

Silvertown Modelling – Changes in Cross-River Public Transport Travel

Introduction

The transport demand model being used to assess the strategic impacts of the Silvertown Tunnel is the London Regional Demand Model (LoRDM). LoRDM replicates Transport for London's (TfL's) variable demand forecasting methodology used in the long-established London Transportation Studies (LTS) model and applies it to the detailed sub-regional Highway Assignment Model (RXHAM) and the Railplan public transport assignment model.

The mathematical form of the demand model is a nested logit with the redistribution response being more sensitive than mode shift. This structure is compliant with the advice provided in TAG Unit M2 (chapter 4.5) and supported by the sensitivity parameters estimated for the LTS model based on the London Travel Demand Survey 2008-2011. More information on the LoRDM structure and parameters can be found in AECOM's report "Application of LoRDM in East London, August 2015" (Response to TT FWQs, Appendix B).

Following requests from the ExA and discussions had at the Issue Specific Hearing on Traffic/Transport Modelling on 7 December, this note explains the demand responses predicted by LoRDM in the 2021 Assessed Case scenario and provides a breakdown of cross-river trips that would be diverted to Public Transport as a consequence of the tunnel and user-charging. The analysis focuses on the daily changes in trip making in the east London sub-region, i.e. for the three 'host' boroughs of RB Greenwich, LB Newham and LB Tower Hamlets and six adjacent boroughs, i.e. LB Southwark, LB Lewisham, LB Bexley, LB Barking and Dagenham, LB Hackney and LB Waltham Forest.

The analysis presented in this note is based on the LoRDM outputs of 24 hour Production-Attraction person trips and compares the Assessed and Reference case demand forecasts for 2021. To derive demand changes by borough the trips were aggregated by their home locations (place of residence) which included both outbound and returned journeys. For example a trip made by a resident of RB Greenwich from home to a workplace located in LB Newham in the morning and a return trip in the afternoon were counted as two RB Greenwich home-based/residents commute trips. This approach enables a direct comparison between changes in demand by mode and purposes¹.

Additional details of the socio-economic make-up of the cross river travel can be found in Appendix B of the Distributional Impact Report. The appendix covers the effect of the Scheme on each East London borough and looks at the changes in car and public transport

¹ There may be minor differences between the statistics described in this note and statistics quoted in other Applicant submissions, as these can be based on e.g. origin/destination rather than production and attraction and may be referring to different parts of the study area, for example regeneration areas.

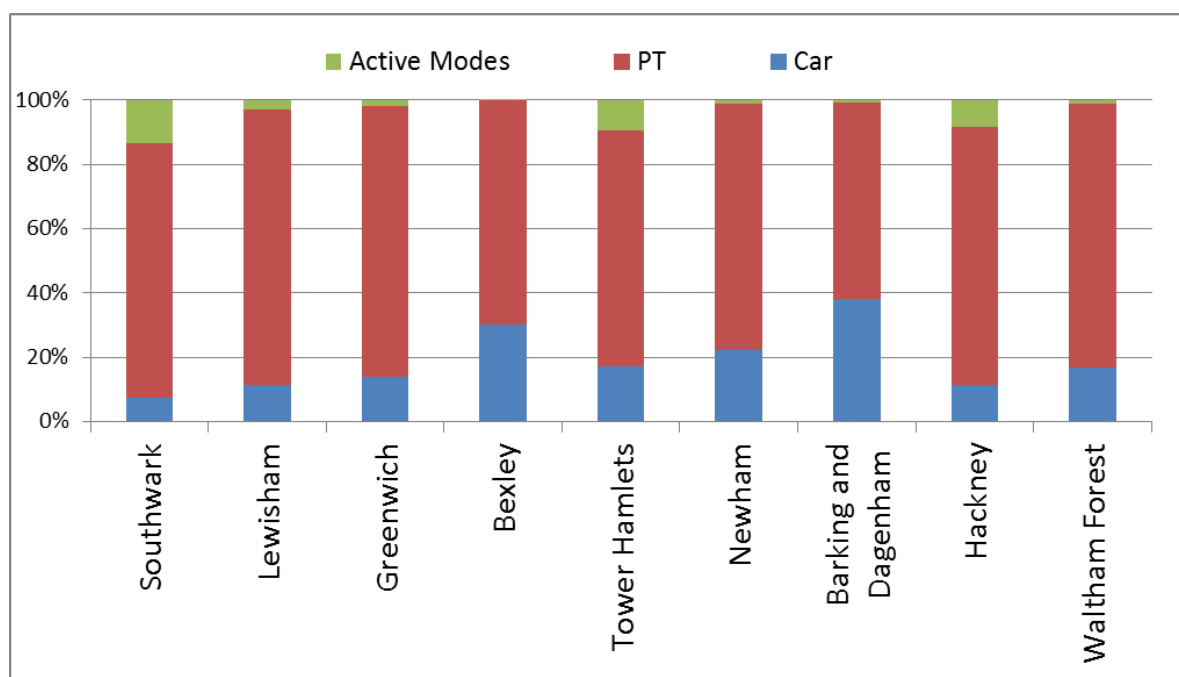
cross river trips by origins and destinations. This note briefly explains the key findings of the analysis and provides the relevant references to the main report. We note later that disaggregation of mode shift results below borough level is not recommended due to the small impacts predicted.

Background to mode shift

The existing options for crossing the river by motorised vehicle in East London are limited to a small number of highly congested crossings (particularly during the peak hours). Highway alternatives to the Blackwall Tunnel consist of the Rotherhithe Tunnel and Woolwich Ferry for shorter distance trips and the Dartford Crossing (which is subject to a charge) and Tower Bridge for longer distance trips. The limited options for those who need to drive across the river are demonstrated by the regular extensive queue lengths currently seen at Blackwall Tunnel.

As demonstrated in Figure 1, the vast majority of cross-river trips in east London are undertaken by public transport with the highest public transport (PT) share being around 90% in LB Lewisham.

Figure 1: 2021 Reference Case Mode shares of cross-river trips made by residents of east London boroughs, an average weekday



In the Reference Case, the cross river public transport options available will include the DLR, Jubilee Line, Crossrail, limited other rail and the Emirates Air Line. There is also a single cross-river bus service, the 108, through the Blackwall Tunnel. The restricted geometry of

the northbound tunnel and the major congestion and journey time reliability issues at the Blackwall crossing currently severely restrict the ability to improve cross-river bus services.

The Silvertown Tunnel will provide additional cross river highway capacity to improve the efficiency of traffic movement on the A102 Blackwall river-crossing corridor by reducing delays and queues and enabling traffic to flow more freely. To minimise the impact of additional 'induced' traffic being attracted to the route a charge will also be introduced to offset the reduction in highway travel time and manage demand. The Scheme will also enable enhancements to the bus network improving accessibility for those without access to a car to job opportunities and other activities and amenities on the other side of the River Thames.

Proposed PT Services

Detailed bus service proposals to connect locations north and south of the river would be worked up in increasing detail nearer to the opening of the Scheme in accordance with TfL's Bus Service Planning Guidelines. For the purposes of assessing scheme impacts, TfL has identified at this early stage two potential new services and enhancements to four existing services (predominantly through cross-river extensions). Collectively these represent an overall service of 37.5 buses per hour in each direction and are summarised in Figure 2.

Figure 2: Potential new cross-river bus services



Overall Changes to PT Demand

The model forecast for the Assessed Case suggests that the introduction of charges for the tunnel use and the additional bus service provision will result in additional public transport demand. Table 1 shows the change in the total number of trips made by each mode on an average weekday for the modelled area for the following trip purposes:

- Home-based Commute (includes blue and white collar categories);
- Home-based Other (includes education, social and leisure);
- Home based Employer’s Business;
- Non-home-based Employer’s Business; and
- Non-home-based Other.

Table 1: Changes in 2021 daily demand by purpose and mode, person trips

Trip Purpose	Actual Change (for the modelled area)			Percentage Change (for the modelled area)		
	Car	PT	Active Modes	Car	PT	Active Modes
Home-based Commute	-1290	1590	-290	-0.1%	0.1%	0.0%
Home-Based Other	-1560	5210	-3650	0.0%	0.1%	-0.1%
Home-Based Business	760	-580	-180	0.1%	-0.1%	-0.1%
Non-home-based Business	0	-40	0	0.0%	0.0%	0.0%
Non-home-based Other	-270	360	0	0.0%	0.1%	0.0%
Total	-2360	6530	-4110	0.0%	0.1%	-0.1%

*Rounded to the nearest 10 trips

The model predicts that 1290 commute and 1560 other trips will shift to public transport but business travel by car will increase by 760 trips leading to an overall reduction of 2360 daily trips made by car.

The model also suggests a transfer of 4110 cycle and walk (active modes) trips to public transport due to an improved accessibility by bus. The majority of these active mode journeys are home-based ‘other’ short distance trips in RB Greenwich, LB Lewisham, LB Tower Hamlets and LB Newham with both origins and destinations within the same borough. As demonstrated later in Table 3 the changes to cross river trips by active modes are not regarded as significant in the overall scheme context.

Because LoRDM is designed for highway schemes it represents active travel modes simplistically – for example it does not take account of people’s propensity to walk/cycle for health or lifestyle reasons, and does not explicitly consider future local policy impacts on active modes). This forecast mode shift response from active modes to bus is therefore regarded as less reliable, and accordingly, the PT benefits which would otherwise result from the active mode transfer were ‘screened out’ of the scheme appraisal to make this conservative. The exact specification of the bus components of the scheme will be

considered closer to the opening date and can take account of any walk/cycle policies and observed behaviours in relevant locations.

The overall mode shifts result in 6530 new trips made by public transport in the Assessed Case, with 2360 of those transferring from car (we explain later in this note that the new bus services also benefit and attract other passengers from existing rail services). This relatively low mode shift of new public transport passengers is considered sensible for the following reasons:

- There is an extensive public transport network and most cross river trips are already made by this mode in the Reference Case scenario;
- Current road based trips using the Blackwall Tunnel have dispersed origins and destinations and many are relatively long distance, making them more difficult to serve by public transport.
- The combination of time-savings resulting from the scheme and the user charge results in lower net changes to car users' costs of travel, reducing the overall level of change and therefore the propensity to shift mode.

The Scheme impact by boroughs showing the total number of new public transport trips transferred from car is presented in Table 2. The positive values for the home-based commute and other purposes indicate a shift from car to public transport whereas the negative changes for business travel indicate a shift from public transport to car. The analysis suggests that while it does result in some shift to public transport, the scheme impact on the overall mode shares is likely to be small.

Table 2: Changes in daily 2021 PT demand by purpose (due to mode shift from car), person trips – Productions by Borough

Trip Purpose	Actual Change				Percentage Change			
	Commute	Other	Business	Total	Commute	Other	Business	Total
Southwark	40	70	20	130	0.0%	0.0%	0.1%	0.0%
Lewisham	100	200	-60	240	0.1%	0.2%	-0.3%	0.1%
Greenwich	220	320	-310	230	0.2%	0.3%	-1.3%	0.1%
Bexley	100	70	-100	70	0.2%	0.2%	-1.3%	0.1%
Tower Hamlets	40	50	-30	60	0.0%	0.0%	-0.1%	0.0%
Newham	130	390	-20	500	0.1%	0.3%	-0.1%	0.2%
Barking & Dagenham	30	60	10	100	0.1%	0.1%	0.1%	0.1%
Hackney	30	20	-10	40	0.0%	0.0%	0.0%	0.0%
Waltham Forest	50	40	-10	80	0.1%	0.1%	0.0%	0.0%
East London Boroughs	750	1220	-520	1450	0.1%	0.1%	-0.2%	0.1%

*Rounded to the nearest 10 trips

Changes in Cross River Travel

The Silvertown tunnel provides a new and improved connection across the River Thames for car and bus users and could therefore attract extra demand if traffic is not managed by user charging.

Table 3 summarises the changes in cross-river trips in the east London sub-region for all purposes by mode and borough of residence. The boroughs located south of the river, i.e. RB Greenwich, LB Lewisham and LB Bexley will benefit the most from the improved connectivity and experience increases in cross-river trips by both car and public transport modes. For LB Tower Hamlets and LB Newham, the reductions in car trips will be offset by the increase in public transport use. The effect of the scheme on the cross river travel by residents of the other boroughs is relatively small.

The results also demonstrate that any changes to the cross river travel by active modes are extremely small and confirm that the Scheme is unlikely to encourage any significant shifts from active to motorised modes for cross-river travel.

Table 3: Changes in 2021 daily cross river total demand by mode and by borough, person trips –Travel in East London Sub-region

Borough/Mode	Actual Change				Percentage Change			
	Car	PT	Active Modes	Total	Car	PT	Active Modes	Total
Southwark	-50	30	0	-20	-1.3%	0.2%	0.0%	-0.1%
Lewisham	70	180	0	240	1.5%	1.0%	-0.5%	1.1%
Greenwich	440	640	-40	1040	6.6%	3.3%	-2.4%	3.7%
Bexley	380	50	0	430	7.6%	0.7%	-1.4%	3.6%
Tower Hamlets	-250	220	-10	-30	-5.4%	1.0%	-0.2%	-0.1%
Newham	-60	850	-10	770	-1.4%	4.0%	-3.4%	3.0%
Barking and Dagenham	-100	60	0	-40	-4.6%	1.0%	-0.5%	-0.4%
Hackney	-70	10	0	-70	-6.5%	0.1%	0.0%	-0.5%
Waltham Forest	-140	30	0	-110	-10.2%	0.4%	0.0%	-1.1%
East London Boroughs	220	2070	-70	2220	0.7%	1.5%	-0.5%	1.2%

*Rounded to the nearest 10 trips

Socio-economic information

The ExA question also refers to socio-economic information relating to changes in travel. Appendix B of the Distributional Impact Report (APP - I04) covers the effect of the Scheme on each East London borough (it excludes Southwark, which is outside the East London Sub-region, but this can be made available if required).

Appendix B shows for each borough the number of daily cross-river trips to/from each borough, split into Public Transport and Highways modes – see for example Table B 6 for Greenwich. This shows an increase in public transport trips and a decrease in highway trips, reflecting the mode shift to public transport. There are also some additional public transport trips that have redistributed to take advantage of the new crossing.

Also in Appendix B are details of the socio-economic make-up (income and car ownership at MSOA level for each borough – this also shows the percentage of the workforce that crosses the River by car. This therefore provides information on the characteristics of the car users who will move to public transport to cross the river. The MSOA's are shown graphically in Figure B4.

As can be seen from Table B-6 and Table B-4, the number of people who will be diverted to public transport is small, and if disaggregated further to e.g. MSOA or traffic zone level they would be extremely small, and it is not recommended that this type of model response is disaggregated to this detailed level.

Transfer from Rail to Bus

The improved local buses are also expected to improve accessibility for those travellers without access to a car. In addition to the shift from car to public transport, there is a shift from the use of rail to bus for some journeys. Over the course of a 12-hour period (07:00-19:00), a total of almost 19,000 cross-river bus passenger trips are forecast to be made via the Silvertown and Blackwall tunnels in 2021, with a large proportion of this total coming from people switching from rail to bus. This compares with a total of around 3,000 cross-river trips made via the Blackwall Tunnel in the Reference Case.

SDG Audit

SDG investigated the PT mode shift responses and reported their findings in the audit report (Chapter 3 “Railplan Assessed Case”). SDG concluded that “The Assessed Case Railplan model is responding in a reasonable manner and is deemed fit for the purpose of assessing the public transport implications of the scheme in future years. Changes to public transport demand and movements seen in the Assessed Case Railplan model are relatively slight, and in keeping with the project’s principle aim to improve the network performance of Blackwall Tunnel and its approach road and to improve the resilience of river crossings to incidents and/or planned events”.

Summary and conclusions

- The bus network enabled by the Scheme would support a shift from car to public transport for those users experiencing increases in travel cost from the user charges and will improve accessibility for those without access to a car.

- As there is an extensive public transport network in the Reference Case, and most cross river trips are already made by this mode in this scenario the Scheme only improves accessibility for relatively short distance journeys in the East London sub-region. Hence the mode shift from car is relatively low in the context of the whole study area.
- The model suggests that the Scheme will generate more cross-river trips by both car and public transport modes in RB Greenwich, LB Lewisham and LB Bexley. The increased public transport use will offset the reduction in cross river car travel in LB Tower Hamlets and LB Newham. The effect of the scheme on the cross river travel by residents of the other boroughs is likely to be small.
- SDG concluded that the model is responding in a reasonable manner and is deemed fit for the purpose for assessing the public transport implications of the scheme in future years.