

TN 01 ROAD BASED IMPACTS OF HUB PROPOSAL AT HEATHROW

Project	Heathrow Runway Proposals		Contract	47067372
Original	Prepared by	Reviewed by	Rev	Rev Date
16/06/'14	A C Young	P Perret		

1. INTRODUCTION

Robust and reliable surface access is a key component when considering any plans for the development of additional hub capacity in the UK. There is a need to consider an appropriate strategy to ensure that adequate infrastructure is in place to cater for predicted future rail, bus and coach and road transportation demand with focus on encouraging sustainable travel behaviours.

This technical note focuses on road transportation. It presents the baseline, future developments and traffic generated by these as well as the predicted impact on the local road network.

2. BASELINE

In developing the proposals, the existing transport system has been examined based on an assessment of traffic flows compared with the national standards for highway capacity (TD79/99). We have also examined current public transport access to the airport using publicly available information this has been reported separately.

Heathrow Airport is well served by the existing road network with direct motorway links to Terminals 1, 2 and 3 from the M4 and from the M25 to Terminal 5. Terminal 4 is accessible via the A30 and also the southern perimeter road running south of the airport east/west from the A3113. The A3113 also provides easy access to the cargo terminal from both London and the rest of the UK by way of the trunk road network, accessible from J14 of the M25. Both the M4 and A4 provide direct access with London for all airport users, while the local road network provides for access in the immediate vicinity. Currently, about 15% of traffic in the vicinity of the airport is Heathrow related in the peak.

Some parts of the surrounding road network experience stress owing to high levels of traffic compared with the capacity available. The exercise indicated that M25 J13 – J14 NB and SB, M25 J12 - 13 NB and M4 J3 – J4 WB are operating at between 85% and 99% of capacity with other routes operating at less than 85% of capacity. It should be noted that directly related airport traffic is a relatively small proportion of total traffic in the area as a whole, for example, in the morning peak, less than 10% of the traffic between Junctions 13 and 14 of the M25 is entering or leaving the airport.

Heathrow is serviced by a large number of bus and coach routes and it is considered a key hub for bus services by the London Borough of Hillingdon. Local bus routes serve north and west London, providing travel for employees and local passengers. Coach routes serve Heathrow from a large range of locations.

3. FUTURE DEMAND

In developing the proposal, we have examined traffic levels in 2060 using Department for Transport traffic growth forecasts (NTEM) from a 2011 base year.

Without the proposed development at Heathrow (the Reference Case), there were increases in network stress at:

- M25 - J12 to J17
- M4 - J2 to J5 west of the M25
- M40 - J1 to J2
- On the local road network The Parkway (A312) north of the M4 comes under stress southbound.

A case was assembled with the proposed development using the following assumptions:

- The proportion of hub traffic remains at its current level of around 37%, which is considered reasonable for a UK hub.
- The current distribution of surface access trips is maintained.
- A proportion of road based traffic from the North (M25 North, M40) and West (M4 West) is expected be attracted to the Hub. Central case assumed to be 50% with a sensitivity test assuming 0% included as a worst case.
- M25 Junction 14 will be removed, and a new 3-lane dual carriageway southern perimeter road access constructed connecting to Junction 13.
- An allowance for increased freight trips has been included
- Employee trips increase pro rata with increases in passenger numbers and have the same distribution and mode share as existing employment trips.
- Additional passenger traffic is shared in proportion to the existing modes which is

Car	Taxi	Rail	Bus & Coach
53.8%	5.8%	9%	32%

With the improvements to heavy rail infrastructure it is anticipated that potential new demand on the underground will be accommodated by overground services such as Crossrail. This would be facilitated by improved cross-London connectivity and high frequency of service with ease of access via a Heathrow Hub, offering a viable alternative compared with existing options.

These assumptions are intended to be worst case, to allow highway issues to be considered before taking into account the impact of new rail interventions as part of this proposal, to reduce car use and increase rail's mode share. In addition, no allowance is made for potential economies of scale in staffing. We have, however, considered proposals that would alter the mode split in favour of public transport.

When the peak hour additional traffic from the development is added to the 2060 Reference Case additional impacts occur at the following locations:

- M25 - J12 to J16 (both directions);
- M4 - J2 to J5 (both directions);

- A30 London Road comes under stress northbound;
- A4 Bath Road east of Tunnel Road exceeds capacity westbound and comes under stress eastbound;
- Tunnel Road southbound exceeds capacity;
- The Parkway (A312) north of the M4 exceeds capacity southbound; and
- A308 High Street exceeds capacity southbound.

4. FUTURE DEVELOPMENT

Whilst stress occurs in the highway network, with or without the proposed development, we believe it is vital to improve public transport access to Heathrow. This will reduce road use and congestion, improve local air quality, enhance the passenger experience and optimise the airport's catchment.

Current rail proposals include Crossrail, replacing Heathrow Connect services, and with the possibility that Heathrow Express will also be replaced or subsumed into Crossrail at or prior to expiry of its Track Access Agreement in 2023.

The proposed Heathrow Hub interchange would provide a step change in Heathrow's accessibility, with an integrated airport station located directly on Crossrail and the Great Western Main Line. This allows all trains to call, providing a higher frequency and efficiency than alternative branch or loop line proposals dependent on airport passengers alone that require a change of train for many passengers. Through lines would allow non-stop long distance trains to by-pass platforms, minimizing delay to these services. Direct access to Heathrow from the west would be of particular benefit to the economically disadvantaged

Owing to the flexible nature of the bus and coach network it is anticipated that existing and potential future operators will respond to the increase in demand with higher frequencies to current destinations and new services to provide for alternative destinations as required. This is reflected in the Hillingdon Local Infrastructure Plan that identifies Heathrow as an opportunity for improving local bus services and notes that there are already plans to improve services connecting with the airport.

Both rail and bus/coach passengers will benefit from the development of an efficient Heathrow Hub interchange for public transport providing direct access to all terminals.

Whilst the emphasis is on sustainable travel modes, the proposal to extend one of the runways over existing roads to the west of the airport provides an opportunity to rationalise and strengthen the road network.

Additionally the Heathrow Hub proposal will enable direct road surface access to the airport site from the M4 to the west of Junction 4b and the M25 to the north of Junction 15. To accommodate this traffic the Hub site will contain long-stay car parks. The pricing structure for these car parks will be arranged to try to ensure that these are used primarily for long-stay airport related purposes. While this is secondary to the emphasis on improving sustainable travel to/from Heathrow, this will reduce demand on the M25 between Junctions 13 and 15, the M4 between Junctions 4 and 4b, and the existing Heathrow access roads (primarily Tunnel Road) improving the overall reliability of the local road network.

To further reduce and control demand on the tunnels between Junctions 13 and 15 of the M25 it is also proposed that the existing Junction 14 be removed. Access to Heathrow from the motorway network to the south will be via 3-lane slip roads connecting Junction 13 to a

roundabout on the A3044 north of the reservoirs. To cope with the added demand the section of A3044 north of this roundabout will be upgraded to three lanes in each direction. It should be noted however that the success of this scheme is dependent upon high usage of the Heathrow Hub for surface access traffic. In the event that the Hub is under-utilised this new southern access will be operating at or above capacity.

5. IMPACTS OF THE SCHEME

This proposition builds on the existing road and public transport networks. This limits the impacts on the patterns of use of leisure and business passengers as well as freight and logistics companies. Effective public transport options are already available to the site and can be developed on the basis of existing proposals to encourage use of more sustainable modes. Some of these proposals could create significant reductions in access times from locations outside the south east that currently require travel via central London and could contribute to mode shift away from road.

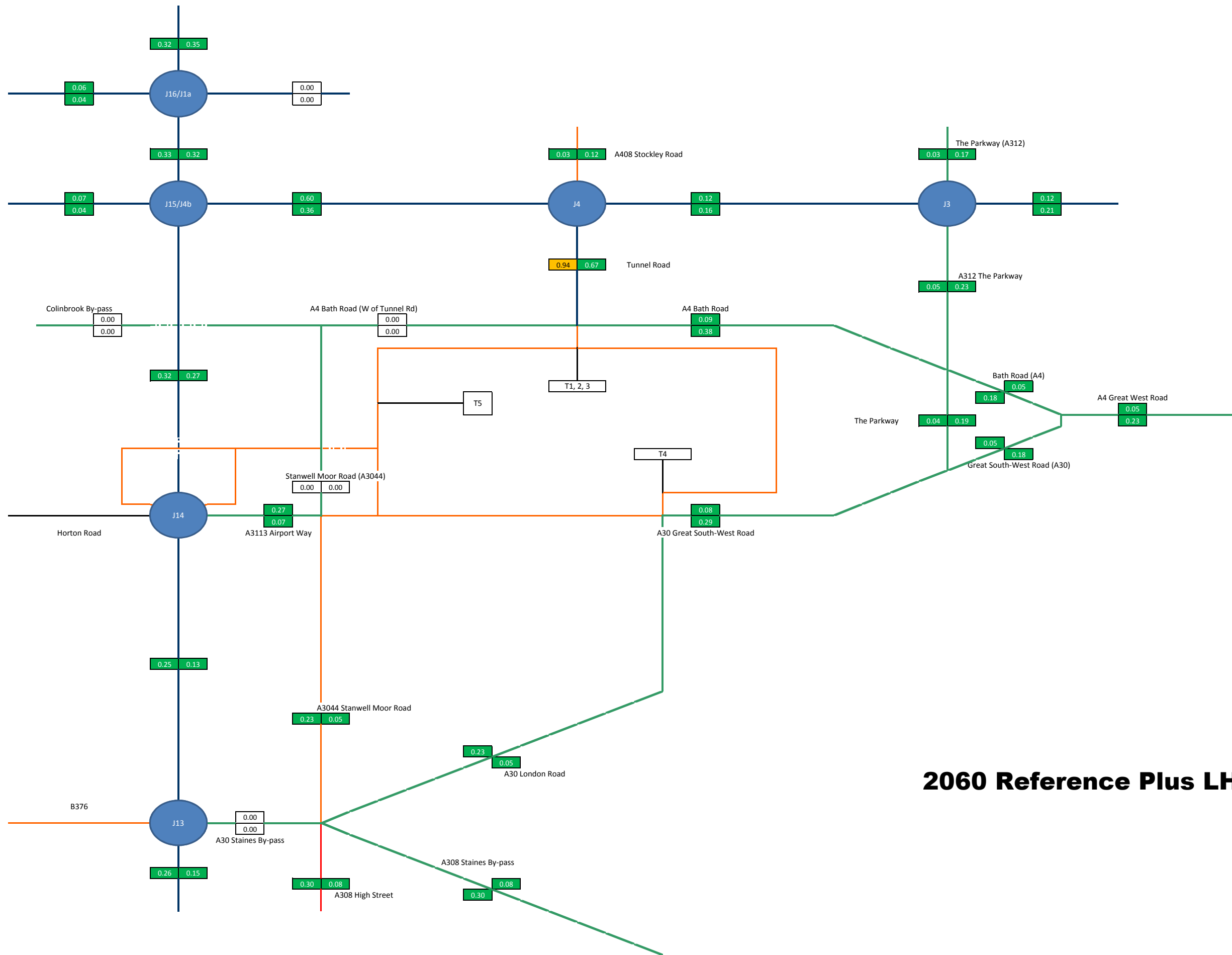
The highway network will require strengthening in this area with or without increased Heathrow traffic. It is assumed that the strengthening required as a result of general traffic growth, for example development of managed motorways and local improvements will occur in all future scenarios. Based upon analysis completed for this work the additional capacity provided by these upgrades and those proposed specifically to accommodate growth of the airport are anticipated to keep journey times for both airport and non-airport users stable. It should be noted that the Heathrow airport capacity is greatly increased by the proposal, the impact on the local road network is minimal with Heathrow related traffic planned to be around 18-20% depending on the efficiency of the Hub.

However, growth in general traffic volumes independent of the Heathrow demand will result in the M25 between J12 and J13 northbound, and between J16 and J15 southbound being significantly overcapacity (with five and four lanes respectively). The latter may have a significant negative impact upon the success of the Heathrow Hub in reducing traffic demand on key access links¹ as manoeuvring to exit overcapacity links can create significant delays for all traffic, and the Hub itself will only mitigate the impact of this in reducing demand southbound into J15, yet having a significant impact on Journey time reliability for all users of the M25.

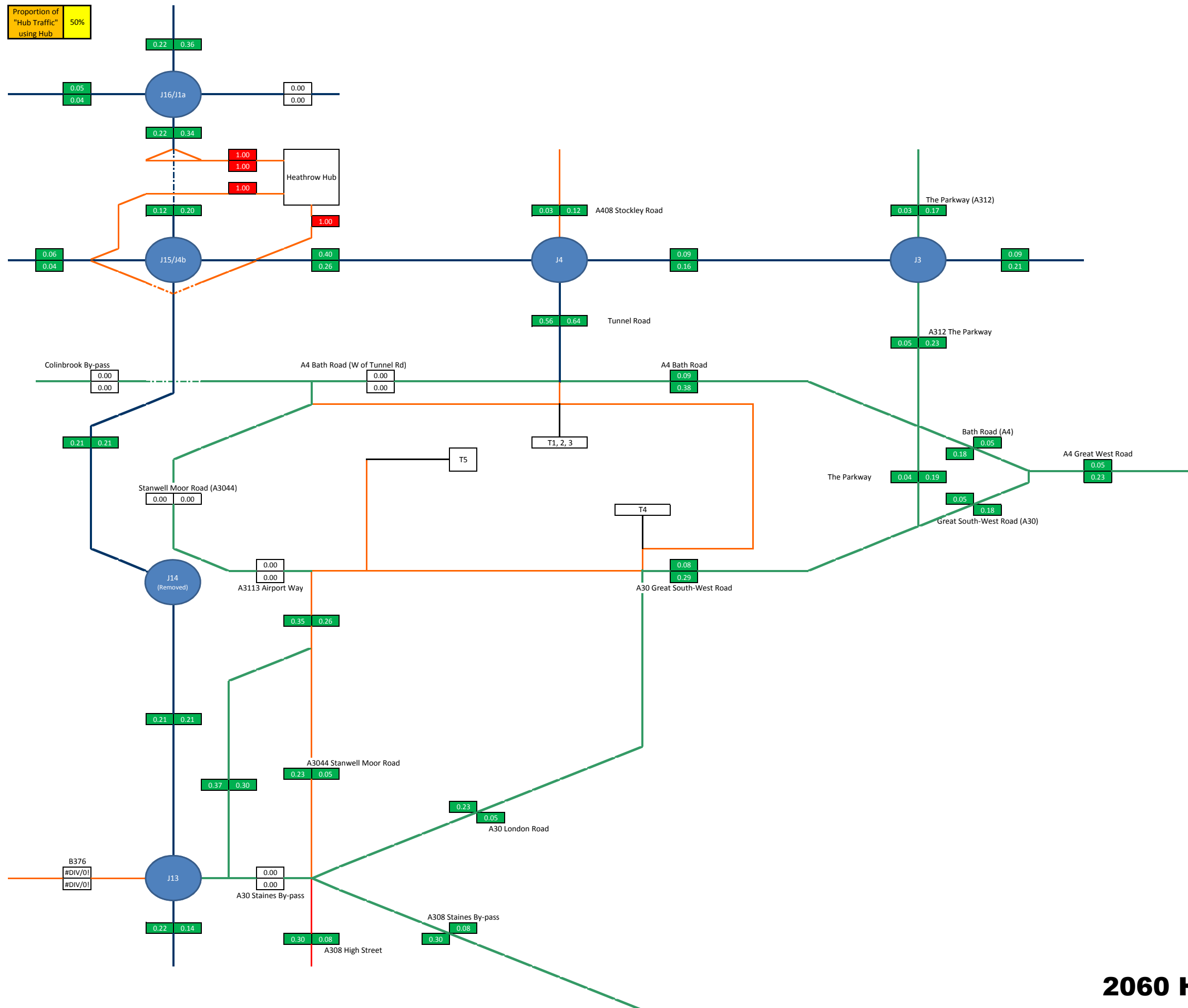
As Heathrow is an existing site in the capital city it is almost certain that it would be redeveloped for commercial or residential use. A site the size of Heathrow has significant development potential and may be likely to generate similar or greater trips compared with the existing situation. This means that re-directing current air services to an alternative UK hub airport would be unlikely to provide relief to the highway and public transport networks.

This analysis shows that London Heathrow is ideally placed to build on its existing strengths to continue as the UK's hub airport and that the likely additional demand that can be effectively accommodated to serve both passengers and freight and also to support the local economy through effective access for airport employees.

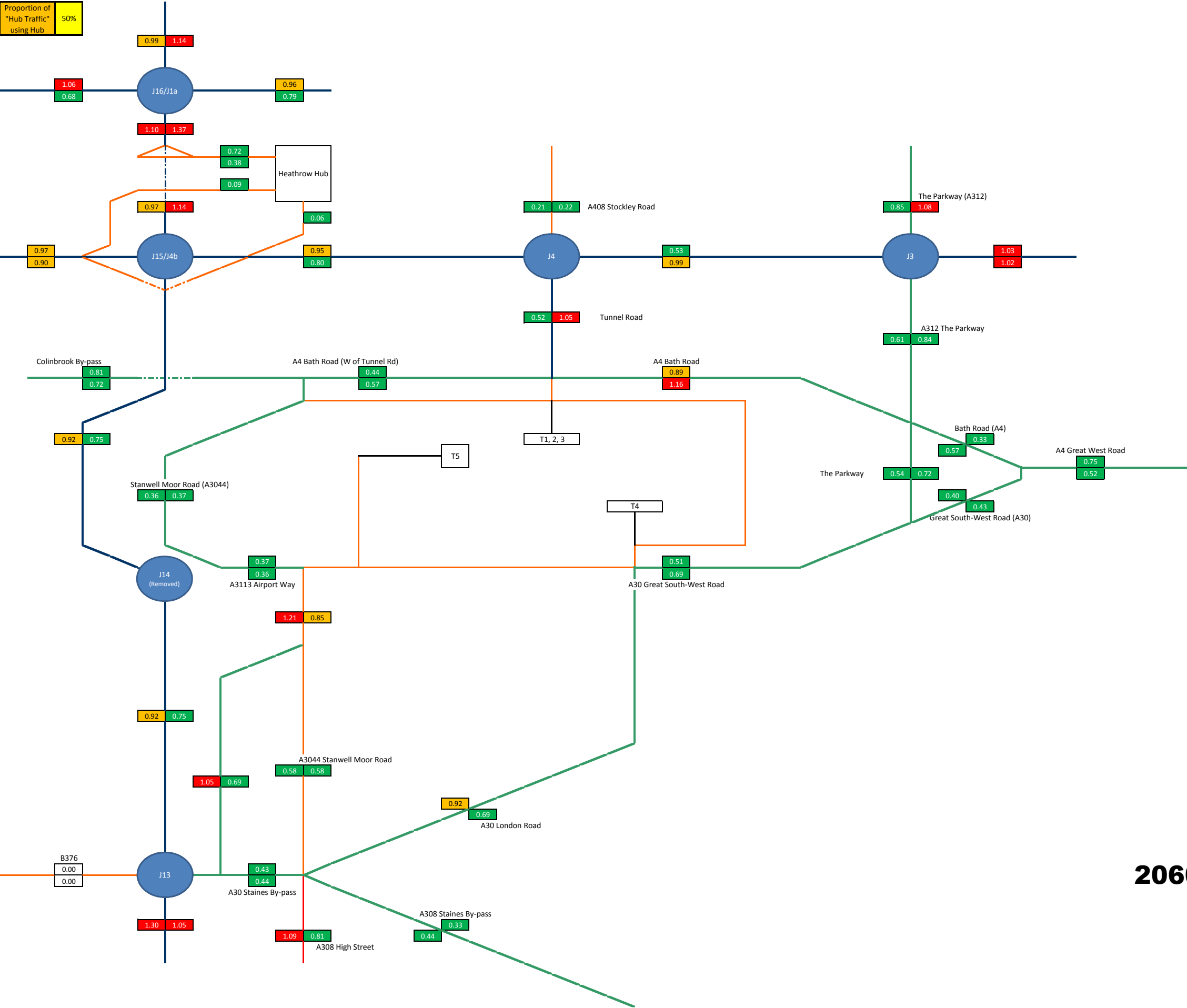
¹ If all car traffic using the M25 north of J15 and the M4 west of J4b were to use the Heathrow Hub, this would reduce car trips in the AM Peak on the M25 between J13 and J15 by about 2,250 trips (both directions), on the M4 between J4b and J4 by about 3,500 trips (both directions), and on Tunnel Road by about 3,500 trips (both directions). It is not expected that all such traffic will use the Heathrow Hub, and the appendices present the highway impacts should 50% and 0% of such traffic use the Heathrow Hub.



2060 Reference Plus LHR LHR Ratio



2060 HH 50% LHR Ratio



2060 HH 50% VoC

TN 02 COMPARISON OF HEATHROW TRAFFIC ANALYSES				
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04/06/'14	A C Young	P Perret		

1. INTRODUCTION

In May 2014 TfL published Inner Thames Estuary Feasibility Study documents authored by Atkins as part of their submission to the Airports Commission. These documents contain assumptions and deductions based on an expansion of Heathrow. For the purpose of future reference the relevant reports are:

- “Inner Thames Estuary Feasibility Study” (the main report, denoted “ITEFS”); and
- “Airport Surface Access Demand and Impacts” (denoted “ASADI”).

The purpose of this Technical Note is to compare the base assumptions used in the Atkins analysis and deductions thereof with those contained in the URS analysis. There also contains an addendum listing the high-level analysis of the URS results.

2. COMPARISON OF ANALYSES

The following table contains a comparison of the key assumptions and deductions contained in the TfL documents.

Table 1: Comparison of High-Level Data in Atkins' and URS' Analysis of LHR Expansion

Core assumptions	Atkins AM Peak Hour (7:30-8:30)	URS AM Peak Hour (8:00-9:00)
Number of Air Passengers	130 mppa	130 mppa
Number of Staff	137,750	133,714
Total Peak Hour Passenger Surface Access Trips	18,750	17,958
Total Peak Hour Staff Surface Access Trips	20,100	23,400
Total Additional Peak Hour Surface Access Trips	16,650	19,737

The data on numbers of passengers and staff are very similar in both sets of analyses.

For peak hour trips (combining to and from the airport) only total Surface Access (i.e. car and PT combined) have been given in the table as the individual car and PT components are not stated explicitly in the TfL documentation. It is noticeable that Atkins assumes slightly fewer surface access trips in the peak hour across passengers and staff combined, and also assumes slightly fewer additional surface access trips deriving from the airport expansion.

This pattern continues when the car trips alone are compared. For passengers the URS analysis suggests that 6,426 peak hour trips will be made by car, compared with about 9,000

as seen in Figure 2 on page 8 of ASADI. For staff the equivalent figures are 15,210 car trips in the peak hour compared with about 11,000 from Figure 2 of ASADI. This gives total peak hour car trips of about 21,500 from URS analysis and about 20,000 from Atkins analysis.

For the additional peak hour traffic, URS estimates a total of 10,218 of these trips will be by car, whereas Figure 3 from page 29 of ITEFS suggests that there will be about 7,000 additional peak hour car trips.

The net result is that URS' analysis assumes a greater Heathrow-related demand upon the local road network than that seen in Atkins' analysis. Hence URS' analysis should be considered to be a very robust analysis of the impact of the highway network demand generated by the proposed Heathrow expansion.

3. **CONCLUSIONS OF URS' HIGHWAY ANALYSIS**

The overall results of the analysis of the highway demand predicted by URS on the local highway network are that:

- Without any expansion of Heathrow, the background traffic growth alone results in significant strain on the local strategic network (with most links over 85% capacity).
- With Heathrow expansion, new proposed network alterations and the Heathrow Hub attracting 50% of related trips, the M25 between J13 and J15 and the M4 between J3 and J4a operate below capacity.
 - This is better than the situation in the non-expansion scenario where three of these links are over capacity.
- The strategic links that operate over capacity with the Heathrow expansion are generally links that are operating over 90% capacity with just the non-airport related background growth.
 - They will be in need of an upgrade irrespective of whether the Heathrow expansion goes ahead or not.
 - The traffic on these links is primarily non-Heathrow related, with the proportion of traffic flows going to/from Heathrow <40% in all cases, and on some links considerably lower.

The input assumptions and output trip volumes in the two analyses are similar, which leads us to conclude that URS' figures are reasonable.