



Hammersmith Tunnel

Strategic Outline Business Case



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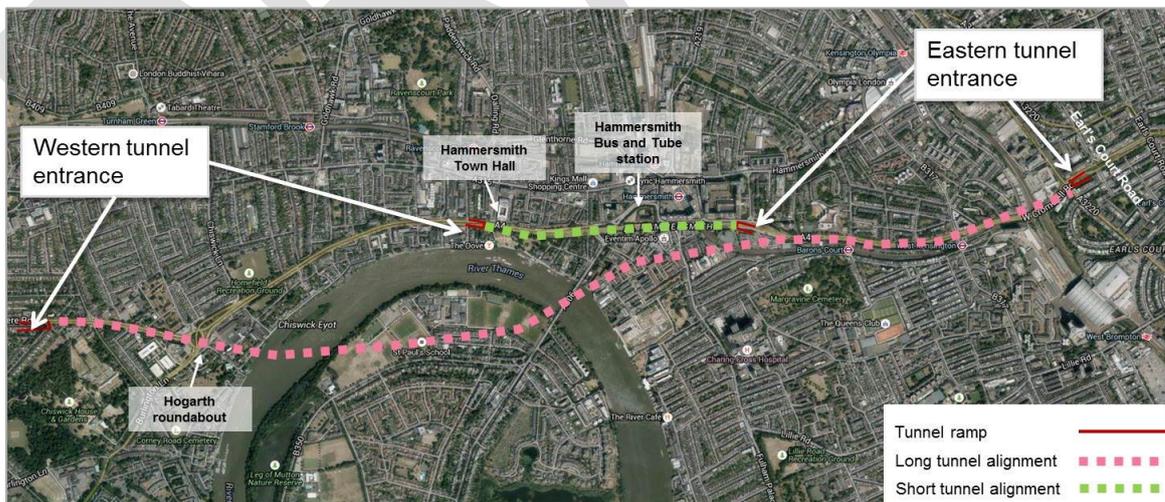
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Executive Summary

Purpose of this document

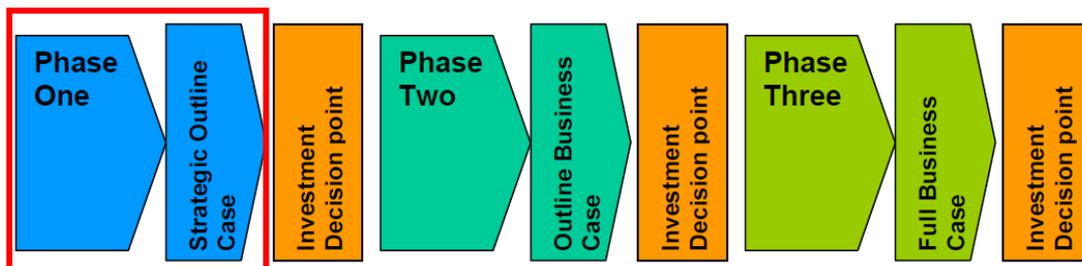
1. Transport for London (TfL) and the London Borough of Hammersmith and Fulham are assessing the construction of a new road tunnel to replace the existing A4 flyover and gyratory in Hammersmith Town Centre. The scheme would act as a catalyst for the transformation and regeneration of Hammersmith Town Centre.
2. The core regional and local objectives of the scheme are to:
 - **Accelerate housing and office space delivery in the Greater London Area and contribute to the London Plan's aim of building 49,000 new homes every year.**
 - Enable the regeneration of Hammersmith Town Centre and achieve higher housing and job densities.
 - **Improve the quality of life of residents through more sustainable transport networks and a better environment.**
 - Enhance local residents' quality of life by improving urban realm, reducing severance caused by the A4 flyover and gyratory and improving local access for all road users, including pedestrians and cyclists.
 - **Secure the strategic function of the Transport for London Road Network (TLRN).**
 - Mitigate the increasing congestion on the A4 to maintain its strategic economic function as freight corridor and major link between Heathrow Airport, west London and Central London.

Figure ES I: Hammersmith tunnel scheme options location:



- This document is the **Strategic Outline Business Case (SOBC)**, the first phase of the **decision making process**. The SOBC sets out the strategic fit for the scheme and scopes out the initial intervention proposal.

Figure ES 2: Decision making process



- This SOBC is presented in accordance with the DfT's Business Case Guidance which stipulates a five case model to developing transport business cases which considers whether the scheme:
 - is supported by a robust case for change that fits with wider public policy objectives – the 'strategic case';
 - demonstrates value for money – the 'economic case';
 - is commercially viable – the 'commercial case';
 - is financially affordable – the 'financial case'; and
 - is achievable- the 'management case'.

Policy framework

The Mayor's Roads Task Force (RTF) has sets the vision for London's roads and streets.

- The RTF report, 'Vision for London's Roads and Streets' (2013) sets out three core aims:
 - To enable people and vehicles to move more efficiently on London's streets and roads;
 - To transform the environment for cycling, walking and public transport; and
 - To improve the public realm and provide better and safer places for all the activities that take place on the city's streets, and provide an enhanced quality of life.
- Particular objectives from the RTF report and of relevance to this business case include:
 - Release land at the surface for development;
 - Improve the public realm;
 - Create new green space;
 - Provide better facilities for pedestrians, cyclists and public transport users;
 - Relieve congestion and improve journey time reliability;
 - Reduce severance;
 - Reduce the negative impacts of roads on noise and air quality.

7. Following the publication of the RTF report, TfL undertook a series of studies to identify opportunities for decking over or tunnelling under roads at a number of locations around London in order to unlock development opportunities.
8. The initial phase of work identified 70 potential locations, and sifting work identified 15 locations suitable for high level feasibility work. This feasibility work identified five of these locations with the potential to make a significant contribution to achieving the aims and objectives of the Roads Task Force. Further feasibility work was carried out for each of these five locations resulting in the production of a Strategic Outline Business Case for each scheme. The location for the schemes listed below is shown on Figure ES 3:

- **A4 Hammersmith;**
- A13 Barking Riverside;
- A316 Chalkers Corner;
- A406 New Southgate;
- A3 Tolworth.

Introduction to the scheme

Hammersmith is a major London town centre with a high potential for growth.

9. Hammersmith town centre is connected to central London by the District and Circle, Piccadilly, and Hammersmith and City underground railways and located on the strategic A4 road corridor linking London to Heathrow airport and the west of England. Due to its high public transport accessibility level, the town centre has the potential to host significantly denser levels of development than it does at present.
10. However the town centre's potential for growth is currently constrained by the presence of the A4 Hammersmith flyover, which exerts a substantially negative impact on the local area, creating local severance and causing negative visual, noise and air quality impacts, and inhibiting the viability of new development.
11. The A4 is a key link in the Transport for London Road Network (TLRN), the strategic London road network that is the responsibility of TfL, carrying flows of 70 – 90,000 annual average daily traffic (AADT), of which 4 per cent are heavy vehicles. Safeguarding this strategic movement function is vital to London's wider economic performance.

TfL has identified options to address the problems caused by the flyover, whilst maintaining the capacity and function of the A4.

12. Two options have been shortlisted which meet overall policy goals in the London Plan and the Mayor's Transport Strategy (MTS), are considered to be practical to construct, are environmentally acceptable, are in suitable locations, and are likely to be affordable:
 - Option 1 – replacement of the flyover with a cut and cover tunnel between the Talgarth Road/Gliddon Road junction and the A4 to the west of Hammersmith Town Hall (the 'short' tunnel option).
 - Option 2 – Longer bored tunnel between Hogarth Roundabout and Earls Court, passing beneath the Thames.

13. Figure ES 3 and Figure ES 4 show the location and approximate alignments of both tunnel options.
14. Both tunnels would be able to accommodate all types of road vehicles, including double decker buses and heavy goods vehicles. In both cases surface roads would remain open for local traffic and the current Hammersmith gyratory would be removed, with the western side used for non-motorised transport and the remainder of the gyratory being returned to two-way traffic.

Figure ES 3 Hammersmith tunnel scheme location

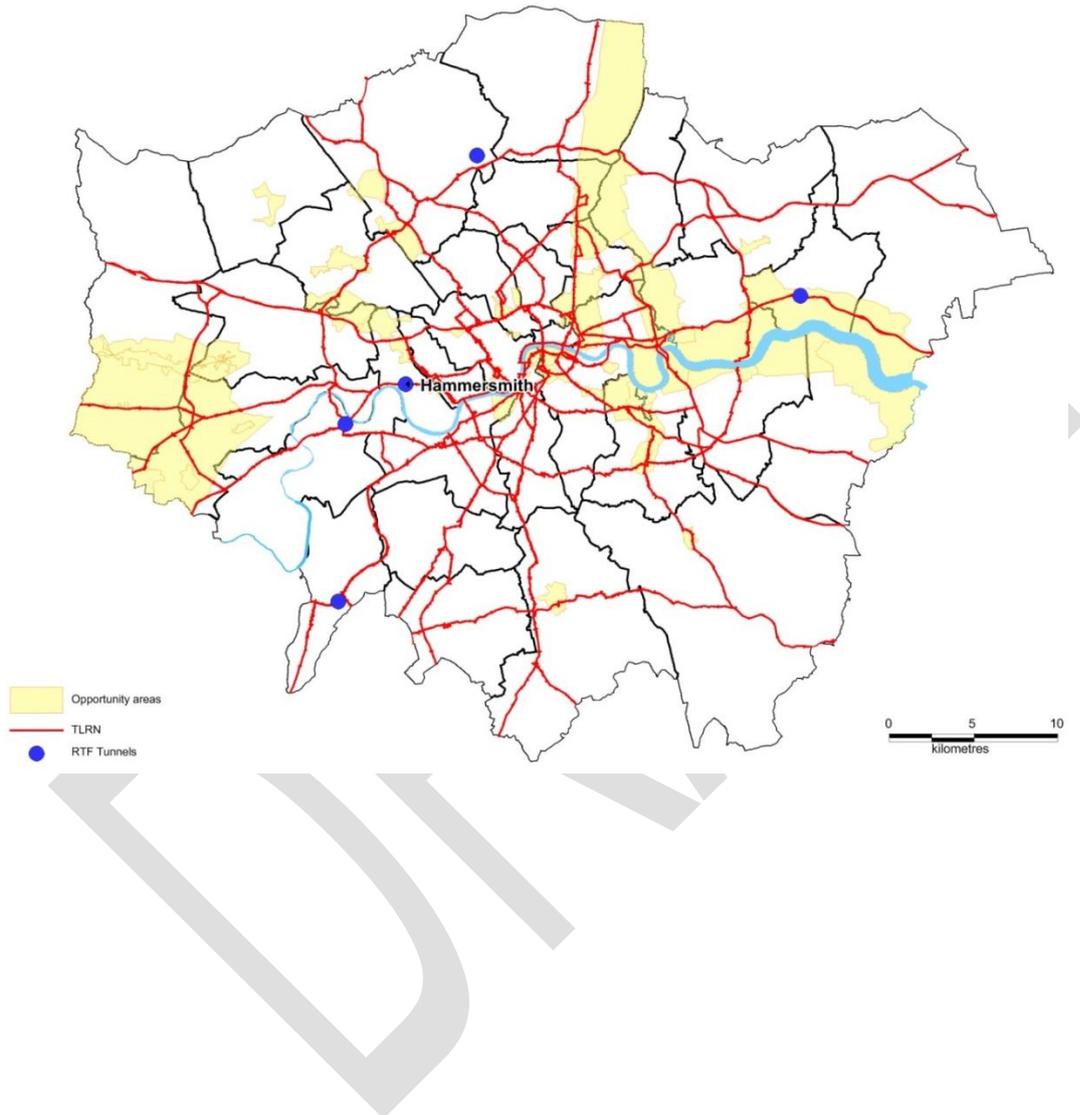
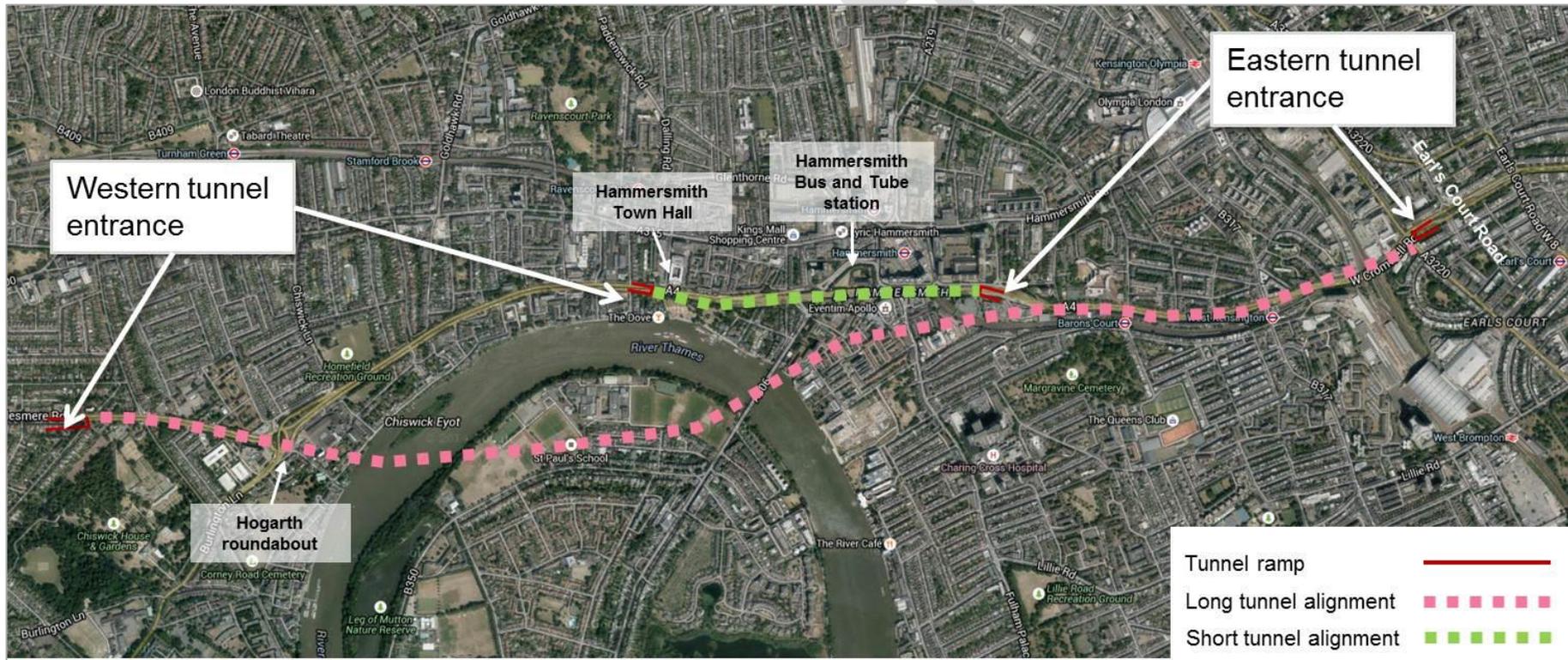


Figure ES 4 Detailed scheme location plan



Removal of the Hammersmith flyover and gyratory can enable the delivery of around 3,800 homes and 13,800 jobs in a high value area of London (gross numbers).

15. Removal of the Hammersmith flyover and gyratory would act as a catalyst for the transformation of Hammersmith Town Centre by addressing the problems of connectivity, poor public realm and environment that currently limit its development potential. The removal of surface road infrastructure and traffic would unlock new land for development, and allow the recreation of the area's traditional street pattern and its link to the river Thames.
16. This would deliver a step-change in the area's attractiveness for residential and commercial development, unlocking delivery of around 3,800 gross new homes and 13,800 gross new jobs to serve London's growing population.
17. Without the removal of the flyover and gyratory, a maximum of around 620 homes and 4,920 gross new jobs could be created.

Figure ES 5 Existing and potential urban realm at Hammersmith Town Centre



There is significant support for the A4 Hammersmith tunnel scheme.

18. The A4 Hammersmith tunnel proposal has strong political and public support. Consultation¹ carried out by the London Borough of Hammersmith and Fulham in 2013 demonstrated that very high support exists for the principle of the tunnel, with 89 per cent of respondents supporting the scheme. A dedicated website set up by LB Hammersmith and Fulham to inform and publicise the initial Hammersmith Flyunder Feasibility Study received one of the highest numbers of posts ever received on the borough's webpages, indicating a high public interest in the scheme.
19. Key stakeholders such as the London Borough of Hammersmith and Fulham support the principle of the tunnel and are working with TfL as the current route options are assessed. The project is central to the Borough's vision for Hammersmith Town Centre, which will be formalised in the publication of a Supplementary Planning Document in 2016.

Overall, a tunnel conforms to policy at all levels, helping to secure London and the UK's continued prosperity.

20. Due to the extent that the A4 Hammersmith tunnel can help address the challenges faced in London, it makes a significant contribution to policy at all levels. At a national level the proposal strongly supports the intended outcomes in the DfT's priorities for the transport network. The Hammersmith tunnel also supports London-wide and local policy – in particular in the Mayor's Spatial Development Strategy (known as the London Plan), the Mayor's Transport Strategy (MTS), and the London 2050 Infrastructure Plan. It also fits within local policy such as Borough Local Development Frameworks.

¹ Source: Hammersmith Flyunder Feasibility Study, March 2014 - http://www.lbhf.gov.uk/Images/flyunder_feasibility_study_web_medium_tcm21-187089.pdf

1. The Strategic Case

21. The Strategic Case demonstrates the need for an intervention, the problems identified, and the possible solutions to the problems.

The future of the UK's economic performance lies in improving the performance of its cities. In particular, London is the driver of the UK's economic growth.

22. Cities drive the UK economy – they are home to 54 per cent of the population, generating 60 per cent of its GVA, containing 53 per cent of all businesses and 72 per cent of all highly skilled workers² within just 9 per cent of the UK's land area. London contributes an estimated 21 per cent of total UK tax revenues³.
23. London's rapidly growing population is linked to and necessary to its strong economic performance. Over the period 1991 to 2011, London's population increased by 1.4 million, enabling the number of jobs in the capital to increase by 900,000. London's population surpassed its 1939 peak of 8.6 million in early 2015 and is forecast to reach 10.1 million by 2036.
24. Since 1994, on average, 29,700 new jobs a year have been created within London. This employment growth is expected to continue. London Plan forecasts suggest that the number of jobs in London is expected to grow by 1.4m between 2011 and 2036. This growth is expected to be largely concentrated within central London, as businesses take advantage of agglomeration and clustering benefits.

London is ranked alongside New York as the most competitive city in the world⁴; however, its success cannot be taken for granted.

25. Recent evidence suggests some deterioration in London's international rankings, including cost of staff (a result of a high cost of living) and quality of life. The housing issues that lie behind these factors are fundamental to maintaining London's competitiveness and will be exacerbated by continued population growth.

London's future economic growth depends on having an increased housing availability supporting labour supply.

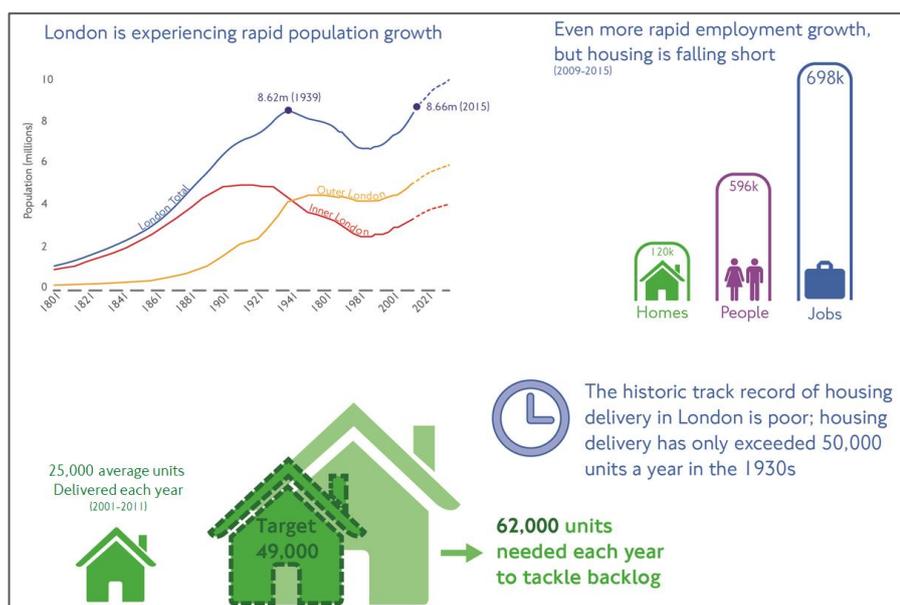
26. The scale of the projected employment and population growth provides both an opportunity for driving London and the UK's economy, but also presents a considerable challenge. To sustain this growth, it is estimated that 62,000 new units should be built every year. The Greater London Authority (GLA) has set the aim of building 49,000 new units each year to reduce the gap between offer and demand and drive down high costs of living that undermined London's competitiveness.

² Centre for Cities website, 'City by City', <http://www.centreforcities.org/cities/>

³ Research Report: London's Finances and Revenues: City of London Corporation & CEBR (2014)

⁴ based on the Global Financial Competitive Index assembled by Longman Finance and the Qatar Financial Centre Authority, 2015

Figure ES 6: London’s housing challenge at a glance



London must unlock new development opportunities to support delivery of new housing and jobs.

- 27. London’s supply of land to support housing and jobs growth is limited and the development potential of brownfield land must be maximised. An innovative approach to unlocking this land to support new development is therefore urgently required if the Capital’s housing needs are to be met.

For London to remain competitive and attract new businesses, its office supply must keep up with employment growth and trends.

- 28. In recent decades London’s economy has been increasingly service-based, and this is likely to continue. As a result, ensuring there is enough office space of the right kind in the right place is a key task.
- 29. Results from the 2009 London Office Policy Review indicate that office based employment may grow by 303,000 between 2011 and 2031. On this basis, London might need an additional 3.9 million sq m (net) of office space⁵.

⁵ With a central assumption for office employment density of 12 sq.m per worker; net : gross development ratios of 75% - 85%; and a frictional vacancy rate of eight per cent.

Table ES I Demand for office based employment and floorspace, 2011-2031⁶

Location	Office based employment growth (number of jobs)	% of total employment growth	Demand for office floorspace (net million sqm)
Outer London	59,000	20	0.77
Inner London ⁷	67,000	22	0.86
CAZ and north of the Isle of Dogs	177,000	58	2.30
London total	303,000	100	3.93

30. A further alteration to the London Plan based on the 2012 London Office Policy Reviews projected an office employment growth of 575,000, a substantially higher figure than the 303,000 forecast based on the 2009 London Office Policy Review.
31. Although the demand for office space is strongest in the CAZ and north of the Isle of Dogs (international centres), other business centres in Inner and outer London have an important role to play in maintaining and enhancing London's competitiveness.
32. The London Plan recognises the need to increase office space capacity in town centres. It seeks to:
"Consolidate and extend the strengths of the diverse office markets elsewhere in the capital by promoting their competitive advantage, focusing new development on viable locations with good public transport, enhancing the business environment including through mixed use redevelopment (...)".
33. The London Borough of Hammersmith and Fulham is one of London's fastest growing boroughs in terms of office employment projections. The borough's office workforce is forecast to grow from 46,000 workers to 72,000 by 2036, a 56 per cent increase⁸.
34. Hammersmith Town Centre is a major centre with excellent access to public transport. The regeneration of the town centre provides the opportunity to increase both the quantity and quality of office space to support London's employment growth.
- Protecting the strategic movement function of the TLRN is critical to London's economy.**
35. The A4 is part of the Transport for London Road Network (TLRN). Whilst the TLRN represents 4 per cent of London's road network, it carries 30 per cent of all traffic in London. The A4 is a key part of this network, carrying high volumes of strategic,

⁶ Source: GLA; derived from London Office Policy Review 2009

⁷ Excluding CAZ and north of the Isle of Dogs.

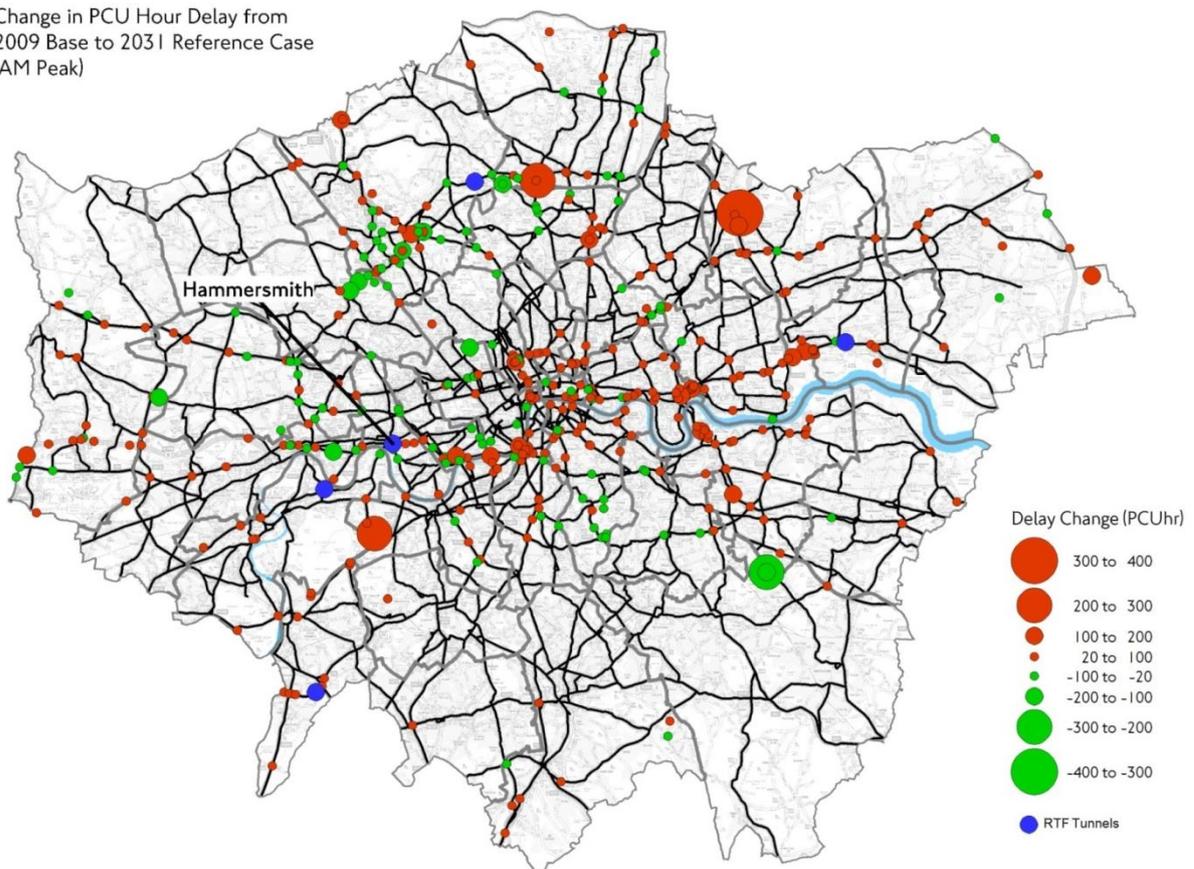
⁸ London Office Floorspace Projections – July 2014.

economically important traffic between central London, the west of England, and Heathrow airport. Removing road capacity on the surface in order to unlock development in Hammersmith would cause significant disruption to this strategic traffic corridor, with subsequent negative economic impacts for London.

36. As London's population grows, there will be increasing demand for vehicle travel. On many corridors, delays in vehicle traffic, including buses, are forecast to worsen (as shown in Figure ES 7). This will significantly affect quality of life for those living and working near these road corridors, leading to higher levels of noise and air pollution, worsening existing severance, and having substantial negative impacts on health. In turn, these impacts will make locations along the TLRN, including Hammersmith town centre, less attractive for development.

Figure ES 7 Change in PCU hour delay, 2009 – 2031

Change in PCU Hour Delay from
2009 Base to 2031 Reference Case
(AM Peak)



There is a case for new road tunnels at key locations to unlock development whilst mitigating the massive congestion costs of losing surface road space.

37. Maintaining and safeguarding this strategic movement is essential to London's future economic success. Replacement of the Hammersmith flyover with a road tunnel is the only infrastructure solution capable of safeguarding this strategic movement function, whilst simultaneously enabling the development of Hammersmith town centre.

Removal of the Hammersmith flyover and gyratory can support the delivery of around 3,800 gross new homes and around 13,800 gross new jobs⁹ in a high value area of London.

38. Removal of the Hammersmith flyover and gyratory would act as a catalyst for the transformation of Hammersmith Town Centre by addressing the problems of connectivity, poor public realm and environment related to the A4 flyover and gyratory that currently limit its development potential.
39. Without the removal of the flyover and gyratory, a maximum of around 620 gross new homes and 4,920 jobs could be created.
40. In summary, a tunnel can address significant challenges that currently limit the development potential of Hammersmith town centre, unlocking the delivery of thousands of new homes and jobs, reducing these constraints on London's future productivity and competitiveness, helping to maintain its position as one of the leading global cities. By enabling new housing along its route, a road tunnel on the A4 would also enable LBHF to make a significant contribution towards supporting regional population growth, and would connect new and existing residents to new local employment opportunities, benefiting businesses by broadening and deepening the labour market available to them leading to productivity gains.

The key points arising from the Strategic Case can therefore be summarised as:

- London is a key driver of the UK's economic growth. Its success benefits the UK as a whole, but this cannot be taken for granted.
- Central London's future employment growth depends on having an increased labour supply, but the city faces significant housing and space pressures, exacerbated by a growing population.
- London must unlock more development opportunities to support delivery of new housing and jobs.
- For London to remain competitive and attract new businesses, its office supply must keep up with employment growth and trends.
- The Hammersmith tunnel scheme can support the delivery of over 3,800 gross new homes and 13,800 gross new jobs¹⁰ in a high value area of London.
- Protecting the strategic movement function of the TLRN is critical to London's economy.
- There is a strong case for new road tunnels at key locations to unlock development whilst mitigating the massive congestion costs of losing surface road space.
- There is strong support for the A4 Hammersmith tunnel scheme, and the scheme conforms to policy at all levels, helping to secure London and the UK's continued prosperity.

⁹ Gross figures. See Part G of the Strategic Case, Regeneration and Growth Unlocked, for full details.

¹⁰ Based on a maximum jobs scenario for land parcels within Hammersmith town centre following flyover removal - see Part G of the Strategic Case, Regeneration and Growth Unlocked, for full details.

2. The Economic Case

41. The economic consequences of both tunnel options have been assessed.
- The short and long tunnel options would deliver significant regeneration benefits at the London level helping to support the delivery of 3,800 gross new homes and up to 13,800 gross new jobs¹¹.**
42. Reflecting this primary purpose, both A4 tunnel options deliver substantial regeneration benefits. Provided that changes to planning policies to allow more flexibility to accommodate higher density developments are implemented, the scheme would help support the unlocking of development sites that have capacity to deliver up to 3,800 new homes and 13,800 new jobs. These gross figures represent the total quantum that is possible, including those that would have come forward without the tunnel and exclude any displacement effects. In terms of growth directly enabled by the Hammersmith tunnel options, 1,500 net additional new homes as well as over 2,300 net additional jobs at the London level (allowing for displacement)¹². It is estimated that the scheme would generate £1,045bn gross value added (GVA) at the London level. These benefits are summarised in Table ES 2 below:

Table ES 2 Summary of additional impacts of A4 Hammersmith Tunnel (at London level)

<i>Figures rounded to nearest 10</i>	Option 1 or Option 2 with flexible planning
Net additional homes	1,528
Net additional jobs (direct and indirect)	2,282
GVA generated by additional jobs (direct and indirect) (£m PV)	1,045

43. These are significant economic benefits that would strengthen London's economy and boost tax receipts.
44. The scheme would also improve quality of life through an improved public realm and reduced severance and noise impacts, with additional associated economic impacts. Under a conservative estimate, urban realm benefits can be quantified at £932,000 over a 30 year period, and noise benefits can be quantified at a net present value of £30m for Option 1 (the short tunnel), and £144m for Option 2 (the longer tunnel).

¹¹ These are gross figures not accounting for displacement.

¹² Displacement captures the proportion of economic activity/outputs which would have occurred elsewhere in the target area and are expected to be displaced as a result of developments brought forward by the scheme.

Conventional WebTAG appraisal approaches that focus on the transport benefits of the Hammersmith tunnel has limitations in reflecting the full growth benefits enabled by the scheme.

45. Although WebTAG guidance requires the reporting of a Benefit to Cost Ratio (BCR), this is not an appropriate metric by which to judge the A4 Hammersmith tunnel scheme. The tunnel's primary purpose is not to deliver transport benefits, but to achieve the regeneration of Hammersmith town centre, delivering thousands of jobs and homes and in turn supporting London's wider economic growth, while seeking to maintain network efficiency and avoid the negative impacts that would otherwise result.
46. In terms of transport user benefits (excluding the scheme's very strong positive regeneration impacts) both tunnel options do not perform strongly – representing 'poor' value for money.
47. Over the 60-year appraisal period, Option 1 - the shorter tunnel with development and using London Values of Time (VoT) has a Benefit Cost Ratio (BCR) of 0.00 to 1, including additional land acquisition costs. The Net Present Value (NPV) of this option is estimated at -£0.49m. Option 2 - the longer tunnel with development and London VoT has a BCR of 0.02 to 1, with a NPV of -£1.4m. However, these values do not take into account the substantial regeneration benefits that the scheme delivers at a local and a London-wide level through enabling more housing and commercial floorspace.

The key points arising from the Economic Case can therefore be summarised as:

- In regeneration terms the A4 tunnel scheme performs very strongly, unlocking significant economic benefits for London, including large numbers of new jobs and much needed housing.
- The short tunnel option would deliver the same development enabling benefits as the long tunnel option, for a lower cost.
- WebTAG guidance requires the reporting of traditional transport BCRs. If traditional transport user benefits were to be considered in isolation, then the Hammersmith tunnel would offer 'poor' value for money.
- However, given that the focus of the scheme is on unlocking regeneration, rather than delivering journey time savings and decongestion benefits then the BCR alone is not an appropriate metric by which to judge the A4 tunnel scheme.

3. The Financial Case

Cost estimates suggest the short tunnel would cost £668m to construct and the longer tunnel option would cost around £2bn.

48. The Financial Case sets out the project and ongoing operating costs and financing and funding arrangements to deliver the scheme.
49. Project costs for each option have been developed:
 - Option 1: Estimated construction cost of £668m
 - Option 2: Estimated construction cost of £2bn
50. Both costs are presented in 2015 prices, including 66 per cent optimism bias. Further design work is being undertaken which may see these cost figures revised.
51. Cost figures presented do not include land acquisition costs of £16m for Option 1 and £60.5m for Option 2; costs of traffic disruption as a result of construction; possible improvements to the Hammersmith gyratory or the Earls Court one way system; or the downgrading of existing surface junctions on the A4.
52. Once built, it is estimated that operations and maintenance for Option 1 would cost £3.9m per annum (in 2015 prices). A further £1.5m would need to be invested roughly every ten years on lifecycle cost. The annual operations and maintenance cost for Option 2 would be £11.85m, with a further £4.6m investment every ten years for renewals.

A significant proportion of the funding for a tunnel could be met from non-grant funding sources.

53. The following funding sources for this scheme have been considered:
 - Funding from taxes on new development (incremental Borough Community Infrastructure Levy, business rates and stamp duty);
 - Funding from developing land directly on the schemes and additional land purchased around them;
 - Funding from potential road user charges or taxation, building on TfL's congestion charge;
 - Funding from taxes on existing residential development (council tax).
54. Given the early stage of the scheme, sources of funding are only indicative at the moment. However TfL has had a significant level of engagement with the borough of Hammersmith & Fulham to explore the local funding sources that would be most feasible and acceptable.
55. A funding package for the tunnel would need to come from a combination of sources. However, some of these sources are not currently devolved from Central Government to the Mayor.

Around forty percent of the construction cost of Option 1 could be secured through land value uplift capture.

56. TfL appointed Jones Lang LaSalle (JLL), the property consultants, to evaluate the possible funding that could be derived from the residual land value, borough CIL, incremental business rates and other possible developer contributions.
57. The identified sources of funding could cover around 40% of the shorter tunnel option, or around 14% of the longer tunnel option, unadjusted for financing costs.

TfL is seeking further powers and fiscal devolution to enable a significant proportion of the cost of construction to be raised from local funding sources.

58. In addition to the funding options presented above, TfL has considered stamp duty as a possible funding source for this project, given the link between the tunnel scheme and the number of homes that this project could unlock. If the stamp duty revenue within a designated zone was devolved, or an equivalent earnback arrangement created, then this could provide a potential funding source for the Hammersmith tunnel.
59. TfL has also looked at tolling and council tax precept as alternative sources of project funding. At present, it is not felt that these options can be progressed, given the significant level of resistance that is likely to be shown by local residents and road users towards them.
60. Other means of covering the costs of the tunnel, such as partial government funding would also need to be considered.

The key points arising from the Financial Case can therefore be summarised as:

- Cost estimates suggest the short tunnel would cost £668m to construct and the longer tunnel option would cost around £2bn
- A significant proportion of the funding for a tunnel could be met from non-grant funding sources
- TfL is seeking further powers and fiscal devolution to enable a significant proportion of the cost of construction to be raised from local funding sources

4. The Commercial Case

61. This sets the commercial structure, the accounting treatment and procurement approach for the project.
62. The tunnel is being promoted by TfL in partnership with the London Borough of Hammersmith and Fulham (LBHF). All potential suppliers would be required to consider the Mayor of London's Responsible Procurement Policy in their bid as part of any Invitation to Tender (ITT) for the design and build contract.

TfL has substantial experience of delivery of complex highway and tunnelling projects, which we would apply to the procurement, funding and financing of the Hammersmith tunnel.

63. TfL has significant experience in the procurement and construction of major infrastructure projects, including rail tunnels and highway improvements, on projects such as Crossrail, Docklands Light Railway extensions, and major station schemes such as King's Cross St Pancras. Examples of significant highway improvements delivered by TfL include the Chiswick Bridge refurbishment, and the Cycle Superhighways programme.
64. It is expected that the construction stage of the project would be led by TfL and where involving infrastructure owned by other parties, such as the London Borough of Hammersmith and Fulham, would be delivered in partnership with these other organisations.

TfL can achieve efficiencies by delivering the Hammersmith scheme within a wider highway capital investment programme and link into a wider programme of tunnel projects.

65. TfL is undertaking and proposing a range of large capital infrastructure projects that involve procurement of skills and services that will all be highly relevant to approaches that would need to be adopted for the A4 Hammersmith tunnel. For example, Crossrail and the Northern Line Extension have led to an increase in skills associated with deep bored tunnel design and construction procurement, whilst the Cycle Superhighways and Better Junctions programmes have led to an increase in skills associated with large-scale highway engineering and construction traffic management.
66. There is an opportunity to build on the experience TfL is developing through delivering the Silvertown Tunnel, applying this to other highway tunnelling projects, such as Hammersmith.
67. The A4 Hammersmith tunnel is also being proposed as part of a wider programme of Roads Task Force (RTF) tunnels and decking over at a range of locations throughout London, arising from the 2013 recommendations published by the RTF. If these projects are progressed, some significant economies and efficiencies could be achieved through co-ordination of delivery with the A4 Hammersmith tunnel.

TfL utilises supply chains from across the UK – work for a tunnel would support jobs outside London.

68. Although TfL undertakes procurement for projects implemented in the capital, the wider benefit to the UK is extensive, with over 60,000 jobs estimated to be supported by services TfL procures from outside of London. The construction of the Hammersmith tunnel would add to the pipeline of capital investment that supports jobs across the UK.
69. The procurement strategy for this stage of the project would be refined and improved as the scheme is further developed.

The key points arising from the Commercial Case can therefore be summarised as:

- TfL has substantial experience of delivery of complex highway and tunnelling projects, which we would apply to the procurement, funding and financing of the Hammersmith tunnel
- TfL can achieve efficiencies by delivering the Hammersmith scheme within a wider highway capital investment programme and link into a wider programme of tunnel projects.
- TfL utilises supply chains from across the UK – work for a tunnel would support jobs outside London

5. The Management Case

70. The purpose of the Management Case is to assess whether a proposal is deliverable. It reviews evidence from similar projects, sets out the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance.

TfL would make full use of best practice within the company and from industry.

71. TfL has extensive experience in developing, promoting and implementing significant infrastructure projects. This ranges from modifications to existing infrastructure (such as repairs to the A4 Hammersmith flyover, modernisation of the London Underground, extensions to Tramlink and DLR) to major schemes such as Crossrail.
72. TfL also has demonstrable experience in delivering major road junction improvements, pedestrian and cycle schemes, and wider public realm improvements. These projects share similarities to the A4 Hammersmith tunnel scheme, involving processes and aspects of design and construction which would be faced by a road tunnel. TfL will continue to actively incorporate best practice and experience from these schemes into the development of the Hammersmith tunnel project.
73. The Hammersmith tunnel project is part of the wider Roads Task Force programme sponsored by the Managing Director of TfL Planning. There are a number of programme linkages with other schemes being taken forward as part of the RTF Key Corridor Interventions Programme, as well as the wider Roads Modernisation Programme, which will present opportunities to share best practice as these schemes progress.

A comprehensive and robust project management framework would be applied, helping to ensure scope, cost and benefits are controlled.

74. TfL uses a number of mechanisms to improve the management of its major projects in order to help ensure the objectives and benefits of a scheme at inception are realised following implementation. TfL's project management framework, known as 'Pathway' provides consistency in approach and the tools required for planning and delivery teams, whilst retaining flexibility in its application to manage and control a project. Embedded into Pathway is a delivery assurance process using stage gates, upon which TfL utilises industry-leading external expertise to review and challenge all aspects of the project.

Rigorous assurance processes would provide close scrutiny and challenge of risk management and decision-making throughout the project.

75. TfL also receives project review and assurance from the Independent Investment Programme Advisory Group (IIPAG), which report to the Mayor of London concerning TfL's Investment Programme. This includes all maintenance, renewal, upgrades and major projects (excluding Crossrail).
76. TfL has the option of establishing an Independent Peer Review Group (IPRG). This approach has been followed for other major TfL projects, so given the scale of the Hammersmith tunnel project, this could warrant a similar approach. If appropriate, an IPRG can be set up for the scheme if further development of the project is approved. Initially it could oversee the refinement of delivery sub-options and review engineering feasibility studies and scheme appraisal undertaken.

77. Stakeholder engagement has already been undertaken and there is strong support for the scheme from the London Borough of Hammersmith and Fulham. A future programme of stakeholder engagement has been developed for the scheme if/as it progresses.
78. The current anticipated key milestones for the project are shown in Table ES 3 below. Any changes to baseline scope, cost and schedule will be reviewed, impact assessed and approved following the change control process.

Table ES 3 Key project development milestones

Milestone Description	Date ¹³
Planning, design, approval and procurement	2016 - 2025
Construction	2025 - 2031

The key points arising from the Management Case can therefore be summarised as:

- TfL would make full use of best practice within the company and more widely from industry
- A comprehensive and robust project management framework would be applied, helping to ensure scope, cost and benefits are controlled
- Rigorous assurance processes would provide close scrutiny and challenge of risk management and decision-making throughout the project

¹³ Subject to tender returns and planning application process.

6. Conclusions

There are compelling regeneration benefits of the A4 Hammersmith tunnel project.

79. The A4 Hammersmith tunnel Strategic Outline Business Case demonstrates that across the Five Case Model:
- there is a **case for change** for the Hammersmith tunnel scheme to address issues of severance, public realm and environmental quality, and to cater for the needs of future population and economic growth. This 'strategic case' is closely related to national, London-wide and local road policy objectives, with a particular reference to the London Plan and the Mayor's Transport Strategy.
 - the analysis demonstrates that the scheme would deliver **economic and regeneration benefits** for London by unlocking a net additional 1,500 new homes and a net additional 2,300 new jobs at the London level. This would add over £1,045bn worth of GVA at the London (region) level. This new development would generate additional Stamp Duty revenues and Corporation Tax and VAT revenues.
 - is **financially affordable** – the 'financial case' analysis demonstrated that a significant portion of some costs may be recoverable from land value uplift and operating surplus, but would require significant further mechanisms for the Mayor and TfL to achieve this.
 - is **commercially viable** – this business case sets out the procurement, commercial structure, and proposed allocation of risk and payment mechanisms for the project.
 - is **achievable**- the 'management case' sets out a clear governance, process and programme for the further development of the scheme by TfL, an authority with a very successful experience and record in major project delivery.

It is suggested that further feasibility and scheme development work takes place to investigate both proposed tunnel options.

80. While the Strategic Outline Business Case has reported on the majority of the likely impacts of the scheme, further feasibility and scheme development work is required to further investigate these impacts for both proposed tunnel options. This includes work to establish the air quality, noise and social/distributional impacts of the options to inform the production of any future Outline and/ or Full Business Case. Future work will also elaborate on the potential commercial case and charging policy and various sensitivity tests.
81. TfL will continue to liaise closely with LB Hammersmith and Fulham during any further work. TfL will also work closely with the Borough to inform the development of a Hammersmith town centre Supplementary Planning Document, due to be published in 2016.

Given the strong case for the A4 Hammersmith tunnel scheme, TfL would propose the following to facilitate its delivery.

- Enterprise Zone designation.
- A zonal trial of stamp duty devolution;
- An extension of CPO powers to TfL for 'transport-enabled' development;
- Investigation of a loan facility to enable early land acquisition to secure value uplifts arising from a tunnel; and

82. To capitalise on those the Mayor / TfL and GLA propose to:

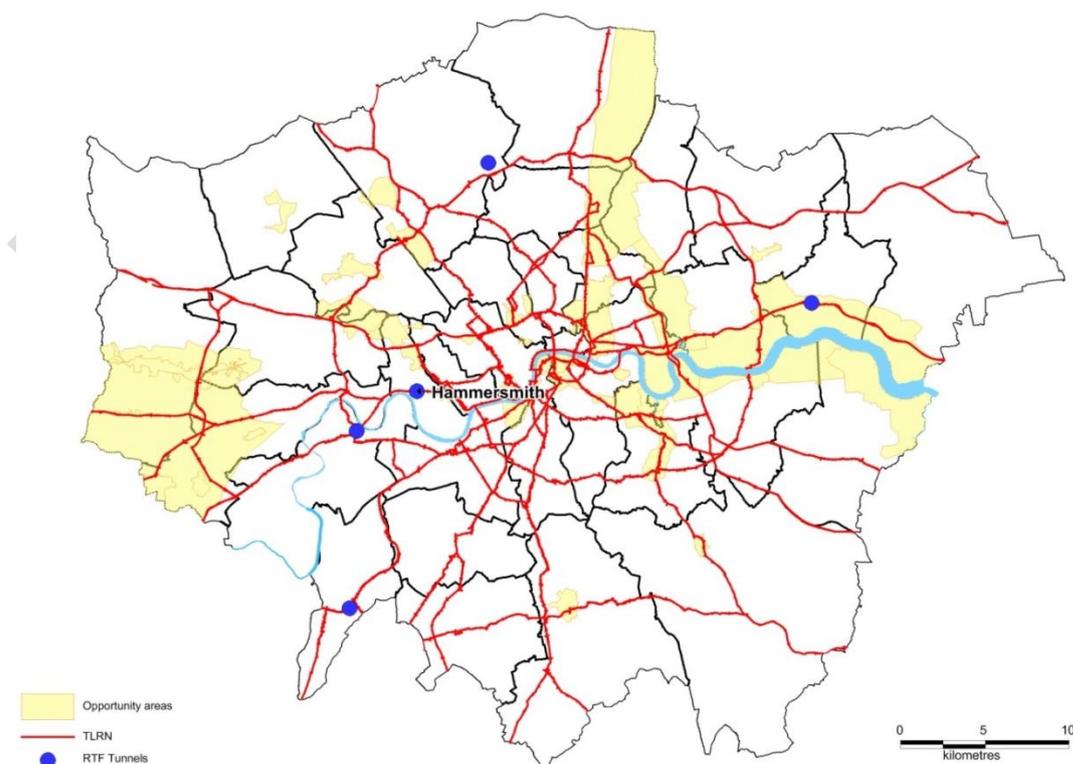
- Commit to take risk on land values that accrue;
- Use existing public land as far as possible to enhance and speed delivery of development;
- Commit to use of CPO powers to ensure land for development is utilised to its full extent; and
- Commit to ongoing use of the tunnelling expertise and supply chains which have been developed for other TfL projects to reduce infrastructure provision costs.

1. The Approach to the Business Case

Introduction

- 1.1 Transport for London (TfL) and the London Borough of Hammersmith and Fulham are proposing to construct new road infrastructure on the A4 at Hammersmith to act as a catalyst for the transformation and regeneration of Hammersmith town centre by unlocking land for development, reducing local severance, improving the public realm, and improving the quality of the local environment.
- 1.2 The scheme has been identified following the recommendations of the Road Task Force (RTF) Report: 'Vision for London's Roads and Streets' published in 2013. The scheme is one of five schemes which form part of the first tranche of opportunities identified by the RTF to address Transport for London Road Network (TLRN) challenges and which have been subject to detailed feasibility work. Notwithstanding this, all schemes are at an early stage in their development stage and further, detailed design and assessment will be undertaken during 2015 and 2016.
- 1.3 This document is the Strategic Outline Business Case for the project.
- 1.4 Figure 8 shows the location of the scheme, and Figure 9 and Figure 10 illustrate the extent of Option 1 (green) and Option 2 (pink)¹⁴.

Figure 8: London wide location map



¹⁴ Alignments shown are approximate.

Figure 9: Scheme location plan

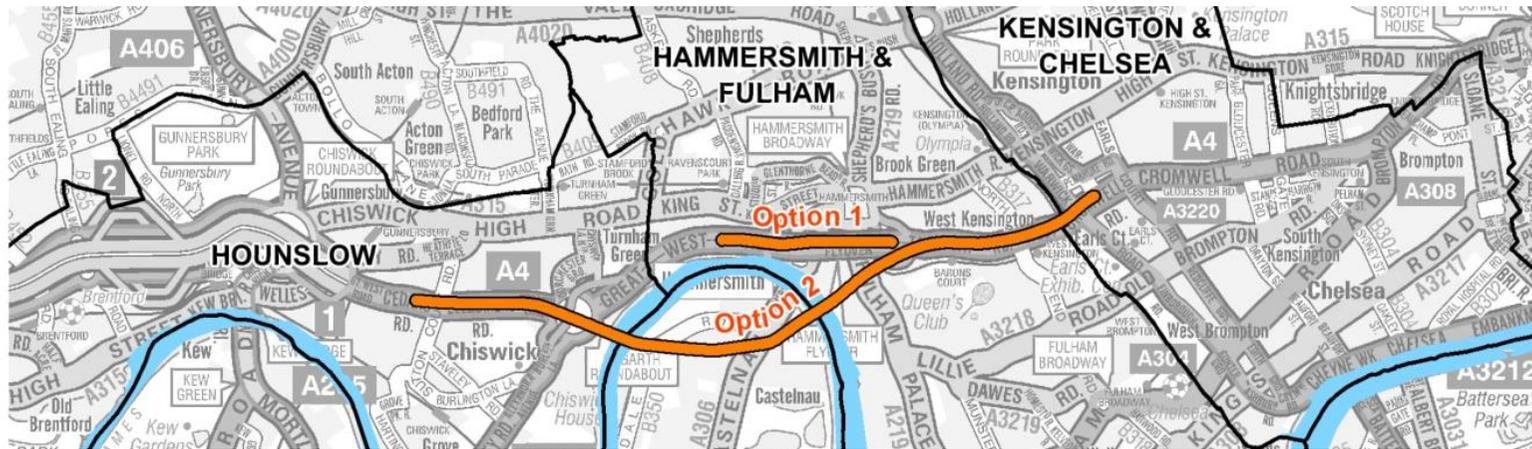
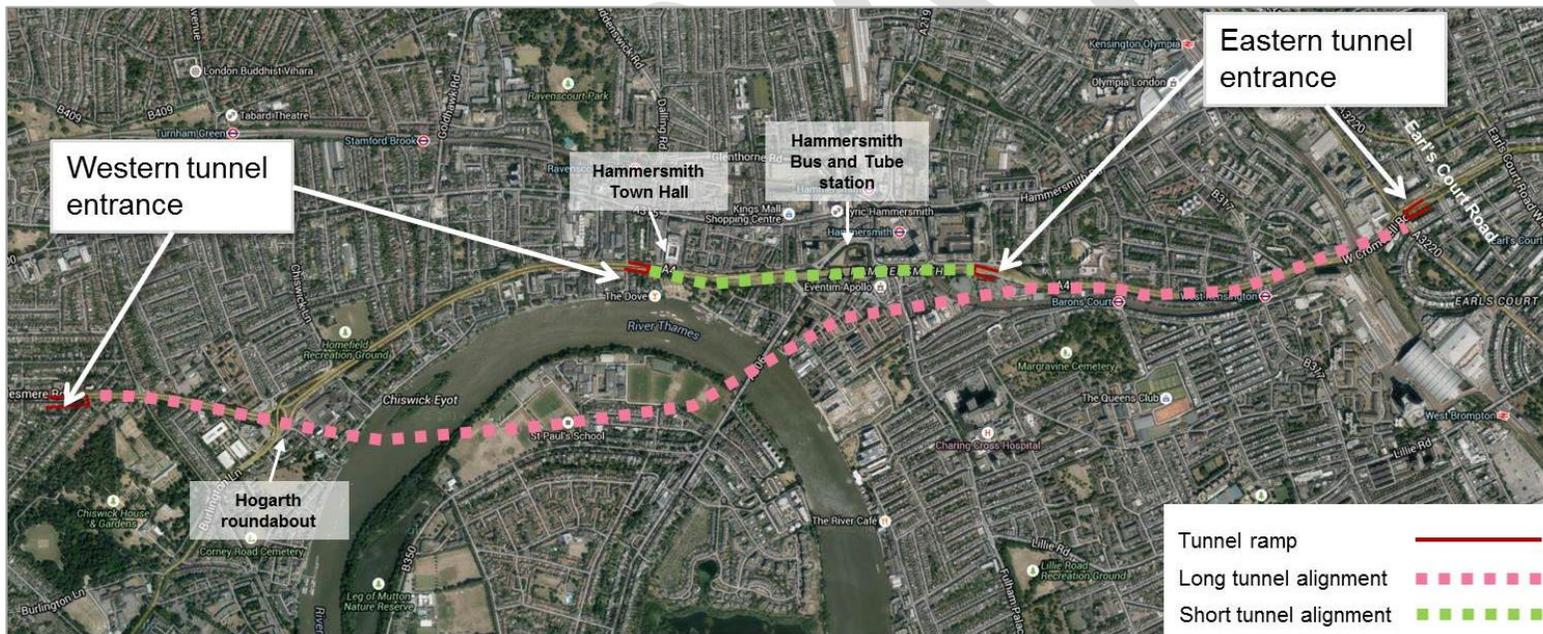


Figure 10: Detailed scheme location plan

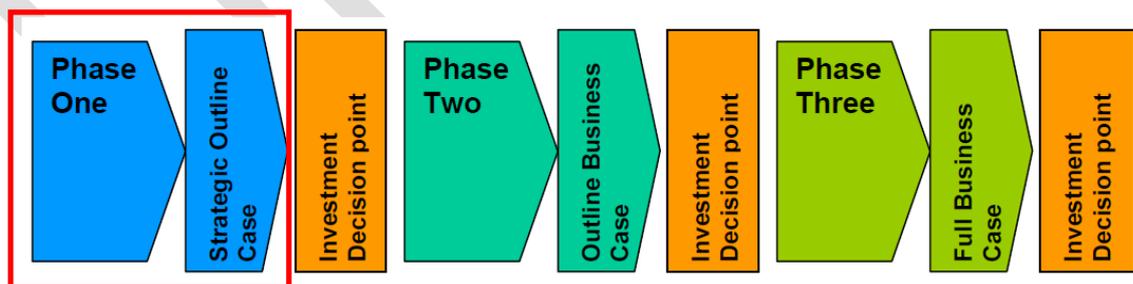


The Five Case Model for Transport Appraisal

- 1.5 The purpose of a business case is to provide evidence-based information in relation to investment programmes. Guidance for the preparation of Business Cases for Transport Schemes has been published by the DfT¹⁵. This is based on H.M. Treasury's advice on evidence-based decision making as set out in the Green Book¹⁶ and uses the best practice five case model approach.
- 1.6 This approach assesses whether schemes:
- are supported by a robust case for change that fits with wider public policy objectives – the 'strategic case';
 - demonstrate value for money – the 'economic case';
 - are commercially viable – the 'commercial case';
 - are financially affordable – the 'financial case'; and
 - are achievable – the 'management case'.
- 1.7 The evidence gathered as part of the business case preparation process has been prepared using the tools and guidance provided by the DfT, notably WebTAG¹⁷. This approach ensures that the evidence produced is robust and consistent for all the options examined in detail. This applies equally to those options proposed for investment and those which, following assessment, are not to be developed further.

The decision making process

- 1.8 The decision making process, of which this Strategic Outline Business Case forms part, usually takes place in three phases. Each phase includes the preparation of a business case followed by an investment decision point. Each business case builds upon that previously prepared. Evidence is reviewed to ensure that it remains up to date, accurate and relevant. The current Strategic Outline Business Case is in Phase One of this iterative process, with two further future stages of development to follow, as shown below.



¹⁵ See https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/85930/dft-transport-business-case.pdf - accessed 5 September 2014

¹⁶

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf accessed 5 September 2014

¹⁷ See <https://www.gov.uk/transport-analysis-guidance-webtag> accessed 5 September 2014

- 1.9 The current **Phase One** of this process focuses on articulating the need for the intervention and summarising the range of options developed and considered. This phase:
- is used to set out the strategic fit of the project with achieving relevant national and London Mayoral and TfL policy objectives;
 - confirms the strategic fit and the case for change;
 - scopes out the initial investment/intervention proposal; and
 - provides details of the project's overall balance of benefits and costs against objectives
- 1.10 In the next stage, **Phase Two**, which will follow over the course of 2016, TfL will reconfirm the conclusions from Phase One and will concentrate on a more detailed assessment of the options to find the best solution, culminating in the preparation of an Outline Business Case, which will build on the Strategic Outline Business Case.
- 1.11 The final phase in the process, **Phase Three**, will result in the production of the Full Business Case – this will accompany the planning application process.

The role of the Mayor of London and TfL

- 1.12 This investment proposal is made by TfL acting as the body responsible for planning, organising and controlling and, in some instances, operating transport within London for the Mayor, who is charged with setting the policy and strategy for transport which he has done by the publication of the Mayor's Transport Strategy (MTS).
- 1.13 TfL is responsible for operating, maintaining and improving the strategic road network (the Transport for London Road Network (TLRN) in Greater London. The TLRN represents 4 per cent of London's road network, but carries 30 per cent of all traffic in London.
- 1.14 The strategy of TfL is decided by the Mayor through the MTS. The MTS is the principal policy tool through which the Mayor exercises his responsibilities for the planning, management and development of transport in London, for both the movement of people and goods. It takes into account the policies in the London Plan and the Mayor's Economic Development Strategy (EDS). It provides the policy context for the more detailed plans of the various transport-related implementation bodies, particularly TfL and the London boroughs.
- 1.15 The legislative framework for the MTS is laid down by the Greater London Authority (GLA) Act 1999 as amended by the GLA Act 2007. The GLA Act 1999 sets out the general transport duties of the Mayor and the GLA. It specifies that the transport strategy must contain policies for 'the promotion and encouragement of safe, integrated, efficient and economic transport facilities and services to, from and within Greater London', and proposals for securing the transport facilities and services needed to implement the Mayor's policies over the lifetime of the MTS, with regard to the movement of people and goods. TfL is under a duty to use its powers to facilitate and implement the policies and proposals of the MTS.

Summary of consultations to date

There is local support for the A4 Hammersmith tunnel scheme.

- I.16 No formal public consultation has been carried out to date given the early stage of the project. However a number of public engagement events were held by LB Hammersmith and Fulham in 2012 and 2013 to gauge local support for the scheme and to help inform the early stages of option development.
- I.17 As part of this process, a public 'Flyunder Summit' was held at the Town Hall in October 2013, exhibiting initial feasibility study outcomes as well as the emerging vision for the scheme. Surveys completed at this event confirmed a high level of public support for the tunnel scheme, with 89 per cent agreeing, or strongly agreeing, with the principle of replacing the flyover with a tunnel.
- I.18 A dedicated website (www.lbhf.gov.uk/flyunder) set up by LB Hammersmith and Fulham to inform and publicise the initial Hammersmith Flyunder Feasibility Study received one of the highest numbers of posts ever received on the borough's webpages, indicating a high public interest in the scheme.
- I.19 The Roads Task Force consultation, published as a report in 2012¹⁸, asked stakeholders to provide their views on the main challenges facing London's roads, and how these should be tackled. The report revealed that key concerns shared by London boroughs, the public and other stakeholder organisations included noise and air pollution, increased pressure on roads as a result of congestion, and safety concerns relating to walking and cycling.
- I.20 Should the project develop further, formal consultation would be undertaken with the public and relevant stakeholders.

¹⁸ TfL (2012) Roads Task Force: Response to Consultation, November 2012.
https://consultations.tfl.gov.uk/roads/taskforce/consult_view

2. The Strategic Case

Introduction

- 2.1 This Strategic Case has been prepared by TfL, in close consultation with the London Borough of Hammersmith and Fulham, and with support from an independent Expert Group comprised of experts in economic appraisal of major transport infrastructure projects. It is the first of the five cases forming the Strategic Outline Business Case for the scheme. Its purpose is to set out the need for investment in the transport network at Hammersmith.
- 2.2 The Strategic Case demonstrates how the scheme responds to the following regional and local objectives:
- **Accelerate housing and office space delivery in the Greater London Area and contribute to the London Plan’s aim of building 49,000 new homes every year.**
 - Enable the regeneration of Hammersmith Town Centre and achieve higher housing and job densities.
 - **Improve the quality of life of residents through more sustainable transport networks and a better environment.**
 - Enhance local residents’ quality of life by improving urban realm, reducing severance caused by the A4 flyover and gyratory and improving local access for all road users, including pedestrians and cyclists.
 - **Secure the strategic function of the Transport for London Road Network (TLRN).**
 - Mitigate the increasing congestion on the A4 to maintain its strategic economic function as freight corridor and major link between Heathrow Airport, west London and Central London.

The Strategic Case is structured into seven sections:

Part A: The role of office space supply, housing and the TLRN in supporting London’s growth

Part B: TfL’s proposal to free-up road space for urban regeneration whilst securing the TLRN strategic movement function

Part C: Hammersmith town centre, local context

Part D: Objectives for the A4 tunnel scheme and options considered

Part E: How the tunnel options address the problems and meet the objectives

Part F: Strategic policy context

PART A: THE ROLE OF OFFICE SPACE SUPPLY, HOUSING AND THE TLRN IN SUPPORTING LONDON'S ECONOMIC GROWTH

Section Summary:

1. London is the UK's powerhouse

- London makes a significant and growing contribution to the UK economy in employment, GVA and tax revenues.
- Employment levels in London are growing rapidly, helping to encourage population growth in response.

2. For London to remain competitive and attract new businesses, its office space supply must keep up with employment growth and trends

- There is a high demand for office space in Central London and other Inner London areas with good public transport accessibility.
- Town centres have a key role to play to support London's employment growth.

3. London's housing supply is not keeping up with population growth

- London is delivering only 25,000 new homes a year, when it needs to deliver at least double this volume.
- London's continued economic growth and competitiveness is increasingly being threatened by a constrained supply of housing.
- London's growth is being constrained by a chronic shortage of housing which is driving up housing costs as a proportion of household income.
- Dense cities are the way to accommodate growth most sustainably and most efficiently.
- TfL can help unlock more land for urban regeneration and contribute to meeting London's housing and employment targets.
- London's town centres will be vital to meeting the challenges of enabling and accommodating London's future growth.

4. The strategic movement function of Transport for London's Road Network

- The strategic road network is vital for London, but as the city grows the level of congestion is forecast to grow, even with sustained investment in public transport capacity.
- At the same time, the competing demands for space for walking, cycling and creating better places will become ever more important.
- A growing city population will travel more using different modes, resulting in more congestion and crowding, and poorer air quality, reducing the overall quality of life.

5. The need to balance the sense of place and the movement function of the road network

- Better use of road space on strategic roads is a possible means of both improving quality of place and unlocking additional development, but this needs to be balanced against continued needs for movement.
- Road corridors with a strong "movement" emphasis cause severance impacts that inhibit connectivity, sustainable transport modes and quality of life.

6. Objectives for action on the TLRN corridors

- Objectives arise from two key sources, the Mayor's Transport Strategy and the 2013 Roads Task Force "Vision for London's Roads and Streets".

London is the UK's powerhouse

London makes a significant and growing contribution to the UK economy in employment, GVA and tax revenues.

- 2.3 London is the UK's main engine of economic growth, contributing 22 per cent of total UK Gross Value Added (GVA) in 2013 and generating £56,687 GVA per worker compared to the UK average of £41,088¹⁹. Evidence suggests that within large cities, greater employment density drives higher productivity through skills specialisation and clustering²⁰. These agglomeration effects help London to drive UK's international competitiveness through increasing employment densities in the Central Activities Zone (CAZ).
- 2.4 The strength of London's economy makes it a vital contributor to the UK's finances. In 2013/14, an estimated £127 billion of tax revenue was estimated to have been generated through economic activity in London, comprising an estimated 21 per cent of total UK tax revenue²¹. Investing to support the growth of London is essential to build strong public finances.
- 2.5 Since 1994, on average, 29,700 new jobs a year have been created within London. The city's economic growth is forecast to be 4.2 per cent in 2014 and 3 per cent each year to 2020. This is faster than the projected UK growth rate overall, partly driven by forecast increases in population and the size of the workforce. The latest GLA employment forecasts suggest that on average, 41,000 new jobs a year in London will be created to 2036²².

Key Finding:

The London economy makes a vital contribution to the success and competitiveness of the UK, and if London succeeds, the UK as a whole benefits.

¹⁹ GLA Economics, GVA per Workforce Job <http://data.london.gov.uk/dataset/gva-per-workforce-job> (February 2015)

²⁰ Transport investment and economic performance, October 2014 (Venables, Laird and Overman)

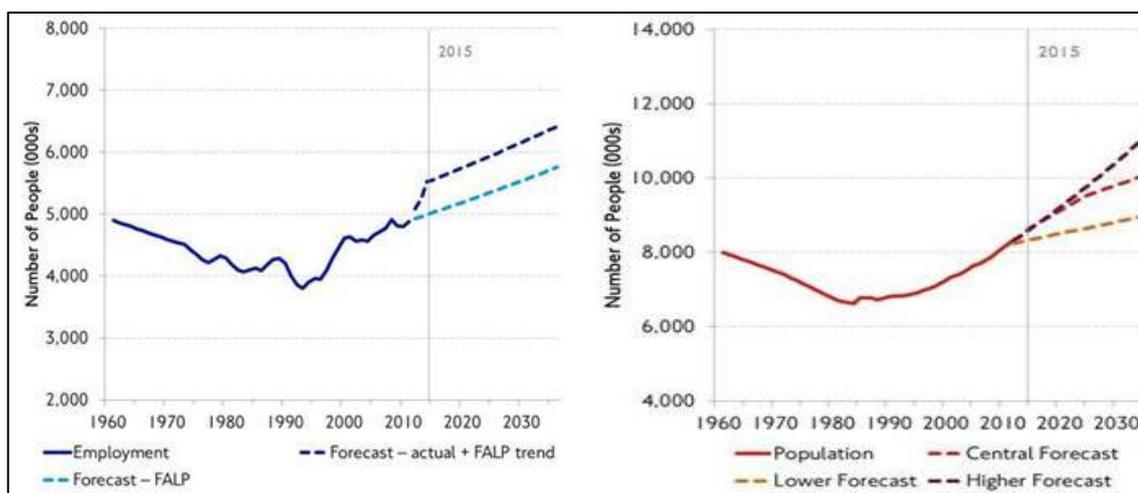
²¹ Research Report: London's Finances and Revenues: City of London Corporation & CEBR (2014)

²² GLA Economics Employment Forecasts, May 2015

Employment levels in London are growing rapidly, helping to encourage population growth in response.

- 2.6 After reversing a steady period of decline London has been on a growth trajectory since the 1980s. These trends are shown in Figure 11.

Figure 11: Historic trends and projected growth in London’s employment and population (1961 - 2036)



- 2.7 Between 1991 and 2011, the number of jobs in London rose by 900,000 and over the same period, the population rose by 1.4m. The number of jobs in London is expected to grow by 1.4m between 2011 and 2036. As the left hand graph in Figure 11 above shows, a total of 650,000 of these jobs have already been created between 2012 and 2014²³.
- 2.8 Rapid employment growth in London has been driven by a range of factors including the UK’s flexible labour markets, high skill levels and openness to Foreign Direct Investment. Employment growth has been felt most acutely within central London, where connectivity is highest.

For London to remain competitive and attract new businesses, its office space supply must keep up with employment growth and trends.

- 2.9 In recent decades London’s economy has been increasingly service-based, and this trend is likely to continue. As a result, ensuring there is enough office space of the right kind in the right place is a key task.
- 2.10 Results from the 2009 London Office Policy Review shown in Table 4 overleaf indicate that office based employment may grow by 303,000 between 2011 and 2031. On this basis, London might need an additional 3.9 million sq m (net) of office space²⁴.

²³ This trend is regarded as a short term phenomenon reflecting London’s resilience to economic shocks in recent years and it is expected that job growth will revert to historic trend levels going forward.

²⁴ With a central assumption for office employment density of 12 sq.m per worker; net : gross development ratios of 75% - 85%; and a frictional vacancy rate of eight per cent.

Table 4: Demand for office based employment and floorspace, 2011-2031²⁵

Location	Office based employment growth (number of jobs)	% of total employment growth	Demand for office floorspace (net million sqm)
Outer London	59,000	20	0.77
Inner London ²⁶	67,000	22	0.86
CAZ and north of the Isle of Dogs	177,000	58	2.30
London total	303,000	100	3.93

- 2.11 A further alteration to the London Plan based on the 2012 London Office Policy Reviews projected an office employment growth of 575,000, a substantially higher figure than the 303,000 forecast based on the 2009 London Office Policy Review.

There is a high demand for office space in Central London and other Inner London areas with good public transport accessibility.

- 2.12 Although the demand for office space is strongest in the CAZ and north of the Isle of Dogs (international centres), other business centres in Inner and outer London have an important role to play in maintaining and enhancing London's competitiveness.
- 2.13 Increasing employment densities in the CAZ is adding pressure on already over-crowded radial public transport routes. While the agglomeration benefits are currently greater than the costs of providing extra capacity to the network, there might be a limit at some stage to the density that can be supported within the CAZ.
- 2.14 There is a case to expand the high density core to areas on the fringe of the CAZ or within easy access to the CAZ. The latter includes underused Inner London town centres with good public transport access.
- 2.15 The London Plan recognises the need to expand the CAZ and increase office space capacity in town centres through densification and regeneration. It seeks to:

“Consolidate and extend the strengths of the diverse office markets elsewhere in the capital by promoting their competitive advantage, focusing new development on viable locations with good public transport, enhancing the business environment including through mixed use redevelopment (...).”

²⁵ Source: GLA; derived from London Office Policy Review 2009

²⁶ Excluding CAZ and north of the Isle of Dogs.

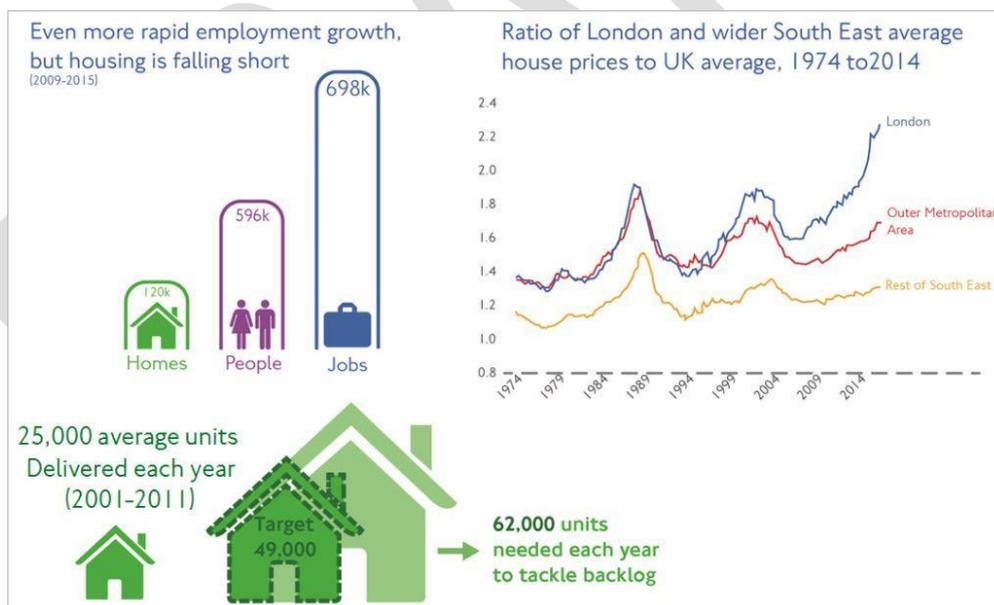
- 2.16 Hammersmith Town Centre is a major centre with excellent access to public transport. The regeneration of the town centre provides the opportunity to increase both the quantity and quality of office space to support London's employment growth.

London's housing supply is not keeping up with population growth

London is delivering only 25,000 new homes a year, when it needs to deliver at least double this volume.

- 2.17 The UK Office for National Statistics projections expect a 23 per cent rise in London's Population between 2011 and 2031 which equates to a 1.9m increase, taking the population to 10.1m²⁷ by 2036, as shown in the right hand graph in Figure 12. The London Infrastructure Plan predicts a 37 per cent increase in population between 2011 and 2050.
- 2.18 London's rapid population growth is driving the need for an additional 1.5m additional homes and a 50 per cent increase in public transport capacity over and above what is already planned²⁸.
- 2.19 Demand for new housing is outstripping supply by a factor of three to one. Over the decade when London's population grew by more than a million, its housing stock grew by less than 300,000.

Figure 12: Summary of housing supply and affordability issues facing London.



London's continued economic growth and competitiveness is increasingly being threatened by a constrained supply of housing.

²⁷ FALP (2014) - GLA Population forecasts

²⁸ London Infrastructure Plan 2050

<https://www.london.gov.uk/sites/default/files/LIP%202050%20update%20presentation%20March%202015.pdf>

- 2.20 Many of London's key economic activities are global, its businesses and workforce are increasingly footloose, and as a result London and the UK's success cannot be taken for granted.
- 2.21 The World Economic Forum Global Competitiveness Report for 2014-15 highlights that there are a number of factors businesses consider as problematic in the UK for doing business – with infrastructure and access to skilled and educated workforce amongst the top 6 factors.
- 2.22 There has been some deterioration in London's international rankings, notably around cost of staff and quality of life²⁹. Housing shortages and the associated worsening of housing affordability could constrain employment growth.
- 2.23 Addressing the housing supply and affordability issues that lie behind these factors is fundamental to London's future growth and competitiveness, and is a key part of the Government's Productivity Plan launched in July 2015.

Key Finding:

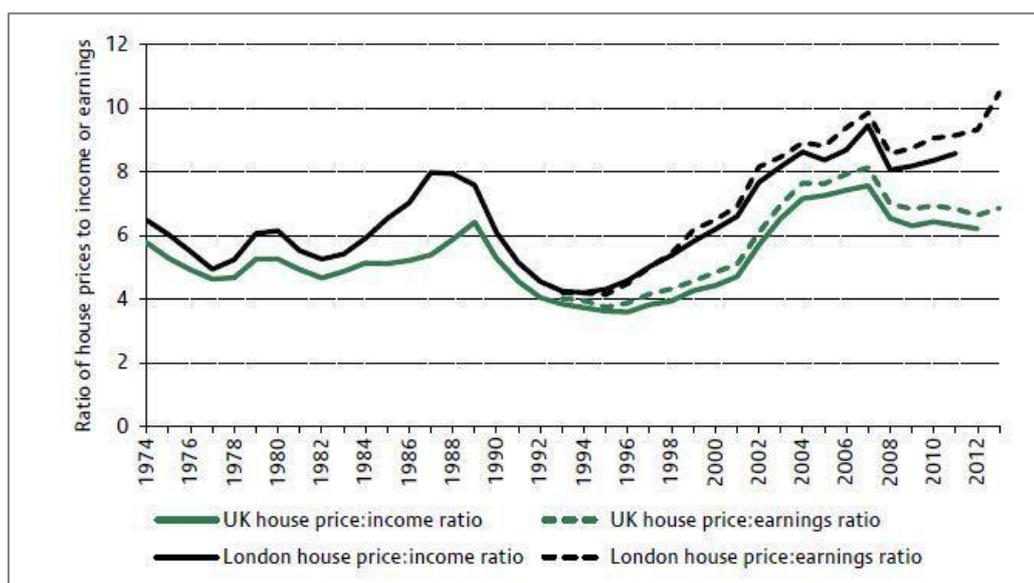
London's population and employment levels are growing rapidly. This is due to the clustering of economic activity, particularly within central London. London's future economic success depends on its ability to continue to accommodate population and employment growth.

London's growth is being constrained by a chronic shortage of housing which is driving up housing costs as a proportion of household income.

- 2.24 House prices have spiralled, with the average house in inner London now costing over 13 times the average wage, and properties in some prime central London areas costing more than 30 times the average wage. The ratio of house prices to both income and earnings are shown in Figure 13 below for the UK and for London, showing how housing in London is significantly less affordable than in the rest of the UK. This has priced many people on modest incomes out of large parts of the city and led to longer less sustainable commuting patterns.
- 2.25 Providing sufficient housing to meet demand is essential to London's ability to attract and retain talented workers and in turn maintain the city's competitiveness.
- 2.26 This shortage of housing is raising the cost of living and ultimately undermining London's and the UK's competitiveness.

²⁹ Global Liveable Cities Index

Figure 13: House price to income and earnings ratios for the UK and London



Source: Nationwide, Labour Force Survey, Family Expenditure Survey and Family Resources Survey

- 2.27 Providing sufficient – and sufficiently affordable – housing is also important if the city’s communities are to remain cohesive and vibrant and avoid the problems associated with social polarisation.
- 2.28 London needs to build 49,000³⁰ new homes per year between 2015 and 2036 to house the growing population, a 50 per cent increase compared with current levels of delivery.
- 2.29 A total of 15 of the 32 London boroughs fell short of annual targets between 2010 and 2013³¹. Housebuilding targets are set by the Mayor but it is accepted that more incentives have to be put into place in order for boroughs to meet their targets³².
- Dense cities are the way to accommodate growth most sustainably and most efficiently.**
- 2.30 London has grown sustainably through densification and efficient recycling of redundant or under-utilised land. Densification reduces the capital and operating costs of infrastructure as well as increasing agglomeration benefits. Within London, there are opportunities to increase the density of housing development and there are opportunities to create new sites for development.

³⁰ London Plan March 2015

<http://www.london.gov.uk/sites/default/files/London%20Plan%20March%202015%20%28FALP%29.pdf>

³¹ London First, Carrots and Sticks: a targets and incentives approach to getting more homes built in London (May 2015) http://londonfirst.co.uk/wp-content/uploads/2015/05/Carrots-and-Sticks-Report_Web.pdf

³² London First propose a London Housing Delivery Bonus (LHDB) scheme for boroughs and greater powers for the Mayor of London to determine planning of all applications for 50 homes or more

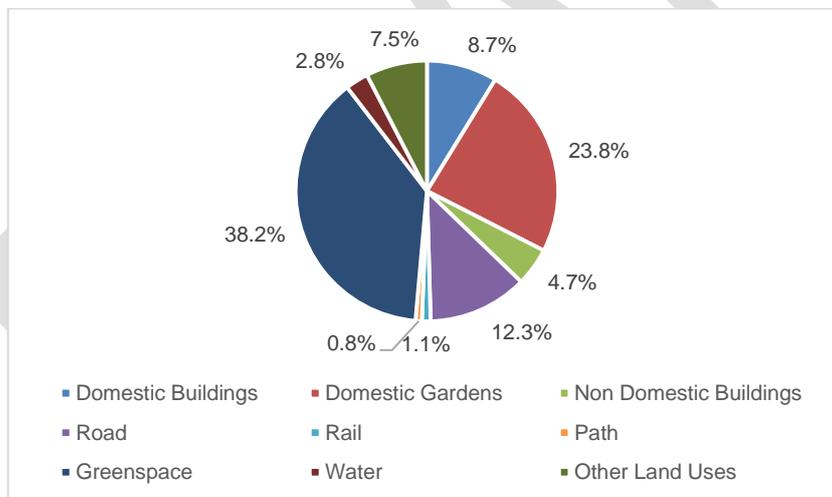
Key Finding:

Further densification in areas with good public transport access will enable London's increasing population to access London's jobs and simultaneously giving London's businesses access to a large pool of well qualified labour.

TfL can help unlock more land for urban regeneration and contribute to meeting London's housing and employment targets.

- 2.31 If London is to meet its housing needs then it has to utilise its land as effectively as possible and be creative about assembling sites for development and identifying more usable space in areas with good public transport access.
- 2.32 Infrastructure schemes can play a role in creating the right incentives for developers through boosting the attractiveness of locations through provision of enhanced transport accessibility and public realm improvements.
- 2.33 Figure 14 shows that in 2005, 12.3 per cent of the total area of London was taken up with roads, more than the amount of land occupied by domestic dwellings. Better use of road space is a potential source of development land that is worth exploring further. However, given the challenges of increasing congestion and the economic impacts of this, it needs to be done in such a way that also protects the function of key strategic road corridors.

Figure 14: London Area by Land Use.



Source: Land Use Generalised Land Use Database 2005

Key Finding:

There is an opportunity to unlock more land for housing development through better use of the road network.

London's town centres will be vital to meeting the challenges of enabling and accommodating London's future growth.

- 2.34 The London Plan designates London's town centres as key foci for commercial and residential development outside the CAZ. Town centres can support much denser development than other areas, and tend to have high public transport

and/or highway accessibility, allowing businesses and services located in these areas to have access to a wider pool of workers and customers.

- 2.35 However it is essential that London's town centres attract investment in order to maintain and increase their attractiveness as destinations for residential and commercial development. If they do not, a significant opportunity to support London's wider growth will be lost.

The strategic movement function of Transport for London's Road Network

- 2.36 London's strategic road network is relied upon by businesses, provides workers with access to employment and services across the city. It forms the backbone for freight and servicing movements and the bus network. To compete as a world city, London needs an efficient road network.

The strategic road network will remain vital for London, but as the city grows the level of congestion is forecast to grow, even with sustained investment in public transport capacity. At the same time, the competing demands for space for walking, cycling and creating better places will become ever more important.

- 2.37 Road congestion cost the London economy £5.4bn in 2013, accounting for 41 per cent of costs to all of UK's large urban areas³³.
- 2.38 Around two-thirds of these costs accrue from delays in Outer London where car driver/passenger share within/to/from Outer London accounts for 48 per cent of modal share compared to 10 per cent in within/to/from Central London³⁴.
- 2.39 London's growing population, as well as supporting employment growth in the CAZ, will strain TfL's strategic road network as car-dependency and meeting the needs of freight movements remains a key issue in Outer London. In particular, this will lead to significant increases in congestion on key strategic arterial roads into London.
- 2.40 The Government's National Infrastructure Plan 2014³⁵ clearly sets out the scale of investment required for the UK's Strategic Road Network (SRN), committing £15.2bn between 2015-16 and 2021-21 to transform the SRN – the biggest programme of investment since the 1970s with investment tripling from current levels by 2020.
- 2.41 However, the £15bn precludes any investments to improve the Transport for London Road Network (TLRN) – the Roads Task Force Vision states that at least £30bn of investment is required over the next 20 years on London's streets and roads.

³³ The future economic and environmental costs of gridlock in 2030, Centre for Economics and Business Research/INRIX, July 2014 http://www.cebr.com/wp-content/uploads/2014/10/INRIX_costs-of-congestion_Cebr-report_v5_FINAL.pdf

³⁴ Based on percentage of average daily trips in three year period 2007/8 to 2009/10

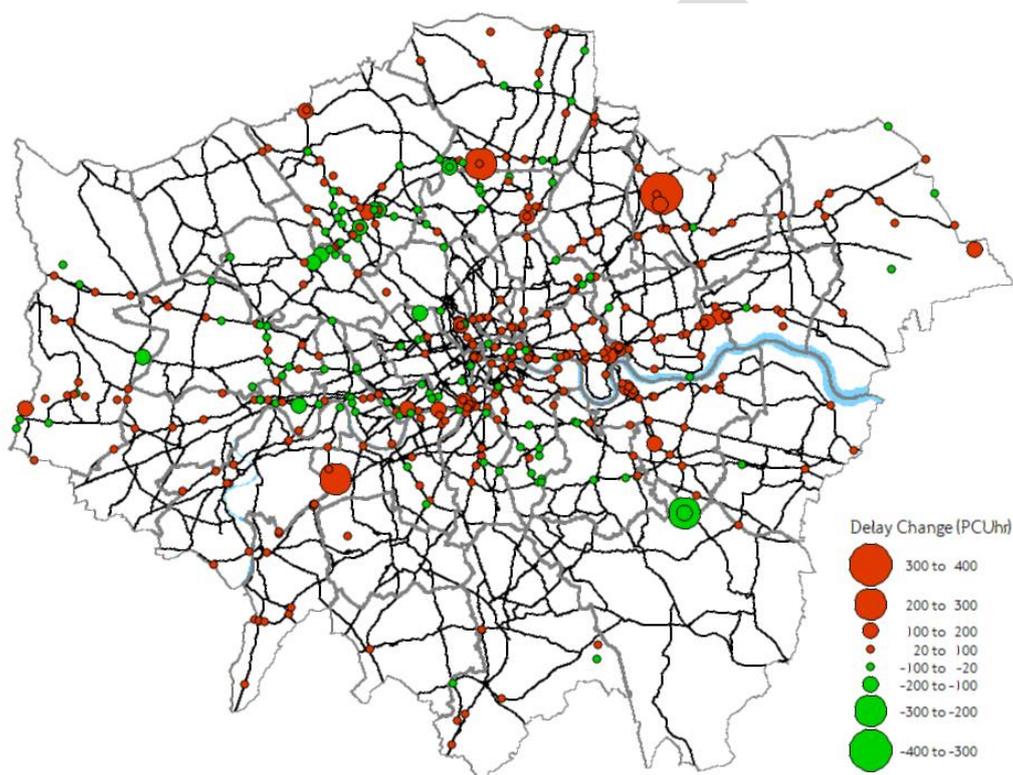
³⁵ National Infrastructure Plan 2014 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/381884/2902895_NationalInfrastructurePlan2014_acc.pdf

- 2.42 Without significant investment within the Capital, congestion and road traffic delay will grow in many areas as illustrated in Figure 15. A planned 70 per cent increase in rail capacity through Tube upgrades, Crossrail and Thameslink programmes is underway. This is likely to aid modal shift from private vehicles to rail but is not sufficient by itself to address London's road congestion issues.

Key finding:

The pressures on London's roads are growing and there is a need for a major investment programme to modernise the road network and address congestion.

Figure 15: Change in PCU hour delay, 2009 – 2031 (AM Peak)



A growing city population will travel more using different modes, resulting in more congestion and crowding, and poorer air quality, reducing the overall quality of life.

- 2.43 A higher employment base and higher population in London will result in increased demand for travel and for freight and servicing. This will generate a need for investment to accommodate the increasingly diverse demands being placed on strategic roads - such as more bus passengers, cyclists, pedestrians and growth in freight movements to service more people.
- 2.44 To enable the city to grow London will require investment to increase the capacity and efficiency of its road-based and rail, underground, DLR and tram systems.
- 2.45 If this investment is not forthcoming, congestion will worsen and levels of crowding on public transport systems will increase. This will lead to longer and less predictable journey times for London residents and in-commuters from the rest of the South East.

- 2.46 These increases in travel times will result in longer commutes and increased risk of employees arriving late for work. A less efficient transport system will result in a more stressful and frustrating travel experience for its users. This will have an impact on the productivity of workers. Londoners and employees' quality of life will deteriorate.
- 2.47 This will result in some choosing to relocate to areas that offer a better quality of life or skilled workers choosing to work elsewhere, which would be detrimental to overall UK productivity given the agglomeration gains of dense cities.

Key Finding:

There is a need to maintain or increase the TLRN traffic capacity to mitigate increasing congestion levels due to employment and population growth.

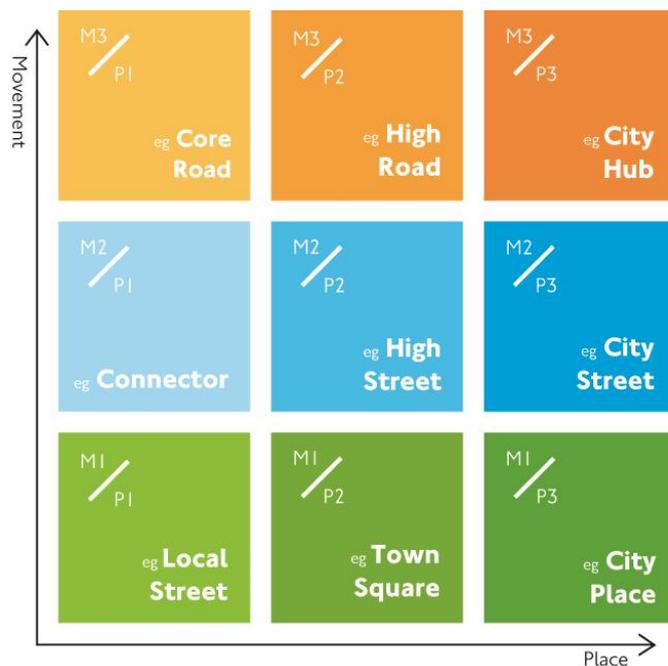
The need to balance the sense of place and the movement function of the road network

Better use of road space on strategic roads is a possible means of both improving quality of place and unlocking additional development, but this needs to be balanced against continued needs for movement.

- 2.48 The road network in London serves a wide range of functions. At one end of the scale, core roads and main corridors form the TLRN function as the principal routes for movement of vehicular traffic.
- 2.49 At the other end of the scale, streets with lower traffic flows often have a primary 'place' function. TfL and boroughs need to work together to find the appropriate balance between the movement and place demands on roads and streets.
- 2.50 The Roads Task Force (RTF) report³⁶ identifies nine typologies of road corridors or streets that reflect whether they play a strategic or local movement or place function. These nine street types are shown in the matrix in Figure 16.

³⁶ Roads Task Force Report (July 2013) - <https://tfl.gov.uk/corporate/publications-and-reports/roads-task-force>

Figure 16: The RTF Street Types Matrix



- 2.51 Roads such as the A4, the A13 and A406 North Circular have the highest strategic movement function which, in many locations, takes priority over place functions, so have an “core road typology”. Other roads such as Kensington High Street have to balance a clear movement function with an equally important place function.
- 2.52 The higher traffic volumes become, the more the quality of the public realm can be adversely affected, and the less willing people would be to use the street to meet, interact with others, to shop, enjoy food or drink or take a break.
- 2.53 In some cases, the current typology or performance of a road or street may not reflect a borough’s place-making aspirations or be conducive to achieving proposed land use changes in an area. Heavy traffic volumes in those typologies towards the top left of Figure 16 have the effect of discouraging new residential development and lowering property prices.
- 2.54 With good planning, careful design and investment, more emphasis can be given to the place function of a particular TLRN road corridor without unduly compromising its strategic movement role. Such win-wins are increasingly important in a growing world city where the competing demands on places are ever increasing.

Key Finding:

Land in the vicinity of TLRN corridors has the potential to help accommodate new housing development to help meet some of London’s need.

Road corridors with a strong “movement” emphasis cause severance impacts that inhibit connectivity, sustainable transport modes and quality of life.

- 2.55 Road corridors with a strong ‘movement’ function present barriers that inhibit crossing movements by cyclists and pedestrians. If there is not provision in the

form of at-grade crossings or over-bridges or subways at sufficient intervals, this can act as a significant deterrent to movement by these modes.

- 2.56 These severance impacts can also reduce the willingness of nearby residents to use public transport if the walking trip to access a station or bus stop is too circuitous or unpleasant.
- 2.57 If streets on either side of a busy road are impermeable and not pedestrian and cycle friendly, and the busy road is difficult to cross, this can reduce the propensity to walk or cycle to access services or facilities by these modes.
- 2.58 If people find it more convenient to drive to access shops or services, then this can also adversely affect the vitality of district or neighbourhood shopping areas and lead to their decline.
- 2.59 Other severance effects such as high noise levels, poor air quality and negative visual impacts also affect the quality of life of residents and in turns reduce the area's potential for housing development.
- 2.60 The above negative impacts of major road infrastructure are particularly problematic in town centres and other areas with good access to public transport services where there is a high potential for housing and/or commercial development.

Key Finding:

A road corridor with strategic movement functions can cause severance reducing the area's housing development potential.

Objectives for action on the TLRN corridors

- 2.61 Any proposal seeking to strike a better balance between the movement and place function of a road must also reflect the wider public policy objectives.
- 2.62 These arise from two key sources, the Mayor's Transport Strategy and the 2013 Roads Task Force "Vision for London's Roads and Streets".
- 2.63 The Mayor's Transport Strategy (MTS) sets out six goals for transport in London:

- Support economic development and population growth;
- Enhance the quality of life for all Londoners;
- Improve the safety and security of all Londoners;
- Improve transport opportunities for all Londoners;
- Reduce transport's contribution to climate change, and improve its resilience; and
- Support delivery of the London 2012 Olympic Games and its legacy.

- 2.64 The Roads Task Force Vision sets out the following core objectives:

- To enable people and vehicles to move more effectively on London's streets and roads;
- To transform the environment for cycling, walking and public transport; and
- To improve the public realm and provide better and safer places for all the activities that take place on the city's streets, provide an enhanced quality of life and help to unlock development and deliver new homes.

PART B: TFL'S PROPOSAL TO FREE UP ROAD SPACE FOR URBAN REGENERATION WHILST SECURING THE TLRN STRATEGIC MOVEMENT FUNCTION

Section Summary:

The Roads Task Force report 2013 recommends that TfL consider the delivery of major highway interventions on the TLRN, including tunnels, fly-unders and over-decking.

A process of prioritisation has been followed. A list of 70 locations was assessed using Multi-Criteria Analysis to identify which locations tunnel, fly-under and decking solutions would deliver the greatest benefits.

From a short list of 15 schemes, five have been taken forward as a first tranche of projects for further feasibility work. The Hammersmith tunnel scheme is one of these five.

A joined-up approach to planning and infrastructure investment by the GLA, TfL and Boroughs will help to unlock development in areas with high regeneration and growth potential.

- 2.65 Investment to enhance the attractiveness of locations both for businesses and also local residents and potential workers will stimulate regeneration of under-utilised land.
- 2.66 There is a clear role for public intervention in the form of targeted investment, enabling sites to maximise their development potential in areas of opportunity, such as in Hammersmith Town Centre. There are co-ordination market failures that act as constraints on urban sites coming forward for development even in areas where the development gains are potentially quite high.
- 2.67 A package of measures at various scales and geographies will be required to ensure that land and potential sites for development within all parts of London are used efficiently to support sustainable growth.

In 2013, the Mayor of London's independent Roads Task Force (RTF) published a document setting out the strategic direction for London's roads.

- 2.68 The Roads Task Force comprises a diverse group of road users, developers, local authorities and other statutory highway authorities. The RTF vision is designed to tackle congestion, support a shift to more sustainable modes of travel and improve quality of life in London.
- 2.69 A key recommendation of the RTF report, published in July 2013, was that the potential of major highway interventions on the TLRN such as tunnels and 'fly-unders' should be investigated to determine the role they could play in achieving the vision for London's roads and streets across the strategic highway network.
- 2.70 In particular, whether major interventions at key locations could 'relocate or provide substitute capacity for motorised traffic to unlock surface space for 'living', more sustainable modes and development – enabling different use of space above and reducing impacts such as severance and noise, while maintaining network functioning'.

2.71 This view built on experience from other cities around the world such as Paris, Oslo and Boston, which have undertaken these kinds of ambitious projects and have seen dramatic results.

Since the publication of the RTF recommendations, TfL has conducted a number of strategic studies to understand opportunities for roofing over or tunnelling roads.

2.72 These studies were aimed at understanding the opportunities for roofing over or tunnelling under existing infrastructure at particular locations. Three main types of infrastructure were considered:

- Tunnels to release land at the surface for either development, green space, improved public realm or better facilities for pedestrians, cyclists and public transport users but also relieve congestion and improve journey time reliability (where relevant)
- Fly-unders to release land at the surface for either development, green space, improved public realm or better facilities for pedestrians, cyclists and public transport users but also relieve congestion and improve journey time reliability (where relevant)
- Decking of roads to provide public parks, reduce severance and the negative impacts of roads including noise and poor air quality and helping to bring forward development on neighbouring land especially where there is good existing or future public transport connectivity which can support high density development

2.73 To identify locations where tunnels, fly-unders or decking solutions would deliver strong potential benefits, a prioritisation process has been followed

From an initial list of approximately 70 locations, through a Multi-Criteria Analysis (MCA) a shortlist of fifteen sites was identified.

2.74 These sites were identified as having sufficient potential for initial feasibility studies. A combined score was developed from SAF³⁷ and RTF appraisals. For each identified site, the following was also investigated:

- Potential intervention types;
- Engineering feasibility;
- Transport impact for all users including those travelling by car, foot, cycle and public transport;
- Local and strategic environmental impacts including on visual amenity, noise and air quality;
- Level and quality of enabled development;
- Likely programme;
- Route to consent; and
- Cost of delivery

³⁷ TfL Strategic Assessment Framework (SAF) is a tool that allows planners, managers and sponsors across Transport for London (TfL) to assess projects and programmes using a set of strategic criteria. SAF is used as part of the process of developing projects and programmes within TfL.

As part of a rolling feasibility assessment programme, the following five locations are being taken forward for further assessment.

- **A4, Hammersmith**
- A13, Barking Riverside
- A406 North Circular Road, New Southgate
- A316, Chalkers Corner
- A3, Tolworth

2.75 TfL is now beginning to look at the options for the next tranche of schemes in further detail.

The road tunnel schemes being considered are aimed at releasing the potential of specific areas for housing and wider development, while maintaining the vital movement function of strategic roads, thereby helping underpin London's growth more widely.

2.76 The scope to regenerate and develop land along busier TLRN corridors is currently reduced by the adverse impacts of traffic. High traffic volumes and severance, air quality and noise impacts can limit the viability of development.

2.77 If nothing is done to reduce the impact of the road corridor, then it is unlikely that development will come forward, or it will come forward only at a significantly lower density, as new properties will be harder to sell or less profitable than alternative sites.

2.78 If these negative impacts can be reduced through improvements to 'place' and local connectivity, then redevelopment is likely to become a more attractive and viable commercial investment proposition. However, this needs to be done without undermining the movement function or there will be wider adverse economic impacts. Therefore investment in improving quality of place that addresses these issues can enable significant quantities of new housing to be unlocked without unduly constraining the ongoing operation of the strategic road network.

2.79 Road tunnels and decking schemes would do this in the following ways:

- They would provide companies with access to a larger and higher quality workforce, customers and suppliers, supporting the agglomeration impacts arising from faster or more reliable journey times by road.
- They would enable development of housing and employment on under-utilised land along the road corridor which might otherwise be constrained to a lower density or not take place at all.
- They would provide a focus for regeneration and improvements in quality of life, including urban realm improvements, which can help drive investment and jobs in local economies through increased footfall or attracting new employers and residents.

2.80 Each tunnel or decking scheme would have a different mix or focus.

2.81 This is part of a major shift to needing to support greater growth in London and the changing role of town centres and the increasing importance of the quality of place in our city's success.

- 2.82 Figure 17 illustrates a number of visualisations of proposed public realm improvements for selected roads and streets associated with the decking-over, fly-under and tunnelling schemes.
- 2.83 The bottom left visualisation shows the eastern portal of the short Hammersmith tunnel option. It would enable the redevelopment plots of land on both sides of the tunnel for high density office and residential use, and would create new high-quality public spaces as shown on the bottom right.
- 2.84 The top left shows a proposed fly-under at Chalkers Corner, which would help reduce traffic congestion and delays at a key traffic signal controlled crossroads and reduce severance for pedestrian and cycle movements. The top right shows a linear park that could be constructed above the A3 at Tolworth, enabling new high density residential development to come forward within a parcel of land that lies between the A3 and the railway station, if Crossrail 2 were to serve this rail corridor. The bottom left visualisation shows the eastern portal of the short Hammersmith tunnel option. It would enable the redevelopment plots of land on both sides of the tunnel for high density office and residential use, and would create new high-quality public spaces as shown on the bottom right.

Figure 17: Urban realm improvements: Chalkers Corner (top left), Tolworth (top right), Hammersmith (bottom)



Key Finding:

Investment in decking-over, tunnelling and fly-under schemes on London's road network **would** help to enable regeneration and economic growth

To retain London's competitiveness, further investments in transport links and the public realm are required to facilitate delivery of more successful places and new housing in areas adversely impacted by traffic.

- 2.85 Some of the most successful cities around the world have invested in improvements to the quality of the urban realm alongside investment in public transport capacity. Providing cover over ring roads and building tunnels helps to maintain road network functioning while reducing traffic impacts, creating new spaces for city life and delivering high quality cycle and walk paths.
- 2.86 London's streets account for 80 per cent of public space in London and therefore schemes which are able to unlock spaces for living and working whilst not impeding network functioning are 'win-wins'.
- 2.87 An improved public realm delivered through reallocation of road space or capacity can also reduce severance for pedestrians and cyclists. This is particularly the case for heavily congested core road corridors, where provision of better infrastructure for walking and cycling along the existing alignments can enable people to gain quicker and easier access to key amenities and rail/underground stations.
- 2.88 Three important dimensions to helping ensure London's continued growth and competitiveness are: expanding the capacity of its transport network, releasing more land for housing and protecting and enhancing quality of place.
- Insufficient transport capacity to access jobs and enable reliable servicing or freight access across the city would hinder employment growth and agglomeration impacts. **Decking-over, tunnelling and flyunder schemes would address congestion pinchpoints on and around strategic corridors into London.**
 - Housing within or close to London is becoming increasingly unaffordable for many workers. The failure to supply new volumes of housing to meet increasing demand has resulted in rapid house price and rental inflation, reducing disposable income. **Decking-over, tunnelling and flyunder schemes would release land and enable higher density developments to be brought forward.**
 - A deteriorating quality of place and quality of life for Londoners and workers could make the city comparatively a less attractive place for footloose companies to be based. **Decking-over, tunnelling and flyunder schemes would reallocate road space on the surface to pedestrians and cyclists, reduce severance and noise impacts.**

Key Finding:

Solutions which continue to support the functioning of the strategic road network whilst reducing traffic impacts to communities around London's ring roads, gyratories and town centres and enhance conditions for pedestrians and cyclists must be found. Delivering 'win-win' solutions is increasingly important to London's continued success.

PART C: HAMMERSMITH TOWN CENTRE, LOCAL CONTEXT

Section Summary:

- 1. Housing delivery in the London Borough of Hammersmith and Fulham is not keeping up with population growth**
 - The growth in population on the GLA scale is reflected in Hammersmith and Fulham, outstripping delivery of new homes
 - The contribution of Hammersmith Town Centre in supporting population growth is relatively modest with most of the population increase likely to be concentrated in the eastern areas of the borough.
- 2. Several parts of Hammersmith have significant deprivation**
 - The borough is ranked the 31st most deprived local authority in England.
- 3. Hammersmith Town Centre has a strong potential for urban regeneration**
 - Hammersmith town centre has excellent public transport access and could host significantly higher-density commercial and residential development than it does at present.
 - Hammersmith Town Centre provides an optimum location within which to accommodate a significant share of London's future employment growth, but this growth could be constrained by a lack of office space.
 - Despite its regional importance, Hammersmith is underperforming in retail terms relative to other nearby town centres due to lower levels of investment
- 4. The A4 and A219 gyratory are significant barriers to new residential and commercial developments**
 - The Hammersmith flyover exerts a significant severance on local connectivity within Hammersmith town centre
 - Air and noise pollution in Hammersmith town centre is extremely high
 - Negative impacts on quality of life are key reasons cited by local residents for supporting removal of the flyover
 - Despite a high public transport and active transport mode share, roads and cars are still dominating the urban landscape and deteriorating the development potential of the town centre.
- 5. It is vital to maintain the capacity and function of the A4 strategic road corridor**
 - The A4 and the Hammersmith flyover serve a vital strategic movement function, which delivers substantial economic benefits to London
 - Any proposal to address the negative impacts of the Hammersmith flyover by removing road space on the surface must maintain the vital movement function of the A4.

Housing delivery in the London Borough of Hammersmith and Fulham is not keeping up with population growth

2.89 As set out in Part A of this Strategic Case, London’s population is growing, placing an ever growing pressure on the city’s infrastructure, housing stock, and road network.

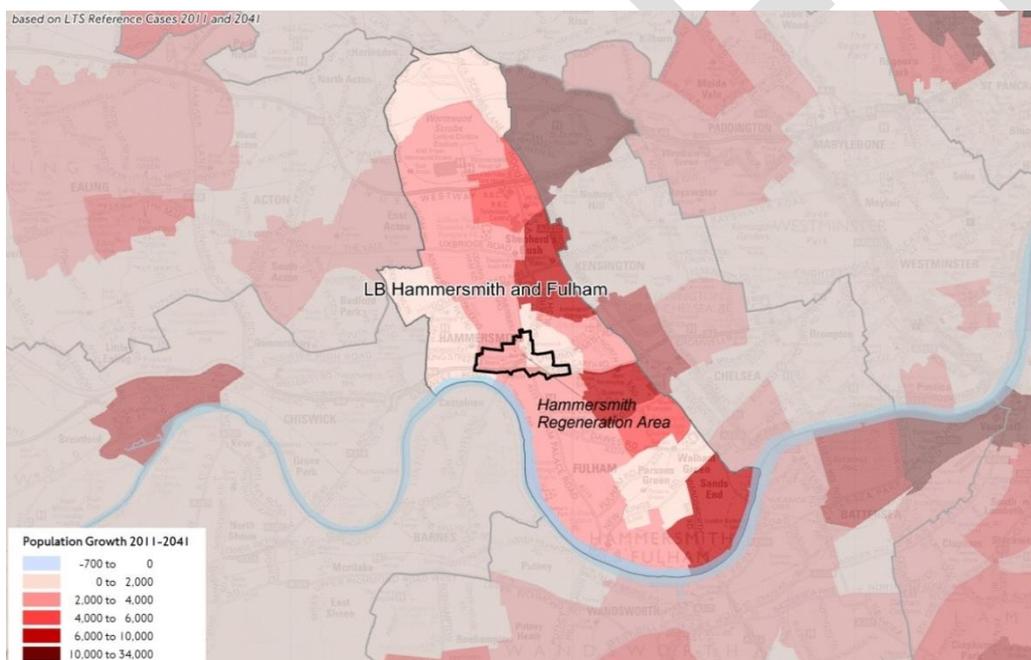
The growth in population on the GLA scale is reflected in Hammersmith and Fulham, outstripping delivery of new homes.

2.90 The LB Hammersmith and Fulham’s population is projected to grow by almost 12,000 people over the 10 years to 2025, from a base of just over 180,000 today³⁸.

2.91 This projected growth in population in Hammersmith and Fulham is not matched by a similar rate of growth in home building, with projected completion of 6690 homes within the Borough over the same ten year period³⁹ (a shortfall of over 3600 homes against the Borough’s target of 10,312 homes).

2.92 GLA population projections predict that the Borough’s growth in population will accelerate in future, with a further 14,000 people living in Hammersmith and Fulham by 2041 (compared to 2025 levels)⁴⁰, with the rate of projected population growth in Hammersmith and Fulham being significantly greater than that expected in neighbouring boroughs (Figure 18).

Figure 18: Absolute population growth in Hammersmith and Fulham (2011-2041)



The contribution of Hammersmith town centre in supporting population growth is relatively modest with most of the population increase likely to be concentrated in the eastern areas of the borough.

2.93 With excellent public transport access, Hammersmith Town centre could play a greater role in accommodating population growth. However large scale housing developments are currently unviable in the absence of significant urban realm improvements.

³⁸ GLA 2014 Round Population Projections – Short Term Migration Assumptions <http://data.london.gov.uk/dataset/2014-round-population-projections/resource/1b5bd5a7-376f-4dde-9b32-f8c4b3399231>

³⁹ Based on levels of delivery from 2004-2014, as set out in the London Plan Annual Monitoring Reports.

⁴⁰ Ibid

- 2.94 Given the shortfall in homes compared to the projected rise in population, significant increases in house prices can be expected within the Borough in future, leading to increasing unaffordability of homes and widening social polarisation within the area.

Key finding:

Hammersmith requires a substantial increase in homes in order to prevent a future accommodation shortage and to stem further rises in housing prices

Several parts of Hammersmith have significant deprivation

- 2.95 Although LB Hammersmith and Fulham as a whole contains some of the highest average house prices in London, much of the borough – including the town centre and surrounding areas – contain high levels of deprivation.

The borough is ranked the 31st most deprived local authority in England⁴¹.

- 2.96 Despite its high levels of employment and high connectivity, the Hammersmith Regeneration Area (HRA), which contains Hammersmith town centre, suffers from substantial deprivation with most of the area being classified as being either in the most 20 per cent of deprived areas in England, or the most 20 to 40 percent of deprived areas. (Figure 19).
- 2.97 Within the town centre itself, less than 15 per cent of housing is owner-occupied⁴², with the majority of housing rented from the council, or from housing associations. The high cost of housing in the area means that households on low to middle incomes have very limited opportunities to become owner-occupiers⁴³.
- 2.98 In addition, the number of children entitled to free school meals is significantly higher in Hammersmith and Fulham than it is nationally, with 30 per cent of nursery and primary school children entitled to free meals compared to a national average of 15 per cent.⁴⁴

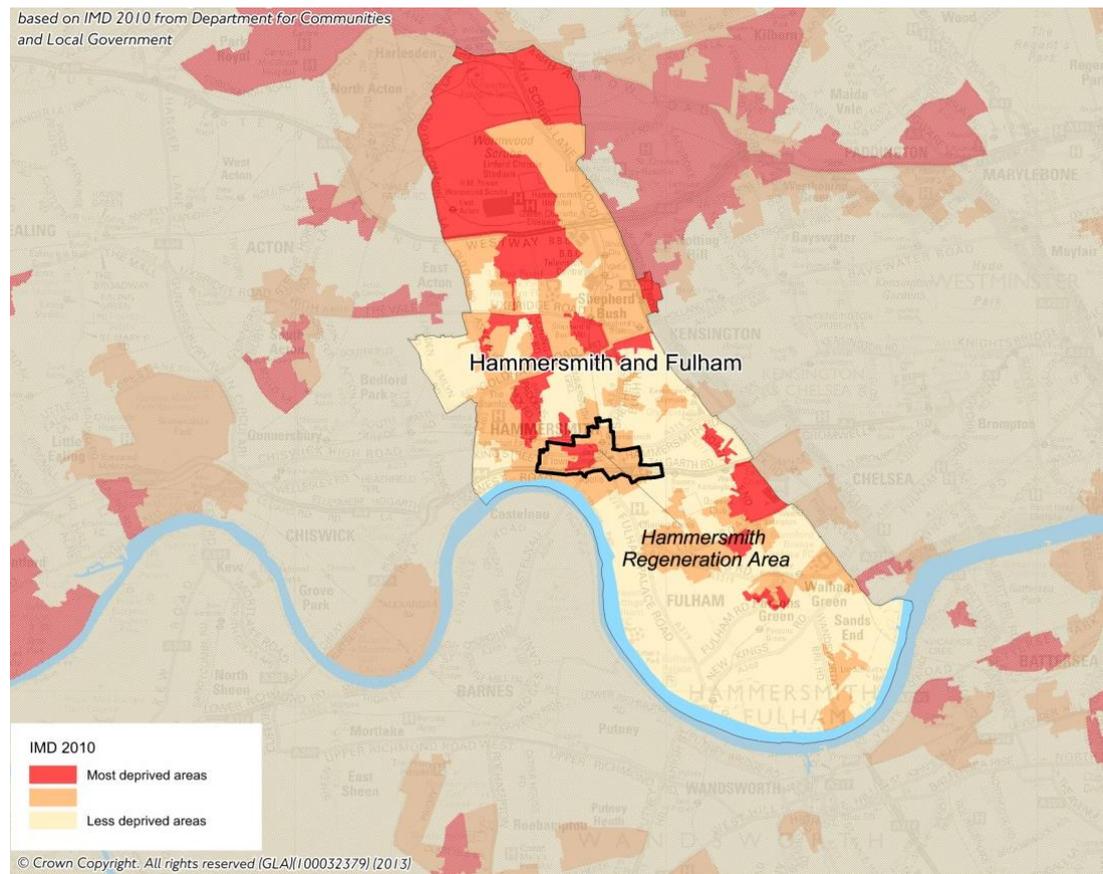
⁴¹ The English Indices of Deprivation 2010: Local Authority District Summaries File Notes
<http://www.communities.gov.uk/documents/statistics/xls/1871689.xls>

⁴² Hammersmith and Fulham Council Core Strategy – October 2011

⁴³ *ibid*

⁴⁴ LBHF Monitoring Report, April 2013 to March 2014 https://www.lbhf.gov.uk/Images/AMR%202014_tcm21-193972.pdf

Figure 19: Index of multiple deprivations in Hammersmith and Fulham (2010)⁴⁵.



Hammersmith Town Centre has a strong potential for urban regeneration

2.99 Hammersmith as a whole is a desirable area in which to live, with long-established residential neighbourhoods and a number of major new schemes, including Sovereign Court.

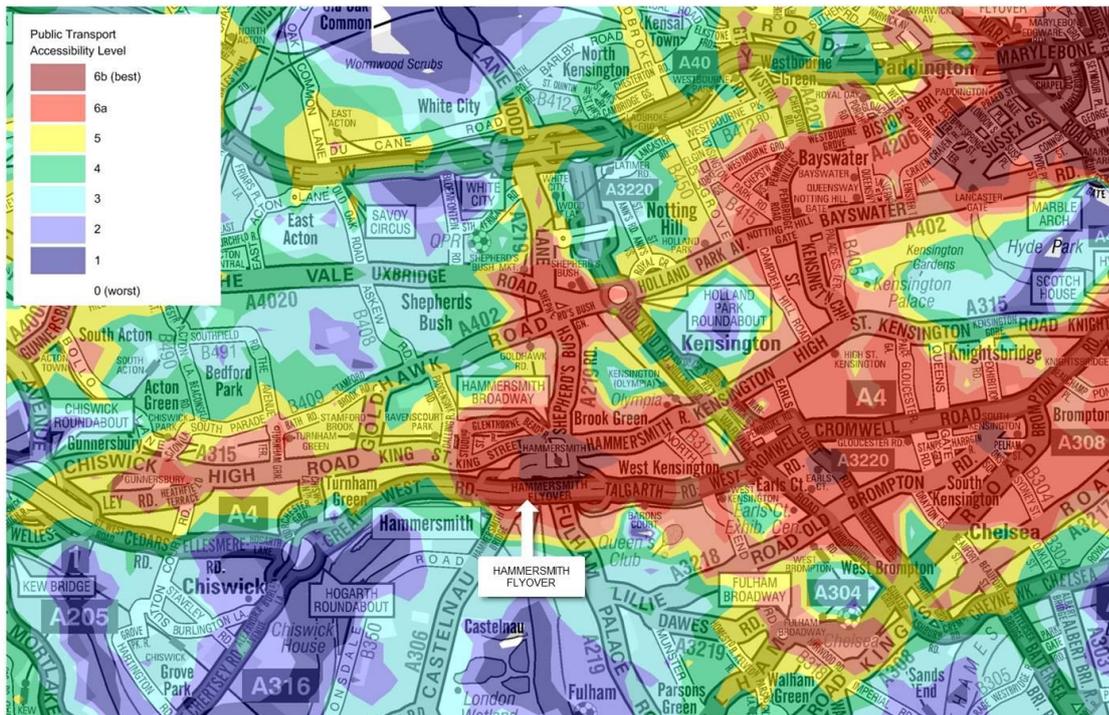
Hammersmith town centre has excellent public transport access and could to host significantly higher-density commercial and residential development than it does at present.

2.100 Hammersmith town centre has an excellent public transport accessibility level (PTAL) (6b, the highest possible) (Figure 20), meaning it has the potential to host much higher densities of jobs and residential development than it does at present⁴⁶.

⁴⁵ Red areas are in the lowest 20 percent of Census Lower Super Output Areas in England, and orange areas in the lowest 20 to 40 per cent.

⁴⁶ See London Plan Density Matrix – Table 3.2 in London Plan Housing Supplementary Guidance 2012

Figure 20: Hammersmith town centre Public Transport Accessibility Level



- 2.101 Hammersmith town centre is one of London’s strongest performing office centres. It has the second highest rent values per square foot of all centres outside the CAZ⁴⁷. This is reflected in a strong ongoing growth in employment: the percentage of the working age population in employment in the borough grew from 67 per cent in 2004 to 76 per cent in 2014⁴⁸. This is significantly higher than the London average growth rate of just over 71 per cent over this same time period⁴⁹.
- 2.102 Employment is projected to continue to grow rapidly in future as shown in Figure 21, delivering an extra 33,000 jobs (a 28 per cent increase) to LB Hammersmith and Fulham by 2036 compared to 2011, significantly higher than the London average growth rate of 16 per cent⁵⁰. The highest growth rates are projected to be concentrated in the east of the borough, which will be less able to support dense office space development than Hammersmith’s well connected town centre.

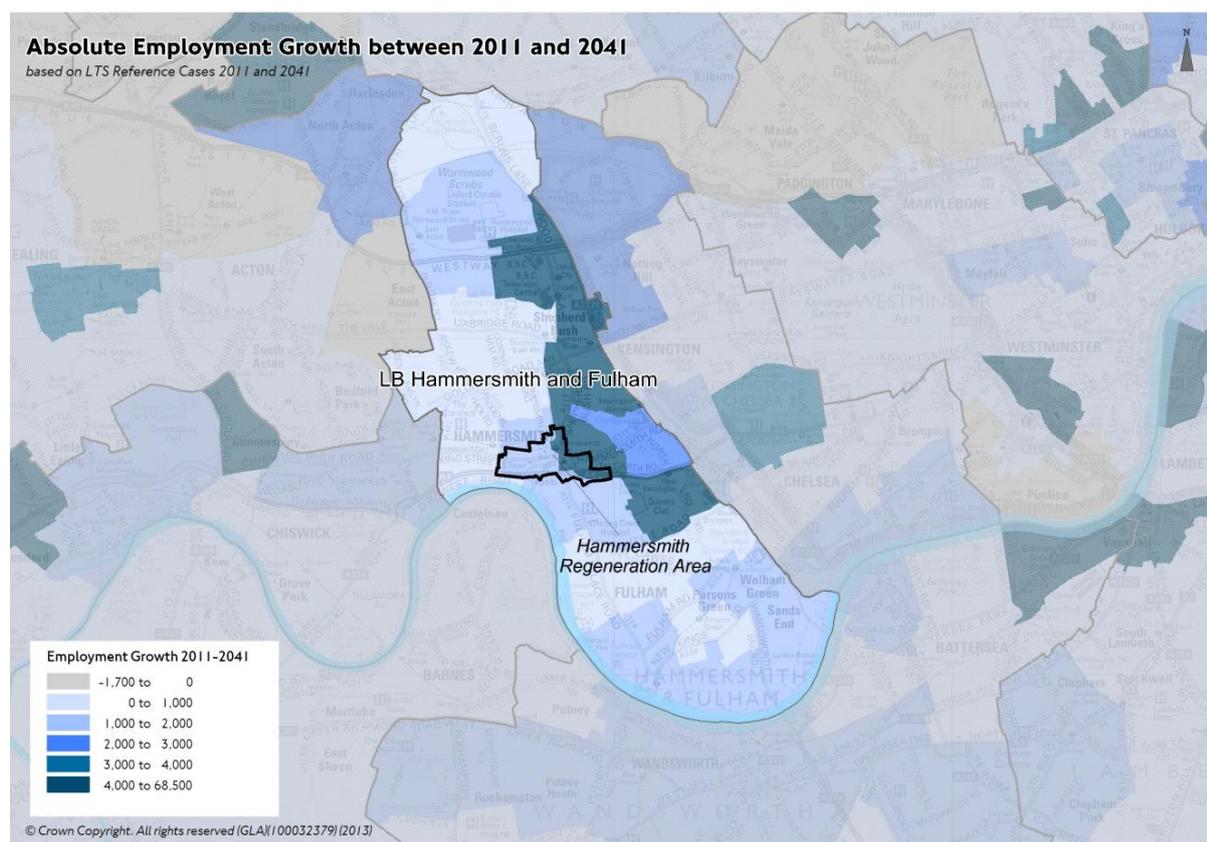
⁴⁷ London Office Policy Review, GLA 2012

⁴⁸ ONS Annual Population Survey (January-December 2004 – January-December 2014), ONS, 2014.

⁴⁹ ONS Annual Population Survey (January-December 2004 – January-December 2014), ONS, 2014

⁵⁰ GLA 2013 Borough Projections – Employment.

Figure 21: Projected employment growth in Hammersmith and Fulham



- 2.103 The town centre is currently a major sub-regional office centre, home to the offices of a number of major international organisations, including Disney, L’Oréal and Virgin. The area’s importance as a strategic office centre is reflected in the dominance of professional occupations within the borough, which together comprise over 60 per cent of the workforce.
- 2.104 The predominance of professional occupation is set to be reflected in future growth as the borough’s office workforce is forecast to grow from 46,000 workers to 72,000 by 2036, a 56 per cent increase⁵¹.

Hammersmith Town Centre provides an optimum location within which to accommodate a significant share of London’s future employment growth, but this growth could be constrained by a lack of office space.

- 2.105 Hammersmith town centre, with its high PTAL (Figure 20), concentration of professional expertise, and high development potential, provides an optimum location within which to host some of London’s projected growth in employment. However in order to accommodate this future growth in employment, and to continue to attract new high-profile employers to the town centre, significant areas of high-quality new office development will be required in order to ensure that a shortage of office space is not a constraint.

Key findings:

Hammersmith will require significant new office development in order to accommodate the Borough’s projected employment growth and support London’s economy.

⁵¹ London Office Floorspace Projections – July 2014.

Despite its regional importance, Hammersmith is underperforming in retail terms relative to other nearby town centres due to lower levels of investment.

- 2.106 Hammersmith town centre is a key sub-regional town centre, performing an important function as the borough's primary civic, shopping and leisure destination, and with a long established presence as a strategic office centre. It is designated as a Major Centre in the London Plan, with an assumed medium potential for growth, and the Borough have designated it as a Regeneration Area (Figure 22). However this is based on the assumption that the flyover remains in-situ; following its removal additional growth above these levels should be possible, particularly given the high PTAL of the town centre.
- 2.107 Despite its importance, Hammersmith town centre has received relatively little private investment over the past 10-15 years, and its important retail offer has increasingly suffered from competition as a result of the new and extensive options offered at Westfield Shepherd's Bush, just over 1.5km to the north, which has attracted greater private investment to the nearby Shepherd's Bush town centre⁵².
- 2.108 This is illustrated by shopping frontage vacancy rates in each town centre (Table 5), with Shepherd's Bush experiencing a rapid increase in occupancy and rates and Hammersmith remaining largely static. Over the same two year period from 2012 to 2014, footfall for the King's Mall (containing over half Hammersmith's retail space) fell almost 6 per cent⁵².

Table 5: Vacancy rates in Hammersmith and Shepherd's Bush town centres

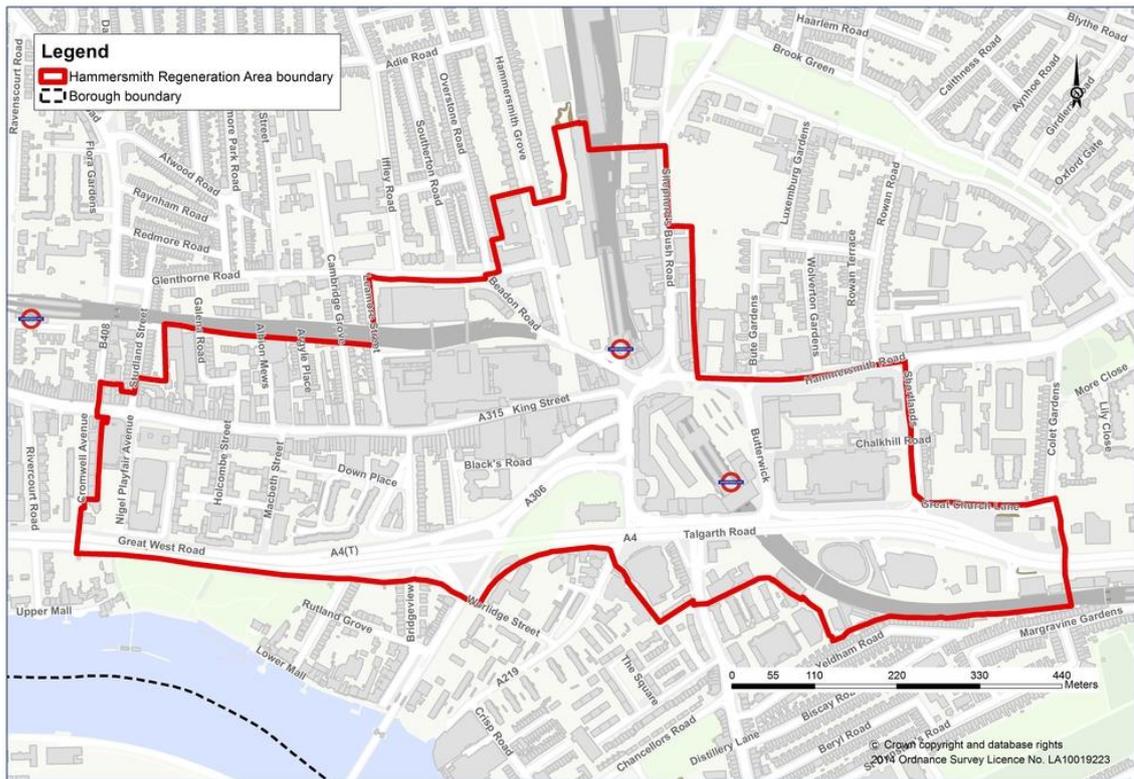
	Vacancy rate 2012	Vacancy rate 2014
Hammersmith town centre	12%	10%
Shepherd's Bush town centre	14%	5.5%

Key finding:

Hammersmith town centre requires significant new investment in order to compete with other retail centres.

⁵² The Impact of Westfield on Hammersmith Town Centre, 2013
http://democracy.lbhf.gov.uk/documents/s29760/Brief%20Report%20on%20the%20Impact%20of%20Westfield%20on%20Hammersmith_updated.pdf

Figure 22: Hammersmith Regeneration Area⁵³



The A4 and A219 gyratory are significant barriers to new residential and commercial developments

2.109 Despite Hammersmith’s potential and pressing need for additional homes and office space, the town centre still is under-developed. This underperformance is largely due to the negative environmental effects of the flyover and the gyratory.

Key finding:

The A4 Hammersmith flyover acts as a major constraint on future residential and commercial developments within Hammersmith town centre by exerting substantial negative impacts on public realm and environment, and by occupying potentially developable land.

The Hammersmith flyover exerts a significant severance on local connectivity within Hammersmith town centre.

2.110 The flyover’s physical structure and associated noise and visual intrusion, coupled with the presence of 70,000 - 90,000 fast-moving vehicles daily, causes both physical and perceptual severance, limiting north-south connectivity and creating a barrier between the town centre and the important open spaces of Furnivall Gardens and the River Thames, to which Hammersmith town centre was traditionally linked.

2.111 To the immediate west of the town centre, north-south connectivity along the wider A4 is

⁵³ Hammersmith and Fulham Draft Local Plan – Regulation 18 Consultation, January 2015
http://www.lbhf.gov.uk/Directory/Environment_and_Planning/Planning/Planning_policy/181500_Local_Plan_Review.a.sp

limited to three underpasses, relegating pedestrians and cyclists in this area to a secondary position relative to the car despite the area's predominantly residential character. These underpasses are of poor quality, and are isolated from the above-ground environment, creating safety issues for users.

- 2.112 In the town centre, although there are a number of connections beneath the flyover, the pedestrian and cycle experience is blighted by a combination of high noise and air pollution, the flyover's negative visual impact (Figure 23), and the high priority given to car traffic at junctions. This results in a perceptual barrier for people attempting to use these routes, and may deter pedestrians and cyclists from making this journey entirely.
- 2.113 Additional physical severance is caused by the Hammersmith gyratory, which creates a noisy, fast-moving and polluting barrier to pedestrians aiming to cross from the bus and tube stations to the north, or to the nearby King Street shopping area. Given the high average pedestrian flows in the town centre (over 60 metres walked per square metre per day⁵⁴ - see Figure 36 in the Economic Case), this severance affects many thousands of pedestrians per day

Key finding:

Thousands of pedestrians and cyclists are negatively affected every day by the severance, visual blight and noise and air pollution caused by the flyover and the associated Hammersmith gyratory. This significantly reduces the sense and quality of place in Hammersmith town centre.

Figure 23: Negative visual intrusion and perceptual severance caused by the flyover⁵⁵



⁵⁴ TfL Research and Data Analysis team, LTDS

⁵⁵ Source: Hammersmith Flyunder Feasibility Study, March 2014 -

http://www.lbhf.gov.uk/Images/flyunder_feasibility_study_web_medium_tcm21-187089.pdf



Air and noise pollution in Hammersmith town centre is extremely high.

- 2.114 The physical and perceptual severance caused by the flyover and the gyratory, coupled with the noise, air quality and visual impacts of 70,000 - 90,000 vehicles using the A4 daily, means that local quality of life is substantially negatively impacted within Hammersmith.
- 2.115 The A4 and the gyratory reach the highest measured daily noise level for roads of 75+ decibels (Figure 24), whilst air pollution levels along the A4 and the gyratory are so high that they breach European Union limits on air quality (Figure 25). This creates an unpleasant environment for pedestrians and non-motorised transport users within the town centre, and along the wider A4.

Negative impacts on quality of life are key reasons cited by local residents for supporting removal of the flyover.

- 2.116 The negative impact of the flyover on public realm and environmental quality is illustrated by public responses to the 2013 Hammersmith Flyunder Summit. Over half of respondents (57 per cent) cited an environmental concern as their key reason for supporting replacement of the flyover⁵⁶, with 20 per cent citing its visual intrusion, 19 per cent air quality concerns, and 18 per cent the noise impact.

⁵⁶ Hammersmith Flyunder Feasibility Study, March 2014 - http://www.lbhf.gov.uk/Images/flyunder_feasibility_study_web_medium_tcm21-187089.pdf

Figure 24: Noise levels in Hammersmith town centre ⁵⁷

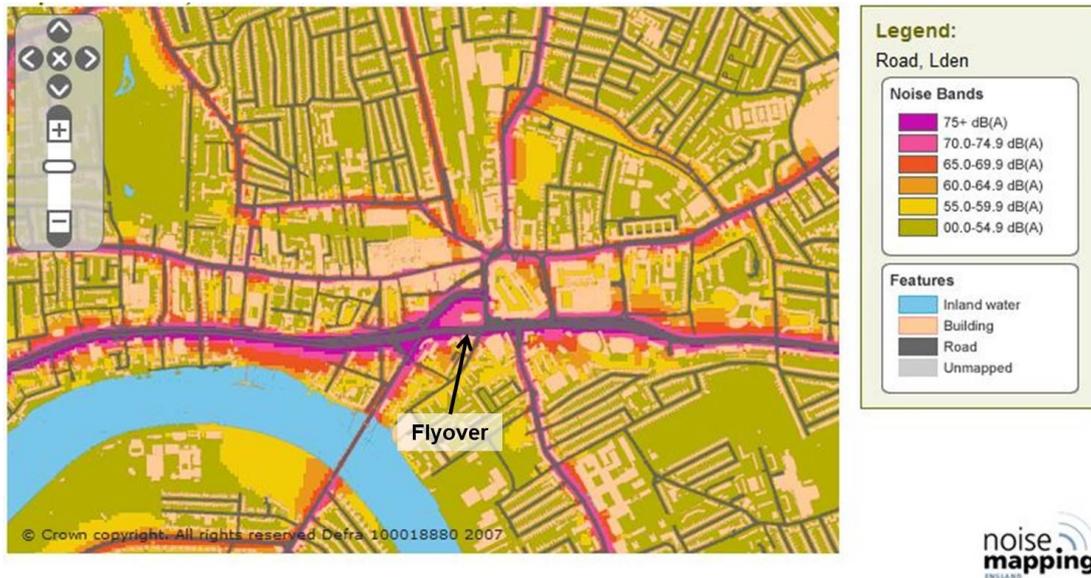
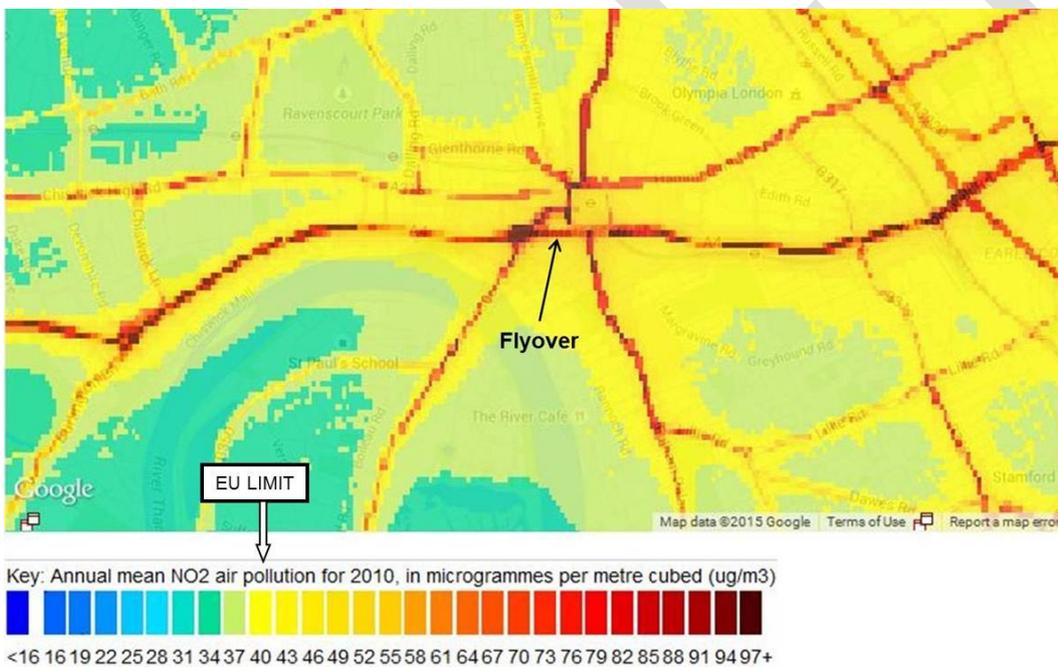


Figure 25: NO₂ concentration in Hammersmith town centre ⁵⁸



Despite a high public transport and active transport mode share, roads and cars are still dominating the urban landscape and deteriorating the development potential of the town centre.

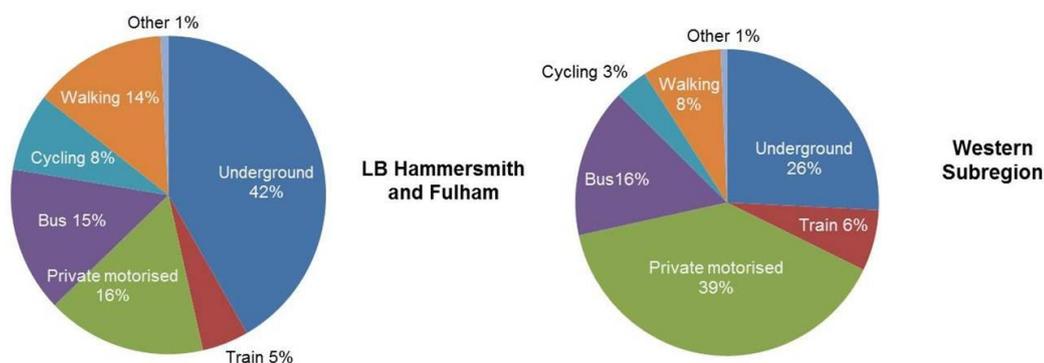
2.117 The wider sub-regional travel patterns contrast markedly with those within LB Hammersmith and Fulham itself (Figure 26). Within the borough, private motorised road travel comprises only 16 per cent of commuting mode share, with a significant role played by walking and cycling, at over 20 per cent of mode share combined.

⁵⁷ Source: Defra <http://services.defra.gov.uk/wps/portal/noise/>

⁵⁸ <http://www.londonair.org.uk/london/asp/annualmaps.asp>

- 2.118 Furthermore, over 40 per cent of the commuting mode share in Hammersmith is accounted for by the underground. Many of these commuters will be walking or cycling to and from their station, increasing the need for local routes to and from transport interchanges to be well connected, safe and attractive.
- 2.119 However despite the local importance of walking and cycling, and their wider importance as sustainable modes of travel, the needs of pedestrians and cyclists within Hammersmith town centre are not currently being met. Cyclists and pedestrian currently have to contend with severance caused by the flyover and gyratory, high levels of noise and air pollution, and a busy, fast-moving traffic flow with priority given to vehicles at junctions.
- 2.120 An infrastructure solution is required which better balances the demand for private vehicle travel with the needs of pedestrians and cyclists in Hammersmith.
- 2.121 With further population and employment densification in the borough, good access to public transport hubs will be critical to sustain growth. The urban realm must reflect the importance of active transport and not be a barrier to walking and cycling.

Figure 26: Travel to work mode shares



Key findings:

Good access to public transport hubs will be critical to sustain employment and residential growth in the borough. The urban realm must reflect the importance of active transport and not be a barrier to walking and cycling.

It is vital to maintain the capacity and function of the A4 strategic road corridor

- 2.122 During the early 20th century, increasing levels of motor traffic within Hammersmith town centre led to calls for a new westwards route to relieve congestion. A tunnelled road, favoured by the borough, was rejected on cost grounds and construction of the Hammersmith flyover commenced in the 1950s.
- 2.123 The A4 and the Hammersmith flyover is now part of the Transport for London Road Network (TLRN), the strategic London road network that is the responsibility of TfL. The TLRN comprises only 4 per cent of London's road length but carries 30 per cent of London's traffic. The A4 is a key link in this network, providing a strategic route linking central London, Heathrow airport, and the west of England. Traffic data indicates the road consistently carries flows of 70,000 – 90,000 annual average daily traffic (AADT), of which 4 per cent are heavy vehicles.

The A4 and the Hammersmith flyover serve a vital strategic movement function, which delivers substantial economic benefits to London.

- 2.124 The strategic traffic flow supported by the A4 is economically important to London, as illustrated by the impact of the forced emergency closures of the Hammersmith flyover from December 2011 to January 2012 as a result of safety concerns, and subsequent partial closure during repair works. Diverting traffic used alternative local routes, causing a significant increase in traffic flow on these roads. The impact on the network, and the extra delay as a result of the reduction in capacity, caused an estimated cost to London on the order of £0.3 million per day⁵⁹.
- 2.125 Further closures of the eastbound flyover during weekends from May – June 2014 resulted in considerable disruption on all links approaching the flyover, as well as moderate disruption on alternative diversion routes, with delays of up to one hour experienced. A conservative estimate of the overall cost of the congestion over the first four weekends of this part-closure is £6 million⁶⁰.

Key findings:

Any proposal to address the negative impacts of the Hammersmith flyover by removing road space on the surface must maintain the vital movement function of the A4.

⁵⁹ Transport for London (2012) Hammersmith Flyover Monitoring Initial Report, (23 December 2011 to 8 January 2012)

⁶⁰ Transport for London (2014) Hammersmith Flyover: Road Network Impact of the First Four Weekend Eastbound Closures, May to June 2014

PART D: OBJECTIVES FOR THE A4 AT HAMMERSMITH AND OPTIONS IDENTIFIED

Objectives and measures of success for the A4 tunnel scheme

2.126 The objectives and measures of success for the A4 tunnel scheme at Hammersmith are, therefore, as outlined below:

Strategic challenges	Objective of the A4 tunnelling scheme	Measures of success
<p>Housing and office space supply:</p> <p>London's housing and office space supply is not keeping pace with population and employment growth.</p> <p>London must unlock development opportunities to support delivery of new housing and office space.</p>	<p>Accelerate housing and office space delivery in LB Hammersmith and Fulham and contribute to the London Plan's aim of building 49,000 new homes every year.</p>	<p>Redevelopment of Hammersmith Town Centre with higher residential and jobs densities (around 3800 homes and 15,000 jobs instead of 600 homes and 5000 jobs without the scheme).</p>
<p>Severance & quality of life:</p> <p>In many cases, severance effects from major transport corridors results in local residents having a greater reliance on the private car or reduced access to employment and services.</p> <p>The potential of regeneration sites can be undermined by local severance effects from major transport corridors (e.g. poor air quality, limited surface access to surrounding areas, visual impact, noise levels).</p>	<p>Improve the quality of life of residents through more sustainable transport networks and better environment.</p> <p>Enhance local residents' quality of life by improving urban realm, reducing severance caused by the A4 flyover and gyratory and improving local access for all road users, including pedestrians and cyclists.</p>	<p>Provision of better connections between Hammersmith tube station and the bus station.</p> <p>Provision of safe cycling routes connected to the existing cycling network.</p> <p>Increased footfall in Hammersmith Town Centre.</p> <p>Reduced retail vacancies in the town centre.</p> <p>Reduced noise pollution.</p> <p>Improved air quality.</p>
<p>TLRN capacity:</p> <p>Road congestion cost the London economy £5.4bn in 2013.</p> <p>With a sustained growth in population and employment, congestion on the TLRN will increase significantly, deteriorating residents' quality of life and the experience of road users.</p>	<p>Secure the strategic function of the Transport for London Road Network (TLRN).</p> <p>Mitigate the increasing congestion on the A4 to maintain its strategic economic function as freight corridor and major link between Heathrow Airport, west London and Central London.</p>	<p>Avoid further increasing delays on the A4 despite population and employment growth in Hammersmith Town Centre.</p>

Options for the A4 at Hammersmith

The options appraisal process described in Part D concluded that further feasibility investigation into the A4 tunnel scheme should be undertaken.

- 2.127 This current feasibility work is investigating the feasibility of potential road interventions on the A4 at Hammersmith, and builds on earlier high-level feasibility studies led by LB Hammersmith and Fulham and published in 2014⁶¹.
- 2.128 These earlier feasibility studies considered options which could catalyse Hammersmith town centre regeneration and unlock development, whilst simultaneously maintaining the road movement of the A4. The studies concluded that the only option which could achieve these aims would be to place the Hammersmith flyover and a section of the A4 in a tunnel, freeing up space on the surface to transform connectivity, urban realm and environment in Hammersmith town centre and unlock thousands of jobs and homes.

Key findings:

A 2014 feasibility study concluded that placing the A4 underground was the only feasible option which could achieve both the transformation of Hammersmith town centre, and avoid major congestion impacts of removing surface road space.

- 2.129 The studies considered three different tunnel route options (Figure 27), each consisting of two separate sub-options. These options were developed initially through a public engagement and design process led by LB Hammersmith and Fulham, in combination with professional engineering judgement, and assumed environmental and economic factors.
- 2.130 A number of surface highway options were considered to identify the best location for a tunnel. The decision of where best to locate the tunnel portals was determined by the desire to bring maximum benefits to the local area with minimal negative impacts.
- 2.131 Tunnel options with north-south junctions were rejected as the benefits delivered were judged to be insufficient in comparison to the high cost of these schemes. Finally, a tunnel between Sutton Court Road and North End Road was rejected based upon the outcome of public surveys which indicated that the most popular tunnel end points would be Earls Court and Sutton Court Road.

Optioneering work led by LBHF and published in 2014 identified two tunnel options on which to carry out further appraisal as part of this business case.

- 2.132 In both cases surface roads would remain open for local traffic and the current Hammersmith gyratory would be removed, with the western side used for non-motorised transport and the remainder of gyratory being returned to two-way traffic.
- **Option 1** would be a short road tunnel between the Great West Road just to the west of Hammersmith Town Hall, and Talgarth Road to the west of the junction with Gliddon Road. Removal of the flyover would have a transformative effect on the local town centre, reknitting severed streets and creating the opportunity to deliver a transformed urban realm and environment. This would make the area more attractive to residents and businesses, unlocking the development of thousands of new jobs and homes.

⁶¹ See Hammersmith Flyunder Feasibility Study, A4 Flyunder Masterplan and Development Value Study, and Hammersmith Flyunder Tunnel Feasibility Study - Tunnel and Geotechnical Engineering, all available from http://www.lbhf.gov.uk/Directory/News/Hammersmith_flyunder.asp

- **Option 2** would be a longer strategic tunnel between Sutton Court Road and Earls Court. This option would unlock the same levels of growth in Hammersmith town centre, as described above, and would also deliver improvements in urban realm, environment and connectivity over a wider stretch of the A4, including at the current traffic dominated environments of Earls Court and Hogarth roundabout.

Option 2 would require removal of the Earls Court one-way system due to the location of the eastern portal.

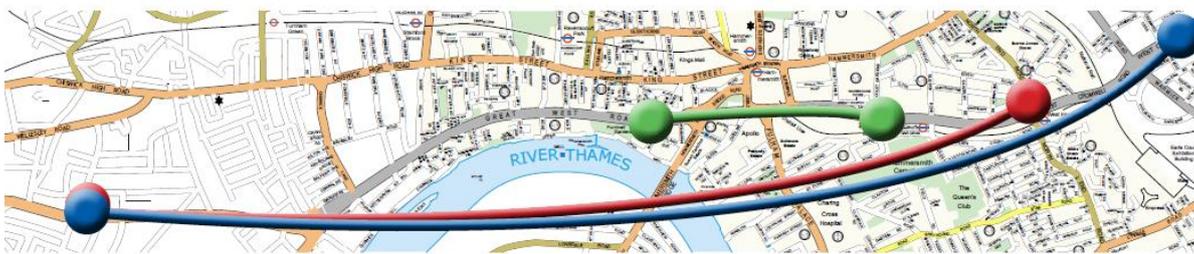
Key finding:

Two tunnel options were identified as a result of optioneering work, which were progressed for further appraisal as part of this Business Case:

Option 1: A tunnel between the Great West Road just to the west of Hammersmith Town Hall, and Talgarth Road to the west of the junction with Gliddon Road.

Option 2: A longer strategic tunnel between Sutton Court Road and Earls Court

Figure 27: Options assessed



Option risks and mitigation

2.133 The enclosed nature of a tunnel option introduces additional safety risks not associated with surface roads or bridges, such as smoke inhalation in the event of a fire, or the risks associated with a toxic spillage in an enclosed space. Tunnels also require additional mechanical and electrical equipment, such as ventilation and lighting technology. Periodic overnight closures of tunnel bores for maintenance would be required, potentially causing significant disruption to traffic.

In the event of further progressing a tunnel scheme, TfL would provide mitigation measures to address potential risks.

2.134 TfL has a highly experienced and dedicated 24 hour London Street Tunnel Operations Centre (LSTOC) that currently serves all 12 tunnels on the TLRN, and which maintains working relationships with emergency responders, including to create and rehearse multi-agency incident response and recovery plans. Any new tunnel would be operated by LSTOC, and would have the ability to be closed remotely to traffic using signals and barriers. Resulting traffic impacts would be managed by live adjustments to traffic signals, coordinated from within LSTOC.

2.135 Any necessary two-way operation during periods of bore closure would be managed in accordance with the EU Directive on Road Tunnel Safety Regulation.

PART E: HOW THE TUNNEL OPTIONS ADDRESS THE PROBLEMS AND MEET THE OBJECTIVES

Section Summary:

- 1. The removal of the flyover and gyratory would be a catalyst for the regeneration of Hammersmith Town Centre**
 - Tunnelling the A4 would enable Hammersmith to deliver the residential and office space necessary to support London's growth and accommodate the borough's increase in population and employment.
 - Both Option 1 and Option 2 deliver the same quantum of development
 - Flyover removal and subsequent development would support the vitality of Hammersmith town centre, and increase opportunities for local people
 - Replacing the flyover with a tunnel would reduce severance and improve quality of life
- 2. The flyover removal would provide the opportunity to reknit Hammersmith's traditional street pattern**
 - Improvements to Hammersmith town centre connectivity would benefit thousands of people daily, and serve local demand for walking and cycling
 - Both tunnel options provide benefits for severance reduction
 - Flyover removal would reduce traffic, and thereby improve local air and noise pollution and remove the flyover's visual blight
 - Both tunnel options provide benefits for local public realm
- 3. Impact on congestion and function of the road network**
 - Options 1 and 2 are not expected to impact delays on the A4, preserving its strategic movement function.
 - Traffic impacts as a result of Option 1 are projected to be minimal
 - Option 2, the longer tunnel, has a more significant traffic impact, with a noticeable increase in delay around Hammersmith town centre
- 4. Impact of not changing**
 - Retention of the flyover would prevent Hammersmith town centre meeting its potential to deliver high levels of housing and job growth

The removal of the flyover and gyratory would be a catalyst for the regeneration of Hammersmith Town Centre

- 2.136 Following inclusion of the A4 into the RTF programme, LB Hammersmith and Fulham provided TfL with a series of development scenarios (Table 6) for the number of new homes and jobs that could be created following flyover removal.
- 2.137 These scenarios indicated that there is an opportunity to deliver around 3,800 gross new homes and 15,600 jobs in Hammersmith town centre following flyover removal (both are gross figures – Scenario 5). This compares to a maximum of around 600 homes and 4,900 gross new jobs that could be created should the flyover remain in-situ.

Table 6: LBHF development scenarios for Hammersmith town centre

Scenario	Total new homes	Indicative residential floorspace (assumed 86.25sqm gross external area per dwelling)	Total new jobs	Indicative commercial floor space
Scenario 1 – Base Case: Consistent with Local Plan, excl Riverside areas – no tunnel	620	86,250 sqm	4,900	56,500 sqm
Scenario 2: Draft Local Plan Regulation 18 Consultation – with tunnel	2800	241,500 sqm	10,000	127,000 sqm
Scenario 3: Tunnel plus Broadway redevelopment as a higher density commercial /residential scheme (inc. tall buildings)	3600	310,500 sqm	13,027	147,200 sqm
Scenario 4: Tunnel plus Broadway redevelopment as a higher density residential scheme (inc. tall buildings)	4400	379,500 sqm	9,026	102,000 sqm
Scenario 5⁶²: Tunnel, plus Broadway redevelopment, plus indicative 4 taller buildings (25-30 storeys) in town centre (50/50 residential commercial)	3832	330,500 sqm	15,600	177,000 sqm

- 2.138 Further work led by CH2M in 2015, building on this earlier LBHF work, identified a series of development parcels in the town centre that could be developed, or redeveloped, following flyover removal and surface road network remodelling.
- 2.139 The study developed a series of scenarios to indicate how much growth these parcels could accommodate. This confirmed the LBHF development scenarios, and identified capacity for around 3,800 homes, and around 13,500 office jobs.
- 2.140 The additional homes created in Hammersmith would create jobs in other ‘supporting’ activities such as health, education, food, retail and leisure. This results in a final gross figure of approximately 3,800 homes, and 13,800 jobs that could be created within Hammersmith town centre following flyover removal.

Key finding:

Hammersmith town centre has the opportunity to support over 3,800 homes and 13,800 jobs following removal of the flyover. With the flyover in-situ, only around 620 homes and 4,920 jobs could be created.

Tunnelling the A4 would enable Hammersmith to deliver the residential and office space necessary to support London’s growth and accommodate the borough’s increase in population and employment.

- 2.141 The provision of 3,800 new homes (gross) in Hammersmith town centre would exceed the borough’s projected 3,620 home shortfall against London housing targets to 2025 and would provide a badly needed source of new housing to help stem future housing shortages and prices rises. As Table 6 shows, Hammersmith town centre, with its high PTAL, concentration of

⁶² The physical impacts of 25-30 storeys buildings have not yet been tested and will be subject to further impact assessment.

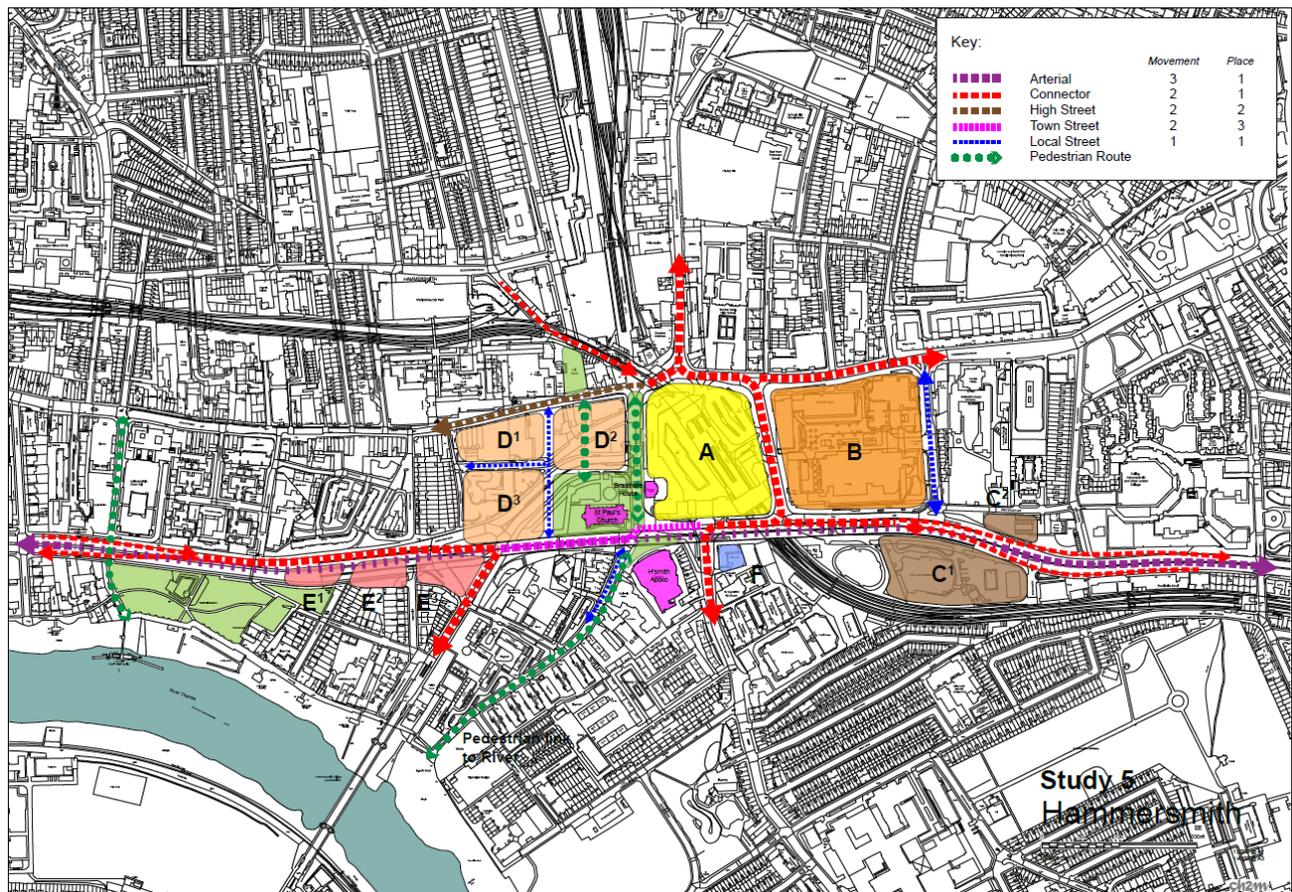
professional expertise also provides an optimum location within which to accommodate much of the borough's projected employment growth. With the tunnel and redevelopment of Hammersmith Broadway, there is potential for up to 120,000 sqm of new commercial floorspace (compared to the base case).

Both Option 1 and Option 2 deliver the same quantum of development.

Key finding:

Despite their differences in length, there is little to no additional development associated with Option 2. Both options would unlock the parcels of land shown on Figure 28. It is not envisaged that either tunnel would unlock any additional development outside Hammersmith town centre.

Figure 28: Development parcels



Flyover removal and subsequent development would support the vitality of Hammersmith town centre, and increase opportunities for local people.

- 2.142 This growth in homes and jobs would support the vitality of Hammersmith town centre and its ability to attract private investment and new businesses, and provide an economic boost to existing businesses as a result of increased demand.
- 2.143 Furthermore, the increase in local employment provided by the unlocking of the town centre's development potential would increase the job opportunities available to local people, addressing local deprivation, whilst the delivery of more homes would result in provision of more housing stock – including affordable housing – for borough residents.

Reducing severance and improving quality of life

The flyover removal would provide the opportunity to reknit Hammersmith's traditional street pattern.

- 2.144 Removal of the flyover and replacement of a section of the current A4 with a tunnel would provide the opportunity to improve town centre connectivity in Hammersmith, for example by reknitting the street pattern currently severed by the gyratory, or by better linking King Street and the tube station to St Paul's Green, the Apollo and the riverside (potential options for improving connectivity are shown in Figure 29 and Figure 30).
- 2.145 This would also provide the opportunity to recreate Hammersmith's traditional connection to Furnivall Gardens and to the River Thames, creating opportunities to better utilise these open spaces for leisure, recreation and social activities.

Improvements to Hammersmith town centre connectivity would benefit thousands of people daily, and serve local demand for walking and cycling.

- 2.146 Lower vehicle numbers in the town centre as a result of removal of the gyratory and flyover would mean that vehicle speeds could be lowered, creating the opportunity for new at-grade crossing facilities and increased road space for pedestrians and cyclists. This would transform the town centre from a highway dominated landscape to a high quality pedestrian-friendly environment, and given the high pedestrian flows in the town centre (over 60 metres walked per square metre per day)⁶³ would benefit many thousands of people daily.
- 2.147 Given the lower mode share of the private car within Hammersmith, and the greater importance of walking and cycling, replacing the flyover with a tunnel would also serve a significant local demand for active modes of travel by improving local connectivity and public realm. It would also address the current problems of severance between Hammersmith tube and bus stations and the town centre, thereby addressing the needs of the 58 per cent of commuters who travel to work in the borough via the underground and bus⁶⁴.

Both tunnel options provide benefits for severance reduction.

- 2.148 Both tunnel options would deliver a reduction in severance in Hammersmith town centre. However the benefits associated with Option 1 would be higher, as the longer tunnel (Option 2) would attract lower levels of local traffic: any local traffic not travelling as far as Earl's Court would still be required to use the local surface network, resulting in a lower reduction in the numbers of vehicles travelling through Hammersmith town centre.
- 2.149 Option 2 would however provide the opportunity to improve north-south connectivity along a longer section of the A4, as well as at both east and west portal locations (Earls Court and Hogarth roundabout). Speed limits could be lowered and more at-grade crossing facilities delivered, as well as more road space for pedestrians and cyclists travelling across, and along, the A4. However, modelling results indicate that significant additional traffic would be attracted to some areas of the A4 to the immediate west of the longer tunnel, which would generate additional severance impacts in these areas.

Key finding:

Option 1 would provide the greatest connectivity benefits for Hammersmith town centre, but Option 2 would improve connectivity along a longer section of the A4, as well as at both Earls Court and Hogarth roundabout.

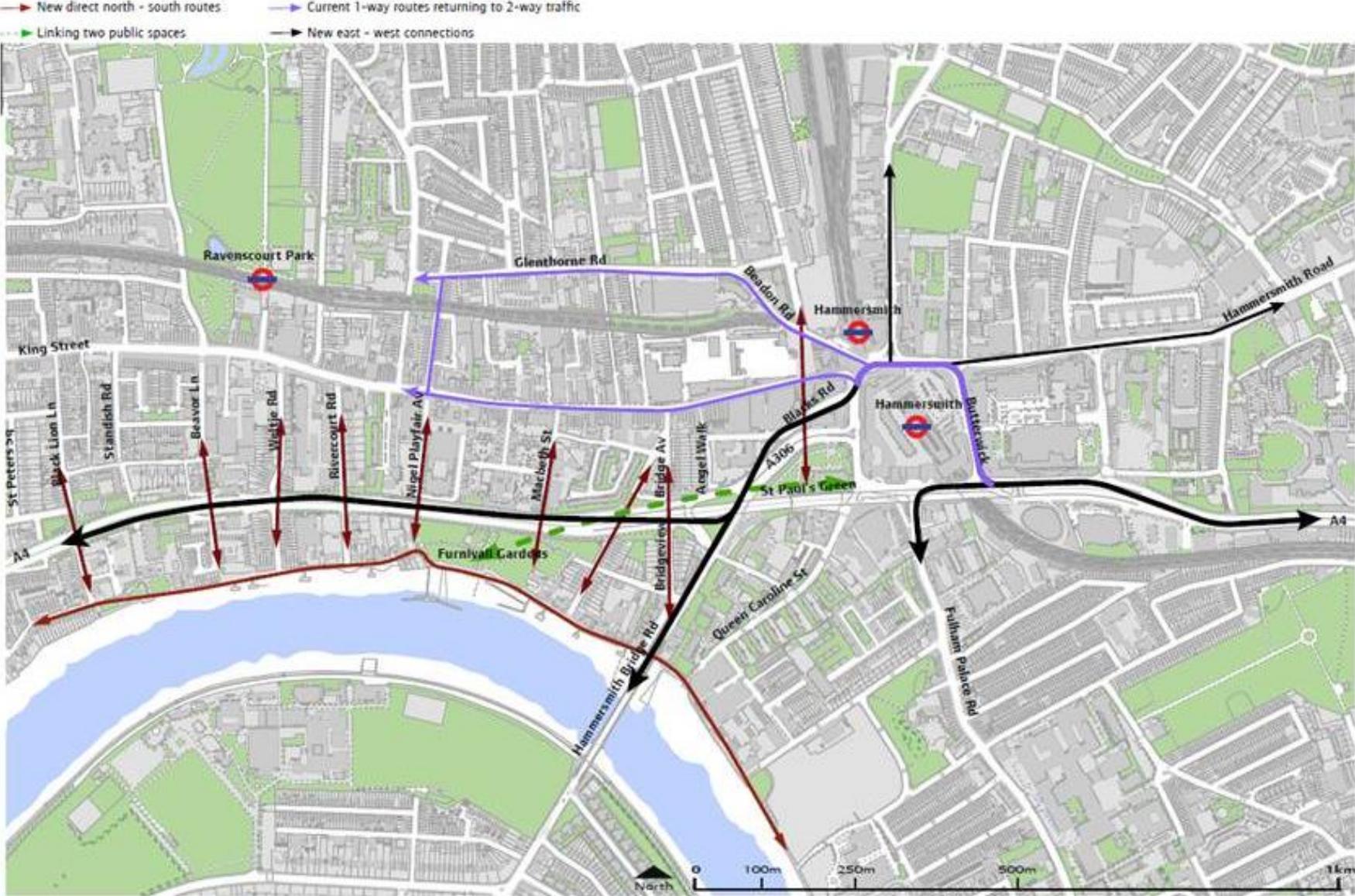
⁶³ TfL Research and Data Analysis team, LTDS

⁶⁴ See Figure 26. 42 per cent of commuters travel to work in LB Hammersmith and Fulham by underground, and 16 per cent by bus.

Figure 29: Connectivity across the A4 in Hammersmith town centre: existing



Figure 30: Connectivity across the A4 in Hammersmith town centre: potential following flyover removal



Flyover removal would reduce traffic, and thereby improve local air and noise pollution and remove the flyover's visual blight.

- 2.150 As summarised above, replacement of the A4 Hammersmith flyover with a tunnel would reduce levels of traffic along the current surface road network in Hammersmith. This in turn would result in a reduction in the noise and air pollution currently experienced by the local area, which has a substantially negative impact on Hammersmith's urban realm and environmental quality.
- 2.151 Removal of the flyover and its associated infrastructure would also reduce the visual intrusion associated with the current concrete structure, and create opportunities to deliver new open, green space for recreation and leisure activities (Figure 31 and Figure 32). This would bolster the liveability of local neighbourhoods, particularly in the context of increased densities.

Both tunnel options provide benefits for local public realm.

- 2.152 Option 1 would deliver the highest benefits for public realm and quality of life in Hammersmith town centre, due to the greater associated reduction in traffic levels.
- 2.153 However Option 2 also provides the opportunity to deliver significant environmental improvements for the current traffic-dominated environments of Hogarth roundabout and Earls Court, as a result of substantially reduced demand. In addition, there would be the opportunity to create a calmer road environment along the stretch of A4 between the two portals, as much of the surface road traffic would opt to use the tunnel rather than the surface network.
- 2.154 However, modelling results indicate that significant additional traffic could be attracted to some areas of the A4, particularly to the immediate west of Option 2 (the longer tunnel), which would generate additional negative impacts on the environment and public realm in these areas.

Key finding:

Option 1 would provide the greatest public realm benefits for Hammersmith town centre, but Option 2 would improve public realm along a longer section of the A4, as well as at both Earls Court and Hogarth roundabout.

Figure 31 : Proposal for a reimagined St Paul's Green: existing⁶⁵



Figure 32: Proposal for a reimagined St Paul's Green: potential following flyover removal⁶⁶



⁶⁵ LB Hammersmith and Fulham (2014) A4 Flyunder Masterplan and Development Value Study http://www.lbhf.gov.uk/Images/A4_flyunder_valuation_chapter_tcm21-187048.pdf

⁶⁶ LB Hammersmith and Fulham (2014) A4 Flyunder Masterplan and Development Value Study http://www.lbhf.gov.uk/Images/A4_flyunder_valuation_chapter_tcm21-187048.pdf

Impact on congestion and function of the road network

Options 1 and 2 are not expected to impact delays on the A4, preserving its strategic movement function.

- 2.155 Maintaining the capacity and function of the A4 as a strategic road corridor is key to any proposal for replacement of the flyover, given the importance of the route to the economy of London and the west London sub-region.
- 2.156 Highway assignment modelling (HAM) was conducted by CH2M to investigate the effects of both tunnel options on the highway network, and is set out below.

Traffic impacts as a result of Option 1 are projected to be minimal.

- 2.157 Aside from some modest adverse impacts on roads in and out of Hammersmith town centre, impacts of Option 1 (the short A4 tunnel) are likely to be very small.
- 2.158 The majority of the impacts of this scheme occur off the A4 corridor. This is to be expected, particularly given the shorter tunnel's close alignment to the existing flyover, and given the reduction in capacity within Hammersmith town centre due to the removal of the gyratory system. This would reduce the current negative environmental and severance impacts of traffic on Hammersmith town centre.
- 2.159 Changes in delay across both peak periods are virtually identical and can be described as minimal, predominately affecting routes around the centre of Hammersmith. Changes in delay from the with-scheme only case are minimal and can be attributed to model noise, with the exception of a handful of links where delays are more modest (one of which is due to the convergence of a node on Fulham Palace road at its junction with St Dunstons Road, leading to a reduction in northbound flows into Hammersmith town centre).
- 2.160 In the with-development case there are modest further impacts in comparison to the with-scheme only case, centred on roads in and out of Hammersmith town centre. It is worth noting that in the PM peak, while this pattern is largely replicated, the same issues are experienced with the aforementioned Fulham Palace Road/St Dunstons Road junction.
- 2.161 The gyratory removal causes some local reassignment of traffic, particularly onto the parallel route of Goldhawk Road. Other changes are likely to be due to capacity of particular approaches into what remains of the gyratory, and with further refinement are likely to settle. However, it is clear that the capacity of the highway network in Hammersmith town centre is reduced as a result of the proposed gyratory removal and as such increased traffic on alternative routes is to be expected.

Key finding:

Changes in delay associated with Option 1 are expected to be minimal. The majority of impacts that do occur are off the A4 corridor.

Option 2, the longer tunnel, has a more significant traffic impact, with a noticeable increase in delay around Hammersmith town centre.

- 2.162 Flow changes associated with the longer tunnel (in a with-development scenario) would cause a noticeable increase in delay around Hammersmith town centre. Although there would be significant drops in delay at Sutton Court Road, Hogarth Roundabout, Weltje Road and North End Road, significant additional traffic would be attracted to the A4 to the immediate west of the scheme, creating severance and noise and air pollution in this area.
- 2.163 The longer tunnel scheme is forecast to carry 2,500 PCUs eastbound and 2,000 PCUs

westbound in the AM peak (and the reverse in the PM peak). There is no noticeable change to these numbers as a result of development traffic, given the distance of the portals from the Hammersmith town centre sites.

- 2.164 In a without development scenario, the tunnel would result in a small overall reduction in travel time of 130 passenger car unit hours. The travel time benefits delivered by the tunnel would be offset by an increased travel distance of 12,000 pcu-kms across both peak periods. The increase in travel distance can be attributed to the gyratory changes at Hammersmith, and the removal of the Earls Court one way system.
- 2.165 In a with-development scenario, the travel distance is greater and a travel time increase of 440 pcu-hrs across both peak periods is realised.
- 2.166 The scheme attracts significant traffic to the A4 to the immediate west of the scheme (880 additional PCUs in the AM peak and additional 1,160 PCUs in the PM peak). At the eastern end, given the number of routes into the tunnel portal, the increases appear more modest. The scheme appears to attract traffic mainly from routes to the south, such as the A316, rather than the A40. At a local level, changes to the gyratory at Hammersmith cause significant impacts on traffic routing, for example a drop in flow on Shepherds Bush Road. The plots appear to show decreases in flow around Earl's Court, but this is as a result of changes brought about by the removal of the one-way system.
- 2.167 There are significant drops to delay at Sutton Court Road, Hogarth Roundabout, Weltje Road and North End Road, because of substantially reduced demand. Otherwise, changes are relatively modest.
- 2.168 As a result of the additional development in Hammersmith town centre (a gross increase of circa 3,800 homes and 13,800 jobs) flow changes are relatively modest with the exception of areas immediately around central Hammersmith and roads leading to/from this area; these see a noticeable increase in delay.

Key finding:

Roads around central Hammersmith **would** experience a noticeable increase in delay with Option 2, and strategic traffic **would** experience both an increased travel distance and travel time. The only drops in delay **would** be to the east and west of the scheme, at Sutton Court Road, Hogarth Roundabout, Weltje Road and North End Road, which **would** experience substantially reduced traffic levels.

- 2.169 A key aim is to ensure that both tunnel options serve to maintain capacity of the A4 whilst improving connectivity in Hammersmith town centre. There is the need to balance the need for vehicle travel with the demands of pedestrians and cyclists. In a with-development scenario, the highway modelling work suggests that there would be an increase in travel time for strategic traffic. As this business case is further developed, options for addressing this impact will be considered further.
- 2.170 Both tunnels fulfil the following criteria:
- Technically feasible and can be constructed.
 - Enables major redevelopment of Hammersmith Town Centre including major changes to the gyratory, that would reduce traffic flow in the town centre.
 - Improves the urban realm in Hammersmith, providing a reduction in severance and better links to the River Thames.

- Does not compromise, and likely enhances the delivery of wider initiatives to regenerate Hammersmith, while maintaining the road network functioning of the A4.

2.171 In addition, Option 2 (the longer tunnel):

- Requires the removal of the Earls Court one way system.
- Provides some relief to a number of other existing surface junctions on the A4 (although modelling suggests there would be an increase in traffic and associated impacts to the west of the scheme).

Impact of not changing

Retention of the flyover would prevent Hammersmith town centre meeting its potential to deliver high levels of housing and job growth.

2.172 The impact of a decision to not progress with a Hammersmith Tunnel would mean:

- The town centre would not be able to deliver a high quantum of new residential units and would make a lower contribution towards addressing London's housing need generated by strong employment and population growth
- There would be insufficient floorspace delivered to meet the needs of employers, resulting in upward pressures on rents
- Worsening affordability of housing within the borough
- A deterioration of the quality of the urban realm and environmental quality as traffic volumes increase and air quality and noise worsen
- Severance impacts are not addressed
- Footfall and retail spend within the town centre to remain the same or decline
- Motivation of firms to move to Hammersmith to take advantage of clustering and agglomeration impacts of media and creative industries would weaken.
- Productivity and GVA levels and tax receipts would be lower.

Key finding:

Not building the tunnel project would have a number of negative impacts on Hammersmith. These would include rising office rents and house prices; decline in town centre footfall and spend; an ongoing deterioration of quality of the urban realm; and a failure to tackle severance issues.

PART F: STRATEGIC CONTEXT

Section Summary:

This section describes how Options 1 and 2 are supported by policy at all spatial scales.

Existing national, regional and local policies give general and specific support to tunnelling of the A4 in Hammersmith to address strategic and local needs to unlock land for development, reduce severance, improve public realm and local connectivity, and promote walking and cycling.

National policy context

2.173 The Department for Transport's **nine priorities** for the transport network are:

1. continuing to develop and lead the preparations for a high speed rail network
2. improving the existing rail network and creating new capacity to improve services for passengers
3. tackling congestion on our roads
4. continuing to improve road safety
5. encouraging sustainable local travel
6. promoting lower carbon transport, such as walking and cycling as well as introducing more environmentally-friendly buses and trains
7. supporting the development of the market for electric and other ultra-low emission vehicles
8. supporting the development of aviation, improving passenger experience at airports
9. maintaining high standards of safety and security for passengers and freight

The A4 Hammersmith tunnel project contributes towards DfT priority numbers 4, 5 and 6, while also supporting priority 3.

- 2.174 The project would improve the safety of pedestrians and cyclists by reducing the severance effects of the A4 and would encourage greater use of these lower carbon modes by improving the public realm and improving provision for walking and cycling.
- 2.175 The National Planning Policy Framework (NPPF) published in 2010 sets out a policy framework for how the land-use planning system should function.
- 2.176 The NPPF seeks to secure economic growth to create jobs and prosperity. The Government is committed to ensuring that the planning system does everything it can to support sustainable economic growth and a competitive economy and so significant weight should be placed on the need to support economic growth through the planning system. The NPPF positively promotes competitive town centre environments and contains a 'town centre first' policy.

The A4 scheme contributes towards the NPPF 'town centre first' policy and its commitment to supporting economic growth through the planning system.

- 2.177 The NPPF states that the transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel. Encouragement should be given to solutions which support reductions in greenhouse gas emissions and reduce congestion.
- 2.178 The NPPF states that planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure.
- 2.179 The NPPF says that the planning system should contribute to and enhance the natural, local and

historic environment.

The A4 tunnel contributes to NPPF goals to promote sustainable transport by improving the public realm in Hammersmith town centre, thereby improving the attractiveness of active travel modes.

- 2.180 The **National Policy Statement (NPS) for the National Road and Rail Networks** published in December 2014 states “The national road and rail networks that connect our cities, regions and international gateways play a significant part in supporting economic growth, as well as existing economic activity and productivity and in facilitating passenger, business and leisure journeys across the country. Well-connected and high-performing networks with sufficient capacity are vital to meet the country’s long-term needs and support a prosperous economy.”

The Hammersmith tunnel scheme accords with the NPS by ensuring that the vital strategic road network function of the A4 road corridor is maintained.

- 2.181 The NPS states that: “Improved and new transport links can facilitate economic growth by bringing businesses closer to their workers, their markets and each other.” By inference there is a risk that insufficient investment in these transport connections and not increasing capacity of road and rail networks would act as a major barrier to and brake on economic growth.
- 2.182 The pressure on the road network is forecast to increase with economic growth, substantial increases in population and a fall in the cost of car travel from fuel efficiency improvements. The NPS states that 2014 DfT traffic forecasts predict that by 2040, a quarter of travel time would be spent delayed in traffic.
- 2.183 It suggests that without improving national road networks, including its performance, it would be difficult to support further economic development, employment and housing and this would impede economic growth and reduce people’s quality of life. It is reasonable to argue that the same rationale applies to the TfL Road Network.

Key finding:

The A4 Hammersmith tunnel scheme demonstrates a close fit with national policy goals, including the DfT’s nine transport priorities, the NPPF, and the NPS for the National Road and Rail Networks.

Regional and Sub-Regional policy context

The Mayor's Transport Strategy (MTS seeks to better integrate land-use and transport planning within London.

- 2.184 The MTS, published in 2010 by the Greater London Authority, sets out the following vision for travel and transport in London:
- 2.185 'London's transport system should excel among those of world cities, providing access to opportunities for all its people and enterprises, achieving the highest environmental standards and leading the world in its approach to tackling urban transport challenges of the 21st century.'
- 2.186 Alongside this vision, the MTS identifies six strategic goals for London:
1. Supporting economic development and population growth
 2. Enhancing the quality of life of all Londoners
 3. Improving the safety and security of all Londoners
 4. Improving transport opportunities for all Londoners
 5. Reducing transport's contribution to climate change and improving its resilience
 6. Support delivery of the London 2012 Olympic and Paralympic Games and its legacy
- 2.187 The A4 Hammersmith tunnel project would contribute to these goals through unlocking development sites, improving the public realm and conditions for the sustainable modes of walking and cycling, and improving access to both the tube and bus stations. It would achieve these goals whilst maintaining the vital strategic movement function of the A4 corridor.
- 2.188 London's road network provides arteries for the movement of people and goods and helps Londoners and those from surrounding areas to access employment, education, retail, and leisure opportunities. A well-functioning and efficient highway network is essential for the proper functioning of the London economy and to maintain the quality of life of the residents of the city. Improvements to streetscapes and the public realm would help to create safer, more walkable neighbourhoods, support place-shaping and regeneration and attract investment. Improvements to traffic management would help to make the TfL and borough road network more resilient.
- 2.189 The MTS also contains proposals for improving transport networks in London. This includes a contribution to improved connectivity, and contribution to improvements in conditions for pedestrians and cyclists.

Key finding:

The A4 Hammersmith tunnel project contributes towards MTS goals 1-5

2.190 Table 7 sets out how the A4 Hammersmith tunnel project conforms to relevant MTS policies.

Table 7: Relevant Mayor’s Transport Strategy policies

Policy no.	Policy description	How the Hammersmith tunnel project conforms with the policy
1	The Mayor, through TfL, will seek to develop London’s transport system in order to accommodate sustainable population and employment growth.	The Hammersmith tunnel scheme would help unlock housing and new employment by enabling higher density of development.
3	The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to improve public transport accessibility and conditions for cycling and walking in areas of lower PTAL, where there is an identified need for improving accessibility; and to improve access to economic and social opportunities and services for all Londoners.	The Hammersmith tunnel scheme would improve access to public transport by reducing severance between Hammersmith bus and tube station and Hammersmith town centre. This would help improve access to employment and services for residents.
4	The Mayor, through TfL, will seek to improve people’s access to jobs, business’ access to employment markets, business to business access, and freight access by seeking to ensure appropriate transport capacity and connectivity is provided on radial corridors into central London.	By supporting higher employment densities around a major public transport hub, the Hammersmith tunnel scheme would improve business’s access to the workforce and residents’ access to jobs.
5	The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to ensure efficient and effective access for people and goods within central London through providing improved central London connectivity and appropriate capacity. This will include improving access to major public transport interchanges for pedestrians, cyclists and by public transport.	The Hammersmith tunnel scheme would improve access to the tube and bus station – a key west London interchange – and also support pedestrians and cyclists by improving local connectivity.
6	The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other transport stakeholders, will seek to provide appropriate connectivity and capacity on radial transport corridors into current and potential metropolitan town centres and to Strategic Outer London Development Centres.	The Hammersmith tunnel scheme would improve connectivity for road users and pedestrians, facilitating the regeneration of Hammersmith town centre.
8	The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other transport stakeholders, will support a range of transport improvements within metropolitan town centres for people and freight that help improve connectivity and promote the vitality and viability of town centres, and that provide enhanced travel facilities for pedestrians and cyclists.	The improved connectivity would help enable residents along the corridor to more easily access Hammersmith town centre, supporting its vitality and viability.

Policy no.	Policy description	How the Hammersmith tunnel project conforms with the policy
9	<p>The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other transport stakeholders, will use the local and strategic development control processes to seek to ensure that:</p> <ul style="list-style-type: none"> • All high trip generating developments are located in areas of high public transport accessibility, connectivity and capacity (either currently or where new transport schemes are committed) • The design and layout of development sites maximise access on foot, cycle and to public transport facilities, for example, via safe walking and cycling routes and provision of secure cycle parking • Access for deliveries and servicing, maximise the opportunities for sustainable freight distribution where possible • Land for transport use is safeguarded in line with London Plan policy and Supplementary Planning Guidance • Planning contributions are sought for transport improvements where appropriate 	<p>The level and vitality of development at Hammersmith town centre would be shaped by the improvement in capacity, connectivity and accessibility brought by the Hammersmith tunnel scheme.</p> <p>The town centre has the highest possible PTAL rating, meeting the requirement to locate development in an area of high public transport accessibility.</p> <p>The Hammersmith tunnel scheme would reduce local severance and traffic volumes, creating safer walking and cycling routes.</p>
11	<p>The Mayor, through TfL, will seek to reduce the need to travel, encourage the use of more sustainable, less congesting modes of transport (public transport, cycling, walking and the Blue Ribbon Network), set appropriate parking standards, and through investment in infrastructure, service improvements, promotion of smarter travel initiatives and further demand management measures as appropriate, aim to increase public transport, walking and cycling mode share.</p>	<p>The Hammersmith tunnel scheme would encourage walking and cycling by providing new/ improved cycle/pedestrian facilities.</p>
13	<p>The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will expand the capacity and quality of public transport services, improve passenger comfort and customer satisfaction, reduce crowding, and improve road user satisfaction.</p>	<p>The Hammersmith tunnel scheme would support road user satisfaction by maintaining the A4's vital movement function.</p>
14	<p>The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to improve transport's contribution to the built and natural environment.</p>	<p>The Hammersmith tunnel scheme would improve the public realm and environment in Hammersmith, by removing the visually intrusive flyover, improving noise and air quality, and improving local connectivity,</p>

Policy no.	Policy description	How the Hammersmith tunnel project conforms with the policy
16	The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, freight operators, London boroughs and other stakeholders, will seek to reduce noise impacts from transport.	The Hammersmith tunnel scheme would reduce noise impacts from transport for residents in the surrounding area by 10dB for dwellings close to the A4, and 5dB for those further away.
17	The Mayor, through TfL, and working with the DfT and other government agencies, the London boroughs, health authorities and other stakeholders, will promote healthy travel options such as walking and cycling.	The Hammersmith tunnel scheme would reduce severance, and improve public realm and environmental quality, creating a more welcoming environment for pedestrians and cyclists
22	The Mayor, through TfL, and working with the LDA, DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to enhance connectivity, reduce community severance, promote community safety, enhance the urban realm and improve access to jobs and services in deprived areas.	The Hammersmith tunnel scheme would reduce community severance by placing the busy A4 underground. The urban realm would be enhanced by removing the flyover's visual intrusion and creating new public spaces. Better connections in the area would improve access to jobs and services for residents.
30	The Mayor, and TfL, will make the case to Government for long-term investment in the transport network to secure the outcomes set out in this strategy.	This business case sets out the case for investment in improving part of the strategic road network.
36	The Mayor, and TfL, will work with the London boroughs and other stakeholders, to seek to secure further investment from a variety of sources that help improve the quality and range of transport services available to Londoners.	The Financial Case for this project has considered a range of sources of funding that could be utilised to enable the delivery of the scheme.

The London Plan (updated in March 2015), sets out the strategic spatial planning framework for London as a whole.

2.191 The London Plan sets out the following vision for London:

'Over the years to 2036 – and beyond, London should:

excel among global cities – expanding opportunities for all its people and enterprises, achieving the highest environmental standards and quality of life and leading the world in its approach to tackling the urban challenges of the 21st century, particularly that of climate change.'

2.192 This high level, over-arching vision is supported by six detailed objectives that will inform place-making and land-use planning for new development, all of which are in some way relevant to this business case:

1. A city that meets the challenges of economic and population growth;
2. An internationally competitive and successful city;
3. A city of diverse, strong, secure and accessible neighbourhoods;
4. A city that delights the senses;
5. A city that becomes a world leader in improving the environment;
6. A city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities.

Key finding:

The A4 Hammersmith tunnel project contributes towards London Plan objectives 1-6.

The London Plan emphasises the importance of London's town centres in accommodating London's future growth.

- 2.193 It states that these should provide the major foci for commercial and residential development outside the Central Activities Zone (CAZ). Hammersmith Town Centre is designated as a Major Centre in the London Plan, with a medium potential for growth based on current levels of demand and transport capacity. However it is important to note that this projection is based on the assumption that the Hammersmith flyover remains in-situ – its removal would free up significant additional growth in jobs and homes, meaning that growth above these levels may be possible. A gross 3,800 new homes and 13,800 new jobs would be comparable to the growth capacities within some of the 38 Opportunity Areas that have been designated.
- 2.194 This project would help to support the wider London economy by acting as a catalyst for investment in improving the public realm, thereby opening up redevelopment opportunities for denser development. By enabling new housing and office development, this would help London to retain its status as a competitive global city. A better, more walkable public realm with reduced severance would improve safety for Londoners of all ages and backgrounds and enhance the setting of landmark buildings. The project would result in environmental improvements through supporting modal shift from the private car towards public transport, cycling and walking, with positive impacts on air quality, noise and townscape. As a result, the neighbourhood around the project would be more permeable and easier to navigate around for pedestrians and by bicycle.

The Roads Task Force (RTF) is an independent body, with a remit to tackle the challenges facing London's streets and roads.

- 2.195 This body, which was set up by the Mayor of London in 2012 brings together a wide range of interests and expertise, united in the belief that the Capital needs a long-term strategy for roads and a commitment to major investment in our streets.

2.196 The RTF report, published in July 2013, focuses on three core aims:

- To enable people and vehicles to move more efficiently on London's streets and roads
- To transform the environment for cycling, walking and public transport
- To improve the public realm and provide better and safer places for all the activities that take place on the city's streets, and provide an enhanced quality of life

2.197 The RTF highlights 'breathing life back into town centres across London' and 'unlocking major growth and regeneration' as key parts of its vision for the city. The report notes that the potential of many areas to deliver growth is constrained because of a lack of connectivity, and/or the impact of roads on 'place value', and cites mitigation of noise and severance as key to unlocking this potential growth. Importantly the report also highlights the importance of maintaining road network functioning, and the need to better balance the 'place' and 'movement' functions of our streets.

Annex 3 of the RTF report cites the Great West Road (A4) and the Hammersmith flyover in particular as key causes of local severance.

2.198 The report states that alternative tunnelled routes for traffic should be explored in order to improve local quality of life and provide 'transformative effects' to the town centre.

Key finding:

The A4 Hammersmith tunnel project contributes to all 3 core aims of the RTF, and is a key area identified in the RTF report.

The TfL Surface Transport Plan 2015/16 sets out the approach towards managing the organisation's transport networks.

2.199 This includes TfL's bus, taxi, coach and river networks, freight deliveries, the Santander cycle hire, Congestion Charge and Low Emission Zone schemes and the approach towards the management of the TfL Road Network (TLRN).

2.200 The Plan sets out a goal: 'to keep London working, growing and to make life in London better'. Alongside this goal, the Plan has an ambition: 'to provide, manage and improve the services, streets and places that connect London for all, sustaining its position as a world leading city'. The Plan has identified ten outcomes for surface transport in London. Table 8 sets out how the Hammersmith tunnel would contribute towards each of these outcomes.

Table 8: Surface Outcomes supported by the scheme

Surface Outcome	How this project contributes towards the outcome
Quality bus network: Maintaining and enhancing a reliable, safe, accessible bus network and supporting coach operations, across all of London.	The scheme would support improved, safer access to Hammersmith bus station, and would help maintain bus reliability by preserving road network functioning.
Reliable roads: Ensuring a reliable and resilient road network for all of London by managing congestion and improving connectivity.	The tunnel project would maintain the capacity and function of the A4 as a strategic core route.
Improving the environment: Continuing to deliver environmental improvements, by reducing pollutants from ground based transport and enhancing the natural environment (e.g. additional open space, improved visual impact, etc.).	The removal of the flyover would result in improved air quality at surface level, due to fewer vehicles using the surface road network. A tunnel also provides the option of emissions filtering being used, which would further improve air quality.
More and safer cycling: Enabling more people to cycle, more safely, more often.	The removal of the flyover would reduce severance, helping to improve conditions for cyclists, generating more cycling trips.
Better places to walk: Creating and supporting safe attractive, accessible streets and places that people can use, enjoy and choose to walk more.	The removal of the flyover would reduce severance and achieve a higher quality public realm, helping to improve the pedestrian environment, generating more walking trips.
Reduced casualties: Continuing the downward trend in casualties on London's roads and public transport networks	The removal of the flyover would improve safety for pedestrians and cyclists.
Sustainable freight: Enabling safer, cleaner and more efficient delivery and servicing activity to support London's economy.	The scheme would reduce noise levels generated by HGVs. It would also maintain road network functioning, key for freight deliveries which are reliant on London's roads.
Quality door-to-door transport: Supporting provision of safe, reliable, accessible door-to-door services, including regulating London taxi and private hire services and operating Dial-a-Ride services.	The tunnel project would maintain current journey times on the A4, helping taxi, private hire and Dial-a-Ride service users to maintain service standards.
Reduced crime: Continuing the downward trend in crime, antisocial behaviour and fear of crime on London's transport networks.	A more attractive public realm and higher pedestrian flows would help reduce the fear of crime.
Realising rivers' potential: Harnessing the potential of London's rivers and waterways to carry people and goods.	Not applicable.

Key finding:

The A4 Hammersmith tunnel contributes to Surface Outcomes 1-9.

The London Infrastructure Plan 2050⁶⁷ sets out the Mayor's long-term aspirations for the infrastructure to support London's future growth.

- 2.201 The central projection is a 37 per cent increase in population from 2011 to 2050. It notes that the road network caters for 80 per cent of people's journeys and 90 per cent of freight journeys and is vital for the continued economic success and functioning of the city.
- 2.202 The **Transport Supporting Paper** of the London Infrastructure Plan 2050 sets out the Capital's infrastructure requirements and how best to deliver them. The document sets out the following transport requirements that are relevant to this business case:
- 12: A new inner orbital tolled tunnel and a series of other smaller tunnels and decking over to help transform places across the city.
 - 23: A comprehensive network of high quality cycle and pedestrian routes

Key finding:

The A4 tunnel scheme **would** help enable TfL to meet the requirements of the 2050 Infrastructure Plan.

- 2.203 The Sub-Regional Transport Plan (SRTP), updated in 2014, lists cycling **enhancements** and connections as a key priority work area. The draft 2014/15 priorities for the sub-region include improving road safety, improving the quality of urban realm, and promoting walking. The A4 tunnel scheme would enable these priorities to be met.

Local policy context

- 2.204 References to specific project drivers of change or other relevant policies in local planning documents are summarised in Table 9.
- 2.205 It should be noted that whereas Option 1 lies entirely within the host borough of LB Hammersmith and Fulham, the eastern and western portals of Option 2, the longer tunnel option, lie within RB Kensington and Chelsea and LB Hounslow respectively.
- 2.206 LB Hammersmith and Fulham in particular are strongly supportive of the proposal to place the A4 in a tunnel and remove the existing flyover, which is central to their vision for the redevelopment of Hammersmith town centre. The borough conducted the early feasibility planning for the scheme, developing a number of documents as set out in Table 9.
- 2.207 In addition to the documents outlined below, LB Hammersmith and Fulham are currently developing a Supplementary Planning Document setting out the borough's vision for Hammersmith town centre, due to be published in 2016.
- 2.208 LB Hounslow are supportive of the project, as expressed in a letter sent by the borough in early 2014⁶⁸. RB Kensington and Chelsea support the objective of regenerating Hammersmith town centre, as expressed by a letter in the same report, and are 'sympathetic' to removal of the flyover (ibid). Both boroughs do however express concerns over the construction and traffic impacts of the longer tunnel option.

⁶⁷ The London Infrastructure Plan, GLA, 2014 -

https://www.london.gov.uk/sites/default/files/LIP%202050%20update%20report%20March%202015_0.pdf

⁶⁸ Hammersmith Flyunder Feasibility Study, March 2014 -

http://www.lbhf.gov.uk/Images/flyunder_feasibility_study_web_medium_tcm21-187089.pdf

Key finding:

All local boroughs are supportive of the principle of delivering improvements to the A4 and Hammersmith town centre, subject to concerns about local impacts.

Table 9: Local policy context summary

LB Hammersmith and Fulham	
Document	Relevant content
Core Strategy: Local Development Framework 2011 ⁶⁹	Strategic Policy A commits to focusing regeneration and growth in designated 'regeneration areas', including Hammersmith Town Centre & Riverside.
	Strategic Policy C states that Hammersmith town centre will be the borough's primary civic centre, a strategic office centre, and a major destination for retail, arts, and culture. The Council aims to encourage development of sites within the town centre to strengthen that role.
	Strategic Policy HTC sets out the Council's vision for Hammersmith Town Centre & Riverside. They envision significant development potential, but any development should help to overcome the barrier effect of the A4 which currently severely impacts the town centre, restricting pedestrian movement and making walking 'unpleasant'.
	Strategic Objective 8 commits to regenerating LBHF's town centres 'to improve their viability and vitality'.
	Strategic Objective 13 pledges to improve and protect quality of life in the borough by ensuring safe, accessible local environments, with a strong sense of place.
Hammersmith and Fulham Draft Local Plan – Regulation 18 Consultation, January 2015 ⁷⁰	Strategic Policy T1 states that the borough will seek localised improvements in the highway network, and increased opportunities for walking and cycling.
	Strategic Policy HRA (Hammersmith Regeneration Area) sets out the vision for regeneration of Hammersmith town centre, and specifically states that the Council will support the replacement of the flyover and a section of the A4 with a tunnel.
A Transport Plan for Hammersmith and Fulham – The Second Local Implementation Plan (LIP2), 2011-2031	Objective 2 makes improving the road network's a priority for the Council, including working with TfL to deliver improvements to the A4. The Council supports TfL's improvements to walking and cycling facilities along the A4 (Talgarth Road) and would welcome additional projects along the road to improve efficiency and safety.
Hammersmith Flyunder Feasibility Study – March 2014	This document sets out strong support for replacement of the Hammersmith Flyover with a cut and cover tunnel, as well as removal of the gyratory, to deliver a 'momentous' reimagining of Hammersmith town centre. The report concludes that subsequent town centre redevelopment could generate around 350,000sqm of floorspace and 3000 new homes, funded by the value of the unlocked development. It concludes that a shorter tunnel would be more advantageous, with fewer environmental impacts and a lower cost.

⁶⁹ http://www.lbhf.gov.uk/Images/Core%20Strategy_tcm21-165496.pdf

⁷⁰ http://www.lbhf.gov.uk/Images/Draft%20Local%20Plan%20for%20print%2002.01.15.compressed_tcm21-193109.pdf

A4 Flyunder Masterplan and Development Value Study – March 2014	Report accompanying the Feasibility Study. Examines potential for development of Hammersmith town centre following flyover and gyratory removal, including potential value of development. The report states that more detailed study is required to provide any comprehensive valuation, but that the shorter tunnel is the most attractive option, with a potential positive benefit/cost ratio.
Hammersmith Flyunder Strategic Impact Assessment – March 2014	Concludes that the socio-economic benefits of a tunnelled bypass for Hammersmith would be high, generating not just new housing and jobs, but also increasing retail footfall, attracting visitors and tourists and enhancing the local image of the area.
LB Hounslow	
Hounslow Local Implementation Plan for Transport 2011 - 2031	LIP Transport Objective 3 states that the borough will aim to improve satisfaction with the street environment and maximise the amenity of public spaces, while Objective 5 (Healthy) refers to maximising the opportunity to improve health by removing barriers to active travel.
	Commits to supporting the S RTP's goals by improving permeability for sustainable modes (particularly in town centres) and promoting sustainable/active modes serving congested east/west corridors.
Unitary Development Plan – September 2007	Objective T.2 refers to promoting sustainable transport whilst reducing car traffic, with Policy T.2.1 stating that particular emphasis should be given to measures that encourage walking.
RB Kensington and Chelsea	
Core Strategy – December 2010	The borough support improvements for pedestrian movement across West Cromwell Road, particularly at the junction with Warwick Road, as part of their strategy for the Earls Court area.
	Strategic Issue 2 refers to improving travel choices to reduce car dependency.
	Strategic Objective CO1 <i>Keeping Life Local</i> refers to creating walkable neighbourhoods, and the associated importance of strong neighbourhood centres.
	Strategic Objective CO4 <i>Better Travel Choices</i> refers to making walking and cycling safer and more attractive, including by working with TfL to improve the streets in the Earls Court one-way system.
	Strategic Objective CO3 <i>An Engaging Public Realm</i> refers to creating and maintaining a sense of place, attractive streets, and outdoor spaces

Stakeholders

2.209 Table 10 outlines the main stakeholder groups that would be involved with or interested in the project.

Table 10: Stakeholder groups

Stakeholder	Description
Affected boroughs: LB Hammersmith and Fulham	Local authority, protecting interests of residents and local businesses. Responsible for design review/approvals, and reviewing the impact on local residents
Adjoining boroughs: RB Kensington & Chelsea, LB Hounslow	Local authority, protecting interests of residents and local businesses Likely to be concerned about congestion impacts
Borough councillors and MPs	Protecting policy and constituent interests
Local community/interest groups	Groups representing those who live and/or work in the local area Interested in local impacts of the scheme, scheme design
Affected landowners	Individual or groups who own land affected by the scheme.
Business Groups	Umbrella organisations (e.g. London First) and employers within Hammersmith town centre
Greater London Authority (GLA)	Statutory planning authority, protecting interests of Londoners and policy interest
Deputy Mayor for Transport	Providing policy advice and direction, setting priorities and taking decisions relating to transport issues on behalf of the Mayor
HM Treasury	Maintaining control over public spending, setting the direction of economic policy
Department for Transport (DfT)	Setting national policy for transport

2.210 There would be ongoing liaison with these stakeholders in relation to the project, and mapping of views and requirements and where these may conflict. Affected boroughs would continue to be updated regularly by the programme team.

2.211 As the programme advances, the stakeholders engaged are likely to expand considerably, and would include the public. Accordingly, the Stakeholder Management Plan is subject to ongoing review and would be updated/expanded as necessary.

Constraints

There are a number of constraints which may have a bearing on the tunnel options under consideration.

- 2.212 Engineering feasibility work has been carried out on both tunnel options. This work has identified alignments and portal locations that are considered to be feasible, that avoid key constraints on the route, and that minimise the requirement for occupied or protected land for worksites and operational infrastructure.
- 2.213 However, at this early stage of the design, some aspects carry a high risk and hence an optimism bias of 66 per cent for a non-standard civil engineering project has been applied. A Quantified Risk Assessment is currently being undertaken for the options, and once completed this will result in an agreed level of optimism bias for the scheme.
- 2.214 Constraints identified are shown in Table 11. Suitable mitigation measures have been identified for each constraint and in some cases have been resolved. None of the constraints represent an insurmountable challenge. TfL is confident that they could be sufficiently addressed through suitable design.

Table 11: Constraints

Constraint	Type of constraint	Potential impact	Potential mitigation
Acquisition of properties	Land take	Scheme would involve temporary and permanent acquisition of residential and commercial properties	Working closely with LB Hammersmith and Fulham to minimise impact on residents and those affected by the scheme.
Unmanageable construction traffic	Construction	Risk that disruption to traffic during construction is unmanageable	Use best practice to understand innovative construction techniques. Careful traffic management would be required to ensure delays and disruption are minimised, and both traffic and pedestrian access are maintained throughout.
Proposed masterplan layout	Planning	No formal consent for number of dwellings/construction as outlined in masterplan.	Working closely with LB Hammersmith and Fulham to agree way forward. The SPD being prepared by the borough would set a planning framework for development of the town centre and would involve community engagement on development intensity/additional dwellings and the preferred layout of development.

Inter-dependencies

There are a number of dependencies with other work streams that may affect the delivery and/or outcomes of the A4 Hammersmith scheme.

2.215 Interdependencies identified include:

- Potential synergy between wider improvements for cycling:
 - TfL Better Junctions is currently investigating opportunities to provide a high quality east-west link through the gyratory scheme as currently developed (within the existing arrangement) includes a bi-directional facility across the north of the gyratory and improved facilities around the rest of the gyratory
 - This could be a short-term or interim option given the possibility of changes to the gyratory as a result of the road tunnel scheme
- Redevelopment of Hammersmith bus station is being considered by TfL to improve its capacity and quality, as well as to create potential commercial development opportunities

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STRATEGIC CASE SUMMARY

The key points arising from the Strategic Case can be summarised as:

- London is a key driver of the UK's economic growth. Its success benefits the UK as a whole, but this cannot be taken for granted
- Central London's future employment growth depends on having an increased labour and office space supply, but the city faces significant housing and space pressures, exacerbated by a growing population
- London must unlock wider development opportunities to support delivery of new housing and jobs
- Town centres near the CAZ or with good public transport access to the CAZ are critical to support London's economic growth
- The Hammersmith tunnel scheme can support the delivery of over 3,800 homes and 13,800 jobs⁷¹ in a very well-connected town centre
- The scheme would unlock growth by tackling the problems of poor connectivity, urban realm and environment which currently negatively affect quality of life
- There is a case for new road tunnels at key locations to unlock development whilst mitigating the massive congestion costs of losing surface road space
- There is significant support for the A4 Hammersmith tunnel scheme, and the scheme conforms to policy at all levels, helping to secure London and the UK's continued prosperity

⁷¹ Based on a maximum jobs scenario for land parcels within Hammersmith town centre following flyover removal - see Part G of the Strategic Case, Regeneration and Growth Unlocked, for full details.

3. The Economic Case

Section summary:

This section outlines the economic analysis regarding the tunnel scheme. As stated in the Strategic Case, although the traditional WebTAG transport benefits have been quantified, the A4 Hammersmith Tunnel is not being proposed to address a transport problem, but instead as a catalyst for the comprehensive regeneration of Hammersmith Town Centre. Therefore it is against these wider regeneration criteria that the scheme should be judged rather than on metrics that quantify transport user costs and benefits, such as the benefit-cost ratio (BCR).

In regeneration terms the A4 tunnel scheme performs very strongly, unlocking significant economic benefits for London, including large numbers of new jobs and much needed housing.

Options appraised

- 3.1 Hammersmith town centre is a hub of urban activity. With four tube lines stopping in the town centre and a wealth of bus services either terminating or passing through the large bus station, the area is well served by public transport. The A4 is a key artery in the road network of Greater London, linking the M4 (and the west of England) with Heathrow Airport and Central London. Annual average daily traffic (AADT) counts across the Hammersmith flyover are quantified between 70,000 – 90,000 vehicles with 4 per cent being heavy goods vehicles.
- 3.2 The Hammersmith flyover is located immediately to the south of the town centre and results in a poor quality of urban realm. The flyover itself is old and has recently undergone strengthening works to remain safely operational. It also creates severance between the town centre and the river Thames. Although it is possible for pedestrians to reach the riverside by walking under the flyover it is not a pleasant journey, with heavy traffic flows in the area.

This economic case looks to appraise two options within the Hammersmith tunnel scheme.

- 3.3 Option 1 (the short tunnel) would have its eastern portal situated to the west of the junction with Baron's Court tube station and Hammersmith College, and the western portal situated on the A4 to the west of Hammersmith Town Hall.
- 3.4 Option 2 is to construct a much longer tunnel on an alternative alignment from Hogarth roundabout in the west to Earls Court Road in the east. In both cases surface roads would remain for local traffic routes and the current Hammersmith gyratory would be removed, with the western side used for non-motorised transport and the rest of the current gyratory opening to two-way traffic.

Modelling Approach & Assumptions

DfT transport appraisal guidance (WebTAG) has been followed for all sections of this report.

- 3.5 A cost-benefit analysis has been undertaken to assess the scheme's value for money. That is, the monetised benefits are weighed against the costs of the scheme (and the costs of any land acquisition needed) to form a benefit to cost ratio (BCR) which quantifies the benefit for each £1 of cost.
- 3.6 The cost figures used do not take account of the costs of disruption to traffic as a result of construction.
- 3.7 TUBA is a DfT modelling appraisal tool used to compute an appraisal of road transport

schemes. Comparing the base (or do nothing scenario) to the scheme, TUBA assesses the difference in costs and travel time by journey purpose as well as change in fuel costs and CO2 emissions. The demand matrices used for this analysis are consistent with the LTS forecasts of transport growth, which assume zero percentage growth in traffic.

- 3.8 WebTAG also outlines approaches to social and environmental aspects of an appraisal. This includes as severance, and journey, noise, and air quality.

TUBA Analysis

Purpose of this section:

This section explores both road user and non-road user benefits in terms of travel time savings. TUBA is the main economic appraisal software for transport schemes. It is compliant with DfT's WebTAG by implementing a willingness-to-pay approach to economic appraisal for multi-modal schemes with a fixed or variable demand.

- 3.9 General assumptions for the Hammersmith tunnel scheme are as follows
- Scheme opening year: 2030
 - Appraisal period: 60 years
 - Model years: 2031 and 2041
 - Modelled time periods: AM and PM peak and Inter Peak period
 - Price base and base year for discounting: 2010
 - Discount rate 3.5 per cent for 30 years from current year, then 3 per cent thereafter
 - 2031 demand matrix held constant in 2041
 - Road demand growth: 0 per cent in line with the LTS low growth scenario⁷²
 - Development scenario: Scenario 5 which includes redevelopment of Broadway, plus four 25-30 storey buildings in core town centre. This includes 3,836 new dwellings and 160,186 sqm of office floorspace.
- 3.10 The impact of construction has not been taken into account in terms of disruption costs; the costs used for the present value for costs (PVC) below relate include construction cost and land acquisition costs. The costs of the schemes include land acquisition costs for the tunnel which are assumed to occur in the year before start of construction. With respect to the long option, the CPO land take requirement is in respect of the western portal which also covers the cost of acquiring land temporarily. No land is required for the eastern portal which can be constructed entirely within existing highway boundaries. CPO costs for the short option relate to land-take at both the eastern and western portals.
- 3.11 Results of the TUBA analysis are shown in Table 12 and Table 13. The present value of benefits (PVB) is positive in all options apart from the short Hammersmith tunnel option with development.
- 3.12 In all cases the PVC is higher than the PVB leading to a negative NPV. Two separate Values of Time (VoT) have been used to calculate the monetary benefits of time savings using DfT WebTAG (shown in Table 12) and TfL BCDM values⁷³ (shown in Table 13).

⁷² Whilst a zero growth in road traffic demand has been assumed for modelling purposes, in practice there is likely to be an increase in road demand using the TLRN, due to a growing population as set out in the Strategic Case.

⁷³ TfL London Values of Time (VoT) apply a 39.1% uplift to DfT WebTAG VoTs for all work time purposes (including LGV/OGV) and a 29.3% uplift to all out-of-work time purposes.

Table 12: TUBA headline results for four Hammersmith options using DfT VoT

2010 prices and values (£'000s)	Short no development	Short with development	Long no development	Long with development
Economic efficiency: Consumer users (commuting)	20,895	-14,413	40,822	-365
Economic efficiency: Consumer users (other)	52,702	-5,665	45,247	-20,699
Economic efficiency: Business users & providers	156,201	12,621	181,486	32,769
Wider public finances	-4,568	7,356	-4,839	8,427
Present Value Benefits (PVB) ⁷⁴	225,230	-101	262,716	20,132
Present Value Costs (PVC)	488,179	488,179	1,435,467	1,435,467
Net Present Value (NPV)	-262,949	-488,280	-1,172,751	-1,415,335
Benefit Cost Ratio (BCR)	0.46	0.00	0.18	0.01

Table 13: TUBA Headline results for four Hammersmith options using TfL VoT

2010 prices and values (£'000s)	Short no development	Short with development	Long no development	Long with development
Economic efficiency: Consumer users (commuting)	28,659	-18,594	56,674	1,453
Economic efficiency: Consumer users (other)	67,493	-6,047	58,628	-24,633
Economic efficiency: Business users & providers	212,386	15,349	246,946	43,648
Wider public finances	-4,568	7,356	-4,839	8,427
Present Value Benefits (PVB) ⁷⁵	303,970	-1,936	357,408	28,895
Present Value Costs (PVC)	488,179	488,179	1,435,467	1,435,467
Net Present Value (NPV)	-184,209	-490,115	-1,078,059	-1,406,572
Benefit Cost Ratio (BCR)	0.62	0.00	0.25	0.02

- 3.13 A BCR of 1.0 shows a project 'break-even' point where for every £1 invested in the scheme, there are £1 benefits received. Therefore any BCR above 1.0 shows value for money in terms of receiving higher benefit for every £1 of invested cost.
- 3.14 Given the large cost of the Hammersmith options, it would be difficult to achieve a BCR greater than one. This is because the benefits of easing the strategic flow (especially with Option 2) are eroded by the closure of the western north-south arm of the existing Hammersmith gyratory, and the introduction of a two-way system around the remaining north, south and east sides. The longer tunnel option would also see the one-way system currently in operation around Earls Court becoming two-way traffic, which would dampen benefits attributed to the strategic traffic.

⁷⁴ Greenhouse gas emission benefits and costs have been excluded from the PVB as WEBTAG Unit A3. Environmental Impact Appraisal requires that all 8760 hours of the year are represented in the analysis. The traffic modelling undertaken models a one hour time slice in each of the AM and PM weekday peak periods.

The short tunnel option would not deliver any significant journey time savings with development.

- 3.15 TUBA results can be analysed in terms of the distribution of time saved. The distribution of time savings by time saved per trip is displayed in Table 14 to Table 17.
- 3.16 From **Error! Reference source not found.** and Table 15, it is clear Option 1 (the short tunnel) would not impact journey time savings significantly. Indeed, for both options the majority of journey time changes fall within the -2 to 2 minute bracket.

Table 14: Distribution of Time Savings by User Class, for Option 1 (short tunnel) without development

Short – no development	Time benefits £'000s					
	<-5 mins	-5 to -2 mins	-2 to 0 mins	0 to 2 mins	2 to 5 mins	>5 mins
Car- business	-1,218	-36,589	-117,089	207,319	41,030	11,156
Car – commuting	-426	-5,614	-40,347	55,975	8,695	1,574
Car – other	-1,211	-16,679	-80,530	111,979	26,233	10,691
LGV	-303	-15,517	-56,282	82,305	17,110	4,161
OGV	-93	-4,374	-13,234	19,066	4,662	1,584
Total	-3,251	-78,773	-307,482	476,644	97,730	29,166
Percentage of total	1%	20%	79%	79%	16%	5%
	100% (increases in journey time)			100% (reductions)		

Table 15: Distribution of Time Savings by User Class, for Option 1 (short tunnel) with development

Short with development	Time benefits £'000s					
	<-5 mins	-5 to -2 mins	-2 to 0 mins	0 to 2 mins	2 to 5 mins	>5 mins
Car- business	-747	-36,724	-159,865	151,988	36,168	11,080
Car – commuting	-312	-7,351	-53,418	43,191	5,681	1,517
Car – other	-726	-18,399	-106,455	93,426	20,263	10,589
LGV	-243	-11,552	-75,024	72,420	13,052	4,017
OGV	-92	-4,287	-16,034	16,759	4,538	1,519
Total	-2,120	-78,313	-410,796	377,784	79,702	28,722
Percentage of total	0%	16%	84%	78%	16%	6%
	100% (increases)			100% (reductions)		

- 3.17 Table 14 and Table 15 also show that for Option 1, the proportion of benefits greater than 5 minutes is no more than 6% either with or without the development option.

The longer tunnel option would deliver small significant journey time savings with development.

For Option 2 (the long tunnel option),

3.18 Table 16 and Table 17 suggest that the scale of journey time benefits is greater as the removal of junctions for strategic traffic travelling along the A4 would bring benefits from less queuing.

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Table 16: Distribution of Time Savings by User Class, for Option 2 (long tunnel) without development

Long no development	Time benefits £'000s					
	<-5 mins	-5 to -2 mins	-2 to 0 mins	0 to 2 mins	2 to 5 mins	>5 mins
Car- business	-15,445	-57,072	-210,942	254,371	122,394	13,012
Car – commuting	-2,899	-12,858	-62,333	79,592	35,565	3,360
Car – other	-10,490	-31,919	-149,169	152,239	73,514	10,808
LGV	-5,860	-21,190	-100,325	107,494	65,063	8,929
OGV	-3,433	-8,910	-28,373	26,599	23,365	3,475
Total	-38,127	-131,949	-551,142	620,295	319,901	39,584
Percentage of total	5%	18%	76%	63%	33%	4%
	100% (increases)			100% (reductions)		

Table 17: Distribution of Time Savings by User Class, for Option 2 (long tunnel) with development

Long with development	Time benefits £'000s					
	<-5 mins	-5 to -2 mins	-2 to 0 mins	0 to 2 mins	2 to 5 mins	>5 mins
Car- business	-18,597	-63,363	-237,648	211,974	110,953	11,796
Car – commuting	-4,411	-18,849	-75,808	69,206	31,630	2,883
Car – other	-12,710	-41,727	-170,843	134,976	66,950	9,927
LGV	-7,308	-26,011	-116,714	94,501	56,792	8,446
OGV	-3,009	-7,638	-26,770	20,973	16,844	2,604
Total	-46,035	-157,588	-627,783	531,630	283,169	35,656
Percentage of total	5%	19%	76%	63%	33%	4%
	100% (increases)			100% (reductions)		

- 3.19 Benefits are more evenly distributed with just under two thirds of benefits (63%) falling within the 0-2 minute time frame and a third (33%) within a 2-5 minute time frame. Still just 4% of time saving benefits are felt by those travelling more than 5 minutes.

- 3.20 Tables Table 18 to Table 21 show the distribution of benefits by distance travelled by user class, for each of the four scheme options where the proportions are of the total positive figures (i.e. benefits of the scheme).
- 3.21 For Option 1 (the short tunnel) in a without development scenario, Table 18 shows that more local traffic (those travelling less than 15km) receive a higher proportion of the benefits (73% of benefits felt by those travelling between 1km and 15km). For the 'with development' option, Table 19 shows that it is only local traffic travelling less than 10km that would experience positive time saving benefits. Those travelling further (more than 10km) would experience disbenefits from the scheme. However, in practice, CIL or Section 278 measures relating to the new development would enable TfL and the Borough to fund highway mitigation measures, which would look to reduce these disbenefits, thereby ensuring that the strategic function of the A4 can be maintained.

Table 18: Distribution of time savings by distance travelled and user class, Option 1 (short tunnel) no development option

Short – no development	Time benefits £'000s							
	<1km	1-5km	5-10km	10-15km	15-20km	20-50km	50-100km	>100km
Car- business	6,496	49,628	20,899	8,418	4,522	9,515	3,129	2,003
Car – commuting	560	4,995	4,647	2,736	1,752	3,017	1,359	791
Car – other	2,411	13,941	12,185	6,876	3,825	7,021	2,411	1,811
LGV	-1,699	13,861	8,690	3,268	1,147	2,205	3,232	772
OGV	-62	3,054	1,947	481	686	747	364	396
Total	7,706	85,479	48,368	21,779	11,932	22,505	10,495	5,773
Proportion	4%	40%	23%	10%	6%	11%	5%	3%
	100%							

Table 19: Distribution of time savings by distance travelled and user class, Option 1 (short tunnel) with development option

Short – with development	Time benefits £'000s							
	<1km	1-5km	5-10km	10-15km	15-20km	20-50km	50-100km	>100km
Car- business	2,861	8,131	-1,086	353	-713	-4,458	-1,989	-1,200
Car – commuting	-32	-687	-1,428	-983	-887	-4,071	-1,624	-982
Car – other	798	1,819	1,740	839	-477	-3,449	-1,702	-872
LGV	1,129	7,431	1,044	-637	-2,018	-3,961	767	-1,083
OGV	106	2,103	479	107	110	-458	-200	155
Total	4,862	18,797	749	-321	-3,985	-16,397	-4,748	-3,982
Proportion	20%	77%	3%	1%	14%	56%	16%	14%
	100%				100%			

- 3.22 However, for Option 2 (the long tunnel option) in a without development scenario, strategic traffic travelling at least 20km retain the higher proportion of benefits (31% of benefits felt by those travelling 20-50km). This is seen especially in the with development option where, of those affected positively by the scheme, 46% benefits are attributed to those travelling between 20-50km and 12% to those travelling greater than 50km.

Table 20: Distribution of time savings by distance travelled and user class, Option 2 (long tunnel) with no development option

Long – no development	Time benefits £'000s							
	<1km	1-5km	5-10km	10-15km	15-20km	20-50km	50-100km	>100km
Car- business	3,412	37,341	9,018	10,017	2,492	34,667	8,313	451
Car – commuting	390	4,851	5,757	5,647	3,337	11,860	5,695	3,004
Car – other	1,133	6,322	3,971	6,923	3,141	18,077	5,765	336
LGV	-1,358	21,172	7,829	5,373	2,287	12,197	4,039	-874
OGV	64	5,868	1,422	957	1,434	1,838	1,375	-1,922
Total	3,641	75,554	27,997	28,917	12,691	78,639	25,187	995
Proportion	1%	30%	11%	11%	5%	31%	10%	0%
	100%							

Table 21: Distribution of time savings by distance travelled and user class, Option 2 (long tunnel) with development option

Long – with development	Time benefits £'000s							
	<1km	1-5km	5-10km	10-15km	15-20km	20-50km	50-100km	>100km
Car- business	1,150	10,020	-9,679	1,454	-3,863	17,379	2,400	-3,746
Car – commuting	-395	-151	-1,510	1,401	5	2,415	2,141	742
Car – other	-245	-3,694	-8,477	364	-2,331	3,708	727	-3,480
LGV	-525	13,271	-3,239	-1,132	-1,251	4,411	1,144	-2,974
OGV	61	4,584	-614	-215	558	657	701	-2,727
Total	46	24,030	-23,519	1,872	-6,882	28,570	7,113	-12,185
Proportion	0%	39%	(55%)	3%	(16%)	46%	12%	(29%)

Summary of TUBA benefit analysis

The low BCRs for both options do not take account of the wider regeneration impacts brought forward by the scheme. The growth and wider benefits enabled forms the main rationale for the scheme and should be the focus of appraisal.

- 3.23 The Present Value of Benefits relating to the provision of a shorter tunnel to replace the Hammersmith Flyover (including reconfiguration of the gyratory) without any development is £225m (£304m using TfL VoT).
- 3.24 The journey time savings illustrated in **Error! Reference source not found.** show marginal time savings mostly between 0 to 2 mins (79 per cent of positive benefits). This is possibly due to west-to-east movements along the southern leg of the reconfigured gyratory being able to take a shorter route on the two-way operated highway rather than negotiate the entirety of the gyratory.
- 3.25 With a development scenario including provision of 3,800 new dwellings and 162,686 sqm of office floorspace, the PVB falls to -£0.1m (-£1.9m with a TfL VoT). This reflects additional traffic generated from the new mixed use development with the main disbenefits (86%) accruing for trips greater than 20km in length. The resulting BCR for both DfT and London Values of time is 0.00 which is 'poor' value for money according to DfT VfM Assessment criteria.
- 3.26 The Present Value of Benefits relating to the provision of the longer tunnel without development is £263m (£357m with TfL VoT). The longer tunnel would reduce the number of junctions negotiated by strategic traffic travelling along the A4 which is expected to reduce

queuing and bring time saving benefits, while reducing the width of existing surface junctions for traffic and increasing space for pedestrians and cyclists. Dampening these benefits are the reconfiguration of the gyratory and additional works relating to the removal of the Earls Court one-way system and its replacement with a two-way traffic flow.

- 3.27 In the 'with development' scenario, the PVB falls to £20m (£29m with TfL VoT) which reflects additional trips generated from and to Hammersmith Broadway and neighbouring sites. The resulting BCR is 0.01 which is 'poor' value for money according to DfT VfM Assessment criteria.
- 3.28 However, these BCR figures do not include the regeneration and wider impacts of changes in land use and mixed use development brought forward by the scheme.

Key finding:

If traditional transport user benefits were considered in isolation, the scheme with development would show a lower value for money than a scheme without development. Given that the key objective for the scheme is to unlock regeneration and increase employment and population densities, the BCR alone is not an appropriate metric by which to judge the scheme.

Appraisal Summary Table

Table 22: Appraisal Summary Table for Hammersmith Option I (short tunnel with development)

Impacts	Summary of key impacts	Assessment					
		Quantitative			Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	The flyunder option with development shows that for business users benefits are positive for time savings. Without the development, time saving benefits are greater (and positive) due to less traffic being on the road link. The numbers shown here relate to the with development scenario		Value of journey time changes(£)	£5,835,000	£11,432,000	
			Net journey time changes (£)				
			0 to 2min	2 to 5min	> 5min		
	Reliability impact on Business users	Reliability is not likely to increase as the flyover is being replaced for an online like-for-like flyunder				N/A	
Regeneration	Fkyunder reduces severance and unlocks redevelopment of Broadway	Net additional jobs of 3,938 and homes of 1,528 at London level; GVA of £2,115m			N/A		
Wider Impacts					N/A		
Environmental	Noise	The scheme will have a beneficial impacts on the noise levels for residents around the A4 at Hammersmith. By removing the current fly-over noise pollution will be reduced for those residing near the A4. The impact of the noise level has been estimated using a basic noise level calculation. The reduction in noise provided by the tunnel is considered to be 10dB for dwellings close to the A4 and 5dB for dwellings further away.		The scheme will lead to a reduction in noise from traffic (including HGVs) Fly-under: £29,573,748		slight beneficial	£29,573,748
	Air Quality	An environmental assessment has not been carried out, however, the scheme is expected to improve air quality where the tunnel/fly-under lies but this may be at the detriment of reduced air quality at each tunnel portal where vehicle emissions can escape.				neutral	N/A
	Greenhouse gases	Not able to estimate as TUBA is only run for peak periods and not for all 8760 hours of the year. The scheme is not likely to affect greenhouse gas emissions		Change in non-traded carbon over 60y (CO2e)		neutral	N/A
			Change in traded carbon over 60y				
	Landscape	The scheme will complement the current pattern of the landscape, being an urban strategic route. It incorporates measures to ensure the scheme is not visually intrusive and will bring moderately positive benefits to the current level of tranquility				slight beneficial	N/A
	Townscape	The scheme fits well with the current layout and appearance of the townscape at Hammersmith. The scheme incorporates environmental design measures connecting the town centre and river enhancing the townscape				slight/moderate beneficial	N/A
	Historic Environment	The scheme does not impact on historic landscape				neutral	N/A
	Biodiversity	The scheme is not expected to impact biodiversity				neutral	N/A
Water Environment	This scheme does not impact the water environment				neutral	N/A	
Social	Commuting and Other users	The flyunder option with development shows that for commuter and other, users benefits are negative for time savings. Without the development, time saving benefits are greater (and positive) due to less traffic being on the road link. The numbers shown here relate to the with development scenario		Value of journey time changes(£)	-£13,342,000	-£21,546,000	
			Net journey time changes (£)				
			0 to 2min	2 to 5min	> 5min		
	Reliability impact on Commuting and Other	The fly-under replacement of the fly-over is not likely to impact reliability given the flow of traffic is not changed by the scheme.				neutral	N/A
	Physical activity	It is hoped the scheme will encourage walking and cycling around Hammersmith town centre and the river, however effects are likely to be minimal				neutral/slight beneficial	N/A
	Journey quality	The scheme is expected to enhance journey quality. The improvement in urban realm will increase the journey quality for non-motorised transport				slight beneficial	N/A
	Accidents	The fly-under option is not expected to improve accident rates around the Hammersmith area.				neutral	N/A
	Security	This scheme is not expected to have security impacts				neutral	N/A
	Access to services	The scheme is expected to bring slight positive impacts to access to services. With better connectivity between Hammersmith town centre and residents living to the south of the A4. The effects are likely to be minimal given that the journey is currently possible, albeit not pleasant				neutral	N/A
	Affordability	This scheme is not expected to have affordability impacts				neutral	N/A
Severance	The scheme is expected to have slight positive impacts on severance. Severance is a particular issue where the population affected are dependents: those being under the age of 16 or over the age of 65. The total population who live around Hammersmith and who will see a reduction in severance is 7,230, of which 27% are of dependent age		7,230 residents located in and around Hammersmith who expected to experience reduced severance, of which 1,929 are of dependent age.		slight beneficial	N/A	
Option and non-use values	This scheme is not expected to have option & non-use value impacts				neutral	N/A	
Public Accounts	Cost to Broad Transport Budget					£477,621,000	
	Indirect Tax Revenues					£7,356,000	

Table 23: Appraisal Summary Table for Hammersmith Option 2 (long tunnel with development)

Appraisal Summary Table		Date produced:	16	9	2015	Contact:						
Name of scheme:		Hammersmith fly-under and tunnel option				Name						
Description of scheme:		Removing the A4 fly-over at Hammersmith and replacing with long tunnel at an alternative, offline, alignment				Organisation						
						Role						
Impacts		Summary of key impacts		Assessment								
				Quantitative		Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp				
Economy	Business users & transport providers	The tunnel option with development shows that for business users benefits are positive for time savings. Without the development, time saving benefits are greater due to less traffic being on the road link.		Value of journey time changes(£) £27,825,000			£32,769,000					
			Net journey time changes (£)									
			0 to 2min	2 to 5min	> 5min							
			-53,684,000	87,577,000	-6,068,000							
	Reliability impact on Business users	Reliability is likely to improve with the tunnel option given several large junctions are taken out of the network allowing for less stop-start queuing time					N/A					
	Regeneration	Fkyunder reduces severance and unlocks redevelopment of Broadway		Net additional jobs of 3,938 and homes of 1,528 at London level: GVA of £2.115m			N/A					
	Wider Impacts						N/A					
Environmental	Noise	The scheme will have a beneficial impacts on the noise levels for residents around the A4 at Hammersmith. By removing the current fly-over noise pollution will be reduced for those residing near the A4, especially with the long tunnel layout. The impact of the noise level has been estimated using a basic noise level calculation. The reduction in noise provided by the tunnel is considered to be 10dB for dwellings close to the A4 and 5dB for dwellings further away.		The scheme will lead to a reduction in noise from traffic (including HGVs) Long tunnel: £130,420,330		slight beneficial	£130,420,330					
	Air Quality	An environmental assessment has not been carried out, however, the scheme is expected to improve air quality where the tunnel/fly-under lies but this may be at the detriment of reduced air quality at each tunnel portal where vehicle emissions can escape.				neutral	N/A					
	Greenhouse gases	Not able to estimate as TUBA is only run for peak periods and not for all 8760 hours of the year. The scheme is not likely to affect greenhouse gas emissions		Change in non-traded carbon over 60y (CO2e)		neutral	N/A					
					Change in traded carbon over 60y							
	Landscape	The scheme will complement the current pattern of the landscape, being an urban strategic route. It incorporates measures to ensure the scheme is not visually intrusive and will bring moderately positive benefits to the current level of tranquility				slight beneficial	N/A					
	Townscape	The scheme fits well with the current layout and appearance of the townscape at Hammersmith. The scheme incorporates environmental design measures connecting the town centre and river enhancing the townscape				slight/moderate beneficial	N/A					
	Historic Environment	The scheme does not impact on historic landscape				neutral	N/A					
	Biodiversity	The scheme is not expected to impact biodiversity				neutral	N/A					
Water Environment	This scheme does not impact the water environment				neutral	N/A						
Social	Commuting and Other users	The tunnel option with development shows that for commuting and other users, benefits are negative for time savings. Without the development, time saving benefits are greater due to less traffic being on the road link.		Value of journey time changes(£) -£8,776,000			-£21,064,000					
			Net journey time changes (£)									
			0 to 2min	2 to 5min	> 5min							
			-42,469,000	38,004,000	-4,311,000							
		Reliability impact on Commuting and Other users	The tunnel option, being more a strategic link will remove several junctions along the A4 with a different alignment to the current layout. This is expected to improve reliability given traffic will have fewer stop-start queuing time at peak hours						slight beneficial	N/A		
		Physical activity	It is hoped the scheme will encourage walking and cycling around Hammersmith town centre and the river, however effects are likely to be minimal						neutral/slight beneficial	N/A		
		Journey quality	The scheme is expected to enhance journey quality. With the long tunnel, strategic traffic through the new link is expected to flow more freely and thus driver stress is likely to decrease. The improvement in urban realm will increase the journey quality for non-motorised transport						moderate beneficial	N/A		
		Accidents	The tunnel option will potentially have an effect by removing two large junctions and several small junction along the A4 for strategic traffic. This results in a freer flow of traffic, avoiding stop-start queuing at junctions, which in turn has the potential to reduce accidents. The junction for the remain for the continued surface traffic, however, so eradication of accidents is not likely. On the other hand, local roads may suffer more traffic and with less capacity there may be an increase in accidents, however the Saturn model outputs suggest there are traffic flows away from local roads into the tunnel						slight beneficial	N/A		
		Security	This scheme is not expected to have security impacts						neutral	N/A		
		Access to services	The scheme is expected to bring slight positive impacts to access to services. With better connectivity between Hammersmith town centre and residents living to the south of the A4. The effects are likely to be minimal given that the journey is currently possible, albeit not pleasant						neutral	N/A		
	Affordability	This scheme is not expected to have affordability impacts				neutral	N/A					
	Severance	The scheme is expected to have slight positive impacts on severance. Severance is a particular issue where the population affected are dependents: those being under the age of 16 or over the age of 65. The total population who live around Hammersmith and who will see a reduction in severance is 7,230, of which 27% are of dependent age		7,230 residents located in and around Hammersmith who are expected to experience reduced severance, of which 1,929 are of dependent age.		slight beneficial	N/A					
	Option and non-use values	This scheme is not expected to have option & non-use value impacts				neutral	N/A					
Public Accounts	Cost to Broad Transport Budget						£1,427,736,000					
	Indirect Tax Revenues						£8,427,000					



Supplementary Analysis - Net Additional Homes, Jobs and GVA unlocked

Purpose of this Section:

This section sets out the methodology and results of an approach which has been developed by TfL to assess the value of the additional jobs and houses that would be unlocked by the Hammersmith Tunnel.

3.29 This section presents an overview of the additionality approach and its results. In order to maintain clarity, technical details are omitted here. An additional **Technical Appendix** presents further information on various aspects: methodology, factors, assumptions, data sources, and detailed results.

This approach has been developed to address a number of recommendations made in the TIEP report.

3.30 This approach has been developed in light of emerging research, advice and discussion on the economic impacts of transport schemes, and in particular to fulfil some of the recommendations of the “Transport investment and economic performance” (TIEP)⁷⁶ report, commissioned by the Department for Transport (DfT) and published in October 2014.

3.31 The authors of the TIEP report sought to examine the “impacts of transport investments on economic performance with a view to informing the appraisal techniques that are used in project selection.”⁷⁷ Their final recommendations will inform revisions of the DfT WebTAG appraisal guidelines on Wider Impacts and Dependent Development (Tag Units A2.1 and A2.3) set to be released in May 2016.⁷⁸

3.32 TfL has developed this approach to specifically address 3 of the 7 recommendations of the TIEP report⁷⁹:

- 1) Appraisal of larger projects should direct more attention to impacts on private sector investment decisions and associated changes in employment and economic activity.
- 2) Land-use change (and more general changes in the level and spatial distribution of private investment) should be estimated and reported in a wider range of projects.
- 3) In some circumstances it will be appropriate to produce estimates for a range of different scenarios concerning private sector responses and related government policies.

⁷⁶ ‘Transport investment and economic performance’, Venables, Laird & Overman (2014). URL: <https://www.gov.uk/government/publications/transport-investment-and-economic-performance-tiep-report>

⁷⁷ Ibid, p. 9

⁷⁸ As outlined in ‘Understanding and valuing the impacts of transport investment: progress report (Dec 2014)’, Department for Transport (2014). URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/389960/understanding-and-valuing-the-impacts-of-transport-investment-progress-report-2014.pdf

⁷⁹ Venables et al. (2014): pp. 62-63

The approach to calculation of net additional homes and jobs and GVA impacts is in line with Government guidance.

- 3.33 As a framework, this approach follows published guidance⁸⁰ from the Homes and Communities Agency (HCA), and is consistent with both the HM Treasury 'Green Book'⁸¹ and the '3Rs'⁸² guidance published by the Department for Communities and Local Government (DCLG). In addition, Professor Peter Tyler, lead author of research into additionality for DCLG⁸³ and the Department of Business, Innovation and Skills (BIS)⁸⁴, has advised TfL throughout the development process.
- 3.34 **Additionality** is defined as “the net changes that are brought about over and above what would take place anyway.”⁸⁵
- 3.35 This approach has been developed to estimate:
- **Jobs** – the number of additional jobs unlocked by the scheme
 - **Homes** - the number of additional homes unlocked by the scheme
 - **GVA** - the value of the additional jobs unlocked by the scheme, in Gross Value Added (GVA) to London
- 3.36 It is important to note that the estimates presented in this section are assessments of additional impact at the regional (London) level. They represent the additional impact of the scheme across London; although it is important to consider possible scheme impacts outside London, they have not been included in the additionality results.

⁸⁰ 'Additionality Guide' 4th ed., Homes and Communities Agency (2014). URL:

https://cfg.homesandcommunities.co.uk/sites/default/files/aboutus/additionality_guide_2014_full.pdf

⁸¹ 'The Green Book: appraisal and evaluation in central government', HM Treasury (2003, updated 2013). URL:

<https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

⁸² 'Assessing the impacts of spatial interventions: regeneration, renewal and regional development', Office of the Deputy Prime Minister (2004). URL:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191509/Regeneration_renewal_and_regional_development.pdf

⁸³ 'Valuing the benefits of regeneration', Tyler et al. (2010). URL:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6382/1795633.pdf

⁸⁴ 'Research to improve the assessment of additionality', Tyler et al. (2009). URL:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191512/Research_to_improve_the_assessment_of_additionality.pdf

⁸⁵ HCA (2014): p. 3

3.37 The key components of the methodology include the following:

Direct effects – an estimate of the overall impact of implementing a scheme, including immediate, consequential, and induced effects

Leakage effects – an estimate of the effects on those outside of the target area. These should be deducted from the direct effects at the assumed proportion of leakage for each case.

Displacement effects – an estimate of those impacts that are transferred from elsewhere within the target area. These should be deducted from the direct effects at the assumed proportion of displacement for each case.

Multiplier effects – activity associated with additional local income, local supplier purchases and longer term development, such as through supply chains and expenditure on other activity. These need to be added to the direct effects.

3.38 For the Hammersmith Tunnel, the following options were assessed for additional impact:

- **Reference case (or ‘deadweight’)** - development consistent with Local Plan (excl. Riverside areas) - no tunnel scheme
- **Intervention Case (Option 1)** – The short Hammersmith tunnel option, plus redevelopment of Broadway, plus indicative 4 taller buildings (suggest 25-30 storeys) in the core of the town centre
- **Intervention Case (Option 2)** – The long Hammersmith tunnel option, plus redevelopment of Broadway, plus indicative 4 taller buildings (suggest 25-30 storeys) in core town centre

3.39 These intervention options assume a scheme opening year of 2031.

3.40 The employment impacts of a scheme are the sum of direct and indirect effects. Indirect employment effects, a product of the additional housing unlocked by the scheme, can be identified through two separate effects:

- **Enhanced connectivity**

In areas where there is a relatively high demand for housing – e.g. most of London – the lack of new housing constrains the ability to generate higher employment densities than currently available. Therefore additional housing unlocked by a transport scheme provides dynamic benefits by enabling households to relocate closer to employment centres, or to enhanced transport links to access jobs. In line with research undertaken for DCLG⁸⁶, it is assumed that 25% of additional housing generates additional indirect employment. For London, this is probably a conservative assumption.

- **Increased local household spending**

Additional housing generates indirect jobs as a result of new households’ spending on community, leisure and retail services in the local economy. Following a review of 2011 Census data for London, it is assumed that 250 jobs are created for every 1,000 additional homes provided.

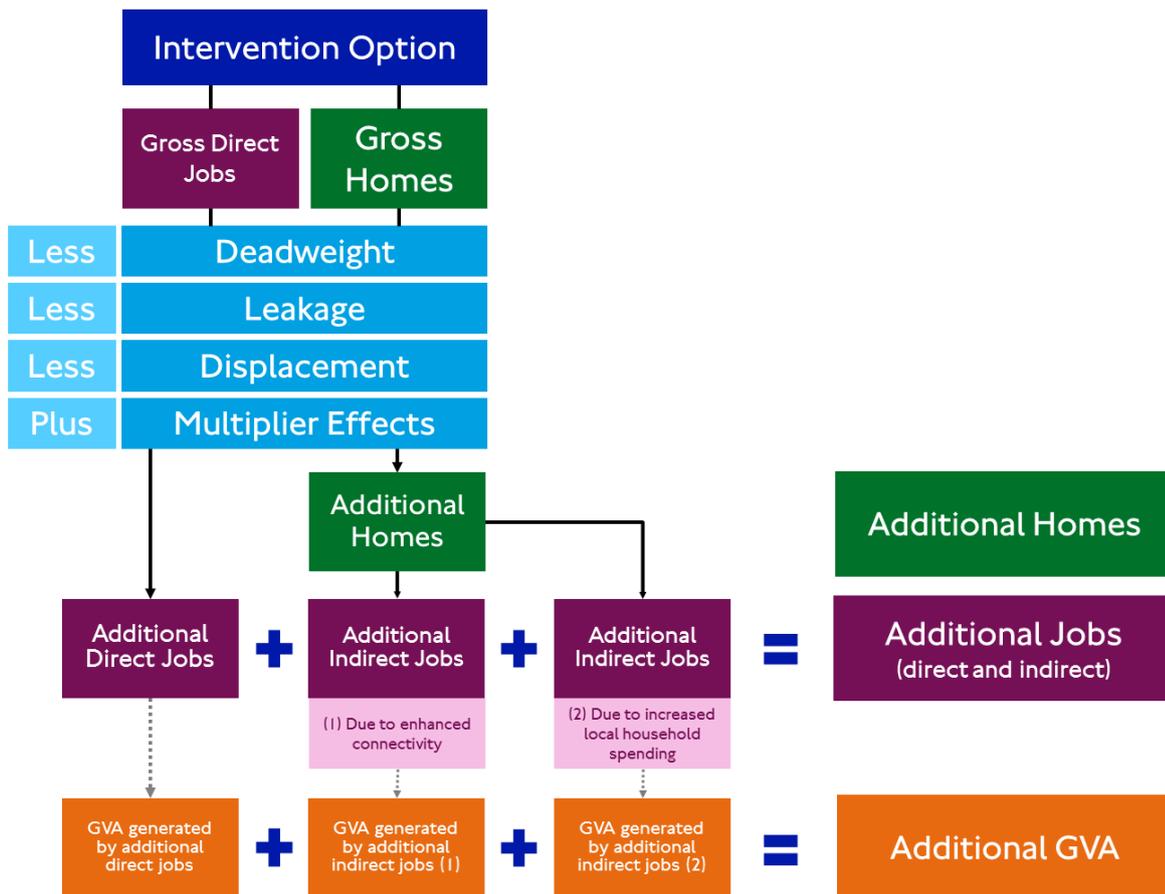
3.41 The value of the additional jobs unlocked by the scheme is assessed individually for each type of employment effect:

⁸⁶ Tyler et al. (2010)

- GVA generated by additional direct jobs
- GVA generated by additional indirect jobs sustained by additional housing (due to enhanced connectivity)
- GVA generated by additional indirect jobs sustained by additional housing (due to increased local household spending)

3.42 The overall methodology of the approach is summarised in Figure 33:

Figure 33: Summary of TfL Additionality Approach



The Hammersmith Tunnel would help to deliver significant volumes of new housing, jobs and GVA within the town centre.

3.43 The results of the additionality approach, presented for each assessed intervention option, are summarised in Table 24, below:

Table 24: Summary of additional impacts of A4 Hammersmith Tunnel (at London level)

<i>Figures rounded to nearest 10</i>	Option 1 or Option 2 with flexible planning
Net additional homes	1,528
Net additional jobs (direct and indirect)	2,282
GVA generated by additional jobs (direct and indirect) (£m PV)	1,045

3.44 As indicated in Table 24, either the short or long Hammersmith Tunnel options could support the delivery of about 1,500 net additional new homes, and new office floorspace and other employment floorspace which would support about 2,300 net additional new jobs (direct and indirect). This new employment would generate an additional GVA for the London economy of up to £1,045 billion – significantly greater than the cost of Option 1 (the short tunnel), and on par with the cost of Option 2 (the long tunnel).

3.45 However, given that housing market constraints in London are very different to other parts of the UK, following the additionality guidance and assuming that 50% of housing displaces housing delivery elsewhere is a conservative assumption. This is not reflective of reality in the London context, so it could reasonably be argued that the full 3,800 gross new housing units that would be enabled in Hammersmith Town Centre are genuinely net additional.

3.46 Realising these benefits is contingent on more flexible planning policies that support higher density development at sites in the vicinity of the existing A4 flyover. However, they demonstrate potentially massive economic benefits for both the local area – the borough of Hammersmith and Fulham – and for the London economy.

Public realm

The Hammersmith Tunnel would also deliver significant Public Realm benefits, which can be quantified.

3.47 The core aims of the Road Task Force (RTF) include improving the quality of the city’s public realm and transforming the environment for cycling, walking and public transport. In recent years, exciting new places for city life have been created that deliver high quality cycling networks and re-imagined streets with a safer, cleaner and greener walking environment. Public realm investments can enhance connectivity, attract more tourism and reduce severance amongst communities. Making cities more walkable reduces reliance on car, contributes to better health and stimulates more spending in district town centres. It is also an increasingly important strategic factor determining the competitiveness of cities.

TfL has applied a robust approach to quantifying the value of urban realm improvements.

- 3.48 The monetary benefits of better open spaces for walking and cycling can be uncovered by analysing the traded prices of goods linked to public realm improvements (e.g. house prices, retail rents or Gross Value Added) or undertaking stated preference-based surveys which uncover the willingness to pay of non-traded goods (e.g. the value of better experiences on streets and in places).
- 3.49 Table 25 illustrates some of the potential mechanisms through which better quality public realm is realised.

Table 25: Mechanisms that capture benefits realization of public realm improvements

Benefit	Valuation technique
Tourism, retail activity and inward investment	Higher tourism footfall, retail spending and inward investment in town centre
Walk/cycling time savings from improved local connectivity	Pedestrian time savings gained from reduced severance and increased permeability of surroundings
Health-related productivity benefits through reduced absenteeism	Valuation of net GVA gained through reduced absenteeism
Residential property prices and retail rents	Boost in prices observed in residential and commercial property markets
Reduced accidents and crime	Gain in welfare, economic output and decrease in medical, healthcare costs
Modal shift from car to public transport/cycling and walking	Reduction in fuel consumption, CO2 emissions and improved air quality from shift from private car to other modes
Noise reduction	Gain in social benefit modelled through revealed preferences techniques drawing on house price data
User experience	Gain in social benefit modelled through willingness-to-pay surveys for higher quality public realm

- 3.50 It is important to note that double-counting could arise if each of these benefits were added together. For example, a boost to house prices due to provision of quieter, safer open space would also partly capture the social benefits uncovered by a noise or accident assessment. A distinction can be made between aspects of better public space which result in a *welfare* gain as captured by time savings, higher house prices, enhanced user experience) and those which result in changes in *economic output* (higher investment and productivity).

Further work using the TfL Valuing Urban Realm Toolkit as a basis for quantification of public realm enhancements will be carried out as this business case is developed.

- 3.51 For this study, it is proposed that future phases of work will quantify the benefits of greater quality public realm through use of the Valuing Urban Realm Toolkit (VURT)⁸⁷ developed by TfL. This tool provides objective, evidence-based monetization techniques for less tangible benefits of better streets and spaces. The outputs of the VUR toolkit are as follows:
 - User Benefits (the values people say they give to changes in urban realm quality)

⁸⁷ TfL's Business Case Development Manual now recognises the VURT toolkit as the approved means of producing values for the User Experience of Public Realm

- Property benefits (increases in residential prices and retail rents)

3.52 The VURT derives monetized urban realm value of a scheme using the Pedestrian Environment Review System (PERS) which assesses the quality of the existing and proposed streetscape through a seven-point quality scale from -3 to +3. Research has been undertaken to derive robust 'Willingness-to-Pay' values for every minute spent in the urban environment for different levels of streetscape quality, as measured using PERS. Similar research has been undertaken to derive the impacts of a change in quality of streetscape on residential property prices and retail rents. However, the two measures should be reported separately as there would be 'double-counting' as enhanced experiences for local residents could also filter through into higher house prices and retail rents.

3.53 The VURT toolkit methodology follows a two-stage approach:

1) **Pedestrian counts:** an initial day long count of pedestrian activity in the scheme area is undertaken to determine the peak period taken forward for analysis. Further PERS assessments and pedestrian activity counts are undertaken at a more local level to acknowledge the diverse character of streetscapes and footways within schemes. Counts are obtained for people walking and staying in public places (e.g. public seating, café tables etc.).

2) **Baseline and forecast PERS assessment:** the forecast scenario will have to be understood in sufficient level of detail to enable changes in certain dimensions to be accurately measured and for there to be clarity about, for example, the proposed location of street furniture, crossing points, light etc. Realistic scheme visualizations will also enable a rational assessment of some of the less tangible scheme attributes such as Personal Security and Quality of Environment.

3.54 The forecast scenario requires an assessment of the likely number of people using the urban environment under the scheme. TfL's London Walkability Model can be utilized as a tool to forecast changes in pedestrian density as a result of reduced severance.

TfL's Better Junctions and Cycle Superhighways Study has shown there to be significant benefits of improving public realm

3.55 For example, an East-West 'Bike Crossrail' for a sample section of Victoria Embankment between Northumberland Avenue and Savoy Street/Place was shown to generate £1.1m-£1.9m of user experience benefits over the lifetime of the scheme.

3.56 Table 26 illustrates the magnitude of social benefits that can be achieved from schemes which have similar public realm improvements.

Table 26: Better Junctions and Cycle superhighways VUR modelled user experience benefits

Scheme	Present Value of User benefits (£m)
Victoria Embankment East-West 'Bike Crossrail'	1.1-1.9
Old Street Superhighway City Hub	7.0-26.5
Ludgate Circus North-South 'Bike Crossrail'	0.3-0.5

3.57 The above estimates illustrate the scale of user experience benefits as modelled by the VUR toolkit – the change in PERS attributes and the predicted volume of pedestrian activity over the lifetime of the scheme are the underlying drivers for the calculations.

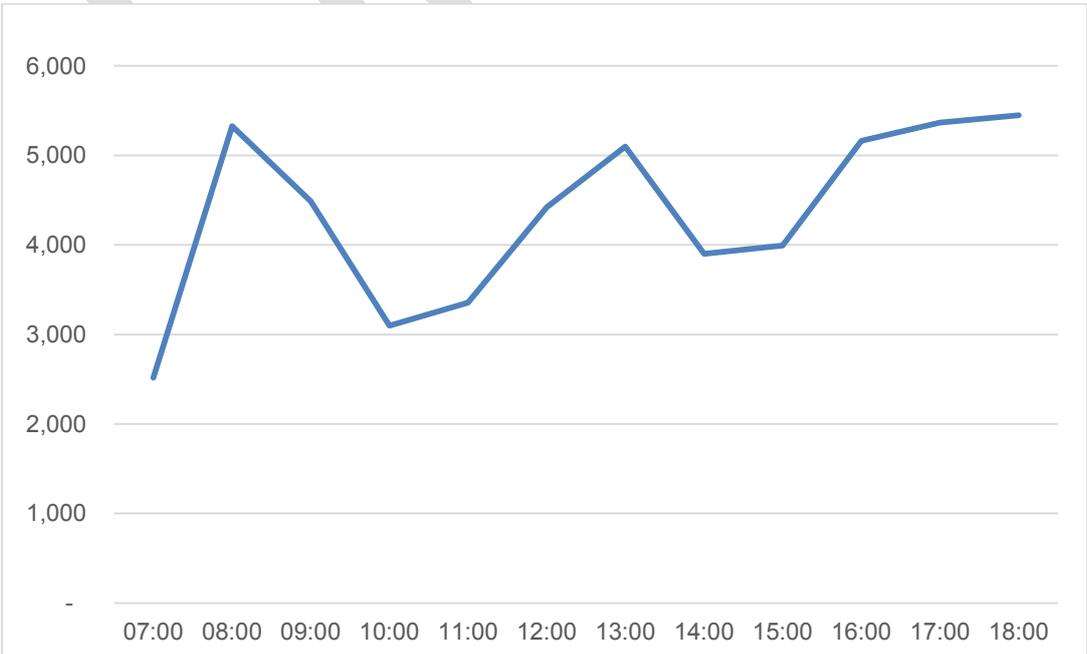
A more detailed assessment of the urban realm benefits is expected to be undertaken should the scheme progress to the next stage of development

- 3.58 Understanding the relative values of different PERS attributes can help direct design development in latter stages of the scheme. The Willingness-to-Pay values for different attributes are a reflection of the benefits that people appreciate, it is reasonable to focus on improving attributes that people value more highly than others.
- 3.59 The benefits of quality public realm can be monitored against policy objectives over the longer term, for example through performance indicators such as crime/accident statistics, London Travel Demand Survey (LTDS), town centre performance indicators, permanent pedestrian counter installations.

The Hammersmith Tunnel scheme would deliver a range of public realm benefits

- 3.60 Hammersmith Town Centre is a densely built-up area where there are large business/commercial uses and a significant node of social/ entertainment established to the south west of Broadway. These include St. Paul’s Church, the Hammersmith Apollo and the historic Bradmore House.
- 3.61 A key goal of the Masterplan is the opportunity to provide a landscaped, pedestrian link between King Street/tube stations and southward to these group of buildings, through removal of the western leg of the gyratory and the Hammersmith Flyover. Physical severance is caused by the gyratory which impedes pedestrian movements between the Bus/District & Piccadilly Line Tube Station to the south and Hammersmith & City Line Tube stations/King Street shopping area to the north and west respectively.
- 3.62 Figure 34 illustrates the flow of pedestrians by time of day crossing in each direction from the North West corner of Broadway to the pedestrian way linking to Kings Street. This particular link provides a proxy for volumes of pedestrians who are likely to benefit from closure of the western leg of the gyratory and improved pedestrian links to the River Thames.

Figure 34: Hourly weekday pedestrian counts between North West corner of Broadway and pedestrian way to Kings Street



- 3.63 This link has a high average hourly pedestrian flow of 4,350 across the whole weekday, with a 3-hour peak between 4pm and 7pm of 5,330 per hour⁸⁸. Within Hammersmith town centre as a whole, peak hour pedestrian flows are around 14,000⁸⁹, showing a strong existing demand for walking as a mode within the town centre. However, this demand is poorly served by the existing environment: although there is open access beneath the flyover for most of its length, the poor quality environment does not offer an attractive option for north to south movements and may result in concerns over personal security for pedestrians.

Figure 35: Hammersmith Flyover - looking towards the Apollo (left) and Hammersmith Bridge Road towards western leg of gyratory (right)



- 3.64 The area around the Hammersmith Apollo in particular is visually blighted by the flyover which masks the building's front façade. Equally, physical severance is caused by the gyratory road network and Hammersmith Bridge Road which negatively affects pedestrian links between bus/tube stations to the north and the King Street shopping areas to the west and the riverside area to the south of Broadway (as Figure 35 above shows). As illustrated in Figure 32 the removal of Hammersmith Bridge Road would enable a greener, quieter and safer setting for St. Pauls' Gardens.
- 3.65 The A4 is a very heavily used road which results in high levels of noise and air pollution. The flyover introduces additional visual impact and a physical barrier. The combination of removing the flyover and reconfiguration of the gyratory would transform the urban environment of the area and the perception of Hammersmith. Table 27 illustrates the main parameters used in the VUR analysis in order to monetize impacts on user experiences. Each parameter is worth a fixed amount of pence per minute of time spent using the public space.
- A conservative estimate of the public realm benefits of the scheme equates to £932,000 over the 30 year lifetime of the scheme.**
- 3.66 An initial high-level assessment of the Hammersmith scheme impact on the PERS attributes described above suggest an annual user experience benefit of £108 per person (2009 prices). Based on an hourly flow of 5,330 during the peak 3 hour period of analysis and

⁸⁸ Sky High/TfL Hammersmith Gyratory Pedestrian Counts, Tuesday 2nd December 2014 07:00 to 19:00

⁸⁹ Tab 4.6 Pedestrian Flows, London Town Centre Health Check - Technical Annex.

assuming 10 per cent of pedestrians use re-imagined public spaces created by the scheme, an annual benefit of £82,130 is estimated. This equates to £932,000 over the 30 year lifetime of the scheme.

- 3.67 However, it should be noted that this calculation is based on conservative assumptions on the number of pedestrians that would travel to the area after the scheme is built and zero-growth in pedestrian volumes is also assumed.

Key finding:

The Hammersmith Tunnel would deliver significant public realm benefits, with a conservative estimate suggesting a value of just over £930,000. If less conservative assumptions are used the scheme's value would be higher, potentially comparable to the value of the East-West Cycle Superhighway, a major London road infrastructure project.

Table 27: PERS attributes affected by the scheme

Link	Description	Scheme impact
Effective Width	The space available for pedestrian movement	Removal of western leg of gyratory and flyover would allow for creation of pedestrian streets and downgraded roads
Permeability	Extent to which pedestrians can make their own informal movements rather than rely on designated crossings	Eliminating the need to use designated crossings and subways provides freer pedestrian movements
Legibility	Way in which the pedestrian environments' built form may assist the user to navigate them within the space	A clearer path linking Hammersmith town centre to the River Thames
Personal security	Environmental features that relate to individual pedestrians' vulnerability to, or fear of, crime	Creates a safer environment to cross the A4 compared to existing subways and crossings below the flyover
Surface quality	Poor surfaces can create trip hazards, reduce comfort and cause route severance for the mobility-impaired	Investment and maintenance regime would directly improve surface quality
User conflict	Hazards to pedestrians as a result of making conflicting movements with other users (e.g. cyclists, road users)	Less conflict between road users and pedestrians travelling between tube stations and King Street shopping area
Quality of Environment	The general ambience of the streetscape	Introduction of pedestrian links and east-west boulevard provide high quality access routes whilst reduced surface traffic would mitigate noise and severance issues
Space	Description	Scheme impact
Sense of place	The aesthetics and quality of the environment	The scheme improves the setting for Hammersmith Apollo, St Paul's Church and Bradmore House and Furnivall Gardens
Opportunity for activity	A public space can have many functions and can provide a facility for a variety of needs	Removal of Hammersmith Bridge Road would provide an enhanced setting for St. Paul's Gardens

Severance

The Hammersmith fly-over currently creates severance between Hammersmith town centre and the river.

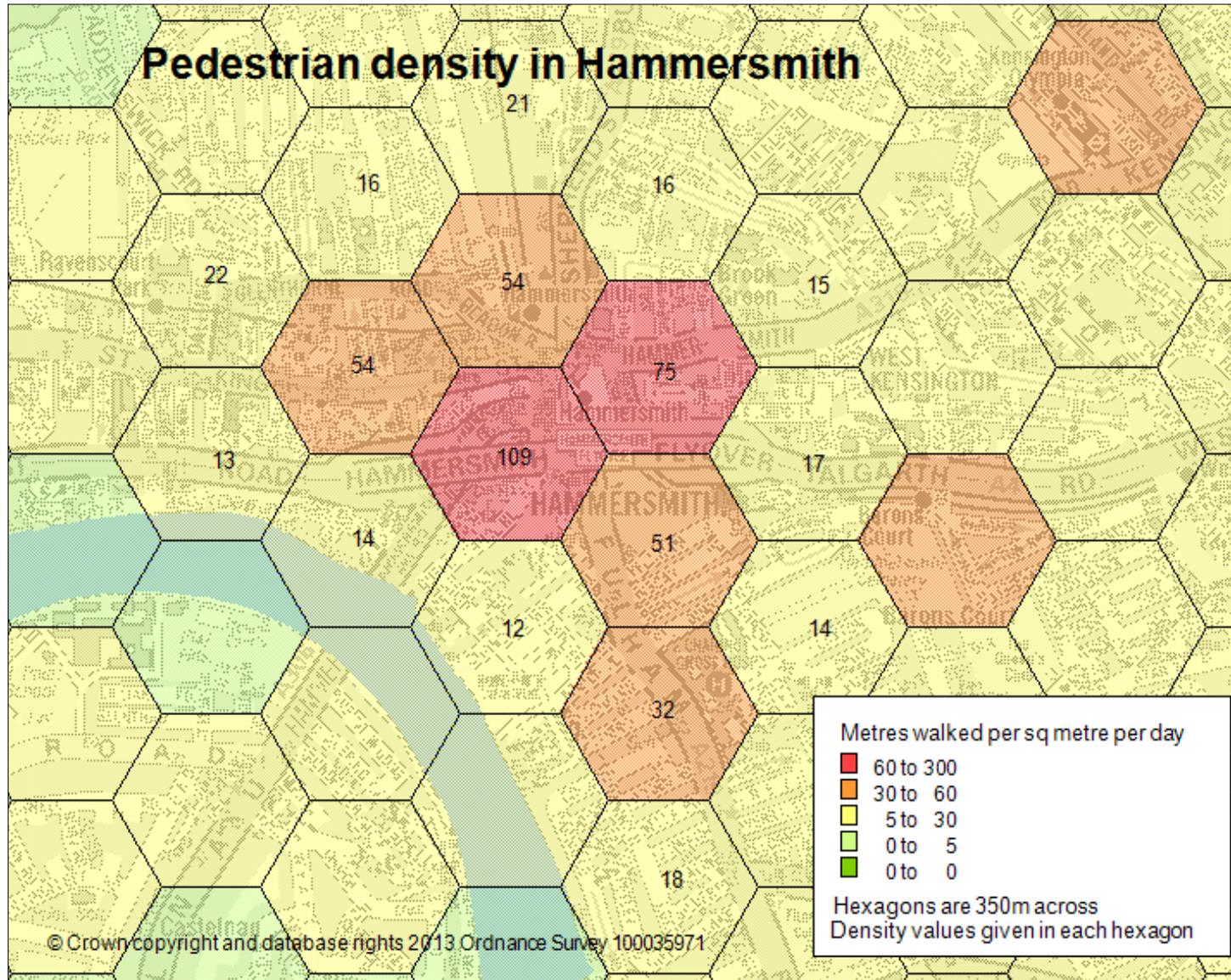
- 3.68 Severance is defined in WebTAG unit A4.1 Section 5 as 'the separation of residents from facilities and services they use within their community caused by substantial changes in

transport infrastructure or by changes in traffic flows'. Severance is an issue where traffic flows impede pedestrian movement or when infrastructure presents a physical barrier to movement.

- 3.69 Although it is not impossible for pedestrians to reach the river Thames from Hammersmith, the presence of the flyover and the busy nature of the local road network makes the journey unpleasant and may deter pedestrians and cyclists from making their journeys.
- 3.70 On the approach to the fly-over (on the west side), the A4 is a dual carriageway (with AADT 70,000-90,000) with a high central reservation making it impossible for pedestrians to cross over. There is a subway for pedestrians to cross under the A4 but the length of this and cramped feel may affect perceptions of personal security and deter its use. Pedestrians can also cross over the four-lane Hammersmith roundabout and use surface roads to reach the river, however this journey is not pleasant given the high volumes of traffic on local roads.
- 3.71 Around the town centre pedestrian density is high (over 60 metres walked per square meter per day) which falls to an average of 13 metres walked per square metre per day by the riverside. This is shown in Figure 36.

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Figure 36: Pedestrian density in Hammersmith



Source: TfL Research and Data Analysis team, LTDS

Up to 7,230 current residents in the immediate area in and around the flyover would benefit from reduced severance.

- 3.72 Based on this analysis the current severance rating of Hammersmith is described as moderate (that is, journeys are longer and less attractive and therefore some people are dissuaded from making journeys on foot). Distributionally this is likely to affect the elderly, children and women walking alone the most. Of the five lower super output areas surrounding Hammersmith town centre (in Hammersmith Broadway ward) the average proportion of dependents in 2012 (over 65's and under 16's) was 27 per cent (1,929 people) of the resident population. This equates to up to 7,230 current residents in the immediate area who would benefit from reduced severance.
- 3.73 The current PTAL score for Hammersmith is 6b (the best rating), however areas by the river to the south of the A4 suffer the lowest public transport accessibility level (PTAL) rating, as shown in Figure 2.12.
- 3.74 The scheme aims to completely remove the current fly-over and replace it with a tunnel, keeping surface local roads which would no longer carry the strategic traffic. The west side of the existing gyratory would be replaced with a green walkway which would connect Kings Mall directly to the riverside. This scheme complements the London Borough of Hammersmith and Fulham's plan to rejuvenate Kings Street, especially the area around Hammersmith Town Hall. This regeneration project, which has approved planning permission, sees the construction of a new town square, new homes and offices, a cinema, new restaurants, cafes, and retail space⁹⁰.
- 3.75 Based on this evidence and scheme outlines it is therefore assessed that this scheme would bring positive benefits in terms of severance to the local area.

Key finding:

Removal of the flyover **would** reduce severance impacts for up to 7,230 current residents in the immediate area in and around the flyover.

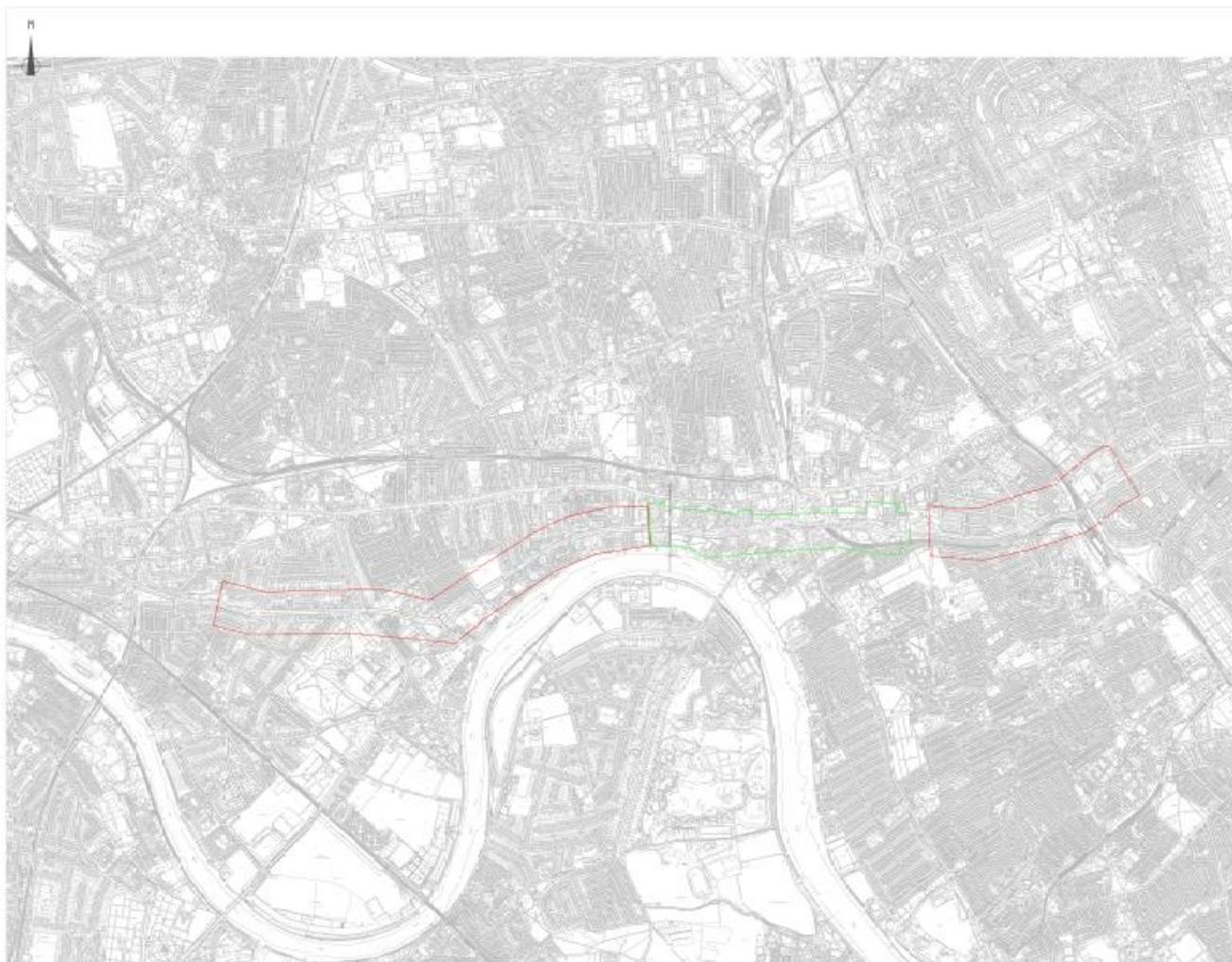
Noise

The Hammersmith Flyover would deliver a reduction in traffic noise, affecting 297 people for Option 1 and 1321 people for Option 2

- 3.76 A high level WebTAG compliant noise appraisal has been carried out to assess the benefits of the tunnel scheme on the local residents. The noise levels have been calculated from a Basic Noise Level (BNL) as described in the Calculation of Road Traffic Noise (CRTN) and the calculated noise levels have been corrected for distance, angle of view and screening. The angle of view correction has been based on the percentage of the route that has been covered by the short or long tunnel options (in the 'with scheme' scenario only) as indicated in Figure 37.

⁹⁰http://www.lbhf.gov.uk/Directory/Environment_and_Planning/Regeneration/Regeneration_projects/80217_King_Street_regeneration.asp

Figure 37: Area covered by noise impacts analysis for Hammersmith short and long tunnel options



- 3.77 The reduction in noise provided by the covered area is considered to be 10dB for dwellings close to the A4 and 5dB for dwellings further from the A4. Only dwellings within 100m of the flyover and A4 are considered for this analysis. Only the traffic using the A4 was considered as the noise source and the same flow of traffic has been assumed for the opening and 15th year.
- 3.78 The noise analysis concluded that the covered area of the road network would cause a noticeable reduction in noise for those dwellings immediately alongside the A4, with the quantified results shown in Table 28.

Table 28: Estimated noise appraisal results

Parameter	Value
Hammersmith Option 1 (Shorter Tunnel)	
Estimated population annoyed (base)	813
Estimate population annoyed (with-scheme)	515
Net noise annoyance change in 15th year after opening (number of people)	-297
Net present value (60 year period)	£29,573,748
Hammersmith Option 2 (Longer Tunnel)	
Estimated population annoyed (base)	2,806
Estimate population annoyed (with-scheme)	1,484
Net noise annoyance change in 15th year after opening (number of people)	-1,321
Net present value (60 year period)	£130,420,330

Note: a positive NPV values and negative net noise annoyance figures denote a net benefit (i.e. noise reduction)

- 3.79 Overall the scheme is expected to reduce the number of people annoyed by 297 for Option 1 and 1,321 people for Option 2, producing a net present value of nearly £30 million (2010 discounted prices) for Option 1 and £144 million⁹¹ (2010 discounted prices) for Option 2.
- 3.80 Including the noise appraisal in the BCR increases all the options' viability except for the short option with development, however all options remain poor value for money. For Option 1 without development the BCR increases from 0.00 to 0.06, for Option 2 without development the BCR increases from 0.17 to 0.28, and for Option 2 with development the BCR increases from 0.01 to 0.11.
- 3.81 For dwellings further away and those near the portals, there would be some reduction in noise although not to the same degree as those residing near the tunnels. It is expected that night-time changes in noise would be similar to that of the daytime and some reduction in noise would be evident at nearby schools.

Key finding:

Removal of the flyover would deliver significant noise benefits, quantified at a net present value of nearly £30m for Option 1, and over £130m for Option 2.

⁹¹ Please note both the NPV from the noise appraisal WebTAG spreadsheet has been adjusted to incorporate income (GDHI) differences between the UK and LB Hammersmith & Fulham, as outlined on page 11 of WebTAG Unit A3.

ECONOMIC CASE SUMMARY

The key points arising from the Economic Case can therefore be summarised as:

- In regeneration terms the A4 tunnel scheme performs very strongly, unlocking significant economic benefits for London, including large numbers of new jobs and much needed housing.
- WebTAG guidance requires the reporting of traditional transport BCRs. If traditional transport user benefits were to be considered in isolation, then the Hammersmith tunnel would offer 'low' value for money.
- However, given that the focus of the scheme is on unlocking regeneration then the BCR (based on appraisal of transport benefits) is not an appropriate metric by which to judge the A4 tunnel scheme.

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4. The Financial Case

Section summary:

The Financial Case sets out the project and ongoing operating costs and financing and funding.

Cost estimates suggest the short tunnel would cost £668m to construct and the longer tunnel option would cost around £2bn. A significant proportion of the funding for a tunnel could be met from non-grant funding sources, with around 40 per cent of Option 1 and 14 per cent of Option 2 tunnel construction cost secured through land value uplift capture

TfL is seeking further powers and fiscal devolution to enable a significant proportion of the cost of construction to be raised from local funding sources arrangements to deliver the scheme.

Project costs

- 4.1 Indicative cost estimates (capital and operational) have been produced for both potential tunnel options. The cost estimates set out below were developed by CH2M based on engineering assessments of the tunnel options.
- 4.2 Due to the early stage of the project, and the fact that some costs (such as for powers and procurement) remain unknown, it is not possible at this stage to present an Estimated Final Cost for the project.
- 4.3 All prices shown are in 2015 prices.

Cost estimates suggest the short tunnel option would cost £668m to construct and the longer tunnel option would cost around £2bn.

Option 1

- 4.4 The total construction cost for the shorter tunnel, including 66 per cent optimism bias, is approximately £668m, although further design work undertaken in future may see this figure revised. This figure includes design and supervision of works, concrete structures, excavation, and utilities, and a risk allowance of 15 per cent of total physical works. There would be additional costs of £16m for land acquisition.
- 4.5 These figures do not include costs of traffic disruption as a result of construction; improvements to the Hammersmith gyratory or the Earls Court one way system; or the downgrading of existing surface junctions on the A4.
- 4.6 The operational cost is estimated to be approximately £3.9m per annum, made up of routine and reactive maintenance costs. It should be noted that this also includes £1.5m to be spent on lifecycle costs only every 10 years.

Option 2

- 4.7 The total construction cost for the longer tunnel, including 66 per cent optimism bias, is approximately £2bn, although further design work undertaken in future may see this figure revised. This figure includes design and supervision of works, concrete structures, excavation, and utilities, and a risk allowance at 20 per cent of tunnel works, and 15 per cent of ramps and cut-and-cover work. There would be additional costs of approximately £60.5m for land acquisition.
- 4.8 These figures do not include costs of traffic disruption as a result of construction; improvements to the Hammersmith gyratory or the Earls Court one way system; or the

downgrading of existing surface junctions on the A4.

- 4.9 The operational cost is estimated to be £11.85m per annum, made up of routine and reactive maintenance costs. It should be noted that this includes £4.6m to be spent on lifecycle costs only every 10 years.

Risk Allowance and Optimism Bias

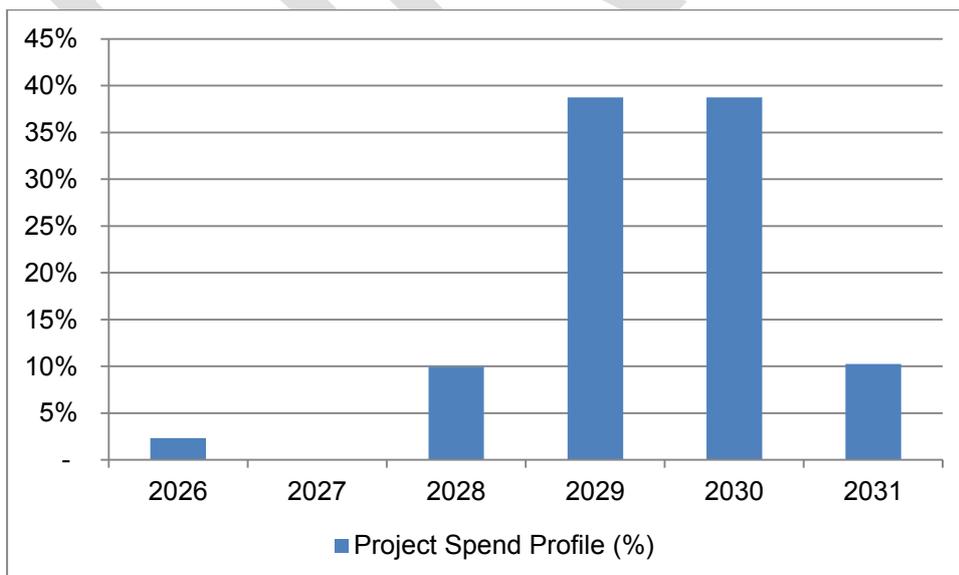
Engineering assessments have informed the development of both tunnel options.

- 4.10 The costs presented outline an estimate for construction including concrete structures, road works, excavation and utilities. 15 per cent of total works and design and supervision costs is allocated as a risk contingency for Option 1. For Option 2, the longer tunnel, 15 per cent of ramps and cut and cover works, and 20 per cent of tunnel works, is allocated as a risk contingency.
- 4.11 Optimism Bias has been applied to all constructions costs at a rate of 66 per cent given the early stage of project development. This rate is expected to reduce as the schemes are taken forward and become better defined.
- 4.12 Detailed cost estimates will follow in future stages of the project once the final preferred option is decided and more detailed modelling and engineering work has been undertaken.

Spend Profile

- 4.13 A high-level spend profile is shown in Figure 38. As the project develops further, a more detailed estimate of construction programme and spend profile to be used in future business case work will be prepared.
- 4.14 At this stage of the project’s planning, these costs are assumed to be borne directly by TfL, with funding to cover them having to come from a variety of sources. See Funding for more details.

Figure 38: Construction Spend Profile



Funding

A significant proportion of the funding for a tunnel could be met from non-grant funding sources.

4.15 The following funding sources for this scheme have been considered:

- Funding from taxes on new development (incremental Borough Community Infrastructure Levy, business rates and stamp duty);
- Funding from developing land directly on the schemes and additional land purchased around them;
- Funding from potential road user charges or taxation, building on TfL's congestion charge;
- Funding from taxes on existing residential development (council tax).

4.16 Given the early stage of the scheme, sources of funding are only indicative at the moment. However TfL has had a significant level of engagement with the borough of Hammersmith & Fulham to explore the local funding sources that would be most feasible and acceptable. A funding package for the tunnel would need to come from a combination of sources.

Given the significant amount of development planned for the local area, there is potential for development-related funding to be captured.

4.17 This could be through capturing residual land value (RLV) from development, on the land in public sector ownership, or from borough Community Infrastructure Levy (CIL). The value of CIL captured would depend on factors such as the extent of new floorspace, and the percentage of affordable housing provided. The funding figures presented below are calculated based on 20% affordable housing level, however it is recognised that the borough may be reluctant to revise down their current 40% affordable housing target or alter the nature of the town centre redevelopment to enable more funding to be extracted from new development. The borough would also have other infrastructure expenditure needs on which it may want to spend its borough CIL and RLV proceeds. In order to achieve funding at the scale presented below borough support would be required.

4.18 As the proposed development Masterplan for the Hammersmith & Fulham town centre includes a significant amount of new commercial space, this could offer scope for capturing incremental business rates through the establishment of an Enterprise Zone. Incremental business rates can provide a steady stream of income over a long period of time, which is considered to be an acceptable source of funding for repaying any upfront borrowing required for the project. Creation of an Enterprise Zone would require central Government support and approval.

4.19 TfL appointed Jones Lang LaSalle (JLL), the property consultants, to evaluate the possible funding that could be derived from the residual land value, borough CIL, incremental business rates and other possible developer contributions.

Around forty percent of the construction cost of Option 1 could be secured through land value uplift capture.

4.20 The identified sources of funding could cover around 40% Option 1, or around 14% of Option 2 (the longer tunnel), unadjusted for financing costs. The summary table in Table 29 below presents the amount of funding as % of Option 1 cost:

Table 29: Summary of funding sources explored

Availability	Option	£ m (NPV 2015/16)	% of Total Cost of £685m (2015/16 prices)
	Residual Land Value, 20% Affordable Housing	155	23%
	Borough CIL	35	5%
	Incremental Business Rates	80	12%
	Voluntary Developer Contributions	3	0.4%
	Total Funding	273	40.4%



Funding option that could make contribution, subject to borough approval



Funding options that could make contribution, but require central Government support and developers' willingness to contribute

Key finding:

The identified sources of funding could cover around 40% of the shorter tunnel option, or around 14% of the longer tunnel option

Funding sources presented are dependent on the proposed town centre redevelopment going forward

4.21 If the development does not progress or progresses at a slower rate, there would be a knock-on effect on whether/when the funding would become available. It is considered therefore that there is some degree of risk associated with these funding sources and the amount of upfront finance that they could support needs to be assessed and adjusted for this risk. This work will be undertaken as the project progresses.

TfL is seeking further powers and fiscal devolution to enable a significant proportion of the cost of construction to be raised from local funding sources, but other means of covering tunnel costs such as partial government funding may also need to be considered.

4.22 In addition to the funding options presented above, TfL has considered stamp duty as a possible funding source for this project, given the link between the tunnel delivery (either the short or long tunnel options) and the number of additional houses that this project could unlock.

4.23 Stamp duty land tax (SDLT) is currently payable on the purchase of property above £125,000. This is a national tax and there are no current plans to devolve it to local authorities. However, if the stamp duty revenue within a designated zone or corridors was devolved, or an equivalent earnback arrangement created, then this could provide a potential funding source for the Hammersmith tunnel.

4.24 Work on estimating the size of the stamp duty receipts on new development is currently underway. It is worth noting that financing against stamp duty would be difficult, given the uncertain nature of property sales transactions. A direct Government contribution, reflective of the size of the stamp duty receipts the new development could yield over time, may be more desirable.

4.25 TfL has also looked at tolling and council tax precept as alternative sources of project

funding. At present, it is not felt that these options can be progressed, given the significant level of resistance that is likely to be shown by local residents and road users towards them. In the case of tolling, a road user charge may lead to a lower level of tunnel use, and lower benefits to the surface road network and Hammersmith town centre. It is possible however, that with time, opinions on feasibility of these options will alter.

Financing

- 4.26 There is a mismatch between the timing of the project expenditure and when potential funding to pay for the project would come forward – the majority of the town centre redevelopment is planned to occur after the Hammersmith tunnel is delivered. This creates a need to raise upfront finance and there are a number of options available to TfL to do this. TfL could potentially use a privately financed solution to deliver the Hammersmith tunnel project (either the short or long option). A privately financed solution would see the private sector take on the responsibilities for design, construction and other risks of the project, in return for a series of payments by TfL. The risk transfer to the private sector would however come at a higher financing cost. The level of the financing cost would be dependent on the appetite of the private sector for this type of a road project.
- 4.27 Alternatively, the public sector could borrow from a variety of sources. The public sector borrowing rate is usually lower than the private sector's. There is however some uncertainty associated with the funding sources that would be used to repay the borrowing and the amount of borrowing that the identified funding would support would need to be considered.
- 4.28 Other financing options could include grant funding which is received from central and local government.

FINANCIAL CASE SUMMARY

The key points arising from the Financial Case can therefore be summarised as:

- Cost estimates suggest Option 1 would cost £668m to construct and Option 2, the longer tunnel option, would cost around £2bn
- A significant proportion of the funding for a tunnel could be met from non-grant funding sources
- TfL is seeking further powers and fiscal devolution to enable a significant proportion of the cost of construction to be raised from local funding sources

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5. The Commercial Case

Section summary:

The Commercial Case provides details on the commercial structure, procurement approach, and accounting implications of the project.

TfL would apply its substantial experience of delivering complex highway and tunnelling projects to the procurement, funding and financing of the Hammersmith tunnel. TfL would also achieve efficiencies by delivering the Hammersmith scheme within a wider programme of tunnel projects. The Hammersmith tunnel project would support many jobs outside of London.

Procurement Strategy and Sourcing Options

Design

- 6.1 The scheme is being promoted by TfL and would be developed through close working with LB Hammersmith and Fulham who are closely engaged with the project, as well as with RB Kensington and Chelsea and LB Hounslow should the longer tunnel option be progressed.
- 6.2 TfL is responsible for the Transport for London Road Network (TLRN), which the Hammersmith Flyover is part of. Changes to this key part of the road network could have an impact on the surrounding road network for which the local borough is the Highway Authority.
- 6.3 It is expected that the construction stage of the project would be led by TfL and where involving infrastructure owned by other parties, such as the London Borough of Hammersmith and Fulham, would be delivered in partnership with these other organisations.

TfL has substantial experience of delivery of complex highway and tunnelling projects, which we would apply to the procurement, funding and financing of the Hammersmith tunnel.

- 6.4 TfL is an experienced organisation, with a successful track record on procuring and managing highways improvement works (such as the recent completion of life extension works to the Hammersmith fly-over, the Cycle Superhighways programme, and the Chiswick Bridge refurbishment).
- 6.5 The procurement and construction of major infrastructure projects, including rail tunnels, is also an area TfL has extensive experience in, with sub-surface construction works having been undertaken across a multitude of projects in constrained and heavily populated areas of London, such as Crossrail, DLR extensions, major station schemes such as King's Cross St Pancras and Green Park. All potential suppliers would be required to consider the Mayor of London's Responsible Procurement Policy in their bid as part of any Invitation to Tender (ITT) for the design and build contract.

TfL can achieve efficiencies by delivering the Hammersmith scheme within a wider programme of tunnel projects and linked into a wider highway capital investment programme.

- 6.6 TfL is undertaking and proposing a range of large capital infrastructure projects that involve procurement of skills and services that would all be highly relevant to approaches that would need to be adopted for the A4 Hammersmith tunnel. For example, Crossrail and the Northern Line Extension have led to an increase in skills associated with deep

bored tunnel design and construction procurement, whilst the Cycle Superhighways and Better Junctions programmes have led to an increase in skills associated with large-scale highway engineering and construction traffic management.

- 6.7 There is an opportunity to build on the experience TfL is developing through delivering the Silvertown Tunnel, applying this to other highway tunnelling projects, such as Hammersmith.
- 6.8 The A4 Hammersmith tunnel is being proposed as part of a wider programme of Roads Task Force (RTF) tunnels and decking over at a range of locations throughout London, arising from the 2013 recommendations published by the RTF. If these projects are progressed, some significant economies and efficiencies could also be achieved through co-ordination of delivery with the A4 Hammersmith tunnel.
- 6.9 TfL would also seek to incorporate best practice from Highways England's own highways works and approaches to procurement given the larger volume of capital infrastructure works the agency undertakes across the country.

In addition to internal staff, consultancy support would be required to support future scheme development and consents process.

- 6.10 It is anticipated that consultancy support would be required in the following areas:
- Legal
 - Environmental Impact Assessment
 - Engineering
 - Transport Planning
 - Planning and Socio Economics
 - Architecture and Urban Design
 - Cost Estimating
 - Property Surveyors/Land referencing

Construction and Operations

- 6.11 As the scheme progresses and further details concerning the design of the tunnel are determined (i.e. cut and cover or bored tunnel construction), a procurement strategy would be developed which can incorporate the necessary design aspects, the operation and management approach, and the funding and financing approach to the scheme given the potential sources of funding as covered in the Financial Case. The risks associated with each element would be a consideration in the approach taken to procuring both construction and operational and maintenance of the new tunnel.
- 6.12 The Silvertown tunnel river crossing project will have provided a contemporary example of a tunnelled road scheme in inner London, and hence will provide an important benchmark that TfL and the market can use to determine that the risks are tolerable and generate appetite from the market. Capacity of the market would need to be monitored given there are other potential tunnelled road schemes, such as the Lower Thames Crossing, that may overlap.
- 6.13 Dependent on the form of contract, an assessment of the likely accounting treatment of any commercial structure under ESA95/10 would need to be undertaken to determine whether the project is likely to be treated as "off budget" and therefore whether liabilities would score towards TfL's borrowing.

Methods for the mitigation of construction impacts will be investigated, including the option of retaining the flyover for traffic during construction.

- 6.14 TfL has extensive experience of developing and delivering Traffic Management Plans. As part of the TLRN, the A4 would continue to ultimately be managed by TfL, acting as the client on any subsequent procurement of operations and maintenance contracts that could be let.
- 6.15 Further consideration will need to be given to the management of the new open space and public realm, the day to day management of which could be passed to the relevant boroughs, but with maintenance privileges for the tunnelled section over the A4 to be retained.
- 6.16 An EU-compliant procurement route following the Competitive Dialogue procedure, under the Public Contracts Regulations 2006, can be adopted to enable TfL to obtain certainty that the Contractor is capable of developing a compliant design.
- 6.17 Throughout a procurement process for both construction and operations / maintenance, TfL would undertake bi-lateral discussions with selected Contractors to seek views on the proposed procurement route, contract form and risk allocation. In addition, legal resource would be procured to provide commercial advice and contract drafting support, whilst Insurance advice would enable determination of the most cost-effective means of insuring risk during construction and operations.
- 6.18 As a public body, TfL has to meet the requirements of the Mayor of London's Responsible Procurement Policy consisting of the following themes:
- Environmental Sustainability
 - Supplier Diversity
 - Community Benefits
 - Skills and Employment
 - Sustainable Freight
 - Fair Employment
 - Ethical Sourcing
- 6.19 In compliance with the Mayor's responsible procurement policy, all potential suppliers would be asked to consider these elements in their bid as part of the Invitation to Tender (ITT) for any future project support or the design and build contract. Each appointed consultant or contractor would be subject to a supplier performance plan.

TfL utilises supply chains from across the UK – work for a tunnel would support jobs outside of London.

- 6.20 Although TfL undertakes procurement for projects implemented in the capital, the wider benefit to the UK is extensive, with over 60,000 jobs estimated to be supported by services TfL procures from outside of London. The construction of the Hammersmith tunnel would add to the pipeline of capital investment that supports jobs across the UK.
- 6.21 The procurement strategy for this stage of the project will be refined and improved as the scheme is further developed.

The key points arising from the Commercial Case can therefore be summarised as:

- TfL has substantial experience of delivery of complex highway and tunnelling projects, which we would apply to the procurement, funding and financing of the Hammersmith tunnel
- TfL can achieve efficiencies by delivering the Hammersmith scheme within a wider programme of tunnel projects and link into a wider highway capital investment programme
- TfL utilises supply chains from across the UK – work for a tunnel would support jobs outside of London

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7. The Management Case

Section summary:

The purpose of the Management Case is to assess whether a proposal is deliverable. It reviews evidence from similar projects, sets out the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance.

Evidence of similar projects

TfL would make full use of best practice within the company and more widely from industry.

- 7.1 TfL has extensive experience in developing, promoting and implementing significant infrastructure projects and securing necessary consents required.
- 7.2 This ranges from modifications to existing infrastructure (such as repairs to the A4 Hammersmith flyover, modernisation of the London Underground, extensions to Tramlink and DLR) to major schemes such as Crossrail. TfL also has demonstrable experience in delivering major road junction improvements, pedestrian and cycle schemes, and wider public realm improvements. These projects share similarities to the A4 Hammersmith tunnel scheme, involving processes and aspects of design and construction which would be faced by a road tunnel. TfL would continue to actively incorporate best practice and experience from these schemes into the development of the Hammersmith tunnel project.
- 7.3 With a range of highway and public realm improvements identified within the current Business Plan, this experience will have been furthered by the time consent stage for the project is reached and would be transferrable to this scheme. If necessary, additional support and advice from experienced promoters of major highway schemes and operators of similar projects can be sought. This could include for example Highways England and other urban transport agencies.
- 7.4 The Hammersmith tunnel project is part of the wider Roads Task Force programme sponsored by the Managing Director of TfL Planning. There are a number of programme linkages with other schemes being taken forward as part of the RTF Key Corridor Interventions Programme, which will present opportunities to share best practice as these schemes progress.

Linkages

The A4 Hammersmith tunnel scheme has a link with the delivery of the Better Junctions and Quietways programmes in Hammersmith.

- 7.5 The projects are not interdependent and would need to be taken forward separately, but in order to avoid abortive or unnecessary work and to ensure the programmes complement one another, close coordination is required between the relevant business areas within TfL.

Key project assumptions

- 7.6 It is currently assumed that sufficient funding is available to support the planning and development stages of the project up to securing the necessary powers. TfL does not have a budget for the main design and build costs, but as identified in Section 4 *The Financial Case* a number of potential funding sources have been identified. Further work is ongoing to identify the optimal funding solution for the scheme.
- 7.7 It is assumed that the land for the proposed route can be acquired through the Planning and Compulsory Purchase Act (2004).

Project risk

- 7.8 As the scheme is further developed, more detailed plans will be developed and will be subject to further assurance and project controls, including a Quantified Risk Assessment to further improve forecast costs and the economic appraisal.
- 7.9 At this early stage of design, some aspects carry a high risk and hence the optimism bias of 66% for a non-standard civil engineering project has been applied. A quantified risk assessment (QRA) will be undertaken should the scheme be progressed, in order to provide more certainty on costs. Following submission of this business case in July 2015, TfL will liaise with the Treasury / DfT to update the forecast costs following the completion of the QRA, and to agree a new working assumption on the level of optimism bias to continue to apply in future scheme appraisal.

In general, TfL considers the scheme ‘relatively standard’ given the company’s extensive experience.

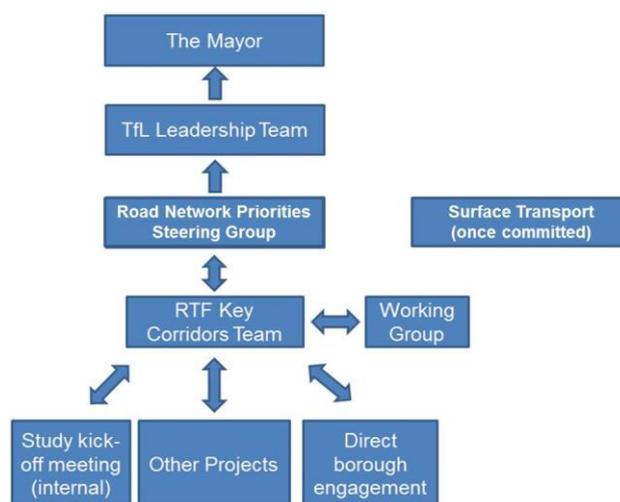
- 7.10 This experience includes planning, procuring and constructing large-scale infrastructure projects, such as the Cycle Superhighways, the Northern line extension and Crossrail. The design and construction of these schemes has provided a wealth of contemporary and relevant comparators against which to benchmark, helping to guide proposed construction approaches for the Hammersmith tunnel scheme.

Governance, organisational structure and roles

The further development of the tunnel proposals would be supported by a robust internal governance process

- 7.11 Tunnelling of the A4 at Hammersmith is part of the Roads Task Force Key Corridor Intervention Programme. The programme is overseen by the RTF Steering Group, which is made up of representatives from across the organisation and the TfL Leadership Team. Once the scheme is finalised and becomes committed, responsibility for its delivery would be overseen by TfL Surface Transport. The Governance arrangements are summarised in the diagram in Figure 39.
- 7.12 As part of future scheme development, an Independent Peer Review Group (IPRG) may be established to provide independent expert scrutiny of the Hammersmith project, initially regarding the selection of a preferred tunnel option. An IPRG would remain in place to undertake reviews on technical and engineering matters at key stages during the design, procurement and delivery of the project.

Figure 39: RTF Internal Governance Structure



Programme/Project Plan

7.13 Some key future milestones for the project are shown in Table 30 below.

Table 30: Key future project milestones

Milestone Description	Date ⁹²
Planning, design, approval and procurement	2016 - 2025
Construction	2025 - 2031

Assurance and approvals plan

A comprehensive and robust project management framework would be applied, helping to ensure scope, cost and benefits are controlled.

7.14 The assurance and approvals process would follow TfL’s established project assurance procedures which include assurance at three levels: internal, Programme Management Office (PMO) and external.

7.15 TfL uses a number of mechanisms to improve the management of its major projects in order to help ensure the objectives and benefits of a scheme at inception are realised following implementation. TfL’s project management framework, known as ‘Pathway’ provides consistency in approach and the tools required for planning and delivery teams, whilst retaining flexibility in its application to manage and control a project. Embedded into Pathway is a delivery assurance process using stage gates, upon which TfL utilises industry-leading external expertise to review and challenge all aspects of the project.

7.16 The number and timing of the stage gates are established by the delivery organisation, based on guidance in Pathway, and informed by a characterisation tool that considers such things as scale, complexity, novelty, project team experience and the strategic importance of the project. A number of Products are required to be completed to provide evidence at the stage gate that the project is fit to proceed to the next stage.

⁹² Subject to tender returns and planning application process.

- 7.17 Products are outputs that are signed off by authorised individuals, and include such documents as project execution plans, risk management plans, project estimates and design compliance certificates
- 7.18 Underlying these stage gates are a number of assurance activities conducted by both TfL and the suppliers and include activities such as design reviews, safety assessments, risk reviews, commercial assessments, estimate validation, material testing, site inspections and product testing.

Rigorous assurance processes would provide close scrutiny and challenge of risk management and decision-making throughout the project.

- 7.19 The PMO is part of TfL but is not accountable for delivery. These reviews are typically Integrated Assurance Reviews (IAR), staffed by a combination of PMO staff, consultant external experts (EE) or peer groups from outside the delivery organisation.
- 7.20 The EEs are selected on the basis of their relevant experience and suitability to the project under review. Each review is covered by a Terms of Reference that sets the scope and the brief to the EE, who is procured from a TfL consultancy framework. The Terms of Reference is based on the Pathway IAR Lines of Enquiry, aimed at generating a comprehensive review. Each Line of Enquiry includes up to 20 detailed challenges, devised to match the maturity of the project at its particular point in its lifecycle.
- 7.21 The Lines of Enquiry were developed as part of the Corporate Gateway Approval Process (CGAP) in 2008, following a comprehensive benchmarking process that assessed the assurance regimes in other organisations and the Office of 3 Government Commerce who produced gateway processes and guidance (now part of the Cabinet Office). Some additions have been made since 2008, including more explicit challenges covering cost benchmarking following consultation with IIPAG.
- 7.22 The IAR report is considered by appropriate bodies prior to seeking authorisation. For projects over £50m the Finance and Policy Committee and Board are informed of the assurance reviews carried out.
- 7.23 IARs are conducted at key stages of the project:
- initiation;
 - option selection;
 - pre-tender;
 - contract award;
 - project close out;
 - benefits delivery; and
 - annual review (where no other IAR would happen within 12 months).
- 7.24 TfL also receives project review and assurance from the Independent Investment Programme Advisory Group (IIPAG), which report to the Mayor of London concerning TfL's Investment Programme. This includes all maintenance, renewal, upgrades and major projects (excluding Crossrail).
- 7.25 The involvement of the IIPAG is determined on both a risk based approach and a project value threshold. The IIPAG reviews are normally commissioned on projects with a value of £50m or more. The IAR process is as detailed above and the IIPAG then attends the Gate Review Meeting once the EE Interim Report has been produced. The IIPAG then produces its own reports, which are submitted at the relevant approval meetings alongside the PMO

Report, based on its review of the IAR material and discussions at the final Gate Review Meeting.

- 7.26 TfL has the option of establishing an Independent Peer Review Group (IPRG). This approach has been followed for other major TfL projects, so given the scale of the Hammersmith tunnel project, this could warrant a similar approach. If appropriate, an IPRG can be set up for the scheme if further development of the project is approved. Initially it could oversee the refinement of delivery sub-options and review engineering feasibility studies and scheme appraisal undertaken.

Communications and stakeholder management

- 7.27 The RTF Key Corridors Team is responsible for keeping internal and external stakeholders appropriately engaged and informed. In accordance, formal, minuted meetings with set agendas and actions have been arranged with all stakeholders. There are a number of internal working groups and external stakeholder meetings are held on a regular basis.

A Stakeholder Management Plan has been prepared for the project.

- 7.28 This Stakeholder Management Plan provides a brief on the objectives of the stakeholder engagement, target audience and methodology. This plan is under ongoing review and will be updated/expanded as necessary.
- 7.29 Stakeholder engagement has already been undertaken and there is strong support for the scheme from the London Borough of Hammersmith and Fulham. A future programme of stakeholder engagement as the scheme progresses has been developed.
- 7.30 The external stakeholders identified are summarised below:

- Boroughs
- Political Stakeholders
- Statutory Stakeholders
- Local Communities

Programme/Project Reporting

TfL would develop programme controls supported by robust reporting processes.

- 7.31 These would align with the Project governance framework, integrating key stakeholder requirements, facilitating continuous monitoring, and incorporating accurate performance measurement. The purpose is to provide accurate project information in a timely way to ensure well informed decisions are made and appropriate action is taken.
- 7.32 The project management model would be designed to deliver a robust reporting regime, including:
- Governance meetings which form part of the reporting process as the forum where performance issues are raised, possible mitigation is discussed and key decisions required are made; and
 - Project reporting requirements would be fully defined, together with content requirements, target audience and timing.

Key project milestones

- 7.33 The current anticipated key milestones for the project are shown in Table 31 Table 31 below. Any changes to baseline scope, cost and schedule would be reviewed, impact assessed and approved following the change control process.

Table 31 Key project development milestones

Milestone Description	Date ⁹³
Planning, design, approval and procurement	2016 - 2025
Construction	2025 - 2031

MANAGEMENT CASE SUMMARY

The key points arising from the Management Case can therefore be summarised as:

- TfL would make full use of best practice within the company and from industry
- A comprehensive and robust project management framework would be applied, helping to ensure scope, cost and benefits are controlled
- Rigorous assurance processes would provide close scrutiny and challenge of risk management and decision-making throughout the project

⁹³ Subject to tender returns and planning application process.

8. Conclusions

There are compelling regeneration benefits of the A4 Hammersmith tunnel project and TfL should continue to progress and develop this scheme.

- 8.1 The A4 Hammersmith tunnel SOBC demonstrates that across the Five Case Model:
- there is a clear robust **case for change** for the Hammersmith tunnel scheme to address issues of severance, public realm and environmental quality, and to cater for the needs of future population and economic growth. This ‘strategic case’ is closely related to national, London-wide and local road policy objectives, with a particular reference to the London Plan and the Mayor’s Transport Strategy.
 - the analysis demonstrates that the scheme would deliver **significant economic and regeneration benefits** for London by unlocking a net additional 1,500 homes (3,800 gross) and a net additional 2,300 jobs (13,800 gross) at the London level. This would add over £1,045bn worth of GVA at the London (region) level. This new development would generate new Stamp Duty revenues and Corporation Tax and VAT revenues. Given the acute housing shortage that exists within London, it could be reasonably argued that displacement of development from other sites would be limited, meaning the additional number of housing units enabled by the scheme would be 3,800 new homes. The tunnel would not deliver transport benefits, and changes to gyratories could extend journey times.
 - is **financially affordable** – the ‘financial case’ analysis demonstrated that a significant portion of some costs may be recoverable from land value uplift and operating surplus, but would require significant further mechanisms for the Mayor and TfL to achieve this.
 - is **commercially viable** – this business case sets out the procurement, commercial structure, and proposed allocation of risk and payment mechanisms for the project.
 - is **achievable**– the ‘management case’ sets out a clear governance, process and programme for the further development of the scheme by TfL, an authority with a very successful experience and record in major project delivery.

It is suggested that further feasibility and scheme development work takes place to investigate both proposed tunnel options.

- 8.2 While the Strategic Outline Business Case has reported on the majority of the likely impacts of the scheme, further feasibility and scheme development work is required to further investigate these impacts for both proposed tunnel options. This includes work to establish the air quality, noise and social/distributional impacts of the options to inform the production of any future Outline and/ or Full Business Case. Future work will also elaborate on the potential commercial case and charging policy and various sensitivity tests, and will be undertaken prior to any future statutory consultation.
- 8.3 TfL will continue to liaise closely with LB Hammersmith and Fulham during any further work. TfL will also work closely with the Borough to inform the development of a Hammersmith town centre Supplementary Planning Document, due to be published in 2016.

Given the strong case for the A4 Hammersmith tunnel scheme, TfL would propose the following to facilitate its delivery.

- A zonal trial of stamp duty devolution;
- An extension of CPO powers to TfL for ‘transport-enabled’ development;

- Investigation of a loan facility to enable early land acquisition to secure value uplifts arising from a tunnel; and
- Enterprise Zone designation.

8.4 To capitalise on those the Mayor / TfL and GLA propose to:

- Commit to take risk on land values that accrue;
- Use existing public land as far as possible to speed delivery of development;
- Commit to use of CPO powers to ensure land for development is utilised to its full extent; and
- Commit to ongoing use of the tunnelling expertise and supply chains which have been developed for other TfL projects to reduce infrastructure provision costs.

DRAFT