

11. EFFECTS ON ALL TRAVELLERS

11.1 Introduction

11.1.1 This chapter assesses the potential effects of the Scheme on all travellers on the highway network. The chapter should be read in conjunction with the Scheme description in Chapter 4. The assessment examines the existing pedestrian, cyclist, equestrian and vehicle traveller provision, assesses the type and level of provision to be provided by the Scheme and the resultant effect on all traveller movements.

11.1.2 This chapter draws on the findings of the Preliminary Transport Assessment prepared for the Scheme.

11.2 Regulatory and Policy Framework

11.2.1 This impact assessment has been undertaken in accordance with current international and national legislation, and national, regional and local plans and policies relating to nature conservation in the context of the Scheme. A summary of the relevant legislation and policies, the requirements of these policies and Scheme response has been provided in Table 11-1.

Table 11-1 Effects on all Travellers Regulatory and Policy Framework

Summary of Requirements	Scheme Response
National Road and Rail Networks: National Policy Statement (NPS) for National Networks, DfT 2014	
<p>The NPS contains the following statement in Section 2 setting out the Government’s vision and strategic objectives for nationally significant networks: ‘The Government will deliver national networks that meet the country’s long-term needs; supporting a prosperous and competitive economy and improving overall quality of life, as part of a wider transport system. This means:</p> <ul style="list-style-type: none"> • Networks with the capacity and connectivity to support national and local economic activity and facilitate growth and create jobs • Networks which support and improve journey quality, reliability and safety • Networks which support the delivery of environmental goals and the move to a low carbon economy • Networks which join up our communities and link effectively to each other’ <p>The NPS explicitly notes at paragraph 2.27 that new links that cross a river or estuary (such as the Silvertown Tunnel), may be needed to increase capacity and connectivity to meet the needs created by economic and demographic growth.</p>	<p>The Scheme seeks to provide a reliable and improved connection to the north and south of the River Thames aiming to facilitate the movement of people and encourage economic growth. As part of the Scheme, localised pedestrian and cycle improvements are provided. The Scheme also provides an opportunity for enhancing cross-river bus services and for enabling new services to become operational.</p> <p>In relation to the delivery of environmental goals, user charging will provide the opportunity to incentivise low-emission vehicles.</p>
<p>The NPS states that where appropriate applicants should seek to deliver improvements that reduce community severance and improve accessibility. Applicants should consider reasonable opportunities to support other transport modes in developing infrastructure. The applicant should provide evidence that as part of the project they have used reasonable endeavours to address any</p>	<p>The Scheme would include localised improvements benefitting non-motorised users and improving accessibility:</p> <ul style="list-style-type: none"> • a new footbridge with ramps over the A102 serving the pedestrian desire

Summary of Requirements	Scheme Response
<p>existing severance issues that act as a barrier to non-motorised users.</p>	<p>lines to and from Boord Street;</p> <ul style="list-style-type: none"> • new pedestrian and cycle facilities within the new Tidal Basin Roundabout; • a lane for buses and heavy goods vehicles, which will help to improve connections by bus between both sides of the river. <p>A review of the feasibility of providing segregated pedestrian and cycle facilities as part of the Silvertown Tunnel itself was commissioned in April 2015 (refer to Preliminary Case for the Scheme for further details).</p> <p>A Pedestrian Environment Review System (PERS) assessment and a Cyclist Levels of Service (CLOS) assessment have been carried out around the proposed sites of the two Silvertown Tunnel portals (full details are provided in appendices G and H of the Preliminary Transport Assessment).</p>
<p>Applications for road and rail projects should usually be supported by a local transport model to provide sufficiently accurate detail of the impacts of a project.</p>	<p>The assessment of the impacts of the Scheme draws on transport models including the London Regional Demand Model and the River Crossings Highway Assignment Model.</p>

Summary of Requirements	Scheme Response
National Planning Policy Framework (NPPF), 2012	
<p>Section 1 of the NPPF ‘Delivering sustainable development’ promotes the building of a strong, competitive economy. The Government is committed to securing economic growth in order to create jobs and prosperity, and the framework states that ‘significant weight should be placed on the need to support economic growth through the planning system’ (paragraph 19). Paragraph 32 sets out the requirement for developments that generate significant amounts of movement to be supported by a Transport Statement or Transport Assessment.</p>	<p>A Preliminary Transport Assessment has been undertaken for the Scheme that provides a summary of the transport related impacts of the Scheme and the mitigation measures needed to address significant impacts during construction and operational phases.</p>
The London Plan, 2015	
<p>Chapter 6 of the London Plan sets out policies to support integration of transport and development. Policy 6.1 (Strategic Approach) states that “the Mayor will work with all relevant partners to encourage the closer integration of transport and development through the schemes and proposals shown in Table 6.1”, which include “new and enhanced road vehicle river crossing(s) in east London (package of measures)” – described as a “programme of works under development to improve cross-Thames road links in east London including Silvertown Tunnel.”</p> <p>Policy 6.4 refers to enhancing London’s transport connectivity stating: The Mayor will work with strategic partners to improve the public transport system in London, including cross-London and orbital rail links, to support future development and regeneration priority areas, and increase public transport capacity by (k) Providing new river crossings’.</p> <p>Policy 6.12 (Road Network Capacity) states that the Mayor supports the need</p>	<p>The Scheme will improve public transport links as new cross river bus services would be provided.</p> <p>Once operational, the Scheme would relieve congestion on the existing highway network. This has been assessed within the Preliminary Transport Assessment.</p>

Summary of Requirements	Scheme Response
<p>for limited improvements to London’s road network, whether in improving or extending existing capacity, or providing new links, to ‘address clearly identified significant strategic or local needs’.</p> <p>Policy 6.12C states that proposals should show, overall, a net benefit across these criteria when taken as a whole. All proposals must show how any dis-benefits will be mitigated.</p>	
Mayor’s Transport Strategy (MTS), 2010	
<p>The MTS sets out the transport strategy for London up to 2031, including the strategy for delivering the transport infrastructure needed to accommodate growth in the east and south-east sub-region (ESR), a key part of the London Plan’s strategic vision.</p> <p>The six goals the MTS seeks to achieve are:</p> <ol style="list-style-type: none"> 1. To support economic development and population growth 2. Enhance the quality of life for all Londoners 3. Improve the safety and security of all Londoners 4. Improve transport opportunities for all Londoners 5. Reduce transport’s contribution to climate change, and improve its resilience 6. Support delivery of the London 2012 Olympic and Paralympic Games and its legacy <p>The strategic need and case for improving river crossings in east London is set out in Section 5.8 of the MTS. This section contains MTS Proposal 39 (set out below) which specifically references a new fixed link crossing at Silvertown to relieve Blackwall Tunnel congestion.</p>	<p>The Scheme aims to improve connectivity across the River Thames by providing improvements to the highway network. This will provide benefits for all road users and will meet the objectives set out within the MTS and Preliminary Outline Business Case.</p>

Summary of Requirements	Scheme Response
<p>Proposal 35 contains policy tests similar to those set out in policy 6.12 of the London Plan (and included above in paragraph 2.20) for new road infrastructure.</p>	
Mayor’s Roads Task Force (RTF), 2013	
<p>In Chapter 1, the RTF sets out a vision for how London’s roads and streets should be planned, managed and developed, based around three core priorities (which are consistent with the statutory policy frameworks of the London Plan and the MTS):</p> <ol style="list-style-type: none"> 1. To enable people and vehicles to move more efficiently on London’s roads 2. To transform the environment for walking, cycling and public transport 3. To improve the public realm and quality of life on our streets. <p>One of the key elements of the vision (set out in Chapter 1) is ‘unlocking major growth and regeneration across London’ particularly in east London and the report notes that enhanced road links to connect areas, for example river crossings, are needed to achieve this.</p> <p>Figure 7 in Chapter 1 flags up ‘inadequate cross Thames connectivity and capacity’ to support the ESR growth agenda.</p> <p>Chapter 3 - need for new infrastructure and notes that while a greater shift to public transport, walking and cycling, and demand management measures, must be a core part of the strategy, capacity measures such as river crossings to support the ongoing regeneration and growth of east London, must also play a role.</p>	<p>The Scheme would provide new road infrastructure that would meet the vision of the RTF to increase north-south connectivity and improve capacity on the highway network.</p> <p>PEIR Chapter 7 Community and Private Assets and the Preliminary Case for the Scheme provide further details of the role of the enhanced road links to connect to areas of major growth and regeneration across south-east London.</p>
London Infrastructure Plan (2014)	
<p>The plan notes the proposed Silvertown Tunnel Scheme and sets out</p>	<p>The Scheme will improve north-south</p>

Summary of Requirements	Scheme Response
<p>aspirations for a series of further new river crossings in east London beyond this current scheme to help overcome the major barrier effect of the River Thames.</p>	<p>connectivity.</p>
<p>East and South East London Sub-regional Transport Plan (SRTP), 2014</p>	
<p>The Silvertown Tunnel is specifically listed as a scheme that will improve east and southeast London. The SRTP notes that proposals are being progressed for a new twin bore road tunnel at Silvertown using safeguarded land adjacent to the Blackwall Tunnel.</p> <p>The Scheme would aim to alleviate the congestion routinely experienced at the Blackwall crossing as well as reduce both the frequency and impact of closures due to the attempted use of the tunnel by over height vehicles.</p>	<p>The Scheme will improve the capacity of the existing highway network.</p>
<p>Royal Borough of Greenwich Core Strategy, 2014</p>	
<p>The Core Strategy sets out how the borough is committed to supporting transport schemes that are critical to the borough's development. The borough will advocate and work in partnership with relevant agencies to deliver a new package of Thames river crossings in east London. This includes the continued safeguarding of the Silvertown Link Tunnel (Core Strategy policy IM3).</p> <p>The Core Strategy states that this new river crossing will improve connectivity between the Greenwich Peninsula (the focus of development in Greenwich, with 14,000 new homes planned) and the north side of the Thames (paragraph 3.3.20).</p>	<p>The Scheme will improve the north-south connectivity and capacity of the existing highway network.</p>
<p>Royal Borough of Greenwich Local Implementation Plan (LIP)</p>	
<p>The LIP discusses river crossings in Section 3 and gives support in principle to 'a vehicle tunnel from the A102 on Greenwich Peninsula to Silvertown.'</p>	<p>The Scheme will improve north-south connectivity.</p>

Summary of Requirements	Scheme Response
<p>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.</p> <p>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’.</p>	<p>The Scheme will improve the capacity of the existing highway network.</p>
The Greenwich Peninsula West Masterplan Supplementary Planning (SPD), 2012	
<p>The SPD provides a masterplan to guide the development planned for this area. Section 4 of the SPD discusses key movements in the area and notes that the A102 The New Blackwall Tunnel, which forms the entryway to the Blackwall tunnel, is a major traffic artery linking both sides of the River Thames.</p> <p>The plan recommends that should an additional road link be provided that it is below ground to minimise the impact of increased traffic in the area. SPDs can help with the assessment of planning applications.</p>	<p>The Scheme will meet objectives set out within the SPD by providing a tunnel that will improve north-south connectivity and improve the capacity of the existing highway network.</p>
LB Newham Core Strategy, 2012	
<p>The Core Strategy gives support for new river crossings that will contribute towards Newham’s regeneration and economic and physical development. It states that ‘the Council supports the development of bridge, tunnel or ferry crossings at these locations [Silvertown and Gallions Reach] to provide resilience to the Blackwall Tunnel and to support future growth’ (paragraph 6.197).</p>	<p>The Scheme is supported within the Core Strategy and will improve north-south connectivity and improve the capacity of the existing highway network.</p>

Summary of Requirements	Scheme Response
LB Newham Local Implementation Plan (LIP)	
<p>The council has a ‘serious concern that its [east London’s] further development will 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).</p> <p>The LIP sets out the Council’s support for strategic transport proposals that will contribute towards Newham’s regeneration and economic and physical development and specifically notes a new river crossing at Silvertown in paragraph 2.6.100.</p> <p>The Council’s 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).</p>	<p>The Scheme will improve north-south connectivity and improve highway capacity. This should address the concerns noted within the LIP.</p> <p>The Gallions Reach Scheme (also known as East of Silvertown) is being progressed separately and at an initial option study stage in terms of programme. The two Schemes are not linked in terms of delivery.</p>
Canning Town and Custom House SPD (2008)	
<p>The SPD identifies the Council’s strategic aspirations for the regeneration of this area and reflects the masterplan that has been developed.</p>	<p>The Scheme will improve north-south connectivity and improve highway capacity. The new crossing will aid the regeneration of the area outlined within the SPD.</p>
LB Tower Hamlets Core Strategy, 2010	
<p>The Core Strategy provides support for river crossings to North Greenwich for the improved accessibility, permeability and connectivity that will be provided to Leamouth, a regeneration area adjacent to the north side of the proposed Silvertown Tunnel where new homes and jobs are being delivered (LAP 7&8, Leamouth)</p>	<p>The Scheme will improve north-south connectivity and improve highway capacity.</p>

Summary of Requirements	Scheme Response
LB Tower Hamlets Local Implementation Plan, 2011	
<p>The LIP includes details of schemes of relevance to Tower Hamlets set out in Transport for London's (TfL's) East London Sub-Regional Transport Plan, including 'Silvertown Tunnel' proposals, and notes that these have been taken into account in the preparation of the Borough's Transport Objectives and Delivery Plan.</p> <p>The Council supports the improvement of the provision of river crossings to relieve pressure on the borough's road network, particularly Blackwall Tunnel (page 38).</p>	<p>The Scheme will improve north-south connectivity and improve highway capacity.</p>
Lower Lea Valley/Olympic Legacy Supplementary Planning Guidance (OLSPG)	
<p>Section 3.4 of the OLSPG Strategic Transport Study sets out the approach to river crossings as</p> <p>'...the barrier of the Thames acts as the major constraint on the sub-region's development and economic potential, not just in geographical terms but also in terms of congestion due to lack of capacity at the three existing road vehicle river crossings (Rotherhithe Tunnel, Blackwall Tunnel and Woolwich Ferry). A significant challenge is therefore to both increase and improve existing river crossings in East London in order to mitigate the severance effects of the river both on communities (including those within the OLSPG area) and on the region's economy'</p>	<p>The Scheme will improve north-south connectivity and improve highway capacity.</p>

11.3 Methodology

General Approach

- 11.3.1 The Supplementary Guidance for users of Design Manual for Roads and Bridges (DMRB) Volume 11 'Environmental Assessment' has been applied and tailored to the context of the Scheme. This guidance created the new topic, 'Effects on All Travellers' and states that a mixture of the methodologies in the DMRB Section 3 Part 8 Pedestrians, Cyclists, Equestrians and Part 9 Vehicle Travellers, should be followed as appropriate. The 'Guidelines for the Environmental Assessment of Road Traffic' ('Institute of Environmental Management and Assessment (IEMA) Guidance') have been applied in order to identify resources and receptors that may be sensitive to changes in traffic conditions.
- 11.3.2 Table 11-2 provides a summary of the relevant sections from this guidance for each assessment criteria.

Table 11-2 Assessment criteria and relevant guidance

Criteria	Guidance Reference
Journey Length	DMRB Volume 11, Section 3, Part 8, Chapters 2 and 3 and professional judgement
Changes in Amenity	DMRB Volume 11, Section 3, Part 8, Chapter 4 and professional judgement
New Severance	DMRB Volume 11, Section 3, Part 8, Chapters 5, 6 and 8 and professional judgement
Relief from severance	DMRB Volume 11, Section 3, Part 8, Chapters 5, 7 and 8 and professional judgement
Views from Road	DMRB Volume 11, Section 3, Part 9, Chapter 2. It will also draw on the Townscape and Visual impact assessment as detailed in Section 6.11 and professional judgement
Driver Stress	DMRB Volume 11, Section 3, Part 9, Chapters 3 and 4 and professional judgement

Source: DMRB, Volume 11 'Environmental Assessment'

Consultation

- 11.3.3 Following the consultation on the Environmental Impact Assessment (EIA) Scoping Report, TfL undertook further public consultation in autumn 2014.

The full consultation report can be found on TfL's website. The issues in relation to all travellers are summarised in Table 11-3 below.

Table 11-3 Summary of consultation responses relevant to effect on all travellers

Summary of consultation responses
<p>Key points raised by members of the public:</p> <p>Overall support for the scheme and need for a new river crossing.</p> <p>Key points for raised in relation to highways / traffic issues included:</p> <ul style="list-style-type: none">• Concern for increased delay and congestion both adjacent to the tunnel and its surrounding highway network; and• Requests to implement full package of river crossings. <p>Key points made in relation to cyclists and pedestrians included:</p> <ul style="list-style-type: none">• There is a need for improved local cross-river links for pedestrians and cyclists;• There is a general need for investment in alternatives to highway links, and further highway links can act to discourage cycling at the expense of less sustainable modes of travel;• The Emirates Air Line (EAL) is subject to charges which deter cyclists and pedestrians;• The EAL fare system is not integrated with the Travel Card system; and <p>The EAL is slow/ inconvenient for use by cyclists.</p>
<p>Key points raised by the Royal Borough of Greenwich:</p> <ul style="list-style-type: none">• would like to see measures address residents' concerns along the A102/A2 and to ensure no additional rat running or congestion on the local highway network;• would like the Scheme to accommodate pedestrians and cyclists within the tunnel to reduce the use of Greenwich foot tunnel by cyclists; and• would like to see charging of other crossings.
<p>Key points raised by the London Borough of Newham:</p> <ul style="list-style-type: none">• supportive of the Scheme as part of a package of river crossing options; and• concerned that the Scheme may cause traffic to divert through the Royal

Summary of consultation responses

Docks highway network and would like mitigation to deter this.

Key points raised by the London Borough of Tower Hamlets:

- supportive of the Scheme as part of a package of river crossing options;
- traffic management measures must be put in place to ensure traffic and congestion is not displaced;
- suggest widening the approach to the Blackwall/Silvertown Tunnel to allow better entry;
- would like the Scheme to accommodate pedestrians and cyclists within the tunnel;
- would ask for discount on toll charges for residents; and
- consideration for multi-modal interchange improvements as part of the Scheme.

The Study Area

11.3.4 For Effects on all Travellers (pedestrian, cyclist, equestrian and vehicle traveller provision) the scope of the study area for each assessment criteria has been chosen by understanding the effect on all relevant receptors as a result of the Scheme. The study area is therefore different for each category of effect and has its own unique scope as shown on Table 11-4.

Table 11-4 Summary of Study Areas

Effect on receptors	Study area
Changes to duration or distance of journeys travelled by pedestrians/cyclists	The study area will include main routes used by pedestrians and cyclists to access key community facilities ¹ in an area extending 1km around the Scheme). Those roads which

¹ Doctors' surgeries, hospitals, aged persons homes, schools, shops, post offices, churches, parks, play areas, sports centres, tube/rail stations.

Effect on receptors	Study area
to community facilities	experience a significant increase or decrease in traffic flows will be assessed.
Changes in Pedestrian/cyclist Amenity (pleasantness of journey)	The study area will include all roads that are likely to experience an increase or decrease in traffic flows of more than 20% as a result of the Scheme.
New Pedestrian Severance from community facilities	The study area will include all roads that are likely to experience an increase in traffic flows of more than 30% as a result of the Scheme.
Relief from severance for pedestrians	All roads where there is a reduction in traffic by 30% or more as a result of the Scheme.
Views from the Road (the Scheme) for all road users	500m either side of the Scheme.
Driver Stress	Includes approach roads to the tunnel and key highway links and junctions approaching the Blackwall Tunnel.

Methodology for establishing baseline conditions

Establishing the existing baseline

11.3.5 Baseline information on the existing highway, road conditions, traffic flows, pedestrian/cycle flows, land use and pedestrian and cycle facilities has been gathered by:

- identifying appropriate study area(s) in consideration of the Scheme details;
- undertaking a desk study of all relevant information within agreed study area(s);
- undertaking a site visit of the study areas and reviewing online imagery; and
- taking into consideration issues raised through consultation with interested parties (including during and post-scoping).

Desk study

- 11.3.6 A desk study was undertaken to assess potential construction access routes, highway infrastructure and transport facilities in the vicinity of the Scheme. This included a review of existing:
- OS mapping and aerial photographs;
 - the strategic and local highway network;
 - pedestrian and cycle facilities;
 - pedestrian amenity and severance;
 - views from the road;
 - public transport provision (bus, Docklands Light Railway (DLR) and London Underground (LU));
 - traffic and pedestrian data to identify existing flows, journey times and delays;
 - and the Preliminary Code of Construction Practice (CoCP) (Appendix 4.A); and
 - background highways reports including: Preliminary Transport Assessment, Preliminary Traffic Forecasting Report and other relevant highways related documents.

Forecasting the future baseline (Without Scheme scenario - Reference Case)

- 11.3.7 A suite of models have been used for assessing future year scenarios and the highway impacts of the proposed Silvertown Tunnel. Estimates of trip generation and distribution for the future year assessments have been derived from TfL's London Transportation Studies (LTS) model and the London Regional Demand Model (LoRDM). A strategic highway model, the River Crossings Highway Assignment Model (RXHAM), has been used to assess the impact of new river crossings on highway network performance in the wider East/South-East London area.
- 11.3.8 The RXHAM model has been used to assess the future baseline traffic flows known as the reference case. Future baseline traffic flows from the

model and pedestrian/cycle flows without the Scheme have been forecast by taking in to account the following:

- changes in population and employment surrounding the Scheme within London and the south-east of England based on Greater London Authority (GLA) forecasts and comparisons to census data;
- increase in baseline walking and cycling levels due to changes in surrounding land use;
- increase in public transport usage on the bus/DLR/LUL;
- new public transport services due to changes in surrounding land use and increased patronage;
- committed developments surrounding the Scheme; and
- highway schemes that may affect travel behaviour.

Defining the importance/sensitivity of resource

- 11.3.9 The following section outlines the criteria that have been used to determine the assessment of Effects on All Travellers.
- 11.3.10 The significance of an environmental effect is a function of the 'value' of the receptor and the 'magnitude' or 'scale' of the impact.
- 11.3.11 Volume 11, Section 2, Part 5 HA 205/08 'Assessment and Management of Environmental Effects' of the DMRB, provides advice on typical descriptors of environmental value, magnitude of change and significance of effects. The importance or sensitivity of each resource has been identified using DMRB and using IEMA guidance criteria provided in Table 11-2.
- 11.3.12 It is anticipated that there will be the following broad receptor groups or categories and their sensitivity is outlined within Table 11-5:
- Transport Users: pedestrians, cyclists, public transport, vehicle travellers who are users/operators travelling to/from home, work and nearby trip attractors;
 - Sensitive receptors: such as schools, playgrounds, hospitals, tourist attractions, open spaces, recreational areas; and

- Transport Infrastructure: road network, footpaths/Public Rights of Way (PRoW) and cycle paths.

Table 11-5 Receptor sensitivity

Sensitivity of resource or receptor	Typical Descriptors
Major	High importance (very limited potential for substitution) - Receptors of greatest sensitivity to traffic flow include schools, colleges, playgrounds, accident blackspots, retirement homes and urban/residential roads without footways that are used by pedestrians
Moderate	High/medium importance (limited potential for substitution) - Traffic flow sensitive receptors include: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycleways, community centres, parks and recreation facilities
Minor	Low/medium importance - Receptors with some sensitivity to traffic flow: places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision
Negligible	Low importance - Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions

Source: IEMA Guidance

Methodology for assessing impacts

Forecasting the With Scheme Scenario – Assessed Case

- 11.3.13 TfL's London Transportation Studies (LTS) model, the London Regional Demand Model (LoRDM) and the River Crossings Highway Assignment Model (RXHAM) have been used to assess the future baseline traffic flows with the Scheme in 2021 (opening year) and 2036 (15 years after opening). The with scheme scenario is referred to as the Assessed Case which assumes both Blackwall Tunnel and Silvertown Tunnel would be subject to user charging.
- 11.3.14 The methodology proposed for determining the magnitude and duration of the impact from the change in baseline follows guidance set out in DMRB and using professional judgement.

11.3.15 The proposed criteria for determining the magnitude of the impacts of the Scheme are set out below and will consider: the spatial extent, the time period over which the impact will occur and whether the impact is permanent or reversible.

11.3.16 Impacts are being assessed for the construction and operational phases of the Scheme.

Journey length

11.3.17 Using DMRB guidance and professional judgement, changes to journey lengths have been assessed where traffic flows on an existing road increase or decrease by 30% or more or where journeys are diverted. The effects of the following changes have been identified for these roads and a descriptive assessment on the effects to all users provided:

- journey routes;
- journey lengths;
- journey times;
- the potential number of people affected; and
- predicted traffic flows.

Changes in amenity

11.3.18 The DMRB does not provide significance criteria for the assessment of changes in amenity; therefore, professional judgement has been applied. The following effects are identified for all road users and a descriptive assessment has been provided.

- change in amenity;
- the number of people affected; and
- predicted traffic flows.

New severance

11.3.19 Pedestrian and cycle connectivity is a fundamental element of London's multimodal transport system, enabling easy journeys to be made on foot or by bicycle using a permeable network of streets and footways. It is vital to consider the impact of the accesses to the new crossing on pedestrian

and cycle movement north and south of the river. This will aim to minimise severance effects caused by the new road connection, and facilitate local movement between neighbourhoods and places.

11.3.20 Using criteria in the DMRB, new severance has been described using a three point scale: slight, moderate or severe, as shown in Table 11-6.

Table 11-6 Assessing magnitude of impact – new pedestrian severance

Magnitude of impact	Criteria
Slight	<ul style="list-style-type: none"> • Pedestrian at-grade crossing (located at carriageway level) of a new road carrying below 8,000 vehicles per day (Average Annual Daily Traffic (AADT)); or • A new bridge will need to be climbed or a subway transverse; or • Pedestrian journeys increased by up to 250m.
Moderate	<ul style="list-style-type: none"> • Two or more of the hindrances set out under ‘slight’ applying to single trips; or • Pedestrian at-grade crossing of a new road carrying between 8,000-16,000 vehicles per day (AADT) in the opening year; or • Journeys will be increased by 250-500m.
Severe	<ul style="list-style-type: none"> • Pedestrian at-grade crossing of a new road carrying 16,000 vehicles per day (AADT) in the opening year; or • An increase in length of journeys of over 500m; or • Three or more of the hindrances set out under ‘slight’ or two or more set out under moderate.

Source: DMRB Volume 11 Section 3 Part 8 Pedestrians, Cyclists, Equestrians and Community Effects (1993)

11.3.21 In addition, an estimate of the following will assessed:

- the numbers of people affected; and
- their location and the community facilities from which they are severed from.

Relief from existing severance

11.3.22 Using criteria in the DMRB, relief from existing severance for pedestrians will be described using a three point scale: slight, moderate or substantial

as shown in Table 11-7. The category of level of relief from severance for a built up area will be applied where existing AADT flows are greater than 8,000 vehicles.

Table 11-7 Assessing magnitude of impact – relief from existing severance

Magnitude of impact*	Criteria
Slight	30% decrease in traffic
Moderate	30-60% decrease in traffic
Substantial	>60% decrease in traffic

Source: DMRB Volume 11 Section 3 Part 8 Pedestrians, Cyclists, Equestrians and Community Effects (1993) (* positive impact)

View from the road

- 11.3.23 View from the road is defined as the extent to which travellers, including drivers, are exposed to the different types of scenery through which a route passes. Most routes will pass through landscapes of different character and quality along their length.
- 11.3.24 The extent to which travellers can perceive the landscape through which they are passing will vary with the relative level of the road and its surrounding ground and vegetation.
- 11.3.25 Using the category description in the DMRB views from the road will be assessed according to travellers' ability to see the surrounding landscape on a four point scale: no view, restricted view, intermittent view, open view as described in Table 11-8.

Table 11-8 Assessing traveller's ability to see the surrounding views from the road

View Categories	Description
No view	road is in a deep cutting or contained by earth bunds, environmental barriers or adjacent structures
Restricted view	frequent cuttings or structures blocking the view
Intermittent view	road generally at ground level but with shallow cuttings or barriers at intervals

View Categories	Description
Open view	view extending over many miles, or only restricted by exiting landscape features

Source: DMRB Volume 11 Section 3 Part 9 Vehicle Travellers (1993)

- 11.3.26 In addition to the ability of the traveller to see the view, the assessment must take into consideration the route type, landscape character and the quality of the view experienced. Table 11-9 below provides definition of the category of the view from the road for vehicles travellers.

Table 11-9 Assessing Magnitude of Impact - View from the Road for Vehicle Travellers

Magnitude of Impact	Criteria
High	Travellers are exposed to views of high quality landscape/ townscape or an area of unique landscape/townscape character. Views may have features of particular interest or quality, or distinctive attractive landscape features.
Medium	Travellers are exposed to views of moderate quality landscape / townscape, which may include views of some features of moderate interest.
Low	Travellers are exposed to views of low quality landscape/townscape and/or unremarkable landscape character/ townscape. Views may include detractors or features which are inconsistent with an area of higher quality or character.

Driver Stress

- 11.3.27 Using the criteria in the DMRB, driver stress has three main components: frustration, fear of potential accidents and uncertainty relating to the route being followed. The assessment of driver stress has been based on the traffic and road conditions likely to be encountered and the certainty of the route for travellers.
- 11.3.28 The DMRB guidance levels of driver stress to the average hourly flow per lane, average journey speed, the urban or rural location of the road, and the type of road (motorway, dual carriageway or single carriageway).

- 11.3.29 Overall driver stress will be assessed according to a three point descriptive scale: low, moderate or high for different roads/types within the study area.
- 11.3.30 The highway network has been assessed using the criteria shown in Table 11-10 and Table 11-11. Note that the criteria are standard and do not for instance take into account that there would be a 30mph speed limit restriction within the tunnel and on the approach roads. Professional judgement has been used taking into consideration comparisons between designated speed limits against modelled speed and predicted traffic flow.
- 11.3.31 In addition, a descriptive assessment of effects on driver stress has been undertaken taking into consideration existing three-year collision data, directional signage; and delay along the highway network.

Table 11-10 Assessing magnitude of impact – driver stress (standard data for dual carriageways)

Average peak hourly flow per lane	Average Journey Speed (kph)		
	Under 60	60-80	Over 80
Under 1200	High (Moderate in urban areas)	Moderate	Low
1200-1600	High	Moderate	Moderate
Over 1600	High	High	High

Source: DMRB Volume 11 Section 3 Part 9 Vehicle Travellers (1993)

Table 11-11 Assessing magnitude of impact – driver stress (single carriageways)

Average peak hourly flow per lane	Average Journey Speed (kph)		
	Under 50	50-70	Over 70
Under 600	High (Moderate in urban areas)	Moderate	Low
600-800	High	Moderate	Moderate
Over 800	High	High	High

Source: DMRB Volume 11 Section 3 Part 9 Vehicle Travellers (1993)

Significance of effects

11.3.32 Table 11-12 provides a summary of the significance of effects. This is judged on the relationship of the magnitude of impact of each assessment criteria to the assessed sensitivity of each receptor. A major and moderate effect is seen as significant in EIA terms. A minor or negligible effect is seen as not significant.

Table 11-12 Assessing significance of effect

Importance /sensitivity of resource or receptor	Magnitude of impact			
	High	Medium	Low	Negligible
High	Major Adverse	Major Adverse	Moderate Adverse	Minor Adverse
Medium*	Major Adverse	Moderate Adverse	Minor Adverse	Negligible
Low	Moderate Adverse	Minor Adverse	Negligible	Negligible
Negligible	Minor Adverse	Negligible	Negligible	Negligible

Source: IEMA Guidance * Medium may be referred to as Moderate in assessment criteria

Assessment period

11.3.33 Changes in journey length, relief from severance and new severance will all require Average Annual Daily Traffic (AADT) flow data for the opening year 2021. For the above assessment topics, perceived disbenefits are most evident in the first few years of operation. To reflect this, the DMRB advises that opening year traffic figures should be used.

11.3.34 In accordance with the DMRB, the assessment of driver stress has been undertaken for the worst case scenario (for this assessment, this is assumed to be 15 years after opening - 2036) and during peak hour flow conditions.

11.3.35 For the view from road assessment, both the opening year 2021 and 15 years after opening – 2036 - have been used.

Limitations and assumptions

- 11.3.36 This Preliminary Environmental Information Report (PEIR) provides preliminary information about likely environmental impacts based on the development of the Scheme to date and the data gathered at this point. The EIA is ongoing and the final results will subsequently be provided in the ES that will accompany the Development Consent Order (DCO) application.
- 11.3.37 The assessment of effects in this section of the PEIR, in relation to construction traffic flows, have been undertaken using the estimated number of vehicles identified within the Preliminary Transport Assessment. This has been generated by identifying the programmed dates of construction for the proposed development and then estimating the quantity of vehicles associated with the works.
- 11.3.38 The number of construction vehicles required for the scheme has been estimated and assigned to the existing highway network, assuming that all waste and materials would be delivered/removed by road. This represents the worst case scenario for impacts on all travellers, and it is this scenario which has been assessed in this Chapter. However, TfL proposes to use river transport in addition to road transport to remove/deliver waste and materials for the Scheme. The predicted effects in relation to construction traffic generation may therefore be less than presented within this PEIR.
- 11.3.39 In terms of operational traffic flow in the assessed case opening year (2021) and 15 years after operation (2036), it has been assumed that tolling will be in place on adjacent river crossings. The assessed case flows have also been generated using predicted changes in adjacent developments, improvements to the transport network and forecast growth in employment and population.

11.4 Description of the baseline conditions

Existing baseline

- 11.4.1 Existing baseline data for the area surrounding the Scheme is described within this section. Further details of the wider area can be found within the Preliminary Transport Assessment.

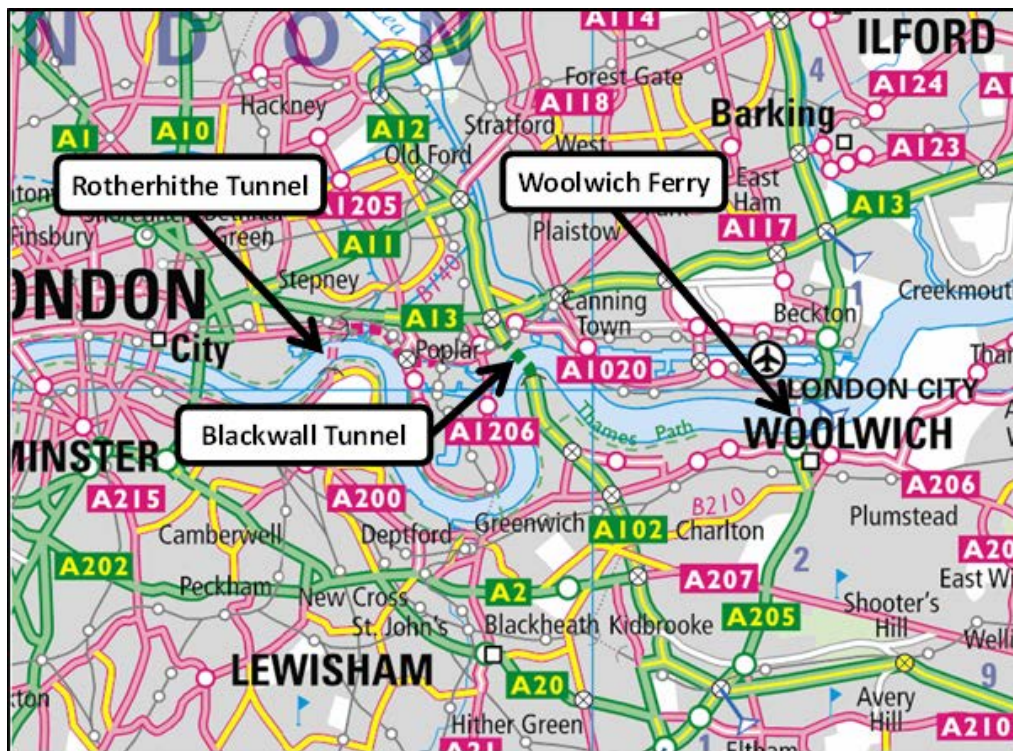
Highway Network

- 11.4.2 The existing strategic and local highway network within the Scheme area is shown in Figure 11-1. Each road has been summarised and described within Table 11.A-1 in Appendix 11.A Baseline Reference Case Traffic Flows (2012, 2021, 2036).
- 11.4.3 The RXHAM model has been used to identify the existing AADT and peak hour flows.

Cross River Connections

- 11.4.4 Surrounding the Scheme, there are three cross river connections; Rotherhithe Tunnel, Blackwall Tunnel and Woolwich Ferry as shown on Figure 11-1 and described below.
- **Rotherhithe Tunnel** - consists of a single bored tunnel providing one traffic lane in each direction. It connects the A200 in Rotherhithe with the A13 at Limehouse. The tunnel is used by all travellers as footways are provided either side of the carriageway.
 - **Blackwall Tunnel** - the Blackwall Tunnel comprises twin bored tunnels carrying two lanes of traffic northbound and two lanes southbound. It passes under the River Thames between the Greenwich Peninsula and Blackwall, approximately three miles east of Tower Bridge. It forms a primary route link (the A102) between the A2 to the south (which connects to the A205 South Circular) and the A12/A13 to the north (which connects to the A406 North Circular). The tunnel is only accessible by motorised vehicles.
 - **Woolwich Ferry** - links the A406 North Circular and the A205 South Circular. A ferry service has existed at Woolwich for centuries but the current ferry infrastructure dates from 1963, when the boats used today were introduced. There are three ferries, of which two are normally in service on weekdays which provide a service approximately every ten minutes. Woolwich ferry is used by all travellers.

Figure 11-1 Location of three existing vehicular river crossings surrounding the Scheme



11.4.5 All of these crossings are located on the Transport for London Road Network (TLRN) as shown on Figure 11-2. In terms of use by longer-distance traffic and high volumes, the only current 'strategic' cross-river highway link is the Blackwall Tunnel.

Public transport

11.4.6 Public transport within the Scheme area consists of the following services shown on Figure 11-3:

- London Underground - Jubilee line with stations at North Greenwich and Canning Town;
- DLR with stations at Greenwich, Woolwich, West Silvertown and Canning Town;
- Emirates Air Line (EAL); and
- Woolwich Ferry.

Figure 11-2 Transport for London Road Network (TLRN)

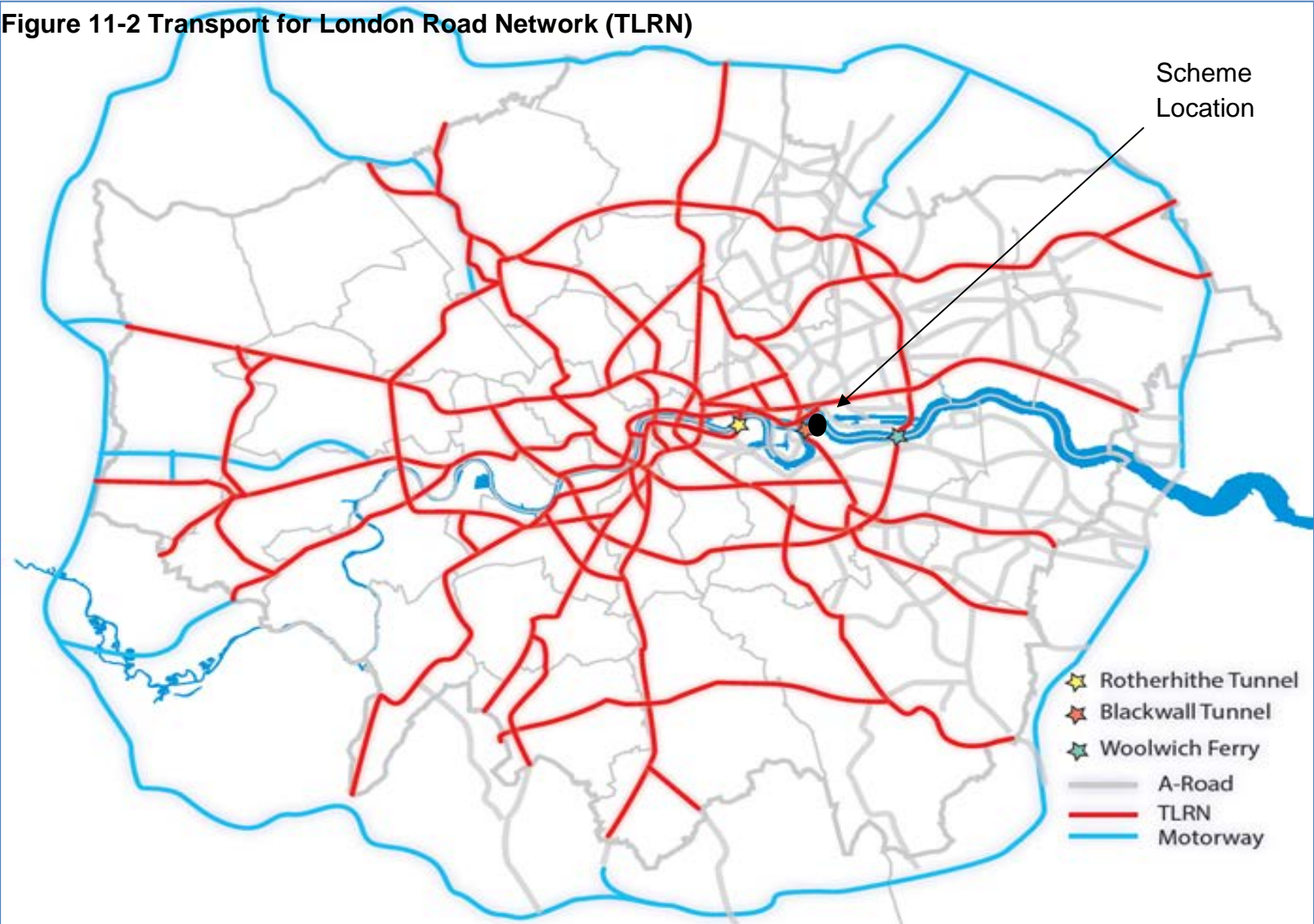
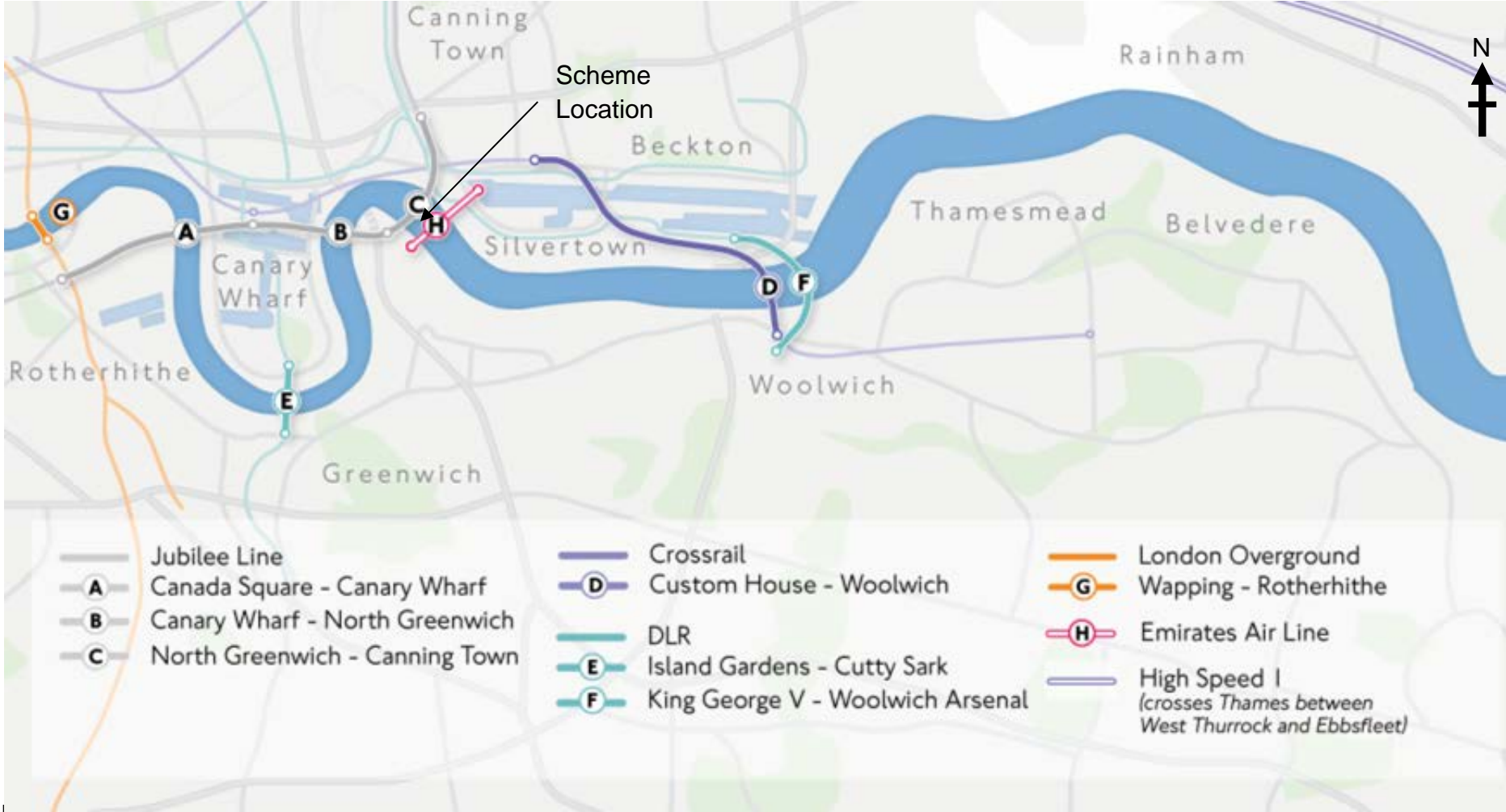


Figure 11-3 Rail based Public transport services surrounding the Scheme area



Rail Services

- 11.4.7 Figure 11-4 illustrates the current rail services within the Scheme area showing connections to overland and underground stations.
- 11.4.8 Table 11-13 shows estimates of the existing capacity of the public transport links in passengers per hour. It can be seen that the Jubilee Line from Canary Wharf to North Greenwich carries the highest number of passengers an hour.

Table 11-13 Existing capacity of study area public transport crossings

Crossing	Existing capacity (pax/hr)
DLR: Island Gardens - Cutty Sark	11,900
Jubilee Line: Canary Wharf - North Greenwich	24,700
Jubilee Line: North Greenwich - Canning Town	19,800
DLR: King George V - Woolwich Arsenal	7,400
Crossrail: Custom House – Woolwich	12,000
Emirates Air Line	2,500
TOTAL	78,300

River Bus network

- 11.4.9 Figure 11-5 illustrates the current river bus services that are currently well used. River bus services primarily provide a radial link between east London and parts of central London, they also serve cross-river trips along the inner section of the Thames. In the study area, river buses 1 and 4 connect the eastern side of Rotherhithe, in Southwark, to Canary Wharf (via Greenland Pier and the Hilton Docklands Pier respectively).

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Figure 11-4 Rail Connections serving the Scheme area

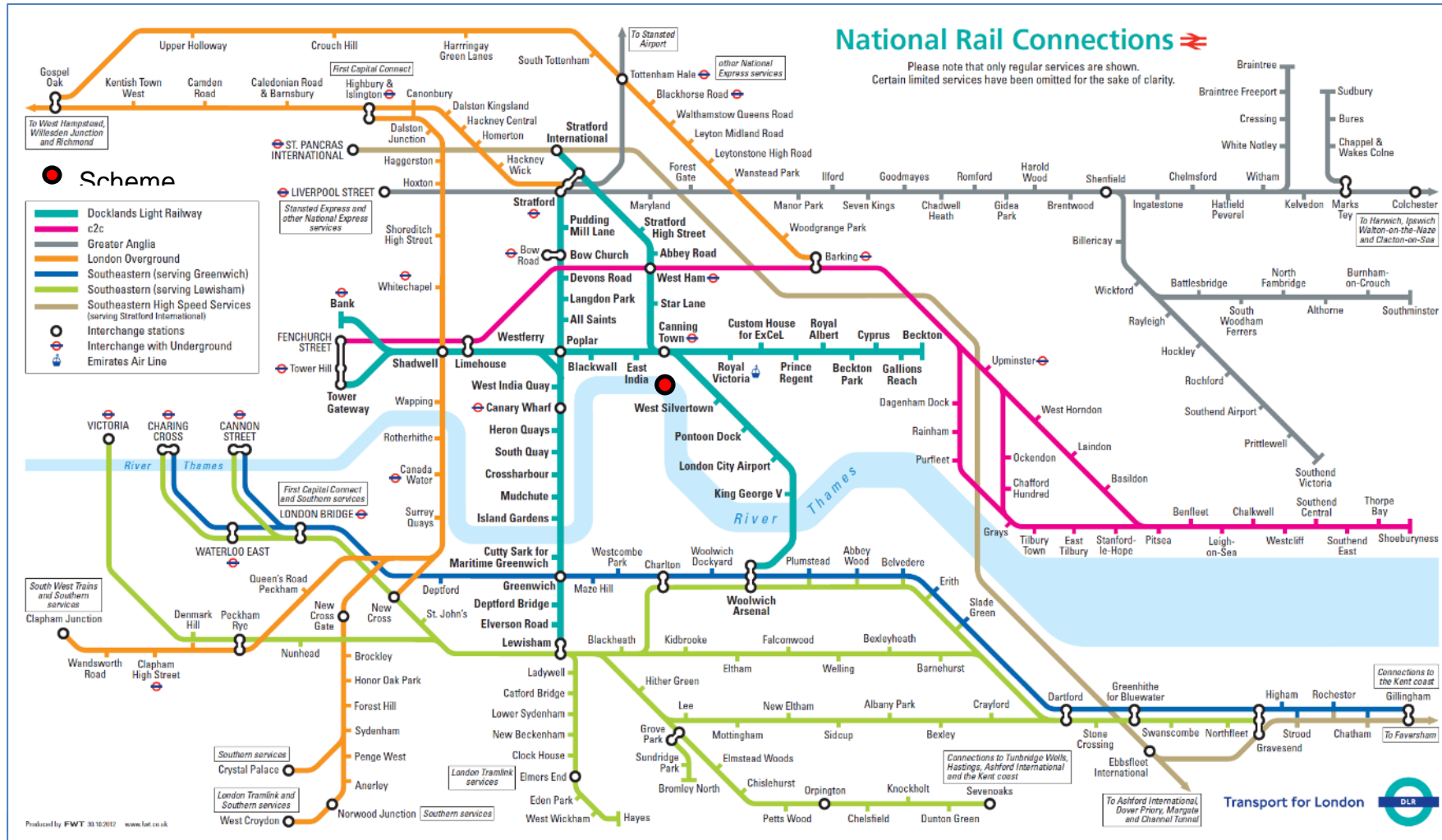
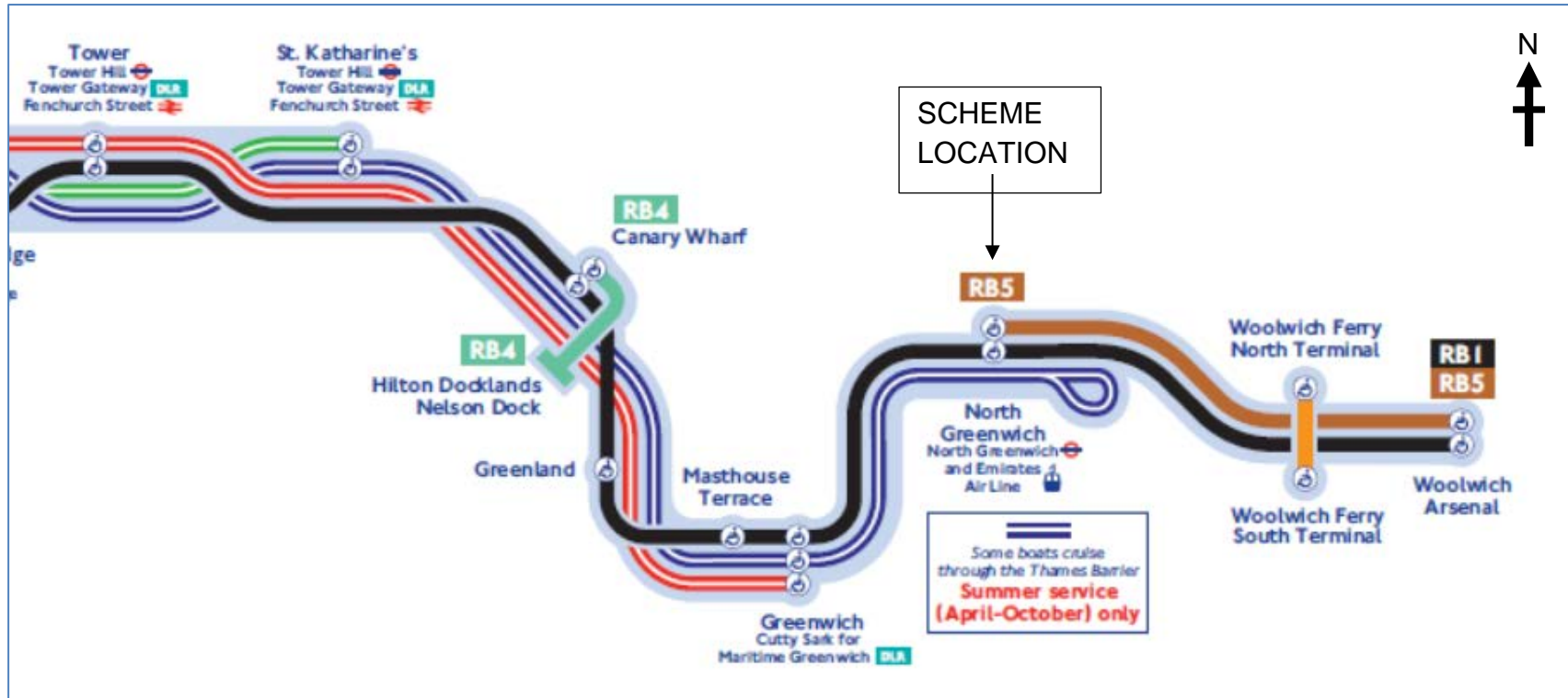


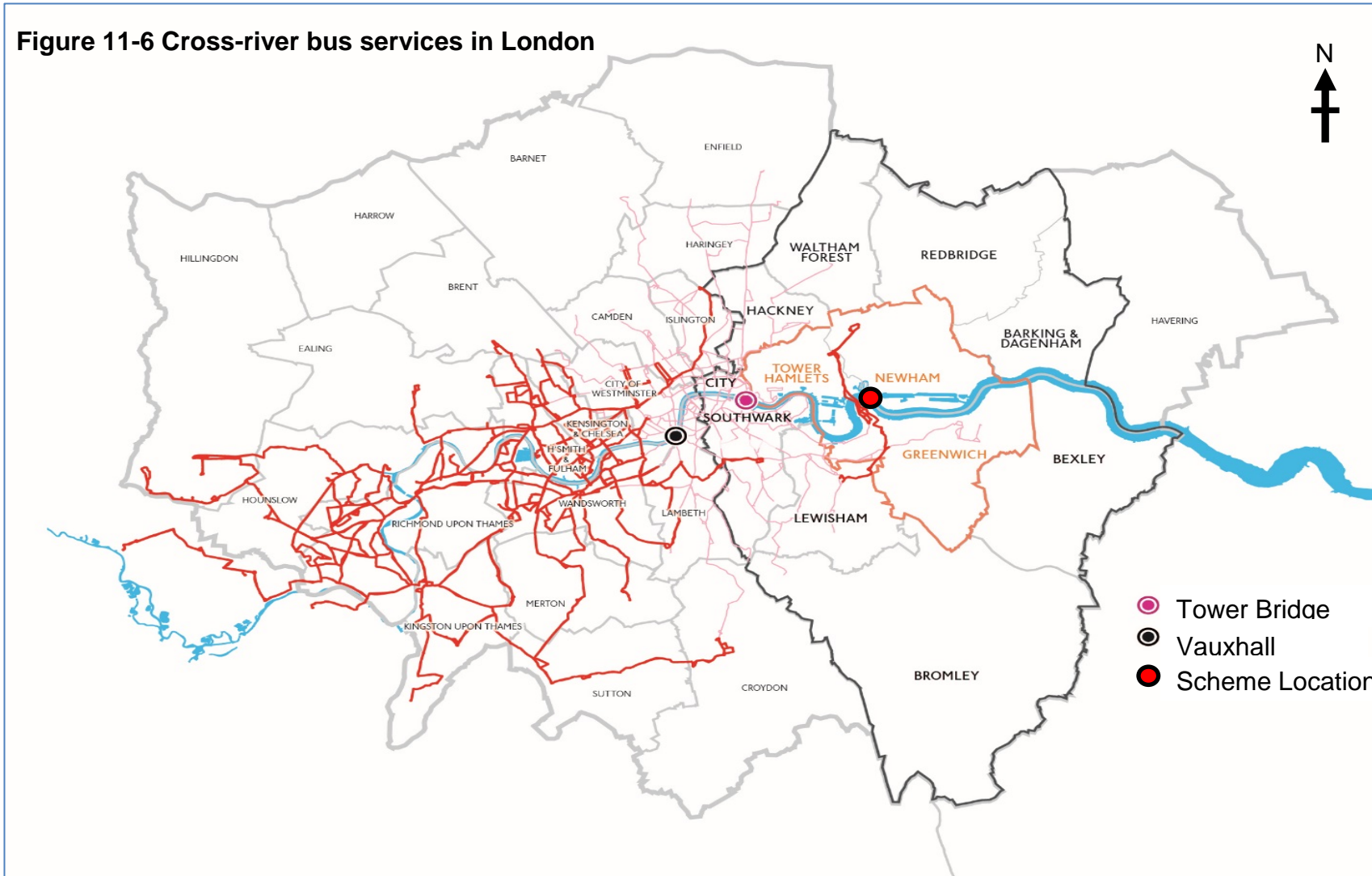
Figure 11-5 River bus services surrounding the Scheme



Bus services

- 11.4.10 Figure 11-6 shows all bus routes in Greater London which at some point cross the River Thames (it excludes excluding night time only bus routes and school services). The Scheme is located within the boroughs outlined in orange. Routes which cross the river in central London, using Vauxhall Bridge, Tower Bridge, or crossing points in between these two are coloured light pink. Routes which cross the river outside these two bridges are coloured red.
- 11.4.11 There are 47 bus routes which cross the river west of Vauxhall Bridge. Only bus route 108 crosses the river east of Tower Bridge between Stratford and Lewisham via the Blackwall Tunnel.
- 11.4.12 Bus route 108 shown on Figure 11-7 suffers from disruption when the Blackwall Tunnel is congested or temporarily closed. The service runs using a single deck bus due to height restrictions along the route. Bus connections are available at both ends of the foot tunnel and ferry at Woolwich and at stations with cross-river services. Figure 11-8 summaries all bus routes within the vicinity of the Blackwall site. Figure 11-9 summaries all bus routes within the vicinity of the Silvertown site.

Figure 11-6 Cross-river bus services in London



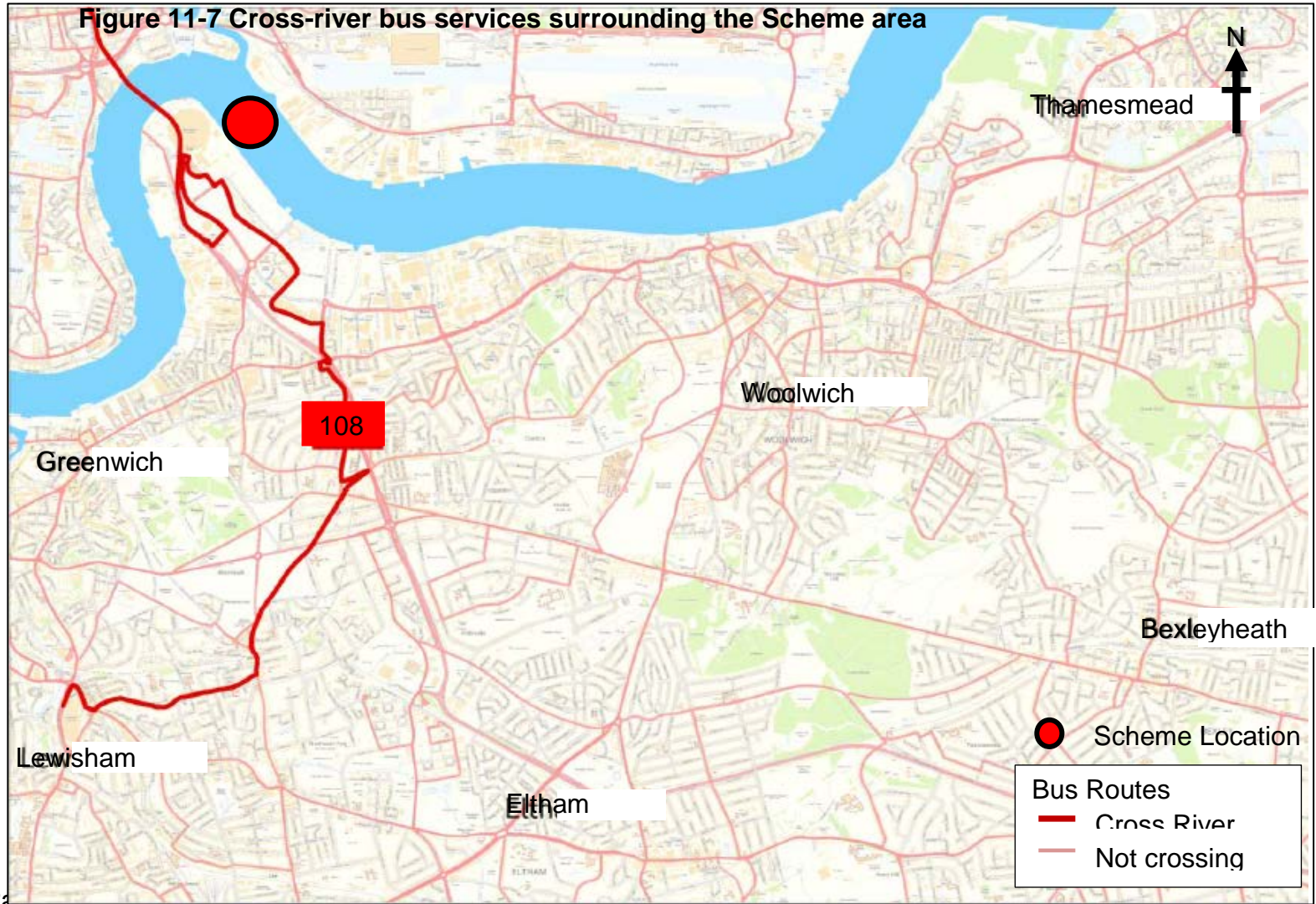


Figure 11-8 Bus Routes for North Greenwich Bus Station

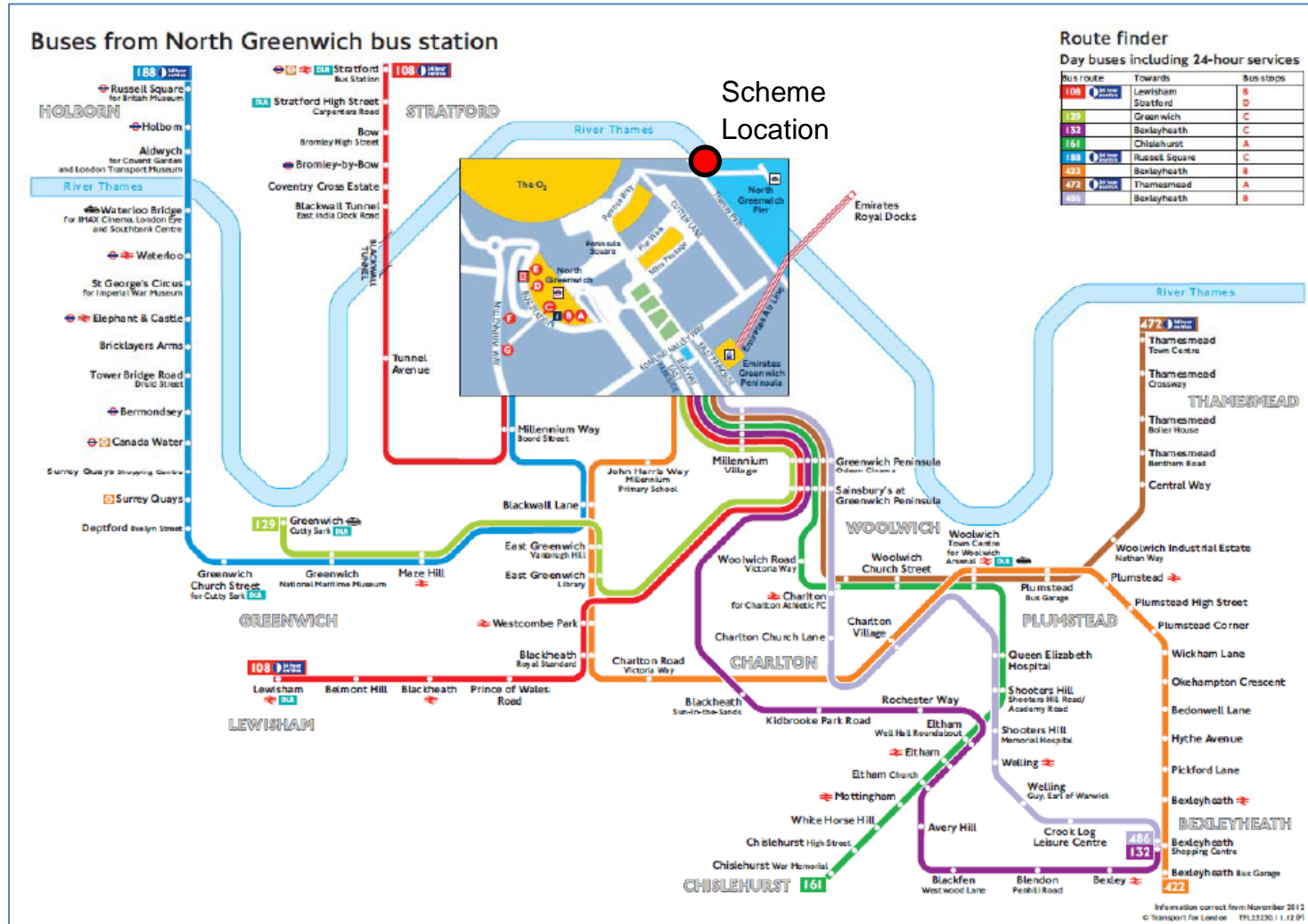
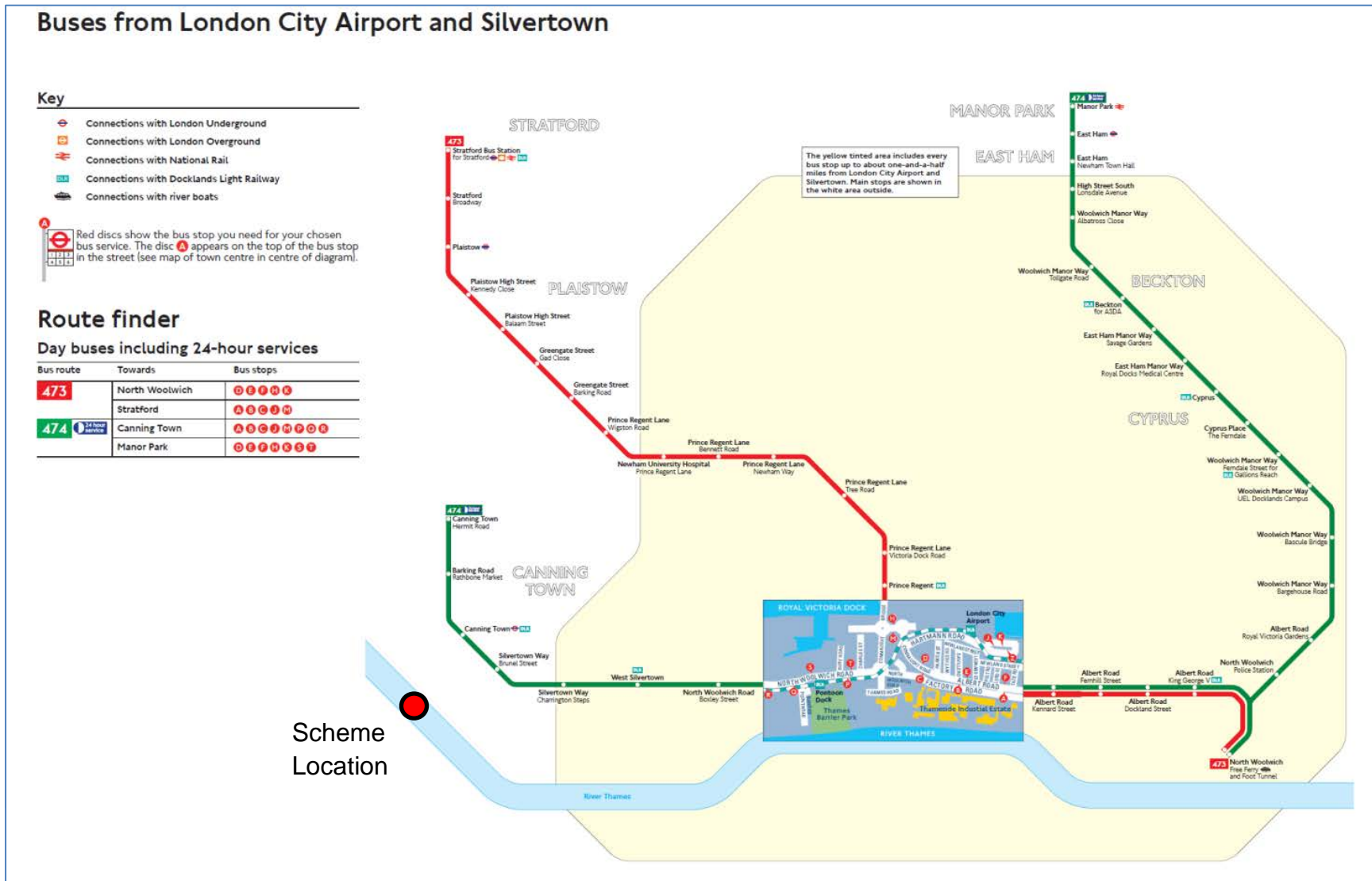


Figure 11-9 Bus Routes for City Airport and Silvertown



Pedestrian network

- 11.4.13 The areas surrounding the Scheme are provided with an extensive network of pedestrian footways/pathways, particularly on the Greenwich Peninsula, which connects to entertainment and residential areas. Recreational routes include the Thames Path.
- 11.4.14 The current walking network up to 800m (or about a 10-minute walk) from the existing Blackwall and proposed Silvertown Tunnel portals is shown in Figure 11-10, with the EAL link shown in a dashed pink line.
- 11.4.15 Pedestrian facilities surrounding the Scheme connect to the EAL (pink dashed line), which caters for pedestrians seeking to travel between the Greenwich Peninsula and the Silvertown end of the Royal Docks. This brings passengers past the riverside and close to the main centres of activity on either side; Millennium Square for The O2 on the southern side, and ExCel and the Siemens Crystal on the northern side.
- 11.4.16 Pedestrians can also use other public transport links in the area to cross the river (Overground, Jubilee line, DLR) or the Woolwich ferry.
- 11.4.17 Pedestrian only cross-river links are provided at the dedicated foot tunnels at Greenwich and Woolwich, built in the early years of the twentieth century, and have recently been refurbished by Greenwich Council. The Rotherhithe tunnel is also open to pedestrians but in practice constitutes an uninviting walking environment and is only used by a handful of pedestrians each day.

Cycle network

- 11.4.18 The following cycle routes connect to the study area:
- Thames Path – eastern side of Greenwich Peninsula;
 - National Cycle Network Route 1 and 64;
 - dense network of cycle route connections using off-road facilities on quieter streets; and
 - Cycle Superhighway 3 – located along the A13, Naval Row and Poplar.
- 11.4.19 Figure 11-11 shows an extract from the Royal Borough of Greenwich Cycle route map which shows current nearby cycle routes on the

Greenwich Peninsular. Figure 11-12 shows the routes for cyclists at Silvertown.

11.4.20 The following cross-river crossings for cyclists near to the Scheme area are shown on Figure 11-11:

- Jubilee line (C), (H) and (I) – non-folded cycles not permitted; and
- EAL – runs parallel to the proposed Silvertown crossing.

Figure 11-10 Existing walking network within 800m of the Blackwall Tunnel and proposed Silvertown tunnel portals

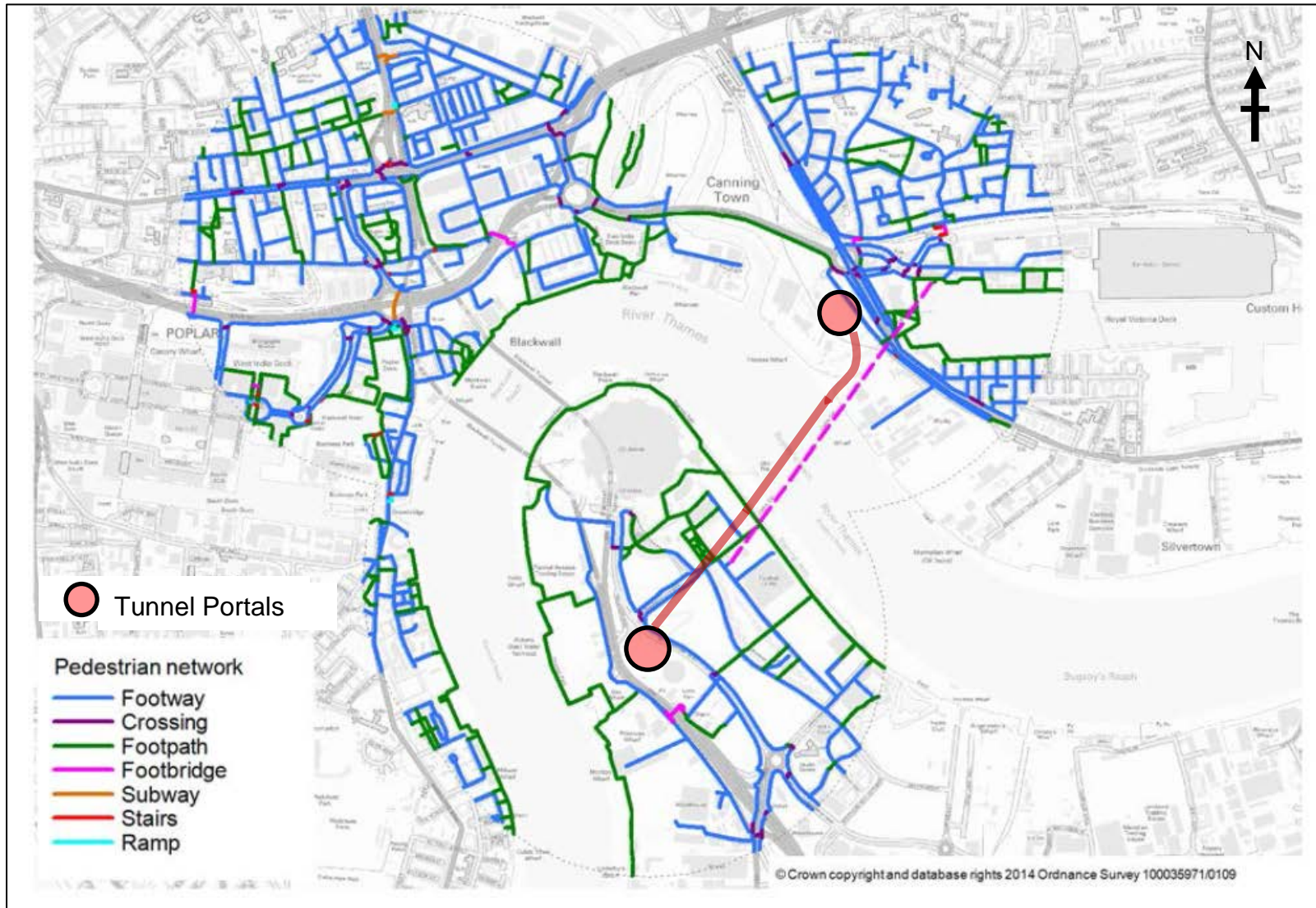


Figure 11-11 Cycle Routes on the Greenwich Peninsular

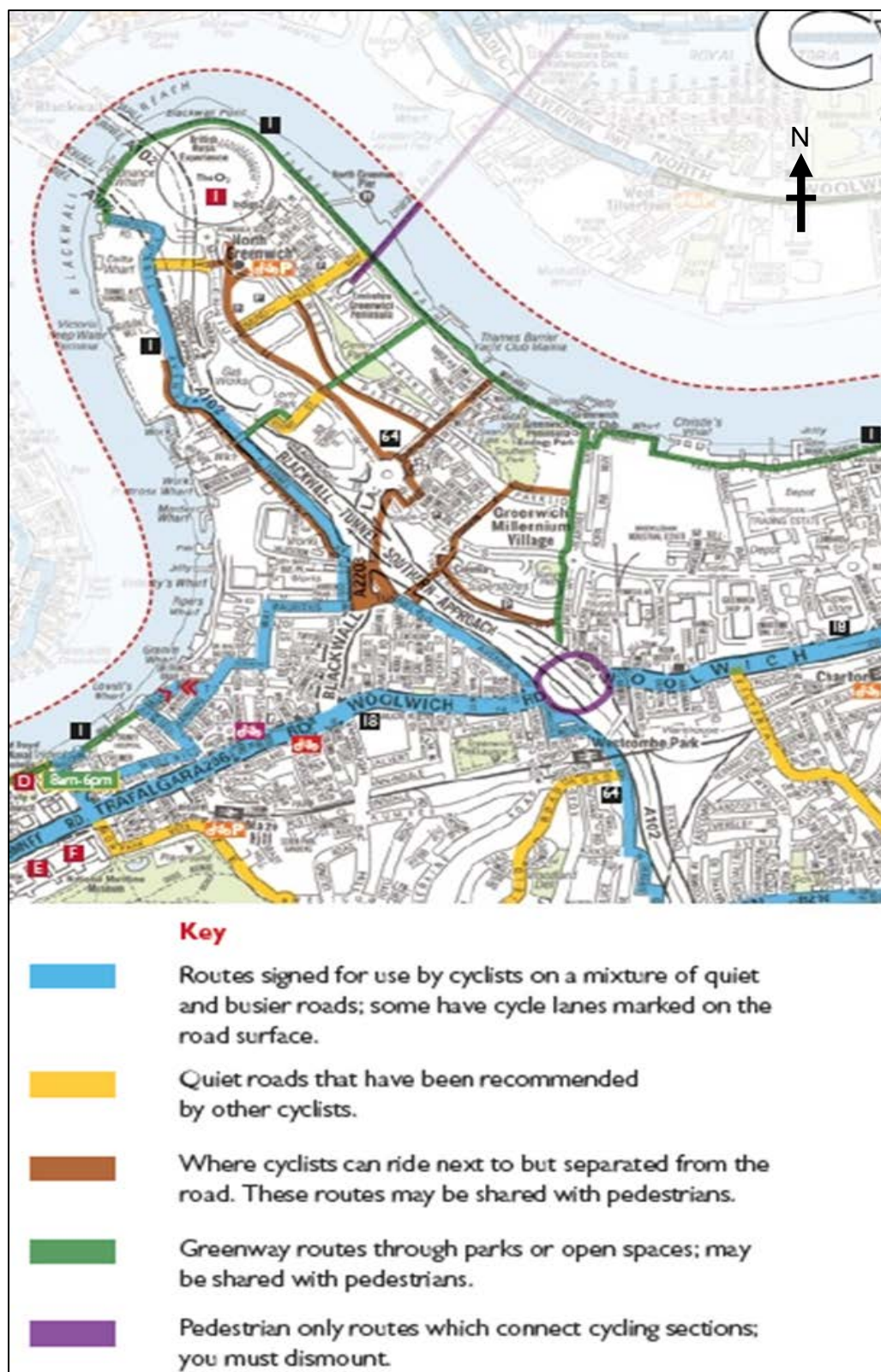
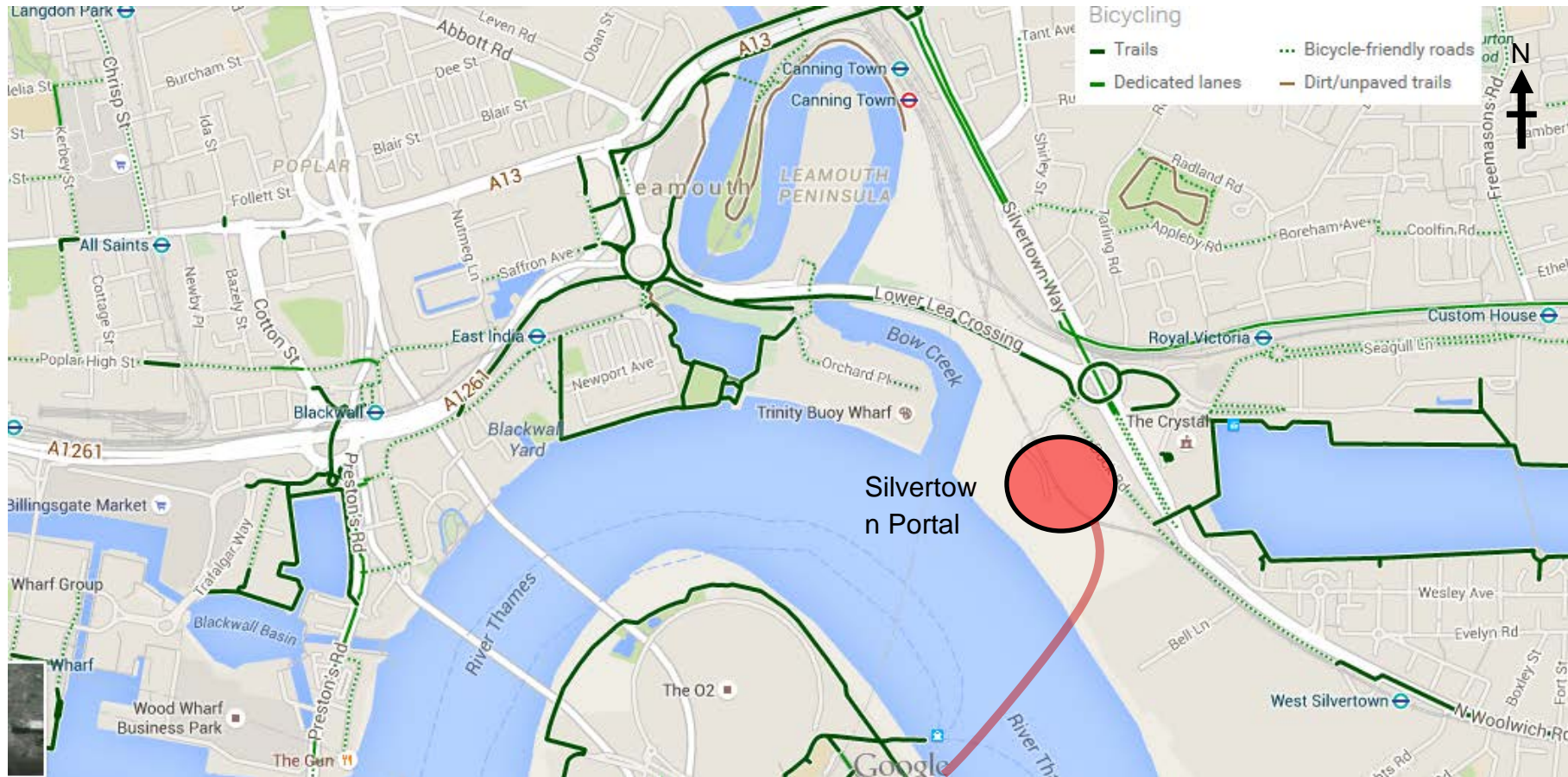


Figure 11-12 Cycle routes around Silvertown



Pedestrian / Cycle flows

11.4.21 Pedestrian flow data has been estimated for crossing movements over/under the River Thames as shown in Table 11-14.

Table 11-14 Estimated pedestrian/cycle crossing movements, average weekday 07:00-19:00 (2013)

River crossing	Modes	Total
Rotherhithe Tunnel	Cyclists	232
	Pedestrians	9
Hilton Docklands - Canary Wharf river bus*	Ferry passengers ²	852
Greenland Pier - Canary Wharf river bus*	Ferry passengers	193
Emirates Air Line**	Cable Car passengers	3995
Greenwich foot tunnel	Cyclists	1481
	Pedestrians	2255
Woolwich foot tunnel	Cyclists	112
	Pedestrians	173
Woolwich Ferry	Cyclists	117
	Pedestrians	616

* 2012 data, all TfL estimates

** Emirates Air Line passenger data (2012)

11.4.22 All of the crossing options are considered to have capacity for additional pedestrian and cyclist movements. However, TfL is continuing to

² Cyclist numbers have not been counted separately for river buses or the Cable Car

investigate greater use of the river for walking and cycling cross-river trips, to ensure demand associated with recent and planned growth along the River Thames.

- 11.4.23 As part of the Preliminary Transport Assessment, a Pedestrian Environment Review System (PERS) audit was undertaken in July 2015. The aim of the PERS audit was to establish the existing baseline environment for pedestrians within the vicinity of the proposed tunnel portals for the Scheme.
- 11.4.24 Figure 11-13 shows the link assessment within the Greenwich area. Pedestrian flow around the proposed tunnel portals was observed as part of the PERS audit. It was found that in general pedestrian activity was light. The North Greenwich Station area had slightly more pedestrian activity than the areas surrounding the A102 and approach to Blackwall Tunnel, and those areas furthest south from the Scheme. Links L2 & L3 (Edmond Halley Way) & L4 (Cutter Lane) experience the highest pedestrian activity and footfall due to trip attractors in the area such as the O2, shops, restaurants and EAL. This pattern of pedestrian activity would no doubt be greater when events are being held at The O2. Link L5 (East Parkside) also experiences some pedestrian activity as it connects the riverside residential developments and on John Harrison Way.
- 11.4.25 By comparison, links L6 (Ordnance Crescent), L9 (Boord Street), L10 (Tunnel Avenue), L12 & L13 (A2203 Blackwall Lane) receive little footfall. In particular, the general environment along Link L10 (Tunnel Avenue) is especially hostile to pedestrians due to the dominance of cars along the strategic route making this an unpleasant journey by foot and cycle. The low levels of pedestrian activity along these links can be attributed to the lack of attractions or trip generators, severance created by the A102 and the negative pedestrian environment (accessibility, traffic noise, car fumes/emissions and debris).
- 11.4.26 Figure 11-14 shows the link assessment within the Silvertown area. The highest pedestrian activity was observed to the east of the A1020 Silvertown Way on links L31 (Seagull Lane), L32 (Western Gateway) and L33 (link adjacent to Siemens Centre) that lead to various trip attractors such as bars, restaurants, the Excel centre, DLR stations (Custom House and Royal Victoria) and residential properties in the Royal Docks Area. These links provide a pleasant experience for pedestrians. High pedestrian flows were also observed on North Woolwich Road due to links with West Silvertown Station and industrial units.

Figure 11-13 North Greenwich PERS Audit Study Area – links assessment

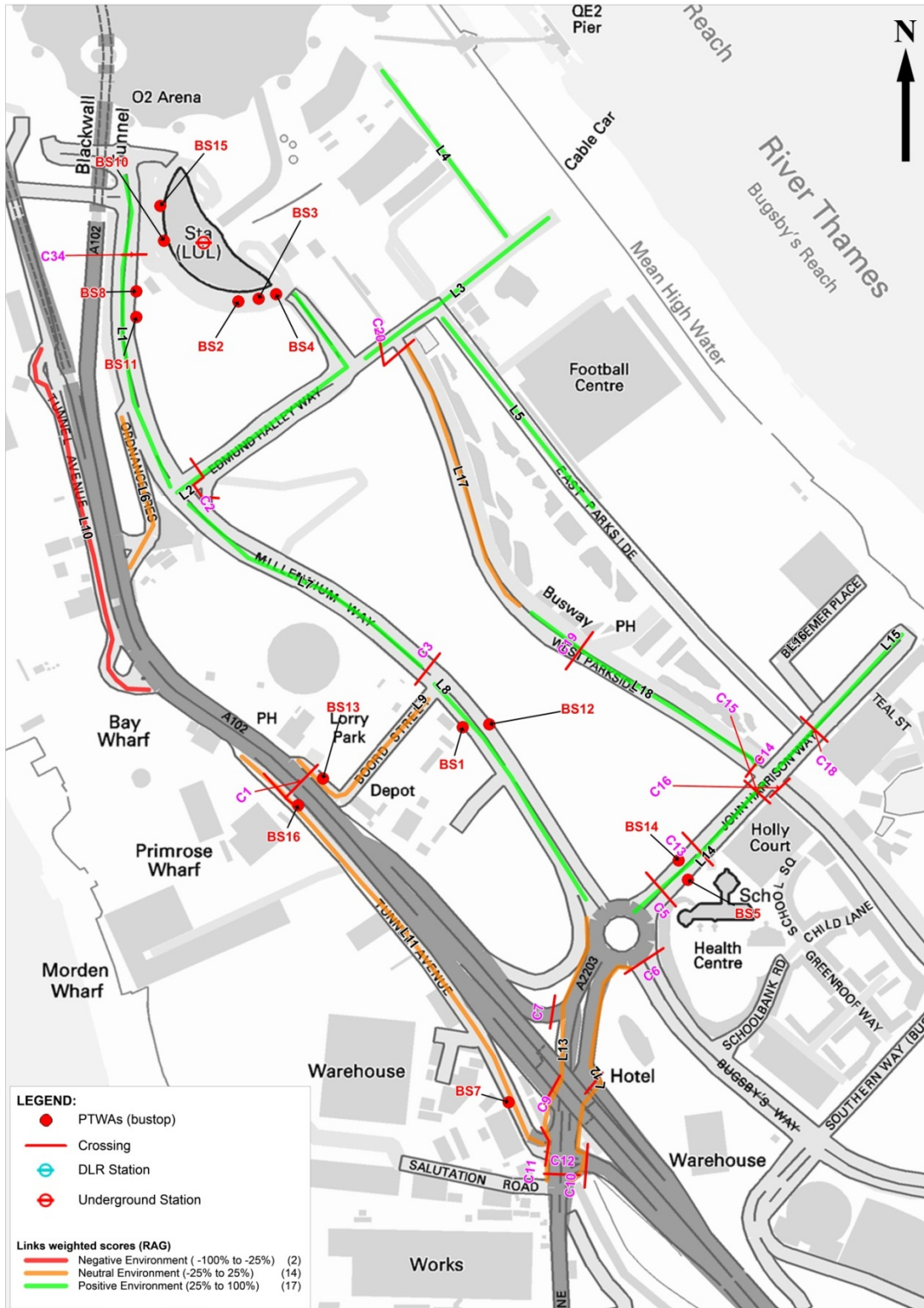
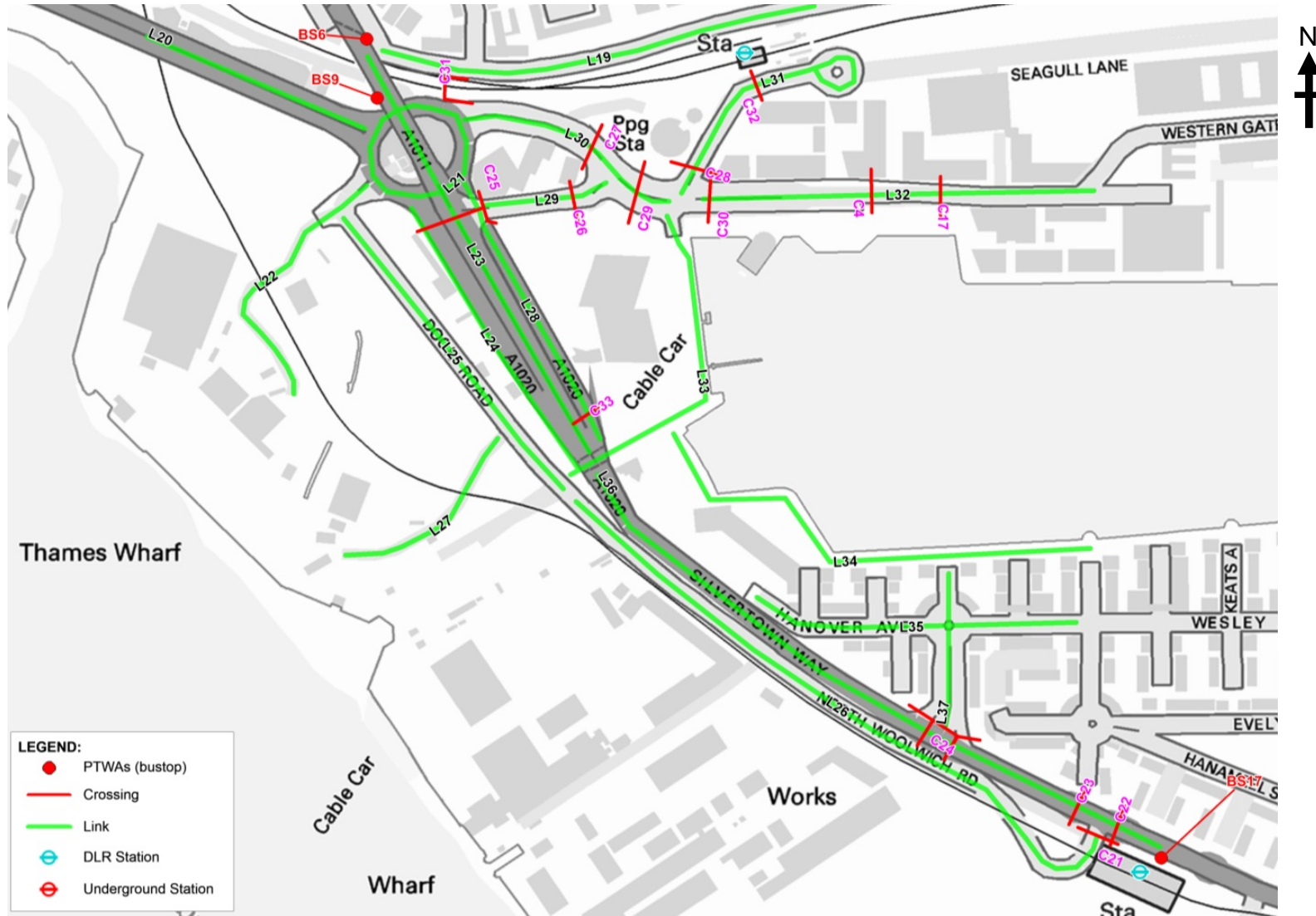


Figure 11-14 Silvertown PERS Audit Study Area – links assessment



11.4.27 In addition, link L26 along North Woolwich Road receives some pedestrian traffic, as it links the West Silvertown Station with the industrial units along L26 (North Woolwich Road). Links L24 and L28 (A1011 Silvertown Way - slip roads) and L23 (A1011 Silvertown Way) receive very little pedestrian traffic.

Pedestrian facilities

11.4.28 The aim of the PERS audit was to establish the existing baseline environment for pedestrians within the vicinity of the proposed tunnel portals for the Scheme. The strengths and weaknesses of the environment were identified in terms of footway provision, condition and surroundings.

11.4.29 It was found that the footways and amenity surrounding the proposed tunnel portal at Greenwich were generally good, although Tunnel Avenue and the A2203 were found in need of improvement. However, it is understood that a programme of improvement works will be undertaken through Borough and TLRN investment and in association with committed developments. Poor quality environment, dust, dirt and pinch points on the footway were observed. On the Silvertown side, the observations recorded good provision adjacent to Royal Docks, but poor to average provision on the A1020 Lower Lee Crossing, with average provision elsewhere on the network. Most pedestrian links could benefit from CCTV and better lighting.

11.4.30 Pedestrian crossings were assessed within the PERS audit. Overall it was found that the capacity and performance of crossings on both sides of the proposed tunnel portals were generally adequate with no overcrowding. General maintenance of the crossing facilities was noted as needing to be requiring improvement.

Cycle flows

11.4.31 Cycle flow data has been estimated for crossing movements over/under the River Thames as shown in Table 11-14. The data shows that in 2013 there were a high number of cyclists using the Greenwich foot tunnel to cross the river.

11.4.32 As part of the Preliminary Transport Assessment, a cycling study was undertaken in July 2015. The study used the Cycling Level of Service (CLoS) methodology to review the existing baseline environment for

cyclists within the vicinity of the proposed tunnel portals for the Scheme. It was found that current levels of cycling activity in the North Greenwich area was low (12-15 cyclists observed over 4hrs inter peak period). Cyclists were observed on both the carriageway and footway even though off-carriageway facilities were available.

- 11.4.33 Within the Silvertown area, the number of cyclists observed was relatively high (60-100 cyclists per hour on Dock Road) in comparison to the North Greenwich side. This may be due to the different time of day that cyclists were observed and recorded moving along the highway, but also the existing cycling environment on the northern side of the river.

Cycle facilities

- 11.4.34 The CLoS assessment for the cycle study identified a mix of facilities from poor quality provision (e.g. narrow shared footways) to wide cycle lanes that would meet the Mayor's Vision for cycling aspirations. It was noted that improvements were needed at the following locations for the reasons summarised below:

- Millennium Way/John Harrison Way roundabout – substandard facilities;
- Blackwall Lane – Sub-standard and inconsistent cycle provision with fear and intimidation from Heavy Goods Vehicle (HGV) movements;
- Millennium Way –Off-carriageway cycle facilities are in need of maintenance;
- Access to North Greenwich Bus and LUL station – incoherent route;
- Tunnel Avenue – poor standard shared footway;
- Dock Road - alternative route required;
- Tidal Basin roundabout – Requires improvements to crossings and signage;
- Lower Lea Crossing/Leamouth Road roundabout – upgrade of existing facilities and provide facilities for all arms of the roundabout; and
- Leamouth Road - cycling provision only on one side of the carriageway.

Collision data

- 11.4.35 Within Appendix A of the Preliminary Transport Assessment, a summary of the latest three year collision data from 1 January 2012 to 31 December 2014 has been provided. The data is for a study area covering the main road network along both approaches to the proposed new Silvertown Tunnel, as well as the existing Blackwall Tunnel and approaches. This included parts of the A13 East India Dock Road and Lower Lea Crossing, the A102 Brunswick Road, Blackwall Tunnel and Blackwall Tunnel Approaches, part of the A2 Shooters Hill Road, A206 Woolwich Road and A1020 Silvertown Way.
- 11.4.36 A total of 477 personal injury collisions were recorded on the highway network of which six resulted in fatalities and 35 in serious injury as shown in Table 11-15. Collisions involving HGVs (19.7%) was higher than the Greater London average, but collisions involving vulnerable road users was lower.

Table 11-15 Collisions by severity and year for study area

Year	Fatal	Serious	Slight	TOTAL	% KSI
Year 1: 01/01/2012 – 31/12/2012	3	12	147	162	9.3%
Year 2: 01/01/2013 – 31/12/2013	1	10	133	144	7.6%
Year 3: 01/01/2014 – 31/12/2014	2	13	156	171	8.8%
TOTAL	6	35	436	477	8.6%
Annual Average	2.0	11.7	145.3	159.0	

- 11.4.37 Seventeen separate cluster sites (six or more collisions) within the study area were identified as summarised below:
- seven clusters were located along the A13 East India Dock Road and Barking Road;
 - five clusters were located along the A102 Blackwall Tunnel Approach to the south of the river;

- four clusters were located along the A206 Woolwich Road; and
- one cluster on Shooters Hill Road, close to its junction with Kidbrooke Park Road.

11.4.38 A breakdown of collisions by severity in the three-year period to December 2014 at key junctions has been provided in Table 11-16. Almost half of the collisions recorded within the study area (46.3%) occurred at these fourteen key interchanges, with the remainder occurring elsewhere within the study area which comprises links between the key interchanges, over- or under-passes, the Blackwall Tunnel itself, and a number of side roads and minor junctions. A higher percentage (20 of 221: 9%) of collisions occurring at the key interchanges resulted in the most serious injuries, compared to the remainder of the study area (21 of 256: 8.2%).

Table 11-16 Collisions at key interchanges within the study area.

Key interchange	Fatal	Serious	Slight	TOTAL	% KSI
A102/A206 Woolwich Road/Peartree Way Junction	0	2	20	22	9.1%
A13 Newham Way/A124 Barking Road/A1011 Silvertown Way Roundabout	0	2	23	25	8%
A2/A102/A207 Sun In The Sands Roundabout	0	1	12	13	7.7%
A206 Woolwich Road/Anchor and Hope Lane Crossroads	0	0	15	15	0%
A206 Woolwich Road/Blackwall Lane Junction	0	0	8	8	0%
Anchor and Hope Lane/Bugsby's Way Roundabout	0	0	1	1	0%

Key interchange	Fatal	Serious	Slight	TOTAL	% KSI
Bugsby's Way/Peartree Way Roundabout	0	1	6	7	14.3%
A1261 Aspen Way/A1206 Preston's Road/Cotton Street Roundabout	0	1	20	21	4.8%
A13 East India Dock Rd/A102/Cotton St Junction	0	7	35	42	16.7%
A102/A2203 Blackwall Lane Junction & Blackwall Lane/Millennium Way/Bugsby's Way Roundabout	0	2	21	23	8.7%
A13 East India Dock Road/Abbott Road/Leamouth Rd Junction	1	2	28	31	9.7%
A1020 Lower Lea Crossing/A1011 Silvertown Way Roundabout & Tidal Basin Road/Western Gateway T-junction	0	1	1	2	50%
A1261 Aspen Way/A1020 Lower Lea Crossing & Leamouth Road/Blackwall Way roundabouts	0	0	10	10	0%
A1020 Silvertown Way/North Woolwich Road T-junction	0	0	1	1	0%
TOTAL at key interchanges	1	19	201	221	9.0%
Remaining area	Fatal	Serious	Slight	TOTAL	%KSI
Remainder of area	5	16	235	256	8.2%
TOTAL FOR STUDY AREA	6	35	436	477	8.6%

Key interchange	Fatal	Serious	Slight	TOTAL	% KSI
% of collisions which occurred at the key interchanges	16.7%	54.3%	46.1%	46.3%	

Amenity views from the road and community facilities

11.4.39 Views from the existing local roads and the TRLN surrounding the Scheme comprise the current mix of dense residential, commercial and industrial properties north of the River Thames and disused/derelict land, light industrial, gasometer and residential to the south of the river along the A102. Existing views towards the location of the proposed Greenwich tunnel portal are limited along Tunnel Avenue, Blackwall Tunnel Southbound/northbound approach and Millennium Way due to noise barriers, fencing and mature trees/vegetation. Towards the Silvertown tunnel portal, views are restricted from Dock Road and Silvertown Way due to buildings, fencing, embankments, trees and the raised DLR infrastructure.

11.4.40 The streets shown on ‘key movement corridors and linear gateways’ as defined in Newham’s Core Strategy (Newham Borough Council, 2012) will be the subject of public realm and regenerative improvements that reinforce their role as high quality movement corridors and linear gateways.

Future Baseline/Reference Case (without scheme)

11.4.41 The London Regional Demand Model and the River Crossings Highway Assignment Model has been used to strategically assess the demand and assignment impacts of the Scheme. The extent of the modelled highway network is shown on Figure 11-16.

Figure 11-15 Summary of collision locations

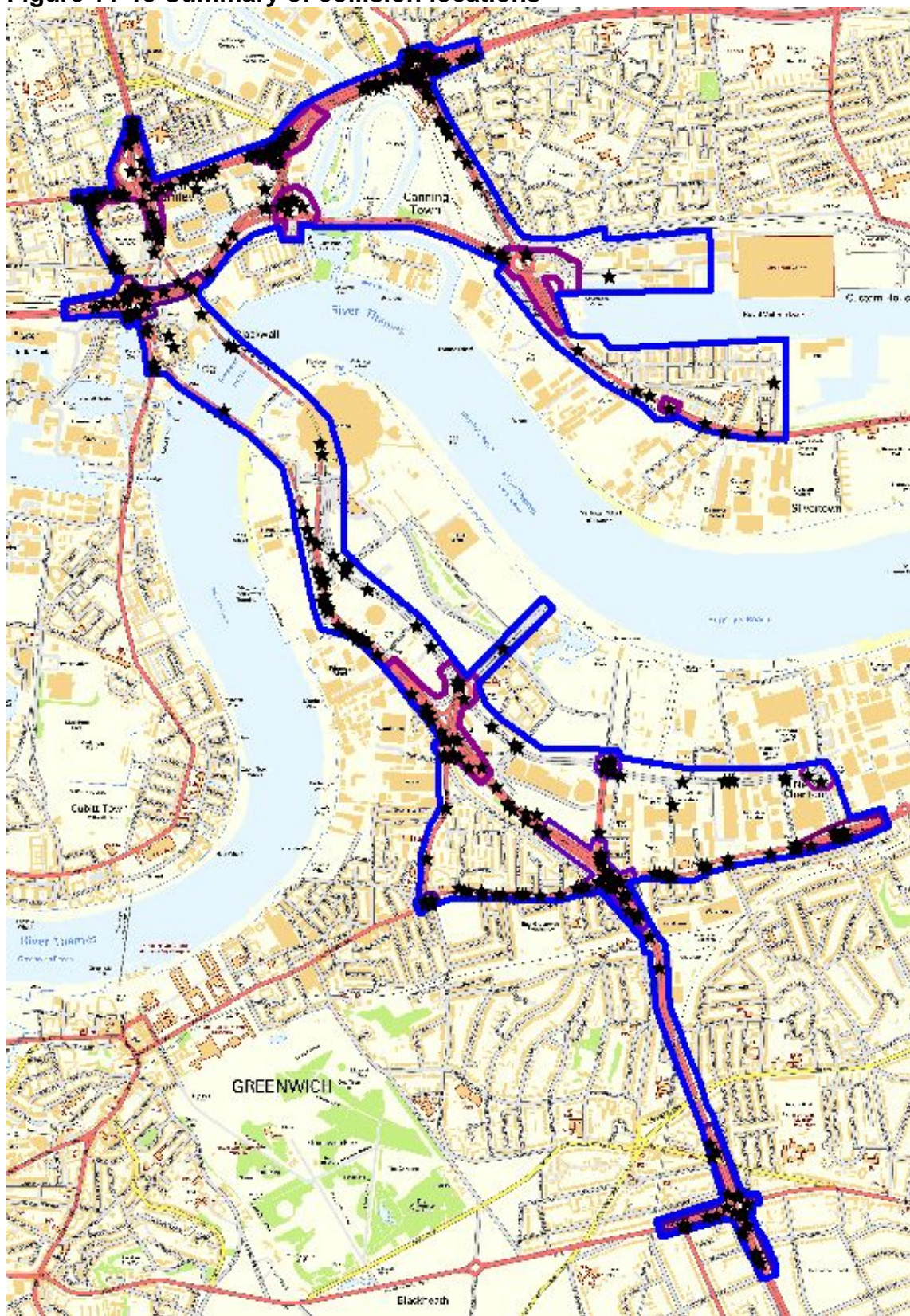
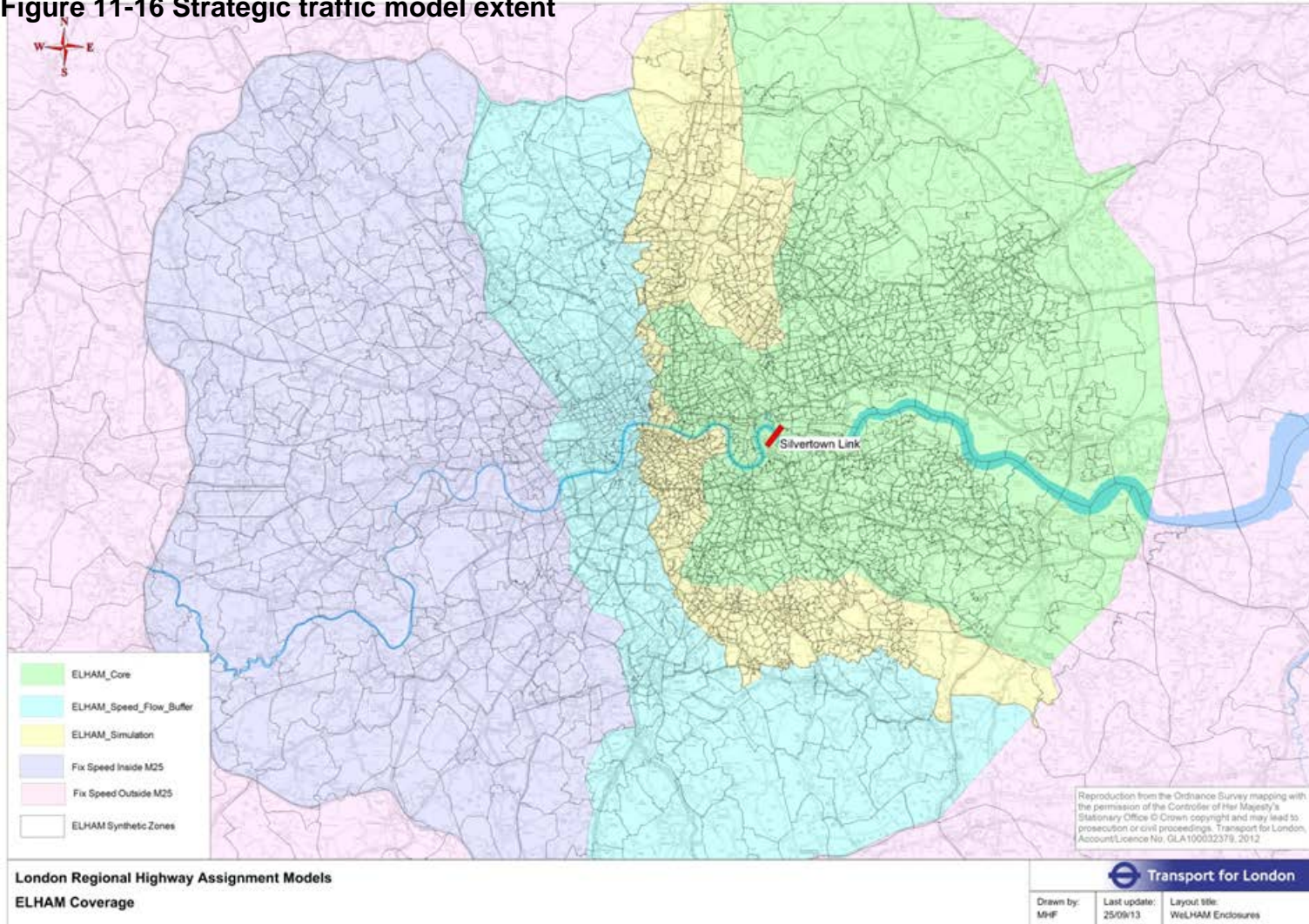


Figure 11-16 Strategic traffic model extent



11.4.42 Using the strategic model, the forecast future baseline/reference case flow data without the Scheme has been identified for the following years and will be used within the impact assessment:

- opening year 2021; and
- opening year 2036.

Future Baseline/Reference Case 2021 (without scheme)

11.4.43 Table 11.A-2 within Appendix 11.A summaries the forecast future baseline/reference case flows for design year 2021 for the surrounding highway network (without the scheme) and shows the percentage increase since from the baseline year 2012.

11.4.44 It can be seen that without the scheme by 2021 there would be on certain parts of the Strategic Network increases in forecast AADT flows as well as both AM and PM peak traffic flows. On the A102 Blackwall Tunnel Southern Approach AADT flows are forecast to increase between 5% and 14%. Looking at the AM and PM peaks there are forecast increases of between 1 and 30% and 1 and 24% respectively. Of note elsewhere is the A13 east of the A12 where AADT and AM peak traffic flows are forecast to increase by up to 21%.

11.4.45 Analysis of the Local Network sees some very significant increase in AADT and AM and PM peak traffic levels. Of particular note is the B212 Prince of Wales Road, where forecast AADT flows increase by 49% (AM peak increase of 86%, PM peak increase of 11%). On other local roads there are also significant increases in forecast AADT flows. There are a small number of links that actually see a decrease in traffic and this may well be traffic avoiding particularly congested links.

Future Baseline/Reference Case 2036 (without scheme)

11.4.46 Table 11.A-3 within Appendix 11.A summaries the forecast future baseline flows for design year 2036 for the surrounding highway network and the percentage increase from 2021 design year baseline flows.

11.4.47 Modelling has shown that without the scheme there would be more modest yet significant further increases between 2021 and 2036 in AADT across the links of the Strategic Network of up to 11%. It is anticipated that by this period traffic will have found alternative routes to avoid the previously higher levels of AADT traffic but this more modest increase is

on top of the increases seen in the earlier 2012 to 2021 period. As far as the AM and PM peak traffic flows are concerned, modelling shows that AM peak traffic flows would increase by up to 19% depending on the road (the A13 West of the A12 would see a 19% increase). PM peak flows are forecast to increase by up to 11%.

- 11.4.48 Forecasts for the Local Network shows some significant increases in forecast AADT, AM and PM peak traffic levels. On local roads AADT flows are forecast to increase by up to 39%, with the highest increase being on the A1011 Silvertown Way. AADT flows on the A102 Lower Lea Crossing are forecast to increase by up to 27% by 2036. AADT flows on Abbott Road are forecast to increase by 29% by 2036.
- 11.4.49 With regards to AM peak traffic flows, Bugsby's Way is forecast to experience a significant growth ranging between 37% and 62%. The A102 Lower Lea Crossing is expected to experience 15% to 33% growth in the AM peak. AM peak traffic flows on the A1011 Silvertown Way are forecast to increase between 18% and 20% although on one link there is a forecast increase of 42%. Forecast AM peak traffic flows on the A206 Woolwich Road are between 18% and 25%.
- 11.4.50 Forecast PM peak flow increases are overall lower with the odd notable exception. PM peak traffic flows on the A1011 Silvertown Way are forecast to increase between 23% and 45%. The A102 Lower Lea Crossing stands out as having the highest forecast growth on any link of 81% (however increases on other links on this road are more modest at between 15% and 20%). The next highest increase is on Blackwall Lane, with a forecast PM peak flow increase of 49% on one of its links. Finally PM peak flows on Victoria Dock Road are forecast to increase between 29% and 35% by 2036.

Changes to all baseline conditions

- 11.4.51 A number of factors may change the existing baseline conditions during the years up to and including the development construction period, namely:
- changes in population;
 - changes in land use and committed development;
 - changes in employment;

- changes to highway infrastructure; and
- changes to public transport services.

11.4.52 All of these factors have been assessed and incorporated within the strategic model to predict forecast baseline flows.

11.4.53 The following known highway schemes have been included within the strategic model:

- Woolwich ferry replacement scheme;
- A206 Woolwich Road scheme;
- Stratford area post-Olympic Games and changes to the operation of the Dartford crossing; and
- A206 Woolwich Road/Gallions Road junction and Gallions Road/Busby's Way junction have been converted from priority control to signal control.

11.4.54 In addition to known highway schemes, it is understood that there will be Borough and TLRN investment in maintenance and upgrades to the highway network where required. The improvements to the highway network may have a positive impact on the journeys of all travellers.

11.4.55 A number of developments are currently under construction and will be either partly completed or fully operational by the time the tunnel construction works begin. The impact on the highway network has been included within the forecast baseline strategic model. The developments are shown on Drawing 17.1 Base case and described in Table 17.A-1 within Appendix 17.A.

11.4.56 Developments that are planned or consented but not yet implemented will form part of the cumulative impact assessment. These developments are shown on Drawing 17.2 Cumulative Developments and described within Table 17.A-2 within Appendix 17.A.

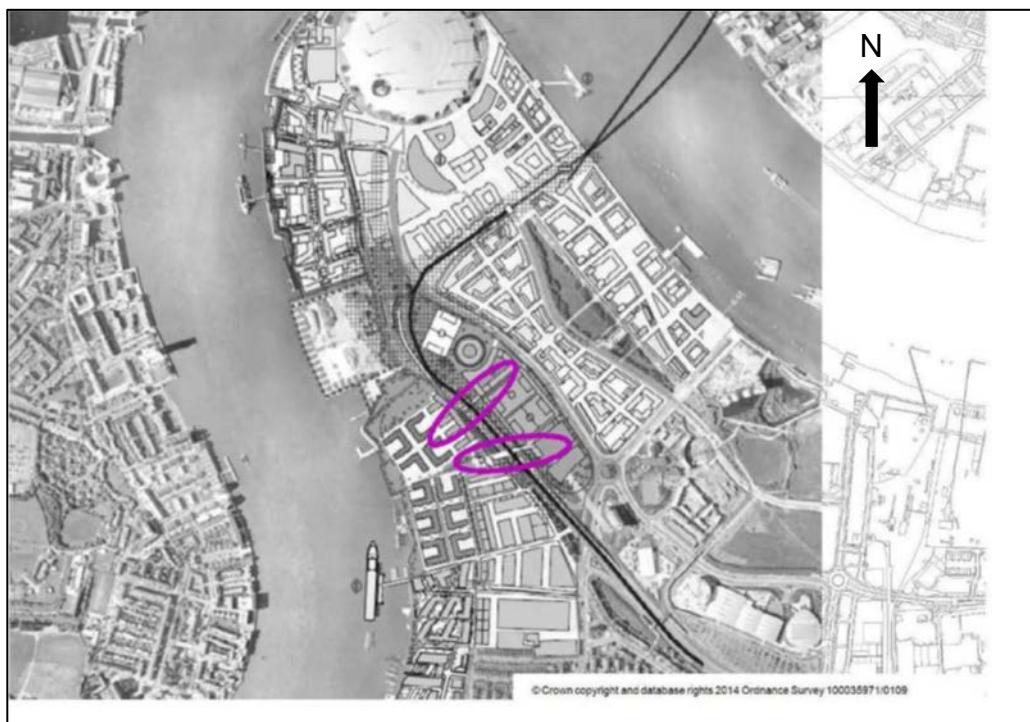
Future walking network

11.4.57 The walking network surrounding the Scheme in Greenwich is expected to change significantly before the proposed tunnel opening year as a result of several major developments. As described in Chapter 2 the Greenwich

Peninsula Masterplan and the Greenwich Peninsula West Masterplan highlight the continuing phases of development on the peninsula.

- 11.4.58 The latter document is of particular significance to the Scheme due to the need to coordinate planning of pedestrian access over the A102 Blackwall Tunnel Approach. Figure 11-17 shows an indicative plan of the future highway/walking links across the A102 between future developments as shown within the Greenwich Peninsula West Masterplan. Potential crossing alignments are highlighted in purple across the A102.
- 11.4.59 On the northern side of the River Thames, adjacent to the northern Blackwall Tunnel portal, the London Borough of Tower Hamlets has granted outline planning permission to the Blackwall Reach development, which will re-configure the local movement network in this area. There are also a number of major developments planned that will alter the nature of the local movement network around Silvertown.
- 11.4.60 Around the northern end of the Silvertown Tunnel, the pedestrian network is currently poor as the immediate area is currently dominated by light industry. East of Silvertown Way there is a high quality pedestrian environment which the EAL passes over.

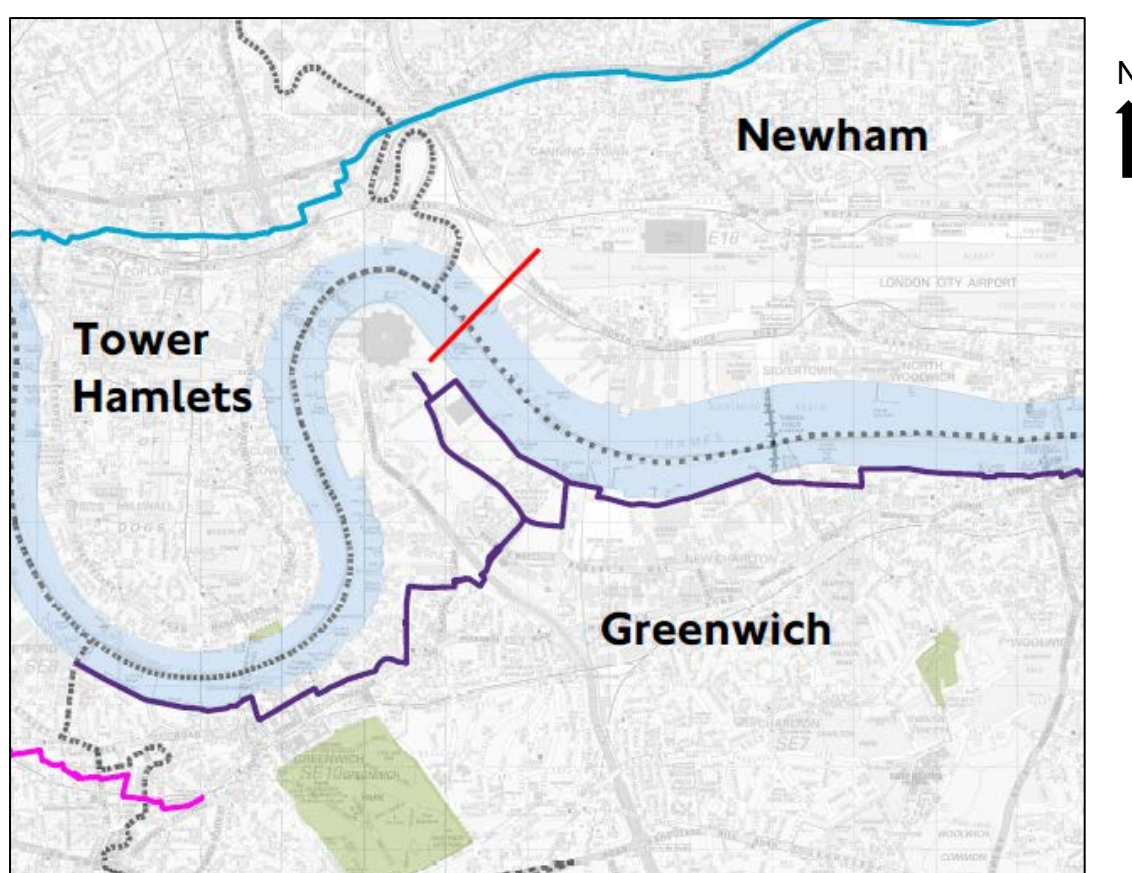
Figure 11-17 Indicative plan of future pedestrian links across the A102



Future cycling network

11.4.61 A cross-London network of high-quality 'Quietways' is also being constructed, which will provide more direct and better serviced cycle routes than the London Cycle Network. The planned network in the area relative to the Scheme is shown in purple on Figure 11-18. The area runs right up to the EAL terminals on both sides of the River Thames. The existing Cycle Super Highways are shown in blue and the EAL is highlighted in red.

Figure 11-18 Proposed 'Quietways' and Existing Cycle Superhighways



Future public transport

11.4.62 A planning application for a mixed-use development in the Greenwich peninsular comprising 12,678 new homes, new office space, new retail/food/drink space, educational facilities and other land uses was granted outline planning permission by the Royal Borough of Greenwich in September 2015. As part of the planned new development, the North Greenwich bus station would be rebuilt, allowing for more bus capacity.

- 11.4.63 Future rail improvement to public transport provision will be provided in the form of upgrades to the Jubilee Line and DLR and Crossrail. The Crossrail project is currently under construction and will provide a new high frequency service from Woolwich and Abbey Wood to the Royal Docks, Canary Wharf and beyond from 2018.

11.5 Scheme design and mitigation

Construction

- 11.5.1 As described in Chapter four of this PEIR, the construction methodology used in this assessment has been developed to inform the assessment of the environmental impacts of the Scheme. It presents a practical and achievable approach to the construction of the Scheme, however the methodology ultimately employed for would be determined and is dependent upon the detailed design and the methodology developed by the appointed contractor in accordance with the parameters of the DCO.
- 11.5.2 As set out in the Preliminary Transport Assessment and the Preliminary Code of Construction Practice (CoCP) (Appendix 4.A), a construction traffic management plan would be prepared for each of the construction work sites. This would set out the methods for managing construction impacts on all forms of transportation, including, but not limited to the areas set out below.

Construction worker flows

- 11.5.3 During the construction phase members of staff, operatives, subcontractors and visitors would attend the Silvertown and Greenwich sites on a daily basis. The estimated peak number of personnel working on the Scheme would be approximately 1100. Works would be phased over a total period of four years.
- 11.5.4 Where possible, construction staff and operatives would be employed from the local and surrounding areas and would use the public transport facilities that serve the area to travel to/from the sites.

Construction routes

- 11.5.5 Strategic access routes have been identified that make use of the TfL Road Network (TLRN), which are used for long distance vehicle movements into and around London.

- 11.5.6 Within the direct vicinity of the Scheme area, this would be the A2, A12 and A13 shown on Figure 11-19 as blue routes that eventually connect to the M25. Local access routes will be required, such as Millennium Way, Blackwall Lane in Greenwich and Dock Road in Silvertown, but the selection of the final local routes these will take into account prohibited routes as identified by TfL, cycle superhighways (CS), local schools, hospitals and vulnerable road user accident black spots.
- 11.5.7 The Silvertown site will require a larger number of lorry movements due to the larger working areas located there. The vehicular access point to this works site will be via the current alignment of Dock Road from the Tidal Basin roundabout. The principal HGV route from the A13 and A12 to the site should be via Leamouth Road and the A1020 Lower Lea Crossing (Figure 11-19). HGV drivers should be advised to avoid Canning Town to minimise the impact on residential areas and to avoid the A1011 Silvertown Way, which does not offer a direct route into the Tidal Basin roundabout.
- 11.5.8 The Greenwich site will require a smaller number of lorry movements, and the vehicular access point to the site will be from Millennium Way. HGVs can access the site from the A102 Blackwall Tunnel Approach via Blackwall Lane and there is space for a small lorry holding facility near to the site entrance if required.

Figure 11-19 Proposed construction traffic routes to work sites



Construction Traffic Flows

- 11.5.9 The Scheme will produce large quantities of excavated materials from the tunnel boring and cut and cover works. The removal of this material would be made by either river or road from the Silvertown site and by road from the Greenwich site. As a worst case scenario, it has been assumed that all materials would be transported to and from sites on the existing highway network. However, the use of river transport will be maximised where possible to reduce the effect on the highway network.
- 11.5.10 It is estimated that the largest number of lorry movements will be made to/from the Silvertown works site. At this stage it is estimated that the Scheme would require the following total lorry movements over the four year construction period:
- Silvertown site (worst case) – 155,200 movements; and
 - Greenwich site – 71,600 movements.

Table 11-17 Estimated two-way lorry movements over four year construction period (worst case – inbound and outbound trips)

Works element	Silvertown site (worst case)	Greenwich site
Site buildings	2,600	2,000
Cut and cover tunnel	41,100	38,600
Bored tunnel	86,500	-
Highways	13,200	24,100
Mechanical and electrical	2,500	2,500
Landscaping	1,000	1,000
Site establishment	7,300	3,400
TBM delivery/removal	1,000	-
Total	155,200	71,600

11.5.11 Peak lorry activity for the Silvertown site is anticipated to occur during month 29 in the worst case scenario, with approximately 224 movements (inbound plus outbound) per day. The peak movements for the Greenwich site is anticipated to occur at the Greenwich site during month three, where approximately 144 movements per day (inbound plus outbound) would be expected.

11.5.12 The following assumptions were made to assess daily traffic generation:

- six working days per week, ten hours per working day, with lorry traffic spread evenly across the hours;
- for the Silvertown site, the following trip distribution assumptions were made:
 - 50% of all lorries travel to/from the east via the A13 and 50% to/from the north via the A12, throughout the construction period for all lorries apart from those removing spoil; and

- for lorries removing spoil, 80% travel to/from the east via the A13 and 20% travel to/from the north via the A12, accounting for the likely destination of excavated material being Wallasea Island.

11.5.13 Table 11-18 and Table 11-19 summarise the impact of construction traffic during the spoil removal stage of excavated material and other construction periods on the highway network during the AM and PM peak hours for the Silvertown work site. The RXHAM 2021 Reference Case scenario was used to provide two-way background traffic estimates on each link.

11.5.14 It can be seen that that the impact of Silvertown site construction traffic movements on total traffic on the A12 and A13 would be negligible throughout the construction period (less than 0.5% during the AM and PM peak hours. The scale of the impact on Leamouth Road and Lower Lea Crossing during the spoil removal stage is estimated as less than 2% of the Reference Case 2021 traffic during both the AM and PM peak hours. The majority of lorry movements would be expected to take place during off-peak periods where vehicle flows are generally over 10% lower than during peak times.

Table 11-18 AM peak hour traffic increase due to construction traffic – Silvertown site (worst case)

Link	Reference Case traffic 2021 (two-way)		Predicted construction traffic (two-way)		% increase in traffic (two-way)			
	Total vehicles	HGV	Spoil removal stage	Other construction period	Total vehicles		HGV	
					Spoil removal stage	Other construction period	Spoil removal stage	Other construction period
A12	4,808	457	5	8	0.1%	0.2%	1.0%	1.6%
A13 East	6,610	701	18	8	0.3%	0.1%	2.6%	1.1%
A13 West	3,327	260	5	8	0.1%	0.2%	1.7%	2.9%
Leamouth Road	1,462	195	23	15	1.5%	1.0%	11.5%	7.7%
Lower Lea Crossing	2,069	79	23	15	1.1%	0.7%	28.5%	19.0%

Table 11-19 PM peak hour traffic increase due to construction traffic – Silvertown site (worst case)

Link	Reference Case traffic 2021 (two-way)		Predicted construction traffic (two-way)		% increase in traffic (two-way)			
	Total vehicles	HGV	Spoil removal stage	Other construction period	Total vehicles		HGV	
					Spoil removal stage	Other construction period	Spoil removal stage	Other construction period
A12	4,567	153	5	8	0.1%	0.2%	2.9%	4.9%
A13 East	6,498	223	18	8	0.3%	0.1%	8.1%	3.4%
A13 West	2,147	79	5	8	0.2%	0.3%	5.7%	9.5%
Leamouth Road	1,530	85	23	15	1.5%	1.0%	26.5%	17.6%
Lower Lea Crossing	1,992	45	23	15	1.1%	0.8%	50.0%	33.3%

11.5.15 Table 11-20 and Table 11-21 summarise the impact of peak construction traffic on the highway network during the AM and PM peak hours for the Greenwich works site. As with the Silvertown site, background traffic was sourced from the RXHAM 2021 Reference Case scenario. It can be seen that the impact of peak construction traffic on the A102 would be negligible during the AM and PM peak hours. The majority of lorry movements would take place during off-peak periods where vehicle flows are generally over 10% lower than during peak periods.

Table 11-20 AM peak hour traffic increase due to construction traffic – Greenwich site

Link	Reference Case traffic 2021 (two-way)		Predicted construction traffic (two way)	% increase in traffic (two way)	
	Total vehicles	HGV		Total vehicles	HGV
A102	5,274	381	15	0.3%	3.8%

Table 11-21 PM peak hour traffic increase due to construction traffic – Greenwich site

Link	Reference Case traffic 2021 (two-way)		Predicted construction traffic (two way)	% increase in traffic (two way)	
	Total vehicles	HGV		Total vehicles	HGV
A102	6,367	179	15	0.2%	8.1%

11.5.16 A Construction Logistics Plan (CLP) will be prepared by the Contractor’s Logistic Manager. The CLP will assign the construction flows to the highway network and an assessment of their effects will be undertaken. The CLP will be agreed and approved by the local highway authority.

Construction diversion routes

11.5.17 The planned works are likely to have an impact on pedestrian and cycle routes immediately around the worksites planned for the Scheme. During

construction private means of access (PMAs) and PRoWs that cross the Scheme would be kept open with temporary diversions as necessary to maintain user safety. This may impact on access to properties. The diversion routes would be kept to a minimum length where possible.

- 11.5.18 The proposed revisions to footpaths and cycle ways for the Scheme are identified within the Preliminary Transport Assessment.

Pedestrian route diversions

- 11.5.19 In the vicinity of the Silvertown site, pedestrian routes around the Tidal Basin Roundabout would remain open for the duration of the works, although there may be minor temporary route diversions during this time. For the duration of the works, pedestrian access to Dock Road from the roundabout would be closed. The alternative pedestrian route is along the Silvertown Way roundabout slip road and down a stairwell. The nearest step-free access route would be via The Crystal and through a shared path passage under Silvertown Way.

- 11.5.20 Surrounding the Greenwich site, pedestrians would be able to use Millennium Way via its temporary diversion throughout the entire works. Although the existing Boord Street bridge would be demolished as part of the works, a bridge would be maintained at or adjacent to this location for the duration of the construction works in the form of the permanent replacement. This construction would take place from month 24 with the works for the ramps due to be finished by month 29. This means that while a bridge would be provided continuously throughout the construction programme, there would be a relatively short period of approximately four weeks when no ramp access to the bridge would be available. The pedestrian route along the Thames Path would be unaffected by the works. During phase 3, pedestrian access to properties on the closed section of Tunnel Avenue may be restricted at times, and engagement with the affected businesses would be required to ensure business continuity.

Cycle route diversions

- 11.5.21 Surrounding the Silvertown site, the off-street cycle route linking the Lower Lea Crossing and Tidal Basin Road around the south of roundabout would remain open for the duration of the works, although there may be minor temporary route diversions during the junction tie-in works. However, for the duration of the works, cycle access via Dock

Road from the roundabout would be closed. The alternative cycle access routes are via the Silvertown Way and North Woolwich Road, or alternatively via Tidal Basin Road, Royal Victoria Dock and through a shared-path passage under Silvertown Way.

- 11.5.22 Surrounding the Greenwich site, the existing Boord Street bridge, which is used by pedestrians and cyclists, would be demolished as part of the works. A new permanent footbridge for pedestrians and cyclists will be built and brought into operation before the old bridge is removed to allow for continuous access. Ramps will be added to the new bridge after the demolition of the old one. The cycle route along the Thames Path would be unaffected by the works. During phase 3, cycle access to properties on the closed section of Tunnel Avenue would be restricted at times although access to businesses should be guaranteed through the management of access points.
- 11.5.23 For permanent works, non-motorised user routes have been established in the vicinity of the Scheme on the Silvertown side for Dock Road, Tidal Basin Roundabout and the A1020 Lower Lea Crossing.

Mitigation measures

- 11.5.24 Mitigation measures have been outlined within the Preliminary Transport Assessment for each work site. This includes the following measures which would be introduced as part of the Scheme:
- the construction of a new pedestrian and cycle bridge over the A102 New Blackwall Tunnel Approach to replace the footbridge that needs to be demolished near Boord Street;
 - appropriate provision for pedestrian crossings when designing the new highway arrangements at each of the tunnel portals;
 - minimising footpath and cycle route diversions both during construction and also those that may be needed permanently during Scheme operation;
 - clear signage as part of the Scheme for motorised and non-motorised users during construction and operation;
 - limit lorry movements and deliveries during peak construction periods, leading to less congestion, reduced emissions and improved safety; and

- ensure that the design of the Scheme reflects public transport needs to allow for additional cross river bus routes, improved bus facilities on the highway (such as bus only links) and journey times during the operational phase.

11.5.25 In addition to these measures, a Construction Logistics Plan for the Scheme will be prepared by the contractor and this will identify additional mitigation where required.

11.6 Assessment of impacts

Receptor sensitivity

11.6.1 A detailed assessment on the significance of effects on receptors has been undertaken using the sensitivity criteria identified within Section 11.3 during both construction and operation of the Scheme. For the Scheme area, receptors have been identified as residents, workers, vehicle drivers, pedestrians (sensitive groups such as children, elderly and disabled) and cyclists.

Construction impacts

11.6.2 A detailed assessment of the significance of effects on receptors during the construction of the Scheme has been undertaken using the sensitivity criteria identified within Section 11.3. A summary of each assessment has been provided.

Journey length

11.6.3 This section should be read in conjunction with PEIR Chapter 7 Community and Private Assets. During construction of the Scheme there would be some impact on pedestrian and cyclist journey lengths and patterns in the study area where existing routes are temporarily closed or diverted by the works, namely Boord Street, Edmund Halley Way, Millennium Way and Tunnel Avenue close to the southern tunnel portal and Dock Road, close to the northern tunnel portal. Where possible, diversion routes would be provided and these will be kept to a minimum length. Overall the effect of construction on journey lengths and local travel patterns is considered to be **Minor to Moderate Adverse**. Further work including the identification of local travel patterns is to be carried out to inform the assessment, with the findings reported as part of the ES.

11.6.4 During construction of the Scheme there would also be some impact on journey length for local vehicle drivers and travellers where existing roads are temporarily closed or diverted by the works, namely Boord Street, Edmund Halley Way, Tunnel Avenue and Millennium Avenue close to the southern tunnel portal, and Dock Road, close to the northern tunnel portal. Further work including the identification of local travel patterns is to be carried out to inform the assessment, with the findings on changes in typical journey lengths and likely changes in travel patterns reported as part of the ES.

Table 11-22 Journey length impacts for local vehicle drivers/travellers during construction

Road	Impacts
Boord Street	Temporarily closed except for access to properties. Boord Street is a no-through road, which would limit the number of journeys affected.
Edmund Halley Way	Temporarily stopped up. A potential diversion route would be via John Harrison Way and West Parkside. Journey length would not change significantly but journey times could increase for vehicle drivers.
Tunnel Avenue	During phase 3, Tunnel Avenue would be closed from the junction with Salutation Road to the entrance to the Morden Wharf Road adjacent to the northbound Blackwall Tunnel gatehouse. During this phase of construction works, access to sites along Tunnel Avenue would be from Blackwall Tunnel Approach itself and would need to be actively managed.
Millennium Avenue	Millennium Way will be disrupted during the construction of the southern portal however it would remain open throughout the works by using a localised diversion for all road users and phasing the cut-and-cover tunnel construction. The diversion and traffic management on Millennium Avenue would increase journey times for vehicle drivers. Further work is to be carried out to estimate potential increases in journey times and their significance, with the findings reported in the ES.

Road	Impacts
Dock Road	<p>For the majority of the construction works, there will be no access to Dock Road from the Tidal Basin roundabout. Access to Dock Road for vehicles will be maintained from North Woolwich Road only. Work is under way to identify a turning facility on Dock Road and appropriate kerbside restrictions to ensure that it remains clear of parked vehicles. Access/egress to remaining businesses currently using Dock Road will be maintained. The diversion via Silvertown Way would increase journey length for vehicle drivers. Further work is to be carried out to estimate potential increases in journey times and their significance, with the findings reported in the ES.</p>

- 11.6.5 Based on an initial assessment, it is not anticipated that increases in traffic flows during construction would be large enough to cause significant changes in journey lengths and patterns for pedestrians, cyclists or vehicle drivers, however this will be reviewed as part of the preparation of the ES.
- 11.6.6 During construction of the Scheme, Boord Street will be closed except for access to properties and a temporary diversion route for pedestrians will be put in place, adjacent to the O’Keefe Group Head Office building. Based on the findings of the PERS audit, Boord Street receives little footfall and is not pedestrian friendly. It has on-carriageway cycle symbols.
- 11.6.7 The existing footbridge over the A102 Blackwall Tunnel Approach at Boord Street would need to be demolished at the start of the works to enable construction of the realigned A102 Blackwall Tunnel Approach northbound carriageway. A new permanent footbridge for pedestrians and cyclists would be built and brought into operation before the old bridge is removed to allow for continuous access. Ramps would be added to the new bridge after the demolition of the old one. The new footbridge would be located approximately 45m south east of the existing footbridge, following the line of Boord Street, to make it more visible to users approaching from that direction.

- 11.6.8 Tunnel Avenue was described in the PERS audit as having a general environment that is especially hostile to pedestrians. In terms of cycling facilities there is a shared use path on Tunnel Avenue south of Boord Street and on a section north of Boord Street as well. There would be no impact on local access to Tunnel Avenue during the first two phases of construction. During phase 3, access along Tunnel Avenue would be closed from the junction with Salutation Road to the entrance to the wharf adjacent to the northbound Blackwall Tunnel gatehouse. In phase 4 Tunnel Avenue would be reopened, along with Boord Street and Edmund Halley Way.
- 11.6.9 Millennium Way, which provides access to the North Greenwich Bus Station, The O2 and associated parking areas, includes a two-way cycle track from Ordnance Crescent to John Harrison Way on the eastern side of the carriageway. Along the western side of Millennium Way there is a short and relatively new (2014) section of shared-use footway between John Harrison Way and Old School Close. Millennium Way will be disrupted during the construction of the southern portal however it would remain open throughout the works by using a localised diversion for all road users and phasing the cut-and-cover tunnel construction. This would remove the need for a longer diversion and avoid encroaching on the site currently occupied by the North Greenwich station car park, where a multi-story car park has been proposed to consolidate The O2 parking arrangements as part of wider development plans for the area.
- 11.6.10 Based on the PERS audit, Edmund Halley Way experiences the highest pedestrian activity in the area because of the facilities and attractions (the O2, shops, restaurants and the EAL close by). There is a westbound advisory cycle lane in the dual-carriageway section of Edmund Halley Way. In the single-carriageway section, there are on-carriageway cycle logos in places and some off-carriageway provision although this is not clearly signed. Edmund Halley will be closed for a period during the construction works to enable the cut and cover section of the tunnel to be constructed. However Millennium Way would remain open as indicated above.
- 11.6.11 In Silvertown, Dock Road, which is close to the proposed northern tunnel portal, is currently the most heavily-used cycle route in the study area although there is no formal provision for cyclists. The PERS audit noted the following existing issues: cars parked on pavements, high HGV traffic, dust, fumes, debris and litter. For the majority of the construction works,

access to Dock Road from the Tidal Basin roundabout will be closed. The alternative pedestrian route will be along the Silvertown Way roundabout slip road and down a stairwell. The nearest step-free access route for pedestrians between Dock Road and the Tidal Basin roundabout will be via The Crystal and through a shared path passage under Silvertown Way. The alternative cycle access routes are via the Silvertown Way and North Woolwich Road, or alternatively via Tidal Basin Road, Royal Victoria Dock and through a shared-path passage under Silvertown Way.

- 11.6.12 Access to Dock Road for vehicles will be maintained from North Woolwich Road only. Work is under way to identify a turning facility on Dock Road and appropriate kerbside restrictions to ensure that it remains clear of parked vehicles. Access/egress to remaining businesses using Dock Road will be maintained, . During the period when there is no access to Dock Road from the Tidal Basin roundabout, signage of the alternative pedestrian, cycle and vehicle routes will be provided.
- 11.6.13 The Tidal Basin Roundabout currently has a two-way cycle track around most of its perimeter with uncontrolled crossings on each arm. Pedestrian and cycle routes around the roundabout would remain open for the duration of the works, although there may be minor temporary route diversions during this time.
- 11.6.14 It is considered that overall there would be **Minor to Moderate Adverse** effect on journey length during construction of the Scheme.

Changes in amenity

- 11.6.15 Changes in amenity has been assessed for all roads which are likely to experience an increase or decrease in net traffic flows of more than 20%. Using this criteria, all roads on the proposed construction route to the work sites have been assessed in terms of changes to pedestrian and cyclist amenity.
- 11.6.16 It has been identified that none of the roads on the proposed construction route to the Silvertown site would have a net increase or decrease in traffic flow over 20%. Therefore, they are not required to be assessed. The highest increase (2%) was identified for Leamouth Road. When comparing the increase in HGV movements with baseline/reference case HGV flows, it was found that a 50% increase would occur in the PM peak hour during the spoil removal phase and a 29% increase in the AM peak hour. Taking into consideration the minor increase in traffic flow, road

characteristics, off-carriageway cycle facilities and low pedestrian flows, there would be a Negligible effect on pedestrian and cyclist amenity.

- 11.6.17 The net increase in traffic flow during the AM and PM peak hour for the Greenwich site would be 1% for the A102 Blackwall Tunnel Southern Approach. When comparing the increase in HGV movements with baseline/reference case HGV flows, it was found that an 8% increase would occur in the PM peak hour during the spoil removal phase and a 4% increase in the AM peak hour. Given the minor increase in traffic flow, it is considered that construction traffic would have a **Negligible** effect on pedestrian and cyclist amenity.

New severance

- 11.6.18 Changes in new severance has been assessed for all roads which are likely to experience an increase in net traffic flows of more than 30% due to construction traffic. Using this criteria it has been identified that none of the roads on the proposed construction routes to the Silvertown and Greenwich works sites would have a net increase of over 30%.
- 11.6.19 It is therefore considered that construction traffic would have a **Negligible** effect on severance and would not be significant.

Relief from existing severance

- 11.6.20 Changes in new severance has been assessed for all roads which are likely to experience a decrease in net traffic flows of greater than 30%. Using this criteria, all roads on the proposed construction route to the work sites have been assessed in terms of changes to pedestrian and cyclist severance.
- 11.6.21 It has been identified that there would be no roads on the construction route that would have a decrease in traffic flow of 30% or more. It is therefore considered that construction traffic would have a **Negligible** effect on the relief from existing severance and would not be significant.

Views from road

- 11.6.22 Views from the road have been assessed 500m either side of the Scheme portals and along direct highway links in terms of the impact associated with the construction of the sites. Views in relation to new developments that may be built by 2018 do not form part of this assessment as they are considered to be as existing.

- 11.6.23 The criterion assesses whether drivers views are obstructed by:
- no view - as road is in a deep cutting or contained by earth bunds, environmental barriers or adjacent structures;
 - restricted view - where there are frequent cuttings or structures blocking the view;
 - intermittent view - where the road is generally at ground level but with shallow cuttings or barriers at intervals; and
 - open view - which extends over many miles, or only restricted by exiting landscape features.
- 11.6.24 During construction the views from the road within the Greenwich area would be intermittently restricted from Tunnel Avenue and the A102 Blackwall Tunnel Southern Approach, where temporary hoardings and traffic management are erected around the works area. Views from Millennium Way (and its new temporary alignment) towards the works area are already restricted by mature trees, therefore views would not be affected.
- 11.6.25 At Silvertown, Dock Road is to be closed except for local access and a new permanent alignment constructed as part of the Scheme. Views from Dock Road are therefore not considered within the assessment. Views from Silvertown Way are already intermittent due to the DLR alignment and also along Lower Lee Crossing the view is tree lined. The views from surrounding roads, such as Lower Lea Crossing, are unlikely to be significantly affected.
- 11.6.26 It is therefore considered that there would be a **Negligible to Minor** Adverse effect on road users.

Driver stress

- 11.6.27 To assess driver stress requires both traffic flow and traffic speed data. For the PEIR, a full assessment of driver stress on roads during construction was not carried out as data on traffic speeds during construction was unavailable. A full assessment will however be carried out for the ES when this data becomes available. The assessment will examine in particular roads that would be used by construction traffic and/or would be affected by the works. The section above on amenity reports that increases in traffic flows would be limited to 1% for the

construction route to the Greenwich site and 2% for the construction route to the Silvertown site. Based on these figures it is considered likely that the temporary increase in traffic flows during construction would have a **Negligible** effect on driver stress levels.

11.6.28 As stated above an assessment of driver stress will be carried out for the ES that will use both traffic flow and traffic speed data. This assessment will compare data for baseline traffic flows and speeds against data for traffic flows and speeds during construction to see if there are any changes in driver stress levels (for example a change from moderate to high). This change will then be considered together with the sensitivity of the road to determine the level of effect likely to occur.

11.6.29 To give an indication of what baseline driver stress levels would be like for the construction period, driver stress levels for the 2021 reference case (without the scheme) for roads in the study area and for which data was available are presented in Table 11-23.

Table 11-23 Driver Stress Levels in 2021 reference case (without scheme)

Road	Predicted Driver Stress in 2021
A1020 Lower Lea Crossing	Moderate
A102 Blackwall Tunnel Approach Southern Approach	Moderate
Blackwall Lane	Moderate
Millennium Way	Moderate

11.6.30 For roads temporarily affected by the works (Dock Road, Tidal Basin roundabout, Millennium Way, Boord Street, Tunnel Avenue, the A102) and potential diversion routes (North Woolwich Road, Silvertown Way, John Harrison Way, West Parkside) the change in road environment through the presence of temporary traffic management and diversions may create an increase in driver stress. Therefore, for these roads it is considered that there would be a **Minor to Moderate** effect on driver stress.

Significance of effects

11.6.31 The likely significance of construction impacts has been assessed. Table 11-24 below provides a summary of the effects.

Table 11-24 Summary of effects during construction

Topic	Effect
Journey Length	Minor-Moderate Adverse
Amenity	Negligible
New Severance	Negligible
Relief from existing Severance	Negligible
View from the road	Negligible-Minor Adverse
Driver Stress	Minor-Moderate Adverse*

*The effect of construction traffic has been assessed as Negligible

Operational impacts opening year- assessed case (2021)

11.6.32 Table 11.B-1 within Appendix 11.B shows the predicted operational flows for the Scheme for the opening year 2021 Assessed Case. A detailed assessment on the significance of effects on receptors for the opening year with and without the scheme has been undertaken, using the sensitivity criteria identified within Section 11.3. These are summarised below.

Journey length

11.6.33 A project requirement for the Silvertown Tunnel is to ensure that all pedestrian and cycling routes in the vicinity of the tunnel portals are reinstated or replaced with a direct, safe and comfortable alternative route. In addition TfL are developing a package of additional works which will help to integrate the scheme into its local context, improve connectivity to the surrounding areas and improve the public realm. These are particularly targeted at improvements for pedestrians and cyclists, to improve their access to the Emirates Air Line, which is the primary cross-river connection for these users. Some of these measures are outside of the boundary of works and exactly how they will be funded and delivered is yet to be finalised. TfL will continue to work with the boroughs and other stakeholders to agree this list before the DCO submission. Details on the measures can be found in the Design and Access Statement. Further work will be carried out to assess the likely effects of the package of additional works on journey length and local travel patterns, with the findings reported in the ES.

- 11.6.34 The Scheme also includes passive provision for access to future developments around the north side of the Silvertown tunnel. The Design and Access Statement highlights potential projects to improve connections for pedestrians and cyclists that could be provided or enhanced by a third party in the future.
- 11.6.35 The Scheme itself will bring about several changes to the pedestrian and cycle network in the study area. On the north side of the Silvertown Tunnel, the Tidal Basin roundabout would be altered (elongated) to create a new signal-controlled roundabout linking Silvertown Way, Dock Road and the Lower Lea Crossing. Dock Road itself would be realigned slightly further west to accommodate the new tunnel and approach road. The exact design of cycling facilities at the Tidal Basin roundabout has not yet been confirmed. However, it is assumed that the current off-street cycle tracks will be maintained or enhanced (also TfL is considering a potential scheme for dedicated off-carriageway cycle provision on Tidal Basin Road), with appropriate crossing facilities provided in line with current good practice. In addition a cross-London network of high-quality 'Quietways' is being constructed, which will provide more direct and better serviced cycle routes than the London Cycle Network.
- 11.6.36 The introduction of controlled crossing facilities at the roundabout could reduce delays for pedestrians and cyclists crossing the roundabout arms. Further work will be carried out to assess the likely effects on journey length and local travel patterns of the changes to the roundabout and Dock Road together with the package of additional works outlined above. The findings will be reported in the ES. The assessment will build on further work to be carried out in terms of understanding local travel patterns in the area.
- 11.6.37 On the south side of the Silvertown tunnel, the existing Boord Street footbridge over the A102 would be replaced with a pedestrian and cycle bridge following the line of Boord Street, making it more visible to users approaching from that direction and providing a slight decrease in journey length. The replacement bridge will also link two masterplan areas on the Greenwich peninsular which will also improve accessibility.
- 11.6.38 Further assessment will be carried out on the likely effects of the new pedestrian and cycle bridge within the ES. The assessment will build on further work to be carried out in terms of understanding local travel patterns in the area and changes to the walking and cycling network resulting from major developments in the area.

- 11.6.39 Changes in traffic flows can also affect journey lengths and local travel patterns, mainly in the first few years of a scheme. DMRB guidance on predicting changes in pedestrians' and cyclists' journey lengths advises that journey length changes should be assessed where traffic flows on an existing road increase or decrease by 30% or more. The predicted changes in traffic flows as a result of Scheme along the main routes in the study area used by pedestrians and cyclists are generally below 30%, which would suggest that journey lengths for pedestrians and cyclists will not change much as a result of the scheme. However, it is possible that some journey lengths could decrease due to the package of additional works outlined above as well as planned developments in the area, connection to new pedestrian and cycle infrastructure and new bus links.
- 11.6.40 With regard to vehicle drivers/travellers, it is likely that their journey times will be greater on those roads that would see an increase in traffic flows. This would most notably be on the A102 Lower Thames Crossing (19%) and the A13 east of the A12 (15%). Where there is a decrease in traffic flow along the surrounding highway network, there would be potential journey time savings. This would most notably be on the A13 east of the A12 (-22%) and the A102 Blackwall Tunnel Southern Approach (-22%).
- 11.6.41 It is likely that the scheme would result in a **Minor Beneficial** effect on journey length.

Changes in amenity

- 11.6.42 Changes in amenity have been assessed for all roads which are likely to experience an increase or decrease in traffic flows of more than 20%. Using this criteria Table 11.B-1 in Appendix B it has been identified that the majority of roads on the highway network surrounding the Scheme during the opening year 2021 would have a negligible effect on the amenity of pedestrians and cyclists. Only two roads shown in Table 11-25 were identified as requiring further assessment in terms of changes to pedestrian and cyclist amenity.

Table 11-25 Summary of roads impacted on Amenity - 2021 central case

Road name	2021 Baseline Flows			2021 Assessed Case Flows			% increase from baseline		
	AAD T	AM peak hour	PM peak hour	AAD T	AM peak hour	PM peak hour	AADT	AM peak hour	PM peak hour
A13 East of A12 (20093/20550)	2706 5	1506	1729	2107 0	1180	1374	-22%	-22%	-21%
A102 Blackwall Tunnel Southern Approach (22126/20040)	4706 2	2440	2949	3660 7	2006	2556	-22%	-18%	-13%

11.6.43 Both the A13 East of A12 (WB link) and the A102 Blackwall Tunnel Southern Approach (NB link) would see a reduction of 22% in traffic flow from the future baseline reference case. The decrease in traffic for these roads, in particular the A102 Blackwall Tunnel Southern Approach, is expected as traffic would redistribute along the highway network when the Scheme is operational.

11.6.44 Pedestrian usage along the A102 Blackwall Tunnel Southern Approach is considered negligible given the end destination, adjacent land use, lack of connectivity to community facilities and the presence of alternative pedestrian networks which are more pleasant. Cycle flows along this road are negligible, given that cyclists are not permitted to travel through the Blackwall Tunnel. Alternative facilities are provided on either side of this road on Tunnel Avenue and along Millennium Way. It is therefore considered that the reduction in traffic flow would have a **Minor Beneficial effect** on the amenity for pedestrians and cyclists using these roads.

11.6.45 Pedestrian and cycle usage along the A13, east of the A12 between Blackwall Tunnel northbound approach and Leamouth Road is considered

moderate. There are bus stops located on both sides of the carriageway, off-carriageway shared pedestrian / cycle facilities and land use consists of residential, office and commercial properties. Cycle flows are noticeably higher to the south of the A13 due to the east-west Cycle Superhighway Three. It is therefore considered that the reduction in traffic flow would have a **Minor Beneficial effect** on the amenity for pedestrians and cyclists using these roads.

New severance

- 11.6.46 Changes in new severance have been assessed for all roads near the Scheme where there is an increase in AADT flows of more than 30%. Using Table 11.B-1 in appendix B it can be seen that the increase in traffic on all roads on the highway network surrounding the Scheme would be less than 30%. Therefore, the impact of new severance on pedestrians and cyclists would have a **Negligible effect**.

Relief from existing severance

- 11.6.47 Changes in the relief of severance have been assessed for all roads near the Scheme. Table 11.B-1 in appendix B shows that no roads on the highway network surrounding the Scheme would have more than a 30% reduction in traffic flow. Therefore, the impact of relief from existing severance on pedestrians and cyclists would have be **Negligible effect**.

Views from the road

- 11.6.48 Views from the road have been assessed 500m either side of the Scheme portals and along direct highway links in terms of the impact associated with the new highway. This assessment includes the committed developments identified within Chapter 17 Cumulative Effects where information is available.
- 11.6.49 The criteria comprises the following categories for drivers' views:
- no view - as road is in a deep cutting or contained by earth bunds, environmental barriers or adjacent structures;
 - restricted view - where there are frequent cuttings or structures blocking the view;
 - intermittent view - where the road is generally at ground level but with shallow cuttings or barriers at intervals; and

- open view - which extends over many miles, or only restricted by exiting landscape features

11.6.50 Once completed, the views from the roads surrounding the Scheme in Greenwich would be moderately impacted by the highway design of the Scheme. The proposed elevated southbound overbridge of the A102 Blackwall Tunnel Approach will restrict views to the north-east for northbound motorists for a short section. Views from the road may also be affected east to west for all road users from Tunnel Avenue towards the O2. The views for motorists travelling southbound along the A102 Blackwall Tunnel Southern Approach would be improved as they are elevated over the Silvertown Tunnel approach road. Views from the new approach roads to the tunnel would be open to intermittent and may include views of the O2. Views from the road for all road users is therefore likely to be intermittent.

11.6.51 The impact on views from the road for all road users at the Silvertown side of the tunnel is considered open to intermittent given the elevated DLR. The realignment of Dock Road would not impact on views and there are no new elevated sections.

11.6.52 It is considered that there would be a **Minor to Moderate Adverse effect**.

Driver stress

11.6.53 Driver stress has been assessed for all roads surrounding the Scheme. The roads shown in **Table 11.B-2 within Appendix 11.B** have been assessed for driver stress based on forecast average peak hour flows and average peak hour traffic speeds for the 2021 assessed case. Where journey speeds are low it has been considered that the road link is congested and the level of driver stress would be high to moderate depending on the level of traffic flow. Frustration would occur where the driver would not be able to keep at a consistent speed in relation to the general standard of the road and therefore has an impact on Driver Stress. Note that Table 11.B-2 reports the predicted levels of driver stress with the Scheme. A comparison between driver stress with and without the Scheme has not yet been completed but will form part of the information presented in the ES.

11.6.54 One component of driver stress is route uncertainty, which is caused primarily by inadequate signing. In relation to the Scheme new or modified

directional signage would be provided on the approaches to major interchanges and on the approaches to the tunnel itself.

11.6.55 Driver stress for the 2021 assessed case has been identified as likely to be **Moderate** for the majority of the roads with the exception of the following roads, where it has been assessed as being **High** on certain road links in the AM or PM peak or in both the AM and PM peaks:

- A1261 West India Dock Road
- A124 Barking Road
- A206 Woolwich Road
- A207 Shooters Hill Road
- A1011 Silvertown Way
- A112 Prince Regent Lane
- B210 Charlton Road
- Anchor and Hope Lane.

11.6.56 As stated above a comparison between driver stress with and without the Scheme has not yet been completed.

11.6.57 The Scheme aims to reduce driver stress by reducing congestion and incidents on the Blackwall Tunnel and on the surrounding highway network. It is therefore expected that there would be some beneficial effects from the scheme where traffic flows are predicted to decrease, although this will be confirmed within the ES following further investigation. Those roads that may see some minor beneficial effects from the scheme would be the A13 east of the A12 (-22%) and the A102 Blackwall Tunnel Southern Approach (-22%).

Significance of effects

11.6.58 The likely significance of construction impacts has been assessed. Table 11-26 below provides a summary of the effects.

Table 11-26 Summary of effects for opening year 2021

Topic	Effect
Journey Length	Minor Beneficial
Amenity	Minor Beneficial
New Severance	Negligible
Relief from existing Severance	Negligible
View from the road	Minor to Moderate Adverse
Driver Stress	To be confirmed in the ES

Operational Impacts for design year– assessed case (2036)

11.6.59 Table 11.C-1 within Appendix 11.C shows the predicted operational flows for in the design year 2036 and the percentage increase from baseline/reference case traffic flows as a result of the Scheme. The Assessed Case scenario assumes Silvertown Tunnel would be subject to road user charging. A detailed assessment on the significance of effects on receptors for the design year with and without the scheme has been undertaken using the sensitivity criteria identified within Section 11.3.

Journey length

11.6.60 Perceived benefits and disbenefits relating to journey length are mainly evident in the first few years of operation of a scheme. In accordance with DMRB guidance the assessment of journey length has only been carried out for the opening year of the Scheme.

Changes in amenity

11.6.61 Changes in amenity have been assessed for all roads which are likely to experience an increase or decrease in traffic flows of more than 20% from baseline flows. Using this criteria Table 11.C-1 in Appendix 11.C, it has been identified that the majority of roads on the highway network surrounding the Scheme during the design year 2036 would have a **Negligible** effect on the amenity of pedestrians and cyclists. Only two roads shown in Table 11-27 were identified as requiring further assessment in terms of changes to pedestrian and cyclist amenity.

Table 11-27 Summary of impact on amenity – central assessed case 2036

Road name	2036 reference case baseline Flows			2036 assessed case Flows			Percentage increase from Baseline 2036		
	AADT	AM peak hour	PM peak hour	AADT	AM peak hour	PM peak hour	AADT	AM peak hour	PM peak hour
A13 East of A12 (20093/20550)	28816	1587	1784	22298	1271	1486	-23%	-20%	-17%
A102 Lower Lea Crossing (20166/20163)	17341	1220	1548	20968	1437	1509	21%	18%	-3%

- 11.6.62 The A102 Lower Lea Crossing (WB link) would see an increase of 21% in the design year 2036. This may be due to drivers using the Scheme instead of the Blackwall tunnel to travel north across the river.
- 11.6.63 Pedestrian flows are considered low along the A102 Lower Lea Crossing due to the existing environment and land use. However, cycle flows are high as the Cycle Superhighway Route 3 runs adjacent to the carriageway along a segregated cycle /pedestrian footway. Given the increase in traffic flow it is likely that the pleasantness of the journeys made by pedestrians and cyclists would be affected in terms of potential traffic congestion, air quality and environment. It is therefore considered that the increase in traffic flow would have a **Minor Adverse effect** on the amenity for pedestrians and cyclists using these roads.
- 11.6.64 The A13 East of A12 (WB link) would see a decrease in traffic flow of 23% in the design year 2036. Pedestrian and cycle usage along the A13, east of the A12 between Blackwall Tunnel northbound approach and Leamouth Road is considered moderate. There are bus stops located on both sides of the carriageway, off-carriageway shared pedestrian / cycle facilities and land use consists of residential, office and commercial properties. Cycle flows are noticeably higher to the south of the A13 due to the east-west Cycle Superhighway 3. It is likely that there would be slight improvements to the existing environment in terms of less congestion and improved air

quality. It is therefore considered that the decrease in traffic flow would have a **Minor Beneficial effect** on the amenity for pedestrians and cyclists using these roads.

New severance

- 11.6.65 Changes in new severance have been assessed for all roads near the Scheme where there is an increase in AADT flows of more than 30%. Using Table 11.C-1 in Appendix 11.C it can be seen that no roads on the highway network surrounding the Scheme would have an increase of less than 30%. Therefore, the impact of new severance on pedestrians and cyclists would have a **Negligible effect**.

Relief from existing severance

- 11.6.66 Relief from existing severance has been assessed for all roads near the Scheme. Using Table 11.C-1 in Appendix 11.C it can be seen that no roads on the highway network surrounding the Scheme would have more than a 30% reduction in traffic flow. Therefore, the impact of relief from existing severance on pedestrians and cyclists would be a **Negligible effect**.

Views from the road

- 11.6.67 Views from the road have been assessed 500m either side of the scheme portals and along direct highway links in terms of the impact associated with the new highway. This assessment includes the committed developments identified within Chapter 17.
- 11.6.68 The criteria comprises the following categories for drivers' views:
- major - no view as road is in a deep cutting or contained by earth bunds, environmental barriers or adjacent structures;
 - moderate - restricted view where there are frequent cuttings or structures blocking the view;
 - minor - intermittent view where the road is generally at ground level but with shallow cuttings or barriers at intervals; and
 - negligible - open view which extends over many miles, or only restricted by exiting landscape features.

11.6.69 As within the 2021 assessment, once completed the views from roads surrounding the Silvertown Tunnel approach in Greenwich would be moderately impacted by the highway design of the Scheme. The views from the road would not significantly change over the 15 years after opening of the Scheme. It is considered that the impact would have a **Negligible effect**, particularly given the land use change in the area due to planned developments.

Driver Stress

11.6.70 Driver stress has been assessed for all roads surrounding the Scheme. The roads shown in Table 11.C-2 within Appendix C have been assessed for driver stress based on forecast average peak hour flows and average peak hour journey speeds for the design year 2036. Where journey speeds are low it has been considered that the road link is congested and the level of driver stress would be high to moderate depending on the level of traffic flow. Frustration would occur where the driver would not be able to keep at a consistent speed in relation to the general standard of the road and therefore has an impact on Driver Stress. Note that Table 11.C-2 reports the predicted levels of driver stress with the Scheme. A comparison between driver stress with and without the Scheme has not yet been completed but will form part of the information presented in the ES.

11.6.71 One component of driver stress is route uncertainty, which is caused primarily by inadequate signing. In relation to the Scheme new or modified directional signage would be provided on the approaches to major interchanges and on the approaches to the tunnel itself. 15 years after opening it is considered that local traffic would understand the information provided to them and new travellers would have a sign that is still adequate and to standard.

11.6.72 Driver stress for the design year 2036 has been identified as likely to be **Moderate** for the majority of the roads with the exception of certain links on the following roads, where driver stress has been assessed as being **High**, either in the AM or PM peak or in both the AM and PM peaks:

- A102 Blackwall Tunnel Southern Approach
- A1261 West India Dock Road
- A112 Prince Regent Lane

- A124 Barking Road
- A206 Woolwich Road
- A207 Shooters Hill Road
- A1011 Silvertown Way
- A1011 Silvertown Way
- B210 Charlton Road; and
- Anchor and Hope Lane.

11.6.73 As stated above a comparison between driver stress with and without the Scheme has not yet been completed.

11.6.74 The Scheme aims to reduce driver stress by reducing congestion and incidents on the Blackwall Tunnel and on the surrounding highway network. It is therefore expected that there would be some beneficial effects from the scheme where traffic flows are predicted to decrease, although this will be confirmed within the ES following further investigation. Those roads that may see some minor beneficial effects from the scheme would be the A13 east of the A12 (-23%) and the A102 Blackwall Tunnel Southern Approach (-13%).

Significance of Impacts

11.6.75 The likely significance of construction impacts have been assessed. Table 11-28 below provides a summary of the effects.

Table 11-28 Summary of effects for Design year 2036

Topic	Effect
Journey Length	n/a
Amenity	Minor Beneficial and Minor Adverse
New Severance	Negligible
Relief from existing Severance	Negligible
View from the road	Negligible

Topic	Effect
Driver Stress	To be confirmed in the ES

11.7 Cumulative effects

- 11.7.1 Known consented/planned developments and highway schemes within the vicinity of the scheme have been taken into consideration within strategic traffic model for the 2021 and 2036 baseline reference case flows. Therefore these are not considered part of the cumulative assessment.
- 11.7.2 Developments that are planned or consented in the vicinity of the tunnel portals, but not yet implemented in the design year 2021, will generate construction traffic flows that will cumulatively impact on the road network. These developments are shown on Drawing 17.2 and described within Table 17.2 within Chapter 17.
- 11.7.3 The period considered was from 2018 to 2021, corresponding to the planned construction programme for the tunnel. The following data was collated for each site:
 - Average daily forecast of construction vehicle trips;
 - Average AM peak forecast of construction vehicle trips; and
 - Average PM peak forecast of construction vehicle trips.
- 11.7.4 Where possible, information on expected construction traffic was sourced directly from the respective TAs for each development. Sites were excluded in cases where construction is expected to be completed before 2018, as construction traffic associated with such sites would not conflict with the current assumed works programme for the Silvertown Tunnel.
- 11.7.5 In cases where construction traffic details were not included in a TA or the information provided was not clear, the following assumptions were used to provide an estimate based on the quantum of development proposed and the length of the anticipated construction period:
 - 0.58 one-way trips per sqm of development, regardless of type of development – this includes demolition, excavation and construction;

- Each residential unit assumed to be 65 sqm – an additional 40% of floorspace was added to each unit to take into account communal areas, car parking and other ancillary uses;
- 5 working days in a week (Monday to Friday) and 65 working days in a quarter;
- No allowance made for peaks in construction activity, hence construction traffic spread evenly over construction phases; and
- 10 hours per working day between 08:00 to 18:00 for lorries.

11.7.6 Where routes to be used by construction traffic were specified in TAs, the traffic generated by these specific schemes was assigned accordingly. Where routes were not specified, traffic was assigned on routes around the northern and southern tunnel portals depending on the location of the development scheme being considered.

11.7.7 Table 11-29 and Table 11-30 summarise the hourly level of construction traffic on the local highway network within the vicinity of the Silvertown and Greenwich sites in 2021.

Table 11-29 Hourly cumulative two-way construction traffic – Silvertown site

Link	Total vehicles	HGV
A12	3	3
A13 East	34	34
A13 West	37	37
Leamouth Road	0	0
Lower Lea Crossing	0	0

Table 11-30 Hourly cumulative two-way construction traffic – Greenwich site

Link	Total vehicles	HGV
A102	21	21

- 11.7.8 An assessment has been undertaken to show the cumulative impact of the development flows with the Silvertown Tunnel construction traffic. Table 11-31 and Table 11-32 show the two-way cumulative development and Silvertown Tunnel construction traffic flows. It can be seen that the impact of the total two-way cumulative development and Silvertown Tunnel construction traffic is less than 2% of 2021 Reference Case traffic flows on all links assessed. It is therefore considered that the impact is negligible.

Table 11-31 AM peak hour increase in traffic due to cumulative development + Silvertown Tunnel construction traffic – Silvertown

Link	Reference Case traffic 2021 (two-way)		Predicted cumulative + Silvertown Tunnel construction traffic (two-way)		% increase in traffic (two-way)			
	Total vehicles	HGV	Spoil removal stage	Other construction period	Total vehicles		HGV	
					Spoil removal stage	Other construction period	Spoil removal stage	Other construction period
A12	4,808	457	8	11	0.2%	0.2%	1.6%	2.3%
A13 East	6,610	701	52	42	0.8%	0.6%	7.4%	5.9%
A13 West	3,327	260	42	45	1.2%	1.3%	16.0%	17.1%
Leamouth Road	1,462	195	23	15	1.5%	1.0%	11.5%	7.7%
Lower Lea Crossing	2,069	79	23	15	1.1%	0.7%	28.5%	19.0%

Table 11-32 AM peak hour increase in traffic due to cumulative development + Silvertown Tunnel construction traffic – Silvertown

Link	Reference Case traffic 2021 (two-way)		Predicted cumulative + Silvertown Tunnel construction traffic (two-way)		% increase in traffic (two-way)			
	Total vehicles	HGV	Spoil removal stage	Other construction period	Total vehicles		HGV	
					Spoil removal stage	Other construction period	Spoil removal stage	Other construction period
A12	4,567	153	8	11	0.2%	0.2%	4.9%	6.9%
A13 East	6,498	223	55	45	0.8%	0.7%	24.7%	20.0%
A13 West	2,147	79	39	42	1.8%	1.9%	48.7%	52.5%
Leamouth Road	1,530	85	23	15	1.5%	1.0%	26.5%	17.6%
Lower Lea Crossing	1,992	45	23	15	1.1%	0.8%	50.0%	33.3%

11.7.9 Table 11-20 and Table 11-21 show the two-way cumulative development and Silvertown Tunnel construction traffic flows. The impact of the total two-way cumulative development and Silvertown construction traffic during the AM and PM peak hour on the A102 is negligible (less than 1% increase in vehicles).

Table 11-20 AM peak hour increase in traffic due to cumulative development + Silvertown Tunnel construction traffic – Greenwich site

Link	Reference Case traffic 2021 (two-way)		Predicted cumulative + Silvertown Tunnel construction traffic (two-way)	% increase in traffic (two-way)	
	Total vehicles	HGV		Total vehicles	HGV
A102	5,274	381	36	0.7%	9.3%

Table 11-21 PM peak hour increase in traffic due to cumulative development + Silvertown Tunnel construction traffic – Greenwich site

Link	Reference Case traffic 2021 (two-way)		Predicted cumulative + Silvertown Tunnel construction traffic (two-way)	% increase in traffic (two-way)	
	Total vehicles	HGVs		Total vehicles	HGVs
A102	6,367	179	36	0.6%	19.8%

11.7.10 In addition to the cumulative impact of additional construction traffic on the highway network, the land developments on both sides of the River Thames will have a significant impact on views from the road during both their construction and once built.

11.8 Further Work to be done

11.8.1 The assessment will continue to be reviewed against further consultation outcomes and any changes to the Scheme, its construction and legislation/policy. Any changes to baseline, future baseline, construction

and cumulative considerations in terms of traffic flows, adjacent developments and highway improvements will be assessed within the ES. Further work will also be carried out on certain elements of the assessment such as journey length and driver stress, as highlighted in earlier sections of this chapter.

11.9 NPS compliance

- 11.9.1 The NPS contains the following statement in Section 2 setting out the Government's vision and strategic objectives for nationally significant networks:
- 11.9.2 'The Government will deliver national networks that meet the country's long-term needs; supporting a prosperous and competitive economy and improving overall quality of life, as part of a wider transport system. This means:
- networks with the capacity and connectivity to support national and local economic activity and facilitate growth and create jobs
 - networks which support and improve journey quality, reliability and safety
 - networks which support the delivery of environmental goals and the move to a low carbon economy
 - networks which join up our communities and link effectively to each other'
- 11.9.3 The NPS explicitly notes at paragraph 2.27 that new links that cross a river or estuary (such as the Silvertown Tunnel), may be needed to increase capacity and connectivity to meet the needs created by economic and demographic growth.
- 11.9.4 This Chapter describes the effects on all travellers in relation to the Scheme in line with NPS, which have been found to be minor and not significant. It has been found that the Scheme will provide a reliable and improved connection to the north and south of the River Thames aiming to facilitate the movement of people and encourage economic growth. This assessment has taken into account the capacity of the network with and without the Scheme. It can be seen that without the Scheme the capacity of the existing highway network would be under stress in the future baseline / reference case.

11.9.5 As part of the Scheme, localised pedestrian and cycle improvements are provided. The scheme also provides an opportunity for enhancing cross-river bus services and for enabling new services to become operational.

11.10 Summary

11.10.1 A tabular summary of the significance of overall impacts is to be provided in the Table 11-33 below.

Table 11-33 Chapter Topic Effect Summary Table

Topic	Temporary/Permanent	Effect Significance rating
Journey length and travel patterns	Temporary	Minor to Moderate adverse
	Permanent	Minor Beneficial
Amenity for pedestrians and cyclists	Temporary	Negligible
	Permanent	Minor Beneficial to Minor Adverse
New Severance	Temporary/ Permanent	Negligible
Relief from existing Severance	Temporary/ Permanent	Negligible
View from the road	Temporary	Negligible to Minor Adverse
	Permanent	Minor to Moderate Adverse (2021) Negligible (2036)
Driver stress	Temporary	Minor to Moderate Adverse
	Permanent	To be confirmed in the ES