Earl's Court and West Kensington Opportunity Area Joint Supplementary Planning Document

EARLS COURT & WEST KENSINGTON SPD STRATEGIC TRANSPORT STUDY REVIEW

NOVEMBER 2011

INTRODUCTION

This Summary Report outlines the findings of the Earl's Court & West Kensington Strategic Transport Study (ECTS) and the independent review / carried out by, and on behalf of Transport for London (TfL), the London Borough of Hammersmith & Fulham (LBHF) and the Royal Borough of Kensington & Chelsea (RBKC). The purpose of the review is to ensure that the ECTS and underlying analysis is acceptable to inform the Earls Court & West Kensington Opportunity Area (OA) Supplementary Planning Document (SPD).

The ECTS comprises of a number reports produced by WSP and Halcrow , which have been independently reviewed and audited by the authorities consultants, MVA. Given the technical detail contained within the ECTS, it is not being widely distributed. **However all the documents that make up the ECTS are available for inspection at each borough's Town Hall and can also be made available for inspection on request to earlscourtspdconsultation@lbhf.gov.uk.**

A glossary is appended explaining the main model types referred to in this report.

CONTEXT

The ECTS is a strategic multi-modal transport study that assesses the impact of different development scenarios within the Earl's Court & West Kensington OA. It has been produced to inform the emerging SPD as prepared by LBHF, RBKC and the Greater London Authority (GLA).

TfL initially commissioned the ECTS in October 2009, based on a study brief agreed by TfL, LBHF, RBKC, GLA and Capital & Counties. This commission was put on hold in February 2010 due to uncertainty over the direction of the SPD.

In March 2010 Capital & Counties assumed responsibility for the ECTS in order to inform their representations to the London Plan Examination in Public. It was accepted that the study would continue to follow the agreed brief of October 2009 and be guided by the (Stage 1) Inception report that was produced for TfL in December 2009. When the decision was made to produce an SPD it was agreed in July 2010 that the ECTS should continue to be progressed by Capital & Counties, but would be subject to an independent review by TfL, LBHF and RBKC to enable it to inform the SPD.

Throughout the SPD process, the ECTS was guided by a steering group made up of TfL, LBHF, RBKC, GLA and Capital & Counties. Each report and associated technical assessments have been reviewed by TfL (including TfL Planning, Surface Transport Development Planning, London Buses, London Rail and London

Underground) LBHF and RBKC. In addition, a detailed independent technical audit was commissioned by TfL and carried out by MVA Consultancy.

STUDY APPROACH

The ECTS has involved the following major workstreams, split into four reports:

- Definition of agreed development scenarios and base transport assumptions – Stage 2a report
- Review of existing models and analysis and development of demand forecasting methodologies in line with TfL guidance including output from TfL's London Transportation Studies model (LTS) and a review of TfL's suite of sub-regional assignment models; central London highway assignment model (CLoHAM) and sub-regional public transport assignment model (Railplan), – Stage 2b report
- Forecasting and analysis including output from TfL's suite of sub-regional assignment models; CLoHAM Railplan – Stage 3 report
- Localised assessment of transport impact including micro-simulation highway modelling – Stage 4 report

This report provides a summary review of each of the four ECTS reports as well as the independent technical audit. In particular it outlines the key areas within the ECTS reporting and analysis that inform the conclusions of the SPD.

STAGE 2a REPORT: DEFINITION OF DEVELOPMENT SCENARIOS & TRANSPORT SCENARIOS

The ECTS stage 2a report provides a breakdown of each of the development scenarios proposed for the Earls Court & West Kensington OA as well as an outline of the future year transport interventions that should be included as part of any future year base case (with or without development). It should be noted that these scenarios are discrete to the ECTS and do not directly correlate to those set out in the first draft SPD. They are, however, sufficient for the purposes of the ECTS and informing the associated SPD.

DEVELOPOMENT SCENARIOS

The information provided in this report accords to the requirements set out in the agreed transport study brief. In total six development scenarios were proposed ranging from c5,000 homes and c11,000 jobs to c10,000 homes and c31,000 jobs)[1], each of which was considered suitable for testing using the agreed methodology.

[1] Please note, this is not the same as the scenarios used for testing the capacity of the overall site, as presented in the first draft SPD, and now referenced in a supporting document.

Subsequent to the Stage 2a Report the number of scenarios considered for the OA in the ECTS was reduced to two (scenarios 1 and 4) in the final stage 3 and 4 reports. The SPD is based on only a single scenario; (scenario 1 at 5,560 homes and 12,165 jobs). Through testing as part of the ECTS it was considered that the alternative scenarios would have too great an impact on the local transport network. As such the remainder of this document refers to the scenario 1 level of development only.

The relationship between floor space and the level of employment and floor space and number of proposed units under each scenario is considered reasonable. The proposed level of car parking provision at 0.4 spaces per residential unit is accepted as realistic and suitable for testing in order to make future judgments about the level of car parking that would be supported through the SPD.

FUTURE YEAR BASE TRANSPORT INTERVENTIONS

All the assumptions regarding future year transport interventions for both future year scenarios (2021 and 2031) are in line with TfL's expectations and correspond with the funded and committed schemes included within TfL's business plan. It was agreed with TfL and is consistent with the reference cases used to inform the Mayor's Transport Strategy (MTS) and London Plan.

CONCLUSIONS

In conclusion, the Stage 2a report and accompanying information is considered an acceptable base to inform the Earls Court & West Kensington SPD transport chapter.

STAGE 2b REPORT

The ECTS stage 2b report outlines the methodology used to generate the demand forecasts for each of the OA development scenarios including the transport models and planning data inputs used. The demand forecasts are presented by mode and judgements are made as to the validity of each of the transport models to be used for the ECTS. The LTS, CLoHAM and Railplan models were supplied by TfL and were agreed as the correct tools to be used, however as with all strategic transport models each still required validation in the study area to ensure that they accurately reflected the baseline situation.

LTS MODEL USE AND FORECASTS

The LTS model has been used to generate the travel demand from each development scenario. This approach is in line with TfL guidance as it allows the development demand to be considered alongside future 'background' growth on both the highway and public transport networks.

As advised by TfL, the planning data and methodology that feeds into the LTS model is accurate and is consistent with that used for other TfL projects including the MTS, London Plan and other OAPF studies, including White City, Vauxhall Nine Elms Battersea and the Upper Lea Valley.

The base planning data (housing and employment forecasts) for both future years was supplied by TfL and, as of November 2011 remains the most up to date forecasts available. The adjustments made to represent the development scenarios were reviewed by TfL and are considered to have been applied correctly.

The travel demand generated by each scenario is considered reasonable both in absolute terms and relative to the other scenarios. The demand flows to and from the development are reflective of the land use split assumed in each of the development scenarios, with a greater increase in outbound trips in the am peak period, a trend which is reversed in the pm peak period. The trips generated by development in the AM and PM peak periods are outlined below in figures1 and 2.

Figure 1. Scenario 1 additional trips by mode LTS model output AM Peak (07:00 – 10:00)

Mode	In	Out	Internal	Total
Car trips	900	800	100	1,800
Public Transport trips	4,500	2,300	300	7,100
Walk and cycle trips	1,300	1000	1,400	3,700
Total trips	6,700	4,000	1,900	12,600

Figure 2. Scenario 1 additional trips by mode LTS model output PM Peak (16:00 – 19:00)

Mode	In	Out	Internal	Total
Car trips	900	1,100	200	2,200
Public Transport trips	2,200	3,700	300	6,242
Walk and cycle trips	1000	1,200	1,400	3,600
Total trips	4,100	6,000	1,900	12,100

In all time periods the majority of additional trips generated (up to 56%) are on public transport, followed by walking & cycling (around 30%) and car (between 14% and 18%). This pattern is consistent with the OA's location surrounded by three London Underground stations and numerous bus stops as well as a congested local road network. The vast majority of trips internal to the development are forecast to be walking and cycling trips, the number and pattern of which are consistent with a large mixed use development.

A sense check against the TRAVL database confirms that the level of travel demand generated by LTS is broadly consistent. This comparison is considered accurate and further validates the LTS forecast demand.

Changes have been made to both the LGV/OGV and taxi movements generated by LTS. Both of these changes have been reviewed by TfL and are considered accurate, based upon the evidence provided. LGV/OGV trips have been reduced owing to the shift in land use to predominantly residential and white collar employment which generated less freight movements, whilst taxi trips were increased to better reflect the change in employment and hotel uses proposed in the development scenarios.

CLoHAM & RAILPLAN MODEL REVIEW

In order to understand the impact of each development scenario on the highway and public transport networks, the demand generated by LTS was input into the central London highway assignment model (CLoHAM) and Railplan public transport assignment model. These models was reviewed as part of the stage 2b report.

Both models were found to validate to an acceptable standard in the local area, but several local network adjustments were also made to the model to further improve local validation. The adjustments made and the overall validation of both models for use in the ECTS were agreed with TfL.

In applying LTS highway demand to the CLoHAM model, a method of 'peak spreading' was employed to reflect that in congested networks, some highway demand will shift away from peak hours. The application of peak spreading was based on a draft methodology provided by TfL and its use for this study was agreed. It is recognised however that the application of this methodology has a relieving effect on the wider highway network, meaning it presents a more favourable forecast than otherwise would have been generated with no peak spreading. No adjustments were made to the LTS public transport demand prior to being input into Railplan.

The specification for the VISSIM model was considered acceptable to inform the ECTS.

CONCLUSIONS

It is considered that the stage 2b report and supporting analysis has been carried out correctly and presents an accurate view of the level and type of travel demand generated by each development scenario. In looking at the impact of development alongside forecast growth it is considered that an accurate assessment of future demand has been presented.

STAGE 3 REPORT: FORECASTING & ANALYSIS

The penultimate ECTS report, Stage 3, outlines the impact of development on the highway and public transport network through TfL's sub-regional assignment models, the CLoHAM highway model and the Railplan Public Transport model.

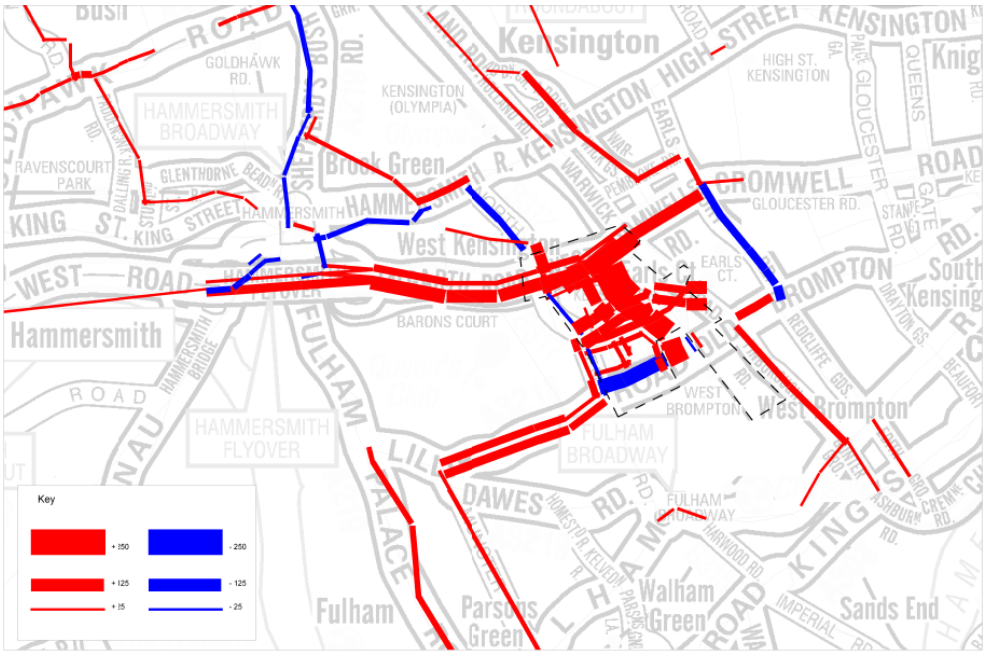
HIGHWAY MODEL (CLoHAM) OUTPUTS AND ANALYSIS

In the CLoHAM model, all figures presented have been reviewed by both TfL and MVA as part of the technical audit and are considered an accurate interpretation of the model. The base (current) year model reflects the current situation, which is already highly congested. The impact of development is considered on top od afutuire tyear (2031) base which adds forecast 'background' growth to the current situation. All figures are representative of 'peak spreading' as outlined in the previous section.

In addition to 'peak spreading' the report presents a situation where traffic signal's have been 'optimised' in the future year. This reflects the fact that signal timings would be adapted to account for future changes in traffic flow and as such it is accepted as a reasonable assumption.

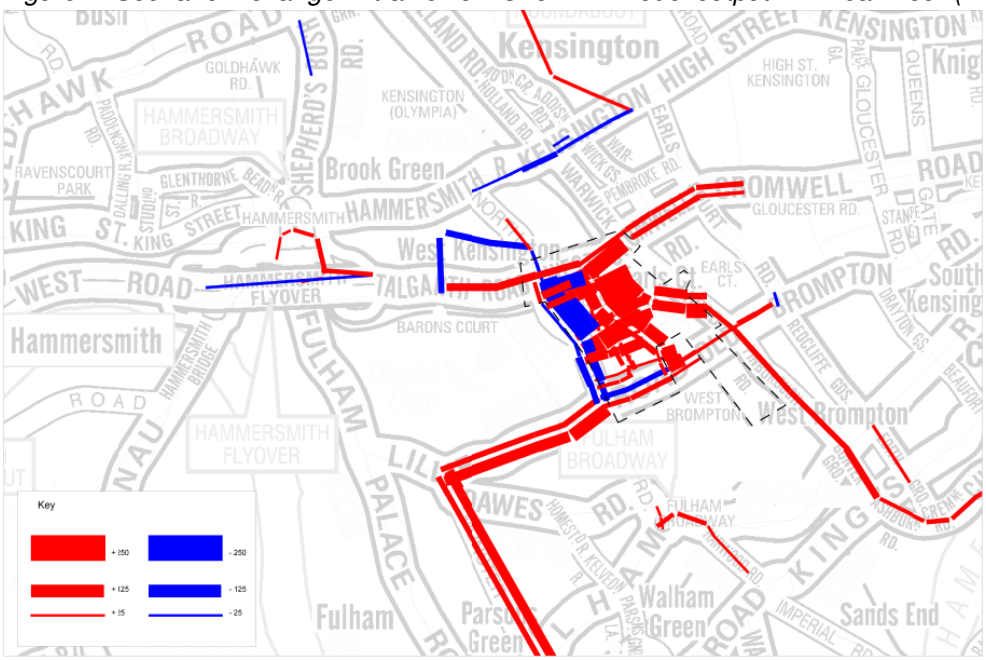
Overall, the modelling indicates that although the addition of development traffic appears to result in only a limited additional impact on the local highway network, it has to be considered in the context of an already highly congested network where some strategic links are at capacity. Figures 3 and 4 below illustrate where traffic flows are shown to change as a result of OA development in the AM and PM peak hour.

Figure 3. Scenario 1 change in traffic flow CLoHAM model output AM Peak hour (08:00 – 09:00)



Red indicates an increase in flow and blue a reduction in flow.

Figure 4. Scenario 1 change in traffic flow CLoHAM model output PM Peak hour (17:00 – 18:00)



Red indicates an increase in flow and blue a reduction in flow.

The vehicle flow plots and statistics indicate that the greatest absolute increase in traffic as a result of development occurs on the strategic road network, particularly the A4 (West Cromwell Road) and the Earls Court One Way System (Warwick Road and Earls Court Road). The junction statistics presented show that a number of locations experience limited capacity, including the A4 junctions with Gliddon Road and North End Road where the volume of traffic reaches almost 90% of road capacity. This is illustrated in figure 5 below.

Figure 5. 2031 base and scenario 1 traffic volume as a percentage of junction capacity CLoHAM model output

Junction	AM Peak		PM Peak	
	2031 Base V/C (%)	Scenario 1 V/C (%)	2031 Base V/C (%)	Scenario 1 V/C (%)
A4/ Gliddon Road	82	85	89	89
A4/ North End Road	85	88	80	79
A4/ Warwick Road	72	74	75	75
A4/ Earls Court Road	70	71	74	76
Lillie Road/ North End Road	72	72	65	65
Old Brompton Road/ Warwick Road/ Finborough Gardens	57	60	59	62
Old Brompton Road/ Earls Court Road/ Redcliffe Gardens	59	59	66	68
A4 Access	-	73	-	76
Lillie Road Access	-	22	-	19

Moreover, further analysis of the modelled results indicates that in the future year with development the A4 (West Cromwell Road) is under significant pressure as the volume of traffic reaches over 90% of road capacity on sections of the A4 and North End Road adjacent to the OA and are over 80% on further sections of the A4 and Warwick Road also adjacent to the OA. This shows that the network is at saturation and that additional traffic entering the network should be minimised. However, despite the additional traffic on the network, there is only limited evidence of traffic rerouting to avoid the OA area and thus having a greater impact on the wider network. This is illustrated in figures 3 and 4.

The addition of north-south connectivity through the OA, the only intervention tested at this level, appears to show a slight relieving effect on parallel routes, particularly North End Road, although this does result in capacity constraints at the junction with the A4 as can be seen in figures 3, 4 and 5.

PUBLIC TRANSPORT MODEL (RAILPLAN) OUTPUTS AND ANALYSIS

As with the CLoHAM model, all the Railplan model outputs presented have been reviewed by both TfL and MVA as part of the technical audit and are considered to be an accurate interpretation of the model.

The key impacts on the public transport network can be seen at each of the three local London Underground stations that serve the OA and also on the West London Line. The increase in station flows at each of the three local London Underground stations is outlined in figures 6, 7 and 8.

Figure 6. London Underground station flows at Earls Court station based on Railplan model output

	AM Peak				PM Peak		
Movement	**2007**	**2031**	**Scenario 1**		**2007**	**2031**	**Scenario 1**
Station Entries	8,900	11,100	12,000		8,000	10,400	11,300
Station Exits	6,600	7,800	8,600		7,100	10,000	10,900
2-Way Flow	15,500	19,900	20,700		15,200	20,400	22,100

Figure 7. London Underground station flows at West Brompton station based on Railplan model output

	AM Peak				PM Peak		
Movement	**2007**	**2031**	**Scenario 1**		**2007**	**2031**	**Scenario 1**
Station Entries	800	1,000	1,300		1,100	1,700	2,400
Station Exits	1,600	2,100	2,900		1,000	1,500	1,800
2-Way Flow	2,400	3,200	4,200		2,100	3,200	4,200

Figure 8. London Underground station flows at West Kensington based on Railplan model output

	AM Peak				PM Peak		
Movement	**2007**	**2031**	**Scenario 1**		**2007**	**2031**	**Scenario 1**
Station Entries	2,600	3,100	3,400		2,000	2,200	3,100
Station Exits	1,600	1,700	2,900		3,900	2,200	2,700
2-Way Flow	4,200	4,800	6,400		3,900	4,400	5,800

As a result of development, Earls Court, West Brompton and West Kensington would see increases in passenger movements of 10%, 32% and 33% respectively on top of future year demand. This is regarded as a significant increase in demand at each station, particularly when compared against current levels. The level of intervention required to address this was considered as part of the stage 4 report.

Away from the stations, there is only a marginal impact on London Underground line loadings due to the level of existing (and forecast) flows already on each of the lines serving the OA. Despite this, it is recognised that these lines, particularly the Wimbledon branch of the District line are already ‘overcrowded’ and that development in the OA would add further additional pressure.

On the West London Line, passenger flows and line crowding increase as a result of development. Although the increases appear relatively small, it is considered that their impact would be magnified by the already crowded nature of the services. As such increased capacity on services using the West London Line would be required to support development in the OA.

On the bus network the modelling indicates that there would generally be sufficient capacity on existing bus services to accommodate development. However, as the increase in capacity on the District and Piccadilly lines brought about by the London Underground capacity upgrades will result in some people switching from the bus to the Underground network, future bus service provision would likely be reduced to better fit demand. Therefore as the addition of development in the OA would increase bus demand, additional bus capacity would likely be required.

CONCLUSIONS

The stage 3 report is considered an accurate reflection of the likely impact of development on the strategic highway and public transport networks.

On the highway network, the addition of a new north-south route through the OA provides some benefits, both in terms of connectivity through the site and relief of existing roads. There is also limited evidence of traffic re-routing causing wider network dis-benefits. However, the network is already highly congested, and with development, some key links and particularly the A4 see further increases in traffic flows. It is apparent that this route is at capacity and that additional vehicle traffic should be minimised.

On the Public Transport network, the impact of OA development is most keenly felt at the local London Underground stations and on the West London Line. At each of these locations, these effects would need to be mitigated to ensure that the network is able to operate at an acceptable level. Additional bus capacity would also need to be provided to cater for OA development demand.

STAGE 4 REPORT: LOCAL CAPACITY STUDY

The purpose of the stage 4 report is to examine the local impacts of development in more detail for walking & cycling, public transport and the highway network. This report was informed through detailed discussions with LBHF, RBKC, Network Rail and the TfL operating businesses including London Buses, London Underground, London Rail and Surface Transport. As previously discussed, the local highway analysis has made use of a VISSIM micro-simulation model.

All analysis and modelling done as part of the stage 4 report has been informed by the modelling and analysis carried out in the stage 2a, 2b and 3 reports. It is considered that the modelled results are an accurate representation of the future situation and that the analysis and conclusions of the report are sound regarding walking and cycling and public transport, but that the effect on the highway network is less acceptable than reported.

Further assessment of all supported measures should be included in any planning application for the OA.

WALKING & CYCLING

The findings of the stage 4 report regarding walking and cycling are considered to be a fair reflection of the situation. This section of the report has been informed by meetings TfL, LBHF and RBKC as well as an agreed Pedestrian Environmental Review System (PERS) audit.

Where modelled data has been used, this has come from a version of the LTS model and is considered acceptable to inform a strategic study such as the ECTS. The likely movements of pedestrians and cyclists is considered broadly accurate based on current movements and the proposed level of development within the site. However it is understood that all such movements would be dependent on the final OA site layout and should be regarded as indicative only, in particular it would be expected that a greater pedestrian and cycle flow would be attracted through the OA site. Also in reality it would be expected that a greater number of trips than forecast would walk and cycle due to travel planning and other measures put in place to support sustainable travel, as such these figures are considered as a worst case.

The walking and cycling interventions supported by the ECTS are accepted including:

- Footway widening, removal of pinch points and general improvements to the local pedestrian and cyclist environment
- Increasing the number of dropped kerbs, facilities for sensory and mobility impaired users, and cracked or damaged footways with poor surfacing reinstatements in places along the Lillie Road footways
- Replacing staged and staggered pedestrian crossings which do not provide for the direct movement of pedestrians
- Improving pedestrian and cyclist facilities at the Lillie Road / North End Road junction
- Review the study area to identify opportunities for enhanced signage and information provision in accordance with the Legible London guidelines
- Consider the potential to promote a green corridor for both walking and cycling alongside the western edge of the West London Line
- Cycle parking to be improved in accordance with TfL's 'Cycling Revolution London'
- An extension of the Mayor's cycle hire scheme into the OA to be provided.
- Ensure that the OA is permeable and to extend travel choices for people through a network of legible connections providing permeability between streets, spaces and significant destinations such as the rail stations, bus routes, schools and local centres.

- Improve the A4 southern footway given the potential increases in pedestrian flow
- Rationalise the provision of street furniture and some minor widening on local streets

IT has also been identified that connectivity benefits could be realised by providing new station entrances to Earls Court (under Warwick Road) and West Kensington stations that access directly into the OA.

PUBLIC TRANSPORT

The findings of the stage 4 report regarding public transport are considered to be a fair reflection of the situation. This section of the report has been informed by meetings with several parts of TfL (including London Underground, London Rail and London Buses) and well as LBHF and RBKC.

As the impact on LUL stations was identified as the key area of concern in the assessment of the stage 3 report, the stage 4 report has undertaken 'static analysis' to assess the requirements at the three London Underground stations. This level of assessment is considered acceptable to inform the SPD and has been agreed with London Underground. This identified that improvements would be needed to:

- Increase the number of ticket gates at West Kensington, West Brompton station and at the Warwick Road side of Earls Court station
- Enhance the capacity of the unpaid side of the West Brompton and West Kensington station concourses
- Widen the staircase widths at West Brompton and West Kensington stations

More specifically, the static analysis identified that the Warwick Road entrance to Earls Court station would require two additional ticket gates, bringing the total to six, West Kensington would require a single additional gate bringing the total to five and West Brompton would require four extra gates bringing the total to seven. These findings are reflected in the SPD. All additional gates should be provided either at current entrances or as part of any new station entrance, subject to operational agreement from London Underground. The additional gate line and concourse requirements for each station as a result of development are set out in figures 9 and 10 below.

Figure 9. Required ticket gates at each local London Underground station

	Earls Court (Warwick Road)	**West Brompton**	**West Kensington**
Current provision	4	3	4
Required 2031	5	6	5
Development requirment	6	7	5

Figure 10. Required station concourse (metres squared) at each local London Underground station

	Earls Court (Warwick Road)	West Brompton	West Kensington
Current provision	385	39	38
Required 2031	61	42	39
Development requirment	76	53	52

In addition, further analysis suggests that the provision of additional capacity on the West London Line as reflected in the SPD based upon analysis of the stage 3 report would also increase demand at West Brompton, requiring at least another additional gate. This is also reflected in the SPD.

On the bus network a series of potential connectivity and capacity improvements are outlined, including bus stop upgrades and new linkages to destinations such as Battersea, Vauxhall and Kings Road. These were developed in consultation with London Buses and should be investigated further as part of any planning application in the OA. All existing bus stands within the OA must also be re-provided as part of any OA development.

Furthermore, in addition to the improvements outlined above, it is the view of the SPD that each of the three stations (including any new or re-commissioned entrances) should be made step free in order to make the OA as accessible as possible. In particular this should include step free access to both platforms at West Kensington and the southbound District Line platform at West Brompton, none of which are currently step free. The proposed third entrance to Earls Court should also provide step free access to the station.

HIGHWAYS

At the local level, the highway flows generated by the CLoHAM model were input into a VISSIM model in order to gain a more detailed understanding of the impact of development on the local highway network. This was done in accordance with the agreed study brief. The model was agreed for use at a strategic level for the ECTS and it is acknowledged that the model outputs in the stage 4 report are an accurate reflection of the forecast situation.

The modelling shows that the addition of development in the OA (including new north-south connectivity), but no further transport interventions, the local network performs to a similar level compared to a future year situation without development in terms of total journey time and completed trips, but performs considerably worse in terms of unreleased vehicles, suggesting severe capacity constraints in the network. This is outlined in figure 11.

Figure 11. VISSIM model overall network performance statics (No of vehicles)

	Total Vehicles in Matrix	Number of Completed Peak Hour Trips	Avg. Peak Hour Journey Time per vehicle (sec.)	Avg. % Delay per vehicle on Completed Trips	Total Completed Warm-up Trips	Total Cool-down Trips	Unreleased vehicles
AM BASE	12200	10000	410	42%	1750	350	70
AM BASE 2031	12800	9900	460	44%	1720	940	170
AM DEVELOPMENT 2031 OPT1	13800	10800	460	46%	1880	840	260
PM BASE	11900	9700	400	43%	1820	200	190
PM BASE 2031	13000	9600	450	45%	1880	1310	250
PM DEVELOPMENT 2031 OPT1	14000	11000	460	46%	2240	580	220

In addition, the figures presented hide some significant variations in performance between east-west and north-south routes, whereby average journey times and queue lengths decrease on the north-south routes (North End Road, Warwick Road and Earls Court Road), but increase on the east-west routes (A4/West Cromwell Road and Lillie Road/Old Brompton Road). This is outlined in figure 12 below. Given the strategic value of the A4, such an impact would be considered unacceptable and further interventions would need to be provided to mitigate this.

Figure 12. average journey time (seconds) along routes bordering the OA VISSIM model output

Route (AM Peak)	09 BASE	31 BASE	31 DEV OPT 1	Dist (m)
A4 Eastbound	240	270	370	1520
A4 Westbound	230	270	300	1520
North End Rd Southbound	450	620	340	1375
North End Rd Northbound	600	490	450	1375
Old Brompton Rd Eastbound	310	380	550	1200
Old Brompton Rd Westbound	240	300	310	1200
Earls Court Road Southbound	350	400	320	1400
Warwick Rd Northbound	650	940	730	1345
Route (PM peak)	**09 BASE**	**31 BASE**	**31 DEV OPT 1**	**Dist (m)**
A4 Eastbound	210	270	420	1520
A4 Westbound	230	240	350	1520
North End Rd Southbound	570	760	608	1375
North End Rd Northbound	580	770	470	1375
Old Brompton Rd Eastbound	220	250	360	1200
Old Brompton Rd Westbound	270	400	610	1200
Earls Court Road Southbound	330	320	270	1400
Warwick Rd Northbound	606	690	410	1345

The following highway intervention measures were tested:

- Adding a left turn filter from North End Road into the A4 Westbound, running in conjunction with the right turn from the A4 into North End Road.
- Re-staging the A4/Warwick Road signals so that the pedestrian crossings run each cycle and removing the large intergreen between stages and that more time can be given to mains movements in the signal plan.
- Increasing the cycle times at the Old Brompton Road/Finborough Road and Old Brompton Road/Earls Court Road junctions
- Signalising the LillieRoad/North End Road junction, rerouting the left turn southbound traffic from North End Road and westbound right turn traffic from Lillie Road through the OA site.

The addition of these additional interventions has the effect of improving the overall aggregate performance of the local network in both the AM and PM peak periods whereby average journey times, total completed trips and the number of unreleased vehicles are improved from the future year base without development. The overall model network statics including interventions is outlined in figure 13.

Figure 13. VISSIM model overall network performance statics (No of vehicles)

	Total Vehicles in Matrix	Number of Completed Peak Hour Trips	Avg. Peak Hour Journey Time per vehicle (sec.)	Avg. % Delay per vehicle on Completed Trips	Total Completed Warm-up Trips	Total Cool-down Trips	Unreleased vehicles
AM BASE	12200	10000	410	42%	1750	350	70
AM BASE 2031	12760	9900	460	44%	1720	940	170
AM DEVELOPMENT 2031 OPT1	13800	11300	410	44%	1970	530	20
PM BASE	11900	9700	400	43%	1820	200	190
PM BASE 2031	13000	9600	450	45%	1880	1310	250
PM DEVELOPMENT 2031 OPT1	14000	11200	400	43%	2260	460	80

This overall improvement is noted, however the variations in performance between the east-west and north-south routes remain, particularly with regards to the A4-West Cromwell Road. Although the impact on this road is reduced in scale due to the tested interventions, they are still regarded as significant with journey time increasing by up to 84 seconds along the A4 in the VISSIM mode area. Figure 14 outlines the changes in journey times as a result of development with interventions.

Figure 14. average journey time (seconds) along routes bordering the OA VISSIM model output

Route (AM Peak)	09 BASE	31 BASE	31 DEV OPT 1	Dist (m)
A4 Eastbound	240	270	310	1520
A4 Westbound	230	270	270	1520
North End Rd Southbound	450	620	530	1375
North End Rd Northbound	600	490	390	1375
Old Brompton Rd Eastbound	310	380	380	1200
Old Brompton Rd Westbound	240	300	310	1200
Earls Court Road Southbound	350	400	310	1400
Warwick Rd Northbound	650	940	590	1345
Route (PM peak)	**09 BASE**	**31 BASE**	**31 DEV OPT 1**	**Dist (m)**
A4 Eastbound	210	270	300	1520
A4 Westbound	230	240	320	1520
North End Rd Southbound	570	760	500	1375
North End Rd Northbound	580	770	420	1375
Old Brompton Rd Eastbound	220	250	320	1200
Old Brompton Rd Westbound	270	400	490	1200
Earls Court Road Southbound	330	320	250	1400
Warwick Rd Northbound	610	690	440	1345

Overall, although the interventions tested do mitigate the impact of development on the highway network to an extent, it is not considered that they completely mitigate the level of development down to an acceptable level. Therefore, further work would need to be done as part of any OA planning application to prove that the development can be accommodated on the network, firstly through minimising travel demand and secondly through further intervention on the network. It will also be necessary to agree any interventions with the relevant highway authorities, as some of the proposed changes may not be considered acceptable.

CONCLUSIONS

The evidence presented as part of the stage 4 report is considered accurate and suitable to help inform the Earls Court and West Kensington SPD. The findings with regard to walking and cycling are supported, as are the enhancements to the local stations, in line with the findings of the static analysis which are accepted as valid for this assessment. In addition to capacity improvements the SPD also supports the provision of step free access at all stations and increased capacity on the west London Line. Bus infrastructure enhancements and further investigation is in line with what has been agreed with TfL, LBHF and RBKC.

On the highway network, although the impact presented shows that aggregate local network performance can be improved to an acceptable level, albeit on an already

highly congested network, some unacceptable impacts are still evident on the strategically important A4, in terms of increased journey times, delay and queue lengths. As such further work is required to demonstrate that these impacts can be mitigated as part of a detailed transport assessment provided as part of any planning application for the OA.

INDEPEPENDENT TECHNICAL AUDIT

In addition to a thorough review of the ECTS by TfL, LBHF and RBKC, MVA consultancy were commissioned to perform an independent technical audit of each of the transport models used in the study. This audit only considered the models themselves and made no judgements on the model output or analysis thereof.

The findings of the audit of each model and conclusions drawn as to the suitability to inform the ECTS and Earls Court & West Kensington SPD are summarised below.

LTS

With regards to the LTS model, the technical audit found that the model was appropriate for use and that all issues had been resolved.

CLoHAM

The final audit of the CLoHAM model found that there were two recommendations that had not been implemented. One of these was a sensitivity test that had been done on a previous version of the model but not repeated, whilst the other related to the coding of a specific link. Following investigation the miscoding of the link had no impact on the model results, whilst the sensitivity test was not considered essential. As such, The CLoHAM model and model outputs were considered of a suitable quality to inform the ECTS.

RAILPLAN

The final audit of the Railplan model found that only one recommendation had not been implemented; a sensitivity test on an alternative peak hour factor. As the peak hour factor used in the ECTS was agreed with TfL and is consistent with that used in other TfL studies, it is considered that this would not materially affect the outcome of the ECTS in any way.

VISSIM

With regard to the VISSIM model, the final audit found that 15 separate recommendations had not been implemented. Although this is considered high, all of the issues identified were either minor changes to assumptions or located at the very edge of the model and would only have had a marginal impact on the model results. Therefore, given the strategic nature of the ECTS it is considered that the modelled

outputs from the VISSIM model remain acceptable, but that these issues would need to be addressed for any more detailed assessment.

Conclusion

Of all the models used to inform the ECTS, the independent technical ausit found that none had any significant issues that would question the outputs of the ECTS at a strategic level. LTS, CLoHAM and Railplan were found to have been developed and used correctly with no, or only minor issues that did not effect the model output and thus the suitability of the models to inform the SPD. The audit of the VISSIM model uncovered a significant number of issues, which whilst incompatible with a detailed assessment such as for a Planning Application, have no more than a marginal affect on model flows or performance which is considered acceptable to inform a strategic study such as the ECTS, where the development quanta tested remain indicative.

OVERALL ECTS CONCLUSIONS

The Earls Court Transport Study has followed an approach agreed with TfL, LBHF, RBKC and the GLA whereby an agreed set of development scenarios have been tested for impact on the transport networks around the Earls Court and West Kensington Opportunity Area.

The study has been undertaken using an agreed and accepted methodology that utilises TfL's suite of sub-regional models and is consistent with other similar high level transport studies.

The ECTS has reported into a steering group made up of TfL, LBHF, RBKC and the GLA and has been informed by independent discussions with TfL operating businesses and Network Rail. The initial work was funded by Capital & Counties. To ensure that transport models and modelled output are of a suitable standard to inform the SPD, a comprehensive independent third party technical audit has been undertaken on behalf of TfL.

The final ECTS reporting has considered only two of the previously agreed six Development Scenarios. This is as a result of conclusions by the authorities that the higher quanta of development would generate transport demands in excess of available and planned capacity on the public transport and highways networks meaning that significant demand management and further investment in transport infrastructure would be required to deliver this level of development. These scenarios are discrete to the ECTS and do not directly correlate to those set out in the first draft SPD. They are, however, sufficient for the purposes of the ECTS and informing the associated SPD.

Both the Stage 3 and 4 reports have indicated that although development could be accommodated on the transport network, this would be subject to a number of improvements and or mitigation and would require significant measures to minimise additional highway trips.

The ECTS considers an indicative package of measures that deliver in broad terms the necessary capacity but that these have some significant negative impacts that would need to be resolved, either through changes to development quanta, alternative mitigation measures, parking restraint or other travel demand measures. This must be addressed as part of any planning application for the OA. Overall it is considered that ECTS supports the key principles outlined in the SPD.

The planned capacity increases on the London Underground lines serving the OA, as well as the West London Line, mean that crowding on London Underground services in 2031 (with development) would be at a similar level as experienced today. As such, given the levels of crowding currently experienced, the SPD supports any measures that would provide additional crowding relief.

The impact on the three local stations will also require additional mitigation as the increases in patronage from development are significant. It is considered that additional gateline capacity is required at all three stations along with additional concourse capacity at both West Brompton and West Kensington. It is also required that all stations and entrances be made step free to allow the OA to become fully accessible. Additional station entrances at West Kensington and Earls Court (under Warwick Road) are also supported subject to London Underground operational agreement.

The highway modelling and analysis indicated that new connectivity and site accesses do provide additional route choice for vehicles that have an origin or destination within the OA and can offer relief to congested parallel routes, particularly North End Road and Warwick Road. This along with signal optimisation and associated traffic management could mitigate the impact of development at an aggregate level, however this would still result in some significant negative impacts on certain routes that would be considered unacceptable as currently outlined, particularly the impact on the A4 (West Cromwell Road) . Therefore, for development to proceed further investigation is required and planning applications must prove that there are no unacceptable impacts on the highway network.

The ECTS has tested parking availability at 0.4 spaces per household. Given the local network is constrained and operating at capacity as well as the identified unacceptable impact of development on parts of the road network, it is considered parking provision in the OA should be provided at a much lower level.

The ECTS considered areas within the pedestrian network where there are existing

constraints and where additional demand is likely to cause a worsening of this situation. A number of localised improvements have been identified including an extension of the Mayor's cycle hire scheme which should be considered as part of any development proposal for the OA. It is also considered that, the wider strategic benefits of opening the site up to greater east-west and north-south permeability will have significant benefits for both existing and future communities.

Overall it is considered that the independent audit of the modelling and analysis has demonstrated that they are of an acceptable quality to inform the ECTS, but only at a strategic level.