SILVERTOWN TUNNEL

SUPPORTING TECHNICAL DOCUMENTATION

PRELIMINARY REGENERATION AND DEVELOPMENT IMPACT ASSESSMENT

October 2015

This report sets out how the Scheme would impact on economic activity at a local, sub-regional, and London level. It draws on a number of strands of evidence and analysis to assess the likely economic and regeneration impacts that could result from the Scheme. This report forms part of the Preliminary Outline Business Case (OBC).

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This report forms part of a suite of documents that support the statutory public consultation for Silvertown Tunnel in October – November 2015. This document should be read in conjunction with other documents in the suite that provide evidential inputs and/or rely on outputs or findings.

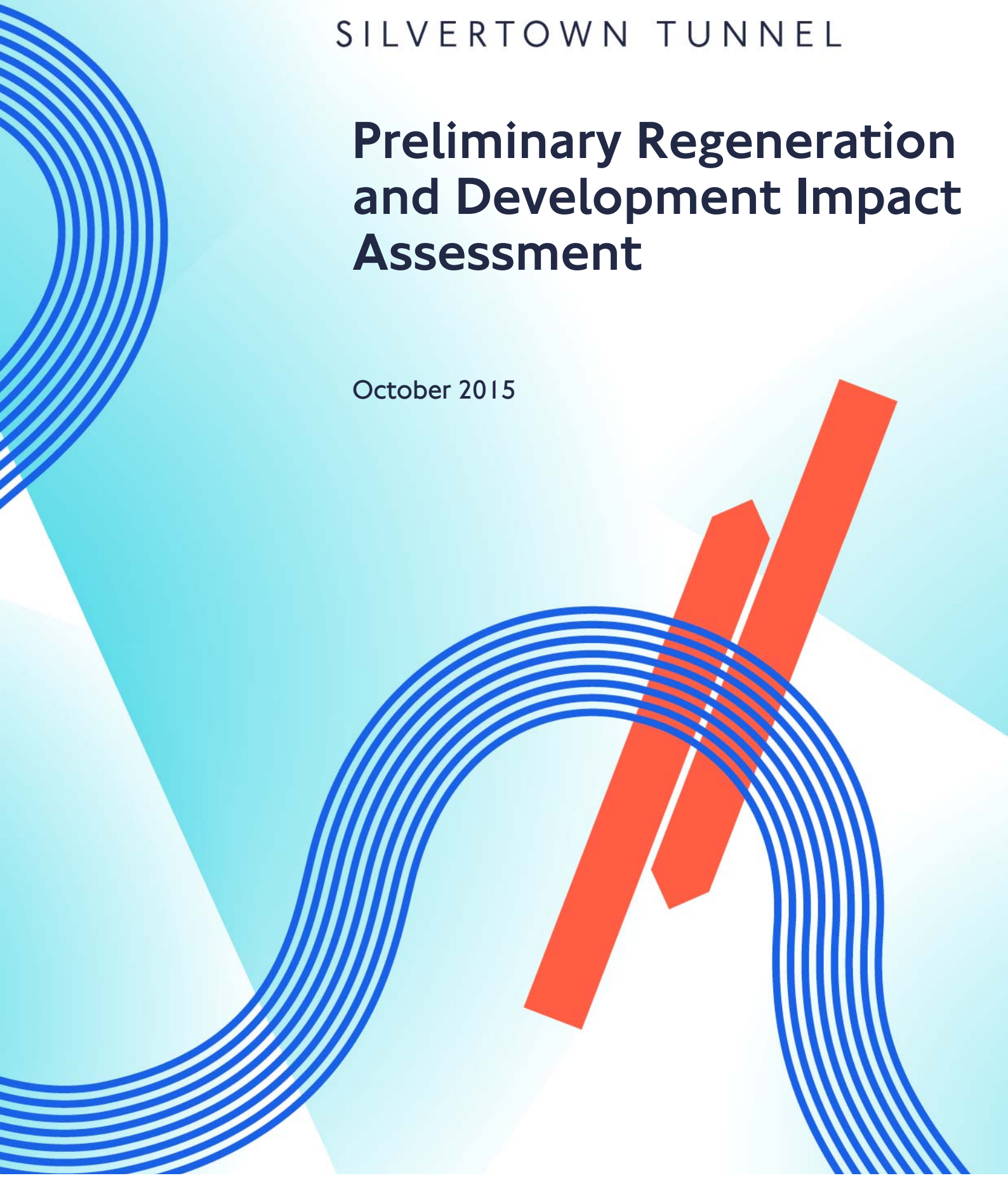
The suite of documents with brief descriptions is listed below:-

- **Preliminary Case for the Scheme**
    - Preliminary Monitoring and Mitigation Strategy
- **Preliminary Charging Report**
- **Preliminary Transport Assessment**
- **Preliminary Design and Access Statement**
- **Preliminary Engineering Report**
- **Preliminary Maps, Plans and Drawings**
- **Preliminary Environmental Information Report (PEIR)**
    - Preliminary Non Technical Summary
    - Preliminary Code of Construction Practice
    - Preliminary Site Waste Management Plan
    - Preliminary Energy Statement
- **Preliminary Sustainability Statement**
- **Preliminary Equality Impact Assessment**
- **Preliminary Health Impact Assessment**
- **Preliminary Outline Business Case**
    - Preliminary Distributional Impacts Appraisal
    - Preliminary Social Impacts Appraisal
    - Preliminary Economic Assessment Report
    - Preliminary Regeneration and Development Impact Assessment

SILVERTOWN TUNNEL

Preliminary Regeneration and Development Impact Assessment

October 2015



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Silvertown Tunnel

Preliminary Regeneration and Development Impact Assessment

Planning Act 2008

Infrastructure Planning

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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1	02/10/2015	David Rowe (TfL Lead Sponsor)		For Consultation
		Richard De Cani (TfL MD Planning)		

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List of Abbreviations

Abbreviation	Full Name
A	
AADT	Average Annual Daily Traffic
AAWT	Average Annual Weekly Traffic
ABD	Area Benefitting from Defences'
ADS	Advance Directional Sign
AEP	Annual Exceedance Probability
ALARP	As Low As Reasonably Practicable
AMCB	Analysis of Monetised Costs and Benefits
ANPR	Automatic Number Plate Recognition
AOD	Above Ordnance Datum
APIS	Air Pollution Information System
AQDMP	Air Quality and Dust Management Plan
AQFAs	Air Quality Focus Areas
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
ATC	Automated Traffic Counts
B	
BAME	Black, Asian and Minority Ethnic
BAT	Best Available Techniques
BCR	Benefit to Cost Ratio
BGS	British Geological Survey
BNL	Basic Noise Level
BPM	Best Practicable Means
BSI	British Standards Institute
BTP	British Transport Police
C	
CABE	Commission for Architecture and the Built Environment
CAMS	Catchment Abstraction Management Strategy
CAZ	Central Activities Zone
CBA	Cost Benefit Analysis
CC	Congestion Charging
CCTV	Closed Circuit Television
CD&E	Construction, Demolition and Excavation
CDM	Construction Design and Management Regulations (2015)
CEMP	Construction Environmental Management Plan
CFA	Continuous Flight Auger

CIEEM	Chartered Institute of Ecology and Environmental Management
CIL	Community Infrastructure Level
CIRIA	Construction Industry Research and Information Association
CLOS	Cyclist Levels of Service
CLP	Construction Logistics Plan
CLR	Contaminated Land Report
CMP	Construction Management Plan
COBA-LT	Cost and Benefit to Accidents – Light Touch
CoC	Contaminants of Concern
CoCP	Code of Construction Practice
COSHH	Control of Substances Hazardous to Health
CPET	Central Point of Expertise in Timber
CRRN	Compliance Risk Road Network
CRTN	Calculation of Road Traffic Noise
CS	Construction Statement
CSH	Cycle Superhighways
CSM	Conceptual Site Model
CSOs	Combined Sewer Overflows
CTMP	Construction Traffic Management Plan
D	
DAS	Design and Access Statement
DB	Drainage Board
DBFM	Design Build Finance and Maintain
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
DEFRA	Department for Environmental, Food and Rural Affairs
DfT	Department for Transport
DI	Distributional Impacts
DLR	Docklands Light Railway
DMP	Delivery Management Plan
DMRB	Design Manual for Roads and Bridges
DoH	Department of Health
DSRC	Dedicated Short Range Communication
E	
EA	Environment Agency
EAL	Emirates Air Line
EAR	Economic Assessment Report
EC	European Commission
EcIA	Ecological Impact Assessment
EDR	Engineering Design Report

EFT	Emissions Factors Toolkit
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ELHAM	East London Highway Assignment Model
ELWA	East London Waste Authority
EMP	Ecology Management Plan
EMS	Environmental Management System
EPA	Environmental Protection Act
EPB	Earth Pressure Balance
EPS	European Protected Species
EPR	Environmental Planning Regulations
EqIA	Equality Impact Assessment
ES	Environmental Statement
ESA	European Statement of Accounts
ESR	East and south-east region
EQS	Environmental Quality Standard
EU	European Union
EWT	Excess Wait Time
F	
FALP	Further Alterations to the London Plan
FFFS	Fixed Fire Fighting System
FRA	Flood Risk Assessment
FSC	Forestry Stewardship Council
FWEP	Flood Warning and Evacuation Plan
G	
GC	Generalised Costs
GDP	Gross Domestic Product
GDPW	Gross Domestic Product per Worker
GGBS	Ground Granulated Blast furnace Slag
GHG	Greenhouse Gases
GIGL	Greenspace Information for Greater London
GIR	Ground Investigation Report
GJT	Generalised Journey Time
GLA	Greater London Authority
GLAAS	Greater London Archaeological Advisory Service
GNSS	Global Navigation Satellite Systems
GVA	Gross Value Added
H	
HFS	High Friction Surfacing

HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HMV	Heavily Modified Waterbodies
HRA	Hot Rolled Asphalt
HSE	Health and Safety Executive
HUDU	Healthy Urban Development Unit
HV	High Voltage
I	
IAN	Interim Advice Note
IAQM	Institute of Air Quality Management
IDB	Internal Drainage Board
IEMA	Institute of Environmental Management and Assessment
IER	Introductory Environmental Report
IHS	Integrated Household Survey
IoD	Index of Deprivation
IoMD	Index of Multiple Deprivation
IPC	Infrastructure Planning Commission
IPRG	Independent Peer Review Group
IUCN	International Union for Conservation of Nature
IWT	In Work Time
K	
KPI	Key Performance Indicator
L	
LACM	Local Air Quality Management
LAD	Local Authority District
LAEI	London Atmospheric Emissions Inventory
LB	London Borough
LBAP	Local Biodiversity Action Plan
LCAP	London Congestion Analysis Project
LED	Light-Emitting Diode
LDF	Local Development Framework
LEZ	Low Emission Zone
LGV	Light Goods Vehicle
LIP	Local Implementation Plan
LLAU	Limits of Land to be Acquired or Used
LLFA	Lead Local Flood Authority
LMVR	Local Model Validation Report
LNR	Local Nature Reserve
LOAEL	Lowest Observed Adverse Effect Level
LoD	Limits of Deviation

LOPR	London Office Policy Review
LoRDM	London Regional Demand Model
LOW	List of Waste
LP	London Plan
LSOA	Lower Super Output Area
LSTOC	London Streets Tunnels Operations Centre
LTDS	London Travel Demand Survey
LTS	London Transportation Studies
LTT	Long Term Trend
LTVS	Longitudinal Tunnel Ventilation System
LU	London Underground
LV	Low Voltage
M	
MCA	Maritime and Coastguard Agency
M&E	Mechanical & Electrical
MAGIC	Multi-Agency Geographic Information for the Countryside
MCC	Manual Classified Counts
MCZ	Marine Conservation Zone
MDD	Managing Development Document
MEDS	Mayor's Economic Development Strategy
MHWS	Mean High Water Spring
MMP	Materials Management Plan
MOL	Metropolitan Open Land
MoU	Measure of Uncertainty
MTS	Mayor's Transport Strategy
MWC	Main Works Contractor
N	
NABSA	Not Aground But Safely Float
NERC	Natural Environment and Rural Communities
NHS	National Health Service
NICE	National Institute of Health and Care Excellence
NJUG	National Joint Utilities Group
NML	Noise Monitoring Location
NMU	Non-Motorised Users
NN NPS	National Networks National Policy Statement
NNR	Natural Nature Reserves
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPSE	Noise Policy Statement for England
NPV	Net Present Value
NSIP	Nationally Significant Infrastructure Project

NTEM	National Trip End Model
O	
OAPF	Opportunity Area Planning Framework
OBC	Outline Business Case
OLSPG	Olympic Legacy Supplementary Planning Guidance
ONS	Office for National Statistics
OSD	Over Site Development
OWT	Out of Work Time
P	
PA	Public Accounts
PAC	Pre Application Consultation
PAVA	Public Address Voice Alarm
PCM	Pollution Climate Mapping
PCN	Penalty Charge Notice
PCU	Passenger Car Unit
PEIR	Preliminary Environmental Information Report
PER	Preliminary Engineering Report
PEMP	Project Environmental Management Plan
PERS	Pedestrian Environment Review System
PEVS	Portal Extract Ventilation System
PFA	Pulverised Fly Ash
PHE	Public Health England
PHV	Private Hire Vehicle
PINS	Planning Inspectorate
PLA	Port of London Authority
PPG	Planning Policy Guidance
PPS	Planning Policy Statement
PPV	Peak Particle Velocity
PTAL	Public Transport Access Level
PTWA	Public Transport Waiting Area
PT	Public Transport
PV	Present Value
PVB	Present Value of Benefits
PVC	Present Value of Costs
Q	
QUADRO	Queues and Delays at Road Works
R	
RA	Regeneration Area
RB	Royal Borough

RODS	Rolling Origin and Destination Survey
RR	Regeneration Report
RRT	Roads Response Team
RSA	Road Safety Audit
RSI	Road Side Interview
RSM	Road Space Management
RSPB	Royal Society for the Protection of Birds
RTF	Road Task Force
RTI	Road Traffic Incident
RUC	Road User Charging
RXHAM	River Crossings Highway Assignment Model
S	
SAC	Special Areas of Conservation
SACTRA	Standing Advisory Committee on Trunk Road Assessment
SATURN	Simulation and Assignment of Traffic to Urban Road Networks
SCOOT	Split Cycle, Offset Optimisation Technique
SFRA	Strategic Flood Risk Assessment
SGI	Spheroidal Graphite Iron
SGV	Soil Guidelines Value
SHLAA	Strategic Housing Land Availability Assessment
SINC	Site of Importance for Nature Conservation
SLM	Sound Level Meter
SLNT	Strategic Labour Needs and Training
SOAEL	Significant Observed Adverse Effect Level
SoCC	Statement of Community Consultation
SOCG	Statement of Common Ground
SoS	Secretary of State
SPA	Special Protection Areas
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance
SPZ	Source Protection Zone
SR	Sensitivity Receptor
SRTP	Sub-Regional Transport Policy
SSD	Stopping Sight Distance
SSR	Safety and Security Report
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan
T	
TA	Transport Assessment
TAG	Transport Analysis Guidance

TBM	Tunnel Boring Machine
TDSCG	Tunnel Design and Safety Control Group
TEE	Transport Economic Efficiency
TfL	Transport for London
TGNPPF	Technical Guidance to the National Policy Framework
TLRN	Transport for London Road Network
TMP	Traffic Management Plan
TRL	Transport Research Laboratory
TSCS	Thin Surface Course System
TTT	Thames Tideway Tunnel
TUBA	Transport User Benefit Appraisal
TVIA	Townscape and Visual Impact Assessment
TWAO	Transport and Works Act Order
U	
UK	United Kingdom
UKBAP	UK Biodiversity Action Plan
ULEZ	Ultra Low Emission Zone
UTC	Urban Traffic Control
UXO	Unexploded Ordnance
V	
VfM	Value for Money
VMS	Variable Message Signs
VOC	Vehicle Operating Cost
VoT	Value of Time
VRM	Vehicle Registration Mark
VCR	Volume/Capacity Ratios
W	
WAC	Waste Acceptance Criteria
WEEE	Waste Electronic and Electrical Equipment
WFD	Water Framework Directive
WHIASU	Wales Health Impact Assessment Support Unit
WHO	World Health Organisation
WI	Wider Impacts
WITA	Wider Impacts in Transport Appraisal
WRAP	Waste and Resources Action Programme
WRRR	Work Related Road Risk
Z	
ZVI	Zone of Visual Influence

Glossary of Terms

Assessed Case	Scenario adopted for assessment of likely effects of the proposed Scheme, with user charges set so as to balance the Scheme's traffic, environmental, socio-economic and financial objectives.
Blackwall Tunnel	A road tunnel underneath the River Thames in east London, linking the London Borough of Tower Hamlets with the Royal Borough of Greenwich, comprising two bores each with two lanes of traffic. The tunnel was originally opened as a single bore in 1897, as a major transport project to improve commerce and trade in London's east end. By the 1930s, capacity was becoming inadequate, and consequently, a second bore opened in 1967, handling southbound traffic while the earlier 19th century tunnel handled northbound.
Bus and Goods Vehicle Lane	A dedicated highway lane that has restricted occupancy, available for use by buses, Heavy Goods Vehicles and taxis.
Bus Gate	Bus gates are traffic signals often provided within bus priority schemes to assist buses and other permitted traffic when leaving a bus lane to enter or cross the general flow of traffic or to meter the flow of general traffic as it enters the road link downstream of the bus lane. Depending on their purpose, bus gates can be located remote from other signals or they can be positioned immediately upstream of a signal controlled junction, as a bus pre-signal.
CDM (2015)	The Construction (Design and Management) Regulations 2015 set out the roles and responsibilities of parties involved in construction projects in relation to health and safety during the project life cycle including design, construction operation and maintenance stages.
Contractor	Anyone who directly employs or engages construction workers or manages construction work. Contractors include sub-contractors, any individual self-employed worker or business that carries out, manages or controls construction work
Control Centre	Facility to deal with issues with over-height, illegal and unsafe vehicles going through Blackwall and Silvertown tunnels, and help manage traffic

Cut and Cover	A method of construction for shallow tunnels where a trench is excavated and roofed over with an overhead support system strong enough to carry the load of what is to be built above the tunnel
Design, Build, Finance and Maintain (DBFM)	A DBFM company is typically a consortium of private sector companies, formed for the specific purpose of providing the services under the DBFM contract. This is also technically known as a Special Purpose Vehicle (SPV). The DBFM Company will obtain funding to design and build the new facilities and then undertake routine maintenance and capital replacement during the contract period, which is typically 25 to 30 years. The DBFM Company will repay funders from payments received from TfL during the lifespan of the contract. Receipt of payments from TfL will depend on the ability of the DBFM Company to deliver the services in accordance with the output specified in the contract and will be subject to deductions if performance is not satisfactory.
Department for Transport (DfT)	The government department responsible for the English transport network and a limited number of transport matters in Scotland, Wales and Northern Ireland that have not been devolved.
Detailed Design	The design that defines precisely the works that are to be constructed to meet the specified outputs.
Development Consent Order (DCO)	This is a statutory order which provides consent for the project and means that a range of other consents, such as planning permission and listed building consent, will not be required. A DCO can also include provisions authorising the compulsory acquisition of land or of interests in or rights over land which is the subject of an application. http://infrastructure.planninginspectorate.gov.uk/help/glossary-of-terms/
Docklands Light Railway (DLR)	An automated light metro system serving the Docklands and east London area. The DLR is operated under concession awarded by Transport for London to KeolisAmey Docklands, a joint venture between transport operator Keolis and infrastructure specialists Amey plc

Earth Pressure Balance (EPB) Tunnel Boring Machine	A type of tunnel boring machine used in soft ground. The machine uses the excavated material to balance the pressure at the tunnel face. Pressure is maintained in the cutter head by controlling the rate of extraction of spoil through the removal Archimedes screw and the advance rate of the machine
Emirates Air Line (EAL)	A cable car service across the River Thames in east London, linking the Greenwich peninsula to the Royal Victoria Dock. The service is managed by TfL, and is part of the TfL transport network
Gasholder	A large container in which natural gas is stored near atmospheric pressure at ambient temperatures
Greenwave	Coordinated control of a series of traffic signals to allow continuous traffic flow in a given direction.
Heavy Goods Vehicle (HGV)	European Union term for any vehicle with a gross combination mass of over 3500kg
Illustrative Design	An example of how the proposals could be developed at the next stage of design as a result of engagement with the DBFM contractor, planning authority and other relevant stakeholders.
London Streets Tunnels Operations Centre (LSTOC)	LSTOC operates the traffic and tunnel safety systems for various road tunnels in London operated by Transport for London. LSTOC operations are fundamental to the safe and reliable operation of TfL's tunnels and performance of the corridors serviced by the London streets traffic control system
Limits of Land to be Acquired and Used (LLAU)	The extent of land and rights over land that will be needed temporarily to construct the Scheme, and permanently to operate, maintain and safeguard the Scheme (often referred to as ‘the red line boundary’)
Outline Design	Defines the design principles and freezes the scope of the project
Reference Case	An assumed ‘future baseline’ scenario, which represents the circumstances and conditions that we would anticipate in the future year without the implementation of the Scheme, taking account of trends (for example in population and employment growth) and relevant developments (such as other committed transport schemes). The reference case is frequently used as a comparator for the ‘with Scheme’ case, to show the effect of the Scheme against the appropriate reference point.
Reference Design	Design proposals that the consultation and DCO application will refer to.

Secant Piles	Piles are vertical structural elements of deep foundations. Secant pile walls are formed by constructing intersecting reinforced concrete piles. The secant piles are reinforced with either steel rebar or with steel beams and are constructed by either drilling under mud or auguring. Primary piles are installed first with secondary piles constructed in between primary piles once the latter gain sufficient strength
Service Building, Tunnel Service Building, Portal Building	The building housing all control, power supply, and other essential equipment for the operation of the tunnel. Also houses firefighting control and ventilation equipment. Serves as a maintenance base and has the facility to become a standby operations room.
Sheet Pile	Sheet piles can be a temporary or permanent earth retention solution, providing support and reducing groundwater ingress. Steel sheets are driven into the ground, interlocking with neighbouring piles in order to create a continuous wall.
Slurry Shield (SS) Tunnel Boring Machine	A type of tunnel boring machine used in soft ground with very high water pressure or where ground conditions are granular (sands and gravels) such that a plug cannot be formed in the removal Archimedes screw. The cutter head is filled with pressurised slurry which applies hydrostatic pressure to the excavation face. The slurry also acts as a transport medium by mixing with the excavated material before being pumped out of the cutter head back to a slurry separation plant
Spoil	The material excavated by the Tunnel Boring Machine during the construction of the tunnel.
SuDS	Sustainable Drainage Systems (SuDS) are water management solutions designed to reduce the impact of surface water runoff from new and existing developments to the natural environment. The purpose of such systems is to improve water quality and store or reuse surface runoff to reduce the discharge rate to the watercourse.
Tension Piles	Piles are vertical structural elements of deep foundations. Tension piles used to resist uplift/pull-out loads
The O2	A large entertainment complex on the Greenwich peninsular, including an indoor arena, cinema, bars and restaurants. It is built largely within the former Millennium Dome

The Scheme	The construction of a new bored tunnel under the River Thames between the Greenwich peninsula and Silvertown, as well as necessary alterations to the connecting road network and the introduction of user charging at both Silvertown and Blackwall tunnels
Toucan Crossing	A signal controlled crossing that allows pedestrians and cyclists to cross a road safely.
Transport for London (TfL)	A local government body responsible for most aspects of the transport system in Greater London. Its role is to implement transport strategy and to manage transport services across London. These services include: buses, the Underground network, Docklands Light Railway, Overground and Trams. TfL also runs Santander Cycles, London River Services, Victoria Coach Station and the Emirates Air Line. As well as controlling a 580km network of main roads and the city's 6,000 traffic lights, TfL regulates London's private hire vehicles and the Congestion Charge Scheme.
The Tunnel, Silvertown Tunnel	A new bored tunnel under the River Thames between the Greenwich peninsula and Silvertown
Tunnel Boring Machine (TBM)	A machine used to excavate tunnels with a circular cross section. There are two main types of closed face TBMs: Earth Pressure Balance (EPB) and Slurry Shield (SS). Please see those terms for further explanation
Ventilation Building	Surface level structure housing ventilation equipment, fans and an exhaust shaft, used to move fresh air underground by drawing air from the tunnel and venting it to the atmosphere. Located adjacent to and integral with the Service Buildings.

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SUMMARY

1. The purpose of this document is to demonstrate how the proposed Silvertown Tunnel would impact on economic activity within local regeneration areas, the wider east London sub-region and how it would support London's economy as a whole.

2. In doing so it shows how the Scheme meets the Nationally Significant Infrastructure Project[1] (NSIP) requirement to provide '*the capacity and connectivity to support national and local economic activity and facilitate growth, job creation and regeneration, particularly in the most disadvantaged areas*'; and the Mayor's London Plan[2] (Policy 6.12B) that new road infrastructure should be assessed against criteria including its '*contribution to London's sustainable development and regeneration including improved connectivity*'.

3. London is a significant driver of the UK economy and creates the wealth and taxes that pay for a substantial proportion of much of the country's public infrastructure and services. For London to continue to be a significant contributor to the UK's economy it needs to be able to compete with other major international centres and grow. Indeed London's population is predicted to increase by two million people over the next two decades, becoming a city of over ten million people by 2031. East London is vital to facilitating that growth, as it has the largest physical capacity for development in the south-east and is one of the largest regeneration areas in the UK.

4. However, for that growth to be delivered, the right supporting infrastructure needs to be put in place. This is recognised in the Further Alterations to the London Plan[3], which identifies Silvertown as one of a package of schemes required to support population and employment growth in east London and thereby support London's economy as a whole.

5. Many parts of the east London economy are not yet achieving their full potential. While Gross Value Added (GVA) per worker has grown between

[1] National Policy Statement for National Networks, Department for Transport December 2014

[2] The London Plan – consolidated alterations since 2011 March 2015

[3] Greater London Authority: Further Alterations to the London Plan, March 2015

2004-2013 by 43% in inner London, the comparable figure for east and north-east outer London is just 13% and for outer south London it is 16%. This compares to the average UK figure of 27%[4]. Levels of economic activity are lower and unemployment rates higher in east London compared with the rest of the city and the UK. Despite significant improvements, there is still latent potential from the local labour force to be unlocked.

6. Over the last 20 years regeneration has transformed much of the former London Docklands and parts of the Thames Gateway and many previously derelict sites now have successful new uses, both commercial and residential, particularly those in inner London boroughs. This has been accompanied by a diversification of the economic base and a substantial increase in employment in the area, supported by investment in road and rail infrastructure.

7. Investment in public transport by Transport for London (TfL) has been fundamental in transforming east London. However, apart from the substantial investments in the early 1990s to support the regeneration of London Docklands, the road network has not seen similar investment. As east London's population and employment base has grown rapidly during the last 20 years, this has increased the number of road trips, (despite the number of car trips per person having fallen) resulting in higher levels of congestion and unreliable journey times. Nowhere is this more apparent than at the Blackwall Tunnel, which is east London's most important cross river highway link, and on its approach roads. High levels of congestion, combined with few alternative routes, mean that large parts of east London are subject to the 'barrier effect' of the River Thames, with businesses able to access fewer customers, workers and suppliers than competitors in other parts of the city and residents able to access fewer jobs and services. This is one factor behind the poorer economic performance and attractiveness of this part of London, which consequently impacts on the ability to attract investment and bring forward development.

8. In order to address these issues, TfL is proposing to construct a new highway tunnel under the River Thames between the Greenwich Peninsula and Silvertown. The introduction of free-flow user charging on both the Blackwall and Silvertown Tunnels would play a fundamental part in managing traffic demand and support the financing of the construction and operation of the

[4] Silvertown Tunnel Outline Business Case, TfL, 2015

Silvertown Tunnel. The design of the tunnel would include a dedicated bus/coach and Heavy Goods Vehicle (HGV) lane, which would provide opportunities for TfL to provide additional cross-river bus routes. It is envisaged that the tunnel would open in 2022/23.

9. This document draws on a number of strands of analysis to assess the potential economic and regeneration impacts that could result from the Scheme. These include a detailed survey of over 500 employers[5], a review of relevant case studies, economic and accessibility outputs from the transport modelling, a comprehensive analysis of the characteristics of the local economy and the labour force and a review of land use and development opportunities.

10. The impacts of the Scheme are expected to be:

- the elimination of congestion at the Blackwall Tunnel resulting in businesses experiencing shorter journey times, reducing vehicle and labour costs and improving operational efficiency;
- significant improvements in journey time reliability enabling businesses to plan deliveries and journeys with a greater degree of confidence, improving business efficiency, particularly for time critical sectors such as construction;
- a new strategic bus corridor, with potential capacity of over 9,000 people in each direction over a three hour peak period[6];
- access to a larger potential labour market, as faster journey times enable more workers to reach employers within an acceptable commuting time which may reduce currently high levels of local unemployment, particularly within London's most deprived areas;
- access to a greater number of potential customers, as faster journey times enable more people to reach businesses within an acceptable travel time;

[5] Silvertown Tunnel Business Survey 2013-2015 WSP

[6] Based on proposed 37 buses an hour in each direction with a capacity of 85 people per bus

- access to a greater number of potential suppliers, increasing competition, driving down costs and raising innovation;
- improved efficiency, reduced costs, combined with potentially higher numbers of customers supporting an improved business environment and potentially higher levels of job creation and retention; and
- improvements in economic performance making the area more attractive to inward investment, raising land values and facilitating the quicker delivery of employment and housing development.

11. The Silvertown Tunnel will almost eliminate congestion and significantly improve reliability and journey times for highway users, including travellers by buses and coaches and freight vehicles. However at the same time a user charge is required to manage traffic and to help pay for the scheme, and this affects the net benefits of the different users described below. Business users have a higher value of time, and will accordingly value journey time savings very highly and any charge at a lower level than other travellers such as social visitors and commuters, so they are likely to benefit the most from the Scheme. TfL proposes to vary the charge by vehicle type to reflect the amount of road space occupied, the contribution to congestion, the emissions and the wear and tear to the road surface caused by different types of vehicles. Consequently HGV's are expected to pay the highest charges, and this will obviously impact their net user benefits.

Faster journey times for businesses

12. All users of the Blackwall and Silvertown tunnels would experience shorter journey times to cross the River Thames as a result of the Scheme, with journey time savings on the immediate approaches to the tunnels of up to 20 minutes in peak periods (excluding any additional reliability benefits), thereby increasing staff productivity.[7]

13. Analysis from the transport modelling demonstrates that quicker business trips would generate time savings for firms worth some £968m, excluding reliability benefits valued at £181m. Even after accounting for user charges, businesses would make total net savings of between £337m and £519m (with reliability). Business trips made by car would experience net benefits of

[7] Silvertown Tunnel Transport Assessment TfL September 2015

between £447m and £539m, while business trips made by bus or coach result in net benefits worth some £60m. Goods vehicles (LGV's and HGV's) would have net benefits worth between -£170m and £80m, although evidence from the Freight Transport Association suggests reliability benefits for goods vehicles may be undervalued. These savings could be invested to support local business and employment growth.

More reliable journey times

14. Poor reliability at the Blackwall Tunnel is a serious issue for businesses, with 56% of employer survey respondents[8] stating they were involved in an unplanned incident (other than everyday congestion) at the Blackwall Tunnel at least once a week, and 70% stating they think that the unpredictability of journey times when crossing the River Thames at the Blackwall Tunnel is a disruption or constraint to the operation of their business. Common problems for employers resulting from this include:

    - additional time and associated costs to plan deliveries to avoid congestion (32% of all respondents who think that unpredictable journey times at the Blackwall Tunnel are a constraint to their business);
    - being late for meetings and appointments (41%);
    - limiting the number of customers that are prepared to use the business (37%);
    - missing time critical deliveries letting down clients or affecting future business opportunities (33%); and
    - staff are regularly late for work (36%).

15. All of these impose costs or restrict potential revenue. As a result, 40% of respondents said that unreliable journey times when crossing the river result in a loss of potential revenue and raise costs. By reducing congestion and improving journey time reliability, employers would have more certainty over their route planning, have more control over their costs and be able to pursue potential opportunities more effectively. Just over half of all respondents reported that their organisation would be more likely to operate cross-river if journey times were made more reliable.

A new strategic public transport corridor

16. Fundamental to the Scheme is the creation of a new strategic bus corridor with the capacity to carry over 9,000 people in each direction during the peak

[8] Silvertown Tunnel Business Survey 2013-2015 WSP

periods. This would significantly improve connectivity between south-east and east London, particularly to parts of the Royal Docks, where there are plans to accommodate tens of thousands of new jobs. This would increase the number of jobs accessible to local residents (for example, by 7,000 for the Royal Borough of Greenwich regeneration area residents), particularly for those with no access to a car, as well as increase the size of the labour market for local firms.

Improvements in access to the labour market

17. At present the labour market in east London is not operating optimally, with the vast majority of people that work in areas east of the Blackwall Tunnel highly likely to also live on the same side of the River Thames. For example, 71% of those who work in the Royal Docks reside north of the River Thames while in Woolwich 80% of workers come from south of the river. This restricts firms' access to skills, with lower levels of competition for jobs. Respondents also reported that they are less willing to employ someone from the opposite side of the River Thames given the unreliable nature of cross river links.

18. With the Silvertown Tunnel, employers north of the River Thames would see more than a 10% increase in the size of their labour market catchments living within a 45 minute drive time due to the faster journey times for those living south of the river wishing to access job opportunities to the north. Once the costs of the assessed charge are taken into account, this increase switches to a small decrease of 1-8% during the morning peak for car drivers, which is offset by positive improvements in the evening peak, as well as the increase in access to the labour market by public transport, particularly in the Royal Borough of Greenwich and London Borough of Newham.

19. Improvements in access to the labour market would be particularly important to the Royal Docks, where tens of thousands of new jobs are planned, but where access to the labour market south of the River Thames is currently poor. Furthermore, Canary Wharf, which has capacity to accommodate 100,000 new jobs, could see benefits from a greater potential labour force, as improved commuter coach services bring in more people from Kent and east London.

Improvements in access to customers

20. The number of potential customers, both in terms of people and businesses, accessible to firms in east London is lower than in other parts of the city due to the barrier effect of the River Thames. The Silvertown Tunnel would increase catchment areas for businesses. For business to business travel, even once the costs of the assessed charge are taken into account, most businesses will experience an increase in their catchment areas of up to 6% if

they avoid the morning peak period. Businesses in the Royal Borough of Greenwich benefit especially from an increased catchment area.

21. As the east London economy has moved towards higher value sectors, particularly around Canary Wharf, there has been growth in services to support these jobs, such as printing, cleaning, food processing and security. The majority of this growth has occurred on the northern side of the River Thames. Indeed, 75% of suppliers to Canary Wharf come from the same side of the river. The Scheme would facilitate businesses south of the River Thames in competing for this work, increasing competition and efficiency.

22. Although net benefits are smaller for goods vehicles, nearly a third of businesses from sectors that typically use goods vehicles, such as those in manufacturing or distribution, said the Scheme would increase their customer base even taking into consideration the charge for using it, whilst only 4% disagreed.

23. Once user charges are taken into account, user benefits of the Scheme for people using their cars in the inter-peak are broadly neutral which would suggest no impact for retail businesses. Improved accessibility to potential customers is most significant in the evening peak which could benefit the evening economy. In addition an improved bus network is likely to improve access to local retailers.

Improvements in access to suppliers

24. The other side of businesses being able to access more customers is that firms also have access to a greater range of suppliers. This can increase competition, drive down costs and support innovation. Just over a quarter of survey respondents said the crossing proposal would make it easier to reach suppliers.

Higher levels of job creation and retention

25. All of the above assists to make the east London economy more efficient; meaning that businesses can reinvest any cost savings, as well as any additional revenue, on plans for future expansion, including job creation. Nearly a fifth of survey respondents said they would take on more staff as a result of the Scheme.

26. Although the net user benefits for businesses as a whole are forecast to be positive, there would be some for whom it would not be financially worthwhile to pay the charge and may see their potential customer base and access to suppliers reduced. However, just 4% of respondents said they expected the Scheme, including the introduction of user charges at the Blackwall and

Silvertown tunnels, to have a negative impact on their business, compared to 37% that said it would have a positive impact.

27. Overall, the employer survey supports the view that greater levels of efficiency, improved access to the labour market and improved access to customers and suppliers would result in a net beneficial effect on employment.

Improvements in access to jobs

28. As set out above, current labour catchments are very much confined to the same side of the river. Under a do-nothing scenario the number of jobs accessible by highway is projected to significantly decrease in south-east London as a direct result of increased congestion at Blackwall, resulting in reduced employment opportunities in some highly deprived areas.

29. By providing a step change in cross-river bus services the Scheme would facilitate an increase in access to 9,000 additional jobs for residents of regeneration areas in RB Greenwich and 6,000 jobs for residents of regeneration areas in LB Newham.

30. The London Plan[9] identifies areas of regeneration based on Lower Super Output areas (LSOAs) within the 20% most deprived nationally, as defined by the Index of Multiple Deprivation. These are heavily concentrated to the north of the river (much of the London boroughs of Tower Hamlets and Newham) but there are also pockets of deprivation to the south as well, with significant areas in the Royal Borough Greenwich. The proposed tunnel links areas of deprivation on both sides of the river, particularly where there would be the largest increase in access to jobs. This has the potential to bring down currently high levels of unemployment. The proposed bus network would be important in supporting this.

Higher levels of inward investment and faster rates of development

31. London's strategic priority is to significantly increase the delivery of housing compared to current levels. The rapid increase in house prices, resulting from supply failing to keep up with demand, is resulting in worsening problems of overcrowding and restricting labour supply. Business leaders are increasingly

[9] The London Plan – consolidated alterations since 2011 March 2015

citing the lack of housing as a key constraint.

32. Compared to a rail-based public transport Scheme, the improvements in connectivity expected with the Silvertown Tunnel would be dispersed over a much wider area, which means that concentrated uplifts in land value are less likely. Following discussions with developers and the Boroughs, this report does not identify any particular sites which are clearly dependent on the Scheme for their delivery, although all sites rely on good highway access to varying degrees.

33. However, when cross-river highway traffic in the single greatest concentration of developable land in the UK's most productive city is subject to diversions, delays and unreliability it can only serve to impede short-run economic output and inhibit sustainable future growth. Tangible impacts in the efficiency of the local economy, improved access to jobs and services, as well as improvements in the perception of the area, could potentially support future levels of development, including housing, as a result of the Scheme.

1. INTRODUCTION

1.1 Purpose of the report

1.1.1 The purpose of this document is to demonstrate how the proposed Silvertown Tunnel would impact on economic activity within local regeneration areas, the wider east London sub-region and support London's economy as a whole.

1.1.2 In doing so it demonstrates how the Scheme meets the Nationally Significant Infrastructure Project[10] (NSIP) requirement that it provides '*the capacity and connectivity to support national and local economic activity and facilitate growth, job creation and regeneration, particularly in the most disadvantaged areas'*; and the Mayor's London Plan[11] (Policy 6.12B) that new road infrastructure should be assessed against criteria including its '*contribution to London's sustainable development and regeneration including improved connectivity'*.

1.1.3 The document draws on other reports, including the River Crossings Development Study (Atkins, June 2014), the Silvertown Business Survey (WSP, 2015) and the Transport Assessment (TfL, September 2015) as well as the accessibility modelling undertaken for the Scheme discussed in the Silvertown Tunnel Economic Assessment Report, (TfL, September 2015).

1.2 London's economic potential

1.2.1 Much has been written about London's economic success; it accounts for 23% of the UK's total output, output per head is over 70% higher than the UK average and its recent growth has significantly outpaced the rest of the country.[12]

1.2.2 Hence London is a significant driver of the UK economy and creates the wealth and taxes that pay for a significant proportion of much of the country's public infrastructure and services. For London to continue to be

[10] National Policy Statement for National Networks, Department for Transport December 2014

[11] Further Alterations to the London Plan March 2015

[12] Regional and local economic growth statistics House of Commons Library 2014

a significant contributor to the UK's economy it needs to be able to compete with other major international centres and grow. Indeed London's population is predicted to grow by two million people over the next two decades, becoming a city of over ten million people by 2031. East London is vital to facilitating that growth, as it has the largest physical capacity for development in the south-east and is one of the largest regeneration areas in the UK.

1.2.3 However, for that growth to be delivered the right supporting infrastructure needs to be put in place. This is recognised in the Further Alterations to the London Plan (FALP),[13] which identifies Silvertown as one of a package of schemes required to support population and employment growth in east London and thereby support London's economy as a whole.

1.3 East London's economic potential

1.3.1 Although London's economy has recovered strongly from the recent global financial crisis, many parts of the east London economy are not yet fulfilling their full potential. For example, while Gross Value Added (GVA) per worker has grown by 43% between 2004-2013 in inner London, the comparable figures for east and north-east outer London is just 13% and only a slightly higher 16% in outer south London. This compares to the average UK growth figure of 27% over the same period.[14] Median wage levels in areas such as the London Borough of Lewisham are below the English average while unemployment rates in outer south-east and north east boroughs are well above the UK average.[15]

1.3.2 Over the last 20 years regeneration has transformed much of the former London Docklands and parts of the Thames Gateway and many previously derelict sites now have successful new uses, both commercial and residential. This has been accompanied by a diversification of the economic base and a substantial increase in employment in the area.

1.3.3 To facilitate this regeneration Transport for London (TfL) has invested

[13] Greater London Authority: Further Alterations to the London Plan, March 2015

[14] Regional Gross Value Added (Income Approach) NUTS2 Tables ONS 2015

[15] Annual Survey of Hours and Earnings ONS 2015

heavily in the area with the continuing development and extension of the Docklands Light Railway, Jubilee Line Extension and with the present construction of Crossrail. However, apart from the substantial investments in the early 1990s to support the regeneration of London Docklands, the road network has not seen similar investment and is severely constrained. In addition there is the 'barrier effect' of the River Thames and the limited number of road crossings across it, all of which are subject to significant congestion and reliability problems especially at the Blackwall Tunnel.

1.4 Transport problems at Blackwall and their economic consequences

1.4.1 The current transport problems associated with the Blackwall Tunnel (as described in detail in the Silvertown Tunnel Transport Assessment) are:

- Traffic congestion due to demand exceeding capacity resulting in long queues at peak times and slow journey times.
- Reliability issues, caused and exacerbated by the low level of spare capacity and a large number of incidents, many of which are related to aged and sub-standard infrastructure.
- Lack of resilience, in the event of a tunnel closure or reduction in capacity, the consequent traffic congestion and delays are widespread throughout south-east and east London and it can take a significant amount of time for traffic conditions to revert to normal. These issues are exacerbated by the lack of alternative crossings with sufficient capacity.
- Physical limitations on access for vehicles over 4m (the standard UK height is 5.1m) through the northbound portal. These vehicles cannot use Rotherhithe Tunnel while Tower Bridge is subject to a weight restriction. This means that the Woolwich ferry is the only option for some HGVs crossing the river between central London and the Dartford crossing.
- Constraints on the type and extent of bus services that can use the Blackwall Tunnel due to height restrictions and the levels of congestion and unreliability.

1.4.2 The above transport problems have adverse economic consequences on the local area. These arise due to the actual delays and inconvenience suffered, as well as the perception of risk of their occurrence, which discourages economic activity that relies, or could rely, on just in time and regular cross-river movement. The potential economic impacts include:

- Increased business costs; the local economy is impacted by the day to day congestion at existing crossing points. Routine congestion

adds to the cost of business while unreliability adds to delays and can cause significant disruption to business operations and hence additional costs. This will impact on the ability of some business sectors to compete effectively cross-river, limiting the overall efficiency of the economy.

- Limitations on labour market access, the local labour market is affected in terms of the ease of access by both employers and employees to opportunities either side of the river due to long journey times and low levels of reliability. This is a particular issue for those living south of the river because of the greater number of jobs north of the river. New rail crossings such as Crossrail will provide a major improvement for some areas, but the current congestion and reliability problems at the Blackwall Tunnel are severe and due to this there is currently only one bus service which uses the tunnel to connect the areas south and north of the river.

- Limiting market potential, poor cross-river connectivity reduces the effective business to business market, limiting the potential viability and growth of firms. Poor accessibility can also limit the potential catchment of businesses that rely on visitors and customers, such as retail and leisure.

- Non-realisation of development opportunities, there remains major opportunities for development on both sides of the river around the Greenwich Peninsula, Royal Docks and London Riverside in particular. Poor transport links can deter or slow development, while improved access can help to bring forward development on these sites by making them more accessible and attractive for developers.

1.4.3 These problems must also be seen in the context of the huge growth planned in east London. It is clear that London has the potential to grow thereby supporting national and local economic activity, that a high proportion of that growth can occur in east London, an area of considerable disadvantage and to facilitate that growth supporting infrastructure is needed.

1.5 The Silvertown Tunnel Scheme

1.5.1 In order to address these issues, TfL is proposing to construct a new highway tunnel under the River Thames between the Greenwich Peninsula and Silvertown (‘the Silvertown Tunnel’, the Scheme). The Scheme comprises a new dual two-lane connection between the A102 Blackwall Tunnel Approach on Greenwich Peninsula and the Tidal Basin roundabout junction on the A1020 Lower Lee Crossing/Silvertown Way (LB Newham). The Silvertown Tunnel would be approximately 1.4 km long and would be able to accommodate large vehicles including double-

decker buses. The Boord Street footbridge over the A102 would be replaced with a pedestrian and cycle bridge.

1.5.2 The introduction of free-flow user charging on both the Blackwall and Silvertown Tunnels would play a fundamental part in managing traffic demand and support the financing of the construction and operation of the Silvertown Tunnel. The design of the tunnel would include a dedicated bus/coach and HGV lane, which would provide opportunities for TfL to provide additional cross-river bus routes.

1.5.3 Main construction works would likely commence in 2018 and would last approximately four years with the new tunnel opening in 2022/23.

1.6 Structure of the report

1.6.1 The rest of the report is summarised as follows:

- section 2 describes the methodology used;
- section 3 describes transport and its relationship with economic growth and development;
- section 4 describes the baseline socio-economic conditions in the regeneration area;
- section 5 highlights the barriers and constraints to development;
- section 6 describes the development potential of the study area;
- section 7 describes the expected impacts of the Scheme; and
- section 8 concludes by summarising the expected regeneration impacts.

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2. METHODOLOGY

2.1 Introduction

2.1.1 As set out in the previous section, east London has a concentration of highly deprived areas, where enhancements are needed to improve access to employment for existing residents. But equally as important, consideration needs to be given to the transport implications of future growth of population and employment in east London. In this context, the methodology uses Department for Transport (DfT) guidance given in TAG unit A2.2 (Regeneration Impacts) in relation to access to employment, in the regeneration area. But this report also shows how the contribution of a reduction in congestion and improvements in reliability and public transport provision would facilitate the wider aims of economic growth and job creation, both locally and for London as a whole. In addition, given the importance of housing in east London and to London's overall economic performance the report looks at how the Scheme impacts on this sector.

2.1.2 In doing so it demonstrates how the Scheme meets the NSIP[16] requirement that provides '*the capacity and connectivity to support national and local economic activity and facilitate growth, job creation and regeneration, particularly in the most disadvantaged areas'*; and the Mayor's London Plan (Policy 6.12B) that new road infrastructure should be assessed against criteria including its '*contribution to London's sustainable development and regeneration including improved connectivity*'.

2.1.3 TAG notes that regeneration impacts from transport would generally be associated with changes in accessibility that may be achieved via changes in journey times, journey costs, or journey reliability. The effect would usually be to change the costs of travel, influence where people choose to travel and alter the costs and time of movement of goods. In addition it is clear from evidence from other major infrastructure schemes that impacts would arise from the change in developers' and employers' perceptions of an area and their subsequent increased willingness to invest in it.

[16] National Policy Statement for National Networks, Department for Transport December 2014

2.1.4 Therefore the report addresses:

- how accessibility and travel conditions are affected by change in journey time, costs and reliability for business and commuter trips; and
- other constraints on the economy of the regeneration area that would affect the ability of the transport Scheme to support economic development.

2.1.5 Following TAG, the overall method followed includes the following key steps:

- Defining the regeneration area (set out in this section).
- Providing a quantified description of the economy in the regeneration area; its main sources of employment; and its recent and expected future performance without the transport Scheme (set out in section 4).
- Describing the ways in which transport is currently a constraint on economic activity in the area as well as other non-transport constraints (set out in section 5).
- Assessing how accessibility and travel conditions would be changed by the Scheme particularly for business trips to customers, suppliers and workers and for commuting trips to employment (set out in section 6).
- Explaining why the proposed Scheme would contribute to a change in economic activity in the regeneration area and a change in employment (set out in section 7).

2.2 Scenarios

2.2.1 In order to establish the expected change in conditions due to the Scheme, the assessment uses two scenarios as described below. Information on changes in travel conditions for both is provided by the LoRDM model described in the Economic Assessment Report[17], while information on reliability and resilience changes are provided from analysis in the Transport Assessment.

[17] Silvertown Tunnel Economic Assessment Report, TfL, September 2015.

2.2.2 **Scenario 1: Reference Case:** This scenario forms the baseline against which the intervention or do-something scenario is measured. This scenario includes land use development as set out in FALP and committed transport improvements in the study area, such as Crossrail.

2.2.3 **Scenario 2: Assessed Case** – This scenario is the above reference case plus the Silvertown Tunnel in place. This scenario includes the following assumptions:

- A road tunnel which links the A102 Blackwall Tunnel Approach at Greenwich Peninsula south of the river with Silvertown to the north. The tunnel consists of a single lane in each direction for all traffic and an additional lane in each direction for buses, coaches, taxis and HGVs.

- Increased public transport capacity, reductions in congestion and much improved reliability enables new cross-river bus routes to be introduced.

- The existing Blackwall Tunnel and the new Silvertown Tunnel would be charged for use as outlined in the User Charging Note[18].

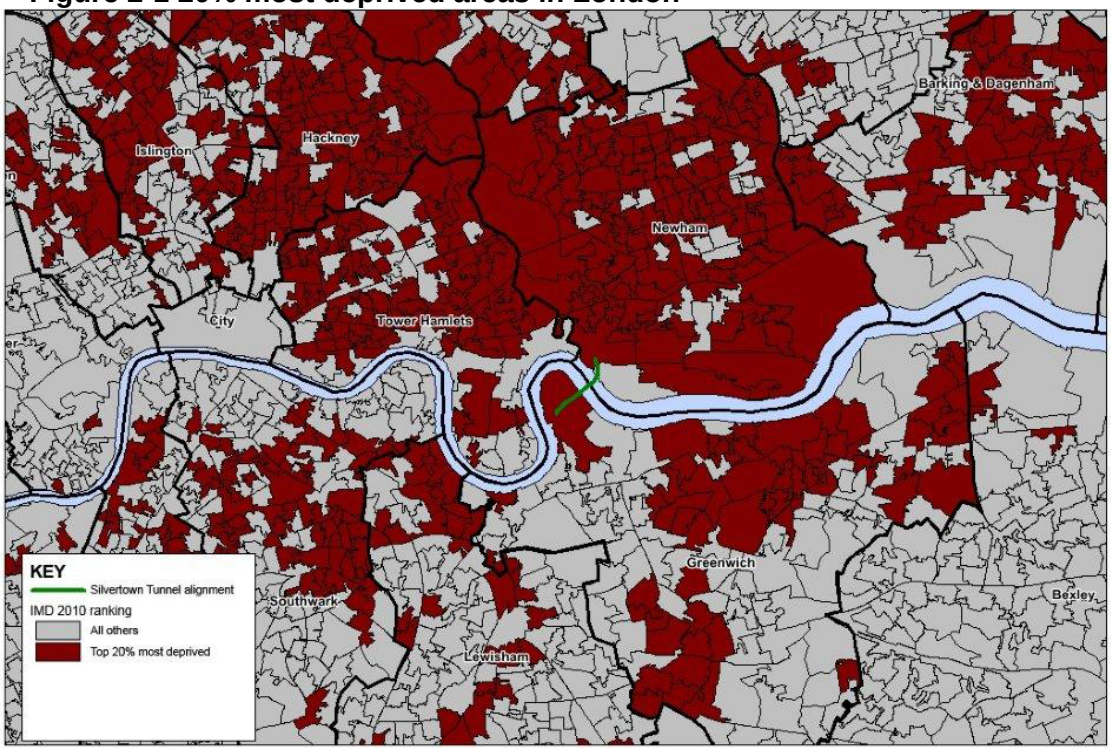
2.3 Regeneration area definition

2.3.1 TAG notes that there is no single definition of regeneration areas, but these areas would have been designated for specific policy purposes related to economic development under one of the UK government's or European Union's regeneration programmes.

2.3.2 The London Plan identifies areas of regeneration based on Lower Super Output areas (LSOAs) within the 20% most deprived nationally, as defined by the Index of Multiple Deprivation. In order to ensure consistency with the available evidence and transport modelling statistical geography, we have adapted this definition to define the Regeneration Area for this study at a ward level, based on those wards containing LSOAs within the 20% most deprived. This is shown in Figure 2-1.

[18] Silvertown Tunnel User Charging Note, TfL, September 2015.

Figure 2-1 20% most deprived areas in London



2.3.3 As can be seen the most deprived areas are heavily concentrated to the north of the river (much of the London Boroughs of Tower Hamlets and Newham) but there are also pockets of deprivation to the south as well, with significant areas in RB Greenwich. The proposed tunnel links areas of deprivation on both sides of the river. For the purposes of this assessment, we have included these three Silvertown Tunnel 'host' boroughs' in the core regeneration study area. It is clear from the above that the proposed Scheme serves one of the most deprived areas in both the UK and London.

2.3.4 TAG also recommends identifying a 'hinterland', linked to the idea of access and generally corresponding to accessible employees, customers, suppliers and markets. An assessment comparing regeneration areas and the expected geographic distribution of the transport benefits from the Economic Assessment Report (EAR)[19] indicated that the hinterland should cover the boroughs of Barking and Dagenham, Hackney, Waltham Forest and Lewisham.

[19] Silvertown Tunnel Economic Assessment Report, TfL, September 2015

2.4 Accessibility assessment

2.4.1 A key factor in the assessment of regeneration impacts resulting from the Silvertown Tunnel is the degree to which it impacts on accessibility or connectivity to and from business and labour markets, facilitating a change in economic activity. A quantitative assessment of the impact of the Scheme in terms of travel times, costs and reliability has been carried out based on the methodology described in TAG Unit A2.2[20].

2.4.2 Accessibility has been estimated for a number of different catchments/measures:

- 45 minutes travel time by car (excluding any user charges);
- 70 minutes generalised time by car (this includes user charges, and is broadly equivalent to a 45 minute journey time); and
- 75 minutes generalised time by public transport, this includes waiting and interchange time which is weighted greater than actual time in accordance with TAG. This is broadly equivalent to a 45 minute journey time by public transport.

2.4.3 The following accessibility measures were then used:

- Employee access to jobs (this is a key locational criteria in housing decisions).
- Business access to the workforce (economically active population); this can be used as a proxy for the potential size of the labour force and therefore a measure of the attractiveness of a location to businesses.
- Business access to consumer customers (adult population) defined as total adult population (aged 16 and above).

[20] See Silvertown Tunnel Accessibility Calculation Technical Note in Silvertown Economic Assessment Report appendices.

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3. RELATIONSHIP BETWEEN TRANSPORT AND DEVELOPMENT

3.1 Summary

3.1.1 There is a large and generally consistent literature explaining the link between transport and economic development. These links can be broadly related to business efficiency, the labour market and land use/development.

3.1.2 Improving accessibility and reducing congestion reduces journey times and the variability in journey times. This leads to reduced costs for business and larger potential catchment areas for markets and suppliers. This increases competition thereby further driving down costs and raising innovation.

3.1.3 Larger labour market catchment areas improve access to specialist skills and can increase competition for jobs and reduce costs. For potential employees, reductions in congestion and improvements in accessibility offer access to more job opportunities and improved career prospects, leading to increased productivity.

3.1.4 Improved accessibility and, often equally important, an improved perception of an area increases its attractiveness for people and businesses. This leads to increased land values which drives higher investment and densification of development.

3.1.5 In a location like London with well-developed transport networks it is congestion and unreliability that is most likely to impact upon productivity and competitiveness.

3.1.6 The second Tyne Tunnel, the most recent major infrastructure Scheme that is similar in nature to the proposed Silvertown Tunnel, opened in 2011. In an evaluation study[21] two thirds of respondents considered that improved business travel time reliability had had a positive impact on their business while 5% of the businesses interviewed identified an increase in market share. Employment and economic activity rates have grown more

[21] The New Tyne Crossing An Economic Impact Assessment Prepared for Tyne and Wear Integrated Transport Authority November 2012

quickly in areas close to the Tyne Tunnel than the regional average since it opened.

3.1.7 In London, despite greater use of public transport than elsewhere, there is evidence from the Isle of Dogs that both road and public transport investment are required to get major development sites off the ground. Whilst future employment growth has been driven by public transport use in this location, roads are still a very important part of the transport mix to support essential servicing of office and retail based jobs.

3.2 Introduction

3.2.1 This chapter provides a review of the available evidence on how changes in transport accessibility can impact on land use and development. This includes a brief summary of the literature on the links between transport and economic growth, as well as a review of the impacts of recent similar cross river transport investments in the UK.

3.2.2 The long term relationship between transport and the UK's productivity was investigated by Sir Rod Eddington in 2006 in a major study for HM Treasury and the DfT[22]. He identified seven main linkages by which transport improvements have an impact on economic growth. They are:

- improved business efficiency, notably by travel time savings, improving journey time reliability and travel quality;
- agglomeration economies which bring firms closer to other firms or workers in the same sector;
- improved labour market efficiency, enabling firms to access a larger labour supply and wider employment opportunities for workers and those seeking work;
- stimulating business investment and innovation by supporting economies of scale and new ways of working;
- increasing competition by opening access to new markets, principally by integration of world markets;

[22] The Eddington Transport Study: the case for action: Sir Rod Eddington's advice to Government, Summary report, December 2006

- increasing domestic and international trade by reducing trading costs; and
- attracting globally mobile activity to the UK, by providing an attractive business environment and good quality of life.

3.2.3 The Eddington report stated

'*There is clear evidence that a comprehensive and high-performing transport system is an important enabler of sustained economic prosperity: a 5% reduction in travel time for all business and freight travel on the roads could generate around £2.5 billion of cost savings – some 0.2% of GDP'*. It went on to state that '*in mature economies with well-developed transport networks it is transport constraints that are most likely to impact upon a nation's productivity and competitiveness'*.

Impacts on employment

3.2.4 The Economic and Social Research Council project, Transport investments and Spatial Economic Performance[23], analysed the impact of transport infrastructure improvement on the economic performance of firms, workers, local areas and regions. Overall, the paper found strong effects from transport improvements on an area's employment and plant counts including:

- A 10% improvement in accessibility (to jobs) leads to a 3% increase in the number of businesses and employment, up to 30km from site of improvement.
- Services sectors (professional services, insurance and financial services and real estate) experience most additional employment growth resulting from road transport improvements. Construction also saw some gains, although retail employment was negatively affected.

3.2.5 This increase in employment can occur by opening up new labour markets due to improved connectivity or by reducing travel times and costs or improving reliability. A larger labour catchment area can then lead to increases in productivity as employers and employees can better match skill requirements and offerings. This in turn results in improved economic

[23] Road networks and local employment, evidence briefing, December 2013, ESRC

efficiency and growth and more employment.

Impacts on access to suppliers and customers

3.2.6 Access to customers and suppliers is obviously a key factor for any business. Changes in accessibility can increase catchment areas for both, whilst improvements in journey time reliability can increase the attractiveness of the business. With a larger catchment area there is greater competition which drives innovation and efficiency and reduces costs. This leads to improved productivity and hence economic growth and employment. In many sectors of the economy, such as retail, there has been a concentration of economic activity at fewer centres. It is important, therefore, for businesses to be able to access these key centres efficiently if they are to remain competitive.

3.2.7 Improvements in the ability to move goods and services by road can again lead to cost savings which in turn brings economic benefits. The provision of river crossings has led to consolidation of activities such as warehousing leading to economies of scale and productivity improvements.[24]

Impacts on perception

3.2.8 Bruinsma et al[25] found at the level of individual entrepreneurs the impact of highway construction was clearly positive for the level of corporate investments, the number of employees, the perceived accessibility, travel time and the accuracy in delivery times. '*Perceptions deserve attention in studies of this type, because behaviour is not only governed by objective facts, but also by subjective perceptions.*'

Transport is a necessary but not sufficient factor for growth

3.2.9 The above studies show that the greatest benefit from new transport investments occur where there are material improvements in connectivity and/or where it is addressing congestion and reliability problems.

[24] River Crossings Development Study Final Report 27th June 2014 WS Atkins

[25] Frank R. Bruinsma, Sytze A. Rienstra and Piet Rietveld 1997 Economic impacts of the construction of a transport corridor: a multi-level and multi approach case study for the construction of the A1 highway in the Netherlands Regional Studies, Vol. 31.4, pp. 391-402

3.2.10 However, they also demonstrate that connectivity and accessibility improvements are only one element which can affect economic performance and there are a number of external factors which can also have a significant influence on economic competitiveness and need to be considered as part of the assessment of regeneration benefits of the Scheme.

3.2.11 Other factors which can impact on the economic and development impact of new crossings include the:

- performance of the regional and sub-regional economy, including wider market factors which could influence investment decisions;
- degree of integration of any new crossing with the wider local and strategic transport network; and
- degree of integration of the Scheme more widely with strategic regeneration and development objectives, using the Scheme as a catalyst to bring forward wider regeneration opportunities at both the local and sub-regional level.

The view of the Select Committee on strategic river crossings

3.2.12 In a March 2015 report,[26] the House of Commons Select Committee for Transport reviewed strategic river crossings, including those in east London. The committee noted that a submission by the London Chamber of Commerce and Industry (LCCI) argued that without sufficient crossings, rivers separate workers from jobs and consumers from retailers. According to the LCCI, businesses have rejected opportunities to operate in such areas and new river crossings can provide immediate benefits to businesses. The LCCI said that by linking communities on either side of rivers, the catchment area for consumers and potential employees is enlarged, which enables firms to take advantage of economies of scale. Productivity rises as vehicle-maintenance costs, fuel costs and transport time for moving goods are lowered.

3.2.13 The Select Committee concluded that it is clear that new river crossings can have genuine financial benefits for local businesses in terms of lower vehicle costs, time efficiencies and greater access to labour and

[26] Parliamentary Select Committee – Strategic River Crossings, Houses of Parliament, Tenth Report of Session 2014–15

consumers. The Select Committee's view was that a package of new river crossings in east London is long overdue. It noted that without new crossings, congestion at the Blackwall Tunnel would only get worse and the area's development potential would never be realised.

3.3 Case studies –river crossings generally

3.3.1 The River Crossings Development Study[27] reviewed impacts of recent major highway river crossings, namely, the Severn Bridge, the Humber Bridge and the Dartford Crossing.

3.3.2 The study demonstrated that there is the potential for a number of economic benefits to be secured from the construction of a new river crossing. The review suggested that:

- improved connectivity from river crossings can impact significantly on employment growth, with the authorities in close proximity to the Dartford Crossing seeing growth rates of 20% above those of the wider sub-region and the Severn Crossing increasing economic activity in south Wales by 4%;

- analysis of the spatial distribution of the Dartford crossing employment impacts suggests that these are most likely to be felt in authorities directly linked by the new crossing (in this case Dartford and Thurrock). However, there may be some displacement effects with new employment choosing to locate closer to the crossing at the expense of other authorities in reasonable proximity to the crossing;

- analysis of the impacts on particular sectors from the Dartford crossing suggests that the construction, retail and distribution sectors are most likely to benefit from the improved road connectivity, although smaller scale positive impacts on office based sectors are also possible too;

- the impact of new crossings on housing growth is less certain and is much more aligned to local authority planning policy. However, analysis from the Dartford crossing suggests that dwelling growth rates in both Thurrock and Dartford have been above the regional averages by 28% and 34% respectively since the crossing opened. The Severn Bridge also appears to have generated significant housing growth of up to 8,800 dwellings a year; and

[27] River Crossings Development Study Final Report 27th June 2014 WS Atkins

- the Humber Bridge was identified as having little economic impact, although this was put down to the fact that it did not link areas of dense economic activity.

3.3.3 It should be noted that these crossings form part of the national strategic road network and the impacts within an urban environment, with higher levels of economic activity, could be different.

3.4 Case study – London Docklands

3.4.1 London Docklands is the largest and most successful regeneration Scheme in the UK. Turned from an almost desolate wasteland to an area now employing some 150,000 people and still expanding. In the early 1990s the initial transport infrastructure was provided including the first stages of the Dockland Light Railway and in 1993 major road links, the Limehouse Link, East India Dock Link, Preston's Road Flyover and Aspen Way were completed, many of these were water crossings (for example, over the River Lee and dock entrances) to improve local connectivity.

3.4.2 Without these road links the construction, development and servicing of the whole of the Isle of Dogs as has occurred to date would not have been possible. In effect the road enhancements were an essential part of the enabling infrastructure that allowed for the massive level of regeneration that has occurred since. As Table 3-1 shows, while car traffic increased on the opening of the new roads, it has barely altered since then and all future commuting flows have been driven by public transport enhancements.

Table 3-1 Commuting flows by mode into Isle of Dogs

						Thousands	
Year	**Other**	**Cars, etc** [28]	**Bus**	**DLR**	**Jubilee Line**	**total**	**car as % of total**
1990	3.0	5.5	1.7	4.3	0.0	14.5	38%
1991	1.5	6.4	1.7	3.5	0.0	13.1	49%
1992	1.1	6.9	1.9	4.0	0.0	13.9	50%
1993	1.2	7.7	1.5	5.1	0.0	15.5	50%
1994	1.1	10.8	1.6	8.4	0.0	21.9	49%
1995	1.5	10.7	1.8	8.9	0.0	22.9	47%
1996	0.9	11.0	2.5	9.3	0.0	23.7	46%

[28] Includes vans, taxis, motorcycles and goods vehicles

1997	1.2	12.6	3.4	14.5	0.0	31.7	40%
1998	2.8	12.0	2.8	16.8	0.0	34.4	35%
1999	2.0	12.0	2.9	12.4	13.5	42.8	28%
2000	2.0	10.7	1.7	11.5	16.3	42.2	25%
2001	1.9	10.6	2.9	13.5	15.7	44.6	24%
2002	2.3	10.2	1.4	14.0	20.4	48.3	21%
2003	3.0	9.5	2.8	14.8	22.3	52.4	18%
2004	3.7	11.4	2.8	17.1	29.5	64.5	18%
2014	6.7	12.7	6.8	26.3	44.8	97.3	13%

Source: TfL

3.5 Case study – Tyne Tunnel

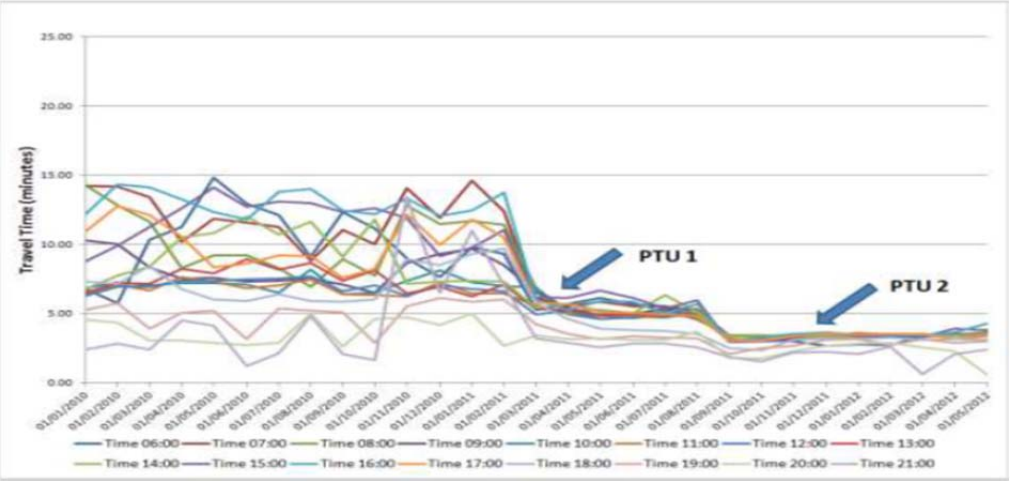
3.5.1 Perhaps the most recent relevant case study to consider in the context of Silvertown Tunnel is the second Tyne Tunnel for which an economic assessment was undertaken a year after opening.[29] It should be noted that the study was undertaken before the recent economic upturn and would have been too soon after opening to pick up many development-related effects. The original Tyne Tunnel opened in 1967. It was designed for a daily traffic throughput of 24,000 vehicles, but by the early 2000s was being regularly used by 38,000 vehicles a day. This led to growing levels of congestion at peak journey times.

3.5.2 A new southbound vehicle tunnel was completed in February 2011 and has greatly increased the daily throughput capacity to some 78,000 vehicles a day. Since the opening of the new crossing journey times to cross the River Tyne have reduced significantly. The increased capacity of the crossing and resultant reduction in congestion has resulted in a switch from other routes to the Tyne Tunnel crossing resulting in a reduction in the traffic flows and journey times for those using other routes to cross the River Tyne.

3.5.3 The impact of the tunnel on journey times is shown in Figure 3-1. PTU1 on the figure is when the first phase of the Scheme was completed (the new bore was opened and the original bore closed for refurbishment) and PTU2 when the original bore reopened.

[29] David Bradley, Mike Coombes, Tom Strickland, The New Tyne Crossing An Economic Impact Assessment Prepared for Tyne and Wear Integrated Transport Authority November 2012

Figure 3-1 Journey time through the Tyne Tunnel January 2010 to May 2012



Source: TrafficMaster and The New Tyne Crossing An Economic Impact Assessment

3.5.4 The main findings of the Tyne Tunnel study were:

- just over half of respondents noted financial benefits to their business although the scale of benefits was in most cases relatively modest;
- 68% of respondents considered that improved business travel time reliability had had a positive impact on their business;
- 5% of respondents reported an increase in market share;
- no respondent at the time of the study considered that the opening of the New Tyne Tunnel had been significant enough to have had an impact on employee numbers (this was, however, in the midst of the recession);
- 71% of businesses considered that reduced travel to work times for those using the Tyne Tunnel had had a positive impact in terms of employee morale, punctuality and productivity / effectiveness;
- several businesses identified an increased potential to recruit staff from the opposite side of the River Tyne;
- businesses across a wide range of activity types were found to have been positively affected by the New Tyne Tunnel;
    - transport / Logistics businesses were most likely to cite positive impacts;
    - contact centres were more likely than businesses from other industry groups to cite positive impacts in relation to travel to work length / time, employee retention / turnover, punctuality, recruitment and journey flexibility but less likely to cite positive impacts from changes in the reliability of business travel times,

employee effectiveness and overall business performance;
  - knowledge intensive business services were more likely to cite positive impacts in relation to reliability of business travel times, market share, workforce morale and improved effectiveness but were less likely to cite positive impacts from changes in the reliability of delivery times and vehicle operating costs;
  - manufacturing businesses were across the overall range of potential impacts less likely to cite positive impacts than businesses from the other industry groups; and
  - other activities (including construction and other services) were slightly more likely to cite positive impacts than manufacturing businesses but were less likely than other industry groups.

- no unintended negative consequences of reduced Tyne Tunnel crossing times were reported by any of the businesses interviewed;

- no evidence was reported by property agents of any significant rise in demand for commercial or industrial property resulting from the Tyne Tunnel. However, anecdotal evidence was reported by property agents of a greater willingness of businesses considering moving to locations on opposite banks of the River Tyne (as noted before the study was undertaken when the economy was in recession); and

- it was too soon after opening to identify any impact on development sites.

3.5.5 Mr Paul Woods, Chief Finance Officer, North East Combined Authority, reported to the 2015 Parliamentary Select Committee hearing on strategic river crossings that the new Tyne Tunnel had attracted industry to the local area: '*there is significant industry both north and south of the crossing; you have Nissan and a range of offshore employment opportunities. Having that free flow of access across is very important for economic regeneration*.'[30]

3.5.6 Since the Tyne Tunnel study was undertaken in 2012, rates of economic activity, businesses and job creation have increased more quickly and

[30] Parliamentary Select Committee – Strategic River Crossings, Houses of Parliament, Tenth Report of Session 2014–15

unemployment decreased more quickly, in the local authorities it links compared with the regional average.

3.5.7 Table 3-2 illustrates that the number of businesses located in South and North Tyneside districts have grown at up to twice the average for the North East as a whole between 2011 and 2014.

Table 3-2 Number of businesses in Tyneside compared with North East

Total businesses	2011	2014	Change	% Change
South Tyneside	2,305	2,670	365	16%
North Tyneside	3,735	4,205	470	13%
North East	54,770	59,340	4,570	8%

Source: Nomis

3.5.8 Table 3-3 and Table 3-4 show that the employment rate and the unemployment rate in South and North Tyneside have generally outperformed the North East as a whole.

Table 3-3 Employment rate (%) in Tyneside compared with North East

Employment rate	2011	2015	Change	% Change
South Tyneside	64.4	69.6	5.2	8%
North Tyneside	72.9	75.5	2.6	4%
North East	65.9	68.7	2.8	4%

Source: Nomis

Table 3-4 Unemployment rate (%) in Tyneside compared with North East

Unemployment rate	2011	2015	Change	% Change
South Tyneside	12.7	9.9	-2.8	-22%
North Tyneside	9.7	5.2	-4.5	-46%
North East	10	7.9	-2.1	-21%

Source: Nomis

3.5.9 Total employment in those areas closest to the Tyne Tunnel have also grown faster than the North East, see Table 3-5.

Table 3-5 Employment in Tyneside compared with north east

Employment	2011	2013	Change	% Change
South Tyneside	42,996	45,617	2,621	6.1%
North Tyneside	71,827	70,024	-1,803	-2.5%
South Tyneside (closest MSOAs to Tunnel)	17,656	18,045	389	2.2%

North Tyneside (closest MSOAs to Tunnel)	32,722	33,189	467	1.4%
North East	114,823	115,641	818	0.7%

Source: Nomis

4. BASELINE SOCIO-ECONOMIC AND LAND USE CONDITIONS

4.1 Summary

4.1.1 The area of south and east London served by the proposed Scheme suffers from high levels of deprivation with higher than average unemployment and lower than average economic activity rates. Skill levels are generally below the London average but have improved faster over the last decade than the rest of the city. This suggests there is significant latent potential to be unlocked from the workforce.

4.1.2 The study area has seen a large increase in population but not the same increase in housing. This excess of demand over supply has increased housing costs, resulting in high average household sizes and overcrowding. The delivery of housing has been slower than expected and needs to increase rapidly to address London's key strategic issue of affordability

4.1.3 The area has seen significant employment growth, particularly centred on Canary Wharf in higher value professional and financial services. The London Borough of Newham has seen rapid growth in retail, although other boroughs have seen slower rates of growth, largely driven by the public sector and retail.

4.1.4 Road dependent sectors such as manufacturing and construction contracted up to 2008 as the economy continued to restructure to higher value services, However, they have experienced healthy levels of growth since 2009 in all boroughs except the London Borough of Hackney

4.1.5 Sectors that support office jobs, such as printing, food preparation and cleaning, have grown much more quickly in boroughs north of the River Thames, closest to rapidly growing office markets. Improving connectivity across the River Thames could increase opportunities to access these growing markets for businesses based south of the River Thames.

4.1.6 In particular, significant levels of employment growth are planned for the Royal Docks, which is likely to increase the demand for travel to this location, including from the other side of the River Thames.

4.1.7 The area historically has had relatively low skilled workforce, although skills levels have increased faster than in London as a whole and are now higher than the UK average.

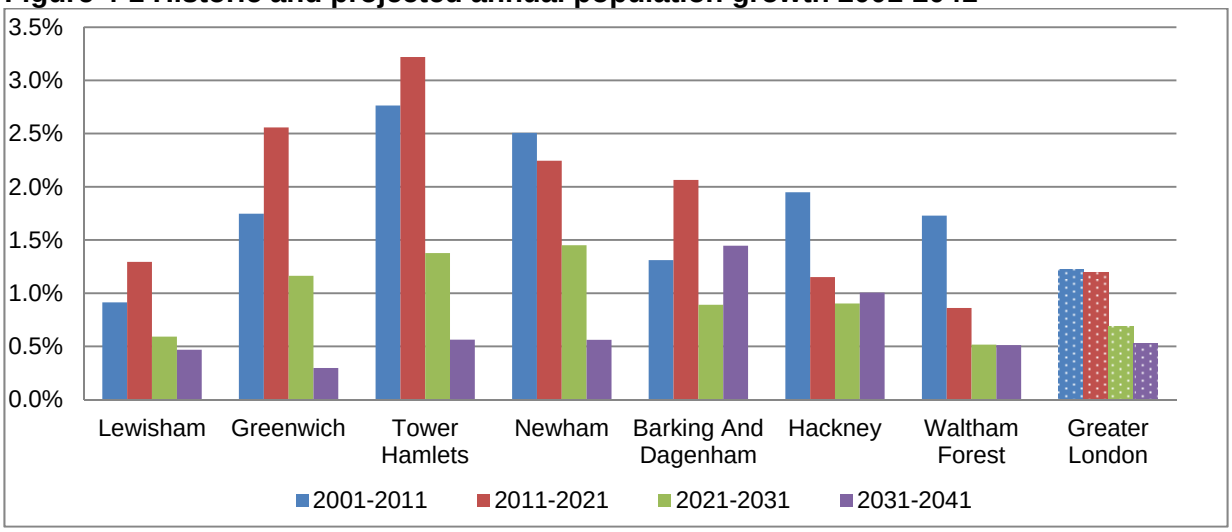
4.2 Introduction

4.2.1 This section provides a high level overview of the socio-economic conditions in the seven Boroughs where the majority of regeneration areas impacted by the Scheme are located (as defined in Chapter 2). The analysis highlights both the area's potential but also the problems it presently faces.

4.3 Population and demand for housing

4.3.1 Population growth in the seven boroughs in the study area has in the past and is expected in the future to be greater than for Greater London as a whole, Figure 4-1. Annual growth rates in the London Boroughs of Newham and Tower Hamlets have been over 2% a year and both boroughs have the potential to continue to grow rapidly if housing developments are able to come forward.

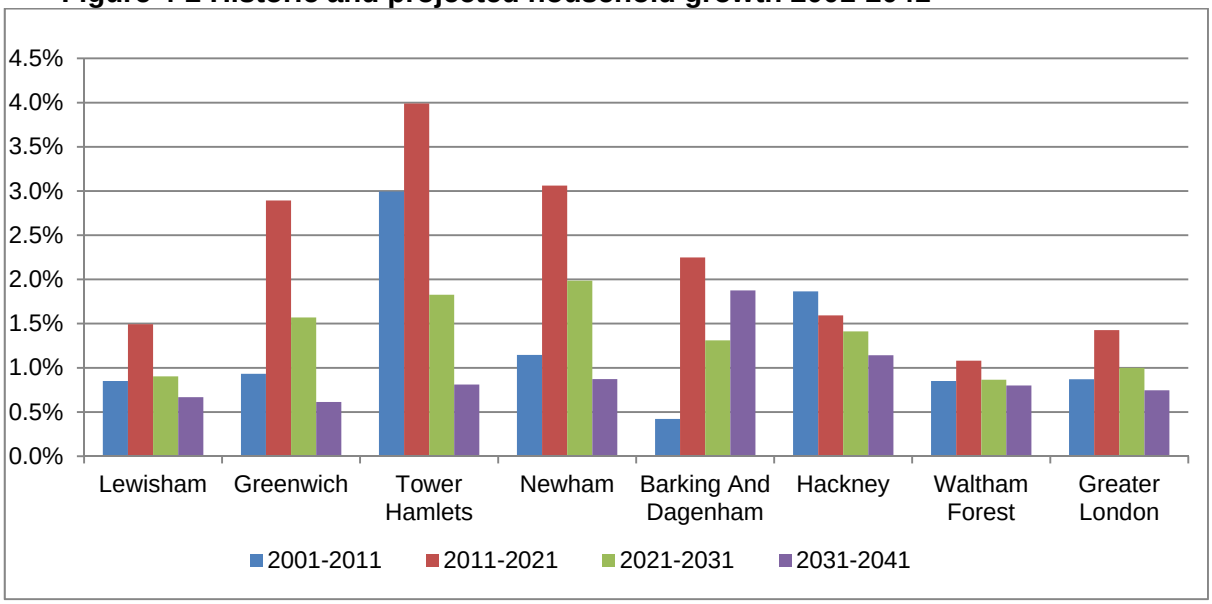
Figure 4-1 Historic and projected annual population growth 2001-2041



Source: ONS and GLA Population Projection

4.3.2 Figure 4-2 shows that, despite annual population growth of 1.8% during the period 2001-2011, annual household growth in the study area was only some 1.3%. The fact that household growth has been lower than population growth has led to a significant increase in average household size. The drivers for the much lower rates of household formation than previous years are likely to include the rising cost of home ownership and rents (as a result of the imbalance between high demand and lack of supply in the housing market). Hence higher average household sizes are a result of economic reasons, rather than a change in cultural preferences or other social drivers given the change is over such a short time period.

Figure 4-2 Historic and projected household growth 2001-2041



Source: ONS and GLA Population Projection

4.3.3 The housing delivery targets in the London Plan identified a potential capacity of around 13,600 dwellings a year in the study area. Table 4-1 shows the net average annual housing units completions in each of the boroughs in the area over the last decade and the minimum ten year target for 2015-25. Between 2004/5 and 2013/4, net additions to the housing stock have been around 7,000 a year (compared to an annual average population growth of 25,000) only about half of the future delivery target of almost 14,000 a year, as set out in the Further Alterations to the London Plan 2015.

Table 4-1 Annual housing targets, 2015-2025

Borough	Minimum total ten year target 2015-2025	Net annual additions 2004/5-2013/14	% increase required to meet target
Barking and Dagenham	12,355	450	175%
Greenwich	26,850	1,070	151%
Hackney	15,988	1,150	39%
Lewisham	13,847	860	61%
Newham	19,945	1,010	98%
Tower Hamlets	39,314	2,050	92%
Waltham Forest	8,620	500	72%
Total	**136,919**	**7,090**	**93%**
Greater London	423,887		

Source: Average Housing Monitoring targets, London Plan March 2015, London data store

4.3.4 Table 4-2 shows that house prices in the area have more than doubled

and in LB Hackney almost trebled over the last ten years. This has led to extremely high house price earnings ratios ranging from 6.6 in the London Borough of Barking and Dagenham to over 13 in the London Borough of Hackney, reflecting that the supply of housing is not keeping pace with demand.

Table 4-2 House prices

Borough	Mean Price	Increase 2005-2014	House price-mean earnings ratios, 2015
Barking and Dagenham	£220,000	127%	6.6
Greenwich	£370,000	164%	10.9
Hackney	£500,000	199%	13.1
Lewisham	£360,000	177%	10.9
Newham	£270,000	133%	8.6
Tower Hamlets	£440,000	168%	7.9
Waltham Forest	£330,000	163%	12
Outer London	£400,000	157%	10.6

Source: May 2015 Land Registry

4.3.5 High house prices and rentals and a shortage of housing are major inhibitors to future growth in London making the city unattractive to people and hence businesses. East London has the potential to meet a significant part of this housing demand but additional investment is needed to help unlock sites and to cope with additional transport demand.

4.4 Employment growth

4.4.1 Table 4-3 shows that over the last decade employment growth in the area has outstripped Greater London as a whole but is still slightly behind inner London. However, LB Tower Hamlets accounts for most of that growth and boroughs such as LB Barking and Dagenham and LB Lewisham have performed relatively poorly. This reflects the changing nature of employment with service sector jobs increasingly concentrating in fewer centres such as central London and the Isle of Dogs.

Table 4-3 Workplace jobs, 2013 and growth over decade

Borough	Total jobs 2013	2004-13 total growth
Barking and Dagenham	54,300	2.5%
Greenwich	83,400	8.3%
Hackney	123,300	28.4%
Lewisham	82,700	4.7%
Newham	100,300	23.8%
Tower Hamlets	269,600	40.0%
Waltham Forest	81,100	17.5%
Total	794,700	22.8%
Inner London	3,263,000	23.8%
Outer London	2,098,000	6.2%
Greater London	5,352,000	16.3%

Source: Annual Business Inquiry (2000-2008) and BRES (2009-2014)

4.4.2 Over the last five years there have been some major changes by sector of employment across the area. Table 4-4 and

4.4.3 Table 4-5 show the largest percentage change for those sectors employing more than 1,000 people, the former considers those sectors that have increased in size while the latter looks at those sectors that have declined in employment terms. The biggest increases in employment are principally in office based service sectors. However, there are very large increases in some sectors which are significant road users including waste collection and treatment and repair and installation of machinery and equipment. Virtually all the sectors listed have outperformed employment growth in London as a whole including those sectors which are road dependent. So, for example, employment in security and investigation activities services has grown by 191% in the area, 152 percentage points more than in London as a whole which experienced only a 39% growth in this sector.

Table 4-4 Workplace jobs, growth 2009-2013, largest growing sectors that employ over 1000 people

Sector – with SIC code	% change in employment 2009-13	Percentage point difference in change compared to London as a whole
80: Security and investigation activities	191%	152
33: Repair and installation of machinery and equipment	163%	115
90: Creative, arts and entertainment activities	99%	34
92: Gambling and betting activities	96%	69
38: Waste collection, treatment and disposal	83%	69

Sector – with SIC code	% change in employment 2009-13	Percentage point difference in change compared to London as a whole
activities; materials recovery		
59: Motion picture, video and television programme production, sound recording and music publishing activities	75%	66
62: Computer programming, consultancy and related activities	73%	46
79: Travel agency, tour operator and other reservation service and related activities	71%	35
74: Other professional, scientific and technical activities	63%	40
82: Office administrative, office support and other business support activities	61%	26
73: Advertising and market research	56%	-1
61: Telecommunications	53%	25
71: Architectural and engineering activities; technical testing and analysis	46%	17
56: Food and beverage service activities	40%	22
46: Wholesale trade, except of motor vehicles and motorcycles	36%	16
70: Activities of head offices; management consultancy activities	36%	10
55: Accommodation	36%	23
96: Other personal service activities	36%	-5
63: Information service activities	33%	-6
81: Services to buildings and landscape activities	31%	29

Source: Business Register and Employment Survey (2009-2014)

4.4.4 The sectors that have seen large falls in employment cover manufacturing and services, many of which are also more road dependent. This decline reflects changes in the economy as a whole but also potentially the increasing unattractiveness of this area of east London given levels of congestion. It is interesting to note that in all but two sectors the decline in employment in these sectors has been worse than the London average.

Table 4-5 Workplace jobs, decline 2009-2013, largest declining sectors that employ over 1000 people

Sector with SIC code	% change in employment 2009-13	Percentage point difference in change compared to London as a whole
31: Manufacture of furniture	-44%	-12
18: Printing and reproduction of recorded media	-31%	-7
65: Insurance, reinsurance and pension funding, except compulsory social security	-29%	-10
87: Residential care activities	-24%	-18

Sector with SIC code	% change in employment 2009-13	Percentage point difference in change compared to London as a whole
53: Postal and courier activities	-24%	-8
14: Manufacture of wearing apparel	-23%	15
58: Publishing activities	-22%	-8
52: Warehousing and support activities for transportation	-21%	-16
45: Wholesale and retail trade and repair of motor vehicles and motorcycles	-19%	-3
29: Manufacture of motor vehicles, trailers and semi-trailers	-19%	10
93: Sports activities and amusement and recreation activities	-13%	-13
84: Public administration and defence; compulsory social security	-12%	-7

Source: Business Register and Employment Survey (2009-2014)

4.4.5 Employment in businesses that serve the fast growing office-based sectors (such as cleaning, food preparation etc) has grown much more quickly since 2009 in boroughs north of the River Thames, including the London Boroughs of Tower Hamlets, Hackney and Newham, than those south of the River Thames. This might be due to their proximity to office markets, with boroughs south of the River Thames finding it more difficult to access these areas.

Table 4-6 Change in office-serving employment sectors 2003-2013

Borough	2003	2008	Change	% Change	2009	2013	Change	% Change
Barking and Dagenham	5,100	4,900	-200	-3.5%	8,100	9,100	1,000	12.0%
Greenwich	8,000	6,400	-1,500	-19.3%	12,000	13,300	1,400	11.4%
Hackney	10,600	10,200	-400	-3.9%	17,200	28,900	11,700	67.7%
Lewisham	9,400	7,400	-2,000	-21.7%	9,800	11,200	1,300	13.8%
Newham	7,500	8,600	1,100	15.2%	12,700	16,700	4,000	31.3%
Redbridge	9,200	12,000	2,900	31.4%	9,500	10,900	1,400	15.2%
Total Study Area	74,600	72,600	-2,000	-2.7%	114,700	155,000	40,300	35.1%
Tower Hamlets	19,200	17,700	-1,400	-7.5%	35,500	47,600	12,000	33.8%
Waltham Forest	5,700	5,300	-400	-7.1%	9,900	17,400	7,500	75.9%
London	529,100	518,200	-10,900	-2.1%	723,800	809,100	85,300	11.8%

Source: Business Register and Employment Survey

4.4.6 Employment in road dependent sectors contracted from 2003 to 2008, but is now growing again at a rate much quicker than that seen in London as a whole.

Table 4-7 Change in road dependent employment sectors 2003-2013

Borough	2003	2008	Change	% Change	2009	2013	Change	% Change
Barking and Dagenham	21,600	19,900	-1,800	-8.2%	18,600	19,900	1,300	7.0%
Greenwich	14,800	16,800	2,000	13.8%	14,600	15,900	1,300	8.8%
Hackney	21,400	20,000	-1,400	-6.4%	19,700	13,200	-6,500	-32.9%
Lewisham	17,700	15,100	-2,600	-14.7%	11,600	12,300	600	5.5%
Newham	19,200	17,300	-1,900	-9.9%	18,100	19,400	1,200	6.7%
Redbridge	16,200	17,200	1,000	6.0%	11,600	12,300	800	6.5%
Tower Hamlets	41,200	36,600	-4,600	-11.1%	33,500	35,200	1,700	5.2%
Waltham Forest	17,100	15,400	-1,700	-10.0%	12,700	19,200	6,500	51.6%
Total Study Area	169,200	158,300	-10,900	-6.5%	140,400	147,400	7,000	5.0%
London	874,000	838,200	-35,800	-4.1%	731,100	742,600	11,500	1.6%

Source: Business Register and Employment Survey

4.4.7 The GLA's employment projections estimate that rates of growth will slow between 2011 and 2036, partly as a result of a slowdown in growth related to financial and business services.

4.4.8 Table 4-8 shows that this would mean a drop in growth in the London Borough of Tower Hamlets and the London Borough of Hackney whilst other locations, such as the London Boroughs of Lewisham, Greenwich, Barking and Dagenham are likely to have increased growth, partly due to the existence of development sites with employment potential and public transport improvements, for example, Crossrail. These growth assumptions assume Silvertown Tunnel as part of a package of wider infrastructure investment.

Table 4-8 GLA employment projection (2011-2036), boroughs

Borough	2011	2036	Absolute growth	% annual growth
Barking and Dagenham	52,000	61,000	9,000	0.7%
Greenwich	79,000	101,000	22,000	1.1%
Hackney	109,000	121,000	12,000	0.5%
Lewisham	73,000	93,000	20,000	1.1%
Newham	87,000	102,000	15,000	0.7%
Tower Hamlets	246,000	281,000	35,000	0.6%
Waltham Forest	70,000	82,000	12,000	0.7%
Regeneration Area	**716,000**	**841,000**	**125,000**	**0.7%**
Inner London	2,963,000	3,522,000	559,000	0.8%
Outer London	1,933,000	2,235,000	302,000	0.6%

Source: London Plan March 2015

4.4.9 The same projections provide a breakdown by major economic sectors as shown in

4.4.10 Table 4-9. Those sectors which may be regarded as more road dependent such as manufacturing, construction, wholesale and transport and distribution are all projected to experience large falls in employment. However, this is principally due to greater automation rather than changes in output and there is unlikely to be a commensurate reduction in road freight traffic. Employment growth in service sectors is expected to continue to grow. Whilst employees in these sectors increasingly use public transport as development is concentrated on key centres, the sectors themselves will still depend on road based servicing.

Table 4-9 GLA employment projection (2011-2036), sectors

Sector	2011 '000s	2036 '000s	Percentage change
Primary and utilities	32	14	-56%
Manufacturing	129	34	-74%
Construction	255	248	-3%
Wholesale	184	117	-36%
Retail	417	436	4%
Transportation and storage	265	199	-25%
Accommodation and food service activities	357	515	44%
Information and communication	360	528	47%
Financial and insurance activities	368	346	-6%
Professional, real estate, scientific and technical activities	670	1,092	63%
Administrative and support service activities	463	673	45%
Public admin and defence	226	178	-21%
Education	353	405	15%
Health	513	574	12%
Arts, entertainment and recreation	164	205	25%
Other services	139	191	37%
All sectors	4,896	5,757	18%

Source: London Plan March 2015

4.4.11 The projected sectoral changes in employment explains some of the differences in borough employment forecasts with locations such as LB Barking and Dagenham more dependent on manufacturing employment which is expected to fall and hence future growth is less than in boroughs with a large service sector.

Table 4-10 Employment by sector by borough (000's) – 2013

Industry	Barking and Dagenham	Greenwich	Hackney	Lewisham	Newham	Tower Hamlets	Waltham Forest
Primary and utilities	1.1	2.1	0.3	0.7	1.3	0.2	0.8
Manufacturing	11.3	3.2	2.3	1.9	3.5	1.3	4.5
Construction	5.3	4.3	2.2	5.3	4.8	1.8	3.8
Wholesale	10.3	3.6	3.0	3.3	4.0	2.6	6.6

Industry	Barking and Dagenham	Greenwich	Hackney	Lewisham	Newham	Tower Hamlets	Waltham Forest
Retail	8.7	10.7	6.2	11.2	16.9	3.2	11.2
Transportation and storage	7.1	5.8	3.1	4.4	5.1	1.9	5.2
Accommodation and food service activities	4.0	7.7	6.3	5.7	9.6	5.1	4.0
Information and communication	2.0	3.9	8.2	2.8	2.4	10.1	1.8
Financial and insurance activities	1.1	0.9	3.4	1.4	1.1	28.7	1.2
Professional, real estate, scientific and technical activities	4.4	6.1	16.7	7.8	5.9	13.0	5.8
Administrative and support service activities	10.1	7.3	20.0	11.1	8.7	13.5	17.7
Public admin and defence	6.0	7.0	4.0	5.4	6.9	2.8	3.9
Education	11.9	16.0	7.1	15.7	13.0	6.3	13.7
Health	9.9	15.4	12.5	18.5	11.4	7.4	15.1
Arts, entertainment and recreation	6.8	6.0	4.7	4.7	5.1	2.1	4.5

Source: Business Register and Employment Survey (2014)

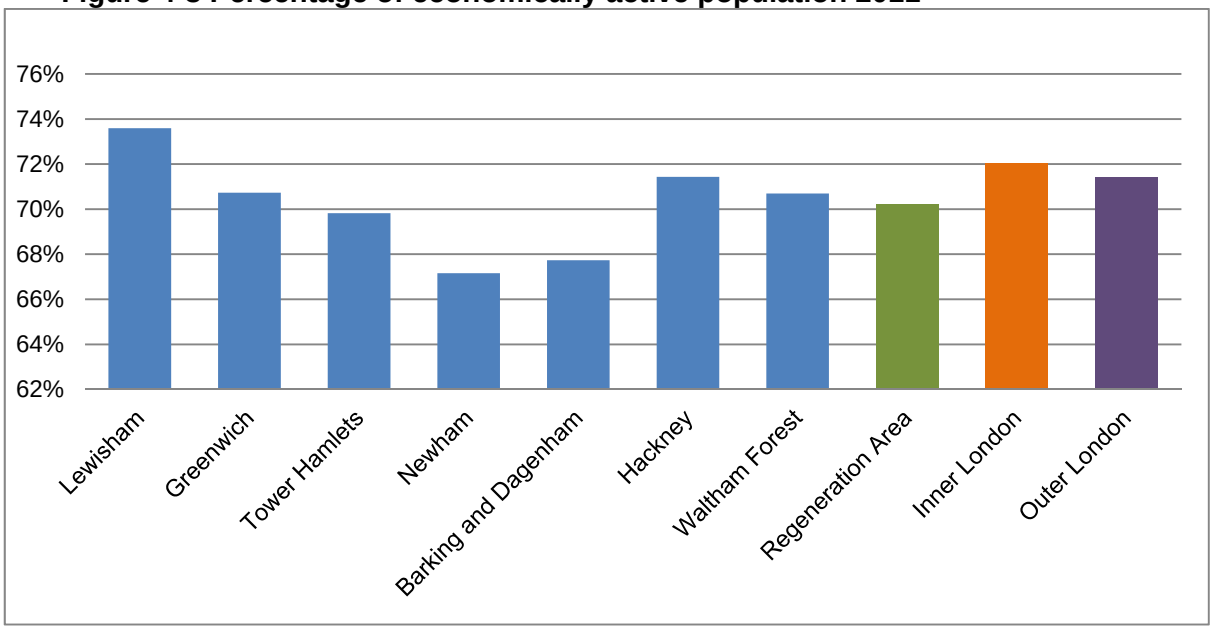
4.4.12 The area has potential for growth significantly above that set out in the London Plan employment projections. As set out in Chapter 6, there is potential for nearly 180,000 housing units and around 3m sqm of commercial space.

4.4.13 In particular, significant levels of employment growth are planned for the Royal Docks, which is likely to increase the demand for travel to this location, including from the south side of the River Thames.

4.5 Labour market profile

4.5.1 Figure 4-3 shows that LB Lewisham is the only borough with an economic activity rate higher than that for Inner London. The London Boroughs of Tower Hamlets, Newham and Barking and Dagenham have significantly lower rates of economic activity than the regeneration area as a whole and Inner and Outer London.

Figure 4-3 Percentage of economically active population 2011



Source: ONS, 2011

4.5.2 Table 4-11 shows the latest claimant count figures for June 2015 and the change over the last ten years. It can be seen that the claimant count is higher in all of the boroughs compared with London as a whole. This is one reason for lower levels of economic inactivity within the area.

Table 4-11 Claimant count, change 2006-2015

Borough	Jun-06		Jun-15	
	Number	Rate	Number	Rate
Barking and Dagenham	4,369	4.1	3,270	2.7
Greenwich	6,186	3.9	3,850	2.2
Hackney	8,114	5.3	5,160	2.8
Lewisham	7,624	4.3	5,196	2.6
Newham	8,678	5.0	5,126	2.3
Tower Hamlets	8,629	5.6	4,588	2.3
Waltham Forest	6,684	4.3	4,386	2.4
London	168,889	3.2	111,798	1.9

Source: Nomis

4.5.3 Skill levels in east London have tended to be lower than the London average. However, over the last decade there has been a marked improvement as shown in Table 4-12Table 4-12 and

4.5.4 Table 4-13. So in relation to those qualified to at least NVQ level 3, five boroughs saw a bigger increase in residents who were qualified to these levels than London as a whole and only RB Greenwich and LB Barking and Dagenham performed less well.

Table 4-12 NVQs by borough and change between 2005 and 2014

	% with NVQ4+ – aged 16-64			% with NVQ3+ – aged 16-64			% with NVQ2+ – aged 16-64		
Borough	Jan 2005-Dec 2005	Jan 2014-Dec 2014	Change	Jan 2005-Dec 2005	Jan 2014-Dec 2014	Change	Jan 2005-Dec 2005	Jan 2014-Dec 2014	Change
London	33.7	49.1	15.4	48.6	64.7	16.1	60.1	76.4	16.3
Barking and Dagenham	15.8	29.4	13.6	30.1	43.0	12.9	42.6	57.8	15.2
Greenwich	28.0	40.7	12.7	46.4	59.3	12.9	59.2	74.0	14.8
Hackney	28.6	48.3	19.7	39.9	63.5	23.6	49.6	75.6	26.0
Lewisham	30.8	54.2	23.4	45.6	69.8	24.2	55.8	80.5	24.7
Newham	21.5	36.8	15.3	33.0	53.1	20.1	45.6	65.3	19.7
Tower Hamlets	29.1	44.2	15.1	40.5	60.0	19.5	48.4	74.3	25.9
Waltham Forest	22.6	43.9	21.3	33.5	59.0	25.5	48.9	73.5	24.6

Source: NOMIS

4.5.5 In terms of those with no qualifications, again five boroughs reduced the proportion of residents with no qualifications faster than the London average, with RB Greenwich and LB Lewisham performing less well, although in the latter case a smaller proportion of residents had no qualifications compared to the London average.

Table 4-13 NVQs by borough and change between 2005 and 2014

	% with NVQ1+ – aged 16-64			% with no qualifications (NVQ) – aged 16-64		
Borough	Jan 2005-Dec 2005	Jan 2014-Dec 2014	Change	Jan 2005-Dec 2005	Jan 2014-Dec 2014	Change
London	70.5	84.2	13.7	14.2	7.8	-6.4
Barking and Dagenham	62.3	70.5	8.2	23.8	15.4	-8.4
Greenwich	71.9	82.2	10.3	14.9	10.5	-4.4
Hackney	57.3	82.4	25.1	24.0	9.5	-14.5
Lewisham	68.1	86.6	18.5	13.8	7.5	-6.3
Newham	56.6	71.4	14.8	22.7	10.9	-11.8
Tower Hamlets	58.2	81.3	23.1	23.0	12.1	-10.9
Waltham Forest	59.4	82.5	23.1	20.0	10.6	-9.4

Source: NOMIS

5. BARRIERS AND CONSTRAINTS TO ECONOMIC ACTIVITY AND GROWTH

5.1 Summary

5.1.1 While highways only carry some of the travel (personal and business) associated with the economy, they are essential for all parts of the economy and a very important element for some sectors in particular, such as the logistics and service industries.

5.1.2 Current congestion levels at the Blackwall Tunnel are significant and impose labour and vehicle costs on businesses and the economy. Poor levels of journey time reliability are a serious issue for businesses and can result in a range of constraints to everyday business operation including additional time and associated costs to plan deliveries, being late for business meetings and appointments, limiting the potential customer base and missing time critical deliveries. All of these constrain the efficiency of the east London economy and hamper business growth.

5.1.3 The labour market is not operating optimally, with very small numbers of people choosing to cross the river to access jobs, particularly in locations east of the Blackwall Tunnel. This limits access to specialist labour skills and competition for jobs for employers and limits the number of employment opportunities for workers.

5.1.4 Customer and supplier markets are constrained, with less people and businesses accessible to firms across east London than in other parts of the city, resulting in less choice.

5.1.5 All of this adds up to a ‘barrier effect’ of the River Thames, where businesses have less access to opportunity and a greater level of costs imposed due to limited number of river crossing options. This means operating in east London is less efficient, making the area less attractive for inward investment.

5.1.6 Other non-transport constraints to economic growth include a relatively low skilled workforce, although skills levels have increased faster than in London as a whole and are higher than the UK average.

5.2 Introduction

5.2.1 This chapter considers the transport and non-transport constraints to growth in the area to be served by the proposed Scheme. It also briefly outlines the importance of London’s road network to its economy. As outlined in chapter 3 transport can impact on businesses through changes

in access to markets, suppliers and employees. The nature of constraints in the local area is principally derived from a survey of some 500 employers across the area31, as well as analysis of secondary data on the labour market and access to jobs and people.

5.3 Importance of roads to London

5.3.1 London's road network is an essential part of the city's economic infrastructure. All sectors of the economy are dependent on road transport even those located in central London and the Isle of Dogs. While the majority of workers in these areas may travel by public transport, all servicing, supply of goods for retail and construction are provided by road. In outer London the car is the dominant mode, accounting for nearly two-thirds of non-walking trips. In addition the dominant public transport mode in outer London is the bus with around 20% more trips per person than rail (underground, tram and national rail).[32]

5.3.2 The success of London is dependent on the efficient movement of goods and services as well as people. For freight, road is even more dominant, in terms of the weight of goods lifted (131.7m tonnes out of a total of 149.6 m tonnes in total)[33]. The growth of London in the medium- to long-term, as set out in the London Plan, would lead to an increase in freight movement to construct, supply and service London's economy in a sustainable way. The number of LGVs on London's roads is expected to grow by 30% between 2008 and 2031[34].

5.4 Impact of congestion

5.4.1 As outlined in the Transport Assessment the road network in the vicinity of the Blackwall Tunnel is currently heavily congested during peak periods, with extensive queuing and delay to vehicular traffic occurring on the main approaches to the Tunnel portals. Delays of around 1.5 minutes per kilometre are common in the morning and evening peaks.[35]

[31] Silvertown Tunnel Business Survey, 2013-2015, WSP, September 2015

[32] TfL Travel in London Report 7, 2014

[33] London Freight Data Report: 2013 Update, University of Westminster for Transport for London

[34] Mayors Transport Strategy 2010

[35] Silvertown Tunnel Transport Assessment TfL September 2015

5.4.2 Congestion imposes real costs on businesses, through vehicle and labour costs which could otherwise be spent on something more productive.

5.4.3 The employer survey found that over a fifth of respondents stated that local road congestion was one of the main weaknesses of their location while a third of respondents reported that local congestion impacted on deliveries to their premises. Nearly 60% of respondents reported daily congestion at the Blackwall Tunnel had a negative impact on their operations,

5.5 Effects on the freight industry

5.5.1 It is noted in Chapter 2 that east London has been identified in the London Plan as the sub-region having the greatest capacity for growth in Greater London and this brings with it the need for infrastructure. The Silvertown Tunnel is critical to more efficient freight movements and these are an important part of London's economic competitiveness.

5.5.2 There has been a variety of responses from the freight industry and their clients to the challenges of congestion that they face every day at the Blackwall Tunnel. The Freight Transport Association calculated that each minute of delay caused by unreliability costs an operator £1; a delay of 20 minutes at the Blackwall Tunnel can, therefore, add £20.00 to the cost of an individual trip.[36]

5.5.3 On the freight delivery industry side at least one major delivery company now actively plans its routeings to avoid the Blackwall Tunnel, thus meaning that other crossings and the wider surrounding road networks are consequently accommodating these diverted movements.[37]

5.5.4 However, it is not possible for many companies, particularly local companies, to avoid using the Blackwall Tunnel to deliver goods to their customers. TfL's Business Survey carried out in summer 2015 cites the example of an engineering company which regularly faces three to four hour long journeys via the A2, which should take in the region of an hour. In extreme cases, five hour delays have occurred at the Blackwall Tunnel, forcing delivery patterns to be suspended.

[36] FTA concerned over journey time reliability for road freight operators Press release May 21, 2015

[37] Silvertown Tunnel Business Survey 2013-2015 case studies WSP

5.5.5 Given such levels of congestion and unpredictability of journey times, the Silvertown Tunnel, with the elimination of peak congestion, reduction of incidents, additional dedicated capacity for HGVs and the ability to handle all standard height large vehicles, would achieve a step change in reliability for the freight industry in east London and would consequently support economic growth in east London and the rest of the city.

5.6 Journey time reliability issues

5.6.1 Poor reliability at the Blackwall Tunnel is a serious issue for businesses with 56% of survey respondents stating they were involved in an unplanned incident (other than everyday congestion) at the Blackwall Tunnel at least once a week. Common problems for these respondents resulting from this include:

- additional time and associated costs to plan deliveries to avoid congestion (32% of all respondents);
- being late for meetings and appointments (41%);
- limiting the number of customers that are prepared to use the business (37%);
- missing time critical deliveries that let down clients or affect future business opportunities (33%); and
- staff are regularly late for work (36%).

5.6.2 All of these impose costs or restrict potential revenue. As a result, 40% of businesses said that unreliable journey times when crossing the River Thames result in a loss of potential revenue and raise costs. By reducing congestion and improving journey time reliability, businesses would have more certainty over their route planning, have more control over their costs and be able to pursue potential opportunities more effectively. Just over half of all businesses in east London reported that their business would be more likely to operate cross-river if journey times were made more reliable.

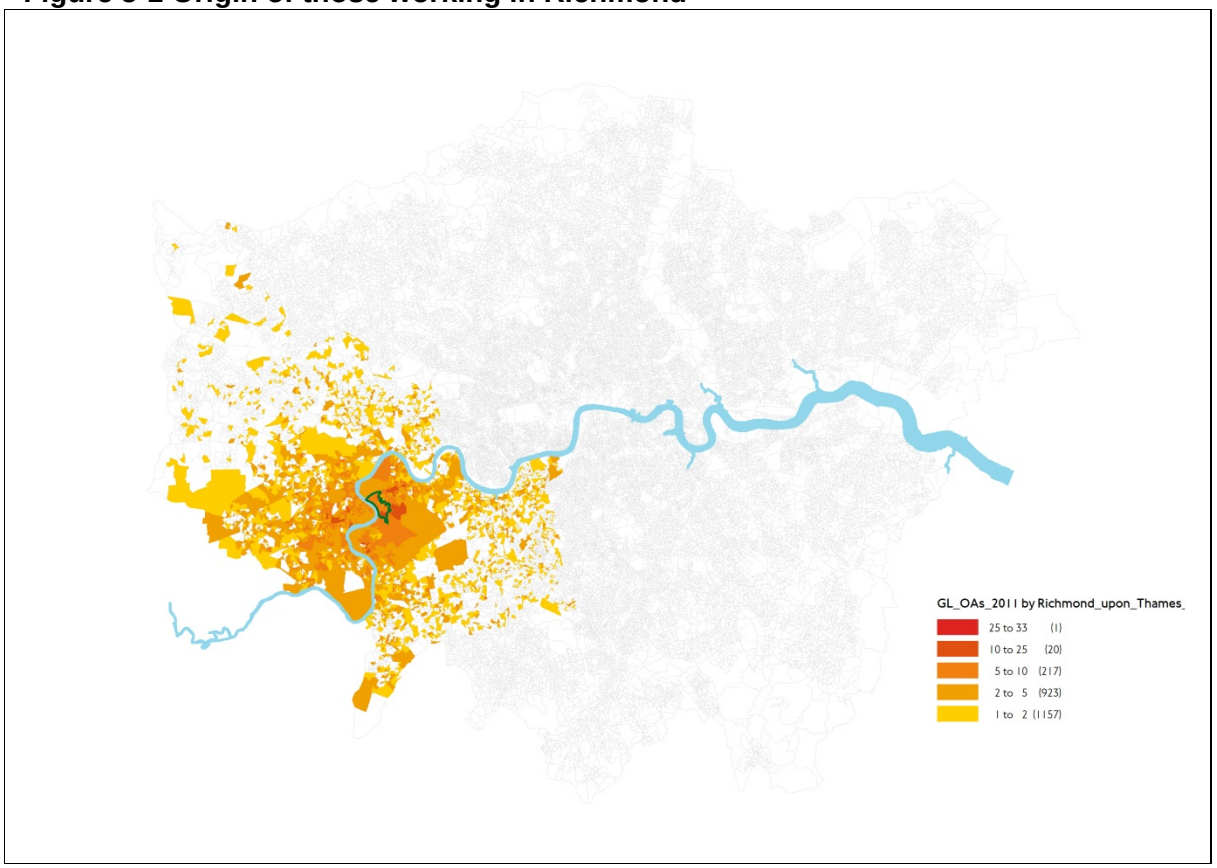
5.7 Access to labour market

5.7.1 Being able to recruit and retain staff is critical to all employers. As the economy grows more employers are looking to recruit staff. Just over half of survey respondents recruited staff over the last 12 months and a third of those had found recruitment difficult. Transport problems were a factor in around a third of those cases, principally associated with accessibility to their site.

5.7.2 Poor levels of accessibility across the River Thames effectively limits the size of the available labour market to the same side of the river. This is demonstrated clearly by the very different geographical extent of labour markets in east and west London.

5.7.3 Figure 5.1 shows the labour catchment area of part of Richmond (outlined in green) located south of the river. It shows a typical distribution of concentric rings, the further one moves away from the centre in all directions the fewer people commute from that area. It can be seen that the river is no real barrier and has minimal impact on travel to work patterns.

Figure 5-1 Origin of those working in Richmond



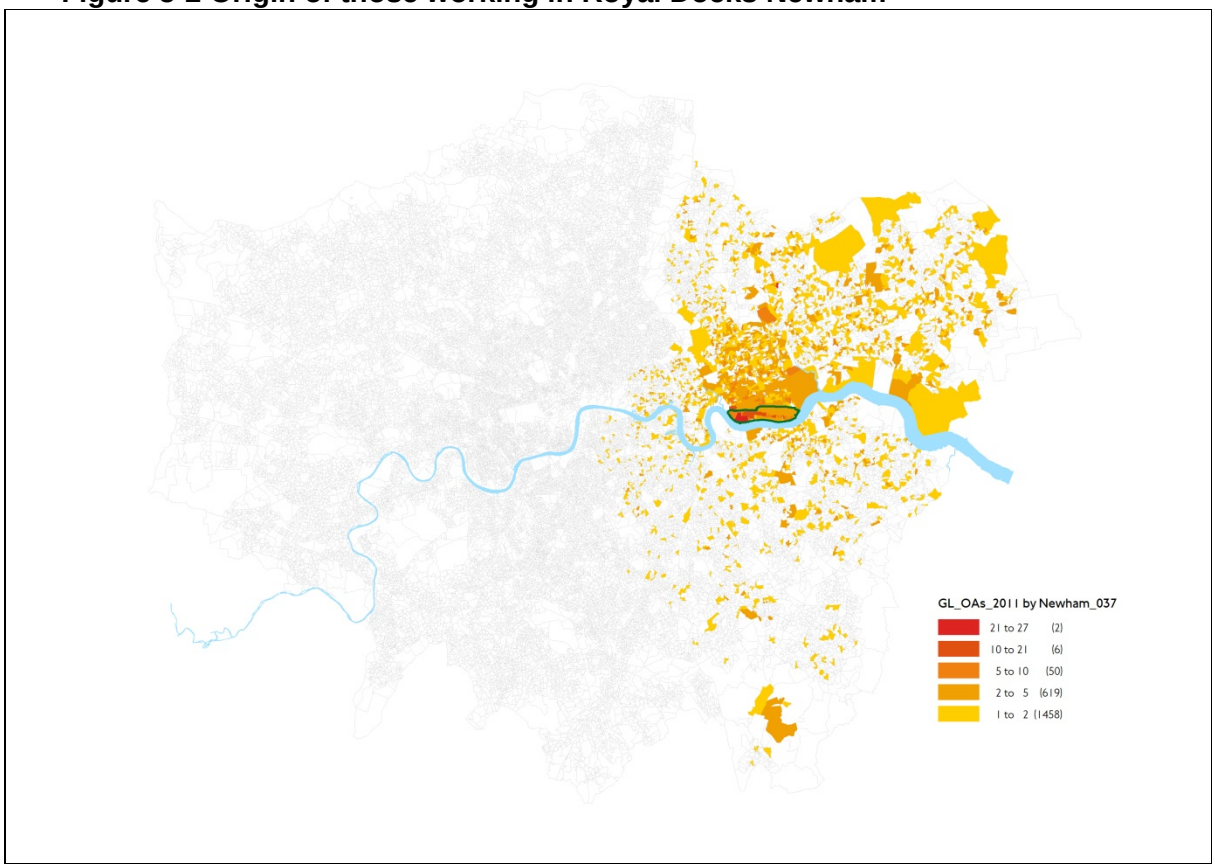
Source: Nomis

5.7.4 A rather different picture emerges when looking at the Royal Docks in LB Newham as outlined in

5.7.5 Figure 5-2. Despite the DLR connection there are very few people travelling from south of the river. It is clear that it is a major barrier both to people seeking work and employers trying to recruit. Given the amount of potential employment growth that can be accommodated in this area this is a major barrier to facilitating access to job opportunities for residents south of the river.

5.7.6 It is telling that in the employers' survey over 60% of those taking on staff had recruited more than 75% of them from the same side of the river and over 40% had recruited no-one from the other side. In addition 15% of respondents reported difficulties in recruiting from across the river.

Figure 5-2 Origin of those working in Royal Docks Newham

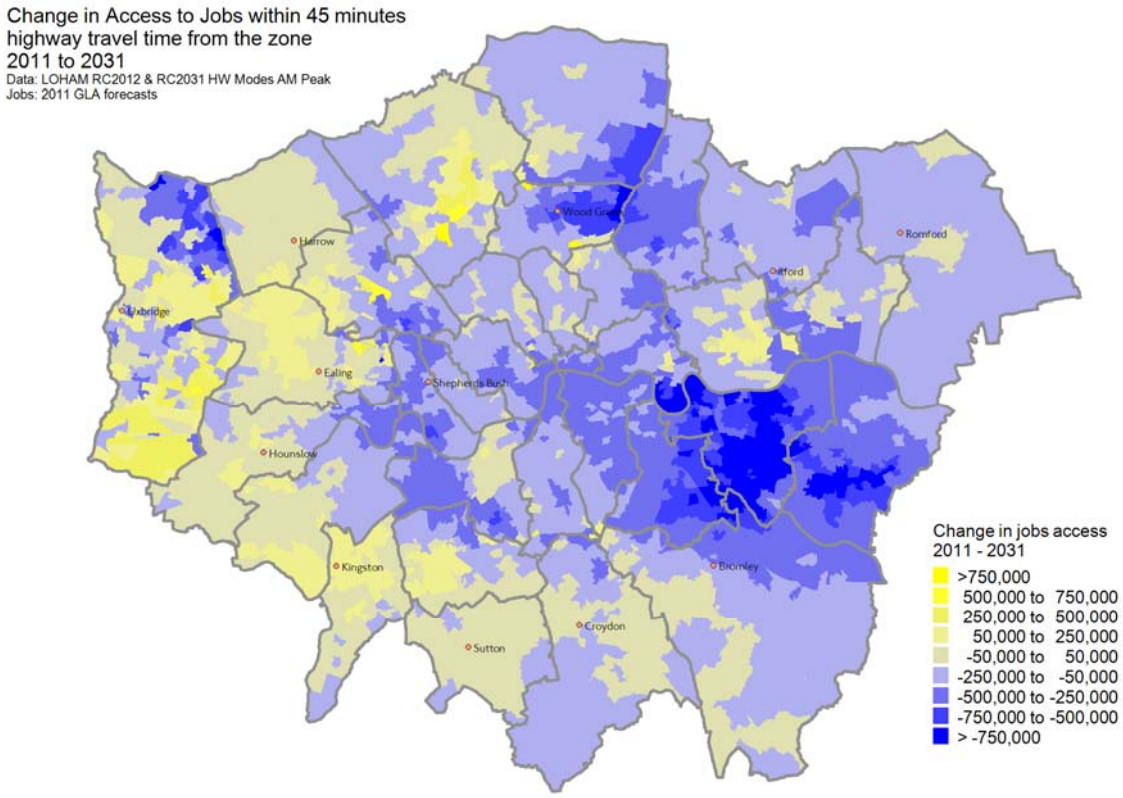


Source: Nomis

5.7.7 Reliability of staff travel due to the road network is also a key issue for east London businesses. Many respondents reported that they are less willing to employ someone from the opposite side of the river given the unreliable nature of cross river links.

5.7.8 Figure 5-3 shows the projected change in accessibility to jobs between 2011-31 based on committed schemes but excluding any new east London river crossings. It shows a major decline in accessibility to jobs from locations in east London especially those south of the river, which is a direct result of the projected increase in congestion at the Blackwall Tunnel. Addressing congestion at Blackwall is, therefore, key to ensuring future access to opportunity for residents of south-east London.

Figure 5-3 Change in accessibility to jobs 2011-2031 without the Scheme

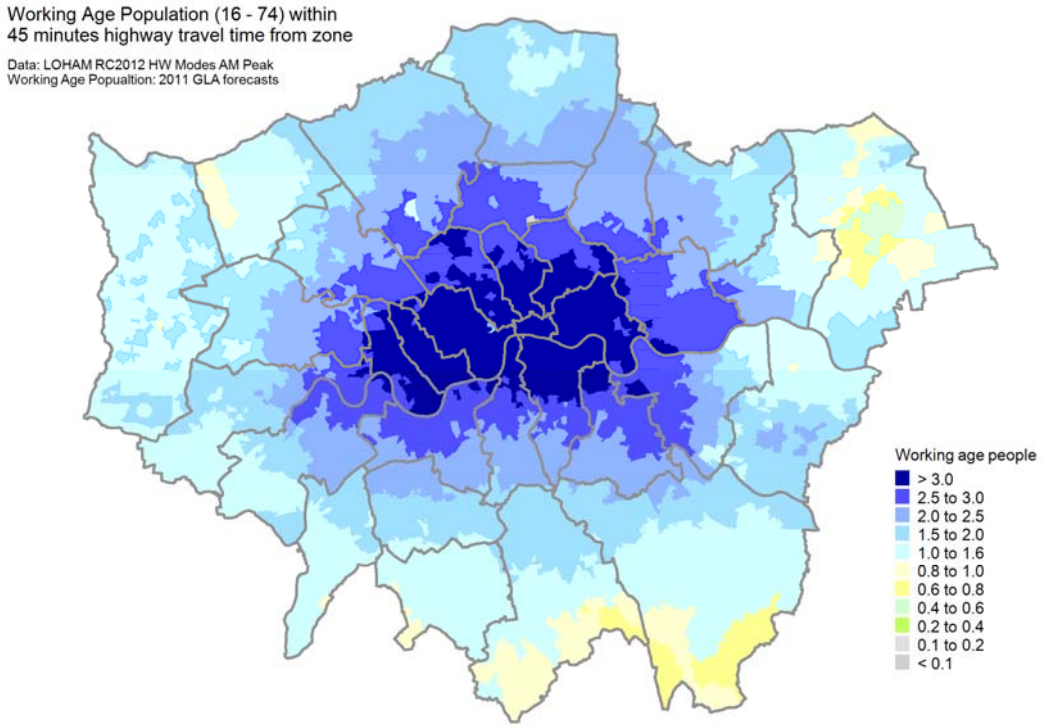


Source: TfL

5.7.9 Figure 5-4 shows the working age population that are within 45 minute highway time in 2011 and Figure 5-5 the same in 2031. The number of people of working age that are accessible to an employer or business is broadly similar either side of the Blackwall Tunnel, although the difference between both sides of the river becomes more apparent further east.

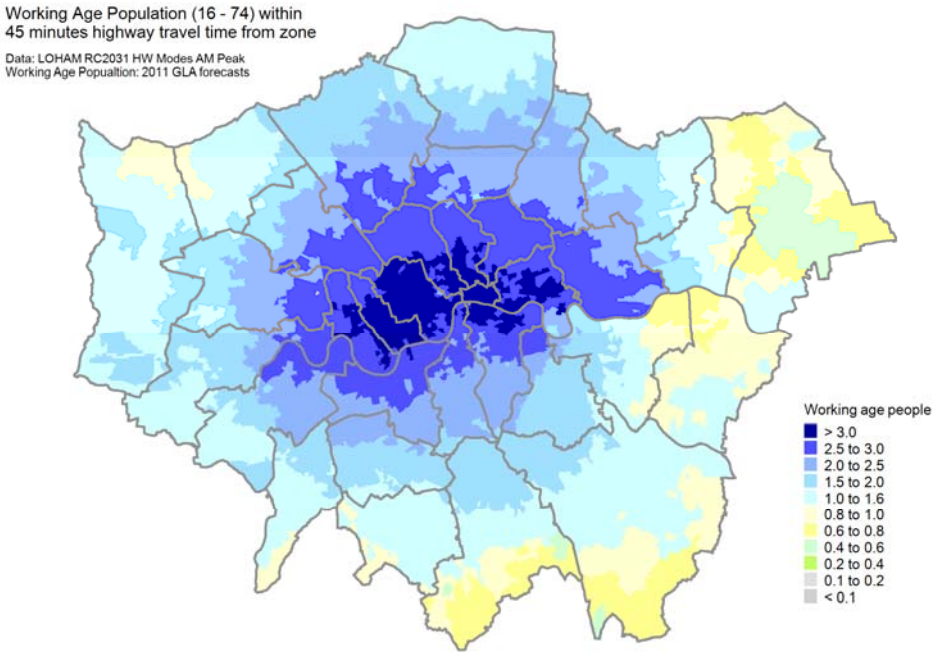
5.7.10 However, by 2031 with increasing congestion the labour catchment areas reduce quite significantly, particularly south of the river. Again, this is a direct impact of the expected levels of congestion at the Blackwall Tunnel. A reduced catchment area would increase the problems that employers have in recruiting, increase costs and reduce efficiency and productivity.

Figure 5-4 Working age population within 45 minutes highway time, 2011



Source: TfL

Figure 5-5 Working age population within 45 minutes highway time, 2031



Source: TfL

5.8 Access to customers and suppliers

5.8.1 Not surprisingly three quarters of respondents to the employer survey state that access to customers is important to them. Nearly a fifth of respondents report that is difficult for either customers to get to them or for them to get to their customers. Similarly, nearly a fifth report problems in getting supplies/deliveries to their location in the area. In a third of cases this was due to local congestion problems and in 8% of cases it is due to problems crossing the river.

5.8.2 As with labour markets the river acts as a barrier for businesses accessing either customers or suppliers on the opposite side. For example, it is estimated that 75% of all deliveries to Canary Wharf are from north of the river reducing access to opportunities for suppliers south of the river and reducing competition in the economy as a whole.

5.8.3 The resident survey[38] also covered the self-employed. Of these 23% reported that the work they choose to take on is limited by their ability to cross the river, 44% report that the time taken to cross the river impacts on the work they choose to do and 39% report that the unpredictability of journeys impacts on what work they choose to take on.

5.8.4 The viability and vitality of retail centres are heavily dependent on the size of their catchment areas. The size of the 45 minute catchment area for town centres in east and west London are markedly different. As can be seen from Table 5-1 those in the east are between a fifth and a third smaller than those in the west. With retail consolidating in fewer larger centres this might suggest centres in the east may struggle given the smaller catchments and associated smaller spend.

[38] River Crossings Residents Survey, TfL, 2015. A survey undertaken of residents living in east London boroughs adjacent to the River Thames.

Table 5-1 Retail centre catchment sizes, accessible population '000s within 45 minutes

Centre type	East	West	Difference
Inner London			
Metropolitan/Major	1,060	1,400	32%
District	1,150	1,570	36%
Outer London			
Metropolitan/Major	720	850	18%
District	500	610	21%

Source: Development study – WS Atkins 2014

5.9 Summary of transport constraints

5.9.1 Four in ten business survey respondents feel that the current number and capacity of river crossings in east London act as a barrier to the development of their operations across the other side of the river. This rises to 49% in LB Tower Hamlets and RB Greenwich and to 53% amongst respondents with £1m turnover or more. Amongst employers there is a strong consensus that current crossing options are not adequate (68%).

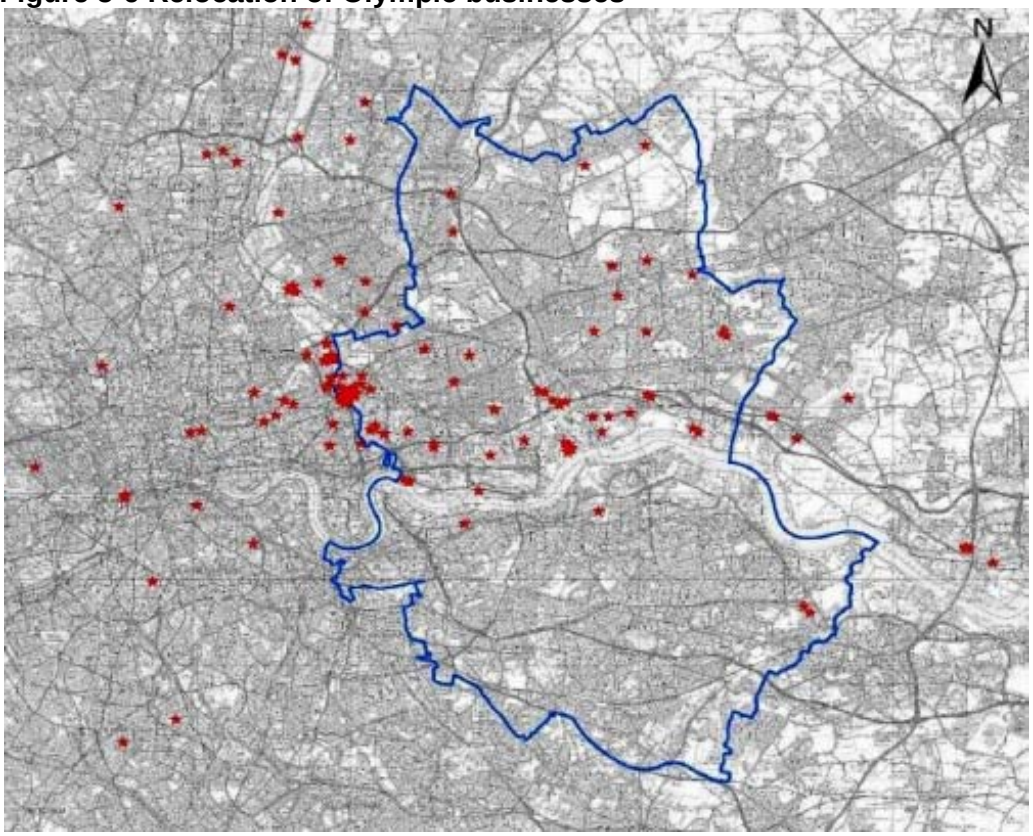
5.9.2 Employers experience regular unplanned delays which impacts on their ability to access customers and suppliers. All these impose additional costs to doing business in the area. The river also acts as a major barrier in terms of the labour market, reducing opportunities for people living in one of the most deprived parts of London and restricting employers in their ability to find people with the right skills and experience.

5.9.3 The self-employed are also restricted in the work they can undertake due to the barrier that the river creates and delays and unreliability in crossing it. Again this reduces efficiency, competition and hence economic growth.

5.10 Impacts of transport constraints on business location decisions and property markets

5.10.1 This lack of cross river movement in east London and the way it affects business location decisions can be illustrated by the relocation of displaced businesses from the 2012 Olympics site (Figure 5-6). Businesses that were based in Stratford decided to overwhelmingly remain north of the river, presumably to maintain access to their labour force and customer base, rather than move south of the river, which in many cases is actually closer to their original business location than their new base.

Figure 5-6 Relocation of Olympic businesses



Source: TfL

5.10.2 The differential in attractiveness is also illustrated by differences in rateable values for boroughs north and south of the river. Table 5.2 shows that retail, office and industrial values are lower in the south and have increased more slowly than those in the north on average.

Table 5-2 Rateable values by use class and borough (£ per sqm)

	Retail		Office		Industrial	
Borough	**2012**	**Change 2000-2012**	**2012**	**Change 2000-2012**	**2012**	**Change 2000-2012**
North						
Hackney	154	78	192	57	59	18
Tower Hamlets	208	102	224	32	61	22
Newham	217	115	120	44	58	23
Barking and Dagenham	137	53	105	30	54	17
Waltham Forest	148	61	105	30	63	24
South						
Lewisham	135	44	77	8	54	11
Greenwich	134	50	98	32	51	13

Source: Valuation Office

5.10.3 There are also some signs that the property market is more active north of the river now too, with property agents reporting off-plan sales markedly higher in the north than the south. This difference cannot be explained solely by actual or anticipated price growth which appears all within a similar range.

5.10.4 It should be noted that poor cross river highway connectivity is not the only factor in this differential. A major contributor to this difference is the more extensive and integrated Underground and DLR network in the north.

5.11 Non-transport constraints to economic activity

5.11.1 TAG unit A2.2 also requires an assessment of the non-transport constraints to economic activity. It defines the main potential constraints to economic development as planning policy (often due to environmental or infrastructure concerns), lack of suitable sites/premises for employers and lack of labour and skills.

Planning policy

5.11.2 As set out in more detail in the Assessment of Needs and Options report[39] policies at a national, regional and local level are supportive of the need for a new crossing to support economic development in the area. Some examples are given below.

5.11.3 RB Greenwich's Second Local Implementation Plan (LIP) discusses river crossings in Section 3 and gives support in principle to '*a vehicle tunnel from the A102 on Greenwich Peninsula to Silvertown'*. In Section 4, the LIP sets out the need for road-based river crossings to support the population and employment growth planned for the borough, particularly to improve radial connectivity into London. The LIP states that '*the proposed package of three crossings at Silvertown, Woolwich and Thamesmead remains critical to successful economic development through improved access to employment opportunities north of the river*'.

5.11.4 LB Newham's Second LIP[40] states that the council has a '*serious concern*

[39] Silvertown Crossing: Assessment of Needs and Options October 2014

[40] London Borough of Newham: 2nd Local Implementation Plan - Transport Policies and Programmes Document, April 2011 (online version not available)

that its [east London's] further development would be hindered by the lack of a suitable road-based river crossing ensuring the efficient flow of both goods and visitors to the centre both north and south of the Thames' (paragraph 2.6.32). The LIP sets out the Council's support for strategic transport proposals that would contribute towards LB Newham's regeneration and economic and physical development and specifically notes a new river crossing at Silvertown in paragraph 2.6.100. The Council notes that its support for this crossing is subject to its delivery as part of a package (along with a crossing at Gallions Reach) and the mitigation of impacts on the Canning Town area (paragraph 3.2.8).

5.11.5 In relation to premises and sites the area has huge potential to deliver additional commercial space, around 3m sqm in net terms. This would suggest the availability of sites and premises is not a constraint. The employers' survey also found that less than 5% of respondents had concerns with premises.

Skills

5.11.6 As highlighted previously economic activity rates are low in the area and around half of respondents to the employers' survey whom reported difficulties in recruitment highlighted skill and or experience shortages as a problem. As section four shows that although skills are low in the area they are generally increasing faster than the London average.

Housing

5.11.7 Housing shortages and constrained labour markets due to the constraints of the River Thames would exacerbate labour shortages. Again as outlined in chapter 6 the area has the capacity to deliver nearly 180,000 homes so in the long term housing shortages can be addressed. However, additional supporting infrastructure is required to bring that development forward, the Scheme is part of that enabling infrastructure.

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6. DEVELOPMENT POTENTIAL

6.1 Introduction

6.1.1 This section examines the level of development potential in the area around the Scheme and reports present developer and land owner sentiment about the potential impact that it may have in relation to development.

6.2 Development projections and capacity

6.2.1 The 2014 Development Study[41] developed a comprehensive database of development land, based on:

- the GLA 2013 Strategic Housing Land Availability Assessment;
- the London Development Database;
- borough site allocation documents; and
- interviews with the Boroughs' planning departments and developers.

6.2.2 The area includes a number of Opportunity Areas which have the potential to accommodate a large number of housing and employment uses.

6.2.3 Figure 6-1 illustrates the nature, location and size of the relevant Opportunity Areas as defined by the London Plan.

[41] WS Atkins, June 2014

Figure 6-1 Opportunity Areas in the vicinity of Silvertown Tunnel

6.2.4

6.2.5 Table 6-1 shows that there is potential capacity for nearly 180,000 residential units, 2.4 million sqm of office, 300,000 sqm of retail and 900,000 sqm of leisure floorspace in the London Boroughs of Barking and Dagenham, Lewisham, Newham, Tower Hamlets and the Royal Borough of Greenwich. If all this was developed it would result in a loss of 600,000 sqm of industrial floorspace. However, this still leaves a considerable increase in employment capacity.

Table 6-1 Summary of development capacity by borough

Borough	Total sites	Total area (ha)	Potential residential units	Potential office floorspace (sqm)	Potential retail floorspace (sqm)	Potential leisure floorspace (sqm)	Potential industrial floorspace (sqm)
Barking and Dagenham	126	518	25,000	25,000	25,000	45,000	-4,000
Greenwich	118	388	36,000	423,000	81,000	241,000	38,000
Lewisham	82	133	16,500	65,000	43,000	98,000	-166,000
Newham	159	615	42,000	681,000	69,000	319,000	-68,000
Tower Hamlets	336	339	58,000	1,172,000	87,000	206,000	-430,000

Borough	Total sites	Total area (ha)	Potential residential units	Potential office floorspace (sqm)	Potential retail floorspace (sqm)	Potential leisure floorspace (sqm)	Potential industrial floorspace (sqm)
Total	821	1,993	177,500	2,366,000	305,000	908,000	-630,000

Source Development Study – Atkins 2014

6.2.6 The Development Study also found that:

- The northern side of the river has over twice as much floorspace capacity that could support employment than the southern side, with the majority of this difference in the office sector.

- This potential imbalance in employment growth, combined with a relatively more even distribution of potential housing growth, is likely to result in a greater demand for trips from those on the south side of the river travelling to the north, reinforcing the need for new river crossings.

- There is a significant oversupply of capacity when compared to estimated demand, particularly for office and retail development. This suggests that not all sites would come forward for development, with only those where market demand is strongest and site constraints do not threaten viability.

- The conclusion is that the area has significant potential for further growth in employment and housing thereby supporting London's wider economy, however, there is a risk that the development would not come forward in a timely manner without the supporting transport infrastructure, including road based infrastructure.

6.3 Summary of development capacity by local area

6.3.1 The following section from the Development Study summarises the development capacity by local area, this review was originally published in 2014 and has not been updated.

Deptford New Cross

6.3.2 This area represents LB Lewisham's greatest focus for change and contains the following key strategic sites:

Convoys Wharf

6.3.3 Convoys Wharf is allocated for mixed use development. It should accommodate about 3,500 homes and provide at least 20% of the built floorspace for class B employment uses, as well as a mix of retail uses that do not adversely impact on established town centres

6.3.4 Development would need to satisfactorily address the protected wharf

status of part of the site in general conformity with London Plan policy and ensure that any new development does not interfere with the operation of the wharf or prejudice its future operation

Surrey Canal Triangle

6.3.5 The Surrey Canal Triangle site is composed of the industrial estates and yards at the western end of Surrey Canal Road, the industrial estate on Bolina Road, Millwall Football Stadium and surrounding buildings in leisure use.

6.3.6 The site as a whole presents a degraded, low quality environment. It is overwhelmingly industrial in character and the industrial estates are closed off and inward looking. The site and wider area suffers from a good deal of severance caused by railway lines on wide viaducts leading to an environment which discourages pedestrian access and connectivity. Bridge House Meadows is a relatively large public open space to the south-east of the site. This open space would require enhancement to meet the needs of the development. The site falls within Flood Zone 3a (high probability of flooding) with high to medium residual risk.

6.3.7 The site is expected to provide for up to 2,500 new homes, as well as at least 20% of the built floorspace for B class employment uses, as well as a mix of retail uses that do not adversely impact on established town centres.

Oxestalls Road

6.3.8 The Oxestalls Road site occupies approximately 4.6 hectares and is a complete urban block bordered by Evelyn Street, Oxestalls Road, Grove Street and Dragoon Road. The site is in close proximity to the Pepys Estate and lies between Evelyn Street and the River Thames river frontage and between Deptford Park and Convoys Wharf. The former route of the Surrey Canal runs through the site.

6.3.9 Redevelopment is expected to provide for a mix of uses to improve the environmental quality of both the site and the surrounding area. The site has sufficient scale to allow a distinct 'business quarter' that could be adjacent rather than integral to residential buildings as part of an intensive mixed use development. Opportunities could be taken to provide residential uses, quality business and light industrial uses providing higher density employment and contribute towards public realm upgrade.

6.3.10 The site is expected to provide for up to 905 new homes, as well as at

least 20% of the built floorspace for B class employment uses, as well as a mix of retail uses that do not adversely impact on established town centres.

6.3.11 It is estimated that there is potential for over 10,000 residential units in Deptford New Cross, the majority of which are judged to have some low risk of flooding, although this is not expected to constrain delivery to a significant extent. The potential impacts on the Safeguarded Wharf would also need to be managed carefully as part of any development proposal.

Lewisham and Catford

6.3.12 Both Lewisham and Catford have scope for intensification, regeneration and renewal. There is particular scope for further intensification in central Lewisham, where a significant amount of development has already taken place in recent years.

Lewisham

6.3.13 The Lewisham AAP estimates that the town centre can accommodate 4,100 housing units with most housing development located at Loampit Vale, Connington Town and Lewisham Gateway;

6.3.14 Lewisham Town Centre is also the largest retail and shopping centre in the Borough. The Council has aspirations to develop 40,000 sqm of additional retail floorspace concentrated towards Lewisham gateway and Lewisham Centre.

Catford

6.3.15 Catford Town Centre is set to accommodate an additional 1,750 net dwellings for the period of 2013-2026 distributed in the areas of Catford Centre, Laurence House, Plassy Road, the former Greyhound Stadium and Wickes and Halford.

6.3.16 There is scope for an additional 8,100 sqm of A1 comparison floorspace and 1,800 sqm of A1 convenience floorspace by 2026. Most of this is expected to be concentrated towards the redevelopment of the Catford Centre and strengthening of the evening economy. The office based employment market in Catford is limited with only local demand.

6.3.17 It is estimated that there is over potential for over 4,300 units remaining in this area. However, many sites have ownership constraints (such as Lewisham Shopping Centre) and there are some concerns about flooding and local infrastructure connections. These could constrain the future delivery of development, although much of these can be overcome if

levels of demand remain high.

Rest of LB Lewisham

6.3.18 The development potential within the rest of LB Lewisham is much more limited than in Lewisham and Catford and Deptford New Cross. It is estimated that there are 1,800 units split over 32 sites with two estate renewal schemes (Excalibur Estate Renewal and Heathside and Lethbridge Estate Renewal) providing over half this capacity. Site constraints are generally relatively minor given the limited size of many schemes in this area.

Greenwich Peninsula and Charlton

Greenwich Peninsula

6.3.19 Greenwich Peninsula is Greenwich's single largest regeneration area. The main focus of commercial development is at the north of the peninsula around The O2 Centre and the Jubilee Line station with residential and retail development further south. There is planning permission for 10,010 residential units, with capacity for approximately 6,000 units left.

6.3.20 As at 2010, the first two phases of Greenwich Millennium Village had been completed providing 1,095 homes, a primary school, medical centre and nature reserve. A Holiday Inn hotel has been built and cycle paths and public realm have been provided together with office space. The next phase of development has been approved for Peninsula Quays to develop out 6 of 11 sites for residential units.

6.3.21 It was originally estimated that the time for completion of the regeneration of the Greenwich Peninsula would be 2022 but the National Audit Office identified that this was now likely to move back to at least 2026, taking into account the delays that this site has encountered. Given the recent further delays to commencement of development, related to the site changing hands and negotiations over affordable housing, it is likely the completion date would now be even later. However, four large new developments which would accommodate almost 900 new homes have recently been given detailed planning permission, which suggests the pace of development is starting to pick up.

6.3.22 Greenwich Peninsula is also expected to see development at Lovell's Wharf (667 dwellings, hotel, small scale retail and community uses) and Enderby's Wharf (770 dwellings, a hotel, retail, commercial and community facilities).

Charlton Riverside

6.3.23 The Charlton Riverside Masterplan outlines a potential opportunity to create a new neighbourhood of 3,000-5,000 new homes and up to 1,000 new jobs. The plan is to create an education and creative industries hub in the eastern Historical Quarter surrounded by a mix of high quality, residential led uses including high quality business space. The retail and industrial uses would be consolidated and rationalised.

6.3.24 The delivery of high value residential development would be dependent on the education hub going ahead and the early delivery of the widening of the Thames Barrier Park to enhance the landscape environment and setting for that new housing.

Woolwich

6.3.25 Building on existing and proposed transport infrastructure including Crossrail and realisation of the substantial residential capacity, Woolwich could evolve to perform a higher role in the town centre network, which could merit Metropolitan status. Implementation of proposals for the Royal Arsenal is also raising the profile of Woolwich and encouraging the wider regeneration of the town centre.

6.3.26 The Woolwich Arsenal site is now one of the focal points for redevelopment in the Borough, much of which is being undertaken by Berkeley Homes. Royal Arsenal has already established a new community, with over 1,248 homes provided to date and with a further 2,517 planned for the future, which are currently being built. The latest planning permission on 25th April 2013 would provide: 2,032 residential units and 2,230sq.m of commercial floorspace.

6.3.27 A number of key sites stand out as having significant development potential:

- Bathway Quarter – located north of the town squares, this area contains a rich mix of historic buildings with sites becoming available for redevelopment.

- Island site, Thomas Street – located at the heart of the town centre, with potential for 400 dwellings, retail and leisure facilities.

- Beresford Street, including MacBean Street and Callis Yard – located in the heart of the town centre with planning consent in place.

- Hare Street Triangle – a considerable retail led mixed use site on the western side of the town centre.

- Spray Street quarter – land assembly is required to facilitate the development of this area opposite the Crossrail development.

- There are also significant future opportunities including the Warren Masterplan (approximately 4,000 units), which would involve the redevelopment of the existing housing estate, as well as at Love Lane. Constraints to delivery are centred around fragmented ownership at some sites, as well as flood risk and negative impacts from heavy traffic flows. It is estimated that there is potential for almost 12,000 residential units, as well a significant amount of office and retail floorspace in the town centre.

Thamesmead and Abbey Wood

6.3.28 Thamesmead is expected to be enhanced through estate renewal integrated with strategic opportunity sites for new housing, social and recreation facilities together with improved open space and Metropolitan Open Land. Crossrail is likely to present a step change in access to Abbey Wood and south Thamesmead. In view of the low lying nature of parts of the Area, particular attention is required on flood risk management. There is scope to enhance employment capacity in the White Hart Triangle and other industrial sites, including waste management and logistics provision.

6.3.29 The Thamesmead and Abbey Wood SPD identifies the following recent Initiatives in this area:

- Gallions Reach Urban Village – new residential community in west Thamesmead;

- Tamesis Point – adopted SPG and outline planning consent for the delivery of 2,000 new homes to the west of Thamesmead town centre;

- White Hart Triangle – creation of high quality business premises in west Thamesmead;

- Tavy Bridge – phased renewal of the housing estate by Southmere which includes the provision of a new library; and

- Veridion Park – rejuvenation of east Thamesmead Business Park including the Thames Innovation Centre (TIC) and outline consent for new office, light industrial and warehouse uses in Bexley.

6.3.30 It is estimated that there is potential for over 3,000 residential units in this area, as well as over 20,000 sqm of office floorspace associated with the planning permission at White Hart Triangle. Many large sites are subject to flooding constraints.

Rest of RB Greenwich

6.3.31 The rest of RB Greenwich area covers the central and southern parts of the Borough, which has fewer development opportunities than the north. Kidbrooke Village, which is currently under construction (with an estimated 1,760 units remaining), represents the biggest single development opportunity.

6.3.32 Most other sites are of a medium size and include the potential development of education facilities as well as town centre sites in Greenwich and Eltham.

Isle of Dogs

6.3.33 The north of the Isle of Dogs forms a strategically significant part of London's offer for financial, media and business services and is recognised as part of the Central Activities Zone for office policy purposes, with Canary Wharf also functioning as a major town centre for its workers and local communities.

6.3.34 Proposed transport investment including Crossrail 1 would allow it to accommodate an additional 110,000 jobs by 2031 focused on the area with particularly good and improving public transport accessibility and capacity in and around Canary Wharf.

6.3.35 Parts of the area have significant potential to accommodate new homes and there is scope to convert surplus business capacity south of Canary Wharf to housing and support a wider mix of services for residents, workers and visitors. Retail provision in Canary Wharf has the potential to develop and serve a wider catchment, complemented by a broader range of civic, leisure and other town centre facilities.

6.3.36 It is estimated that there is potential for 21,500 residential units and over 420,000sq.m of office floorspace, most of which is associated with the Wood Wharf development. All sites are considered to have some degree of flood risk, although this is not expected to constrain development in this location.

Rest of LB Tower Hamlets

6.3.37 The rest of LB Tower Hamlets area includes parts of the City Fringe in the west, as well as a range of locations that are expected to see significant growth, including:

- Aldgate: 1,230 dwellings to 2025;
- Bethnal Green: 1,200 dwellings;

- Limehouse: 1,800 dwellings;
- Shadwell: 710 units;
- Shoreditch: 1,840 units;
- Spitalfields: 2,850 units;
- Wapping: 1,470 units; and
- Whitechapel: 1,340 units.

6.3.38 In total, it is estimated that this area could see 21,000 additional dwellings and up to 750,000sq.m of office floorspace, most of which would be located in the City Fringe.

Lower Lee Valley

6.3.39 The Further Alterations to the London Plan describes this area as the most important single strategic regeneration initiative for London and an urban renewal challenge of global significance. The Lower Lee forms the axis linking two nationally important growth corridors: the London Stansted-Cambridge-Peterborough corridor to the north and the Thames Gateway to the east.

6.3.40 A new Metropolitan centre would be focused on Stratford town centre and a mix of employment, housing and open spaces across the Lower Lee Valley. Stratford is recognised as one of the capital's two strategic office centres beyond central London and a potential Outer London Strategic Development Centre with particular potential for office development. The area would contain a significant new residential community providing at least 32,000 new homes and potentially up to 40,000. There is estimated capacity for up to 50,000 new jobs including over 30,000 predominantly office jobs at Stratford City.

6.3.41 Building on over a decade's worth of regeneration and the positive impact of Westfield Stratford City and the Olympic Park, this metropolitan centre is set to evolve further with the delivery of a new community of over 2,800 homes in east Village, the TIQ Stratford City development creating 500,000sqm of new work space, as well as other significant mixed use sites at Chobham Farm and Strand east.

6.3.42 Coupled with new transport infrastructure, this enhanced residential and commercial offer is set to be accompanied by higher education provision including UEL, Birkbeck and UCL, who have established a vision for the creation of a new university quarter on the Carpenters Estate. This cluster

of universities and their attendant support services would be critical to the establishment of a new knowledge economy across east London.

6.3.43 Any new development and infrastructure brought forward in this area must avoid adverse effects on any European site of nature conservation importance (to include SACs, SPAs, Ramsar, proposed and candidate sites). There is also the issue of the need to manage the release of appropriate industrial sites for mixed-use development, whilst retaining key industrial land, particularly in the Strategic Industrial Locations.

6.3.44 It is estimated that there is potential for 35,000 new homes in this location at present, with up to 500,000sq.m of office floorspace, alongside additional retail and leisure floorspace.

Royal Docks

6.3.45 There have been repeated attempts to regenerate Royal Docks to which there have been some successes. The University of East London now has more than 23,000 students and is positioning itself as an international campus with plans for future expansion. City Airport, which started as a tiny venture, is now London's premier business airport. ExCeL, which started as an exhibition centre, is now developing into a world-class convention centre feeding a growing hotel and entertainment sector.

6.3.46 However the market response to these initiatives has been limited. Housing has been opportunistic, of variable quality and not supported by the range of local centres needed to create sustainable neighbourhoods. Development has been disconnected, ad hoc and in many cases, has not been high quality or as enduring as would have been hoped.

6.3.47 The Enterprise Zone at Royal Docks is expected to be able to accommodate at least 6,000 jobs. Key issues to be addressed include maximising the benefits of the Crossrail station at Custom House, future growth of London City Airport, capitalising on the success of ExCeL and its potential as a focus for further visitor/business related growth and improving connections to London Riverside. For Thameside west, strategic development principles are set out in the adopted Lower Lee Valley OAPF. Thameside east, west and Beckton Waterfront are also key locations for river-related industries. The management of safeguarded wharves, including scope for consolidation, would be an important issue in realising the potential of these sites.

6.3.48 London City Airport is a major employer within the area but the operation of the airport has impacts on the local environment and also could constrain some types of development in the Public Safety Zone to the

east and west of the runway.

6.3.49 A number of wharves on Thameside are safeguarded in the London Plan (and by a Direction from the Secretary of State), protecting them from development which could prejudice their future use for transporting goods by river. However, the wharves are spaced out across the river frontage and the land is in many cases underused.

6.3.50 Key sites in this area include:

- Silvertown Quays. Residential-led mixed use with potential for leisure and hospitality and green industries including research and development, building on the visitor attraction cluster at the western end of the docks.

- Minoco Wharf. The release of land designated as a Strategic Industrial Location at Thameside west up to the eastern boundary of Lyle Park and west of Lyle Park adjacent to north Woolwich Road, (18 hectares) would assist in the development of a new neighbourhood at west Silvertown.

- Thames Wharf. If it can be demonstrated that either Scheme can be delivered, this could provide the opportunity to develop new employment, leisure/ tourism and residential uses grouped around a potential new DLR station where passive provision is in place, subject to addressing the constraints on the site, including the Silvertown Crossing safeguarding area and the removal of the wharf safeguarding by the Secretary of State.

- Albert Basin. New housing around Albert Basin would consolidate existing residential development, with a new local centre focused around Gallions Reach DLR station, providing day-to-day shopping, health, education and community uses. North of Armada Way new development would be employment-led and consistent with Strategic Industrial Locations (SIL). Residential development to be focused around southern end of the site.

- Canning Town Central. Expanded District Centre abutting a transport hub, moving towards a major centre in composition and scale, within a revised boundary to comprise retail (to include anchor food store of up to 6,500 sqm net and significant comparison floorspace, up to 25,000 sqm net) leisure and civic space making use of the more pleasant street environment created by the re-modelling of the junction and public realm, residential and community uses.

6.3.51 It is estimated that there is potential for over 18,000 units in the Royal Docks area, with almost 190,000sq.m of office floorspace.

Rest of LB Newham

6.3.52 The rest of LB Newham area is expected to see less change than the Royal Docks and Lower Lee Valley. Approximately 3,000 additional dwellings would be developed in this area, with a focus around key centres including:

6.3.53 Forest Gate town centre would become an attractive and vibrant centre, with cafes, community and cultural facilities and independent shops together with a small to medium-sized food store to add to the mix and quality of offer.

6.3.54 Manor Park would see most change around the new Crossrail station which would gradually redefine and reinvigorate Manor Park local centre, creating a more significant focus to the area for the local community.

6.3.55 East Ham town centre would continue to be important within the borough as a whole, with recognised heritage assets, employment, civic and community spaces, good accessibility by bus

6.3.56 Constraints on these sites are relatively limited given the small size of most of the development opportunities.

Barking

6.3.57 The Barking Town Centre AAP states that, in addition to providing 6,000 new homes (some of which have already been built) for all sections of the community, the town centre would serve as the retail, leisure, commercial and training centre for Borough residents and grow in vitality and importance as it plays its full part in the expansion of the Thames Gateway. In line with the conclusions of the Barking Town Centre Retail Study Update 2009, the Council considers that up to 9,000 sq. m. (net) of additional shopping floorspace should be provided in the town centre in the period up to 2016. Demand for office development is likely to be limited, although there is potential for a major hotel and leisure use.

6.3.58 Key sites for development in this area include the redevelopment of the Gascoigne Estate, Fresh Wharf Estate and the Abbey Retail Park. It is estimated there is now potential for over 4,400 units, along with some small amounts of office and retail floorspace that could come forward subject to market conditions.

Barking Riverside

6.3.59 Barking Riverside is a 180-hectare site and is a joint venture between the Homes and Communities Agency (HCA) and Bellway Homes plc. Bellway acts as the lead developer for many of the new homes on site and project manage the infrastructure works for the new community on behalf of the

joint venture. The objective is to deliver serviced development plots for 10,800 new, mixed-tenure homes to accommodate 26,000 people, together with healthcare, shopping, community and leisure facilities and environmental benefits, new public transport links and employment opportunities.

6.3.60 Many of the attendant facilities, a primary school, places of worship, healthcare facilities and social enterprise units, would be within the new Rivergate Centre, which opened in September 2011, shortly before the first 350 homes were ready for occupation. These are set to be joined by 700 more during 2013–14: in total, 10% of the target set a decade ago.

6.3.61 The long delay in implementation was due in part to the difficulty and cost of preparing the land, much of which is marshy or rendered undevelopable by the overhead power lines that cross the site. The other main problem is access, a Bus Rapid Transit link from Barking station, the first stage of which opened through Barking town centre in February 2010, completed by a second stage leading directly into the heart of the development in September 2013. There is a long-term plan to electrify the London Overground route from Gospel Oak to Barking and, which has now been announced in the 2013 Comprehensive Spending Review. This would potentially allow an extension from Barking station on to the site.

6.3.62 As well as Barking Riverside, The Core Strategy identifies Dagenham Dock and south Dagenham as key sites. In total it is estimated that there is capacity for almost 16,000 units in this area, the majority of which have constraints related to flooding, land remediation and local access.

Rest of LB Barking and Dagenham

6.3.63 Most of the sites in the rest of the LB Barking and Dagenham are relatively small, although there is still potential for over 5,000 units across 50 sites. The largest single site is the University of East London campus on Longbridge Road, which has permission for over 1,000 units. Very few site constraints were recorded in this area, with some minor flooding and air pollution concerns recorded at three sites.

6.4 Developer views of the impact of the Scheme on development sites

6.4.1 Discussions with developers to ascertain their views of the market and how Silvertown might impact on it are outlined below.

Residential

6.4.2 Rail schemes attract most attention from residential developers. Crossrail is, therefore, expected to be the key driver in supporting residential growth

in the study area, particularly at new stations at Woolwich and Abbey Wood.

6.4.3 The benefit of improved road and bus services is recognised but developers are not well positioned to identify sites that might benefit or understand the implications of such improvements on their developments. The view, therefore, amongst developers is that the Silvertown Tunnel proposal would play a lesser role in site selection or facilitating/ speeding-up the delivery process compared to rail schemes such as Crossrail.

Commercial

6.4.4 The commercial (office and retail) real estate market was strongly affected by the recession with an absolute contraction of floorspace and new construction. The market has now recovered strongly in central London but returns in outer London/M25; high street shops and industrial remain below pre-recession levels. In east London the market was consolidating north of the river, reinforcing the point that employment growth is likely to be higher north than south, creating the need for improved cross river movement.

6.4.5 So while Silvertown Tunnel may not have a material impact on individual sites it would support development across east London by tackling congestion, improving reliability and increasing access to markets and suppliers.

Industrial

6.4.6 Developers/land owners are looking to consolidate investment around existing industrial estates or creating new estates with super-large distribution sheds located on the periphery of London. Most of this activity is road-based and hence would welcome improvements to the road network.

6.4.7 Whilst the Scheme may not have a material impact on individual sites it would make the marketing and take-up of development easier as the image of the local area would be improved with the removal of cross river congestion.

Logistics

6.4.8 There has been significant growth in the logistics market, with in some cases rental returns exceeding residential development returns for the site. Units increasingly work 24/7 on small, highly-accessible sites. Critical to this sector is location, time is money, i.e. the turn-around time between load and delivery is critical to both the driver and the company’s business

case. This sector is highly affected by road congestion. Hence companies tend to look for a series of logistic hubs surrounding London to serve each metropolitan quarter, rather than servicing London from one geographical point partially because of the demand for ‘instant delivery’ and to mitigate against cross-London movement.

6.4.9 All of this activity is road-based and would consequently benefit from improvements to the road network facilitated by the Scheme. Silvertown Tunnel may not have a material impact on individual sites, but it would make the marketing and take-up of development easier as the image of the local area would be improved with the removal of cross river congestion.

6.5 Conclusion

6.5.1 East London has the single largest capacity for growth anywhere in the UK, with London’s future economic potential depending on the realisation of these development opportunities. Unlike a rail-based public transport Scheme, the improvements in connectivity expected with the Silvertown Tunnel would be dispersed over a much wider area, which means that concentrated uplifts in land value are less likely. Following discussions with developers and the Boroughs, we have not identified any particular sites which are clearly dependent on the Scheme for their delivery. However, all sites rely on good road access to varying degrees.

6.5.2 When cross-river highway traffic in the single greatest concentration of developable land in the UK’s most productive city is subject to diversions, delays and unreliability it can only serve to impede short-run economic output and inhibit sustainable future growth. Tangible impacts in the efficiency of the local economy, improved access to jobs and services, as well as improvements in the perception of the area, could mean that future levels of development, including housing, may be higher as a result of the Scheme.

7. SCHEME IMPACTS

7.1 General Scheme impacts

7.1.1 The principal effect of the Silvertown Tunnel Scheme is expected to be a significant improvement in the efficiency of traffic movement on the A102 corridor, where congestion would be almost eliminated. Access by road, congestion and delays were noted in the business survey as the most important issues for local businesses.

7.1.2 The other significant effect of the Scheme would be to reduce the frequency and impact of closures of the Blackwall Tunnel, greatly reducing disruption and helping to provide more reliable journey times. Reliability was highlighted in the business survey as a very important issue.

7.1.3 The Scheme would enable the provision of a network of cross-river bus services (currently rendered impractical by the constraints imposed by the Blackwall Tunnel).

7.1.4 The expected impacts on congestion, reliability and resilience, all critical to business and freight users, are described below.

7.2 Congestion

7.2.1 The Scheme would be expected to lead to a reduction in the length of the morning and afternoon peak periods, principally as a result of the reduced congestion and additional capacity that it would provide. Effectively, the Scheme would enable more motorists to travel at the times they wish, rather than earlier or later to avoid the worst of the traffic. With reduced congestion, the Scheme would also result in an overall reduction in travel times across the network.

7.2.2 Journey times through the Blackwall Tunnel in peak periods and peak directions would be reduced by up to 20 minutes taking into account reliability benefits. In particular, the Silvertown Tunnel would relieve congestion at the A102/A13 East India Dock Road junction, improving northbound journeys during the AM peak hour by some 9-17 minutes[42].

[42] Silvertown Tunnel Preliminary Transport Assessment, TfL, September 2015

7.3 Reliability

7.3.1 This is expected to be one of the most significant benefits of the Scheme and is of particular importance to business users including freight. The design of the Silvertown Tunnel would allow for full clearance by higher vehicles, including HGVs and double-decker buses. It, therefore, would reduce the propensity for certain types of incidents to occur, including those relating to congestion and those involving over-height vehicles attempting to use the northbound Blackwall Tunnel bore and would offer freight operators more route choices. Much lower congestion would also reduce congestion-related incidents such as vehicle shunt accidents.

7.3.2 When there are closures at the Blackwall Tunnel, the journey times and congestion impacts on the wider road network and on adjacent river crossings would be lessened because there is an alternative crossing available. This includes relatively short closures as well as potential longer-term closures associated with major incidents.

7.4 Resilience

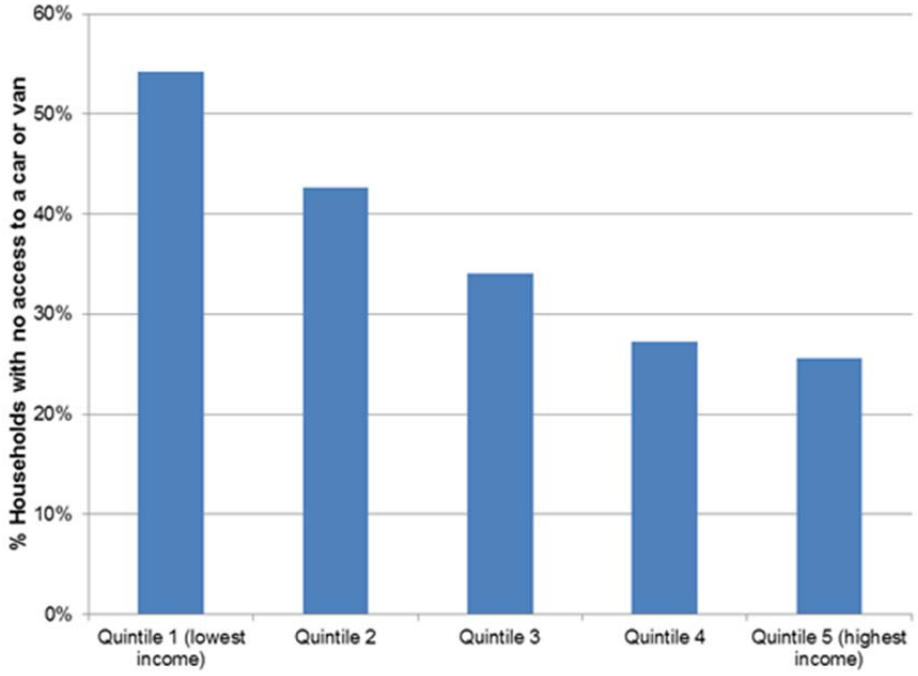
7.4.1 The new tunnel provides both short- and long-term resilience, another benefit particularly important to businesses. TfL would use signage and information to encourage tall vehicles to use the new tunnel, thereby reducing the number of closures at the Blackwall Tunnel. However, if the Blackwall Tunnel is closed, Silvertown Tunnel would provide an alternative to which vehicles, sharing the same approach road, could easily switch.

7.4.2 In the long-term, the presence of the Silvertown Tunnel increases the scope for allowing refurbishment of the Blackwall Tunnel, notably the northbound bore, which is over 115 years old.

7.5 Public transport links

7.5.1 The Scheme would create opportunities for significant improvements in cross-river bus services, which are vital to the ability of residents in the regeneration areas to access employment opportunities. Lower-income residents of London have very low levels of access to cars and vans (see Figure 7-1) and there is, therefore, a much higher dependence on the use of public transport for access to employment.

Figure 7-1 Households in London with no access to a car or van, by income group



Source Nomis

7.5.2 Figure 7-2 shows the areas with high levels of deprivation close to the proposed Silvertown Tunnel. When these are compared to the current public transport provision in the area (see Figure 7-3) there are clear gaps in cross-river provision, crucially from the regeneration areas of RB Greenwich to the regeneration areas in the Royal Docks and other parts of LB Newham.

7.5.3 As noted above, there is only one existing cross-river bus service in this area (the service 108 through the Blackwall Tunnel, linking Greenwich to Stratford along the A102/A12), the geometry of the tunnel and the major congestion and reliability issues presently restrict the ability to improve cross-river bus services.

Figure 7-2 High levels of deprivation close to Silvertown Tunnel

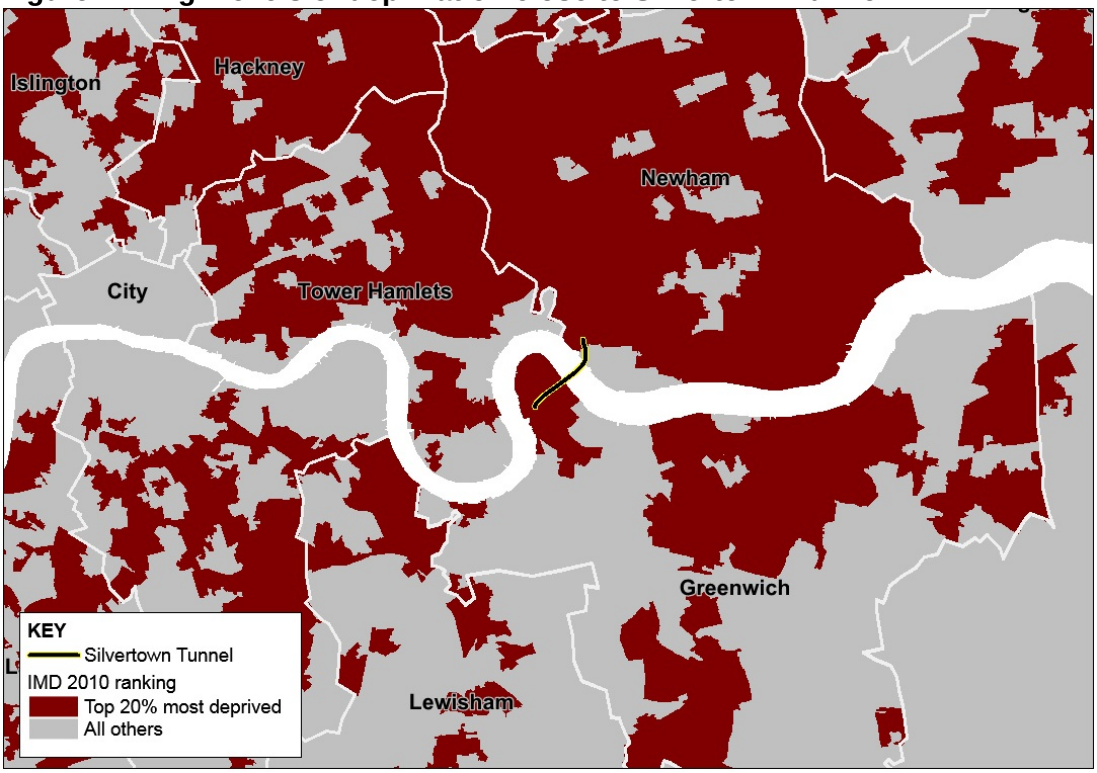
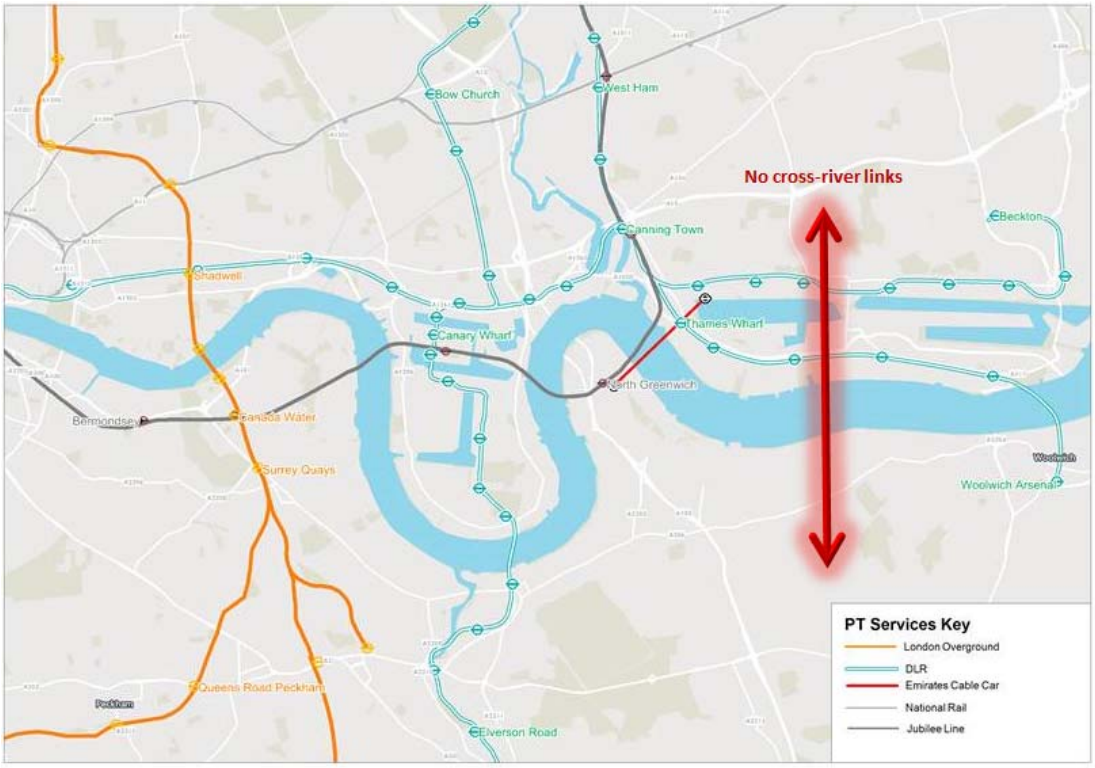
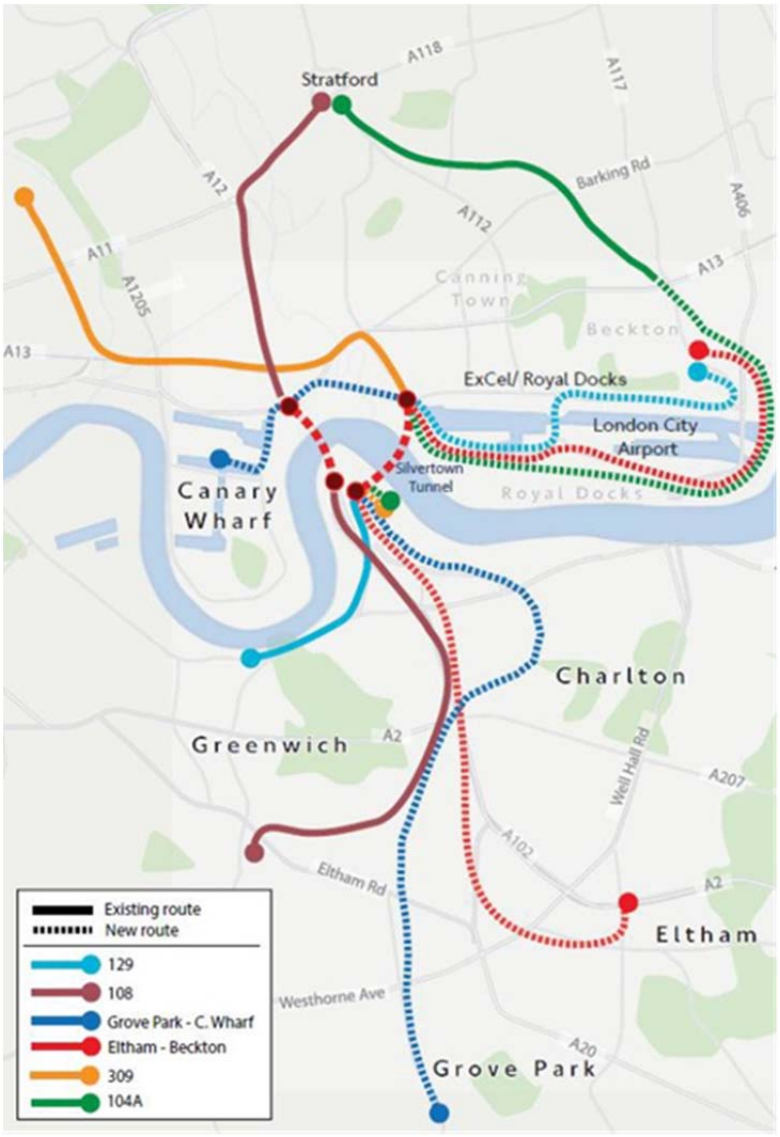


Figure 7-3 Rail connections in the vicinity of the proposed Silvertown Tunnel



7.5.4 Figure 7-4 shows the potential bus services following the introduction of the Scheme.

Figure 7-4 Potential new cross-river bus services



7.5.5 These show excellent connections between Greenwich, Eltham. Charlton and the Grove Park areas and the Royal Docks area and other parts of LB Newham and LB Tower Hamlets. There would also be a secondary effect that route extensions to/from cross-river links would also help connect other parts of RB Greenwich and LB Newham to Opportunity Areas on either side of the river which are anticipated to provide considerable volumes of homes and jobs. In effect the Scheme opens up the area to many new potential bus connections to ‘stitch together’ the regeneration areas on either side of the river. The Scheme is, therefore, expected to deliver a step change in cross-river bus connectivity and the ability of

residents to access jobs in this area.

7.5.6 In addition to cross-river bus service improvements, the EAR[43] shows that there would be very significant improvements to the journey time and reliability of the extensive network of commuter coaches which serve the City and Canary Wharf from Kent and the Medway towns.

7.6 Overall economic impacts

7.6.1 The EAR shows the overall economic impacts; the key implications for businesses are summarised below and in Table 7-1:

- Significant time user benefits for all modes (table row A).
- When the effect of user charges is taken into account (row C) bus and coach and car users have positive net user benefits, while goods vehicles (HGV's/LGV's) show negative user benefits due to the charge.
- When the effects of reliability are included (row D) all user groups show positive net user benefits apart from goods vehicles, as noted above.
- It should be noted that TfL proposes to vary the charge by vehicle type to reflect the amount of road space occupied, the contribution to congestion, the emissions and the wear and tear to the road surface caused by different types of vehicles. Consequently HGV's pay the highest charges, and this impacts their net user benefits. There are also indications that the value placed in the current appraisal on reliability of goods vehicles is an underestimate – for example the Freight Transport Association (FTA) calculated that each minute of delay is related to unreliability costs an operator £1; a delay of 20 minutes at the Blackwall Tunnel could therefore, add £20 to the cost of an individual trip, considerably more than the value currently placed on this impact.[44].
- Wages in London exceed national averages and hence TfL recommend using higher London VoT in appraisals compared to the national values of time used in TAG. A sensitivity test using London VoT has, therefore, been undertaken and the results are shown in

[43] Silvertown Tunnel Economic Assessment Report, TfL, September 2015

[44] FTA concerned over journey time reliability for road freight operators Press release May 21, 2015

rows E and F (the latter also includes reliability benefits) of the table. This shows that all bus, coach and car users have significant net user benefits, while freight users have positive benefits when reliability benefits are included.

Table 7-1 Benefits and charges by user 60 year npv (£m, 2010 prices)

	Others users			**Business users**			**Total**
	Car commuting	**Car other**	**Bus and coach**	**Cars**	**LGV and HGV**	**Bus and coach**	
A: Total user benefits	£161	£349	£650	£578	£390	£60	£2,188
B: User charges	-£150	-£278		-£131	-£559		-£1,118
C: Total Net user benefit	£11	£71	£650	£447	-£170	£60	£1,069
D: Total net user benefit (with reliability)	*£44*	*£153*	*£650*	*£539*	*-£80*	*£60*	£1,366
E: Total net user benefit (with London VoT, no reliability)	*£54*	*£167*	*£841*	*£663*	*-£34*	*£83*	*£1,774*
F: Total net user benefit (with London VoT, with reliability)	*£97*	*£273*	*£841*	*£792*	*£90*	*£83*	*£2,176*

7.6.2 The conclusion from the economic analysis is, therefore, that car commuters would experience a net benefit over the Scheme appraisal period, while commuters by bus and coach would experience very high benefits, this is clearly in line with TfL's sustainable transport policies. Business car users would also experience high net benefits, and important regeneration outcome. Under national value of time assumptions, there would be net disbenefits for LGV and HGV users, although as noted above HGV's pay the higher charges and the value placed on reliability benefits for these users are likely to be underestimated. When London Values of Time are assumed and reliability benefits are included, all user types experience net benefits.

7.7 Accessibility analysis

7.7.1 The impact of accessibility changes in and around the regeneration area (as defined in Chapter 2) are discussed below.[45] The analysis shows the change in the number of jobs, potential employees and economically active individuals that residents or organisations can access within a set isochrone for both car and public transport users.

7.7.2 As noted previously in this report, the Silvertown Tunnel will almost eliminate congestion and significantly improve reliability and journey times for highway users, including travellers by buses and coaches and freight vehicles. However at the same time a user charge is required to manage traffic and to help pay for the scheme, and this affects the net benefits and the estimates of changes in accessibility of the different users described below. Business users have a higher value of time, and will accordingly value journey time savings very highly and any charge at a lower level than other travellers such as social visitors and commuters, so they are likely to benefit the most from the Scheme. TfL proposes to vary the charge by vehicle type to reflect the amount of road space occupied, the contribution to congestion, the emissions and the wear and tear to the road surface caused by different types of vehicles. Consequently HGV's are expected to pay the highest charges, and this will obviously impact their net user benefits.

7.7.3 For car users two sets of plots are provided. The first shows the impact of actual journey time changes that would arise from a new tunnel. The second takes account of the charge to use the Scheme. This is done by converting the charge into a time cost based on the relevant values of time.

7.7.4 For public transport users the plot takes account of weighted journey times, that is, it includes time cost for waiting and interchange as well as in vehicle time. In accordance with TAG, waiting and interchange times are weighted higher than the actual time spent doing these activities to reflect people's aversion of them. The accessibility analysis shown here is

[45] The analysis in this section refers only to the impact for regeneration areas within the Boroughs and therefore the figures are different to those that appear in the Transport Assessment which are for both regeneration and non-regeneration areas.

for 2021 in line with the Transport Assessment.

7.7.5 The plots show that time savings are extensive and in the morning peak benefit principally the residents south of, and businesses north of the River Thames. In the evening peak extensive benefits in terms of improved accessibility apply to residents and businesses on both sides of the river. Once account is taken of the costs from the Assessed Case charge then benefits reduce but there are still high benefits for businesses on both sides of the river.

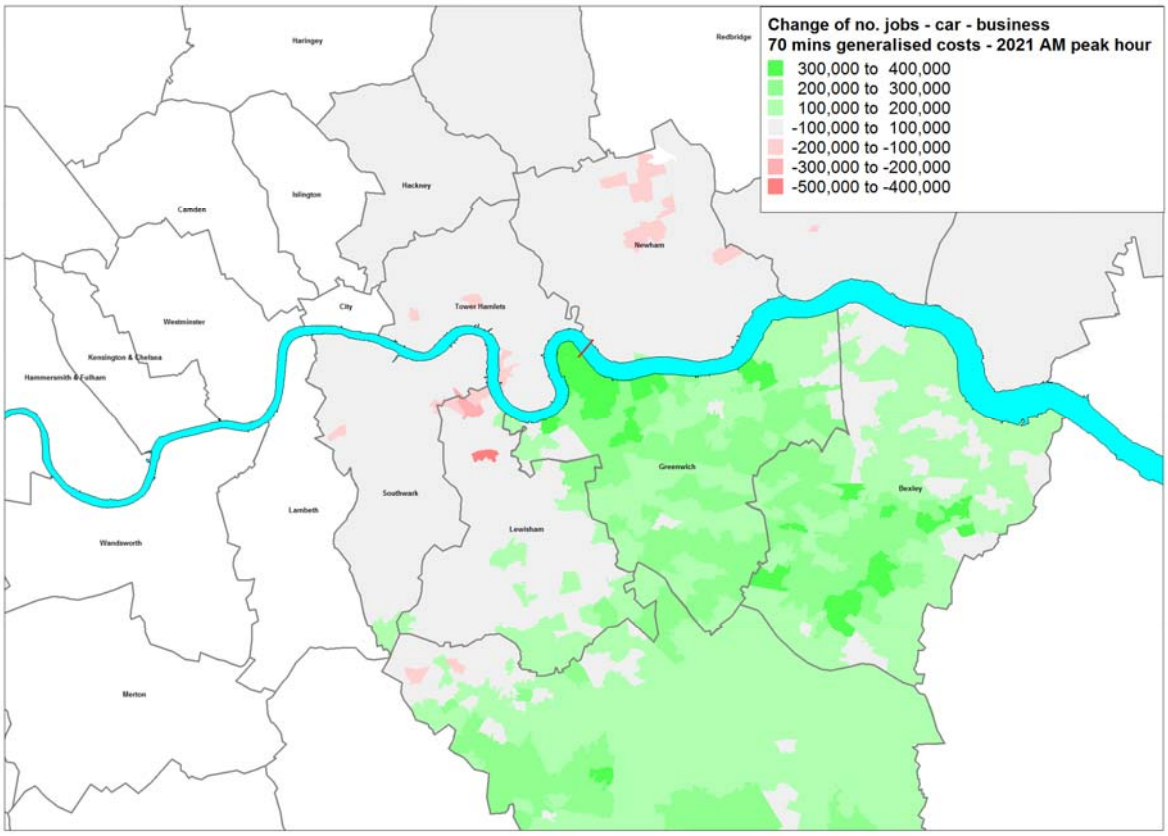
7.7.6 Public transport improvements lead to localised improvements in accessibility benefiting residents and businesses in LB Newham and RB Greenwich. For commuters the application of the costs from the Assessed Case charge means accessibility changes are marginal and sometimes negative. However, these have been calculated using a national value of time, which is likely to underestimate the true value of time for London commuters, so the accessibility benefits may be more positive than shown here.

7.7.7 Economic benefits from the Scheme will grow over time, so while the plots shown here indicate negative accessibility for car commuters in the morning peak during 2021, the overall benefit to commuters over the life of the Scheme are substantial, ranging from £11m using national values of time and including no reliability benefits, up to £97m with London values of time and including reliability benefits. This means that accessibility to jobs by car is expected to improve over time.

Business travel

7.7.8 The overall impact of the Scheme for business travellers (who have a higher value of time than commuters) is generally positive in terms of improved access to jobs, which is taken as a proxy for access to other businesses. Taking into account the charge, the impacts range from largely positive in the case of RB Greenwich to marginally positive or slightly negative for the other boroughs, as shown in Figure 7-5.

Figure 7-5 Change in number of jobs accessible by car, business users, generalised time AM peak



7.7.9 Table 7-2, Table 7-3 and Table 7-4 show the change in accessibility to jobs by car in the morning peak, inter-peak and evening peak respectively in numeric terms, both for the absolute and percentage change. In RB Greenwich the increase in accessible jobs (as mentioned a proxy for accessibility to other businesses) ranges from 3% to 8% depending on time period. For other boroughs the impacts are positive in the PM peak, neutral in the inter-peak and range from slightly positive to slightly negative in the morning peak.

Table 7-2 Change in number of jobs accessible by car within 70 minute generalised travel time by car, AM peak business users

Borough	Access to jobs	
	No.	%
Barking and Dagenham	-24,000	-1%
Greenwich	248,000	8%
Hackney	-10,000	0%
Lewisham	68,000	2%
Newham	-32,000	-1%
Tower Hamlets	-27,000	-1%
Waltham Forest	-18,000	0%

Table 7-3 Change in number of jobs accessible by car within 70 minute generalised travel time by car, inter-peak, business users

Borough	Access to jobs	
	No.	%
Barking and Dagenham	-5,000	0%
Greenwich	100,000	3%
Hackney	-2,000	0%
Lewisham	41,000	1%
Newham	11,000	0%
Tower Hamlets	-2,000	0%
Waltham Forest	-12,000	0%

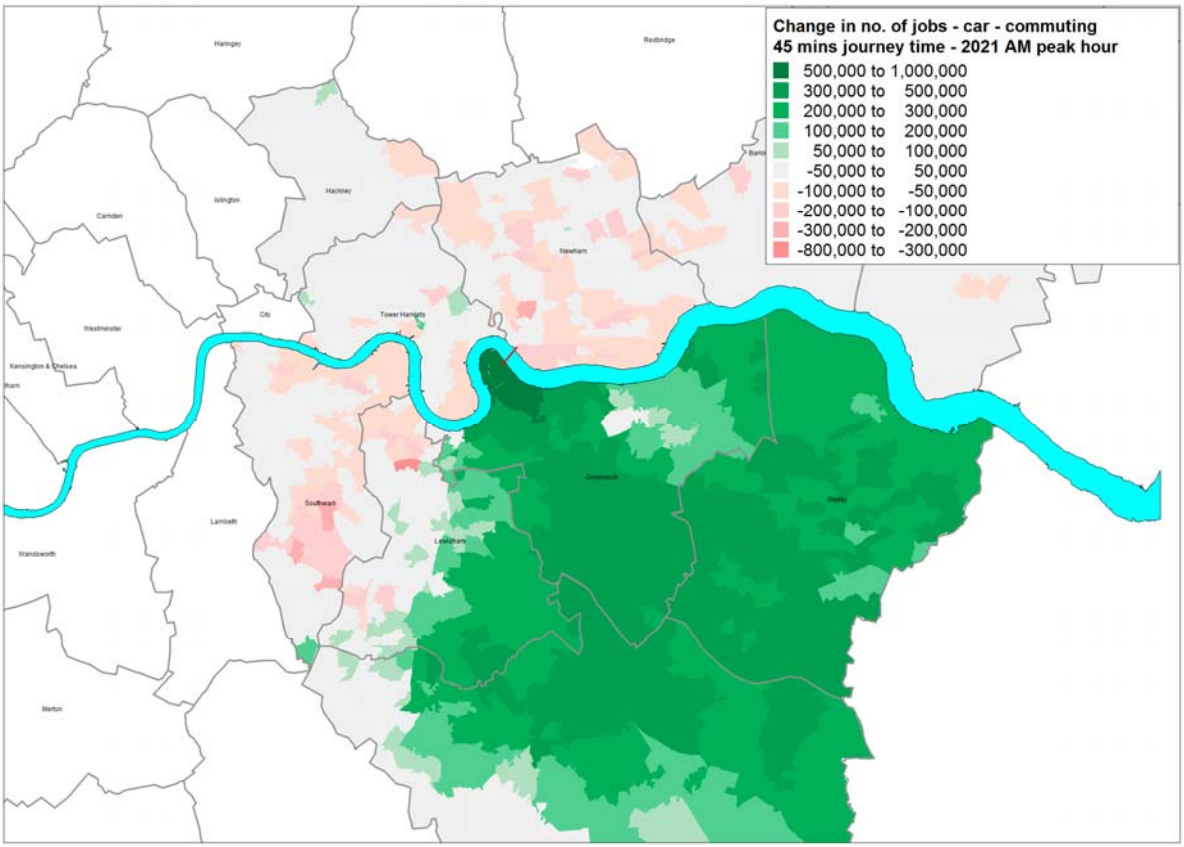
Table 7-4 Change in number of jobs accessible by car within 70 minute generalised travel time by car, PM peak, business users

Borough	Access to jobs	
	No.	%
Barking and Dagenham	48,000	1%
Greenwich	193,000	6%
Hackney	108,000	3%
Lewisham	67,000	2%
Newham	105,000	3%
Tower Hamlets	106,000	3%
Waltham Forest	106,000	3%

Commuting

7.7.10 The overall impact of the Scheme for car commuters in the morning peak in terms of journey time alone is shown in Figure 7-6. This indicates clear improvements in accessibility over a very wide area south of the River Thames. The reason for the slight reduction in accessibility north of the River Thames is due to a very small increase in traffic here as more vehicles can now cross the river from the south to the north due to the additional capacity available.

Figure 7-6 Change in number of jobs accessible within 45 minutes journey time by car commuters, AM peak



7.7.11 The change in the number of jobs accessible within 45 minutes travel time by car is shown in Table 7-5. The table shows that there are large positive benefits for the RB Greenwich and LB Lewisham regeneration areas with increases of 21% and 9% respectively in the number of jobs that can be accessed within 45 minutes as a result of the new crossing. In the other boroughs the impacts are marginal with, for example, LB Newham experiencing a small reduction of 2%.

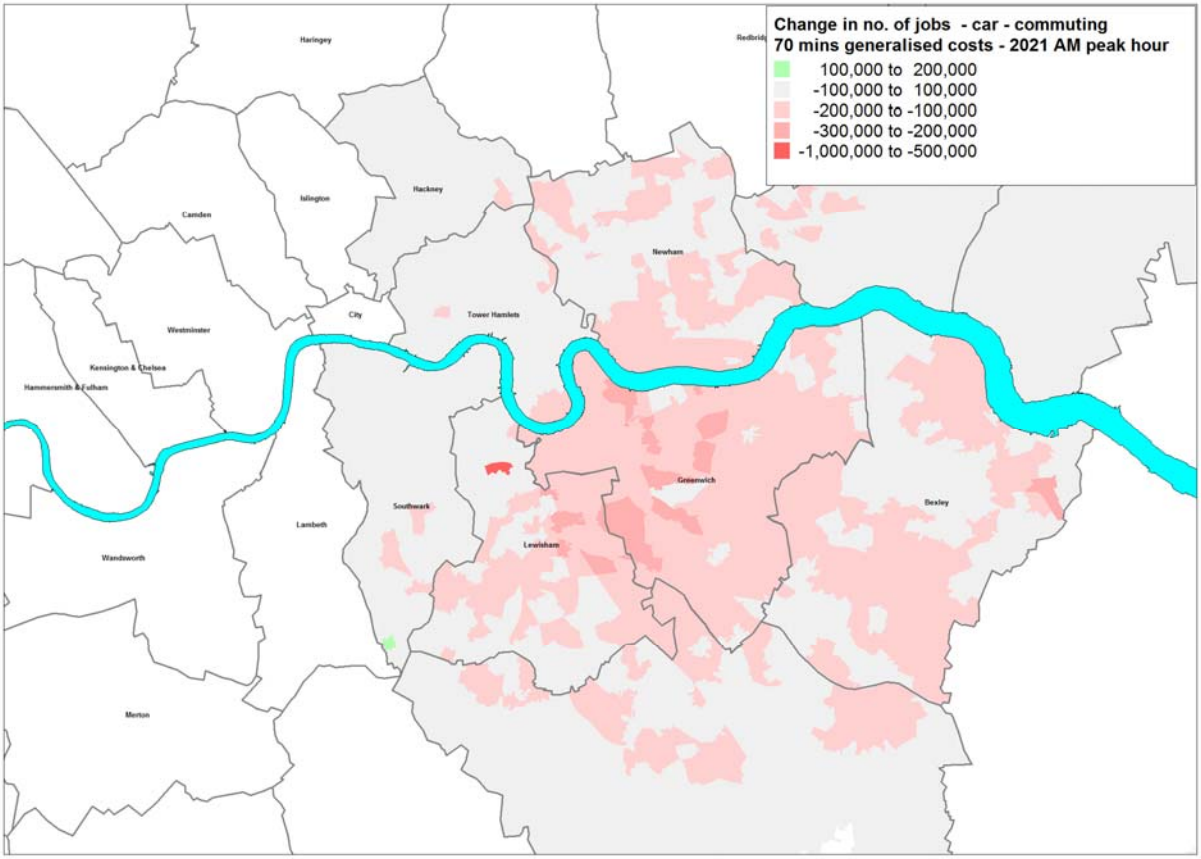
Table 7-5 Change in number of jobs accessible from regeneration areas within 45 minutes by car, commuters, journey time only, AM peak

Borough	Access to jobs	
	No.	%
Barking and Dagenham	-9,000	-1%
Greenwich	269,000	21%
Hackney	0	0%
Lewisham	140,000	9%
Newham	-46,000	-2%
Tower Hamlets	-16,000	0%
Waltham Forest	-5,000	0%

7.7.12 When the impact of the Assessed Case charge is taken into account, see

Figure 7-7, the level of accessibility to jobs during the morning peak is reduced. It should be noted that this analysis is based on a national value of time which may underestimate the London commuters' value of time. In such circumstances, the number of jobs accessible as a result of the Scheme will be higher. This analysis should also be considered alongside net improvements in access during the afternoon peak, which makes up half the overall travel time to and from work, as well as improvements in public transport.

Figure 7-7 Change in number of jobs accessible by car commuters, within 70 minutes generalised time (with reliability) AM peak



7.7.13 The impact by Borough varies, with the number of fewer jobs that are accessible ranging from 8% in RB Greenwich to 1% in LB Tower Hamlets, see

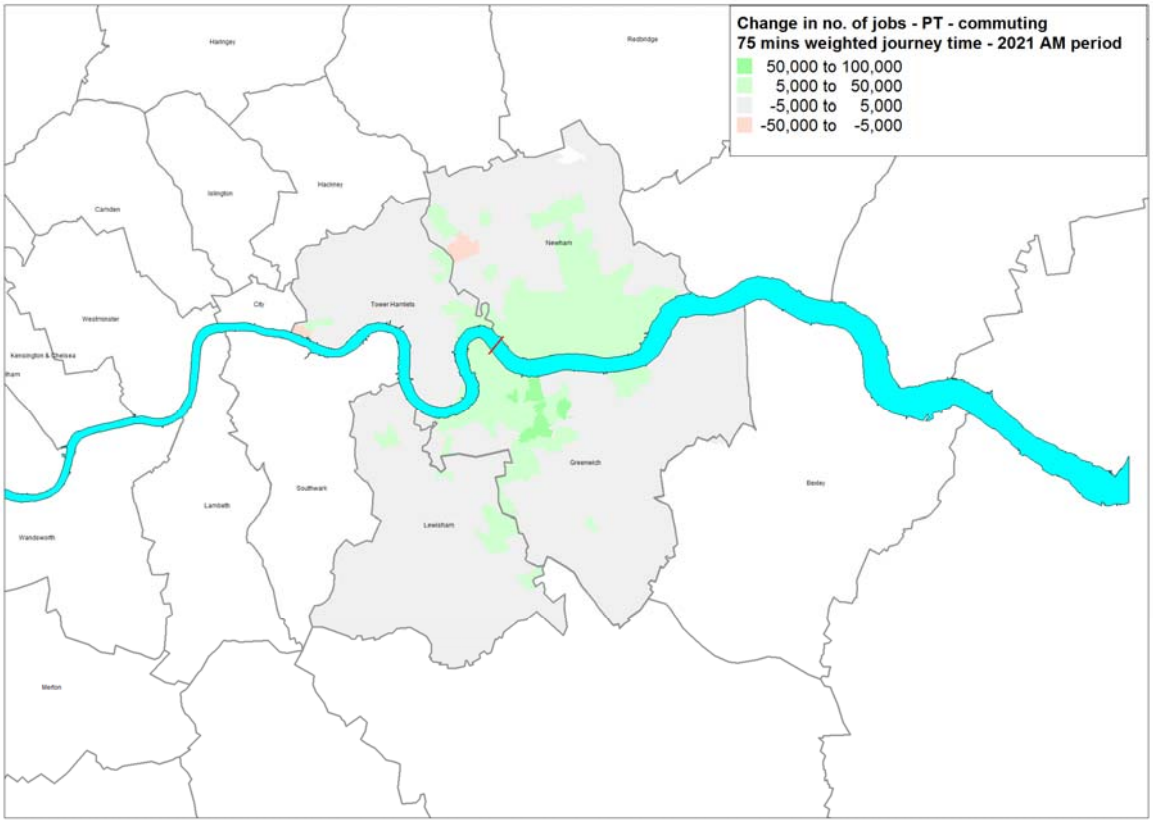
7.7.14 Table 7-6. Again, this analysis is based on a national value of time and so the number of jobs accessible as a result of the Scheme may be higher.

Table 7-6 Change in number of jobs accessible from regeneration areas within 70 minutes generalised time, commuters, AM peak

Borough	Access to jobs	
	No.	%
Barking and Dagenham	-49,000	-3%
Greenwich	-137,000	-8%
Hackney	-66,000	-2%
Lewisham	-107,000	-5%
Newham	-75,000	-3%
Tower Hamlets	-57,000	-1%
Waltham Forest	-61,000	-2%

7.7.15 For public transport users the impacts are more localised around the Scheme itself (that is, in LB Newham and RB Greenwich) and in the vast majority of cases are positive. The new bus links open up access to the Royal Docks in LB Newham where extensive development, including the potential for tens of thousands of jobs, is planned.

Figure 7-8 Change in number of jobs accessible within 75 minutes weighted time, commuters, public transport, AM peak



7.7.16 As Table 7-7 shows there is an increase in the number of jobs accessible for regeneration area residents in Greenwich and Newham. The percentage increases are small due to the very large number of jobs that are accessible in central London that are included in the base catchment area.

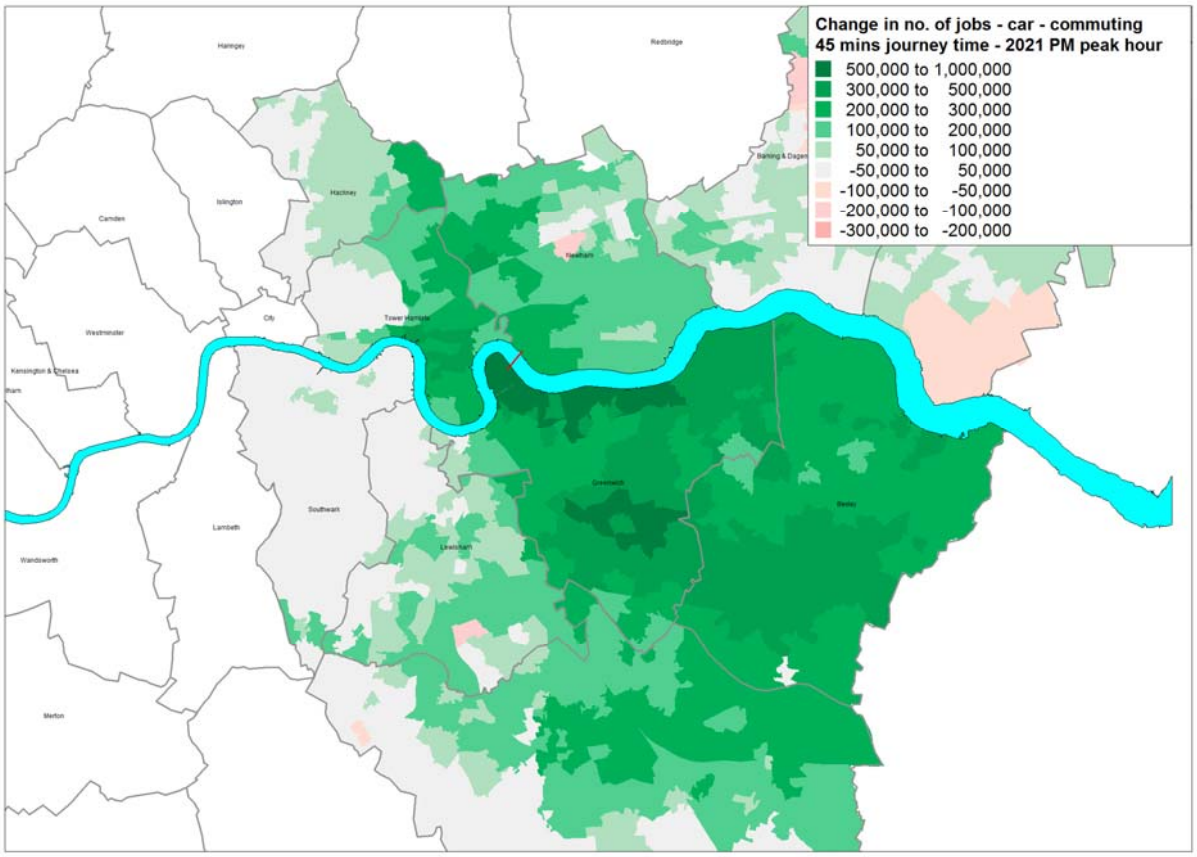
Table 7-7 Change in number of jobs accessible from regeneration areas by public transport within 75 minute weighted time, commuters, AM peak

Borough	Access to jobs	
	No.	%
Barking and Dagenham	0	0%
Greenwich	9,000	3%
Hackney	0	0%
Lewisham	2,000	0%
Newham	6,000	1%
Tower Hamlets	2,000	0%
Waltham Forest	0	0%

7.7.17 In the afternoon peak hour the increase in accessibility to jobs for

commuters based on journey time only is positive for both north and south of the River Thames, see Figure 7-9.

Figure 7-9 Change in number of jobs accessible within 45 minutes journey time by car commuters, PM peak



7.7.18 The change in the number of jobs accessible within 45 minutes in the evening peak, based upon journey time only, is shown in Table 7-8. In RB Greenwich's regeneration areas, the number of jobs accessible under this measure increases by 20%. In the other boroughs the increase is between 3% and 5%.

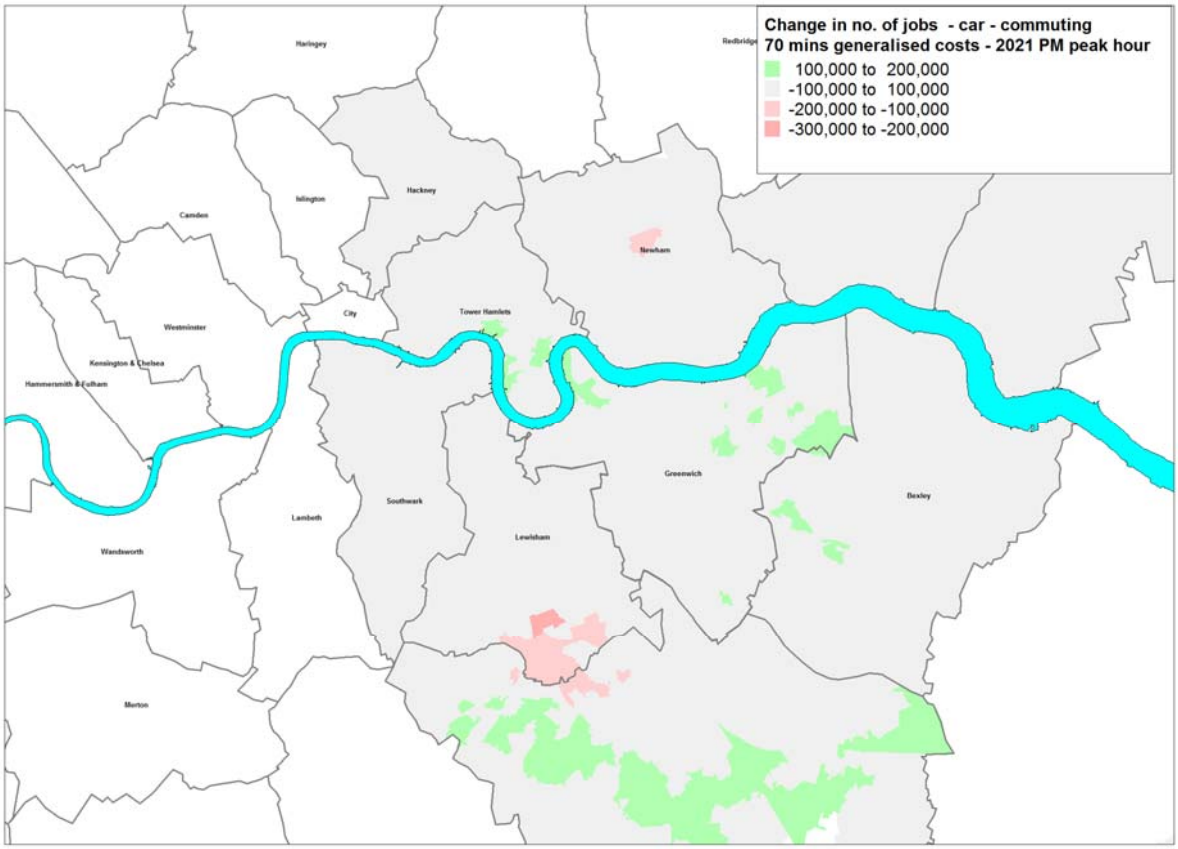
Table 7-8 Change in number of jobs accessible from regeneration areas within 45 minutes by car, commuters, journey time only, PM peak

Borough	Access to jobs	
	No.	%
Barking and Dagenham	60,000	3%
Greenwich	363,000	20%
Hackney	102,000	3%
Lewisham	85,000	4%
Newham	147,000	5%

Borough	Access to jobs	
	No.	%
Tower Hamlets	140,000	5%
Waltham Forest	137,000	5%

7.7.19 Even when the costs of the assessed charge are taken into account there are improvements in accessibility to jobs south of the River Thames, although in most areas the impact is neutral, Figure 7-10. Whilst it is not possible to combine the AM and PM peak figures or the highway and car accessibility plots the negative access to jobs by car in the AM peak is to some extent cancelled out by the improvements in access by car during the PM peak and by public transport improvements.

Figure 7-10 Change in number of jobs accessible by car commuters, within 70 minutes generalised time (with reliability) PM peak



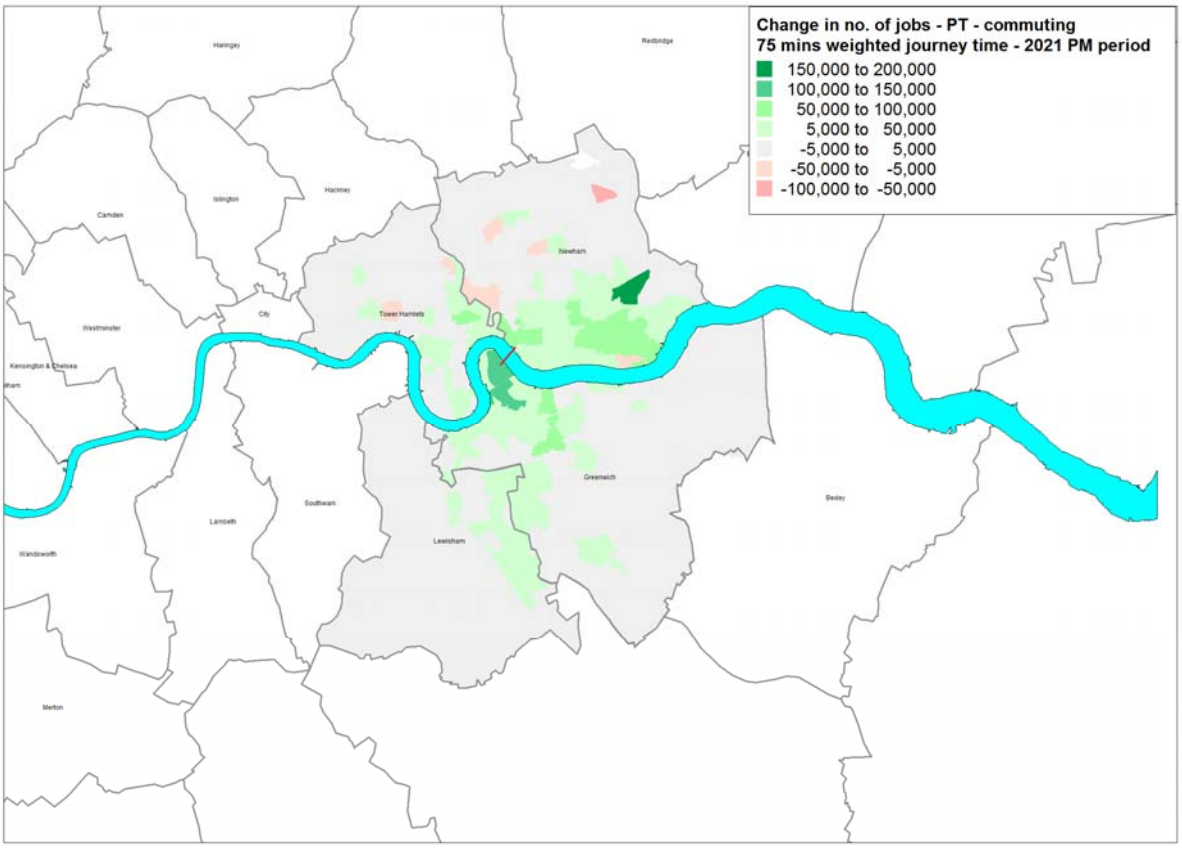
7.7.20 Table 7-9 shows that the number of jobs accessible in the pm peak by car from the regeneration areas is broadly neutral, with the impact ranging from 0 to 2% across the boroughs.

Table 7-9 Change in number of jobs accessible from regeneration areas within 70 minutes generalised time, commuters, PM peak

Borough	Access to jobs	
	No.	%
Barking and Dagenham	-8,000	0%
Greenwich	47,000	2%
Hackney	3,000	0%
Lewisham	6,000	0%
Newham	-4,000	0%
Tower Hamlets	13,000	0%
Waltham Forest	11,000	0%

7.7.21 For public transport users the impacts remain positive albeit small on both sides of the river, Figure 7-11.

Figure 7-11 Change in number of jobs accessible within 75 minutes weighted time, commuters, public transport, PM peak



7.7.22 This is demonstrated in Table 7-10 which shows an increase in the number of jobs accessible by public transport within 75 minutes weighted travel time in the PM peak of between 0 and 3%.

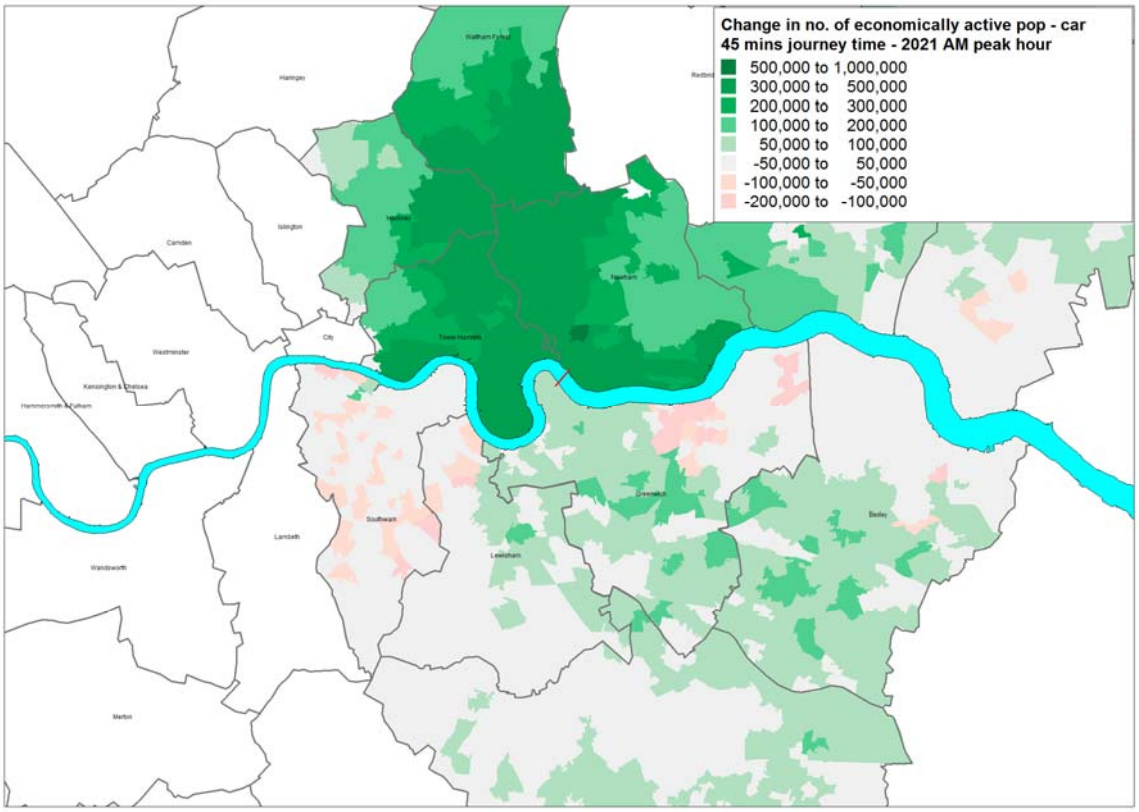
Table 7-10 Change in number of jobs accessible from regeneration areas by public transport within 75 minute weighted time, commuters, pm peak

Borough	Access to jobs	
	No.	%
Barking and Dagenham	1,000	0%
Greenwich	10,000	3%
Hackney	0	0%
Lewisham	2,000	0%
Newham	8,000	1%
Tower Hamlets	3,000	0%
Waltham Forest	0	0%

Access to economically active population

7.7.23 The next set of plots and tables looks at accessibility in terms of the number of economically active people who live within 45 minutes travel time of a regeneration area. This gives an indication of the size of the labour market catchment area for an employer. For businesses located in regeneration areas, their opportunity to draw upon a larger labour market catchment area would improve their competitiveness facilitating future growth. In terms of just journey time, Figure 7-12 shows that employers to the north of the river and to a lesser extent the south as well see an increase in the number of potential employees within 45 minutes' drive time.

Figure 7-12 Change in number of economically active population within 45 minutes journey time by car, AM peak



7.7.24 The increase in the number of economically active people within a 45 minute drive time catchment (journey time only) is around 11% in the core northern boroughs and around 1% in the southern boroughs.

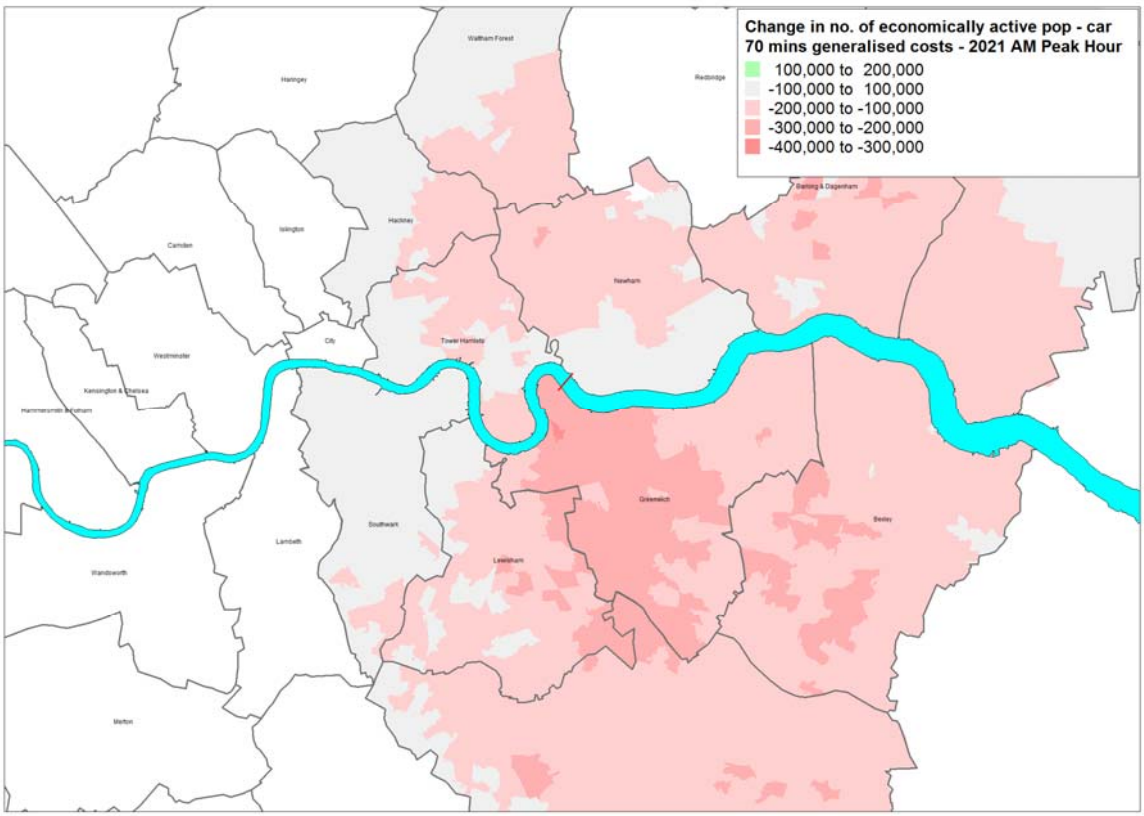
Table 7-11 Change in number of economically active population from regeneration areas within 45 minutes by car journey time only, AM peak

Borough	Access to people	
	No.	%
Barking and Dagenham	100,000	3%
Greenwich	25,000	1%
Hackney	291,000	11%
Lewisham	37,000	1%
Newham	322,000	11%
Tower Hamlets	326,000	12%
Waltham Forest	317,000	11%

7.7.25 However, when the costs associated with the Assessed Case user charge are taken into account, see Figure 7-13, this increase in accessibility reduces to slightly negative both north and south of the river. Again, it should be noted that this analysis is based on a national value of time which may underestimate London commuter's value of time. In such

circumstances, the number of economically active people accessible as a result of the Scheme will be higher. This analysis should also be considered alongside net improvements in access during the afternoon peak, which makes up half the overall travel time to and from work, as well as improvements in public transport.

Figure 7-13 Change in economically active population accessible by car, within 70 minutes generalised time (with reliability) AM peak



7.7.26 Table 7-12 shows that, when considering the costs from the Assessed Case charge, the number of economically active people accessible within the 45 minute catchment falls by between 3% and 6%, with the largest decrease south of the river.

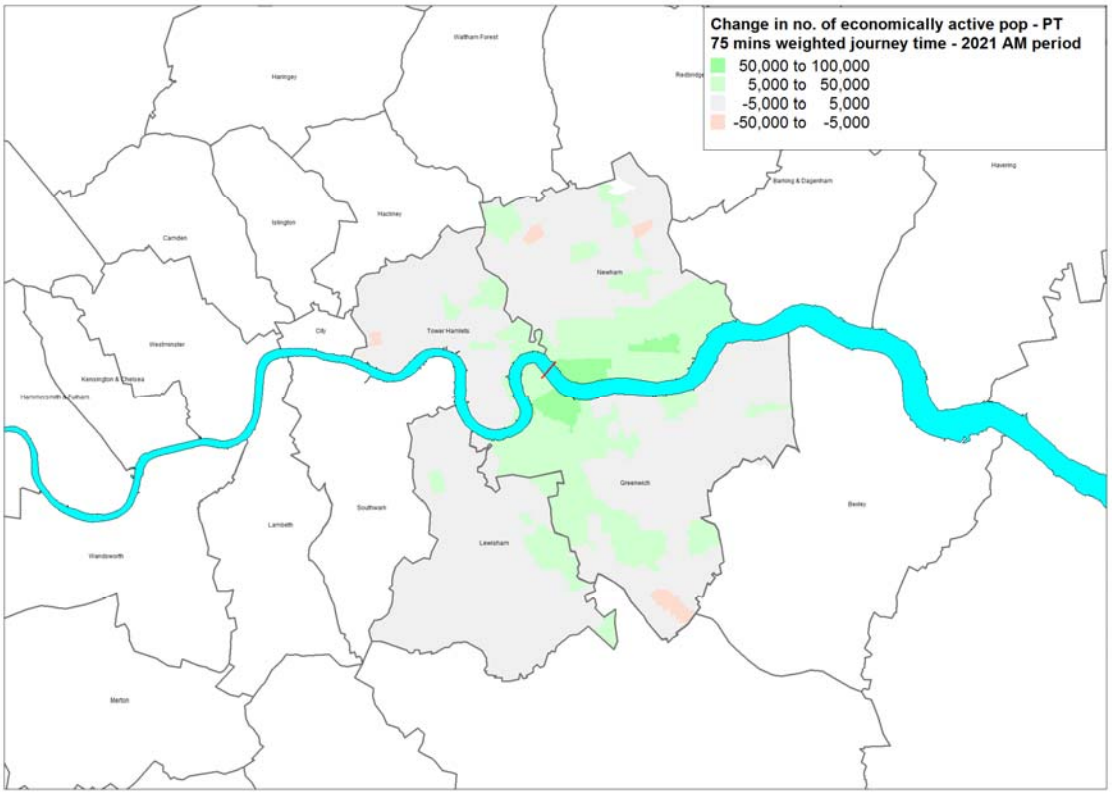
Table 7-12 Change in economically active population accessible from regeneration areas within 70 minutes generalised time, AM peak

Borough	Access to people	
	No.	%
Barking and Dagenham	-139,000	-4%
Greenwich	-203,000	-6%
Hackney	-114,000	-3%
Lewisham	-145,000	-4%
Newham	-113,000	-3%

Tower Hamlets	-92,000	-3%
Waltham Forest	-120,000	-3%

7.7.27 Figure 7-14 shows that the number of economically active people accessible within 75 minutes weighted time by public transport in the morning peak is expected to increase, and is largely focused around LB Newham and RB Greenwich.

Figure 7-14 Change in economically active population within 75 minutes weighted time by public transport, AM



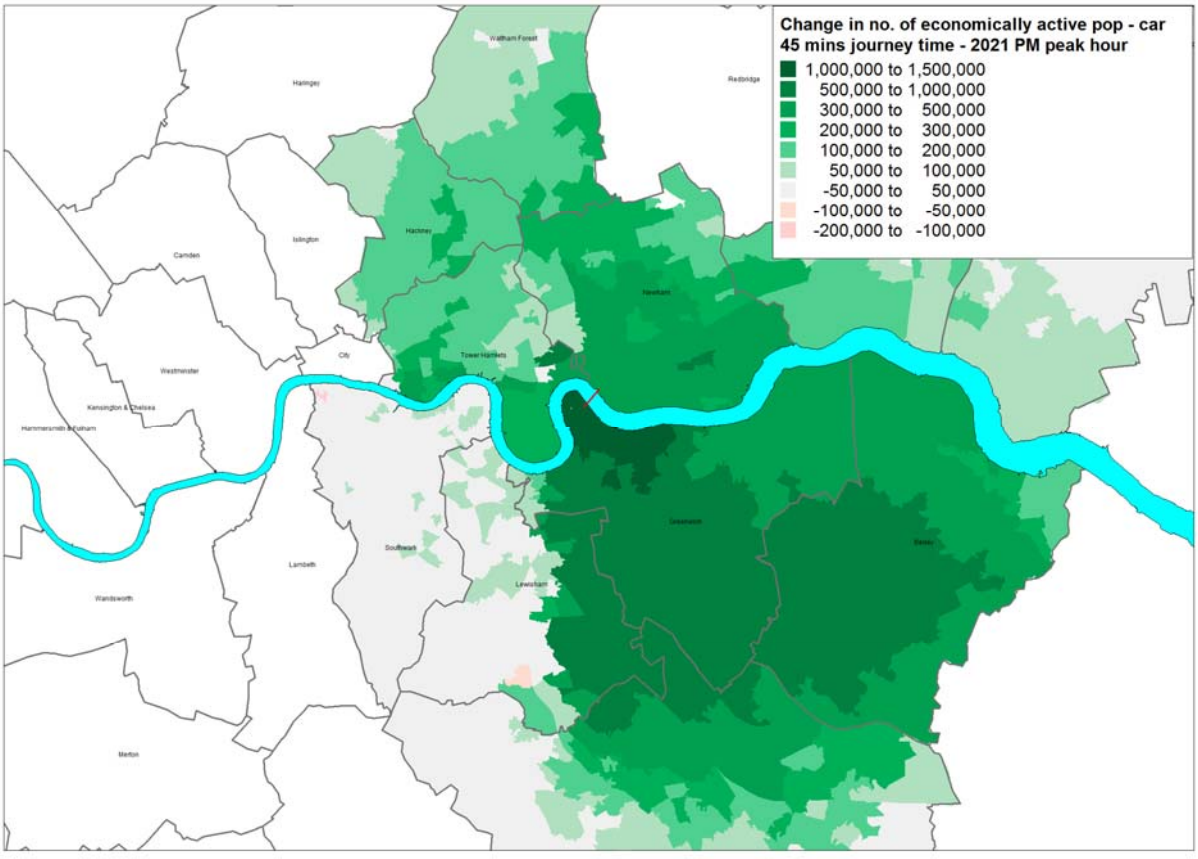
7.7.28 Table 7-13 shows that the number of economically active people within 75 minutes weighted travel time by public transport of the regeneration areas will increase by 4% in Greenwich. The increase in the labour catchment area while relatively small can still be beneficial to employers, especially for those employees who are dependent on public transport access, see Table 7-13.

Table 7-13 Change in economically active population accessible by public transport within 75 minutes from regeneration areas, AM peak

Borough	Access to people	
	No.	%
Barking and Dagenham	1,000	0%
Greenwich	11,000	4%
Hackney	0	0%
Lewisham	1,000	0%
Newham	8,000	1%
Tower Hamlets	1,000	0%
Waltham Forest	0	0%

7.7.29 Figure 7-15 shows that, in the afternoon peak employers both north and south of the river see a large increase in labour catchments within 45 minutes' drive time by car.

Figure 7-15 Change in access to economically active population within 45 minutes by car, travel time only, PM peak



7.7.30 Figure 7-14 shows that there are some significant increases in the number

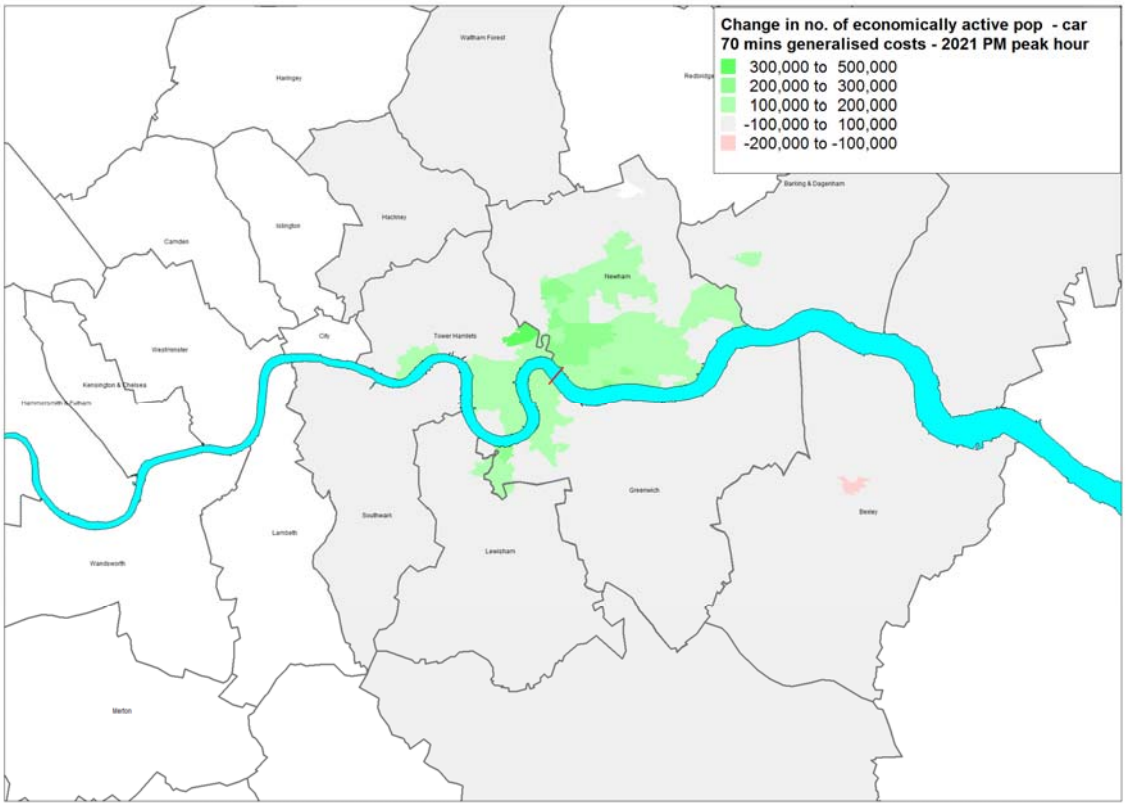
of economically active people within 45 minutes travel time to regeneration areas by car in the afternoon peak. The increases in RB Greenwich are very large with a 44% increase in labour catchment size and in the other boroughs it ranges from 5%-9%.

Table 7-14 Change in economically active population within 45 minutes journey time only, by car, PM peak

Borough	Access to people	
	No.	%
Barking and Dagenham	117,000	5%
Greenwich	811,000	44%
Hackney	175,000	5%
Lewisham	205,000	8%
Newham	268,000	9%
Tower Hamlets	216,000	6%
Waltham Forest	137,000	5%

7.7.31 Figure 7-16 shows that, even when the costs associated with the Assessed Case charge are taken into account, there remains a positive increase in the number of economically active people within 70 minutes generalised time by car, both immediately north and south of the Silvertown Tunnel during the afternoon peak.

Figure 7-16 Change in access to economically active population within 70 minutes generalised time (with reliability) by car, PM peak



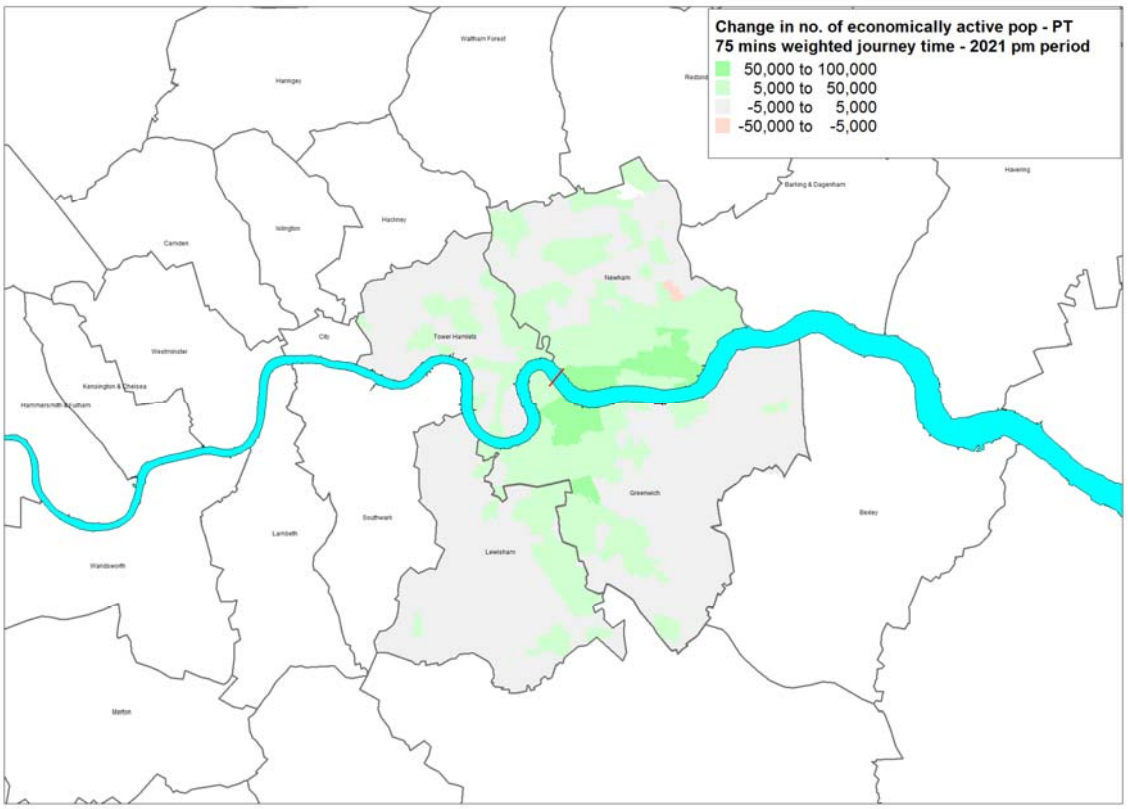
7.7.32 Table 7-15 shows that there is an increase in the economically active population within 70 minutes generalised time by car to regeneration areas of up to 3%, including the costs associated with the Assessed Case charge,

Table 7-15 Change in access to economically active population by car within 70 minutes generalised time, PM peak

Borough	Access to jobs	
	No.	%
Barking and Dagenham	50,000	2%
Greenwich	65,000	3%
Hackney	-15,000	0%
Lewisham	35,000	1%
Newham	74,000	2%
Tower Hamlets	54,000	1%
Waltham Forest	-5,000	0%

7.7.33 Figure 7-17 shows that access to the economically active population within 75 minutes weighted time by public transport increases north and south of the river in the PM peak.

Figure 7-17 Change in access to economically active population within 75 minutes weighted time by public transport, PM peak



7.7.34 Table 7-16 shows that the number of economically active people accessible within 75 minutes weighted time by public transport to regeneration areas increases by 4% in Greenwich in the afternoon peak, Table 7-16. Again it is not possible to add the morning and evening peak accessibility changes or combine highway with public transport accessibility changes but it is apparent that the reduction in access to the economically active population during the morning peak is partially offset by improved accessibility in the afternoon peak and from public transport accessibility improvements.

Table 7-16 Change in access to economically active population within 75 minutes weighted travel time by public transport, PM peak

Borough	Access to jobs	
	No.	%
Barking and Dagenham	1,000	0%
Greenwich	14,000	4%
Hackney	0	0%
Lewisham	2,000	1%
Newham	10,000	2%
Tower Hamlets	3,000	0%

Waltham Forest	0	0%

Access to customers

7.7.35 Using the adult population as an indicator of retail and leisure catchment areas, a similar assessment has been undertaken looking at the inter-peak and afternoon peak. For businesses located in regeneration areas, their opportunity to draw upon a larger catchment area in terms of customers would improve their competitiveness facilitating future growth. In terms of journey time alone, Figure 7-18 shows that businesses to the north and south of the river would see up to a 3% increase in the number of potential customers within 45 minutes' drive time (Table 7-17).

Figure 7-18 Change in accessibility to the adult population within 45 minutes by car, journey time only, inter-peak

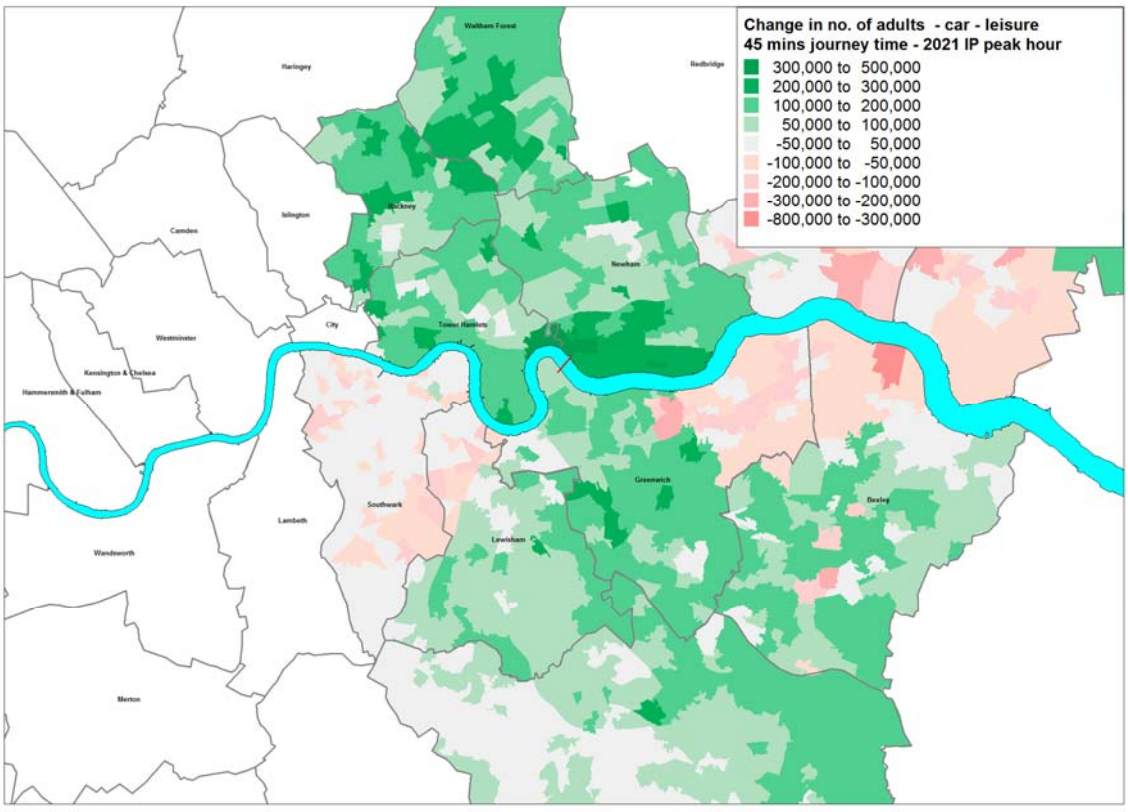


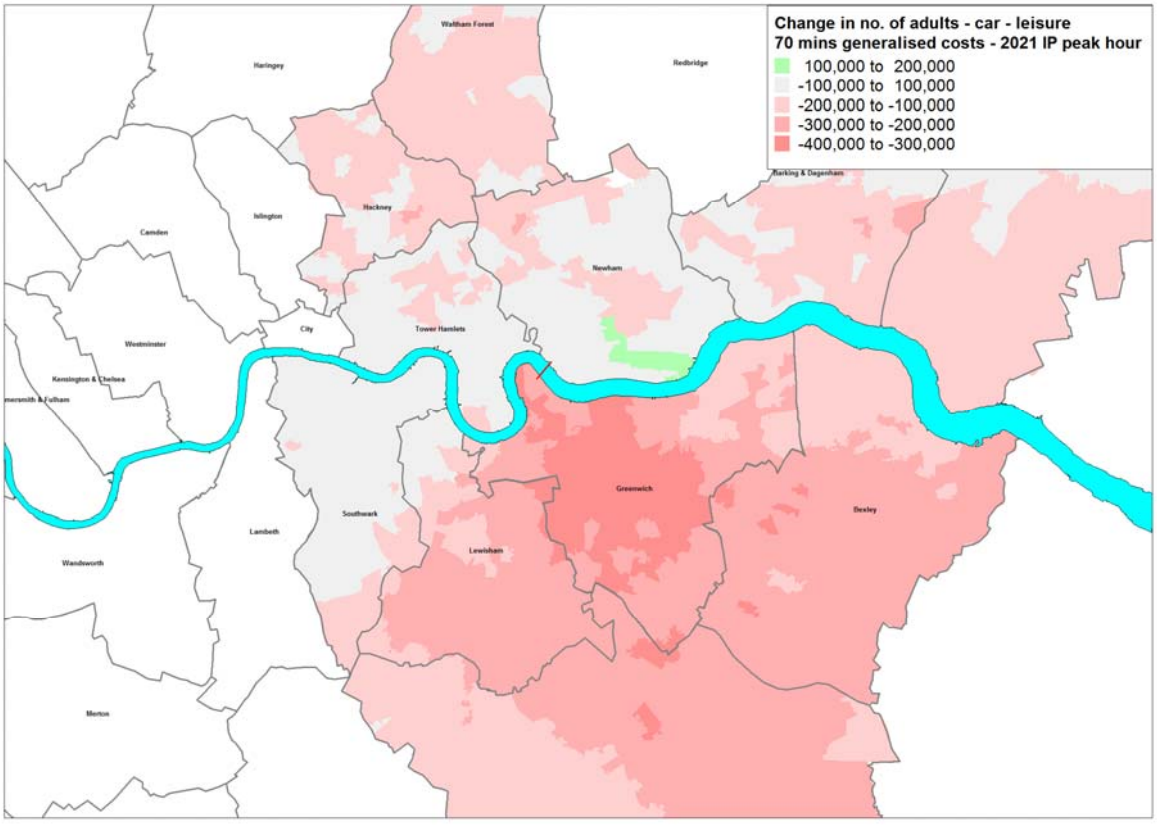
Table 7-17 Change in access to the adult population within 45 minutes of regeneration areas by car, journey time only, inter-peak

Borough	Access to adults	
	%	Number
Barking and Dagenham	0%	2,000
Greenwich	1%	46,000
Hackney	3%	132,000

Borough	Access to adults	
	%	Number
Lewisham	2%	76,000
Newham	3%	131,000
Tower Hamlets	3%	128,000
Waltham Forest	3%	157,000

7.7.36 Including the costs associated with the Assessed Case charge in place, accessibility to the adult population in 70 minutes generalised time is reduced for businesses in RB Greenwich but remains positive in parts of the Royal Docks, LB Newham, Figure 7-19.

Figure 7-19 Change in accessibility to the adult population by car within 70 minutes generalised time, inter-peak



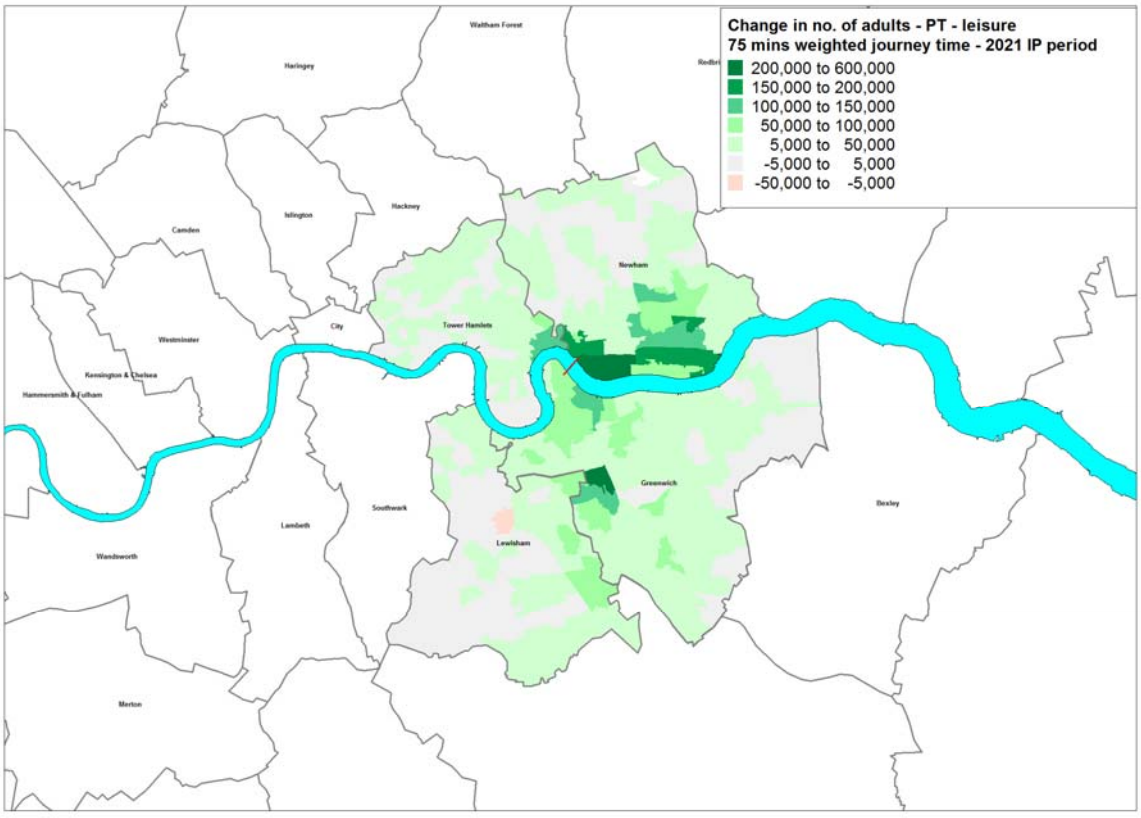
7.7.37 Numerically, as Table 7-18 shows, the average impact across the boroughs is marginally negative, ranging from 1 to 6% reduction in accessibility to the adult population within 70 minutes generalised time to regeneration areas by car during the inter-peak.

Table 7-18 Change in access to the adult population within 70 minutes generalised time of regeneration areas by car, inter-peak

Borough	Access to adults	
	%	%
Barking and Dagenham	-3%	-108,000
Greenwich	-6%	-274,000
Hackney	-2%	-125,000
Lewisham	-5%	-224,000
Newham	-2%	-76,000
Tower Hamlets	-1%	-45,000
Waltham Forest	-2%	-111,000

7.7.38 Access to the adult population in the inter-peak by public transport improves for businesses both north and south of the river, Figure 7-20.

Figure 7-20 Change in access to the adult population within 75 minutes weighted time by public transport, inter-peak



7.7.39 As Table 7-19 shows there is a marginal improvement in the number of adults accessible by public transport to regeneration areas, of up to 4%, with benefits mainly accruing to businesses in LB Newham and RB

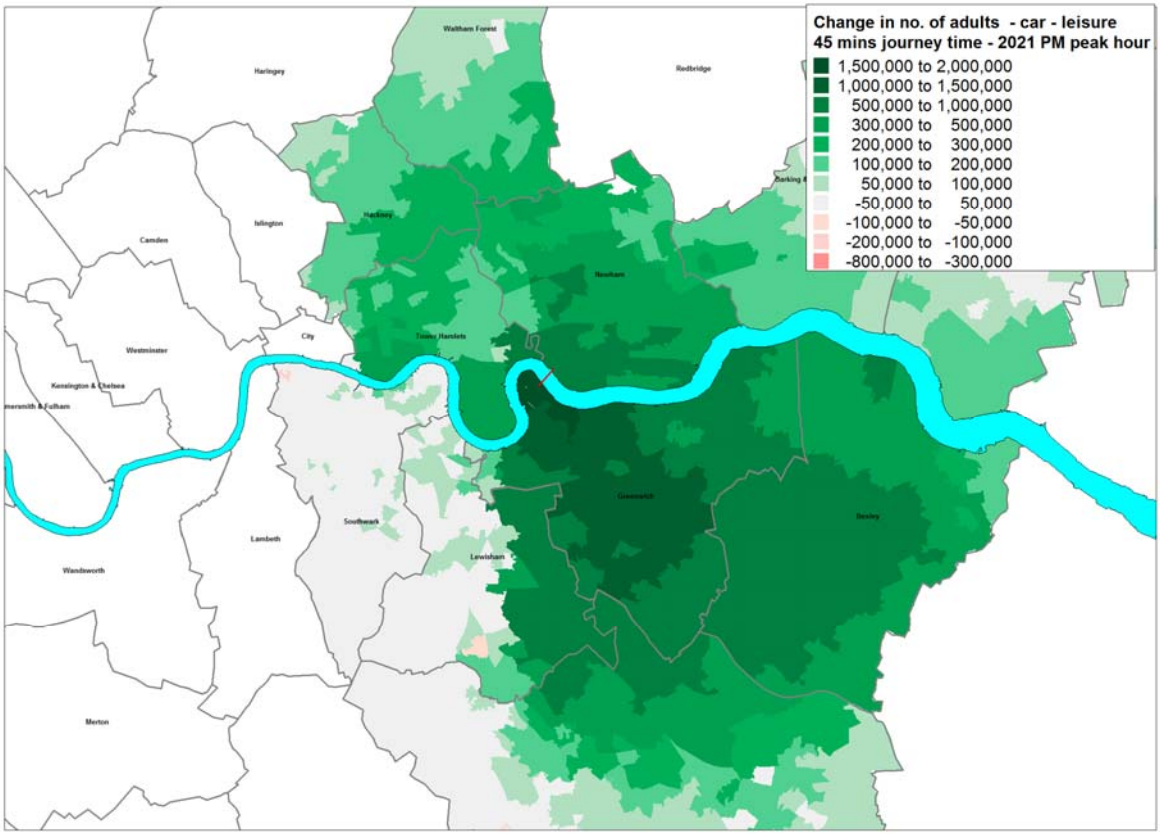
Greenwich.

Table 7-19 Change in access to the adult population within 75 minutes weighted travel time of regeneration areas by public transport, inter-peak

Borough	Access to adults	
	%	%
Barking and Dagenham	1%	7,000
Greenwich	4%	30,000
Hackney	0%	2,000
Lewisham	1%	9,000
Newham	3%	26,000
Tower Hamlets	1%	9,000
Waltham Forest	0%	3,000

7.7.40 Given the importance of the evening economy, Figure 7-21 shows the increase in catchment area for businesses in the evening peak. As can be seen boroughs both north and south of the river experience large increases in catchment area based on drive time alone.

Figure 7-21 Change in access to the adult population within 45 minutes by car, journey time only, PM peak



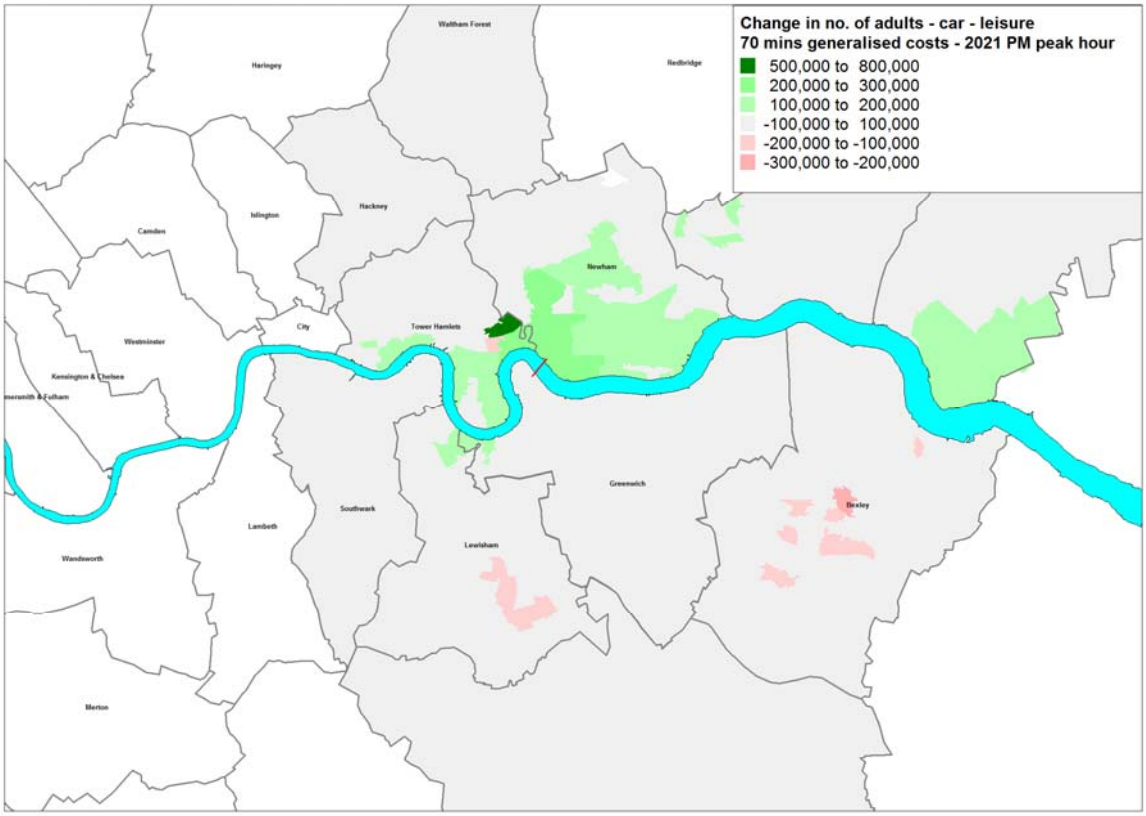
7.7.41 These increases in catchment are very large: 43% in the case of RB Greenwich and nearly 1 million additional people, see Table 7-20.

Table 7-20 Change in access to adult population within 45 minutes by car to regeneration areas, journey time only, PM

Borough	Access to adults	
	%	%
Barking and Dagenham	5%	143,000
Greenwich	43%	966,000
Hackney	6%	223,000
Lewisham	8%	231,000
Newham	10%	351,000
Tower Hamlets	7%	299,000
Waltham Forest	5%	162,000

7.7.42 Even when the costs associated with the Assessed Case charge are included, there are positive increases in the number of adults accessible within 70 minutes generalised time, especially for businesses in Newham, Figure 7-22.

Figure 7-22 Change in accessibility to adult population by car within 70 minutes, generalised time, PM peak



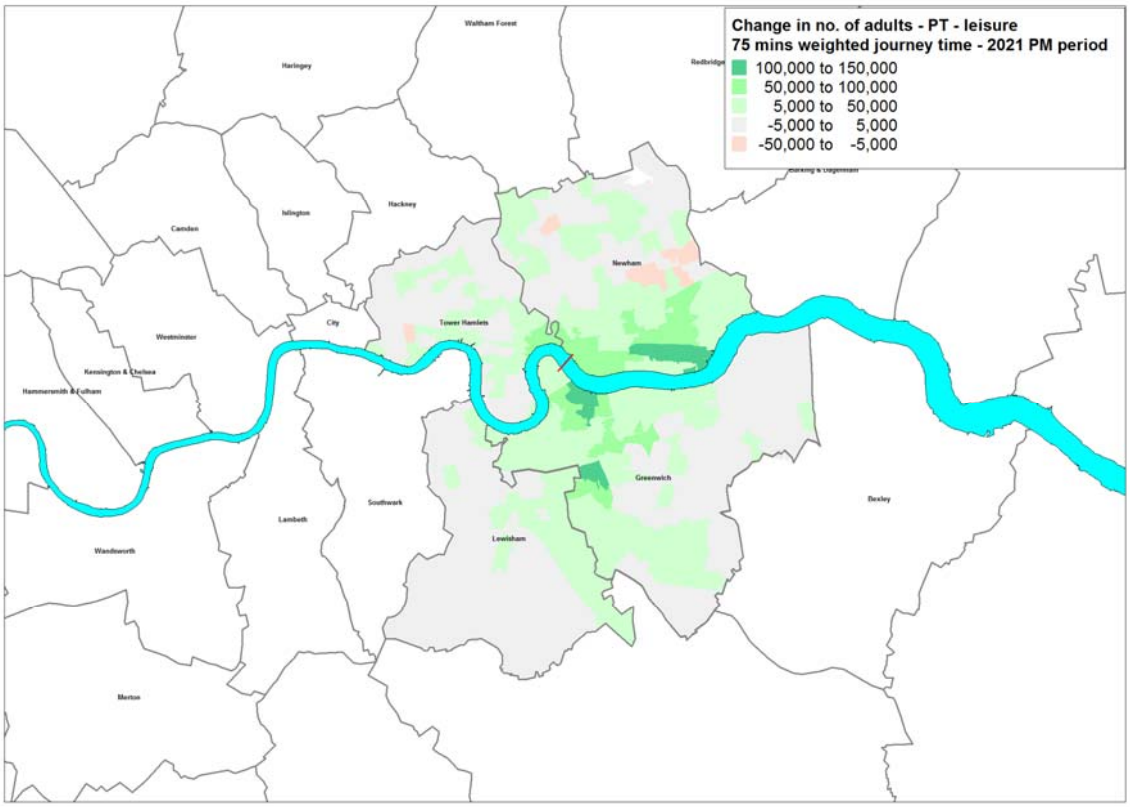
7.7.43 Table 7-21 shows that the number of adults accessible to regeneration areas by car in the afternoon peak increases in most Boroughs, with the largest increase in Newham.

Table 7-21 Change in access to adult population within 70 minutes by car to regeneration areas, generalised time, PM

Borough	Access to adults	
	%	%
Barking and Dagenham	2%	48,000
Greenwich	0%	-12,000
Hackney	-1%	-36,000
Lewisham	1%	18,000
Newham	2%	68,000
Tower Hamlets	1%	53,000
Waltham Forest	-1%	-27,000

7.7.44 Finally, for public transport there are increases in the number of adults accessible for locations both north and south of the river, Figure 7-23.

Figure 7-23 Change in accessibility to the adult population within 75 minutes weighted time by public transport, PM peak



7.7.45 This equates to an increase in the number of adults accessible to

regeneration areas of up to 4% in the case of Greenwich, Table 7-22.

Table 7-22 Change in access to the adult population within 75 minutes weighted time of regeneration areas by public transport, PM peak

Borough	Access to adults	
	%	%
Barking and Dagenham	1%	3,000
Greenwich	4%	18,000
Hackney	0%	0
Lewisham	1%	4,000
Newham	2%	14,000
Tower Hamlets	0%	3,000
Waltham Forest	0%	0

7.8 Summary of impacts on accessibility

7.8.1 There would be significant benefits for residents and employers in regeneration areas around the proposed Silvertown Tunnel in terms of improved bus access to jobs and employees. This has a particular relevance for the important regeneration area of the Royal Docks, public transport access is likely to be improved both to the north and to the south of this area as cross-river bus services link through here. The Scheme would transform the opportunities for cross-river bus access in the area.

7.8.2 Business travellers would experience a high level of benefit, accessibility would be enhanced, particularly in the peak hours and the catchments of businesses would be expanded.

7.8.3 There would be significant accessibility benefits for commuter coach users to Canary Wharf, the City and the West End primarily from Kent and the Medway towns. This might also encourage other commuter coach services to e.g. the Royal Docks.

7.8.4 The retail sector is unlikely to see improvements to customer catchments by car under current user charging assumptions, although cross-river bus access would be improved.

7.8.5 For commuters the application of the costs from the Assessed Case charge means accessibility changes are marginal and sometimes negative, particularly in the morning peak. However, these have been calculated using a national value of time, which might underestimate London commuters' value of time, so the accessibility benefits may be more positive than shown here. This analysis should also be considered alongside net improvements in access during the afternoon peak, which makes up half the overall travel time to and from work, as well as

improvements in public transport.

7.8.6 Finally, in terms of employer opinion, it was clear from the employer survey that overall; half of respondents (49%) felt that a new Silvertown Tunnel with no height restriction would have a positive impact on their operations. Amongst these 85% believe it would attract more business to the area, there was also agreement that the new tunnel would make journey times more reliable (84%).

7.8.7 Most of these respondents feel the tunnel would increase their customer base (80%), rising to 91% in LB Newham. Slightly fewer (70%) expect the tunnel to make it easier to reach suppliers, with those in LB Barking and Dagenham (84%) and LB Newham (79%) more optimistic. Two thirds think that the new crossing would reduce congestion costs to business, with 20% disagreeing.

7.8.8 A majority of respondents (51%) expected that the crossing would facilitate recruitment, although 24% said it would not. Those most optimistic about recruiting new staff after the tunnel opens are more likely to already employ 50 or more staff (67%).

8. CONCLUSION

8.1 The impact of road schemes and regeneration

8.1.1 This report draws on a number of strands of analysis to assess the potential economic and regeneration impacts that could result from the Scheme. These include a detailed survey of over 500 employers, a review of relevant case studies, economic and accessibility outputs from the transport modelling, a comprehensive analysis of the characteristics of the local economy and the labour force and a review of land use and development opportunities.

8.1.2 Assessing the impact of road schemes on regeneration requires a different approach to that taken when considering the impact of rail schemes. For rail schemes there is a clear focus point, namely around their stations. It is straightforward in a London context to identify concentrations of development around stations and to show how property prices and development are linked to changes in rail accessibility.

8.1.3 With urban road schemes, the accessibility impacts are much more widely spread throughout the highway network, this wide spread of benefits makes it much harder for the development sector to identify particular sites that would benefit from a road enhancement Scheme.

8.1.4 For this reason this report does not identify that the Scheme would bring forward a quantifiable level of development in the area it serves, rather it shows clearly that it is an integral part of the necessary enabling infrastructure needed for development and economic growth in the fastest growing part of London.

8.1.5 The potential impacts of the Scheme are set out below.

Faster journey times for businesses

8.1.6 All user types would experience much faster journey times to cross the River Thames as a result of the Scheme, with time savings of up to 20 minutes in the peak periods (excluding any additional reliability benefits). This would allow businesses to deploy their staff on productive work, rather than being stuck in congestion.

8.1.7 Once the impact of the charge is taken into account, analysis from the transport modelling demonstrates that quicker business trips would generate time savings for firms worth between £340m and £970m[46]. Business trips made by car would experience net benefits of between £450m and £790m, whilst business trips made by bus or coach result in net benefits worth between £60m and £83m. Goods vehicles have net benefits worth between -£170m and £91m, although evidence from the Freight Transport Association suggests benefits are likely to be substantially larger. These savings could be invested to support local business and employment growth.

More reliable journey times

8.1.8 Poor reliability at the Blackwall Tunnel is a serious issue for businesses with 56% of businesses stating they were involved in an unplanned incident (other than everyday congestion) at the Blackwall Tunnel at least once a week, and 70% stating they think that the unpredictability of journey times when crossing the River Thames at the Blackwall Tunnel is a disruption or constraint to the operation of their business. Common problems for businesses resulting from this include:

- additional time and associated costs to plan deliveries to avoid congestion (32% of all businesses);
- being late for meetings and appointments (41%);
- limiting the number of customers that are prepared to use the business (37%);
- missing time critical deliveries that let down clients or affect future business opportunities (33%); and
- staff are regularly late for work (36%).

8.1.9 All of these impose costs or restrict potential revenue. As a result, 40% of businesses said that unreliable journey times when crossing the river result in a loss of potential revenue and raise costs. By reducing congestion and improving journey time reliability, businesses would have more certainty over their route planning, have more control over their

[46] This range depends upon the value of time used, with higher London values of time resulting in higher time saving benefits. Further details are contained in the Economic Assessment Report

costs and be able to pursue potential opportunities more effectively. Just over half of all businesses in east London reported that their business would be more likely to operate cross-river if journey times were made more reliable.

A new strategic public transport corridor

8.1.10 Fundamental to the Scheme is the creation of a new strategic bus corridor with the capacity to carry at least 9,000 people in each direction during the peak period. This would significantly improve connectivity between south-east and east London, particularly to parts of the Royal Docks, where there are plans to accommodate tens of thousands of new jobs. This would facilitate an increase in access to 9,000 jobs for residents of regeneration areas in RB Greenwich and 6,000 jobs for residents of regeneration areas in LB Newham.

Improvements in access to the labour market

8.1.11 At present the labour market in east London is not operating optimally, with the vast majority of people that work east of the Blackwall Tunnel highly likely to also live on the same side of the river. This restricts firms' access to specialist skills, with lower levels of competition for jobs. Many firms have reported that they are less willing to employ someone from the opposite side of the river given the unreliable nature of cross river links.

8.1.12 With the Silvertown Tunnel, employers north of the River Thames would see more than a 10% increase in the size of their labour market catchments living within a 45 minute drive time due to the faster journey times for those living south of the river wishing to access job opportunities to the north. Once the costs of the assessed charge is taken into account, this increase switches to a small decrease of 1-8% during the morning peak for car drivers, which is offset by positive improvements in the evening peak, as well as the increase in access to the labour market by public transport, particularly in the Royal Borough of Greenwich and London Borough of Newham.

8.1.13 Improvements in access to the labour market would be particularly important to the Royal Docks, where tens of thousands of new jobs are planned, but where access to the labour market south of the river is currently poor. Furthermore, Canary Wharf, which has capacity to accommodate 100,000 new jobs, could see benefits from a greater potential labour force, as improved commuter coach services bring in more people from Kent and east London.

Improvements in access to customers

8.1.14 The number of potential customers, both in terms of people and businesses, accessible to firms in east London is lower than in other parts of the city due to the barrier effect of the River Thames. The Silvertown Tunnel would increase catchment areas for businesses. For business to business travel, even once the costs of the assessed charge are taken into account, most businesses will experience an increase in their catchment areas to other businesses of up to 6% if they avoid the morning peak period. Businesses in the Royal Borough of Greenwich benefit especially from an increased catchment area.

8.1.15 As the east London economy has moved towards higher value sectors, particularly around Canary Wharf, there has been growth in services to support these jobs, such as printing, cleaning, food processing and security. The majority of this growth has occurred on the northern side of the River Thames. Indeed, 75% of suppliers to Canary Wharf come from the same side of the river. The Scheme would facilitate businesses south of the River Thames in competing for this work, increasing competition and efficiency.

8.1.16 Once user charges are taken into account, user benefits of the Scheme for people using their cars in the inter-peak are broadly neutral which would suggest no impact for retail businesses whilst they are positive in the evening peak which would support the evening economy. However, an improved bus network is likely to improve access to local retailers.

8.1.17 Firms that rely on the use of goods vehicles would see quicker journey times enabling them to reach more potential customers. However, some of these firms may decide to cross the river less often, as the congestion savings for these users may not outweigh the cost of the user charge. This could result in more cost sensitive businesses choosing to restrict their customer base to the same side of the River Thames to avoid the charge.

8.1.18 However, this is unlikely, as 32% of businesses in the manufacturing, construction and distribution sectors, all of which are more likely to use goods vehicles than firms in other sectors, said the Scheme, including user charges, would increase their customer base, compared to 30% of businesses across all sectors. Just 4% of businesses in these sectors disagreed that it would increase their customer base.

Improvements in access to suppliers

8.1.19 The other side of businesses being able to access more customers is that

firms also have access to a greater range of suppliers. This can increase competition, drive down costs and support innovation. 26% of all businesses said the crossing proposal would make it easier to reach suppliers.

Higher levels of job creation and retention

8.1.20 All of the above serves to make the east London economy more efficient; meaning that businesses can reinvest any cost savings, as well as any additional revenue, on plans for future expansion, including job creation. Nineteen per cent of all businesses said they would take on more staff as a result of the Scheme. If 19% of businesses across the survey area only took on one more member of staff, this would result in over 10,000 additional jobs across east London. These are not necessarily jobs that require regular access across the River Thames (such as a commuting trip from the other side of the River Thames), but would have come about as a result of general improvements in business efficiency across east London.

8.1.21 The potential for job creation needs to be balanced against the costs imposed by the introduction of the charge. Although the net user benefits for businesses are expected to be positive, there might be some more cost sensitive businesses that decide not to pay the charge and see their potential customer base and access to suppliers reduced. However, just 4% of businesses said they expected the Scheme, including user charges, to have a negative impact on their business, compared to 37% of businesses that said it would have a positive impact.

8.1.22 A total of 9% of businesses disagreed that the Scheme would enable them to take on more staff, which is half the number that said they would take on more staff. This supports the economic analysis that greater levels of efficiency, access to the labour market, access to customers and access to suppliers would result in a net beneficial effect on employment.

Improvements in access to jobs

8.1.23 As set out above, labour catchments are very much confined to the same side of the River Thames. Under a do-nothing scenario the number of jobs accessible by highway is projected to significantly decrease in south-east London as a direct result of increased congestion at Blackwall Tunnel, resulting in reduced employment opportunities in some highly deprived areas.

8.1.24 By providing a step change in cross-river bus services the Scheme would facilitate an increase in access to 9,000 jobs for residents of regeneration

areas in RB Greenwich and 6,000 jobs for residents of regeneration areas in LB Newham.

8.1.25 The London Plan[47] identifies areas of regeneration based on Lower Super Output areas (LSOAs) within the 20% most deprived nationally, as defined by the Index of Multiple Deprivation. These are heavily concentrated to the north of the river (much of the London boroughs of Tower Hamlets and Newham) but there are also pockets of deprivation to the south as well, with significant areas in RB Greenwich. The proposed tunnel links areas of deprivation on both sides of the river, particularly where there would be the largest increase in access to jobs. This has the potential to bring down currently high levels of unemployment. The proposed bus network would be key to supporting this.

Higher levels of inward investment and faster rates of development

8.1.26 London's strategic priority is to significantly increase the delivery of housing compared to current levels. The rapid increase in house prices, resulting from supply failing to keep up with demand, is resulting in worsening problems of overcrowding and restricting labour supply. Business leaders are increasingly citing the lack of housing as a key constraint on their business.

8.1.27 Compared to a rail-based public transport Scheme, the improvements in connectivity expected with the Silvertown Tunnel would be dispersed over a much wider area, which means that concentrated uplifts in land value are less likely. Following discussions with developers and the Boroughs, this report does not identify any particular sites which are clearly dependent on the Scheme for their delivery.

8.1.28 However, when cross-river highway traffic in the single greatest concentration of developable land in the UK's most productive city is subject to diversions, delays and unreliability it can only serve to impede short-run economic output and inhibit sustainable future growth. Tangible impacts in the efficiency of the local economy, improved access to jobs and services, as well as improvements in the perception of the area, could mean that future levels of development, including housing, may be higher

[47] Greater London Authority: The London Plan – Spatial Development Strategy for Greater London, July 2011

as a result of the Scheme.