking stations in Westminster and The Royal Parks (iii)

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Locations of possible and probable cycle hire docking stations in the remaining areas of Westminster (iv)

