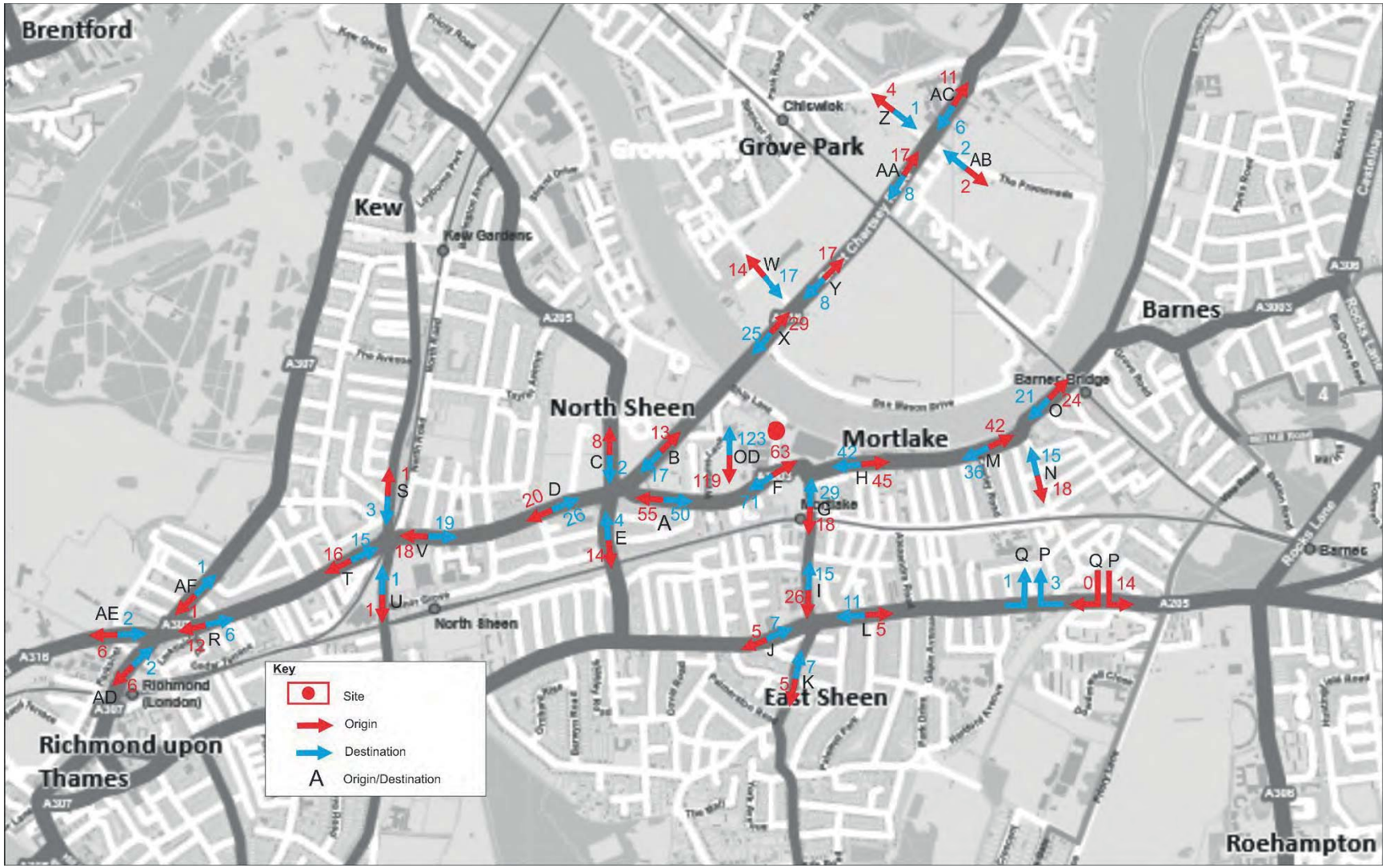


Figure 1.6 PM Peak Trip Distribution

Appendix A TRICS Data

Appendix B School Data

From:	Robert Parker
To:	Mary Toffi
Cc:	Greg Callaghan; "Guy Duckworth" (GuyDuckworth@dartmouthcapital.co.uk); Kevin Watson (KWatson@geraldeve.com); Barnaby Johnston; Nicole Newe; Matthew Bolshaw
Subject:	RE: Stag Brewery - Highway Improvements
Date:	29 November 2016 12:42:55
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png

---

Thanks Mary
That is certainly helpful in terms of defining likely traffic generation for the school.

In terms of parking provision, you will recall that the initial advice we received was that the school would have approximately 120 staff and that we should therefore allow 60 car parking spaces ie 1space per 2 staff. When we met recently there was a suggestion from LBRuT that this level of provision could be cut substantially. The provision at the two schools below appears to be 1:3 staff at Christ's and 1:1.25 staff at Grey Court. I also note that the accessibility by public transport of both these sites appears to be somewhat worse than the Stag site. This therefore appears to support the possibility of substantially reducing the level of car park provision, assuming that an extended CPZ will provide the necessary protection to the local area.

Have you had any further advice on this from the Education Department? Have they been able to provide any information on likely school catchment area?

Kind regards,

Robert Parker
Director of Transport Planning
For and on behalf of Peter Brett Associates LLP - London Brewhouse Yard

t 02075668641
m 07771820727
e rparker@peterbrett.com
w peterbrett.com

From: Mary Toffi [mailto:Mary.Toffi@richmond.gov.uk]
Sent: 29 November 2016 11:04
To: Robert Parker <rparker@peterbrett.com>

Cc: Greg Callaghan <gcallaghan@peterbrett.com>; 'Guy Duckworth' (GuyDuckworth@dartmouthcapital.co.uk) <GuyDuckworth@dartmouthcapital.co.uk>
Subject: RE: Stag Brewery - Highway Improvements

Bob

I have had a look at the secondary schools we discussed at our meeting and have listed all the information below. Richmond Park Academy does not travel plan so I have not included them.

Christ's School, Queens Road Richmond:
770 Pupils and 90 staff. They have 30 on site spaces.
2015/16:
78 pupils driven as single passengers, 5 car share and 24 park and stride.
38 staff drive as single occupant, 4 car share and 1 parks and strides.

Grey Court School, Sandy Lane Ham:
2014/15
1246 pupils and 146 staff. They have 65 on site spaces.
77 pupils driven as single passengers, 17 car share and 2 park and stride.
79 staff drive as single occupants and 4 car share.

Regards Mary

Mary Toffi
Principal Transport Planner
London Borough of Richmond upon Thames
TEL: 020 8891 7379
FAX: 020 8891 7713
mary.toffi@richmond.gov.uk
www.richmond.gov.uk

Please note that I am in the office on Monday, Tuesday and Wednesday and will generally only be available for meetings on those days.

From: Robert Parker [mailto:rparker@peterbrett.com]
Sent: 23 November 2016 13:24
To: Mary Toffi
Cc: Greg Callaghan; 'Guy Duckworth' (GuyDuckworth@dartmouthcapital.co.uk)
Subject: RE: Stag Brewery - Highway Improvements

Mary
I think that is fine.

You could also say that the intention is that we will also implement the improved pedestrian and cycle facilities which are included within their Option 1 Do Minimum scheme as part of our scheme.

Kind regards,

Robert Parker
Director of Transport Planning
For and on behalf of Peter Brett Associates LLP - London Brewhouse Yard

t 02075668641
m 07771820727
e rparker@peterbrett.com
w peterbrett.com

From: Mary Toffi [mailto:Mary.Toffi@richmond.gov.uk]
Sent: 23 November 2016 13:10
To: Robert Parker <rparker@peterbrett.com>
Cc: Greg Callaghan <gcallaghan@peterbrett.com>; 'Guy Duckworth' (GuyDuckworth@dartmouthcapital.co.uk) <GuyDuckworth@dartmouthcapital.co.uk>
Subject: RE: Stag Brewery - Highway Improvements

Bob

Would be ok to share the plan you sent me with TfL tomorrow at a meeting as they always ask for a Brewery update. It will be on a confidential basis and with the proviso that it may not be the final layout or indeed there may not be a change at all. I'm just trying to clarify the status of the adjacent site where land take would be required for the changes to the junction and will come back to you on that.

Regards Mary

Mary Toffi
Principal Transport Planner
London Borough of Richmond upon Thames
TEL: 020 8891 7379
FAX: 020 8891 7713
mary.toffi@richmond.gov.uk
www.richmond.gov.uk

but must delete it from your system and inform the sender of the error. You should be aware that all emails received and sent by the London Borough of Richmond upon Thames may be stored or monitored, or disclosed to authorised third parties, in accordance with relevant legislation.
We welcome both positive and negative customer feedback on the services we provide. If you wish to provide feedback please do so using our online feedback form. Thank you
Please note that I am in the office on Monday, Tuesday and Wednesday and will generally only be available for meetings on those days.

From: Robert Parker [mailto:rparker@peterbrett.com]
Sent: 16 November 2016 16:26
To: Mary Toffi
Cc: Greg Callaghan; 'Guy Duckworth' (GuyDuckworth@dartmouthcapital.co.uk)
Subject: Stag Brewery - Highway Improvements

Mary
Copy of the Option 2 proposal you requested. Obviously, grateful if you treated this with some sensitivity.

I will forward our draft Trip Generation note shortly.

Kind regards,

Robert Parker
Director of Transport Planning
For and on behalf of Peter Brett Associates LLP - London Brewhouse Yard

t 02075668641
m 07771820727
e rparker@peterbrett.com
w peterbrett.com

Appendix C School Catchments

achieving for children

Champions for children and families

Proposed secondary school at the Stag Brewery site

1. Introduction

1.1 This paper sets out some information which may be helpful in assessing the likely catchment for the annual 180 Year 7 places for the above school.

2. Recent new secondary schools

2.1. Two secondary schools have opened in the borough in the last four years – St Richard Reynolds Catholic High (2013) and Turing House (2015) – but neither provides a *direct* precedent for the Brewery site.

2.2 St Richard Reynolds' became oversubscribed from its second intake onwards. Its admissions policy gives priority to children who are baptised, practising Catholics, and where (as it is) it is oversubscribed with such children, random allocation is used to decide which of them is allocated places; therefore, home-to-school distance not a relevant factor in the manner that it is for admission to non-faith schools.

2.3 As its opened in a temporary site in Teddington and no planning application has yet been submitted to build a school on its proposed permanent site in Whitton, Turing House is temporarily using an artificial admissions point, in North Teddington, to allocate most (almost 80%) of its places. The school has been oversubscribed for both its first two Year 7 intakes, heavily so for 2016, and it has received 724 applications for its 100 places for 2017 entry. This year, for the school's second intake, the distance of the last child to be admitted under the home-to-admissions-point criterion, lives 2.43km away, compared with 2.87km in 2015. As and when the school becomes established on its proposed permanent site, I anticipate the catchment to shrink significantly.

2.4 Arguably a closer comparison is the new secondary free school, The Kingston Academy, which opened in North Kingston, close to the LBRuT boundary, in 2015. Like the proposed secondary free school on the Brewery site would be, it is non-faith and its places are allocated mainly on the basis of home-to-school distance. For its first intake, it was undersubscribed, but this year it was oversubscribed and the distance of the last child to be offered a place was 3.54km (just over two miles). That 'catchment' is expected to decrease considerably in 2017 and subsequent years, due to (a) there being a higher number of 'sibling' applicants who take priority over those children within the 'distance' criterion, (b) the likelihood of the school receiving an 'outstanding' judgement when Ofsted inspect it next year, and (c) the school generally becoming more established and therefore more trusted by parents of children living close to the school. I would expect that pattern to be repeated with the proposed school at the Brewery site, i.e. that as the school moves to having children in all year-groups, the overwhelming majority of its pupils will be living locally, within walking, or at the very least a reasonable travelling, distance from the school.

3. Local primary schools

3.1 Most pertinently, perhaps, the cut-off distances for 2016 Reception entry of the five non-faith primary schools which are situated closest to the Brewery site, and would therefore be likely to make up the

bulk of its Year 7 intakes, are all within 1,250 metres of the schools concerned, and are within 800 metres for four of the five, as follows:

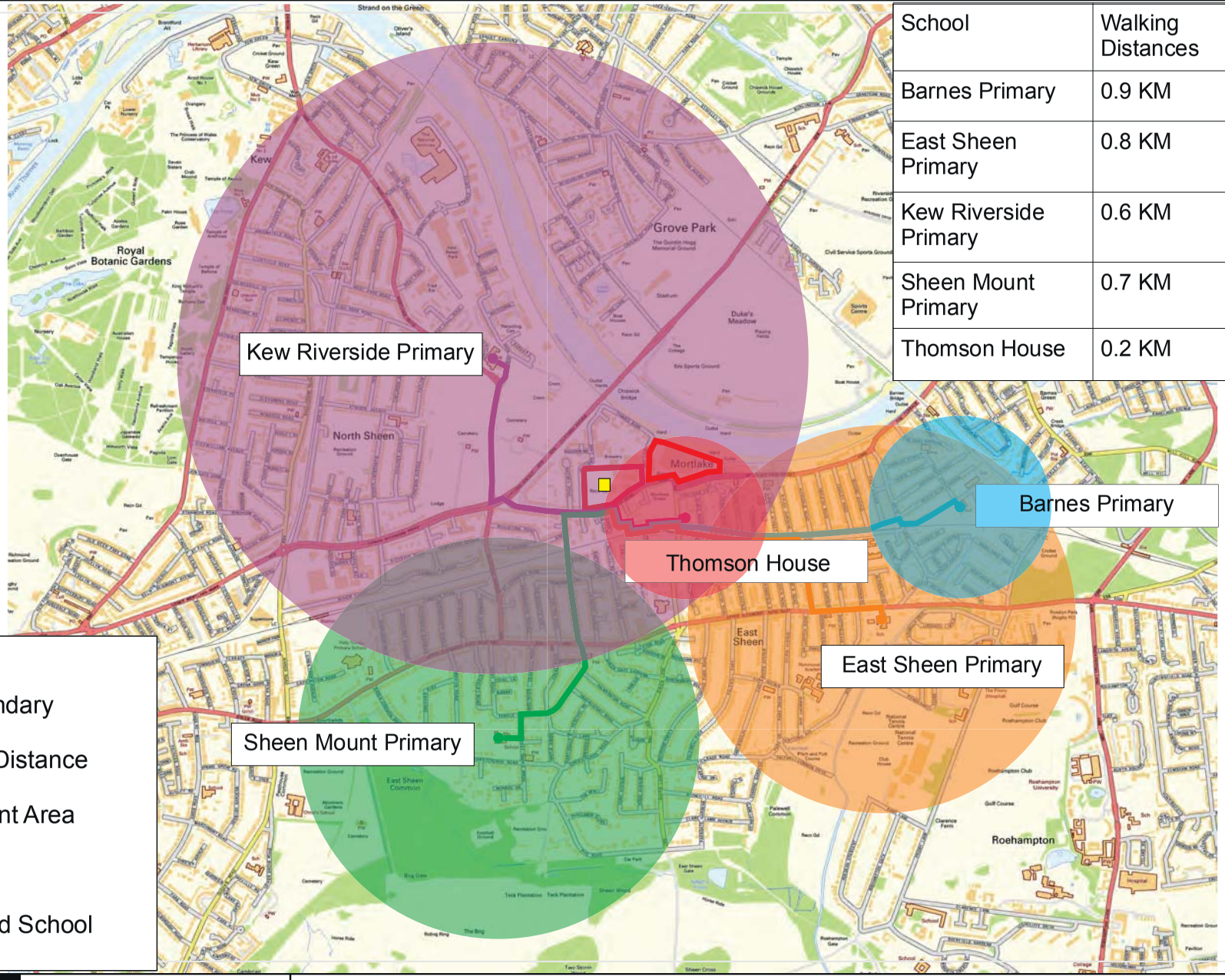
School	Places	Distance (km)
Barnes Primary	60	0.389
East Sheen Primary	90	0.784
Kew Riverside Primary	30	1.247
Sheen Mount Primary	90	0.768
Thomson House	52	0.331

3.2 It should be noted that the catchment for Thomson House, the primary free school which opened in 2013, has already shrunk in three years from 644 metres for its 2013 intake to only 331 metres (measured as the crow flies). That alone demonstrates that the opening of a free school can be highly attractive for parents living near the Brewery.

4. Contact

Matthew Paul, Associate Director, School Place Planning,
Achieving for Children – providing children's services for Kingston and Richmond,
020 8891 7588, matthew.paul@achievingforchildren.org.uk

School	Walking Distances	Catchment Area
Barnes Primary	0.9 KM	0.389 KM
East Sheen Primary	0.8 KM	0.784 KM
Kew Riverside Primary	0.6 KM	1.247 KM
Sheen Mount Primary	0.7 KM	0.768 KM
Thomson House	0.2 KM	0.331 KM



Key

- Site Boundary
- Walking Distance
- Catchment Area
- School
- Proposed School Location

peterbrett

Offices throughout the UK and Europe
www.peterbrett.com

Client

Reselton Properties

Stag Brewery, Mortlake

Local School Catchment Areas and Walking Distances

Date	23/12/2016
Scale	
Drawn by	JS
Checked by	RAP
Revision	-

FIGURE 1

J:\File Location\????????\???????????\???????\????????

Appendix D Cinema First Principles Method

					10:00:00				11:00:00				12:00:00				13:00:00				14:00:00				15:00:00				16:00:00				17:00:00				18:00:00				19:00:00				20:00:00				21:00:00				22:00:00				23:00:00			
			Mode Share		00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45	00	15	30	45
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																	8.4	0.7	0.7	1.4	2.8																																							
0.5	90	45	9								1.8	0.5	0.5	4.5	1.8																																										
																							5.4	0.5	0.5	0.9	1.8																																		
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1	140	140	28																																										3.6	0.9	0.9	9	3.6												
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																																																				17	1.4	1.4	2.8	5.6				
				Arrivals	2.8	0.7	0.7	9.8	3.5	0.7	8.8	3.3	0.5	4.5	1.8	0	2.8	0.7	0.7	7	6.2	0.8	3	8.9	3.9	5.4	2.2	0	0	0	0	0	4.2	1.1	1.1	11	4.2	3.6	0.9	6.5	10	5	14	9.2	0.9	0.9	9	3.6	0	0	0	0	0	0	0	0	0	0	0	0
				Departures	0	0	0	0	0	0	0	0	0	0	0	0	8.4	0.7	0.7	9.8	3.5	0.7	6.8	3.3	0.5	0.9	1.8	0	8.4	0.7	0.7	1.4	13	0.8	0.8	8.2	3.9	0.5	1.1	2.2	0	0	0	0	13	1.1	1.1	2.1	4.2	0	0	28	2.3	2.3	4.6	20	0.9	0.9	1.8	3.6
								14				16				6.8				11				19				11				0				17				15				39				14				0				0				0
Arrival Distribution								0				0				0				20				14				3.2				11				23				7.7				0				17				32				29				7.2
0.2	0.05	0.05	0.5	0.2				14				16				6.8				31				33				15				11				40				23				39				31				32				29				7.2
Departure																																																												
0.6	0.05	0.05	0.1	0.2																																																						

	Arriv	Depa	Total
10:00 - 11:00	14	0	14
11:00-12:00	16	0	16
12:00-13:00	6.8	0	6.8
13:00-14:00	11	20	31
14:00-15:00	19	14	33
15:00-16:00	11	3.2	15
16:00-17:00	0	11	11
17:00-18:00	17	23	40
18:00-19:00	15	7.7	23
19:00-20:00	39	0	39
20:00-21:00	14	17	31
21:00-22:00	0	32	32
22:00-23:00	0	29	29
23:00-24:00	0	7.2	7.2

Appendix E PTAL Report

TRANSPORT FOR LONDON

PTAL output for Base Year
2

TW10 6HW
Richmond TW10 6HW, UK
Easting: **519021**, Northing: **174696**

Grid Cell: 52170

Report generated: 23/12/2016

Map key - PTAL

- 0 (Worst)
- 1a
- 1b
- 2
- 3
- 4
- 5
- 6a
- 6b (Best)

Map layers

- PTAL (cell size: 100m)

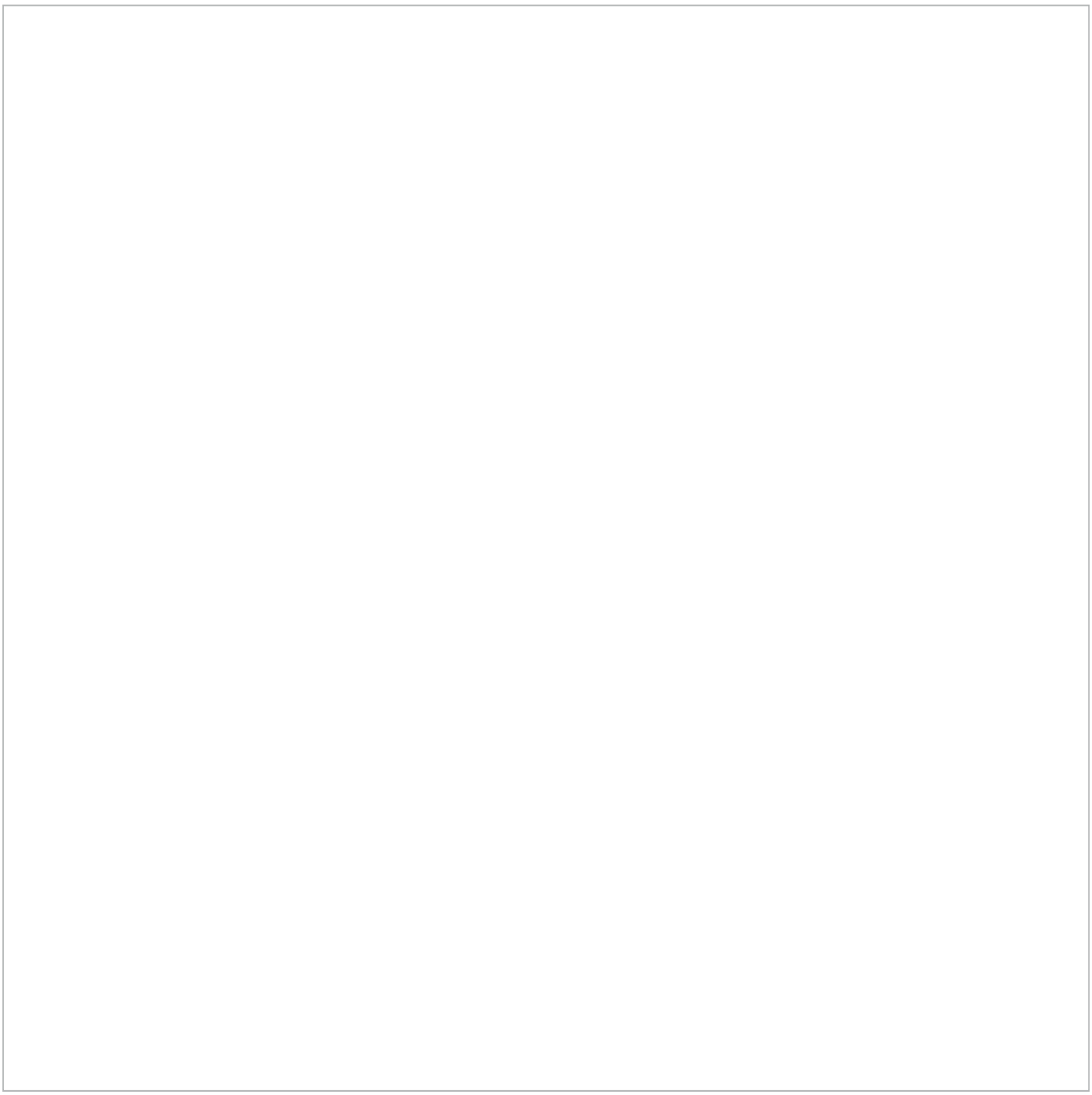
Calculation Parameters

Day of Week	M-F
Time Period	AM Peak
Walk Speed	4.8 kph
Bus Node Max. Walk Access Time (mins)	8
Bus Reliability Factor	2.0
LU Station Max. Walk Access Time (mins)	12
LU Reliability Factor	0.75
National Rail Station Max. Walk Access Time (mins)	12
National Rail Reliability Factor	0.75

Calculation data

Mode	Stop	Route	Distance (metres)	Frequency (vph)	Walk Time (mins)	SWT (mins)	TAT (mins)	EDF	Weight	AI
Bus	MARCHMONT ROAD	371	408.5	7	5.11	6.29	11.39	2.63	0.5	1.32
Bus	EAST SHEEN BLACK HORSE	33	376.75	7.5	4.71	6	10.71	2.8	1	2.8
Bus	EAST SHEEN BLACK HORSE	493	376.75	5	4.71	8	12.71	2.36	0.5	1.18
Bus	EAST SHEEN BLACK HORSE	337	376.75	5	4.71	8	12.71	2.36	0.5	1.18
Rail	North Sheen	'SHEPRTN-WATRLMN 2H92'	911.5	1	11.39	30.75	42.14	0.71	0.5	0.36
Rail	North Sheen	'WDON-WATRLMN 2K03 '	911.5	0.33	11.39	91.66	103.05	0.29	0.5	0.15
Rail	North Sheen	'WATRLMN-WATRLMN 2K09'	911.5	2	11.39	15.75	27.14	1.11	1	1.11
Rail	North Sheen	'WATRLMN-WATRLMN 2O09'	911.5	2	11.39	15.75	27.14	1.11	0.5	0.55
Rail	North Sheen	'WATRLMN-WATRLMN 2R09'	911.5	2	11.39	15.75	27.14	1.11	0.5	0.55
Rail	North Sheen	'HOUNSLW-WATRLMN 2V05'	911.5	0.33	11.39	91.66	103.05	0.29	0.5	0.15
									Total Grid Cell AI:	**9.35**

TRANSPORT FOR LONDON



PTAL output for Base Year
I b

TW10 7HN
Richmond TW10 7HN, UK
Easting: **517330**, Northing: **172490**

Grid Cell: 41945

Report generated: 23/12/2016

Map key - PTAL

0 (Worst)	1a
1b	2
3	4
5	6a
6b (Best)	

Map layers

PTAL (cell size: 100m)

Calculation Parameters

Day of Week	M-F
Time Period	AM Peak
Walk Speed	4.8 kph
Bus Node Max. Walk Access Time (mins)	8
Bus Reliability Factor	2.0
LU Station Max. Walk Access Time (mins)	12
LU Reliability Factor	0.75
National Rail Station Max. Walk Access Time (mins)	12
National Rail Reliability Factor	0.75

Calculation data

Mode	Stop	Route	Distance (metres)	Frequency(vph)	Walk Time (mins)	SWT (mins)	TAT (mins)	EDF	Weight	AI
Bus	HAM POLICE STATION	371	175.48	7	2.19	6.29	8.48	3.54	1	3.54
									Total Grid Cell AI:	**3.54**

Document Path: C:\Scratch\38262\MXD\38262_01_Current_PTAL.mxd

pba peterbrett

Client
Reselton Properties Ltd

1:2,000 @ A4
06/12/2016
Drawn: DRL
Checked: RP

Stag Brewery, Mortlake

Current PTAL

Figure 1 | Rev B

Appendix F Census Data

Appendix G TfL Comments (Lucy Simpson Email)

Robert Parker

From: Simpson Lucy <LucySimpson@tfl.gov.uk>
Sent: 12 January 2017 14:36
To: Robert Parker; George Daugherty
Cc: Mary Toffi; Green John (ST); Nguyen Huy
Subject: RE: Stag

Bob / George,

Please see TfL's comments concerning the Stag Brewery Trip Generation Report - Technical Note (TN) 8.

Development Quantum

Land use	Quantum
Residential	789
Extra care	192
Secondary School	13,731
Retail/restaurant	4,062
Hotel	3,140
Office	3,718
Cinema	2,305
Health care	791
Gym	510
Community Space	1,372

Residential
The TRICS database has been used to determine total person trips and 2011 Census data to determine mode share.

Whilst the methodology for houses seems reasonable Table 2.1 details the vehicle peak hour trip rate for houses rather than the total person rates.

Trip rates for private flats uses a combination of locations which is not recommended by TRICS. Para 2.2.1 of the TN states that no sites were excluded as the rates were to indicate the number of person trips only. However a minimum number of 50 dwellings has been selected. Furthermore, the TRICS outputs indicate a number of sites which were manually deselected. What is the reasoning for this given the statement re not excluding sites?

Affordable flats – again a combination of locations not recommended by TRICS has been used.

Please append the Census data as there is a slight discrepancy with the 2011 Travel to Work data that TfL have downloaded.

The TN also provides an average person and vehicle trip rates for some comparable sites in the TRAVL database as a means of demonstrating the robustness of the TRICS assessment. In addition to this, PBA have commissioned resurveys of Kew Riverside, Kew Riverside Park and Kew Bridge road developments and obtained vehicle survey data for another site in close proximity to the application site. Table 2.5 in the TA details the resultant vehicle trips rates. Whilst TfL support this approach it is not clear why the Imperial Wharf TRICS data has been included. It is considered that the removal of Imperial Wharf would give a more robust vehicle trip rate.

Extra Care
The TRICS assessment uses car parking spaces as the calculation factor, this needs to be amended so that the calculation factor is per resident.

Education
TfL are satisfied with the total person trip generation for the proposed secondary school. Regarding the actual journey to school data, can mode share data also be provided (in addition to target mode share) along with staff data?

Retail
The TN includes trips rates for a proposed convenience store and assumes that the likely other retail land uses will by ancillary to the development, which is a reasonable.

Whilst the convenience store TRICS survey sites used are comparable the outputs (Appendix B – retail) don't correspond with the figures detailed in Table 3.7.

Restaurant
Whilst the vehicle trips associated with the restaurant use look reasonable, the total person trips in the PM peak hour is considered to be too low. Using a similar approach to the residential assessment where no sites are excluded, this results in a total person trip rate almost double that detailed in Table 3.8. A cross check with the TRAVL database confirms this.

Hotel
The trip rates detailed in Table 3.10 don't correspond with the TRICS outputs for the three sites detailed in para 3.3.2 or the outputs included in Appendix B – Hotel. Please update Table 3.10 using the outputs detailed in Appendix B. In addition, please provide further information on the type of hotel proposed (luxury, budget etc.) should be provided as this will influence the mode of travel.

Office
The office trip generation assessment is acceptable.

Cinema
The cinema trip generation assessment is acceptable

Gym
The gym trip generation assessment is acceptable

Community Use
TfL accept there are unlikely to be (or a very limited number of) vehicle trips associated with the proposed community use, however it would be unrealistic to assume that there are no peak hour person trips.. Whilst there is a lack of sites within both the TRICS and TRAVL databases, TfL would recommend that the two England survey sites within the TRICS database are used to estimate total person trips.

Summary
Further work is required before TfL are satisfied with the overall trip generation assessment.

Please don't hesitate to contact me if you have any queries.

Kind regards

Lucy Simpson I Principal Technical Planner I TfL Planning
Transport for London
T: 0203 054 7039 Auto: 87039 E: LucySimpson@tfl.gov.uk
A: 10th Floor, Windsor House, 42-50 Victoria Street, London SW1H 0TL

For more information regarding the TfL Borough Planning team, including TfL's *Transport Assessment Best Practice Guidance,* and pre-application advice please visit https://tfl.gov.uk/info-for/urban-planning-and-construction/planning-applications/pre-application-advice

Appendix H LBRuT Comments (Mary Toffi Email)

Robert Parker

From: Mary Toffi <Mary.Toffi@richmond.gov.uk>
Sent: 23 January 2017 15:20
To: Robert Parker
Cc: Lucy Thatcher; 'Simpson Lucy'
Subject: Stag

Bob

Please see comments below in red from me

Regards Mary

Mary Toffi
Principal Transport Planner
London Borough of Richmond upon Thames
TEL: 020 8891 7379
FAX: 020 8891 7713

mary.toffi@richmond.gov.uk

Serving Richmond and Wandsworth Councils

www.richmond.gov.uk/www.wandsworth.gov.uk

Please note that I am in the office on Monday, Tuesday and Wednesday and will generally only be available for meetings on those days.

From: Simpson Lucy [mailto:LucySimpson@tfl.gov.uk]
Sent: 12 January 2017 14:36
To: 'Robert Parker'; 'George Daugherty'
Cc: Mary Toffi; Green John (ST); Nguyen Huy
Subject: RE: Stag

Bob / George,

Please see TfL's comments concerning the Stag Brewery Trip Generation Report - Technical Note (TN) 8.

Development Quantum

Land use	Quantum
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Extra care	192
Secondary School	13,731

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Cinema	2,305
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Community Space	1,372

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Trip rates for private flats uses a combination of locations which is not recommended by TRICS. Para 2.2.1 of the TN states that no sites were excluded as the rates were to indicate the number of person trips only. However a minimum number of 50 dwellings has been selected. Furthermore, the TRICS outputs indicate a number of sites which were manually deselected. What is the reasoning for this given the statement re not excluding sites?

Affordable flats – again a combination of locations not recommended by TRICS has been used.

Please append the Census data as there is a slight discrepancy with the 2011 Travel to Work data that TfL have downloaded.

The TN also provides an average person and vehicle trip rates for some comparable sites in the TRAVL database as a means of demonstrating the robustness of the TRICS assessment. In addition to this, PBA have commissioned resurveys of Kew Riverside, Kew Riverside Park and Kew Bridge road developments and obtained vehicle survey data for another site in close proximity to the application site. Table 2.5 in the TA details the resultant vehicle trips rates. Whilst TfL support this approach it is not clear why the Imperial Wharf TRICS data has been included. It is considered that the removal of Imperial Wharf would give a more robust vehicle trip rate.

Extra Care
The TRICS assessment uses car parking spaces as the calculation factor, this needs to be amended so that the calculation factor is per resident. This element of care can vary to such a degree, from greater independence when they move in to dependence on the services provided as years go on. You need to show the type of care proposed, with examples of different sites, and how trip generation varies over time.

Education
TfL are satisfied with the total person trip generation for the proposed secondary school. Regarding the actual journey to school data, can mode share data also be provided (in addition to target mode share) along with staff data? I do not agree that 50% of car trips to this use will be pass by traffic. This is a very constrained area given the level crossing and Apex corner and this assumption is very high, particularly given the delays in the area due to these. No one would willingly change their route to pass here. I would suggest something lower 10%.

Retail
The TN includes trips rates for a proposed convenience store and assumes that the likely other retail land uses will by ancillary to the development, which is a reasonable.

Whilst the convenience store TRICS survey sites used are comparable the outputs (Appendix B – retail) don't correspond with the figures detailed in Table 3.7.

Restaurant
Whilst the vehicle trips associated with the restaurant use look reasonable, the total person trips in the PM peak hour is considered to be too low. Using a similar approach to the residential assessment where no sites are

excluded, this results in a total person trip rate almost double that detailed in Table 3.8. A cross check with the TRAVL database confirms this. Slightly concerned that the restaurants used are in PTAL 6 (not a similar characteristic to Mortlake), which could be an indicator of more PT use and less car (although they do not have parking I assume that on street parking would be available. There are extensive controls up to 10pm Mon-Sun around Commercial St where Ten Bells is situated and on street controls near The Cellars as well but not as extensive as 10pm. This area though has very heavy resident parking) and therefore low car trip generation for restaurant use. Given the site I think that it could be a bit of a destination.

Hotel
The trip rates detailed in Table 3.10 don't correspond with the TRICS outputs for the three sites detailed in para 3.3.2 or the outputs included in Appendix B – Hotel. Please update Table 3.10 using the outputs detailed in Appendix B. In addition, please provide further information on the type of hotel proposed (luxury, budget etc.) should be provided as this will influence the mode of travel.

Office
The office trip generation assessment is acceptable.

Cinema
The cinema trip generation assessment is acceptable. We found that the actual car trip generation for the Olympic was much higher than their assessment and it necessitated the extension of hours of the CPZ in adjacent roads.

Gym
The gym trip generation assessment is acceptable

Community Use
TfL accept there are unlikely to be (or a very limited number of) vehicle trips associated with the proposed community use, however it would be unrealistic to assume that there are no peak hour person trips.. Whilst there is a lack of sites within both the TRICS and TRAVL databases, TfL would recommend that the two England survey sites within the TRICS database are used to estimate total person trips.

Summary
Further work is required before TfL are satisfied with the overall trip generation assessment.

Please don't hesitate to contact me if you have any queries.

Kind regards

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For more information regarding the TfL Borough Planning team, including TfL's *Transport Assessment Best Practice Guidance*, and pre-application advice please visit https://tfl.gov.uk/info-for/urban-planning-and-construction/planning-applications/pre-application-advice

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From: Robert Parker [mailto:rparker@peterbrett.com]
Sent: 23 December 2016 13:39
To: Mary Toffi; Simpson Lucy
Cc: Lucy Thatcher; 'Guy Duckworth' (GuyDuckworth@dartmouthcapital.co.uk); Kevin Watson (KWatson@geraldeve.com); Greg Callaghan; Matthew Bolshaw; George Daugherty
Subject: FW: Stag

Appendix C School Catchments

Stag Brewery Mortlake

Technical Note 8b – Trip Generation Report

On behalf of Reselton Properties

Project Ref: 38262/5501 | Rev: AA | Date: June 2017

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Document Control Sheet

Project Name: Stag Brewery, Mortlake
Project Ref: 38262
Report Title: Technical Note 8b – Trip Generation Report
Doc Ref: 8b
Date: June 2017

	Name	Position	Signature	Date
Prepared by:	Matt Bolshaw	Assistant Transport Planner	*M Bolshaw*	June 2017
Reviewed by:	Robert Parker	Director	*R Parker*	June 2017
Approved by:	Greg Callaghan	Partner	*G Callaghan*	June 2017
For and on behalf of Peter Brett Associates LLP				

Revision	Date	Description	Prepared	Reviewed	Approved

Contents

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Appendices

1 Introduction

1.1 Overview

1.1.1 Technical Note 8b – trip generation report has been prepared by Peter Brett Associates LLP (PBA) to set out the estimated trip generation based on an updated land use schedule for the Stag Brewery development in Mortlake, South West London, following a recent public consultation. As the land use schedule is not yet finalised this report will aim to set out the so far agreed trip rates and seek agreement on the final remaining trip rates.

1.1.2 Previous reports issued to both Transport for London (TfL) and London Borough Richmond upon Thames (LBRuT) include Technical Note 8 – Trip Generation Report and Technical Note 8a Trip Generation Supplementary Report. This further technical note should be read in conjunction with these earlier technical notes.

1.1.3 The previous reports provided overall person trip estimates by hour of day and also vehicular trip generation estimates. This report provides a further breakdown of non-motorised trips to identify expected demand on rail and bus modes.

1.2 Updated Land Use Schedule

1.2.1 The revised land use schedule is not yet finalised, however, at this point it is known that the main changes to the proposed development involve the replacement of the proposed 192 extra care units (C3 use) by a similar number of residential apartments, increasing the total number of proposed residential dwellings from 789 to circa 980. In addition, the size of the proposed hotel is to reduce significantly from 3,140m^2 to circa 1,200m^2 with the provision of a maximum of 15 rooms.

1.2.2 There have also been minor changes to the proposed floor areas for some of the other uses. Finally, more detail is now available regarding a number of the ancillary uses, A1 to A3 uses. Maximum parameters for these flexible uses have now been identified, the land uses used within this note fall within the maximum parameters and are therefore a likely reflection of the expected land use quantum.

1.2.3 A potential revised land use schedule is summarised below in Table 1.1, although this is not a finalised schedule.

Table 1.1 Potential Revised Land Use Schedule

Land Use	GIA	Units
Residential	98,648 m^2	946 units
Retail	2,426 m^2	N/A
Restaurant	2,426 m^2	N/A
Hotel	1,199 m^2	15 rooms
Community	741 m^2	N/A

Land Use	GIA	Units
Office	3,371 m^2	N/A
Cinema	2,163 m^2	370 Seats/3 Screens
Gym	510 m^2	N/A
Health Care	759 m^2	4 Consulting Rooms
School	9,186 m^2	1,260 Pupils

1.3 Development Build out

1.3.1 The development buildout for the stag brewery is anticipated to follow the programme below:

- Demolition – October/November 2018
- Construction of Phase One – October 2018 to September 2025
- Construction of Phase Two – March 2023 to November 2025.

1.3.2 Table 1.2 below details the quantum of development by phase. The school, whilst a separate phase is intended to be built alongside Phase One.

Table 1.2 Development quantum by phase

Building Type	Building	Phase 1	Phase 2	School
Residential	Units	467	549	0
Office	sqm	3,371	0	0
Retail/Restaurant	sqm	4,852	0	0
Cinema/Gym	sqm	2,673	0	0
Community	sqm	741	0	0
Hotel	sqm	1,199	0	0
Healthcare	sqm	0	759	0
School	sqm	0	0	9,186

1.4 Maximum Parameters for Flexible Land Uses

1.4.1 As stated above the development land use schedule has not been finalised. However, a number of land uses will be subject to maximum parameters and these will be decided ahead of the finalised scheme. Maximum parameters will be applied to the following land uses:

- Retail;
- Restaurant/Bars;
- Hotel;
- Community;
- Office; and
- Gym/Leisure.

1.4.2 Once these land uses have had the maximum parameters finalised this will enable the assessment of the worst case scenario in terms of trip rates.

2 Summary of past Trip Generation Reports

2.1.1 This section sets out the changes to trip rates across the series of technical notes produced by PBA in response to comments provided by TfL and LBRuT.

2.1.2 As the Extra Care land use has been removed from the development schedule, it has also been removed from the summary of previous notes

Technic al Note 8

2.1.3 Technical Note 8 – Trip Generation report set out the initial trip generation for approval by TfL and LBRUT. This included the following person (Table 2.1) and vehicle (Table 2.2) trip rates.

Table 2.1 Total Person Trips for All Land Uses – Technical Note 8

Land Use	Calculation Factor	08:00 – 09:00			17:00 – 18:00		
		Arr	Dep	Two Way	Arr	Dep	Two Way
Residential	Per Unit	0.116	0.524	0.640	0.360	0.192	0.552
Education	Per Pupil	0.922	0.189	1.111	0.040	0.119	0.158
Retail	Per 100sqm	41.959	41.443	83.402	57.113	56.289	113.402
Restaurant	Per 100sqm	-	-	-	6.716	9.403	16.119
Hotel	Per Bedroom	0.166	0.438	0.604	0.300	0.252	0.552
Office	Per 100sqm	2.072	0.183	2.255	0.311	2.572	2.883
Cinema	Per Seat	-	-	-	0.204	0.276	0.481
Gym	Per 100sqm	1.535	2.112	3.647	3.996	1.793	5.789

Table 2.2 Total Vehicle Trips for All Land Uses – Technical Note 8

Land Use	Calculation Factor	08:00 – 09:00			17:00 – 18:00		
		Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	Per Unit	0.023	0.106	0.129	0.074	0.040	0.114
Education	Per Pupil	0.090	0.074	0.163	0.009	0.021	0.031
Retail	Per 100sqm	1.237	1.031	2.268	1.340	1.753	3.093
Restaurant	Per 100sqm	-	-	-	0.368	0.325	0.693

Land Use	Calculation Factor	08:00 – 09:00			17:00 – 18:00		
		Arrival	Departure	Two Way	Arrival	Departure	Two Way
Hotel	Per Bedroom	0.166	0.438	0.604	0.300	0.252	0.552
Office	Per 100sqm	0.378	0.079	0.457	0.122	0.402	0.524
Cinema	Per Seat	-	-	-	0.023	0.031	0.053
Gym	Per 100sqm	0.213	0.471	0.684	0.213	0.106	0.319

Education Vehicle trip rates have been calculated by applying the car driver mode share of 8%, as indicated by the school travel plan information, to the person trip rates. A pass by trip factor has then been applied to all student trips in the AM Peak. Staff trips were then added on using a first principles approach that saw staff arrivals spread between the hours of 07:00 – 08:00 and 08:00 – 09:00 with staff departures split between the hours of 16:00 – 17:00 and 17:00 – 18:00.

No trip rate has been provided for community land use due to the fact it is assumed that all trips will be local and undertaken by foot or by cycle. It has also been assumed that the restaurant and cinema uses will not generate trips during the AM peak.

Technic al Note 8a

2.1.4 Technical Note 8a – Supplementary Technical Note addressed the comments put forward by both TfL and LBRuT and set out the changes made to incorporate these changes. Based on TfL and LBRuT's comments the following table was included within Technical Note 8a to demonstrate those trip rates from Technical Note 8 that had been agreed in principle, alongside any other changes required to specific land use methodologies. This table is included below as Table 2.3.

Table 2.3 Table 1.1 from Technical Note 8a

Land use	Quantum (m2)	Agreement in Principal	Outstanding Issues
Residential	789 (units)		TfL suggest remove Imperial Warf site from assessment.
Secondary School	13,731	√	Rates agreed but pass by trip assumption queried by both TfL and LBRuT
Retail	2,031	√	
Restaurant	2,031		LBRuT concern that mode share assumptions may not be sufficiently robust
Hotel	3,140	√	TfL queried type of hotel as could affect mode share

Land use	Quantum (m2)	Agreement in Principal	Outstanding Issues
Office	3,718	√	
Cinema	2,305 (370 seats)	√	LBRuT commented that assumptions for a different cinema proved conservative.
Health care	791	√	
Gym	510	√	
Community	1,372	√	Provide Person Trip Rates based on TRICS Sites from England

2.1.5 Based on these comments from the combination of TfL and LBRuT the following changes were made and included within the calculations for Technical Note 8a:

- Imperial Wharf Site was removed from the residential trip rates;
- More information was submitted to support PBA's suggested factor to education trips to reflect pass-by. PBA originally suggested a 50% whereas TfL argued this should be no more than 20%. PBA suggested 20% as a compromise and provided further evidence to support this value.
- Restaurant Person Trips were increased based on TfL's comments;
- Alternative sites were assessed as per LBRuT's comments on restaurant vehicle trip rates. Our assessment of the additional sites suggested demonstrated that our original trip rate was robust and so it has been retained;
- No changes were made to the hotel trip rates at this point, however further research was carried out in future work which is detailed in section XX below.
- LBRuT raised a concern that the car mode share for cinema might be underestimated based upon the actual experience at the Olympic Cinema, in Barnes. However, it was pointed out that vehicle trip rate applied was in fact far higher than the rate used in the Olympic Cinema TA and LBRuT has subsequently confirmed that they agree the proposed cinema trip rates; and
- At the request of TfL person trips were added to the community centre land use based on two TRICS sites from across England.

2.1.6 This resulted in the following person and vehicle trip rates for each land use as shown in Tables 2.4 and 2.5.

Table 2.4 Total Person Trips for All Land Uses – Technical Note 8a

Land Use	Calculation Factor	08:00 – 09:00			17:00 – 18:00		
		Arr	Dep	Two Way	Arr	Dep	Two Way
Residential	Per Unit	0.124	0.555	0.680	0.357	0.198	0.554
Education	Per Pupil	0.922	0.189	1.111	0.040	0.119	0.158
Retail	Per 100sqm	41.959	41.443	83.402	57.113	56.289	113.402
Restaurant	Per 100sqm	0.000	0.000	0.000	10.271	7.552	17.823
Hotel	Per Bedroom	0.166	0.438	0.604	0.300	0.252	0.552
Office	Per 100sqm	2.072	0.183	2.255	0.311	2.572	2.883
Cinema	Per Seat	0.000	0.000	0.000	0.204	0.276	0.481
Gym	Per 100sqm	1.535	2.112	3.647	3.996	1.793	5.789
Community Space	Per 100sqm	0.865	0.079	0.944	0.786	0.76	1.546

Table 2.5 Total Vehicle Trips for All Land Uses Technical Note 8a

Land Use	Calculation Factor	08:00 – 09:00			17:00 – 18:00		
		Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	Per Unit	0.023	0.106	0.129	0.074	0.040	0.114
Education (with 20% pass-by to be applied)	Per Pupil	0.090	0.074	0.163	0.009	0.021	0.031
Retail	Per 100sqm	1.237	1.031	2.268	1.340	1.753	3.093
Restaurant	Per 100sqm	0.000	0.000	0.000	0.368	0.325	0.693
Hotel	Per Bedroom	0.166	0.438	0.604	0.300	0.252	0.552
Office	Per 100sqm	0.378	0.079	0.457	0.122	0.402	0.524
Cinema	Per Seat	0.000	0.000	0.000	0.023	0.031	0.053

Gym	Per 100sqm	0.213	0.471	0.684	0.213	0.106	0.319
Community Space	Per 100sqm	0.000	0.000	0.000	0.000	0.000	0.000

3 Response to Further Comments

3.1.1 In response to Technical Note 8a TfL also issued further comments with the main focus being on the education pass-by trips and the number of taxi trips potentially generated by the hotel.

3.1.2 Additional comments refer to providing updated data sources, namely TRICS data for the most part, which is included in Appendix A.

3.1.3 Whilst PBA still consider that the application of a 20% pass-by factor to education trips is robust, based on NTS data, this has not been agreed by either TfL or LBRuT. Therefore, for the purposes of the TA assessment the 10% pass-by factor will be applied.

3.1.4 TfL had also suggested comparing TRICS data to TRAVL data to assess the number of taxi trips generated by the hotel. The table below compares the two sets of data, based on the hotel sites included in the existing TRICS assessment and two new TRAVL sites identified for the purposes of the taxi trips.

Table 3.1 Taxi Trip Rate Comparison

Time Period	TRICS Data			TRAVL Data		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
08:00 – 09:00	0.009	0.018	0.027	0.005	0.033	0.038
17:00 – 18:00	0.025	0.021	0.046	0.013	0.007	0.020
Daily	0.209	0.211	0.420	0.246	0.158	0.404

3.1.5 Based on the above rates it is proposed that the TRICS taxi rates be added to the previously identified vehicle rates to create a total for hotel trip rate for vehicles.

3.1.6 Both TfL and LBRuT have confirmed that the proposed cinema trip rates are agreed.

3.1.7 Additionally, since the removal of the extra care units, which was assumed to include the healthcare facility within, a health care trip rate has been added in order to ensure these trips are still considered within the assessment.

3.1.8 These trips have been calculated using the one site available within the TRICS database for healthcare sites within London. This is located in Wandsworth and the TRICS output is included within the updated appendix to this note.

3.2 Final Trip Rates for Approval

3.2.1 Based on these changes as a result of the comments made by TfL and with no further comments from LBRuT received. This produces the following person and vehicle trip rates by Land Use, shown in Table 3.2 and Table 3.3.

Table 3.2 Final Person Trip Rates

Land Use		Calculation Factor	08:00 – 09:00			17:00 – 18:00		
			Arr	Dep	Two Way	Arr	Dep	Two Way
Residential	Private Flat	Per Unit	0.080	0.417	0.497	0.267	0.146	0.413
	Affordable Flat		0.180	0.850	1.030	0.533	0.278	0.811
	Houses		0.239	0.914	1.153	0.239	0.914	1.153
Education		Per Pupil	0.922	0.189	1.111	0.040	0.119	0.158
Retail		Per 100sqm	41.959	41.443	83.402	57.113	56.289	113.40
Restaurant		Per 100sqm	0.000	0.000	0.000	9.205	8.057	17.262
Hotel		Per Bedroom	0.166	0.438	0.604	0.300	0.252	0.552
Office		Per 100sqm	2.072	0.183	2.255	0.311	2.572	2.883
Cinema		Per Seat	0.000	0.000	0.000	0.204	0.276	0.481
Gym		Per 100sqm	1.535	2.112	3.647	3.996	1.793	5.789
Community Space		Per 100sqm	0.865	0.079	0.944	0.786	0.76	1.546
Health Care		Per 100sqm	1.218	0.295	1.513	0.701	1.366	2.067

Table 3.3 Final Vehicle Trip Rates

Land Use	Calculation Factor	08:00 – 09:00			17:00 – 18:00		
		Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	Per Unit	0.074	0.120	0.194	0.100	0.064	0.164
Education (with 10% pass-by to be applied and no inclusion of staff trips)	Per Pupil	0.075	0.015	0.091	0.003	0.010	0.013

Retail	Per 100sqm	1.237	1.031	2.268	1.340	1.753	3.093
Restaurant	Per 100sqm	0.000	0.000	0.000	0.448	0.299	0.747
Hotel (Taxi Trips Included)	Per Bedroom	0.175	0.456	0.631	0.325	0.273	0.598
Office	Per 100sqm	0.378	0.079	0.457	0.122	0.402	0.524
Cinema	Per Seat	0.000	0.000	0.000	0.023	0.031	0.053
Gym	Per 100sqm	0.213	0.471	0.684	0.213	0.106	0.319
Community Space	Per 100sqm	0.000	0.000	0.000	0.000	0.000	0.000
Health Care	Per 100sqm	0.258	0.074	0.332	0.221	0.258	0.479

3.2.2 Based on these trip rates, the proposed development would generate the following vehicular and person trips, based on the schedule in Table 1.1.

3.2.3 This will still be subject to the further change to reflect the final development mix and also confirmation of maximum floor areas for flexible uses to reflect a worst case.

Table 3.4 Final Person Trips

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arr	Dep	Two Way	Arr	Dep	Two Way
Residential	123	557	680	355	195	550
Education	1162	95	1400	50	149	199
Retail	265	262	526	360	355	716
Restaurant	0	0	0	223	195	419
Hotel	2	7	9	5	4	8
Office	70	6	76	10	87	97

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arr	Dep	Two Way	Arr	Dep	Two Way
Cinema	0	0	0	76	102	178
Gym	8	11	19	20	9	30
Community Space	6	1	7	6	6	11
Total	1637	937	2717	1106	1102	2208

Table 3.5 Final Vehicle Trips

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	70	114	183	94	61	155
Education (with 10% pass-by to be applied)	105	85	191	12	27	39
Retail	8	7	14	8	11	20
Restaurant	0	0	0	11	7	18
Hotel (Taxi Trips Included)	3	7	9	5	4	9
Office	13	3	15	4	14	18
Cinema	0	0	0	8	11	20
Gym	1	2	3	1	1	2
Community Space	0	0	0	0	0	0
Total	**199**	**217**	**417**	**144**	**136**	**280**

4 Public Transport Trip Generation and Distribution

4.1 Overview

4.1.1 This chapter sets out the proposed public transport trip generation and distribution for both the train and bus modes of transport. The chapter details the methodology for generating the number of trips and rationale behind the respective mode shares applied to each land use.

4.2 Method

4.2.1 The residential mode share has been calculated using the 2011 Census Journey to Work data. The Richmond upon Thames 003 area (shown in Figure 4.1 below) was selected as the place of usual residence and all other area selected as the destination.

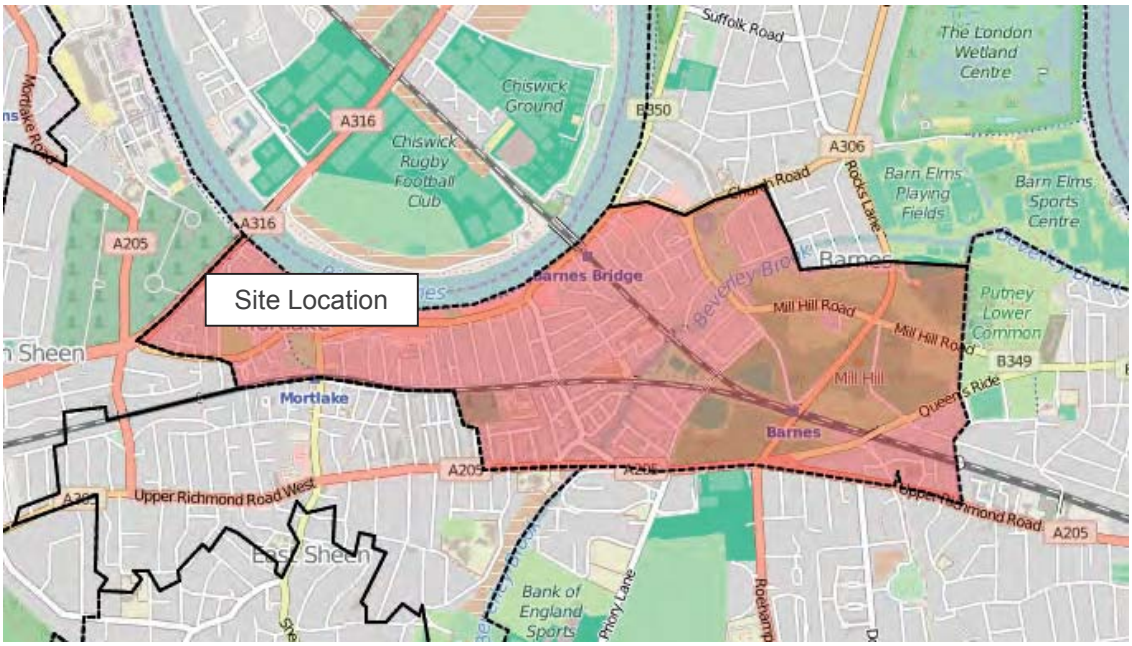


Figure 4.1: Middle Layer Super Output Area of Richmond upon Thames 003 (E02000786)

4.2.2 For the Hotel, Office, Cinema, and Gym land uses the 2011 Census Journey to work data was also used but with Richmond upon Thames 003 selected as the place of work and all other areas the usual place or residence to reflect the proposed development as a place of work rather than residence.

4.2.3 The non-residential mode shares have been adjusted in order to allow for the restrictions and adaptations made to the car driver mode share. In order to increase the bus and rail mode shares proportionately, the car driver mode share used in the vehicle assessment has been subtracted from the census car driver mode share and the difference subtracted from 100%. The census bus and rail mode share has then been divided by this number in order to provide an increased mode share for these modes.

4.2.1 The Census gives the following mode shares for **non-car** modes (Driver and passenger)

Table 4.1 2011 Census Mode Shares

Mode	Mode Share
Train	17.64%
Bus	10.99%
Cycle	7.44%
Walk	14.01%

4.2.2 These proportions have been applied to the non-car (driver and passenger) trips generated by the hotel, office, cinema, gym uses and results in the overall mode share factors for bus and rail as set out in Tables 4.2 and 4.3 respectively.

4.2.3 The community use mode share has been reduced to 0% as all trips to this land use are expected to be extremely local and therefore 100% walking and cycling.

4.2.4 The Education mode share has been taken as an average of three travel plan targets for local schools provided by LBRuT. These schools, Richmond Park Academy, Christs Secondary School and Grey Court Secondary, all have an existing PTAL (2) similar to that of the proposed development site at the moment. It is anticipated that this method provides an over robust assessment of the number of trips being made by public transport over walking and cycling, as it is expected the school will have a small catchment with mainly local pupils. The school catchment information provided by LBRuT demonstrated that many of the local primary schools have catchments that would enable walking and cycling to the site and based on this it is felt that the mode shares used are a more than robust assessment of what is anticipated.

4.2.5 It is anticipated that the retail uses within the development will primarily be used by the local population i.e. new residents / employees within the Stag site and the existing local Mortlake community. Therefore, most trips would be made by foot or by cycle with limited use made of mechanised modes of transport including rail and bus. Therefore, it would be inappropriate to use the Census as a basis for estimating mode share for these uses.

4.2.6 The retail mode share has been calculated using the mode share information provided by TRICS for the same three sites used to inform the person and vehicle trip generation. As there is a lack of information provided for local retail stores within TRICS, these sites have been used as the closest representation of the greatest retail trip generator, the small convenience store. These stores are located in Hackney, Kensington and Chelsea and Westminster and are therefore, much like the education mode shares, likely to over exaggerate the Public Transport trips. As the retail within the Stag Brewery development is much more likely to be aimed at local people it is anticipated this is a robust assessment and that public transport trips will not be as high as suggested in the calculations.

4.2.7 As with retail, there is a dearth of sites within the TRICS database that provide a good fit to the Stag site. Within the “Restaurant” category there is only one multi modal site within London and that is for a Wagamama within central London and therefore not appropriate. Therefore, the most appropriate sites have been selected from the “Pub / restaurant” category. Of the six sites available, sites in Barnet, City of London, Shoreditch and Wandsworth were discounted due to either location, parking facilities, proximity to public transport and surrounding faciltities. The two remaining sites that were similar to Stag Brewery in respect to the previous criteria were then the ‘Cellars’ site in Cannonbury and Spouters Corner site adjacent to Wood Green Tube Station. An average of these two sites was then used to provide the 5% bus mode share.

4.3 Bus

4.3.1 The bus totals have been calculated by applying a mode share to each different land use and applying this mode share to the person trip rates set out in the section above.

Mode Shares

4.3.2 The following mode shares in Table 4.2 demonstrate the mode share applied to each land use and the data source used to derive that factor.

Table 4.2 Bus mode shares by land use

Land Use	Mode Share	Source
Residential	10.9%	2011 Census Journey to work from Mortlake
Education	48%	Travel Plan targets provided by LBRuT
Retail	9.6%	TRICS Data
Restaurant	5%	TRICS Data
Hotel	14.1%	Adjusted Census 2011 Journey to Work in Mortlake
Office	14.8%	Adjusted Census 2011 Journey to Work in Mortlake
Cinema	14.1%	Adjusted Census 2011 Journey to Work in Mortlake
Gym	15.6%	Adjusted Census 2011 Journey to Work in Mortlake
Community	0%	Assumed to be 100% walking and Cycling

4.4 Rail

4.4.1 The rail totals have been calculated by applying a mode share to each different land use and applying this mode share to the person trip rates set out in the section above. For the Education, Retail and Restaurant land uses no underground trips have been added on to avoid double counting, as these mode shares include the underground trips within the rail share. All other land uses will calculate a number of underground trips based on the respective mode share and these will then be added to the rail trips.

Mode Shares

4.4.2 The following mode shares in table 4.3 demonstrate the mode share applied to each land use.

Table 4.3 Train mode shares by land use

Land Use	Mode Share Rail (Underground)	Source
Residential	31.4% (15.3%)	2011 Census Journey to work from Mortlake
Education	6%	Travel Plan targets provided by LBRuT
Retail	8.7%	TRICS Data
Restaurant	8.7%	TRICS Data
Hotel	35% (12.4%)	Adjusted Census 2011 Journey to Work in Mortlake
Office	36.8% (13.0%)	Adjusted Census 2011 Journey to Work in Mortlake
Cinema	35% (12.4%)	Adjusted Census 2011 Journey to Work in Mortlake
Gym	38.8% (13.7%)	Adjusted Census 2011 Journey to Work in Mortlake
Community	0%	Assumed to be 100% walking and Cycling

4.4.3 Using these mode shares this then results in the following trips being generated by the development. These are shown by land use in first table 4.4 below for buses and then table 4.5 below that demonstrating the total train trips by land use.

Table 4.4 Bus Trips by Land Use per 100m^2 except residential (per unit) and Cinema (per Seat)

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	13	61	74	39	21	60
Education	558	45	672	24	72	96

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Retail	25	25	51	35	34	69
Restaurant	0	0	0	11	10	21
Hotel	0	1	1	1	1	1
Office	12	1	14	2	15	17
Cinema	0	0	0	13	18	32
Gym	1	2	3	4	2	5
Community Space	0	0	0	0	0	0
Health Care	1	0	1	1	1	2
Total	**612**	**135**	**816**	**129**	**174**	**302**

Table 4.5 Train and Underground Trips by Land Use per 100m² except residential (per unit) and Cinema (per Seat)

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	57	260	317	166	91	257
Education	70	6	84	3	9	12
Retail	23	23	46	31	31	62
Restaurant	0	0	0	19	17	36
Hotel	1	3	4	2	2	3
Office	42	4	46	6	52	58
Cinema	0	0	0	45	61	107
Gym	5	6	11	12	5	18
Community Space	0	0	0	0	0	0
Total	**198**	**301**	**508**	**285**	**268**	**554**

4.5 Distribution

4.5.1 In order to assess the impact of these peak hour trips on the local public transport network the trips have been distributed based on the Census 2011 Journey to Work Distribution. All residential trips have been distributed using Richmond upon Thames 003 as the place of residence whilst all other land uses have used Richmond upon Thames 003 as the place of work, with the distribution for each mode based on that specific modes distribution and not an average.

4.5.2 The trips detailed below are for the 08:00 – 09:00 peak hour only. The distribution for each mode has been distributed based on that specific modes distribution and not an overall

4.5.3 The most sensible route has then been applied to each location, assuming that most people will take the most direct route of travel. Table 4.5 and Table 4.6 show the residential and non-residential distributions by bus service based on this.

4.5.4 On finalisation of the development schedule, these percentages can be used to calculate the number of trips by service, however at this point, it is not possible to produce a trip rate by service due to the fact there are different calculation factors for each land use. Therefore, by totalling the trip rates it would not provide an accurate number, as part of this rate would require multiplication by floor space and other parts by number of rooms etc. As a result, only the distribution percentages have been provided at this point.

Table 4.5 residential bus distribution

Bus Route	% per Route	Destination	% per direction
419	58%	Hammersmith	44%**
		Richmond	17%
190	36%	West Brompton Station	36%
209	3%	Hammersmith	44%**
R68	3%	Kew	2%
		Hampton Court	1%

*** 419 and 209 towards Hammersmith merged as both services provide similar routes and therefore passengers could use either service.*

Table 4.6 non-residential bus distribution

Bus Route	% per Route	Destination	% per direction
419	76%	Hammersmith	59%**
		Richmond	21%
190	18%	West Brompton Station	18%
209	4%	Hammersmith	59%**
R68	3%	Kew	3%
		Hampton Court	0%

*** 419 and 209 towards Hammersmith merged as both services provide similar routes and therefore passengers could use either service.*

4.5.5 This same method has then also been applied to the train trip generation. However, this distribution has been simplified to an Eastbound/Westbound distribution as there are only two directional options from Mortlake as opposed to the number of bus services available. A residential distribution has also been used due to the majority of trips using the rail network are commuter trips particularly in the AM and PM peak.

Table 4.7 Residential Train distribution

Direction	% per Route
Eastbound	72%
Westbound	28%

4.5.6 This results in the following trips by service for each land use. Table 4.8 and 4.9 indicates the trips by land use on each bus service and Table 4.10 and 4.11 the trips by land use for the rail service.

Table 4.8 Bus Service trips by Land Use AM Peak

Bus Service	Residential			Education			Other Land Uses		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
419 towards Richmond	2	10	12	120	10	129	8	8	17
419/209 towards Hammersmith	6	25	31	325	27	352	23	23	46
190 towards West Brompton	5	22	27	99	8	107	7	7	14
R68 towards Kew	0	1	1	15	1	16	1	1	2

Table 4.9 Bus Service trips by Land Use PM Peak

Bus Service	Residential			Education			Other Land Uses		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
419 towards Richmond	6	4	10	5	15	21	14	17	31

419/209 towards Hammersmith	17	9	26	14	42	56	38	46	84
190 towards West Brompton	14	8	22	4	13	17	12	14	26
R68 towards Kew	1	0	1	1	2	3	2	2	4

Table 4.10 Train Service trips by Land Use AM Peak

Rail Direction	Residential			Education			Other Land Uses		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
Eastbound	26	116	142	50	4	54	30	116	146
Westbound	10	46	57	20	2	21	12	46	58

Table 4.11 Train Service trips by Land Use PM Peak

Rail Direction	Residential			Education			Other Land Uses		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
Eastbound	75	41	116	2	6	9	53	75	128
Westbound	30	16	46	1	3	3	21	30	51

5 Summary

5.1.1 In summary this technical note addresses the comments provided by TfL on the trip generation for the proposed Stag Brewery Development as well as the impact of the proposed change in Land Use Schedule.

5.1.2 All TfL and LBRuT comments have now been addressed and all changes made to both person and vehicle trip rates.

5.1.3 Chapter 4 sets out the number of Public Transport Trips anticipated to be generated by the site as well as its distribution. The chapter sets out the mode share by land use and how this has been derived, as well as the distribution of trips by direction and in case of the bus network by service.

5.1.4 In general, it is noted that due to the local nature of the majority of facilities within the site compared to those from TRICS, the public transport trips are likely over exaggerated and in reality the number of trips by Public Transport would be fewer, with more walking and cycling observed.

5.1.5 Additionally, there is no trip linkage included within the assessment with the exception of a 10% factor applied to AM pupil education trips. In reality, it is expected that several of the land uses, i.e. cinema and restaurant would create a number of link trips, therefore creating an element of double counting.

5.1.6 As this has not been taken into account it is anticipated that the number of trips presented in this note are a more than robust assessment of the proposed development.

5.1.7 All up to date TRICS and TRAVL data is included in Appendix A.

Appendix A TRICS and TRAVL DATA

Appendix D Cinema First Principles Method

TECHNICAL NOTE

Job Name: Stag Brewery

Job No: 38262

Date: October 2017

Prepared By: Matt Bolshaw

Checked By: Bob Parker

Subject: **Final Trip Generation Summary**

Introduction

This technical note sets out the final trip generation figures anticipated to be generated by the Stag Brewery development. It should be read in conjunction with the earlier notes on Trip Generation as follows:

- Technical Note 8 – Trip Generation Report
- Technical Note 8a – Trip Generation Report Update
- Technical Note 8b – Trip Generation Report Addendum

Based on these earlier notes the trip rates for the various proposed uses have been agreed with both TfL and LBRuT.

The trip generation estimates set out below are based on the Scenario 4a land use schedule issued on 28th September 2017, with allowance made for flexible uses. Some further minor changes to the development schedule are still being considered but it is understood that these would lead to a reduction in floor space and unit numbers and therefore the use of the Scenario 4a schedule will provide a robust basis for assessment.

Detailed Application

The development quantum's used in the trip generation assessment for the detailed application, have been taken from a combination of the Scenario 4a land use schedule as well as factoring in the need for flexible uses within the ground floor aspect of the development east of Ship Lane.

This part of the development has been identified as an area with potential flexible land uses to provide the necessary flexibility to respond to market demand. Gerald Eve's note (30th August) sets out maximum allowable floor space for each of these uses.

The flexible uses within this area will total a maximum of 4,819 sqm made up of the following uses (within which the maxima for each use applies) as follows:

• Retail	(2,500sqm)
• Financial and Professional Services	(200sqm)
• Cafes/Restaurants	(2,200sqm)
• Drinking Establishments	(1,600sqm)
• Offices	(2,000sqm)
• Community	(950sqm)
• Boathouse	(350sqm)
Total	(8,000 sqm)

Based on the above, the following mix of flexible uses will be assessed within the Transport Assessment (TA) in order to ensure a robust assessment of potential highway impacts in particular.

Use	Floor Area m² (GIA)	Comment
Retail – local shops	691	The combined retail area (1,259) is the minimum retail required as part of mix. The area for local shops has been minimised as this use will mainly generate local/linked trips. The food store is the floor area for the identified unit fronting Mortlake HS
Retail - food store	568	
Office and Financial / professional Services	1,353	Highest AM peak vehicle generator plus significant PM peak generator
Community	848	Combined ground floor of Maltings and Boathouse buildings which are both identified for this use
Cafes, restaurants and bars	1,353	Highest vehicle generator during PM peak
Total	4,819	

The choice of flexible uses has therefore been selected to ensure a high proportion of those uses that are likely to generate the highest number of trips onto the external highway network. In addition, the total flexible uses are in excess (approx 3%) of the areas identified by Gerald Eve, again ensuring a robust assessment.

Land Use	Architects Schedule M2 GIA	Floor Area (GIA)		Units used for trip generation
Detailed Application (Non residential Uses)				
Unspecified Flexible Floor Areas inc. Retail/Restaurant/Office	3,965 m²	Food Store	568 m2	568 m² **
		Local Retail	691 m2	Included in food store assessment
		Restaurant	1,353 m²	1,353 m²
		Office	1,353m²	
Hotel	1,266m²	1,266m²		16 Rooms
Community	854m²	854m²		854m²
Office	2424 m²	2424 m²		3,777 m²***
Cinema	1,899m²	1,899m²		370 seats
Gym	757m²	757m²		757m²
Total	11,165 m²	11,265 m²		

*** 568 m2 represents the size of the convenience store (Building 5) which the retail trip generation is based on.*
**** Including Flexible Use office*

Outline Application

For the outline application there are no flexible uses and only three different land uses within the application. The following land uses have been applied for the trip generation assessment.

Land Use	Floor Area (GIA)	Units used for trip generation
Outline Application		
Residential	26,547m^2	232 Units
Extra Care	12,324 m^2	150 Assisted Living Units
Care Home	8,450 m^2	70 Care Home Units
Health Care	748m^2	4 Consulting Rooms

School Application

The final application as part of this development is the separate school application which also forms part of the detailed application. For the school trip generation assessment, the following floor area and number of pupils has been assumed. The number of pupils is based on an average of 30 pupils per classroom with a 6 form entry with 5 years of secondary school and 2 years of sixth form college on site.

Land Use	Floor Area (GIA)	Units used for trip generation
Detailed School Application		
School	9,186m^2	1,260

Delivery and Servicing

The TRICS based vehicular trip rates relating to the various land uses will generally include service vehicle trips. In developing the delivery and servicing strategy for the site, a separate assessment has been undertaken to estimate such trips. In order to be robust we have added the estimate of HGV service trips from this assessment to the above trip generation trips as well as the LGV trips from non-residential land uses. These are as follows:

AM Peak Hour - 28 trips (56 movements)
PM Peak Hour - 8 trips (16 movements)

A PCU factor of 2 has been applied to the HGV trips.

Trip Generation

Based on the above development quantum's being applied to the approved trip rates it indicates the following person and vehicular trips are to be generated by the development.

Person Trips

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Detailed Application						
Residential	43	190	233	126	71	197
Retail	238	235	473	324	320	644
Restaurant	0	0	0	125	109	234
Hotel	3	7	10	5	4	9
Office	79	7	86	12	97	109
Cinema	0	0	0	76	102	178
Gym	12	16	28	30	14	44
Community Space	7	1	8	7	6	13
Detailed Total	382	456	838	705	723	1428
Outline Application						
Residential	44	201	245	124	66	190
Extra Care	22	21	43	17	20	37
Health Care	9	2	11	5	10	15
Outline Total	75	224	299	146	96	242
Detailed School Application						
Education	1162	95	1257	50	149	199
Total	**1619**	**775**	**2394**	**901**	**968**	**1869**

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Detailed Application						
Residential	33	54	88	45	29	74
Retail	7	6	13	8	10	18
Restaurant	0	0	0	6	4	10
Hotel	0	1	1	1	0	1
Office	14	3	17	5	15	20
Cinema	0	0	0	8	11	20
Gym	2	4	5	2	1	2
Community Space	0	0	0	0	0	0
Detailed Total	56 (26)	67 (26)	123 (52)	75 (6)	70 (6)	145 (12)
Detailed Total including HGVs	82	93	175	81	76	157
Outline Application						
Residential	17	28	46	23	15	38
Extra Care	5	4	9	4	4	8
Health Care	2	1	3	2	2	4
Outline Total	25 (2)	33 (2)	58 (4)	29 (2)	21 (2)	50 (4)
Outline Total including HGVs	27	35	62	31	23	54
Detailed School Application						
Education*	105	85	191	12	27	39
Total	**186 (28)**	**185 (28)**	**371 (56)**	**116 (8)**	**118 (8)**	**234 (16)**
Total including HGVs	**214**	**213**	**427**	**124**	**126**	**250**

**No school HGV trips to occur during the peak hours*

Other Modes

A detailed spreadsheet has been developed which provides trip estimates by time of day and by mode. A summary of all other modes, such as rail, bus, walking and cycling, and their anticipated trips are included in Appendix A.

Appendix A Trip Generation by Modes

All numbers based on Trip Generation Spreadsheet V12.4

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	87	391	478	250	138	388
Education	1162	95	1257	50	149	199
Retail	238	235	474	324	320	644
Restaurant	0	0	0	125	109	234
Hotel	3	7	10	5	4	9
Office	78	7	85	12	97	109
Cinema	0	0	0	76	102	178
Gym	12	16	28	30	14	44
Community Space	7	1	8	7	6	13
Extra Care	22	21	43	17	20	37
Health Care	9	2	11	5	10	15
Total	1618	775	2393	900	969	1870

Person Totals

Time Range	Total Trips			Residential			Education			Retail			Restaurant			Hotel			Office			Cinema			Gym			Community			Extra Care			Health Care		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way
00:00-01:00	0	0	0																									0	0	0	0	0	0	0	0	0
01:00-02:00	0	0	0																									0	0	0	0	0	0	0	0	0
02:00-03:00	0	0	0																									0	0	0	0	0	0	0	0	0
03:00-04:00	0	0	0																									0	0	0	0	0	0	0	0	0
04:00-05:00	0	0	0																									0	0	0	0	0	0	0	0	0
05:00-06:00	0	0	0	0	0	0																						0	0	0	0	0	0	0	0	0
06:00-07:00	8	6	14	0	0	0										1	4	5							7	3	9	0	0	0	0	0	0	0	0	0
07:00-08:00	424	419	843	58	216	274	128	10	138	178	165	343				2	3	5	23	3	26				12	9	21	0	19	12	31	3	1	4		
08:00-09:00	1618	775	2393	87	391	478	1162	95	1257	238	235	474				3	7	10	78	7	85				12	16	28	7	1	8	22	21	43	9	2	11		
09:00-10:00	692	505	1197	101	159	260	174	22	196	251	258	508				3	5	8	107	16	123				16	10	26	9	5	14	22	24	46	10	7	17		
10:00-11:00	577	501	1077	85	126	211	46	29	75	228	222	450	36	27	63	2	3	5	49	27	77	63	0	63	16	15	31	12	13	25	29	33	62	10	5	15		
11:00-12:00	617	499	1116	105	115	219	66	49	115	228	220	448	51	27	78	2	3	5	31	32	63	73	0	73	16	13	29	10	7	17	27	25	52	7	9	16		
12:00-13:00	888	868	1757	111	115	226	62	87	150	475	464	939	84	43	127	2	3	5	59	89	149	30	0	30	20	17	36	13	17	29	24	24	48	8	9	17		
13:00-14:00	1084	1071	2155	112	111	223	114	83	197	565	580	1145	98	67	165	3	3	5	80	71	151	50	88	139	16	19	34	9	13	23	26	28	54	11	9	20		
14:00-15:00	767	729	1495	103	114	217	58	51	109	343	340	683	64	60	124	3	3	5	58	38	96	85	64	149	11	18	29	6	11	17	26	21	47	9	9	17		
15:00-16:00	803	1663	2466	232	129	361	69	1081	1151	300	301	601	61	47	108	3	3	6	36	36	73	52	14	66	13	11	24	6	6	11	23	26	49	7	9	16		
16:00-17:00	799	862	1661	246	138	384	77	213	290	271	271	542	79	75	154	4	3	7	25	49	75	0	50	50	15	14	30	10	9	19	20	24	44	12	15	27		
17:00-18:00	900	969	1870	250	138	388	50	149	199	324	320	644	125	109	234	5	4	9	12	97	109	76	102	178	30	14	44	7	6	13	17	20	37	5	10	15		
18:00-19:00	955	868	1823	211	105	316	46	91	137	379	385	765	162	146	308	5	5	10	7	48	55	68	35	103	46	28	74	12	6	17	16	15	31	3	3	6		
19:00-20:00	822	538	1360	150	69	218	0	0	0	306	296	601	154	123	277	6	4	10	0	0	0	174	0	174	27	38	65			0	6	8	14	0	0	0		
20:00-21:00	524	571	1095	102	61	163	0	0	0	238	252	491	96	139	235	5	3	8	0	0	0	65	76	140	16	33	49			0	2	7	9	0	0	0		
21:00-22:00	252	453	705	0	0	0	0	0	0	175	182	357	58	101	159	7	2	9	0	0	0	0	143	143	7	18	26			0	5	6	11	0	0	0		
22:00-23:00	51	239	290	0	0	0	0	0	0	0	0	0	51	108	159	0	0	0	0	0	0	0	131	131	0	0	0			0	0	0	0	0	0	0		
23:00-24:00	35	108	143	0	0	0	0	0	0	0	0	0	35	76	111	0	0	0	0	0	0	0	32	32	0	0	0			0	0	0	0	0	0	0		
Daily	11776	11645	23420	1952	1986	3938	2053	1960	4013	4499	4491	8991	1153	1148	2301	56	58	114	567	515	1082	736	736	1472	280	275	555	101	94	194	286	293	578	94	89	182		

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	51	82	133	69	44	112
Education	105	85	191	12	27	39
Retail	7	6	13	8	10	18
Restaurant	0	0	0	6	4	10
Hotel	0	1	1	1	0	1
Office	14	3	17	5	15	20
Cinema	0	0	0	8	11	20
Gym	2	4	5	2	1	2
Community Space	0	0	0	0	0	0
Extra Care	5	4	9	4	4	8
Health Care	2	1	2	2	2	4
Total	186	186	371	115	119	234

Vehicle Totals

Time Range	Total Trips			Residential			Education			Retail			Restaurant			Hotel			Office			Cinema			Gym			Community			Extra Care			Health Care		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way
00:00-01:00	0	0	0													0	0	0										0	0	0	0	0	0	0	0	0
01:00-02:00	0	0	0													0	0	0										0	0	0	0	0	0	0	0	0
02:00-03:00	0	0	0													0	0	0										0	0	0	0	0	0	0	0	0
03:00-04:00	0	0	0													0	0	0										0	0	0	0	0	0	0	0	0
04:00-05:00	0	0	0													0	0	0										0	0	0	0	0	0	0	0	0
05:00-06:00	0	0	0	0	0	0										0	0	0										0	0	0	0	0	0	0	0	0
06:00-07:00	2	1	3	0	0	0										0	0	0							2	1	3	0	0	0	0	0	0	0	0	0
07:00-08:00	58	72	130	15	60	75	20	1	21	6	4	9				0	0	1	9	2	11				3	2	5	0	0	0	4	2	7	1	1	1
08:00-09:00	186	186	371	51	82	133	105	85	191	7	6	13				0	1	1	14	3	17				2	4	5	0	0	0	5	4	9	2	1	2
09:00-10:00	77	64	141	28	40	68	14	2	16	9	9	18				0	1	1	19	7	25				2	1	3	0	0	0	5	5	10	1	0	1
10:00-11:00	70	65	134	23	34	57	4	2	6	10	6	16	2	2	4	0	0	1	14	9	23	7	0	7	3	3	7	0	0	0	6	7	13	1	1	1
11:00-12:00	74	64	139	30	31	61	5	4	9	7	5	12	6	6	12	0	0	1	9	9	18	8	0	8	2	2	4	0	0	0	6	5	11	1	1	2
12:00-13:00	70	71	141	31	32	63	5	7	12	6	9	16	4	2	6	0	0	1	11	12	23	3	0	3	2	2	4	0	0	0	5	5	10	2	2	4
13:00-14:00	71	73	144	31	31	62	9	7	16	4	6	11	6	2	8	0	0	1	7	8	15	6	10	15	1	1	2	0	0	0	5	6	11	1	2	3
14:00-15:00	70	70	140	29	32	62	5	4	9	3	4	7	2	6	8	0	0	1	12	8	21	9	7	17	2	2	4	0	0	0	6	4	10	1	1	2
15:00-16:00	176	145	320	64	38	102	79	79	159	5	4	8	6	4	10	0	0	1	7	9	16	6	2	7	2	2	4	0	0	0	5	5	10	1	2	3
16:00-17:00	104	109	213	68	39	107	6	32	39	11	6	17	4	4	8	0	0	1	6	13	18	0	6	6	2	2	4	0	0	0	4	5	9	2	1	4
17:00-18:00	115	119	234	69	44	112	12	27	39	8	10	18	6	4	10	1	0	1	5	15	20	8	11	20	2	1	2	0	0	0	4	4	8	2	2	4
18:00-19:00	96	78	174	58	30	87	4	7	11	10	12	22	4	6	10	1	1	1	3	11	13	8	4	11	6	3	9	0	0	0	3	3	7	1	1	2
19:00-20:00	76	40	116	37	19	56				5	5	9	8	8	16	1	0	1				19	0	19	5	6	11				0	1	2	3	0	0	0
20:00-21:00	56	53	109	26	16	42				13	16	29	6	6	12	0	0	1				7	8	16	3	5	7				0	1	1	2	0	0	0
21:00-22:00	12	29	41	0	0	0				5	4	9	4	4	8	1	0	1				0	16	16	1	4	5				0	1	1	2	0	0	0
22:00-23:00	6	17	23	0	0	0							6	2	8	0	0	0				0	15	15							0	0	0	0	0	0	0
23:00-24:00	4	16	20	0	0	0							4	12	16	0	0	0				0	4	4							0	0	0	0	0	0	0
Daily	1323	1272	2595	559	530	1089	270	259	528	108	106	214	69	69	137	6	6	12	115	105	221	82	82	164	39	40	78	0	0	0	60	61	121	16	14	30

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	17	83	100	52	28	80
Education	372	30	402	16	48	64
Retail	185	183	368	252	248	500
Restaurant	0	0	0	38	14	52
Hotel	0	1	1	0	0	1
Office	11	1	12	1	11	13
Cinema	0	0	0	46	40	86
Gym	4	5	8	9	4	13
Community Space	7	4	11	9	4	13
Extra Care	5	5	11	4	5	9
Health Care	6	1	7	3	7	10
Total	607	313	921	432	410	843

Pedestrian Totals

Time Range	Total Trips			Residential			Education			Retail			Restaurant			Hotel			Office			Cinema			Gym			Community			Extra Care			Health Care		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way
00:00-01:00	0	0	0																																
01:00-02:00	0	0	0																																
02:00-03:00	0	0	0																																
03:00-04:00	0	0	0																																
04:00-05:00	0	0	0																																
05:00-06:00	0	0	0																																
06:00-07:00	0	0	0																																
07:00-08:00	209	184	393	11	46	57	41	3	44	138	128	267	0	0	0	0	0	1	3	0	4	0	0	0	4	3	6	6	1	6	5	3	8	2	1	2
08:00-09:00	601	312	913	17	83	100	372	30	402	185	183	368	0	0	0	0	1	1	11	1	12	0	0	0	4	5	8	7	4	11	5	5	11	6	1	7
09:00-10:00	301	259	560	21	31	52	56	7	63	195	200	395	0	0	0	0	1	1	9	1	11	0	0	0	5	3	8	9	10	20	6	6	12	7	4	11
10:00-11:00	236	229	465	17	26	43	15	9	24	177	172	349	3	1	3	0	0	1	4	3	6	0	0	0	5	4	9	8	5	13	7	8	16	7	3	10
11:00-12:00	249	240	489	23	24	47	21	16	37	177	171	349	3	2	5	0	0	1	3	4	7	0	0	0	5	4	9	10	13	23	7	6	13	4	6	10
12:00-13:00	452	448	901	24	24	48	20	28	48	369	361	730	14	5	19	0	0	1	6	9	15	0	0	0	6	5	11	7	10	18	6	6	12	5	6	11
13:00-14:00	554	541	1095	24	24	48	36	27	63	439	450	889	17	5	21	0	0	0	8	7	15	14	7	21	5	6	10	5	9	14	7	7	14	7	6	13
14:00-15:00	358	336	694	22	25	47	19	16	35	267	264	531	27	9	36	0	0	0	6	4	9	3	3	6	3	5	9	5	4	9	7	5	12	5	6	11
15:00-16:00	388	662	1050	49	29	78	22	346	368	233	234	467	27	19	46	0	0	1	4	4	7	35	14	49	4	3	7	8	7	14	6	6	12	5	5	10
16:00-17:00	363	364	727	52	30	82	25	68	93	211	210	421	17	19	36	0	0	1	2	5	7	42	15	57	5	4	9	5	5	10	5	6	11	7	10	17
17:00-18:00	429	404	833	52	28	80	16	48	64	252	248	500	38	14	52	0	0	1	1	11	13	46	40	86	9	4	13	9	4	13	4	5	9	3	7	10
18:00-19:00	575	509	1084	44	23	67	15	29	44	295	299	594	53	44	97	1	0	1	1	6	6	149	96	245	14	9	23	0	0	0	4	4	8	2	2	4
19:00-20:00	377	331	707	30	16	46	0	0	0	238	230	467	60	53	113	1	0	1	0	0	0	39	18	57	8	12	20	0	0	0	2	2	4	0	0	0
20:00-21:00	353	415	768	21	13	34	0	0	0	185	196	381	30	42	72	1	0	1	0	0	0	110	152	261	5	10	15	0	0	0	1	2	2	0	0	0
21:00-22:00	0	0	0																																
22:00-23:00	0	0	0																																
23:00-24:00	0	0	0																																
Daily	5443	5235	10679	408	421	829	657	627	1284	3361	3348	6709	288	212	500	5	5	10	57	54	112	437	345	782	81	77	158	78	73	151	71	72	143	60	57	117

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	2	12	14	7	4	11
Education	23	2	25	1	3	4
Retail	3	3	7	5	4	9
Restaurant	0	0	0	1	1	2
Hotel	0	0	0	0	0	0
Office	6	0	6	1	6	6
Cinema	0	0	0	5	4	9
Gym	2	2	4	5	2	7
Community Space	0	0	0	0	0	0
Extra Care	0	0	1	0	0	1
Health Care	0	0	0	0	0	0
Total	37	21	58	25	25	50

Cycling Totals

Time Range	Total Trips			Residential			Education			Retail			Restaurant			Hotel			Office			Cinema			Gym			Community			Extra Care			Health Care		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way
00:00-01:00	0	0	0																																
01:00-02:00	0	0	0																																
02:00-03:00	0	0	0																																
03:00-04:00	0	0	0																																
04:00-05:00	0	0	0																																
05:00-06:00	0	0	0																																
06:00-07:00	0	0	0																																
07:00-08:00	11	11	22	2	6	8	3	0	3	2	2	5	0	0	0	0	0	0	2	0	2	0	0	0	2	1	3	0	0	0	0	0	1	0	0	0
08:00-09:00	37	20	57	2	12	14	23	2	25	3	3	7	0	0	0	0	0	0	6	0	6	0	0	0	2	2	4	0	0	0	0	0	1	0	0	0
09:00-10:00	18	11	29	3	4	7	3	0	4	4	4	7	0	0	0	0	0	0	5	1	5	0	0	0	2	2	4	0	0	0	0	0	1	0	0	0
10:00-11:00	12	12	24	2	4	6	1	1	1	3	3	6	0	0	0	0	0	0	2	1	3	0	0	0	3	2	5	0	0	0	1	1	1	0	0	0
11:00-12:00	12	12	25	3	3	7	1	1	2	3	3	6	0	0	0	0	0	0	1	2	3	0	0	0	2	2	4	0	0	0	1	1	1	0	0	0
12:00-13:00	19	20	38	3	3	7	1	2	3	7	7	13	1	0	1	0	0	0	3	4	7	0	0	0	3	3	6	0	0	0	0	0	1	0	0	0
13:00-14:00	23	21	44	3	3	7	2	2	4	8	8	16	1	0	1	0	0	0	4	4	8	1	1	2	2	3	5	0	0	0	1	1	1	0	0	1
14:00-15:00	16	15	31	3	3	7	1	1	2	5	5	10	1	0	1	0	0	0	3	2	5	0	0	1	2	3	4	0	0	0	1	0	1	0	0	0
15:00-16:00	22	36	58	7	4	11	1	22	23	4	4	8	1	1	2	0	0	0	2	2	4	4	1	5	2	2	4	0	0	0	0	1	1	0	0	0
16:00-17:00	22	20	42	7	4	11	2	4	6	4	4	8	1	1	1	0	0	0	1	3	4	4	2	6	2	2	4	0	0	0	0	0	1	0	0	1
17:00-18:00	25	25	50	7	4	11	1	3	4	5	4	9	1	1	2	0	0	0	1	6	6	5	4	9	5	2	7	0	0	0	0	0	1	0	0	0
18:00-19:00	38	30	68	6	3	9	1	2	3	5	5	11	2	2	4	0	0	1	0	3	3	16	10	26	7	4	11	0	0	0	0	0	1	0	0	0
19:00-20:00	19	16	36	4	2	6	0	0	0	4	4	8	2	2	4	0	0	1	0	0	0	4	2	6	4	6	10	0	0	0	0	0	0	0	0	0
20:00-21:00	22	29	51	3	2	5	0	0	0	3	4	7	1	2	3	0	0	0	0	0	0	12	16	28	2	5	7	0	0	0	0	0	0	0	0	0
21:00-22:00	0	0	0																																
22:00-23:00	0	0	0																																
23:00-24:00	0	0	0																																
Daily	295	279	574	57	59	116	41	39	80	61	60	121	11	8	18	3	3	5	29	27	56	47	37	84	40	39	79	1	1	3	6	6	12	3	2	5

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	9	42	51	27	15	42
Education	523	43	566	22	67	90
Retail	23	23	45	31	31	62
Restaurant	0	0	0	6	5	12
Hotel	0	1	1	1	1	1
Office	12	1	13	2	14	16
Cinema	0	0	0	11	14	25
Gym	2	2	4	5	2	7
Community Space	0	0	0	0	0	0
Extra Care	2	1	3	1	1	3
Health Care	1	0	1	1	1	1
Total	571	113	685	106	152	258

Bus Totals

Time Range	Total Trips			Residential			Education			Retail			Restaurant			Hotel			Office			Cinema			Gym			Community			Extra Care			Health Care		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way
00:00-01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00-02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00-03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00-04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00-05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00-06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00-07:00	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
07:00-08:00	88	47	135	6	23	29	58	4	62	17	16	33	0	0	0	0	0	1	3	1	4	0	0	0	2	1	3	0	0	0	1	1	2	0	0	0
08:00-09:00	571	113	684	9	42	51	523	43	566	23	23	45	0	0	0	0	1	1	12	1	13	0	0	0	2	2	4	0	0	0	2	1	3	1	0	1
09:00-10:00	134	58	191	11	17	28	78	10	88	24	25	49	0	0	0	0	1	1	16	2	18	0	0	0	2	2	4	0	0	0	2	2	3	1	1	2
10:00-11:00	75	58	133	9	13	23	21	13	34	22	21	43	2	1	3	0	0	1	7	4	11	9	0	9	3	2	5	0	0	0	2	2	4	1	1	1
11:00-12:00	85	66	151	11	12	24	30	22	52	22	21	43	3	1	4	0	0	1	5	5	9	10	0	10	2	2	5	0	0	0	2	2	4	1	1	2
12:00-13:00	108	116	224	12	12	24	28	39	67	46	45	90	4	2	6	0	0	1	9	13	22	4	0	4	3	3	6	0	0	0	2	2	3	1	1	2
13:00-14:00	146	137	283	12	12	24	51	37	89	54	56	110	5	3	8	0	0	1	12	11	22	7	12	20	2	3	5	0	0	0	2	2	4	1	1	2
14:00-15:00	98	90	188	11	12	23	26	23	49	33	33	66	3	3	6	0	0	1	9	6	14	12	9	21	2	3	4	0	0	0	2	1	3	1	1	2
15:00-16:00	105	543	648	25	14	39	31	487	518	29	29	58	3	2	5	0	0	1	5	5	11	7	2	9	2	2	4	0	0	0	2	2	3	1	1	2
16:00-17:00	99	159	258	26	15	41	35	96	130	26	26	52	4	4	8	1	0	1	4	7	11	0	7	7	2	2	5	0	0	0	1	2	3	1	1	3
17:00-18:00	106	151	257	27	15	42	22	67	90	31	31	62	6	5	12	1	1	1	2	14	16	11	14	25	5	2	7	0	0	0	1	1	3	1	1	1
18:00-19:00	107	115	222	23	11	34	21	41	62	36	37	73	8	7	15	1	1	1	1	7	8	10	5	15	7	4	12	0	0	0	1	1	2	0	0	1
19:00-20:00	83	49	132	16	7	23	0	0	0	29	28	58	8	6	14	1	1	1	0	0	0	24	0	24	4	6	10	0	0	0	0	1	1	0	0	0
20:00-21:00	51	54	105	11	7	17	0	0	0	23	24	47	5	7	12	1	0	1	0	0	0	9	11	20	2	5	8	0	0	0	0	0	1	0	0	0
21:00-22:00	22	46	68	0	0	0	0	0	0	17	17	34	3	5	8	1	0	1	0	0	0	0	20	20	1	3	4	0	0	0	0	0	1	0	0	0
22:00-23:00	3	24	26	0	0	0	0	0	0	0	0	0	3	5	8	0	0	0	0	0	0	0	19	19	0	0	0	0	0	0	0	0	0	0	0	0
23:00-24:00	2	8	10	0	0	0	0	0	0	0	0	0	2	4	6	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0
Daily	1883	1836	3718	209	213	422	924	882	1806	432	431	863	58	57	115	8	8	16	84	76	160	104	104	208	44	43	87	0	0	1	20	21	41	9	9	18

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Residential	17	69	86	56	31	87
Education	8	1	8	5	13	17
Retail	15	14	30	24	24	47
Restaurant	0	0	0	7	7	13
Hotel	1	1	2	2	1	3
Office	8	1	10	9	18	27
Cinema	0	0	0	0	18	18
Gym	5	3	8	6	6	11
Extra Care	0	0	0	0	0	0
Community Space	0	0	0	0	0	0
Total	**54**	**90**	**144**	**108**	**117**	**225**

Rail Totals

Time Range	Total Trips			Residential			Education			Retail			Restaurant			Hotel			Office			Cinema			Gym			Community			Extra Care			Health Care		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way	Arrival	Departure	Two Way
00:00-01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00-02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00-03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00-04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00-05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00-06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00-07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00-08:00	10	27	36	7	25	31	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3	1	4	0	0	0	0	0	0	0	0	0
08:00-09:00	54	90	144	17	69	86	8	1	8	15	14	30	0	0	0	1	1	2	8	1	10	0	0	0	5	3	8	0	0	0	0	0	0	0	0	0
09:00-10:00	146	100	246	21	63	84	70	6	75	21	20	41	0	0	0	1	2	3	29	3	31	0	0	0	5	6	11	0	0	0	0	0	0	0	0	0
10:00-11:00	300	68	168	21	32	54	10	1	12	22	22	44	0	0	0	1	2	3	39	6	45	0	0	0	6	4	10	0	0	0	0	0	0	0	0	0
11:00-12:00	95	68	163	22	27	49	3	2	4	20	19	39	3	2	5	1	1	2	18	10	28	22	0	22	6	6	12	0	0	0	0	0	0	0	0	0
12:00-13:00	97	69	166	25	26	51	4	3	7	20	19	39	4	2	7	1	1	2	12	12	23	26	0	26	6	5	11	0	0	0	0	0	0	0	0	0
13:00-14:00	139	115	234	25	26	51	4	5	9	41	40	82	7	4	11	1	1	2	22	33	55	11	0	11	8	6	14	0	0	0	0	0	0	0	0	0
14:00-15:00	143	152	295	25	26	50	7	5	12	49	50	100	9	6	14	1	1	2	29	26	55	18	31	49	6	7	13	0	0	0	0	0	0	0	0	0
15:00-16:00	134	110	244	38	28	66	4	3	7	30	30	59	6	5	11	1	1	2	22	14	35	30	22	52	4	7	11	0	0	0	0	0	0	0	0	0
16:00-17:00	128	149	277	54	30	85	4	65	69	26	26	52	5	4	9	1	1	2	13	13	27	18	5	23	5	4	9	0	0	0	0	0	0	0	0	0
17:00-18:00	108	117	225	56	31	88	5	13	17	24	24	47	7	7	13	2	1	3	9	18	27	0	18	18	6	6	11	0	0	0	0	0	0	0	0	0
18:00-19:00	139	152	291	52	28	80	3	9	12	28	28	56	11	9	20	2	1	3	4	36	40	26	36	62	12	5	17	0	0	0	0	0	0	0	0	0
19:00-20:00	137	114	251	41	20	61	3	5	8	33	34	67	14	13	27	2	2	4	2	18	20	24	12	36	18	11	29	0	0	0	0	0	0	0	0	0
20:00-21:00	142	68	210	29	15	43	0	0	0	27	26	52	13	11	24	2	1	4	0	0	0	61	0	61	10	15	25	0	0	0	0	0	0	0	0	0
21:00-22:00	71	81	153	12	7	19	0	0	0	21	22	43	8	12	20	2	1	3	0	0	0	23	26	49	6	13	19	0	0	0	0	0	0	0	0	0
22:00-23:00	26	83	108	0	0	0	0	0	0	15	16	31	5	9	14	2	1	3	0	0	0	0	50	50	3	7	30	0	0	0	0	0	0	0	0	0
23:00-24:00	4	55	60	0	0	0	0	0	0	0	0	0	4	9	14	0	0	0	0	0	0	0	46	46	0	0	0	0	0	0	0	0	0	0	0	0
Daily	**1653**	**1619**	**3272**	**445**	**453**	**898**	**123**	**118**	**241**	**391**	**391**	**782**	**97**	**93**	**191**	**19**	**20**	**40**	**209**	**190**	**398**	**258**	**246**	**504**	**108**	**107**	**215**	**0**	**0**	**0**	**2**	**2**	**3**	**0**	**0**	**0**

Appendix E PTAL Report

Intelligent Data Collection Limited
Richmond Revision

Client:	PBA
Project Number:	ID02940
Site Number:	Site 1
Date of Survey:	19.11.2016
Site Name:	Strand Drive
Survey Type:	Two-way Link Count

Quality Assurance and Issue Record

Quality Assurance

Revision	Rev A			
Date	02.12.2016			
Prepared by	David Brown			
Signature				
Checked by	Fay Underwood			
Signature				
Project Director	Paul O'Neill			
Signature				
Project number	ID02940			
File Ref	ID02940 Richmond Revision - MCC Site 1 - 19.11.2016			

Issue Sheet

	Date			
Issued to	02.12.2016			
Stephanie Yu	E-mail			

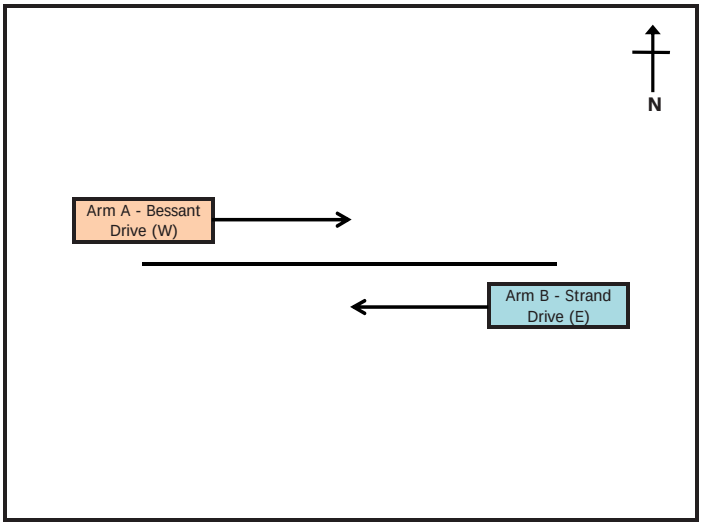
Contents Page

Intelligent Data Collection Limited

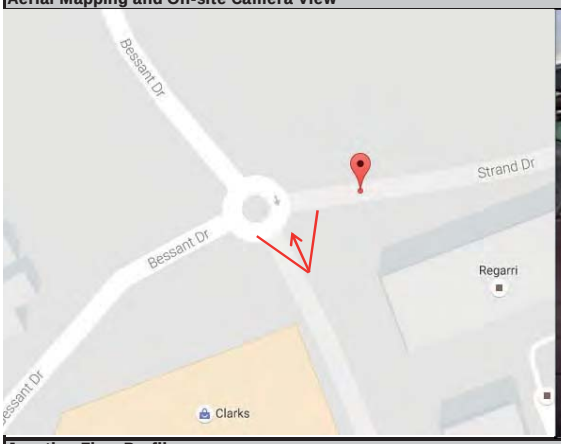
Client:	PBA	**Date of Survey:**	19.11.2016
Project Number:	ID02940	**Site Name:**	Strand Drive
Site Number:	Site 1	**Survey Type:**	Two-way Link Count

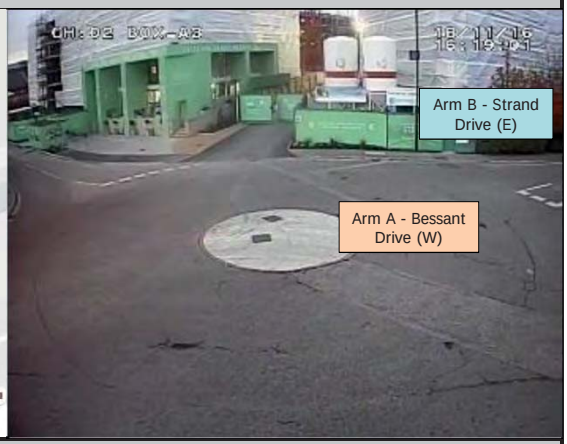
X Coordinate	Y Coordinate	Google Maps Link	
51.479355	-0.278753	Click Here	
AM Peak Conditions	**Inter-Peak Conditions**	**PM Peak Conditions**	
Dry	Dry	Dry	

Junction Layout

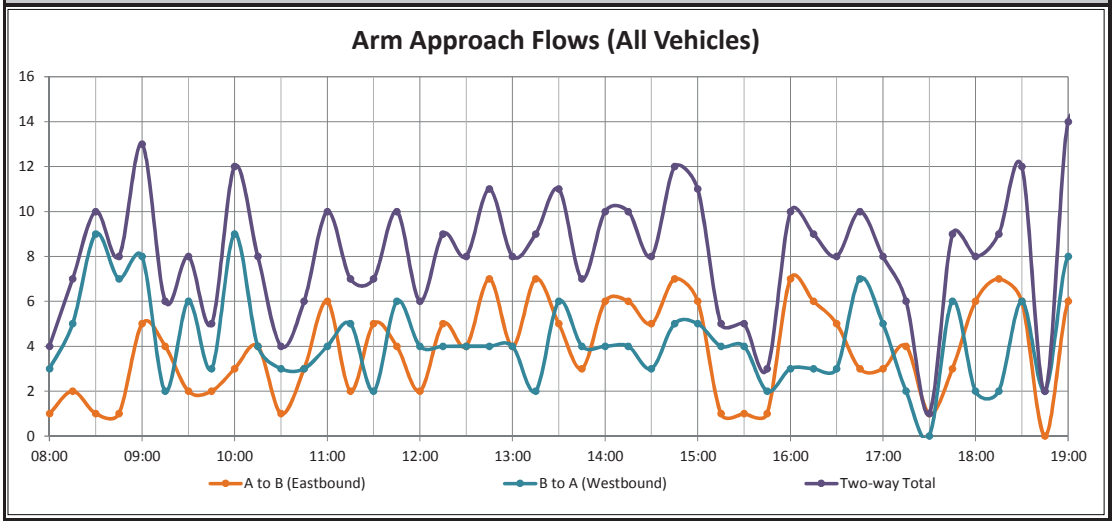


Aerial Mapping and On-site Camera View





Junction Flow Profile



Additional Notes (Factors which may impact on survey results such as accidents, roadworks, special events):

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 1

Date of Survey: 19.11.2016
Site Name: Strand Drive
Survey Type: Two-way Link Count

Arm A: Bessant Drive (W)
Arm B: Strand Drive (E)

	A to B (Eastbound)								B to A (Westbound)								Two-way Total							
Time	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total
08:00	1	0	0	0	0	0	0	1	2	0	0	0	0	0	1	3	3	0	0	0	0	0	1	4
08:15	2	0	0	0	0	0	0	2	5	0	0	0	0	0	0	5	7	0	0	0	0	0	0	7
08:30	1	0	0	0	0	0	0	1	9	0	0	0	0	0	0	9	10	0	0	0	0	0	0	10
08:45	1	0	0	0	0	0	0	1	7	0	0	0	0	0	0	7	8	0	0	0	0	0	0	8
09:00	4	1	0	0	0	0	0	5	7	1	0	0	0	0	0	8	11	2	0	0	0	0	0	13
09:15	4	0	0	0	0	0	0	4	2	0	0	0	0	0	0	2	6	0	0	0	0	0	0	6
09:30	2	0	0	0	0	0	0	2	5	1	0	0	0	0	0	6	7	1	0	0	0	0	0	8
09:45	2	0	0	0	0	0	0	2	3	0	0	0	0	0	0	3	5	0	0	0	0	0	0	5
10:00	3	0	0	0	0	0	0	3	8	0	0	0	0	0	1	9	11	0	0	0	0	0	1	12
10:15	3	0	0	0	0	0	1	4	4	0	0	0	0	0	0	4	7	0	0	0	0	0	1	8
10:30	1	0	0	0	0	0	0	1	1	0	0	0	0	0	2	3	2	0	0	0	0	0	2	4
10:45	3	0	0	0	0	0	0	3	3	0	0	0	0	0	0	3	6	0	0	0	0	0	0	6
11:00	4	0	0	0	0	0	2	6	4	0	0	0	0	0	0	4	8	0	0	0	0	0	2	10
11:15	2	0	0	0	0	0	0	2	5	0	0	0	0	0	0	5	7	0	0	0	0	0	0	7
11:30	5	0	0	0	0	0	0	5	2	0	0	0	0	0	0	2	7	0	0	0	0	0	0	7
11:45	3	0	0	0	0	0	1	4	4	0	0	0	0	1	1	6	7	0	0	0	0	1	2	10
12:00	2	0	0	0	0	0	0	2	3	0	0	0	0	0	1	4	5	0	0	0	0	0	1	6
12:15	4	1	0	0	0	0	0	5	4	0	0	0	0	0	0	4	8	1	0	0	0	0	0	9
12:30	2	1	1	0	0	0	0	4	4	0	0	0	0	0	0	4	6	1	1	0	0	0	0	8
12:45	6	1	0	0	0	0	0	7	2	1	1	0	0	0	0	4	8	2	1	0	0	0	0	11
13:00	1	1	0	0	0	1	1	4	3	1	0	0	0	0	0	4	4	2	0	0	0	1	1	8
13:15	5	0	0	0	0	0	2	7	1	1	0	0	0	0	0	2	6	1	0	0	0	0	2	9
13:30	5	0	0	0	0	0	0	5	6	0	0	0	0	0	0	6	11	0	0	0	0	0	0	11
13:45	3	0	0	0	0	0	0	3	4	0	0	0	0	0	0	4	7	0	0	0	0	0	0	7
14:00	6	0	0	0	0	0	0	6	4	0	0	0	0	0	0	4	10	0	0	0	0	0	0	10
14:15	5	1	0	0	0	0	0	6	4	0	0	0	0	0	0	4	9	1	0	0	0	0	0	10
14:30	4	1	0	0	0	0	0	5	2	1	0	0	0	0	0	3	6	2	0	0	0	0	0	8
14:45	7	0	0	0	0	0	0	7	4	1	0	0	0	0	0	5	11	1	0	0	0	0	0	12
15:00	5	1	0	0	0	0	0	6	5	0	0	0	0	0	0	5	10	1	0	0	0	0	0	11
15:15	1	0	0	0	0	0	0	1	3	1	0	0	0	0	0	4	4	1	0	0	0	0	0	5
15:30	1	0	0	0	0	0	0	1	4	0	0	0	0	0	0	4	5	0	0	0	0	0	0	5
15:45	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	2	3	0	0	0	0	0	0	3
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17:30	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
17:45	2	0	0	0	0	0	1	3	5	0	0	0	0	0	1	6	7	0	0	0	0	0	2	9
18:00	6	0	0	0	0	0	0	6	2	0	0	0	0	0	0	2	8	0	0	0	0	0	0	8
18:15	7	0	0	0	0	0	0	7	2	0	0	0	0	0	0	2	9	0	0	0	0	0	0	9
18:30	4	2	0	0	0	0	0	6	5	1	0	0	0	0	0	6	9	3	0	0	0	0	0	12
18:45	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2
19:00	5	1	0	0	0	0	0	6	6	2	0	0	0	0	0	8	11	3	0	0	0	0	0	14
19:15	5	0	0	0	0	0	1	6	5	0	0	0	0	0	0	5	10	0	0	0	0	0	1	11
19:30	7	0	0	0	0	0	0	7	5	0	0	0	0	0	0	5	12	0	0	0	0	0	0	12
19:45	4	0	0	0	0	0	0	4	3	0	0	0	0	0	0	3	7	0	0	0	0	0	0	7
Start Time				**Rolling Hour**				**Total**				**Rolling Hour**				**Total**					**Rolling Hour**			**Total**
08:00	5	0	0	0	0	0	0	5	23	0	0	0	0	0	1	24	28	0	0	0	0	0	1	29
08:15	8	1	0	0	0	0	0	9	28	1	0	0	0	0	0	29	36	2	0	0	0	0	0	38
08:30	10	1	0	0	0	0	0	11	25	1	0	0	0	0	0	26	35	2	0	0	0	0	0	37
08:45	11	1	0	0	0	0	0	12	21	2	0	0	0	0	0	23	32	3	0	0	0	0	0	35
09:00	12	1	0	0	0	0	0	13	17	2	0	0	0	0	0	19	29	3	0	0	0	0	0	32
09:15	11	0	0	0	0	0	0	11	18	1	0	0	0	0	1	20	29	1	0	0	0	0	1	31
09:30	10	0	0	0	0	1	0	11	20	1	0	0	0	0	1	22	30	1	0	0	0	0	2	33
09:45	9	0	0	0	0	0	1	10	16	0	0	0	0	0	3	19	25	0	0	0	0	0	4	29
10:00	10	0	0	0	0	0	1	11	16	0	0	0	0	0	3	19	26	0	0	0	0	0	4	30
10:15	11	0	0	0	0	0	3	14	12	0	0	0	0	0	2	14	23	0	0	0	0	0	5	28
10:30	10	0	0	0	0	0	2	12	13	0	0	0	0	0	2	15	23	0	0	0	0	0	4	27
10:45	14	0	0	0	0	0	2	16	14	0	0	0	0	0	0	14	28	0	0	0	0	0	2	30
11:00	14	0	0	0	0	0	3	17	15	0	0	0	0	1	1	17	29	0	0	0	0	1	4	34
11:15	12	0	0	0	0	1	1	13	14	0	0	0	0	1	2	17	26	0	0	0	0	1	3	30
11:30	14	1	0	0	0	0	1	16	13	0	0	0	0	1	2	16	27	1	0	0	0	1	3	32
11:45	11	2	1	0	0	0	1	15	15	0	0	0	0	1	2	18	26	2	1	0	0	1	3	33
12:00	14	3	1	0	0	0	0	18	13	1	1	0	0	0	1	16	27	4	2	0	0	0	1	34
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12:30	14	3	1	0	0	1	3	22	10	3	1	0	0	0	0	14	24	6	2	0	0	1	3	36
12:45	17	2	0	0	0	1	3	23	12	3	1	0	0	0	0	16	29	5	1	0	0	1	3	39
13:00	14	1	0	0	0	1	3	19	14	2	0	0	0	0	0	16	28	3	0	0	0	1	3	35
13:15	19	0	0	0	0	0	2	21	15	1	0	0	0	0	0	16	34	1	0	0	0	0	2	37
13:30	19	1	0	0	0	0	0	20	18	0	0	0	0	0	0	18	37	1	0	0	0	0	0	38
13:45	18	2	0	0	0	0	0	20	14	1	0	0	0	0	0	15	32	3	0	0	0	0	0	35
14:00	22	2	0	0	0	0	0	24	14	2	0	0	0	0	0	16	36	4	0	0	0	0	0	40
14:15	21	3	0	0	0	0	0	24	15	2	0	0	0	0	0	17	36	5	0	0	0	0	0	41
14:30	17	2	0	0	0	0	0	19	14	3	0	0	0	0	0	17	31	5	0	0	0	0	0	36
14:45	14	1	0	0	0	0	0	15	16	2	0	0	0	0	0	18	30	3	0	0	0	0	0	33
15:00	8	1	0	0	0	0	0	9	14	1	0	0	0	0	0	15	22	2	0	0	0	0	0	24
15:15	8	0	0	0	0	0	2	10	11	1	0	0	0	0	1	13	19	1	0	0	0	0	3	23
15:30	13	0	0	0	0	0	2	15	11	0	0	0	0	0	1	12	24	0	0	0	0	0	3	27
15:45	17	0	0	0	0	0	2	19	9	1	0	0	0	0	1	11	26	1	0	0	0	0	3	30
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16:30	14	0	0	0	0	0	1	15	15	1	0	0	0	0	1	17	29	1	0	0	0	0	2	32
16:45	10	0	0	0	0	0	1	11	13	0	0	0	0	0	1	14	23	0	0	0	0	0	2	25
17:00	9	0	0	0	0	0	2	11	11	0	0	0	0	0	2	13	20	0	0	0	0	0	4	24
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18:00	17	2	0	0	0	0	0	19	11	1	0	0	0	0	0	12	28	3	0	0	0	0	0	31
18:15	16	3	0	0	0	0	0	19	15	3	0	0	0	0	0	18	31	6	0	0	0	0	0	37
18:30	14	3	0	0	0	0	1	18	18	3	0	0	0	0	0	21	32	6	0	0	0	0	1	39
18:45	17	1	0	0	0	0	1	19	18	2	0	0	0	0	0	20	35	3	0	0	0	0	1	39
19:00	21	1	0	0	0	0	1	23	19	2	0	0	0	0	0	21	40	3	0	0	0	0	1	44

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 1

Date of Survey: 19.11.2016
Site Name: Strand Drive
Survey Type: Two-way Link Count

Arm A: Bessant Drive (W)

Arm B: Strand Drive (E)

	PCU Summary	
Time	A to B	B to A
08:00	1	2
08:15	2	5
08:30	1	9
08:45	1	7
09:00	5	8
09:15	4	2
09:30	2	6
09:45	2	3
10:00	3	8
10:15	3	4
10:30	1	1
10:45	3	3
11:00	4	4
11:15	2	5
11:30	5	2
11:45	3	5
12:00	2	3
12:15	5	4
12:30	5	4
12:45	7	5
13:00	3	4
13:15	5	2
13:30	5	6
13:45	3	4
14:00	6	4
14:15	6	4
14:30	5	3
14:45	7	5
15:00	6	5
15:15	1	4
15:30	1	4
15:45	1	2
16:00	5	2
16:15	6	3
16:30	5	3
16:45	3	7
17:00	3	5
17:15	3	1
17:30	1	0
17:45	2	5
18:00	6	2
18:15	7	2
18:30	6	6
18:45	0	2
19:00	6	8
19:15	5	5
19:30	7	5
19:45	4	3
Start Time	**Rolling Hour**	
08:00	5	23
08:15	9	29
08:30	11	26
08:45	12	23
09:00	13	19
09:15	11	19
09:30	10	21
09:45	9	17
10:00	10	17
10:15	12	12
10:30	10	13
10:45	14	14
11:00	15	16
11:15	12	15
11:30	15	14
11:45	15	16
12:00	19	16
12:15	20	17
12:30	20	15
12:45	20	17
13:00	16	16
13:15	19	16
13:30	20	18
13:45	20	15
14:00	24	16
14:15	24	17
14:30	19	17
14:45	15	18
15:00	9	15
15:15	8	12
15:30	13	11
15:45	17	10
16:00	19	15
16:15	17	18
16:30	14	16
16:45	10	13
17:00	9	11
17:15	12	8
17:30	16	9
17:45	21	15
18:00	19	12
18:15	19	18
18:30	17	21
18:45	18	20
19:00	22	21

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 1

Date of Survey: 19.11.2016
Junction Name: Strand Drive
Junction Type: Two-way Link Count

Arm A: Bessant Drive (W)
Arm B: Strand Drive (E)

Count Method: Vehicles **Classes Included:** All Classes *Select the count method and desired user classes from the drop-downs in cells D8 and G8*

Maximum 15-minute Junction Flow:

AM Peak	**from:**	09:00	**until:**	09:15	**flow:**	13	*AM Peak covers 07:00 until 10:00*
Inter-Peak	**from:**	14:45	**until:**	15:00	**flow:**	12	*Inter-Peak covers 10:00 until 16:00*
PM Peak	**from:**	19:00	**until:**	19:15	**flow:**	14	*PM Peak covers 16:00 until 19:00*

Period Starting: 08:00 *Select the time from the drop-down in cell D16 to show the 15-minute data for that period*

Movement Counts

From \ *To*	A	B	Total
A	0	1	1
B	**3**	0	**3**
Total	**3**	1	4

HGV Proportions

From \ *To*	A	B	Total
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Maximum Hourly Junction Flow:

AM Peak	**from:**	08:15	**until:**	09:15	**flow:**	38
Inter-Peak	**from:**	14:15	**until:**	15:15	**flow:**	41
PM Peak	**from:**	19:00	**until:**	20:00	**flow:**	44

Period Starting: 08:00 *Select the time from the drop-down in cell D31 to show the hourly data for that period*

Movement Counts

From \ *To*	A	B	Total
A	0	5	5
B	**24**	0	**24**
Total	**24**	5	29

HGV Proportions

From \ *To*	A	B	Total
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Bold entries in the above tables indicate the maximum movement, approach and exit flows for the selected time period, and similarly with the HGV proportions

Intelligent Data Collection Limited
Richmond Revision

Client:	PBA
Project Number:	ID02940
Site Number:	Site 1
Date of Survey:	23.11.2016
Site Name:	Strand Drive
Survey Type:	Two-way Link Count

Quality Assurance and Issue Record

Quality Assurance

Revision	Rev A			
Date	13.12.2016			
Prepared by	Gabriela Zelenkova			
Signature				
Checked by	Luke Martin			
Signature				
Project Director	Paul O'Neill			
Signature				
Project number	ID02940			
File Ref	ID02940 Richmond Revision - MCC Site 1 - 23.11.2016			

Issue Sheet

	Date			
Issued to	13.12.2016			
Stephanie Yu	E-mail			

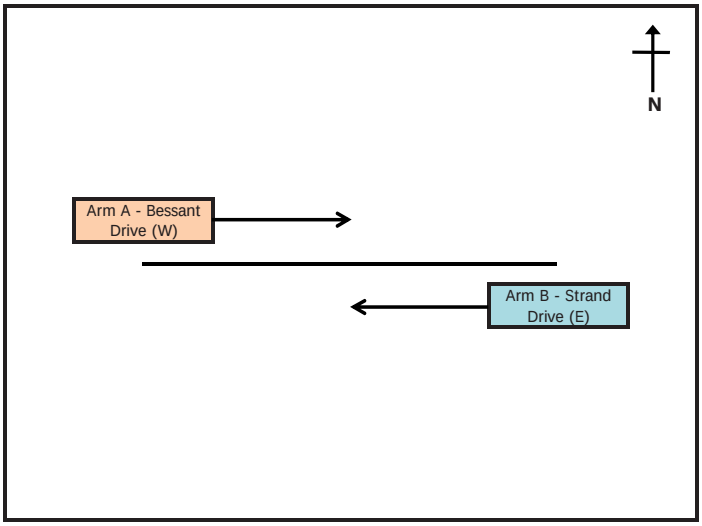
Contents Page

Intelligent Data Collection Limited

Client:	PBA	**Date of Survey:**	23.11.2016
Project Number:	ID02940	**Site Name:**	Strand Drive
Site Number:	Site 1	**Survey Type:**	Two-way Link Count

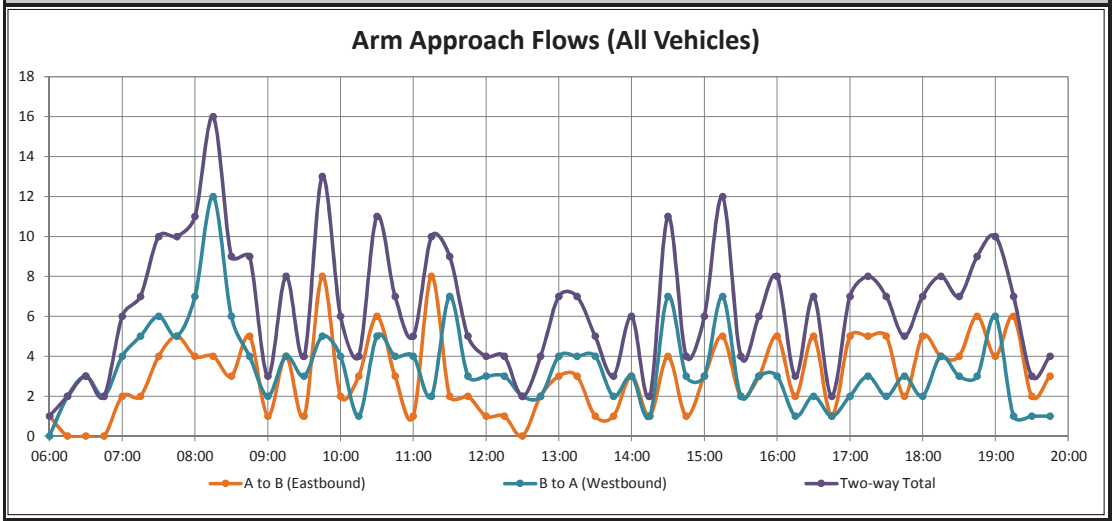
X Coordinate	Y Coordinate	Google Maps Link	
51.479355	-0.278753	Click Here	
AM Peak Conditions	**Inter-Peak Conditions**	**PM Peak Conditions**	
Dry	Dry	Dry	

Junction Layout



Aerial Mapping and On-site Camera View

Junction Flow Profile



Additional Notes (Factors which may impact on survey results such as accidents, roadworks, special events):

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 1

Date of Survey: 23.11.2016
Site Name: Strand Drive
Survey Type: Two-way Link Count

Arm A: Bessant Drive (W)
Arm B: Strand Drive (E)

	A to B (Eastbound)								B to A (Westbound)								Two-way Total							
Time	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total
06:00	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
06:15	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2
06:30	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3	3	0	0	0	0	0	0	3
06:45	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2
07:00	1	1	0	0	0	0	0	2	4	0	0	0	0	0	0	4	5	1	0	0	0	0	0	6
07:15	1	1	0	0	0	0	0	2	4	1	0	0	0	0	0	5	5	2	0	0	0	0	0	7
07:30	2	2	0	0	0	0	0	4	4	1	0	0	0	0	1	6	6	3	0	0	0	0	1	10
07:45	4	1	0	0	0	0	0	5	4	1	0	0	0	0	0	5	8	2	0	0	0	0	0	10
08:00	2	2	0	0	0	0	0	4	7	0	0	0	0	0	0	7	9	2	0	0	0	0	0	11
08:15	4	0	0	0	0	0	0	4	10	2	0	0	0	0	0	12	14	2	0	0	0	0	0	16
08:30	3	0	0	0	0	0	0	3	6	0	0	0	0	0	0	6	9	0	0	0	0	0	0	9
08:45	4	1	0	0	0	0	0	5	4	0	0	0	0	0	0	4	8	1	0	0	0	0	0	9
09:00	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	2	2	1	0	0	0	0	0	3
09:15	2	1	0	0	0	0	1	4	4	0	0	0	0	0	0	4	6	1	0	0	0	0	1	8
09:30	1	0	0	0	0	0	0	1	1	1	0	0	0	0	1	3	2	1	0	0	0	0	1	4
09:45	6	1	0	0	0	0	1	8	4	1	0	0	0	0	0	5	10	2	0	0	0	0	1	13
10:00	2	0	0	0	0	0	0	2	4	0	0	0	0	0	0	4	6	0	0	0	0	0	0	6
10:15	3	0	0	0	0	0	0	3	1	0	0	0	0	0	0	1	4	0	0	0	0	0	0	4
10:30	3	3	0	0	0	0	0	6	4	1	0	0	0	0	0	5	7	4	0	0	0	0	0	11
10:45	2	1	0	0	0	0	0	3	3	1	0	0	0	0	0	4	5	2	0	0	0	0	0	7
11:00	0	1	0	0	0	0	0	1	3	1	0	0	0	0	0	4	3	2	0	0	0	0	0	5
11:15	5	3	0	0	0	0	0	8	1	0	0	0	0	0	1	2	6	3	0	0	0	0	1	10
11:30	2	0	0	0	0	0	0	2	3	4	0	0	0	0	0	7	5	4	0	0	0	0	0	9
11:45	2	0	0	0	0	0	0	2	3	0	0	0	0	0	0	3	5	0	0	0	0	0	0	5
12:00	0	1	0	0	0	0	0	1	3	0	0	0	0	0	0	3	3	1	0	0	0	0	0	4
12:15	1	0	0	0	0	0	0	1	3	0	0	0	0	0	0	3	4	0	0	0	0	0	0	4
12:30	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2
12:45	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	4	0	0	0	0	0	0	4
13:00	3	0	0	0	0	0	0	3	3	1	0	0	0	0	0	4	6	1	0	0	0	0	0	7
13:15	2	1	0	0	0	0	0	3	3	1	0	0	0	0	0	4	5	2	0	0	0	0	0	7
13:30	1	0	0	0	0	0	0	1	3	1	0	0	0	0	0	4	4	1	0	0	0	0	0	5
13:45	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	2	2	0	0	0	0	0	1	3
14:00	1	1	0	0	0	0	1	3	1	1	0	0	0	0	1	3	2	2	0	0	0	0	2	6
14:15	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	2
14:30	3	0	0	0	0	1	0	4	4	1	0	0	0	2	0	7	7	1	0	0	0	3	0	11
14:45	1	0	0	0	0	0	0	1	3	0	0	0	0	0	0	3	4	0	0	0	0	0	0	4
15:00	2	1	0	0	0	0	0	3	3	0	0	0	0	0	0	3	5	1	0	0	0	0	0	6
15:15	4	1	0	0	0	0	0	5	3	4	0	0	0	0	0	7	7	5	0	0	0	0	0	12
15:30	0	1	0	0	0	0	1	2	1	1	0	0	0	0	0	2	1	2	0	0	0	0	1	4
15:45	3	0	0	0	0	0	0	3	3	0	0	0	0	0	0	3	6	0	0	0	0	0	0	6
16:00	5	0	0	0	0	0	0	5	3	0	0	0	0	0	0	3	8	0	0	0	0	0	0	8
16:15	1	0	0	0	0	0	1	2	1	0	0	0	0	0	0	1	2	0	0	0	0	0	1	3
16:30	5	0	0	0	0	0	0	5	2	0	0	0	0	0	0	2	7	0	0	0	0	0	0	7
16:45	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	2
17:00	2	3	0	0	0	0	0	5	0	2	0	0	0	0	0	2	2	5	0	0	0	0	0	7
17:15	4	0	0	0	0	0	1	5	1	2	0	0	0	0	0	3	5	2	0	0	0	0	1	8
17:30	5	0	0	0	0	0	0	5	2	0	0	0	0	0	0	2	7	0	0	0	0	0	0	7
17:45	2	0	0	0	0	0	0	2	3	0	0	0	0	0	0	3	5	0	0	0	0	0	0	5
18:00	5	0	0	0	0	0	0	5	2	0	0	0	0	0	0	2	7	0	0	0	0	0	0	7
18:15	3	0	0	0	0	0	1	4	4	0	0	0	0	0	0	4	7	0	0	0	0	0	1	8
18:30	4	0	0	0	0	0	0	4	3	0	0	0	0	0	0	3	7	0	0	0	0	0	0	7
18:45	6	0	0	0	0	0	0	6	3	0	0	0	0	0	0	3	9	0	0	0	0	0	0	9
19:00	4	0	0	0	0	0	0	4	6	0	0	0	0	0	0	6	10	0	0	0	0	0	0	10
19:15	6	0	0	0	0	0	0	6	1	0	0	0	0	0	0	1	7	0	0	0	0	0	0	7
19:30	2	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1	3	0	0	0	0	0	0	3
19:45	3	0	0	0	0	0	0	3	1	0	0	0	0	0	0	1	4	0	0	0	0	0	0	4
Start Time	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**
06:00	1	0	0	0	0	0	0	1	7	0	0	0	0	0	0	7	8	0	0	0	0	0	0	8
06:15	1	1	0	0	0	0	0	2	11	0	0	0	0	0	0	11	12	1	0	0	0	0	0	13
06:30	2	2	0	0	0	0	0	4	13	1	0	0	0	0	0	14	15	3	0	0	0	0	0	18
06:45	4	4	0	0	0	0	0	8	14	2	0	0	0	0	1	17	18	6	0	0	0	0	1	25
07:00	8	5	0	0	0	0	0	13	16	3	0	0	0	0	1	20	24	8	0	0	0	0	1	33
07:15	9	6	0	0	0	0	0	15	19	3	0	0	0	0	1	23	28	9	0	0	0	0	1	38
07:30	12	5	0	0	0	0	0	17	25	4	0	0	0	0	1	30	37	9	0	0	0	0	1	47
07:45	13	3	0	0	0	0	0	16	27	3	0	0	0	0	0	30	40	6	0	0	0	0	0	46
08:00	13	3	0	0	0	0	0	16	27	2	0	0	0	0	0	29	40	5	0	0	0	0	0	45
08:15	12	1	0	0	0	0	0	13	21	3	0	0	0	0	0	24	33	4	0	0	0	0	0	37
08:30	10	2	0	0	0	0	1	13	15	1	0	0	0	0	0	16	25	3	0	0	0	0	1	29
08:45	8	2	0	0	0	0	1	11	10	2	0	0	0	0	1	13	18	4	0	0	0	0	2	24
09:00	10	2	0	0	0	0	2	14	10	3	0	0	0	0	1	14	20	5	0	0	0	0	3	28
09:15	11	2	0	0	0	0	2	15	13	2	0	0	0	0	1	16	24	4	0	0	0	0	3	31
09:30	12	1	0	0	0	0	1	14	10	2	0	0	0	0	1	13	22	3	0	0	0	0	2	27
09:45	14	4	0	0	0	0	1	19	13	2	0	0	0	0	0	15	27	6	0	0	0	0	1	34
10:00	10	4	0	0	0	0	0	14	12	2	0	0	0	0	0	14	22	6	0	0	0	0	0	28
10:15	8	5	0	0	0	0	0	13	11	3	0	0	0	0	0	14	19	8	0	0	0	0	0	27
10:30	10	8	0	0	0	0	0	18	11	3	0	0	0	0	1	15	21	11	0	0	0	0	1	33
10:45	9	5	0	0	0	0	0	14	10	6	0	0	0	0	1	17	19	11	0	0	0	0	1	31
11:00	9	4	0	0	0	0	0	13	10	5	0	0	0	0	1	16	19	9	0	0	0	0	1	29
11:15	9	4	0	0	0	0	0	13	10	4	0	0	0	0	1	15	19	8	0	0	0	0	1	28
11:30	5	1	0	0	0	0	0	6	12	4	0	0	0	0	0	16	17	5	0	0	0	0	0	22
11:45	3	1	0	0	0	0	0	4	11	0	0	0	0	0	0	11	14	1	0	0	0	0	0	15
12:00	3	1	0	0	0	0	0	4	10	0	0	0	0	0	0	10	13	1	0	0	0	0	0	14
12:15	6	0	0	0	0	0	0	6	10	1	0	0	0	0	0	11	16	1	0	0	0	0	0	17
12:30	7	1	0	0	0	0	0	8	10	2	0	0	0	0	0	12	17	3	0	0	0	0	0	20
12:45	8	1	0	0	0	0	0	9	11	3	0	0	0	0	0	14	19	4	0	0	0	0	0	23
13:00	7	1	0	0	0	0	0	8	10	3	0	0	0	0	1	14	17	4	0	0	0	0	1	22
13:15	5	2	0	0	0	0	1	8	8	3	0	0	0	0	2	13	13	5	0	0	0	0	3	21
13:30	4	1	0	0	0	0	1	6	6	2	0	0	0	0	2	10	10	3	0	0	0	0	3	16
13:45	6	1	0	0	0	1	1	9	7	2	0	0	0	2	2	13	13	3	0	0	0	3	3	22
14:00	6	1	0	0	0	1	1	9	9	2	0	0	0	2	1	14	15	3	0	0	0	3	2	23
14:15	7	1	0	0	0	1	0	9	11	1	0	0	0	2	0	14	18	2	0	0	0	3	0	23
14:30	10	2	0	0	0	1	0	13	13	5	0	0	0	2	0	20	23	7	0	0	0	3	0	33
14:45	7	3	0	0	0	0	1	11	10	5	0	0	0	0	0	15	17	8	0	0	0	0	1	26
15:00	9	3	0	0	0	0	1	13	10	5	0	0	0	0	0	15	19	8	0	0	0	0	1	28
15:15	12	2	0	0	0	0	1	15	10	5	0	0	0	0	0	15	22	7	0	0	0	0	1	30
15:30	9	1	0	0	0	0	2	12	8	1	0	0	0	0	0	9	17	2	0	0	0	0	2	21
15:45	14	0	0	0	0	0	1	15	9	0	0	0	0	0	0	9	23	0	0	0	0	0	1	24
16:00	12	0	0	0	0	0	1	13	7	0	0	0	0	0	0	7	19	0	0	0	0	0	1	20
16:15	9	3	0	0	0	0	1	13	4	2	0	0	0	0	0	6	13	5	0	0	0	0	1	19
16:30	12	3	0	0	0	0	1	16	4	4	0	0	0	0	0	8	16	7	0	0	0	0	1	24
16:45	12	3	0	0	0	0	1	16	4	4	0	0	0	0	0	8	16	7	0	0	0	0	1	24
17:00	13	3	0	0	0	0	1	17	6	4	0	0	0	0	0	10	19	7	0	0	0	0	1	27
17:15	16	0	0	0	0	0	1	17	8	2	0	0	0	0	0	10	24	2	0	0	0	0	1	27
17:30	15	0	0	0	0	0	1	16	11	0	0	0	0	0	0	11	26	0	0	0	0	0	1	27
17:45	14	0	0	0	0	0	1	15	12	0	0	0	0	0	0	12	26	0	0	0	0	0	1	27
18:00	18	0	0	0	0	0	1	19	12	0	0	0	0	0	0	12	30	0	0	0	0	0	1	31
18:15	17	0	0	0	0	0	1	18	16	0	0	0	0	0	0	16	33	0	0	0	0	0	1	34
18:30	20	0	0	0	0	0	0	20	13	0	0	0	0	0	0	13	33	0	0	0	0	0	0	33
18:45	18	0	0	0	0	0	0	18	11	0	0	0	0	0	0	11	29	0	0	0	0	0	0	29
19:00	15	0	0	0	0	0	0	15	9	0	0	0	0	0	0	9	24	0	0	0	0	0	0	24

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 1

Date of Survey: 23.11.2016
Site Name: Strand Drive
Survey Type: Two-way Link Count

Arm A: Bessant Drive (W)

Arm B: Strand Drive (E)

	PCU Summary	
Time	A to B	B to A
06:00	1	0
06:15	0	2
06:30	0	3
06:45	0	2
07:00	2	4
07:15	2	5
07:30	4	5
07:45	5	5
08:00	4	7
08:15	4	12
08:30	3	6
08:45	5	4
09:00	1	2
09:15	3	4
09:30	1	2
09:45	7	5
10:00	2	4
10:15	3	1
10:30	6	5
10:45	3	4
11:00	1	4
11:15	8	1
11:30	2	7
11:45	2	3
12:00	1	3
12:15	1	3
12:30	0	2
12:45	2	2
13:00	3	4
13:15	3	4
13:30	1	4
13:45	1	1
14:00	2	2
14:15	1	1
14:30	3	6
14:45	1	3
15:00	3	3
15:15	5	7
15:30	1	2
15:45	3	3
16:00	5	3
16:15	1	1
16:30	5	2
16:45	1	1
17:00	5	2
17:15	4	3
17:30	5	2
17:45	2	3
18:00	5	2
18:15	3	4
18:30	4	3
18:45	6	3
19:00	4	6
19:15	6	1
19:30	2	1
19:45	3	1

Start Time	Rolling Hour	
06:00	1	7
06:15	2	11
06:30	4	14
06:45	8	16
07:00	13	19
07:15	15	22
07:30	17	29
07:45	16	30
08:00	16	29
08:15	13	24
08:30	12	16
08:45	10	12
09:00	12	13
09:15	13	15
09:30	13	12
09:45	18	15
10:00	14	14
10:15	13	14
10:30	18	14
10:45	14	16
11:00	13	15
11:15	13	14
11:30	6	16
11:45	4	11
12:00	4	10
12:15	6	11
12:30	8	12
12:45	9	14
13:00	8	13
13:15	7	11
13:30	5	8
13:45	8	10
14:00	8	12
14:15	8	13
14:30	12	19
14:45	10	15
15:00	12	15
15:15	14	15
15:30	10	9
15:45	14	9
16:00	12	7
16:15	12	6
16:30	15	8
16:45	15	8
17:00	16	10
17:15	16	10
17:30	15	11
17:45	14	12
18:00	18	12
18:15	17	16
18:30	20	13
18:45	18	11
19:00	15	9

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 1

Date of Survey: 23.11.2016
Junction Name: Strand Drive
Junction Type: Two-way Link Count

Arm A: Bessant Drive (W)
Arm B: Strand Drive (E)

Count Method: Vehicles **Classes Included:** All Classes *Select the count method and desired user classes from the drop-downs in cells D8 and G8*

Maximum 15-minute Junction Flow:

AM Peak	**from:**	07:30	**until:**	07:45	**flow:**	10	*AM Peak covers 08:00 until 10:00*
Inter-Peak	**from:**	08:15	**until:**	08:30	**flow:**	16	*Inter-Peak covers 10:00 until 16:00*
PM Peak	**from:**	15:15	**until:**	15:30	**flow:**	12	*PM Peak covers 16:00 until 20:00*

Period Starting: 06:00 *Select the time from the drop-down in cell D16 to show the 15-minute data for that period*

Movement Counts

From \ *To*	A	B	Total
A	0	**1**	**1**
B	0	0	0
Total	0	**1**	1

HGV Proportions

From \ *To*	A	B	Total
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Maximum Hourly Junction Flow:

AM Peak	**from:**	07:30	**until:**	08:30	**flow:**	47	
Inter-Peak	**from:**	08:00	**until:**	09:00	**flow:**	45	
PM Peak	**from:**	14:30	**until:**	15:30	**flow:**	33	

Period Starting: 06:00 *Select the time from the drop-down in cell D31 to show the hourly data for that period*

Movement Counts

From \ *To*	A	B	Total
A	0	1	1
B	**7**	0	**7**
Total	**7**	1	8

HGV Proportions

From \ *To*	A	B	Total
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Bold entries in the above tables indicate the maximum movement, approach and exit flows for the selected time period, and similarly with the HGV proportions

Intelligent Data Collection Limited
Richmond Revision

Client:	PBA
Project Number:	ID02940
Site Number:	Site 2
Date of Survey:	17.11.2016
Site Name:	Melliss Avenue
Survey Type:	Two-way Link Count

Quality Assurance and Issue Record

Quality Assurance

Revision	Rev A			
Date	02.12.2016			
Prepared by	David Brown			
Signature				
Checked by	Fay Underwood			
Signature				
Project Director	Paul O'Neill			
Signature				
Project number	ID02940			
File Ref	ID02940 Richmond Revision - MCC Site 2 - 17.11.2016			

Issue Sheet

	Date			
Issued to	02.12.2016			
Stephanie Yu	E-mail			

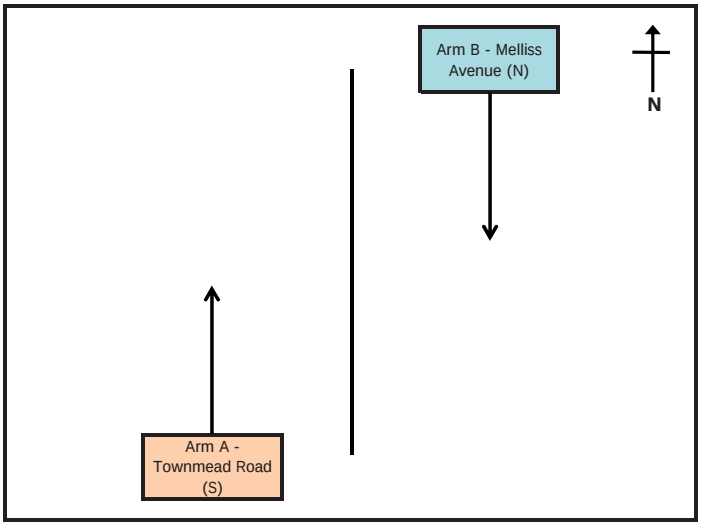
Contents Page

Intelligent Data Collection Limited

Client:	PBA	**Date of Survey:**	17.11.2016
Project Number:	ID02940	**Site Name:**	Melliss Avenue
Site Number:	Site 2	**Survey Type:**	Two-way Link Count

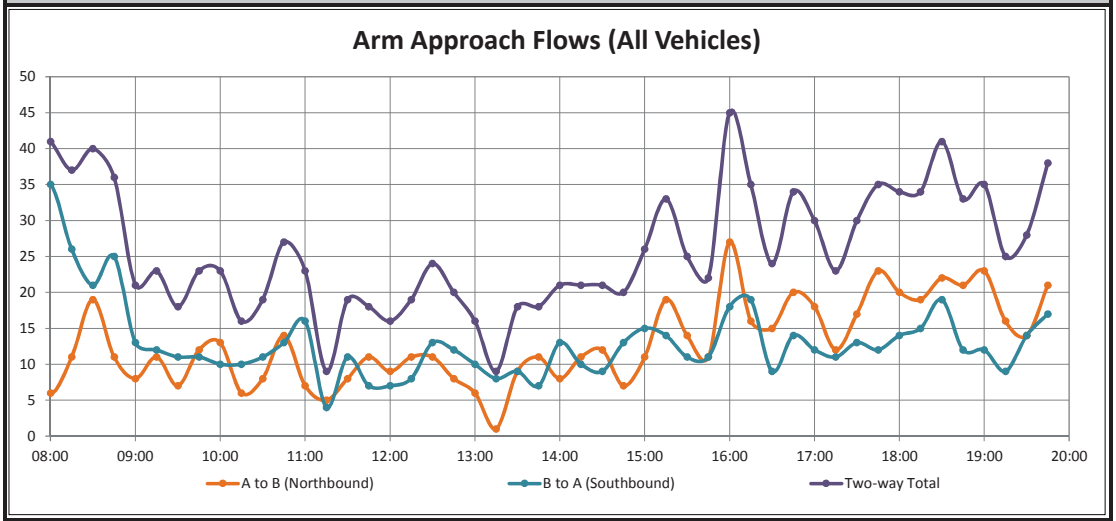
X Coordinate	Y Coordinate	Google Maps Link	
51.474694	-0.276218	Click Here	
AM Peak Conditions	**Inter-Peak Conditions**	**PM Peak Conditions**	
Dry	Dry	Dry	

Junction Layout



Aerial Mapping and On-site Camera View

Junction Flow Profile



Additional Notes (Factors which may impact on survey results such as accidents, roadworks, special events):

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 2

Date of Survey: 17.11.2016
Site Name: Melliss Avenue
Survey Type: Two-way Link Count

Arm A: Townmead Road (S)
Arm B: Melliss Avenue (N)

	A to B (Northbound)								B to A (Southbound)								Two-way Total							
Time	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total
06:00	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
06:15	4	0	0	0	0	0	0	4	5	0	0	0	0	0	1	6	9	0	0	0	0	0	1	10
06:30	2	0	0	0	0	0	1	3	7	0	0	0	0	0	0	7	9	0	0	0	0	0	1	10
06:45	4	1	0	0	0	1	1	7	6	0	0	0	0	0	1	7	10	1	0	0	0	1	2	14
07:00	3	1	0	0	0	0	1	5	12	1	0	0	0	0	0	13	15	2	0	0	0	0	1	18
07:15	7	1	0	0	0	0	0	8	14	0	0	0	0	2	1	17	21	1	0	0	0	2	1	25
07:30	10	0	0	0	0	1	2	13	18	0	0	0	0	1	2	21	28	0	0	0	0	2	4	34
07:45	11	1	0	0	0	0	0	12	26	1	0	0	0	0	4	31	37	2	0	0	0	0	4	43
08:00	4	1	1	0	0	0	0	6	33	0	0	0	0	0	2	35	37	1	1	0	0	0	2	41
08:15	10	1	0	0	0	0	0	11	23	1	0	0	0	1	1	26	33	2	0	0	0	1	1	37
08:30	17	1	0	0	0	0	1	19	18	1	0	0	0	0	2	21	35	2	0	0	0	0	3	40
08:45	9	1	0	0	0	0	1	11	22	0	0	0	0	1	2	25	31	1	0	0	0	1	3	36
09:00	6	2	0	0	0	0	0	8	11	2	0	0	0	0	0	13	17	4	0	0	0	0	0	21
09:15	9	1	0	0	0	0	1	11	8	3	0	0	0	1	0	12	17	4	0	0	0	1	1	23
09:30	5	2	0	0	0	0	0	7	9	2	0	0	0	0	0	11	14	4	0	0	0	0	0	18
09:45	4	4	1	0	0	1	2	12	6	2	1	0	0	0	2	11	10	6	2	0	0	1	4	23
10:00	10	3	0	0	0	0	0	13	9	0	0	0	0	1	0	10	19	3	0	0	0	1	0	23
10:15	6	0	0	0	0	0	0	6	8	2	0	0	0	0	0	10	14	2	0	0	0	0	0	16
10:30	8	0	0	0	0	0	0	8	10	1	0	0	0	0	0	11	18	1	0	0	0	0	0	19
10:45	10	4	0	0	0	0	0	14	11	2	0	0	0	0	0	13	21	6	0	0	0	0	0	27
11:00	6	0	0	0	0	0	1	7	11	4	1	0	0	0	0	16	17	4	1	0	0	0	1	23
11:15	3	1	0	0	0	0	1	5	4	0	0	0	0	0	0	4	7	1	0	0	0	0	1	9
11:30	5	1	1	0	0	0	1	8	9	1	0	0	0	0	1	11	14	2	1	0	0	0	2	19
11:45	7	4	0	0	0	0	0	11	2	4	1	0	0	0	0	7	9	8	1	0	0	0	0	18
12:00	6	2	1	0	0	0	0	9	4	3	0	0	0	0	0	7	10	5	1	0	0	0	0	16
12:15	6	4	0	0	0	0	1	11	4	4	0	0	0	0	0	8	10	8	0	0	0	0	1	19
12:30	7	1	1	0	0	1	1	11	11	0	0	0	0	0	2	13	18	1	1	0	0	1	3	24
12:45	4	2	0	0	0	1	1	8	8	2	1	0	0	1	0	12	12	4	1	0	0	2	1	20
13:00	6	0	0	0	0	0	0	6	5	3	0	0	0	1	1	10	11	3	0	0	0	1	1	16
13:15	0	1	0	0	0	0	0	1	8	0	0	0	0	0	0	8	8	1	0	0	0	0	0	9
13:30	6	3	0	0	0	0	0	9	5	1	1	0	0	1	1	9	11	4	1	0	0	1	1	18
13:45	9	2	0	0	0	0	0	11	6	1	0	0	0	0	0	7	15	3	0	0	0	0	0	18
14:00	6	1	0	0	0	1	0	8	9	3	0	0	0	0	1	13	15	4	0	0	0	1	1	21
14:15	9	2	0	0	0	0	0	11	9	1	0	0	0	0	0	10	18	3	0	0	0	0	0	21
14:30	11	1	0	0	0	0	0	12	6	3	0	0	0	0	0	9	17	4	0	0	0	0	0	21
14:45	6	1	0	0	0	0	0	7	12	1	0	0	0	0	0	13	18	2	0	0	0	0	0	20
15:00	10	1	0	0	0	0	0	11	14	1	0	0	0	0	0	15	24	2	0	0	0	0	0	26
15:15	14	1	0	0	0	0	4	19	12	1	0	0	0	1	0	14	26	2	0	0	0	1	4	33
15:30	13	0	0	0	0	0	1	14	10	1	0	0	0	0	0	11	23	1	0	0	0	0	1	25
15:45	9	0	0	0	0	1	1	11	8	1	0	0	0	2	0	11	17	1	0	0	0	3	1	22
16:00	24	2	0	0	0	0	1	27	17	1	0	0	0	0	0	18	41	3	0	0	0	0	1	45
16:15	13	0	0	0	0	1	2	16	15	3	0	0	0	1	0	19	28	3	0	0	0	2	2	35
16:30	13	1	0	0	0	0	1	15	7	2	0	0	0	0	0	9	20	3	0	0	0	0	1	24
16:45	19	0	0	0	0	0	1	20	13	1	0	0	0	0	0	14	32	1	0	0	0	0	1	34
17:00	16	0	0	0	0	1	1	18	12	0	0	0	0	0	0	12	28	0	0	0	0	1	1	30
17:15	8	0	0	0	0	2	2	12	10	0	0	0	0	1	0	11	18	0	0	0	0	3	2	23
17:30	16	1	0	0	0	0	0	17	11	1	0	0	0	1	0	13	27	2	0	0	0	1	0	30
17:45	19	2	0	0	0	0	2	23	8	1	0	0	0	1	2	12	27	3	0	0	0	1	4	35
18:00	18	1	0	0	0	0	1	20	14	0	0	0	0	0	0	14	32	1	0	0	0	0	1	34
18:15	17	0	0	0	0	1	1	19	13	1	0	0	0	1	0	15	30	1	0	0	0	2	1	34
18:30	17	0	0	0	0	3	2	22	16	0	0	0	0	2	1	19	33	0	0	0	0	5	3	41
18:45	18	0	0	0	0	2	1	21	9	0	0	0	0	0	3	12	27	0	0	0	0	2	4	33
19:00	22	0	0	0	0	0	1	23	11	1	0	0	0	0	0	12	33	1	0	0	0	0	1	35
19:15	12	1	0	0	0	2	1	16	7	0	0	0	0	2	0	9	19	1	0	0	0	4	1	25
19:30	11	2	0	0	0	1	0	14	14	0	0	0	0	0	0	14	25	2	0	0	0	1	0	28
19:45	18	0	0	0	0	2	1	21	13	1	0	0	0	2	1	17	31	1	0	0	0	4	2	38
Start Time	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**
06:00	11	1	0	0	0	1	2	15	18	0	0	0	0	0	2	20	29	1	0	0	0	1	4	35
06:15	19	2	0	0	0	1	3	19	30	1	0	0	0	0	2	33	43	3	0	0	0	1	5	52
06:30	16	3	0	0	0	1	3	23	39	1	0	0	0	2	2	44	55	4	0	0	0	3	5	67
06:45	24	3	0	0	0	2	4	33	50	1	0	0	0	3	4	58	74	4	0	0	0	5	8	91
07:00	31	3	0	0	0	1	3	38	70	2	0	0	0	3	7	82	101	5	0	0	0	4	10	120
07:15	32	3	1	0	0	1	2	39	91	1	0	0	0	3	9	104	123	4	1	0	0	4	11	143
07:30	35	3	1	0	0	1	2	42	100	2	0	0	0	2	9	113	135	5	1	0	0	3	11	155
07:45	42	4	1	0	0	0	1	48	100	3	0	0	0	1	9	113	142	7	1	0	0	1	10	161
08:00	40	4	1	0	0	0	2	47	96	2	0	0	0	2	7	107	136	6	1	0	0	2	9	154
08:15	42	5	0	0	0	0	2	49	74	4	0	0	0	2	5	85	116	9	0	0	0	2	7	134
08:30	41	5	0	0	0	0	3	49	59	6	0	0	0	2	4	71	100	11	0	0	0	2	7	120
08:45	29	6	0	0	0	0	2	37	50	7	0	0	0	2	2	61	79	13	0	0	0	2	4	98
09:00	24	9	1	0	0	1	3	38	34	9	1	0	0	1	2	47	58	18	2	0	0	2	5	85
09:15	28	10	1	0	0	1	3	43	32	7	1	0	0	2	2	44	60	17	2	0	0	3	5	87
09:30	25	9	1	0	0	1	2	38	32	6	1	0	0	1	2	42	57	15	2	0	0	2	4	80
09:45	28	7	1	0	0	1	2	39	33	5	1	0	0	1	2	42	61	12	2	0	0	2	4	81
10:00	34	7	0	0	0	0	0	41	38	5	0	0	0	1	0	44	72	12	0	0	0	1	0	85
10:15	30	4	0	0	0	0	1	35	40	9	1	0	0	0	0	50	70	13	1	0	0	0	1	85
10:30	27	5	0	0	0	0	2	34	36	7	1	0	0	0	0	44	63	12	1	0	0	0	2	78
10:45	24	6	1	0	0	0	3	34	35	7	1	0	0	0	1	44	59	13	2	0	0	0	4	78
11:00	21	6	1	0	0	0	3	31	26	9	2	0	0	0	1	38	47	15	3	0	0	0	4	69
11:15	21	8	2	0	0	0	2	33	19	8	1	0	0	0	1	29	40	16	3	0	0	0	3	62
11:30	24	11	2	0	0	0	2	39	19	12	1	0	0	0	1	33	43	23	3	0	0	0	3	72
11:45	26	11	2	0	0	1	2	42	21	11	1	0	0	0	2	35	47	22	3	0	0	1	4	77
12:00	23	9	2	0	0	2	3	39	27	9	1	0	0	1	2	40	50	18	3	0	0	3	5	79
12:15	23	7	1	0	0	2	3	36	28	9	1	0	0	2	3	43	51	16	2	0	0	4	6	79
12:30	17	4	1	0	0	2	2	26	32	5	1	0	0	2	3	43	49	9	2	0	0	4	5	69
12:45	16	6	0	0	0	1	1	24	26	6	2	0	0	3	2	39	42	12	2	0	0	4	3	63
13:00	21	6	0	0	0	0	0	27	24	5	1	0	0	2	2	34	45	11	1	0	0	2	2	61
13:15	21	7	0	0	0	1	0	29	28	5	1	0	0	1	2	37	49	12	1	0	0	2	2	66
13:30	30	8	0	0	0	1	0	39	29	6	1	0	0	1	2	39	59	14	1	0	0	2	2	78
13:45	35	6	0	0	0	1	0	42	30	8	0	0	0	0	1	39	65	14	0	0	0	1	1	81
14:00	32	5	0	0	0	1	0	38	36	8	0	0	0	0	1	45	68	13	0	0	0	1	1	83
14:15	36	5	0	0	0	0	0	41	41	6	0	0	0	0	0	47	77	11	0	0	0	0	0	88
14:30	41	4	0	0	0	0	4	49	44	6	0	0	0	1	0	51	85	10	0	0	0	1	4	100
14:45	43	3	0	0	0	0	5	51	48	4	0	0	0	1	0	53	91	7	0	0	0	1	5	104
15:00	46	2	0	0	0	1	6	55	44	4	0	0	0	3	0	51	90	6	0	0	0	4	6	106
15:15	60	3	0	0	0	1	7	71	47	4	0	0	0	3	0	54	107	7	0	0	0	4	7	125
15:30	59	2	0	0	0	2	5	68	50	6	0	0	0	3	0	59	109	8	0	0	0	5	5	127
15:45	59	3	0	0	0	2	5	69	47	7	0	0	0	3	0	57	106	10	0	0	0	5	5	126
16:00	69	3	0	0	0	1	5	78	52	7	0	0	0	1	0	60	121	10	0	0	0	2	5	138
16:15	61	1	0	0	0	2	5	69	47	6	0	0	0	1	0	54	108	7	0	0	0	3	5	123
16:30	56	1	0	0	0	3	5	65	42	3	0	0	0	1	0	46	98	4	0	0	0	4	5	111
16:45	59	1	0	0	0	3	4	67	46	2	0	0	0	2	0	50	105	3	0	0	0	5	4	117
17:00	59	3	0	0	0	3	5	70	41	2	0	0	0	3	2	48	100	5	0	0	0	6	7	118
17:15	61	4	0	0	0	2	5	72	43	2	0	0	0	3	2	50	104	6	0	0	0	5	7	122
17:30	70	4	0	0	0	1	4	79	46	3	0	0	0	3	2	54	116	7	0	0	0	4	6	133
17:45	71	3	0	0	0	4	6	84	51	2	0	0	0	4	3	60	122	5	0	0	0	8	9	144
18:00	70	1	0	0	0	6	5	82	52	1	0	0	0	3	4	60	122	2	0	0	0	9	9	142
18:15	74	0	0	0	0	6	5	85	49	2	0	0	0	3	4	58	123	2	0	0	0	9	9	143
18:30	69	1	0	0	0	7	5	82	43	1	0	0	0	4	4	52	112	2	0	0	0	11	9	134
18:45	63	3	0	0	0	5	3	74	41	1	0	0	0	2	3	47	104	4	0	0	0	7	6	121
19:00	63	3	0	0	0	5	3	74	45	2	0	0	0	4	1	52	108	5	0	0	0	9	4	126

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 2

Date of Survey: 17.11.2016
Site Name: Melliss Avenue
Survey Type: Two-way Link Count

Arm A: Townmead Road (S)

Arm B: Melliss Avenue (N)

	PCU Summary	
Time	A to B	B to A
06:00	1	0
06:15	4	5
06:30	2	7
06:45	6	6
07:00	4	13
07:15	8	15
07:30	11	19
07:45	12	28
08:00	7	33
08:15	11	25
08:30	18	19
08:45	10	23
09:00	8	13
09:15	10	11
09:30	7	11
09:45	11	10
10:00	13	9
10:15	6	10
10:30	8	11
10:45	14	13
11:00	6	17
11:15	4	4
11:30	8	10
11:45	11	8
12:00	10	7
12:15	10	8
12:30	11	11
12:45	7	12
13:00	6	9
13:15	1	8
13:30	9	9
13:45	11	7
14:00	7	12
14:15	11	10
14:30	12	9
14:45	7	13
15:00	11	15
15:15	16	13
15:30	13	11
15:45	10	10
16:00	26	18
16:15	14	18
16:30	14	9
16:45	19	14
17:00	17	12
17:15	9	10
17:30	17	12
17:45	21	10
18:00	19	14
18:15	18	14
18:30	19	17
18:45	19	10
19:00	22	12
19:15	14	8
19:30	13	14
19:45	19	15

Start Time	Rolling Hour	
06:00	13	18
06:15	16	31
06:30	20	41
06:45	29	53
07:00	35	75
07:15	38	95
07:30	41	105
07:45	48	105
08:00	46	100
08:15	47	80
08:30	47	67
08:45	35	58
09:00	36	46
09:15	41	42
09:30	37	41
09:45	38	41
10:00	41	43
10:15	34	51
10:30	32	45
10:45	33	44
11:00	30	39
11:15	33	29
11:30	39	33
11:45	42	34
12:00	37	39
12:15	33	40
12:30	24	40
12:45	23	37
13:00	27	32
13:15	28	36
13:30	38	38
13:45	41	38
14:00	37	44
14:15	41	47
14:30	46	50
14:45	47	52
15:00	50	49
15:15	65	52
15:30	63	57
15:45	64	55
16:00	73	59
16:15	64	53
16:30	59	45
16:45	62	49
17:00	64	45
17:15	67	47
17:30	75	51
17:45	77	55
18:00	74	55
18:15	77	53
18:30	74	46
18:45	69	43
19:00	69	49

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 2

Date of Survey: 17.11.2016
Junction Name: Melliss Avenue
Junction Type: Two-way Link Count

Arm A: Townmead Road (S)
Arm B: Melliss Avenue (N)

Count Method: Vehicles **Classes Included:** All Classes *Select the count method and desired user classes from the drop-downs in cells D8 and G8*

Maximum 15-minute Junction Flow:

AM Peak	**from:**	07:45	**until:**	08:00	**flow:**	43	*AM Peak covers 08:00 until 10:00*
Inter-Peak	**from:**	08:00	**until:**	08:15	**flow:**	41	*Inter-Peak covers 10:00 until 16:00*
PM Peak	**from:**	16:00	**until:**	16:15	**flow:**	45	*PM Peak covers 16:00 until 20:00*

Period Starting: 06:00 *Select the time from the drop-down in cell D16 to show the 15-minute data for that period*

Movement Counts

From \ *To*	A	B	Total
A	0	**1**	**1**
B	0	0	0
Total	0	**1**	1

HGV Proportions

From \ *To*	A	B	Total
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Maximum Hourly Junction Flow:

AM Peak	**from:**	07:45	**until:**	08:45	**flow:**	161
Inter-Peak	**from:**	08:00	**until:**	09:00	**flow:**	154
PM Peak	**from:**	17:45	**until:**	18:45	**flow:**	144

Period Starting: 06:00 *Select the time from the drop-down in cell D31 to show the hourly data for that period*

Movement Counts

From \ *To*	A	B	Total
A	0	15	15
B	**20**	0	**20**
Total	**20**	15	35

HGV Proportions

From \ *To*	A	B	Total
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Bold entries in the above tables indicate the maximum movement, approach and exit flows for the selected time period, and similarly with the HGV proportions

Intelligent Data Collection Limited
Richmond Revision

Client:	PBA
Project Number:	ID02940
Site Number:	Site 2
Date of Survey:	19.11.2016
Site Name:	Melliss Avenue
Survey Type:	Two-way Link Count

Quality Assurance and Issue Record

Quality Assurance

Revision	Rev A			
Date	02.12.2016			
Prepared by	David Brown			
Signature				
Checked by	Fay Underwood			
Signature				
Project Director	Paul O'Neill			
Signature				
Project number	ID02940			
File Ref	ID02940 Richmond Revision - MCC Site 2 - 19.11.2016			

Issue Sheet

	Date			
Issued to	02.12.2016			
Stephanie Yu	E-mail			

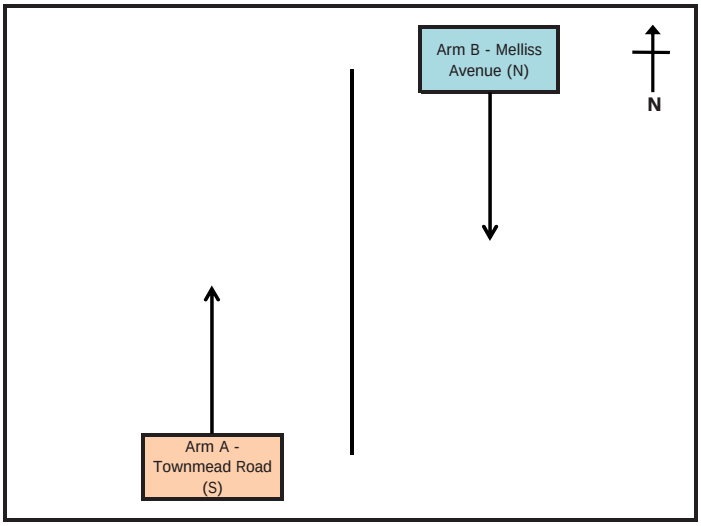
Contents Page

Intelligent Data Collection Limited

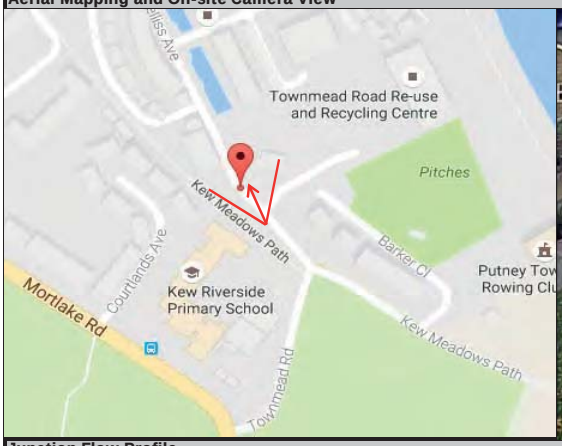
Client:	PBA	**Date of Survey:**	19.11.2016
Project Number:	ID02940	**Site Name:**	Melliss Avenue
Site Number:	Site 2	**Survey Type:**	Two-way Link Count

X Coordinate	Y Coordinate	Google Maps Link	
51.474694	-0.276218	Click Here	
AM Peak Conditions	**Inter-Peak Conditions**	**PM Peak Conditions**	
Dry	Dry	Dry	

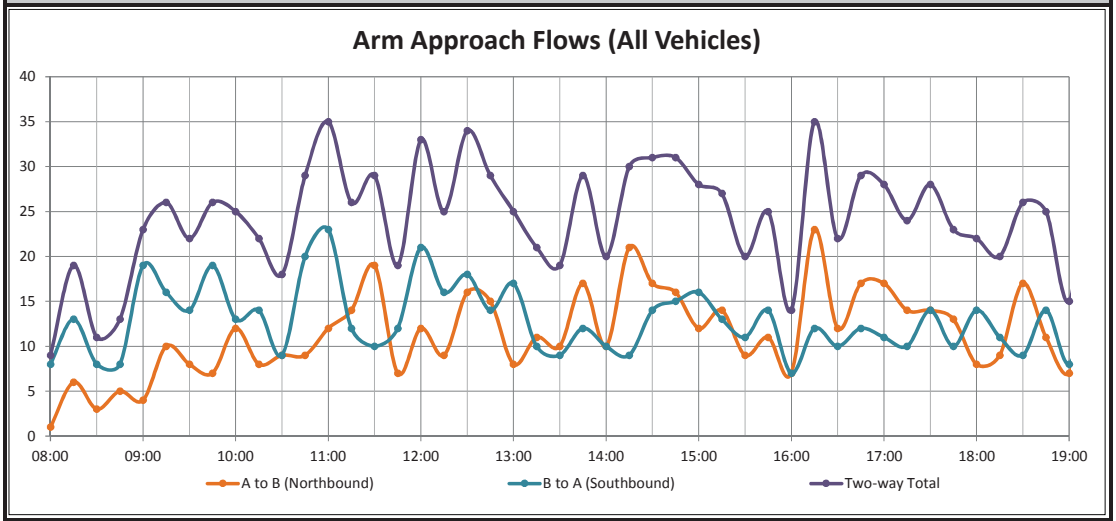
Junction Layout



Aerial Mapping and On-site Camera View



Junction Flow Profile



Additional Notes (Factors which may impact on survey results such as accidents, roadworks, special events):

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 2

Date of Survey: 19.11.2016
Site Name: Melliss Avenue
Survey Type: Two-way Link Count

Arm A: Townmead Road (S)
Arm B: Melliss Avenue (N)

	A to B (Northbound)								B to A (Southbound)								Two-way Total							
Time	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total
08:00	1	0	0	0	0	0	0	1	6	1	0	0	0	1	0	8	7	1	0	0	0	1	0	9
08:15	5	1	0	0	0	0	0	6	12	0	0	0	0	0	1	13	17	1	0	0	0	0	1	19
08:30	3	0	0	0	0	0	0	3	8	0	0	0	0	0	0	8	11	0	0	0	0	0	0	11
08:45	4	0	0	0	0	0	1	5	7	0	0	0	0	1	0	8	11	0	0	0	0	1	1	13
09:00	4	0	0	0	0	0	0	4	17	0	0	0	0	0	2	19	21	0	0	0	0	0	2	23
09:15	8	1	0	0	0	0	1	10	16	0	0	0	0	0	0	16	24	1	0	0	0	0	1	26
09:30	8	0	0	0	0	0	0	8	12	2	0	0	0	0	0	14	20	2	0	0	0	0	0	22
09:45	7	0	0	0	0	0	0	7	16	0	0	0	0	0	3	19	23	0	0	0	0	0	3	26
10:00	11	1	0	0	0	0	0	12	12	1	0	0	0	0	0	13	23	2	0	0	0	0	0	25
10:15	6	1	0	0	0	0	1	8	13	1	0	0	0	0	0	14	19	2	0	0	0	0	1	22
10:30	8	0	0	0	0	0	1	9	7	2	0	0	0	0	0	9	15	2	0	0	0	0	1	18
10:45	6	2	1	0	0	0	0	9	18	2	0	0	0	0	0	20	24	4	1	0	0	0	0	29
11:00	11	1	0	0	0	0	0	12	20	1	0	0	0	0	2	23	31	2	0	0	0	0	2	35
11:15	12	1	0	0	0	1	0	14	10	0	0	0	0	0	2	12	22	1	0	0	0	0	1	2	26
11:30	17	2	0	0	0	0	0	19	6	2	1	0	0	0	1	10	23	4	1	0	0	0	1	29
11:45	7	0	0	0	0	0	0	7	10	1	0	0	0	0	1	12	17	1	0	0	0	0	1	19
12:00	9	1	0	0	0	0	2	12	17	2	0	0	0	0	2	21	26	3	0	0	0	0	4	33
12:15	9	0	0	0	0	0	0	9	16	0	0	0	0	0	0	16	25	0	0	0	0	0	0	25
12:30	14	0	0	0	0	0	2	16	18	0	0	0	0	0	0	18	32	0	0	0	0	0	2	34
12:45	14	0	0	0	0	0	1	15	14	0	0	0	0	0	0	14	28	0	0	0	0	0	1	29
13:00	6	1	0	0	0	0	1	8	14	2	0	0	0	0	1	17	20	3	0	0	0	0	2	25
13:15	9	2	0	0	0	0	0	11	8	2	0	0	0	0	0	10	17	4	0	0	0	0	0	21
13:30	10	0	0	0	0	0	0	10	9	0	0	0	0	0	0	9	19	0	0	0	0	0	0	19
13:45	14	2	0	0	0	0	1	17	11	0	0	0	0	0	1	12	25	2	0	0	0	0	2	29
14:00	9	0	0	0	0	1	0	10	6	0	0	0	0	3	1	10	15	0	0	0	0	4	1	20
14:15	17	3	0	0	0	1	0	21	8	0	0	0	0	1	0	9	25	3	0	0	0	2	0	30
14:30	15	0	0	0	0	1	1	17	10	3	0	0	0	1	0	14	25	3	0	0	0	2	1	31
14:45	14	1	0	0	0	1	0	16	13	0	0	0	0	0	2	15	27	1	0	0	0	1	2	31
15:00	10	1	0	0	0	0	1	12	11	3	0	0	0	2	0	16	21	4	0	0	0	2	1	28
15:15	11	0	0	0	0	1	2	14	13	0	0	0	0	0	0	13	24	0	0	0	0	1	2	27
15:30	8	0	0	0	0	1	0	9	9	0	0	0	0	1	1	11	17	0	0	0	0	2	1	20
15:45	10	0	0	0	0	0	1	11	10	2	0	0	0	1	1	14	20	2	0	0	0	1	2	25
16:00	6	0	0	0	0	0	1	7	6	1	0	0	0	0	0	7	12	1	0	0	0	0	1	14
16:15	19	1	0	0	0	1	2	23	11	1	0	0	0	0	0	12	30	2	0	0	0	1	2	35
16:30	9	0	0	0	0	0	3	12	9	1	0	0	0	0	0	10	18	1	0	0	0	0	3	22
16:45	16	0	0	0	0	1	0	17	12	0	0	0	0	0	0	12	28	0	0	0	0	1	0	29
17:00	16	0	0	0	0	0	1	17	11	0	0	0	0	0	0	11	27	0	0	0	0	0	1	28
17:15	14	0	0	0	0	0	0	14	9	0	0	0	0	0	1	10	23	0	0	0	0	0	1	24
17:30	12	0	0	0	0	2	0	14	12	1	0	0	0	1	0	14	24	1	0	0	0	3	0	28
17:45	9	1	0	0	0	3	0	13	9	0	0	0	0	1	0	10	18	1	0	0	0	4	0	23
18:00	6	1	0	0	0	1	0	8	14	0	0	0	0	0	0	14	20	1	0	0	0	1	0	22
18:15	9	0	0	0	0	0	0	9	10	0	0	0	0	1	0	11	19	0	0	0	0	1	0	20
18:30	14	1	0	0	0	2	0	17	8	0	0	0	0	1	0	9	22	1	0	0	0	3	0	26
18:45	8	1	0	0	0	2	0	11	10	0	0	0	0	3	1	14	18	1	0	0	0	5	1	25
19:00	6	0	0	0	0	1	0	7	6	1	0	0	0	1	0	8	12	1	0	0	0	2	0	15
19:15	16	0	0	0	0	0	0	16	16	0	0	0	0	0	0	16	32	0	0	0	0	0	0	32
19:30	11	0	0	0	0	0	0	11	11	0	0	0	0	1	0	12	22	0	0	0	0	1	0	23
19:45	14	0	0	0	0	0	0	14	4	0	0	0	0	1	0	5	18	0	0	0	0	1	0	19
Start Time	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**
08:00	13	1	0	0	0	0	1	15	33	1	0	0	0	2	1	37	46	2	0	0	0	2	2	52
08:15	16	1	0	0	0	0	1	18	44	0	0	0	0	1	3	48	60	1	0	0	0	1	4	66
08:30	19	1	0	0	0	0	2	22	48	0	0	0	0	1	2	51	67	1	0	0	0	1	4	73
08:45	24	1	0	0	0	0	2	27	52	2	0	0	0	1	2	57	76	3	0	0	0	1	4	84
09:00	27	1	0	0	0	0	1	29	61	2	0	0	0	0	5	68	88	3	0	0	0	0	6	97
09:15	34	2	0	0	0	0	1	37	56	3	0	0	0	0	3	62	90	5	0	0	0	0	4	99
09:30	32	2	0	0	0	0	1	35	53	4	0	0	0	0	3	60	85	6	0	0	0	0	4	95
09:45	32	2	0	0	0	0	2	36	48	4	0	0	0	0	3	55	80	6	0	0	0	0	5	91
10:00	31	4	1	0	0	0	2	38	50	6	0	0	0	0	0	56	81	10	1	0	0	0	2	94
10:15	31	4	1	0	0	0	2	38	58	6	0	0	0	0	2	66	89	10	1	0	0	0	4	104
10:30	37	4	1	0	0	1	1	44	55	5	0	0	0	0	4	64	92	9	1	0	0	1	5	108
10:45	46	6	1	0	0	1	0	54	54	5	1	0	0	0	5	65	100	11	2	0	0	1	5	119
11:00	47	4	0	0	0	1	0	52	46	4	1	0	0	0	6	57	93	8	1	0	0	1	6	109
11:15	45	4	0	0	0	1	2	52	43	5	1	0	0	0	6	55	88	9	1	0	0	1	8	107
11:30	42	3	0	0	0	0	2	47	49	5	1	0	0	0	4	59	91	8	1	0	0	0	6	106
11:45	39	1	0	0	0	0	4	44	61	3	0	0	0	0	3	67	100	4	0	0	0	0	7	111
12:00	46	1	0	0	0	0	5	52	65	2	0	0	0	0	2	69	111	3	0	0	0	0	7	121
12:15	43	1	0	0	0	0	4	48	62	2	0	0	0	0	1	65	105	3	0	0	0	0	5	113
12:30	43	3	0	0	0	0	4	50	54	4	0	0	0	0	1	59	97	7	0	0	0	0	5	109
12:45	39	3	0	0	0	0	2	44	45	4	0	0	0	0	1	50	84	7	0	0	0	0	3	94
13:00	39	5	0	0	0	0	2	46	42	4	0	0	0	0	2	48	81	9	0	0	0	0	4	94
13:15	42	4	0	0	0	1	1	48	34	2	0	0	0	3	2	41	76	6	0	0	0	4	3	89
13:30	50	5	0	0	0	2	1	58	34	0	0	0	0	4	2	40	84	5	0	0	0	6	3	98
13:45	55	5	0	0	0	3	2	65	35	3	0	0	0	5	2	45	90	8	0	0	0	8	4	110
14:00	55	4	0	0	0	4	1	64	37	3	0	0	0	5	3	48	92	7	0	0	0	9	4	112
14:15	56	5	0	0	0	3	2	66	42	6	0	0	0	4	2	54	98	11	0	0	0	7	4	120
14:30	50	2	0	0	0	3	4	59	47	6	0	0	0	3	2	58	97	8	0	0	0	6	6	117
14:45	43	2	0	0	0	3	3	51	46	3	0	0	0	3	3	55	89	5	0	0	0	6	6	106
15:00	39	1	0	0	0	2	4	46	43	5	0	0	0	4	2	54	82	6	0	0	0	6	6	100
15:15	35	0	0	0	0	2	4	41	38	3	0	0	0	2	2	45	73	3	0	0	0	4	6	86
15:30	43	1	0	0	0	2	4	50	36	4	0	0	0	2	2	44	79	5	0	0	0	4	6	94
15:45	44	1	0	0	0	1	7	53	36	5	0	0	0	1	1	43	80	6	0	0	0	2	8	96
16:00	50	1	0	0	0	2	6	59	38	3	0	0	0	0	0	41	88	4	0	0	0	2	6	100
16:15	60	1	0	0	0	2	6	69	43	2	0	0	0	0	0	45	103	3	0	0	0	2	6	114
16:30	55	0	0	0	0	1	4	60	41	1	0	0	0	0	1	43	96	1	0	0	0	1	5	103
16:45	58	0	0	0	0	3	1	62	44	1	0	0	0	1	1	47	102	1	0	0	0	4	2	109
17:00	51	1	0	0	0	5	1	58	41	1	0	0	0	2	1	45	92	2	0	0	0	7	2	103
17:15	41	2	0	0	0	6	0	49	44	1	0	0	0	2	1	48	85	3	0	0	0	8	1	97
17:30	36	2	0	0	0	6	0	44	45	1	0	0	0	3	0	49	81	3	0	0	0	9	0	93
17:45	38	3	0	0	0	6	0	47	41	0	0	0	0	3	0	44	79	3	0	0	0	9	0	91
18:00	37	3	0	0	0	5	0	45	42	0	0	0	0	5	1	48	79	3	0	0	0	10	1	93
18:15	37	2	0	0	0	5	0	44	34	1	0	0	0	6	1	42	71	3	0	0	0	11	1	86
18:30	44	2	0	0	0	5	0	51	40	1	0	0	0	5	1	47	84	3	0	0	0	10	1	98
18:45	41	1	0	0	0	3	0	45	43	1	0	0	0	5	1	50	84	2	0	0	0	8	1	95
19:00	47	0	0	0	0	1	0	48	37	1	0	0	0	3	0	41	84	1	0	0	0	4	0	89

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 2

Date of Survey: 19.11.2016
Site Name: Melliss Avenue
Survey Type: Two-way Link Count

Arm A: Townmead Road (S)

Arm B: Melliss Avenue (N)

	PCU Summary	
Time	**A to B**	**B to A**
08:00	1	7
08:15	6	12
08:30	3	8
08:45	4	7
09:00	4	17
09:15	9	16
09:30	8	14
09:45	7	17
10:00	12	13
10:15	7	14
10:30	8	9
10:45	10	20
11:00	12	21
11:15	13	10
11:30	19	10
11:45	7	11
12:00	10	19
12:15	9	16
12:30	14	18
12:45	14	14
13:00	7	16
13:15	11	10
13:30	10	9
13:45	16	11
14:00	9	7
14:15	20	8
14:30	16	13
14:45	15	13
15:00	11	15
15:15	12	13
15:30	8	10
15:45	10	13
16:00	6	7
16:15	21	12
16:30	10	10
16:45	16	12
17:00	16	11
17:15	14	9
17:30	13	13
17:45	11	9
18:00	7	14
18:15	9	10
18:30	16	8
18:45	10	11
19:00	6	7
19:15	16	16
19:30	11	11
19:45	14	4
Start Time	**Rolling Hour**	
08:00	14	35
08:15	17	45
08:30	20	49
08:45	25	55
09:00	28	64
09:15	36	60
09:30	34	58
09:45	34	53
10:00	37	56
10:15	37	64
10:30	44	61
10:45	54	62
11:00	51	53
11:15	50	51
11:30	45	57
11:45	41	65
12:00	48	67
12:15	45	64
12:30	47	58
12:45	42	49
13:00	44	46
13:15	47	38
13:30	56	36
13:45	62	40
14:00	61	43
14:15	63	50
14:30	54	55
14:45	47	51
15:00	42	50
15:15	37	42
15:30	46	41
15:45	47	42
16:00	53	41
16:15	63	45
16:30	56	42
16:45	59	46
17:00	54	43
17:15	45	46
17:30	40	47
17:45	43	42
18:00	42	44
18:15	41	38
18:30	48	43
18:45	43	46
19:00	47	39

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 2

Date of Survey: 19.11.2016
Junction Name: Melliss Avenue
Junction Type: Two-way Link Count

Arm A: Townmead Road (S)
Arm B: Melliss Avenue (N)

Count Method: Vehicles **Classes Included:** All Classes *Select the count method and desired user classes from the drop-downs in cells D8 and G8*

Maximum 15-minute Junction Flow:

AM Peak	**from:**	10:45	**until:**	11:00	**flow:**	29	*AM Peak covers 07:00 until 10:00*
Inter-Peak	**from:**	11:00	**until:**	11:15	**flow:**	35	*Inter-Peak covers 10:00 until 16:00*
PM Peak	**from:**	19:15	**until:**	19:30	**flow:**	32	*PM Peak covers 16:00 until 19:00*

Period Starting: 08:00 *Select the time from the drop-down in cell D16 to show the 15-minute data for that period*

Movement Counts

From \ *To*	A	B	Total
A	0	1	1
B	**8**	0	**8**
Total	**8**	1	9

HGV Proportions

From \ *To*	A	B	Total
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Maximum Hourly Junction Flow:

AM Peak	**from:**	10:45	**until:**	11:45	**flow:**	119
Inter-Peak	**from:**	12:00	**until:**	13:00	**flow:**	121
PM Peak	**from:**	17:00	**until:**	18:00	**flow:**	103

Period Starting: 08:00 *Select the time from the drop-down in cell D31 to show the hourly data for that period*

Movement Counts

From \ *To*	A	B	Total
A	0	15	15
B	**37**	0	**37**
Total	**37**	15	52

HGV Proportions

From \ *To*	A	B	Total
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Bold entries in the above tables indicate the maximum movement, approach and exit flows for the selected time period, and similarly with the HGV proportions

Intelligent Data Collection Limited
Richmond Revision

Client:	PBA
Project Number:	ID02940
Site Number:	Site 3
Date of Survey:	17.11.2016
Site Name:	Kew Bridge
Survey Type:	Two-way Link Count

Quality Assurance and Issue Record

Quality Assurance

Revision	Rev A			
Date	02.12.2016			
Prepared by	David Brown			
Signature				
Checked by	Fay Underwood			
Signature				
Project Director	Paul O'Neill			
Signature				
Project number	ID02940			
File Ref	ID02940 Richmond Revision - MCC Site 3 - 17.11.2016			

Issue Sheet

	Date			
Issued to	02.12.2016			
Stephanie Yu	E-mail			

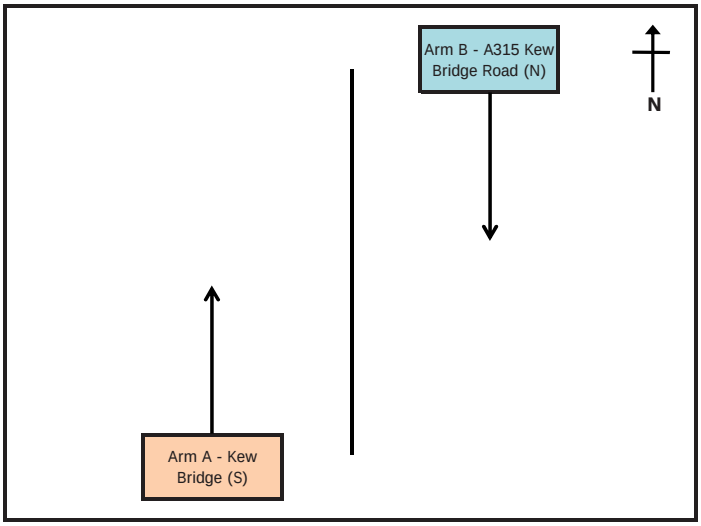
Contents Page

Intelligent Data Collection Limited

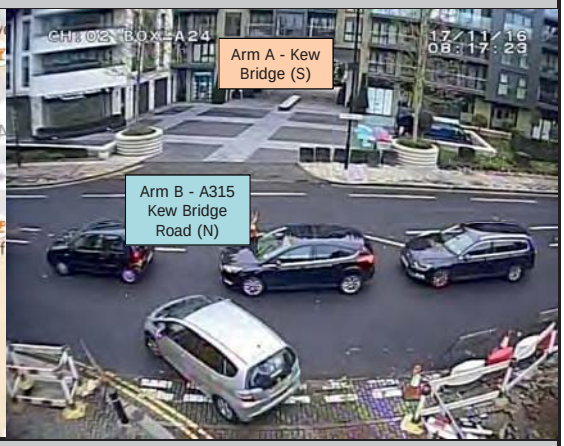
Client:	PBA	**Date of Survey:**	17.11.2016
Project Number:	ID02940	**Site Name:**	Kew Bridge
Site Number:	Site 3	**Survey Type:**	Two-way Link Count

X Coordinate	Y Coordinate	Google Maps Link	
51.488601	-0.289259	Click Here	
AM Peak Conditions	**Inter-Peak Conditions**	**PM Peak Conditions**	
Dry	Dry	Dry	

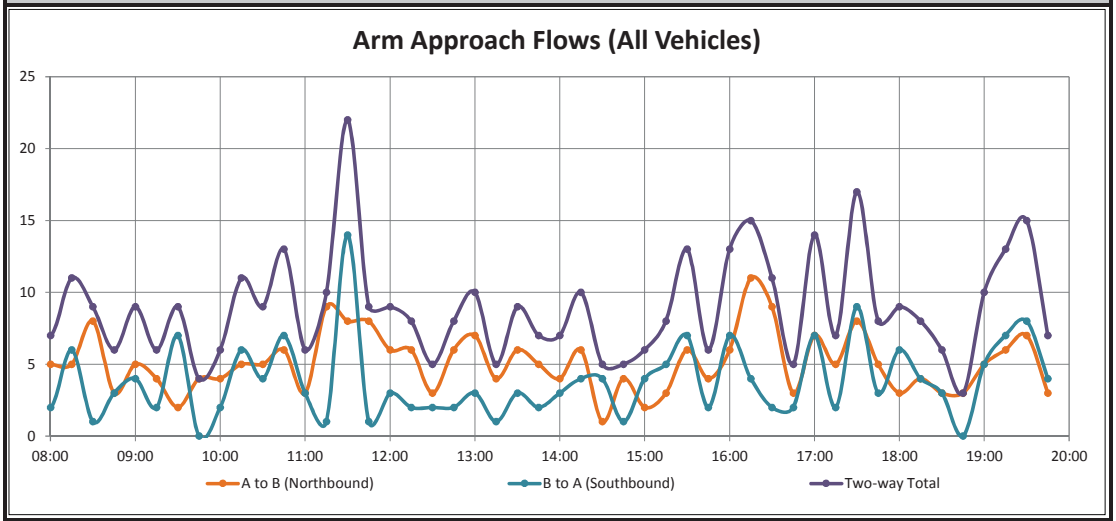
Junction Layout



Aerial Mapping and On-site Camera View



Junction Flow Profile



Additional Notes (Factors which may impact on survey results such as accidents, roadworks, special events):

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 3

Date of Survey: 17.11.2016
Site Name: Kew Bridge
Survey Type: Two-way Link Count

Arm A: Kew Bridge (S)
Arm B: A315 Kew Bridge Road (N)

	A to B (Northbound)								B to A (Southbound)								Two-way Total							
Time	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total
06:00	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
06:15	4	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
06:30	1	1	0	0	0	1	0	3	1	1	0	0	0	0	1	3	2	2	0	0	0	1	1	6
06:45	2	0	1	0	0	0	0	3	0	0	1	0	0	0	0	1	2	0	2	0	0	0	0	4
07:00	3	0	0	0	0	0	0	3	4	0	0	0	0	0	0	4	7	0	0	0	0	0	0	7
07:15	7	0	0	0	0	0	0	7	0	0	0	0	0	1	0	1	7	0	0	0	0	1	0	8
07:30	7	0	0	0	0	0	1	8	1	0	0	0	0	0	0	1	8	0	0	0	0	0	1	9
07:45	5	0	0	0	0	0	0	5	4	1	0	0	0	0	0	5	9	1	0	0	0	0	0	10
08:00	4	0	0	0	0	0	1	5	0	2	0	0	0	0	0	2	4	2	0	0	0	0	1	7
08:15	5	0	0	0	0	0	0	5	4	1	0	0	0	1	0	6	9	1	0	0	0	1	0	11
08:30	8	0	0	0	0	0	0	8	0	0	0	0	0	0	1	1	8	0	0	0	0	0	1	9
08:45	3	0	0	0	0	0	0	3	1	0	0	0	0	0	2	3	4	0	0	0	0	0	2	6
09:00	5	0	0	0	0	0	0	5	2	1	1	0	0	0	0	4	7	1	1	0	0	0	0	9
09:15	4	0	0	0	0	0	0	4	1	1	0	0	0	0	0	2	5	1	0	0	0	0	0	6
09:30	1	0	1	0	0	0	0	2	6	0	1	0	0	0	0	7	7	0	2	0	0	0	0	9
09:45	3	0	0	0	0	1	0	4	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	4
10:00	3	0	1	0	0	0	0	4	1	1	0	0	0	0	0	2	4	1	1	0	0	0	0	6
10:15	5	0	0	0	0	0	0	5	3	2	1	0	0	0	0	6	8	2	1	0	0	0	0	11
10:30	3	1	1	0	0	0	0	5	1	3	0	0	0	0	0	4	4	4	1	0	0	0	0	9
10:45	4	2	0	0	0	0	0	6	7	0	0	0	0	0	0	7	11	2	0	0	0	0	0	13
11:00	2	1	0	0	0	0	0	3	2	1	0	0	0	0	0	3	4	2	0	0	0	0	0	6
11:15	5	4	0	0	0	0	0	9	1	0	0	0	0	0	0	1	6	4	0	0	0	0	0	10
11:30	7	0	1	0	0	0	0	8	11	3	0	0	0	0	0	14	18	3	1	0	0	0	0	22
11:45	5	3	0	0	0	0	0	8	0	0	0	0	0	0	1	1	5	3	0	0	0	0	1	9
12:00	6	0	0	0	0	0	0	6	2	0	1	0	0	0	0	3	8	0	1	0	0	0	0	9
12:15	2	3	0	0	0	0	1	6	1	0	0	0	0	0	1	2	3	3	0	0	0	0	2	8
12:30	2	0	1	0	0	0	0	3	1	1	0	0	0	0	0	2	3	1	1	0	0	0	0	5
12:45	3	3	0	0	0	0	0	6	1	1	0	0	0	0	0	2	4	4	0	0	0	0	0	8
13:00	5	2	0	0	0	0	0	7	3	0	0	0	0	0	0	3	8	2	0	0	0	0	0	10
13:15	4	0	0	0	0	0	0	4	1	0	0	0	0	0	0	1	5	0	0	0	0	0	0	5
13:30	4	1	1	0	0	0	0	6	3	0	0	0	0	0	0	3	7	1	1	0	0	0	0	9
13:45	3	1	0	0	0	0	1	5	1	1	0	0	0	0	0	2	4	2	0	0	0	0	1	7
14:00	2	2	0	0	0	0	0	4	1	2	0	0	0	0	0	3	3	4	0	0	0	0	0	7
14:15	2	2	0	0	0	0	2	6	2	0	0	0	0	0	2	4	4	2	0	0	0	0	4	10
14:30	0	0	0	0	0	0	1	1	2	0	0	0	0	0	2	4	2	0	0	0	0	0	3	5
14:45	3	1	0	0	0	0	0	4	1	0	0	0	0	0	0	1	4	1	0	0	0	0	0	5
15:00	2	0	0	0	0	0	0	2	4	0	0	0	0	0	0	4	6	0	0	0	0	0	0	6
15:15	3	0	0	0	0	0	0	3	4	0	0	0	0	0	1	5	7	0	0	0	0	0	1	8
15:30	5	1	0	0	0	0	0	6	7	0	0	0	0	0	0	7	12	1	0	0	0	0	0	13
15:45	3	1	0	0	0	0	0	4	2	0	0	0	0	0	0	2	5	1	0	0	0	0	0	6
16:00	4	2	0	0	0	0	0	6	7	0	0	0	0	0	0	7	11	2	0	0	0	0	0	13
16:15	7	3	0	0	0	1	0	11	3	1	0	0	0	0	0	4	10	4	0	0	0	1	0	15
16:30	7	2	0	0	0	0	0	9	1	1	0	0	0	0	0	2	8	3	0	0	0	0	0	11
16:45	2	1	0	0	0	0	0	3	2	0	0	0	0	0	0	2	4	1	0	0	0	0	0	5
17:00	7	0	0	0	0	0	0	7	7	0	0	0	0	0	0	7	14	0	0	0	0	0	0	14
17:15	3	2	0	0	0	0	0	5	2	0	0	0	0	0	0	2	5	2	0	0	0	0	0	7
17:30	8	0	0	0	0	0	0	8	8	0	0	0	0	1	0	9	16	0	0	0	0	1	0	17
17:45	5	0	0	0	0	0	0	5	3	0	0	0	0	0	0	3	8	0	0	0	0	0	0	8
18:00	1	0	0	0	0	0	2	3	5	0	0	0	0	0	1	6	6	0	0	0	0	0	3	9
18:15	4	0	0	0	0	0	0	4	2	0	0	0	0	0	2	4	6	0	0	0	0	0	2	8
18:30	3	0	0	0	0	0	0	3	3	0	0	0	0	0	0	3	6	0	0	0	0	0	0	6
18:45	2	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
19:00	4	0	0	0	0	0	1	5	5	0	0	0	0	0	0	5	9	0	0	0	0	0	1	10
19:15	4	1	0	0	0	1	0	6	6	1	0	0	0	0	0	7	10	2	0	0	0	1	0	13
19:30	6	1	0	0	0	0	0	7	8	0	0	0	0	0	0	8	14	1	0	0	0	0	0	15
19:45	3	0	0	0	0	0	0	3	2	0	0	0	0	1	1	4	5	0	0	0	0	1	1	7
Start Time	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**
06:00	8	1	1	0	0	1	0	11	1	1	1	0	0	0	1	4	9	2	2	0	0	1	1	15
06:15	10	1	1	0	0	1	0	13	5	1	1	0	0	0	1	8	15	2	2	0	0	1	1	21
06:30	13	1	1	0	0	1	0	16	5	1	1	0	0	1	1	9	18	2	2	0	0	2	1	25
06:45	19	0	1	0	0	0	1	21	5	0	1	0	0	1	0	7	24	0	2	0	0	1	1	28
07:00	22	0	0	0	0	0	1	23	9	1	0	0	0	1	0	11	31	1	0	0	0	1	1	34
07:15	23	0	0	0	0	0	2	25	5	3	0	0	0	1	0	9	28	3	0	0	0	1	2	34
07:30	21	0	0	0	0	0	2	23	9	4	0	0	0	1	0	14	30	4	0	0	0	1	2	37
07:45	22	0	0	0	0	0	1	23	8	4	0	0	0	1	1	14	30	4	0	0	0	1	2	37
08:00	20	0	0	0	0	0	1	21	5	3	0	0	0	1	3	12	25	3	0	0	0	1	4	33
08:15	21	0	0	0	0	0	0	21	7	2	1	0	0	1	3	14	28	2	1	0	0	1	3	35
08:30	20	0	0	0	0	0	0	20	4	2	1	0	0	0	3	10	24	2	1	0	0	0	3	30
08:45	13	0	1	0	0	0	0	14	10	2	2	0	0	0	2	16	23	2	3	0	0	0	2	30
09:00	13	0	1	0	0	1	0	15	9	2	2	0	0	0	0	13	22	2	3	0	0	1	0	28
09:15	11	0	2	0	0	1	0	14	8	2	1	0	0	0	0	11	19	2	3	0	0	1	0	25
09:30	12	0	2	0	0	1	0	15	10	3	2	0	0	0	0	15	22	3	4	0	0	1	0	30
09:45	14	1	2	0	0	1	0	18	5	6	1	0	0	0	0	12	19	7	3	0	0	1	0	30
10:00	15	3	2	0	0	0	0	20	12	6	1	0	0	0	0	19	27	9	3	0	0	0	0	39
10:15	14	4	1	0	0	0	0	19	13	6	1	0	0	0	0	20	27	10	2	0	0	0	0	39
10:30	14	8	1	0	0	0	0	23	11	4	0	0	0	0	0	15	25	12	1	0	0	0	0	38
10:45	18	7	1	0	0	0	0	26	21	4	0	0	0	0	0	25	39	11	1	0	0	0	0	51
11:00	19	8	1	0	0	0	0	28	14	4	0	0	0	0	1	19	33	12	1	0	0	0	1	47
11:15	23	7	1	0	0	0	0	31	14	3	1	0	0	0	1	19	37	10	2	0	0	0	1	50
11:30	20	6	1	0	0	0	1	28	14	3	1	0	0	0	2	20	34	9	2	0	0	0	3	48
11:45	15	6	1	0	0	0	1	23	4	1	1	0	0	0	2	8	19	7	2	0	0	0	3	31
12:00	13	6	1	0	0	0	1	21	5	2	1	0	0	0	1	9	18	8	2	0	0	0	2	30
12:15	12	8	1	0	0	0	1	22	6	2	0	0	0	0	1	9	18	10	1	0	0	0	2	31
12:30	14	5	1	0	0	0	0	20	6	2	0	0	0	0	0	8	20	7	1	0	0	0	0	28
12:45	16	6	1	0	0	0	0	23	8	1	0	0	0	0	0	9	24	7	1	0	0	0	0	32
13:00	16	4	1	0	0	0	1	22	8	1	0	0	0	0	0	9	24	5	1	0	0	0	1	31
13:15	13	4	1	0	0	0	1	19	6	3	0	0	0	0	0	9	19	7	1	0	0	0	1	28
13:30	11	6	1	0	0	0	3	21	7	3	0	0	0	0	2	12	18	9	1	0	0	0	5	33
13:45	7	5	0	0	0	0	4	16	6	3	0	0	0	0	4	13	13	8	0	0	0	0	8	29
14:00	7	5	0	0	0	0	3	15	6	2	0	0	0	0	4	12	13	7	0	0	0	0	7	27
14:15	7	3	0	0	0	0	3	13	9	0	0	0	0	0	4	13	16	3	0	0	0	0	7	26
14:30	8	1	0	0	0	0	1	10	11	0	0	0	0	0	3	14	19	1	0	0	0	0	4	24
14:45	13	2	0	0	0	0	0	15	16	0	0	0	0	0	1	17	29	2	0	0	0	0	1	32
15:00	13	2	0	0	0	0	0	15	17	0	0	0	0	0	1	18	30	2	0	0	0	0	1	33
15:15	15	4	0	0	0	0	0	19	20	0	0	0	0	0	1	21	35	4	0	0	0	0	1	40
15:30	19	7	0	0	0	1	0	27	19	1	0	0	0	0	0	20	38	8	0	0	0	1	0	47
15:45	21	8	0	0	0	1	0	30	13	2	0	0	0	0	0	15	34	10	0	0	0	1	0	45
16:00	20	8	0	0	0	1	0	29	13	2	0	0	0	0	0	15	33	10	0	0	0	1	0	44
16:15	23	6	0	0	0	1	0	30	13	2	0	0	0	0	0	15	36	8	0	0	0	1	0	45
16:30	19	5	0	0	0	0	0	24	12	1	0	0	0	0	0	13	31	6	0	0	0	0	0	37
16:45	20	3	0	0	0	0	0	23	19	0	0	0	0	1	0	20	39	3	0	0	0	1	0	43
17:00	23	2	0	0	0	0	0	25	20	0	0	0	0	1	0	21	43	2	0	0	0	1	0	46
17:15	17	2	0	0	0	0	2	21	18	0	0	0	0	1	1	20	35	2	0	0	0	1	3	41
17:30	18	0	0	0	0	0	2	20	18	0	0	0	0	1	3	22	36	0	0	0	0	1	5	42
17:45	13	0	0	0	0	0	2	15	13	0	0	0	0	0	3	16	26	0	0	0	0	0	5	31
18:00	10	1	0	0	0	0	2	13	10	0	0	0	0	0	3	13	20	1	0	0	0	0	5	26
18:15	13	1	0	0	0	0	1	15	10	0	0	0	0	0	2	12	23	1	0	0	0	0	3	27
18:30	13	2	0	0	0	1	1	17	14	1	0	0	0	0	0	15	27	3	0	0	0	1	1	32
18:45	16	3	0	0	0	1	1	21	19	1	0	0	0	0	0	20	35	4	0	0	0	1	1	41
19:00	17	2	0	0	0	1	1	21	21	1	0	0	0	1	1	24	38	3	0	0	0	2	2	45

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 3

Date of Survey: 17.11.2016
Site Name: Kew Bridge
Survey Type: Two-way Link Count

Arm A: Kew Bridge (S)

Arm B: A315 Kew Bridge Road (N)

	PCU Summary	
Time	**A to B**	**B to A**
06:00	1	0
06:15	4	0
06:30	2	2
06:45	4	2
07:00	3	4
07:15	7	0
07:30	7	1
07:45	5	5
08:00	4	2
08:15	5	5
08:30	8	0
08:45	3	1
09:00	5	5
09:15	4	2
09:30	3	8
09:45	3	0
10:00	5	2
10:15	5	7
10:30	6	4
10:45	6	7
11:00	3	3
11:15	9	1
11:30	9	14
11:45	8	0
12:00	6	4
12:15	5	1
12:30	4	2
12:45	6	2
13:00	7	3
13:15	4	1
13:30	7	3
13:45	4	2
14:00	4	3
14:15	4	2
14:30	0	2
14:45	4	1
15:00	2	4
15:15	3	4
15:30	6	7
15:45	4	2
16:00	6	7
16:15	10	4
16:30	9	2
16:45	3	2
17:00	7	7
17:15	5	2
17:30	8	8
17:45	5	3
18:00	1	5
18:15	4	2
18:30	3	3
18:45	3	0
19:00	4	5
19:15	5	7
19:30	7	8
19:45	3	3

Start Time	**Rolling Hour**	
06:00	11	4
06:15	13	8
06:30	16	9
06:45	21	7
07:00	22	10
07:15	23	8
07:30	21	13
07:45	22	13
08:00	20	9
08:15	21	12
08:30	20	9
08:45	15	16
09:00	15	15
09:15	15	12
09:30	16	17
09:45	19	13
10:00	22	20
10:15	20	21
10:30	24	15
10:45	27	25
11:00	29	18
11:15	32	19
11:30	28	19
11:45	23	7
12:00	21	9
12:15	22	8
12:30	21	8
12:45	24	9
13:00	22	9
13:15	19	9
13:30	20	10
13:45	13	10
14:00	13	9
14:15	11	10
14:30	9	12
14:45	15	16
15:00	15	17
15:15	19	20
15:30	26	20
15:45	29	15
16:00	28	15
16:15	29	15
16:30	24	13
16:45	23	19
17:00	25	20
17:15	19	19
17:30	18	19
17:45	13	14
18:00	11	11
18:15	14	10
18:30	16	15
18:45	20	20
19:00	20	23

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 3

Date of Survey: 17.11.2016
Junction Name: Kew Bridge
Junction Type: Two-way Link Count

Arm A: Kew Bridge (S)
Arm B: A315 Kew Bridge Road (N)

Count Method: Vehicles **Classes Included:** All Classes *Select the count method and desired user classes from the drop-downs in cells D8 and G8*

Maximum 15-minute Junction Flow:

AM Peak	**from:**	07:45	**until:**	08:00	**flow:**	10	*AM Peak covers 08:00 until 10:00*
Inter-Peak	**from:**	11:30	**until:**	11:45	**flow:**	22	*Inter-Peak covers 10:00 until 16:00*
PM Peak	**from:**	17:30	**until:**	17:45	**flow:**	17	*PM Peak covers 16:00 until 20:00*

Period Starting: 06:00 *Select the time from the drop-down in cell D16 to show the 15-minute data for that period*

Movement Counts

From \ *To*	**A**	**B**	**Total**
A	0	**1**	**1**
B	0	0	0
Total	0	**1**	1

HGV Proportions

From \ *To*	**A**	**B**	**Total**
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Maximum Hourly Junction Flow:

AM Peak	**from:**	07:30	**until:**	08:30	**flow:**	37
Inter-Peak	**from:**	10:45	**until:**	11:45	**flow:**	51
PM Peak	**from:**	15:30	**until:**	16:30	**flow:**	47

Period Starting: 06:00 *Select the time from the drop-down in cell D31 to show the hourly data for that period*

Movement Counts

From \ *To*	**A**	**B**	**Total**
A	0	**11**	**11**
B	4	0	4
Total	4	**11**	15

HGV Proportions

From \ *To*	**A**	**B**	**Total**
A	0.0%	9.1%	9.1%
B	**25.0%**	0.0%	**25.0%**
Total	**25.0%**	9.1%	13.3%

Bold entries in the above tables indicate the maximum movement, approach and exit flows for the selected time period, and similarly with the HGV proportions

Intelligent Data Collection Limited
Richmond Revision

Client:	PBA
Project Number:	ID02940
Site Number:	Site 3
Date of Survey:	19.11.2016
Site Name:	Kew Bridge
Survey Type:	Two-way Link Count

Quality Assurance and Issue Record

Quality Assurance

Revision	Rev A			
Date	02.12.2016			
Prepared by	David Brown			
Signature				
Checked by	Fay Underwood			
Signature				
Project Director	Paul O'Neill			
Signature				
Project number	ID02940			
File Ref	ID02940 Richmond Revision - MCC Site 3 - 19.10.2016			

Issue Sheet

	Date			
Issued to	02.12.2016			
Stephanie Yu	E-mail			

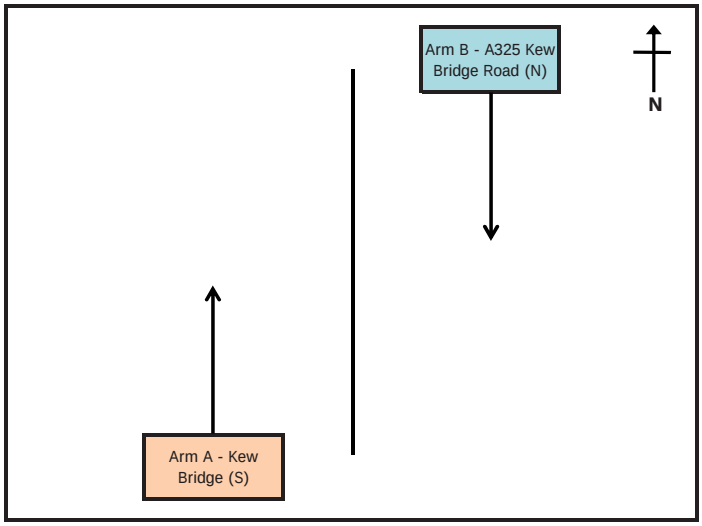
Contents Page

Intelligent Data Collection Limited

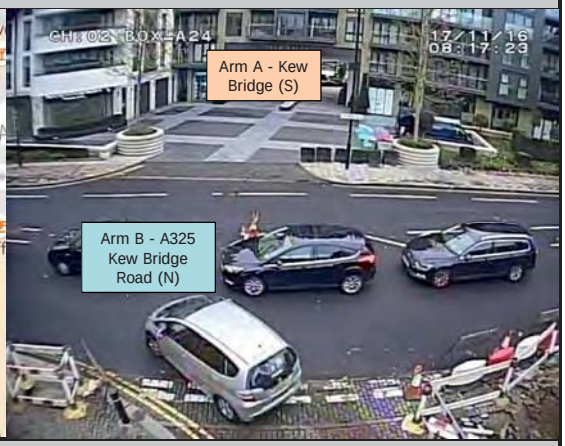
Client:	PBA	**Date of Survey:**	19.11.2016
Project Number:	ID02940	**Site Name:**	Kew Bridge
Site Number:	Site 3	**Survey Type:**	Two-way Link Count

X Coordinate	Y Coordinate	Google Maps Link	
51.488601	-0.289259	Click Here	
AM Peak Conditions	**Inter-Peak Conditions**	**PM Peak Conditions**	
Dry	Dry	Dry	

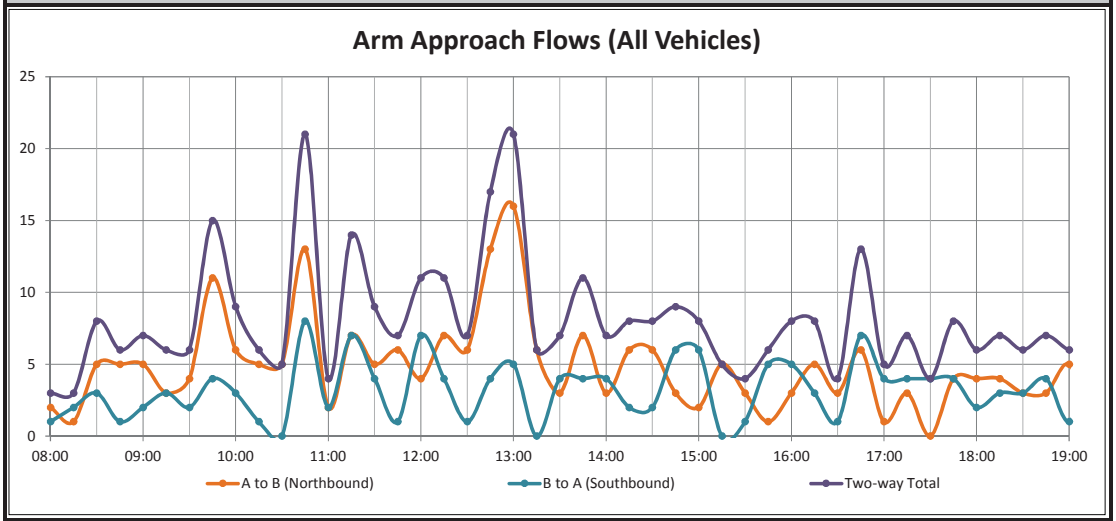
Junction Layout



Aerial Mapping and On-site Camera View



Junction Flow Profile



Additional Notes (Factors which may impact on survey results such as accidents, roadworks, special events):

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 3

Date of Survey: 19.11.2016
Site Name: Kew Bridge
Survey Type: Two-way Link Count

Arm A: Kew Bridge (S)
Arm B: A325 Kew Bridge Road (N)

	A to B (Northbound)								B to A (Southbound)								Two-way Total							
Time	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total
08:00	1	0	0	0	0	0	1	2	1	0	0	0	0	0	0	1	2	0	0	0	0	0	1	3
08:15	0	1	0	0	0	0	0	1	2	0	0	0	0	0	0	2	2	1	0	0	0	0	0	3
08:30	4	0	0	0	0	0	1	5	3	0	0	0	0	0	0	3	7	0	0	0	0	0	1	8
08:45	4	0	0	0	0	1	0	5	0	1	0	0	0	0	0	1	4	1	0	0	0	1	0	6
09:00	5	0	0	0	0	0	0	5	2	0	0	0	0	0	0	2	7	0	0	0	0	0	0	7
09:15	3	0	0	0	0	0	0	3	3	0	0	0	0	0	0	3	6	0	0	0	0	0	0	6
09:30	3	1	0	0	0	0	0	4	2	0	0	0	0	0	0	2	5	1	0	0	0	0	0	6
09:45	8	1	1	0	0	0	1	11	3	0	0	0	0	0	1	4	11	1	1	0	0	0	2	15
10:00	6	0	0	0	0	0	0	6	1	2	0	0	0	0	0	3	7	2	0	0	0	0	0	9
10:15	5	0	0	0	0	0	0	5	1	0	0	0	0	0	0	1	6	0	0	0	0	0	0	6
10:30	5	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5
10:45	12	0	0	0	0	1	13	6	1	0	0	0	0	1	8	18	1	0	0	0	0	2	21
11:00	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	4	0	0	0	0	0	0	4
11:15	5	0	1	0	0	0	1	7	7	0	0	0	0	0	0	7	12	0	1	0	0	0	1	14
11:30	4	0	0	0	0	0	1	5	4	0	0	0	0	0	0	4	8	0	0	0	0	0	1	9
11:45	6	0	0	0	0	0	0	6	1	0	0	0	0	0	0	1	7	0	0	0	0	0	0	7
12:00	4	0	0	0	0	0	0	4	6	0	0	0	0	0	1	7	10	0	0	0	0	0	1	11
12:15	4	1	0	0	0	0	2	7	2	1	0	0	0	0	1	4	6	2	0	0	0	0	3	11
12:30	4	2	0	0	0	0	0	6	1	0	0	0	0	0	0	1	5	2	0	0	0	0	0	7
12:45	9	3	0	0	0	0	1	13	3	1	0	0	0	0	0	4	12	4	0	0	0	0	1	17
13:00	9	7	0	0	0	0	0	16	3	2	0	0	0	0	0	5	12	9	0	0	0	0	0	21
13:15	5	1	0	0	0	0	0	6	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	6
13:30	2	0	0	0	0	1	0	3	2	1	0	0	0	1	0	4	4	1	0	0	0	2	0	7
13:45	7	0	0	0	0	0	0	7	4	0	0	0	0	0	0	4	11	0	0	0	0	0	0	11
14:00	2	0	0	0	0	0	1	3	4	0	0	0	0	0	0	4	6	0	0	0	0	0	1	7
14:15	6	0	0	0	0	0	0	6	2	0	0	0	0	0	0	2	8	0	0	0	0	0	0	8
14:30	4	0	0	0	0	0	2	6	2	0	0	0	0	0	0	2	6	0	0	0	0	0	2	8
14:45	3	0	0	0	0	0	0	3	6	0	0	0	0	0	0	6	9	0	0	0	0	0	0	9
15:00	1	0	0	0	0	0	1	2	6	0	0	0	0	0	0	6	7	0	0	0	0	0	1	8
15:15	4	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	5
15:30	2	0	0	0	0	0	1	3	1	0	0	0	0	0	0	1	3	0	0	0	0	0	1	4
15:45	1	0	0	0	0	0	0	1	4	0	0	0	0	0	1	5	5	0	0	0	0	0	1	6
16:00	3	0	0	0	0	0	0	3	5	0	0	0	0	0	0	5	8	0	0	0	0	0	0	8
16:15	5	0	0	0	0	0	0	5	3	0	0	0	0	0	0	3	8	0	0	0	0	0	0	8
16:30	3	0	0	0	0	0	0	3	1	0	0	0	0	0	0	1	4	0	0	0	0	0	0	4
16:45	4	1	0	0	0	0	1	6	7	0	0	0	0	0	0	7	11	1	0	0	0	0	1	13
17:00	1	0	0	0	0	0	0	1	4	0	0	0	0	0	0	4	5	0	0	0	0	0	0	5
17:15	3	0	0	0	0	0	0	3	4	0	0	0	0	0	0	4	7	0	0	0	0	0	0	7
17:30	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	4	0	0	0	0	0	0	4
17:45	4	0	0	0	0	0	0	4	4	0	0	0	0	0	0	4	8	0	0	0	0	0	0	8
18:00	4	0	0	0	0	0	0	4	2	0	0	0	0	0	0	2	6	0	0	0	0	0	0	6
18:15	4	0	0	0	0	0	0	4	3	0	0	0	0	0	0	3	7	0	0	0	0	0	0	7
18:30	3	0	0	0	0	0	0	3	3	0	0	0	0	0	0	3	6	0	0	0	0	0	0	6
18:45	3	0	0	0	0	0	0	3	4	0	0	0	0	0	0	4	7	0	0	0	0	0	0	7
19:00	5	0	0	0	0	0	0	5	1	0	0	0	0	0	0	1	6	0	0	0	0	0	0	6
19:15	1	0	0	0	0	0	0	1	4	1	0	0	0	0	0	5	5	1	0	0	0	0	0	6
19:30	1	0	0	0	0	0	0	1	2	0	0	0	0	0	1	3	3	0	0	0	0	0	1	4
19:45	4	1	0	0	0	0	0	5	7	0	0	0	0	0	0	7	11	1	0	0	0	0	0	12
Start Time	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**
08:00	9	1	0	0	0	1	2	13	6	1	0	0	0	0	0	7	15	2	0	0	0	1	2	20
08:15	13	1	0	0	0	1	1	16	7	1	0	0	0	0	0	8	20	2	0	0	0	1	1	24
08:30	16	0	0	0	0	1	1	18	8	1	0	0	0	0	0	9	24	1	0	0	0	1	1	27
08:45	15	1	0	0	0	1	0	17	7	1	0	0	0	0	0	8	22	2	0	0	0	1	0	25
09:00	19	2	1	0	0	0	1	23	10	0	0	0	0	0	1	11	29	2	1	0	0	0	2	34
09:15	20	2	1	0	0	0	1	24	9	2	0	0	0	0	1	12	29	4	1	0	0	0	2	36
09:30	22	2	1	0	0	0	1	26	7	2	0	0	0	0	1	10	29	4	1	0	0	0	2	36
09:45	24	1	1	0	0	0	1	27	5	2	0	0	0	0	1	8	29	3	1	0	0	0	2	35
10:00	28	0	0	0	0	0	1	29	8	3	0	0	0	0	1	12	36	3	0	0	0	0	2	41
10:15	24	0	0	0	0	0	1	25	9	1	0	0	0	0	1	11	33	1	0	0	0	0	2	36
10:30	24	0	1	0	0	0	2	27	15	1	0	0	0	0	1	17	39	1	1	0	0	0	3	44
10:45	23	0	1	0	0	0	3	27	19	1	0	0	0	0	1	21	42	1	1	0	0	0	4	48
11:00	17	0	1	0	0	0	2	20	14	0	0	0	0	0	0	14	31	0	1	0	0	0	2	34
11:15	19	0	1	0	0	0	2	22	18	0	0	0	0	0	1	19	37	0	1	0	0	0	3	41
11:30	18	1	0	0	0	0	3	22	13	1	0	0	0	0	2	16	31	2	0	0	0	0	5	38
11:45	18	3	0	0	0	0	2	23	10	1	0	0	0	0	2	13	28	4	0	0	0	0	4	36
12:00	21	6	0	0	0	0	3	30	12	2	0	0	0	0	2	16	33	8	0	0	0	0	5	46
12:15	26	13	0	0	0	0	3	42	9	4	0	0	0	0	1	14	35	17	0	0	0	0	4	56
12:30	27	13	0	0	0	1	1	41	7	3	0	0	0	0	0	10	34	16	0	0	0	0	1	51
12:45	25	11	0	0	0	1	1	38	8	4	0	0	0	1	0	13	33	15	0	0	0	2	1	51
13:00	23	8	0	0	0	1	0	32	9	3	0	0	0	1	0	13	32	11	0	0	0	2	0	45
13:15	16	1	0	0	0	1	1	19	10	1	0	0	0	1	0	12	26	2	0	0	0	2	1	31
13:30	17	0	0	0	0	1	1	19	12	1	0	0	0	1	0	14	29	1	0	0	0	2	1	33
13:45	19	0	0	0	0	0	3	22	12	0	0	0	0	0	0	12	31	0	0	0	0	0	3	34
14:00	15	0	0	0	0	0	3	18	14	0	0	0	0	0	0	14	29	0	0	0	0	0	3	32
14:15	14	0	0	0	0	0	3	17	16	0	0	0	0	0	0	16	30	0	0	0	0	0	3	33
14:30	12	1	0	0	0	0	3	16	14	0	0	0	0	0	0	14	26	1	0	0	0	0	3	30
14:45	10	1	0	0	0	0	2	13	13	0	0	0	0	0	0	13	23	1	0	0	0	0	2	26
15:00	8	1	0	0	0	0	2	11	11	0	0	0	0	0	1	12	19	1	0	0	0	0	3	23
15:15	10	1	0	0	0	0	1	12	10	0	0	0	0	0	1	11	20	1	0	0	0	0	2	23
15:30	11	0	0	0	0	0	1	12	13	0	0	0	0	0	1	14	24	0	0	0	0	0	2	26
15:45	12	0	0	0	0	0	0	12	13	0	0	0	0	0	1	14	25	0	0	0	0	0	1	26
16:00	15	1	0	0	0	0	1	17	16	0	0	0	0	0	0	16	31	1	0	0	0	0	1	33
16:15	13	1	0	0	0	0	1	15	15	0	0	0	0	0	0	15	28	1	0	0	0	0	1	30
16:30	11	1	0	0	0	0	1	13	16	0	0	0	0	0	0	16	27	1	0	0	0	0	1	29
16:45	8	1	0	0	0	0	1	10	19	0	0	0	0	0	0	19	27	1	0	0	0	0	1	29
17:00	8	0	0	0	0	0	0	8	16	0	0	0	0	0	0	16	24	0	0	0	0	0	0	24
17:15	11	0	0	0	0	0	0	11	14	0	0	0	0	0	0	14	25	0	0	0	0	0	0	25
17:30	12	0	0	0	0	0	0	12	13	0	0	0	0	0	0	13	25	0	0	0	0	0	0	25
17:45	15	0	0	0	0	0	0	15	12	0	0	0	0	0	0	12	27	0	0	0	0	0	0	27
18:00	14	0	0	0	0	0	0	14	12	0	0	0	0	0	0	12	26	0	0	0	0	0	0	26
18:15	15	0	0	0	0	0	0	15	11	0	0	0	0	0	0	11	26	0	0	0	0	0	0	26
18:30	12	0	0	0	0	0	0	12	12	1	0	0	0	0	0	13	24	1	0	0	0	0	0	25
18:45	10	0	0	0	0	0	0	10	11	1	0	0	0	0	1	13	21	1	0	0	0	0	1	23
19:00	11	1	0	0	0	0	0	12	14	1	0	0	0	0	1	16	25	2	0	0	0	0	1	28

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 3

Date of Survey: 19.11.2016
Site Name: Kew Bridge
Survey Type: Two-way Link Count

Arm A: Kew Bridge (S)

Arm B: A325 Kew Bridge Road (N)

	PCU Summary	
Time	A to B	B to A
08:00	1	1
08:15	1	2
08:30	4	3
08:45	4	1
09:00	5	2
09:15	3	3
09:30	4	2
09:45	11	3
10:00	6	3
10:15	5	1
10:30	5	0
10:45	12	7
11:00	2	2
11:15	7	7
11:30	4	4
11:45	6	1
12:00	4	6
12:15	5	3
12:30	6	1
12:45	12	4
13:00	16	5
13:15	6	0
13:30	2	3
13:45	7	4
14:00	2	4
14:15	6	2
14:30	4	2
14:45	3	6
15:00	1	6
15:15	5	0
15:30	2	1
15:45	1	4
16:00	3	5
16:15	5	3
16:30	3	1
16:45	5	7
17:00	1	4
17:15	3	4
17:30	0	4
17:45	4	4
18:00	4	2
18:15	4	3
18:30	3	3
18:45	3	4
19:00	5	1
19:15	1	5
19:30	1	2
19:45	5	7
Start Time	**Rolling Hour**	
08:00	11	7
08:15	15	8
08:30	17	9
08:45	16	8
09:00	23	10
09:15	24	11
09:30	26	9
09:45	27	7
10:00	28	11
10:15	24	10
10:30	26	16
10:45	26	20
11:00	19	14
11:15	21	18
11:30	20	14
11:45	21	11
12:00	28	14
12:15	40	13
12:30	40	10
12:45	37	12
13:00	31	12
13:15	18	11
13:30	18	13
13:45	20	12
14:00	16	14
14:15	15	16
14:30	14	14
14:45	11	13
15:00	9	11
15:15	11	10
15:30	11	13
15:45	12	13
16:00	16	16
16:15	14	15
16:30	12	16
16:45	9	19
17:00	8	16
17:15	11	14
17:30	12	13
17:45	15	12
18:00	14	12
18:15	15	11
18:30	12	13
18:45	10	12
19:00	12	15

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 3

Date of Survey: 19.11.2016
Junction Name: Kew Bridge
Junction Type: Two-way Link Count

Arm A: Kew Bridge (S)
Arm B: A325 Kew Bridge Road (N)

Count Method: Vehicles **Classes Included:** All Classes *Select the count method and desired user classes from the drop-downs in cells D8 and G8*

Maximum 15-minute Junction Flow:

AM Peak	**from:**	10:45	**until:**	11:00	**flow:**	21	*AM Peak covers 07:00 until 10:00*
Inter-Peak	**from:**	13:00	**until:**	13:15	**flow:**	21	*Inter-Peak covers 10:00 until 16:00*
PM Peak	**from:**	19:45	**until:**	20:00	**flow:**	12	*PM Peak covers 16:00 until 19:00*

Period Starting: 08:00 *Select the time from the drop-down in cell D16 to show the 15-minute data for that period*

Movement Counts

From \ *To*	A	B	Total
A	0	**2**	**2**
B	1	0	1
Total	1	**2**	3

HGV Proportions

From \ *To*	A	B	Total
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Maximum Hourly Junction Flow:

AM Peak	**from:**	10:45	**until:**	11:45	**flow:**	48
Inter-Peak	**from:**	12:15	**until:**	13:15	**flow:**	56
PM Peak	**from:**	19:00	**until:**	20:00	**flow:**	28

Period Starting: 08:00 *Select the time from the drop-down in cell D31 to show the hourly data for that period*

Movement Counts

From \ *To*	A	B	Total
A	0	**13**	**13**
B	7	0	7
Total	7	**13**	20

HGV Proportions

From \ *To*	A	B	Total
A	**0.0%**	**0.0%**	**0.0%**
B	**0.0%**	**0.0%**	**0.0%**
Total	**0.0%**	**0.0%**	0.0%

Bold entries in the above tables indicate the maximum movement, approach and exit flows for the selected time period, and similarly with the HGV proportions

Intelligent Data Collection Limited
Richmond Revision

Client:	PBA
Project Number:	ID02940
Junction Number:	Site 4
Date of Survey:	17.11.2016
Junction Name:	A30003 Mortlake High Street/Vineyard Path
Junction Type:	T-Junction

Quality Assurance and Issue Record

Quality Assurance

Revision	Rev A			
Date	02.12.2016			
Prepared by	David Brown			
Signature				
Checked by	Fay Underwood			
Signature				
Project Director	Paul O'Neill			
Signature				
Project number	ID02940			
File Ref	ID02940 Richmond Revision - MCC Site 4 - 17.11.2016			

Issue Sheet

	Date			
Issued to	02.12.2016			
Stephanie Yu	E-mail			

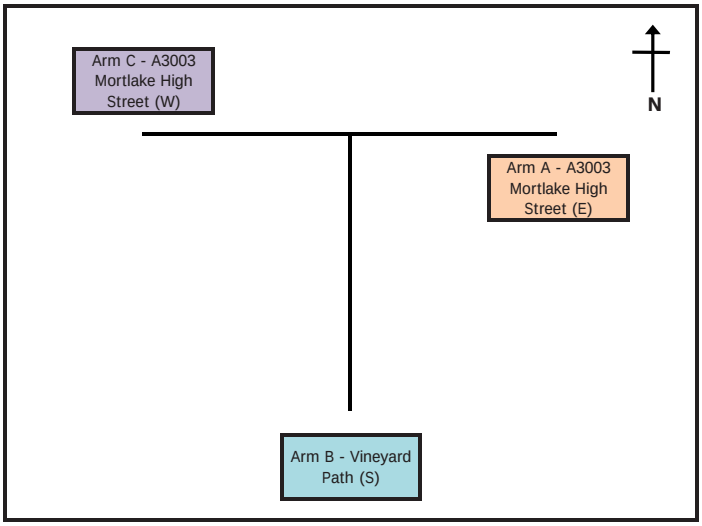
Contents Page

Intelligent Data Collection Limited

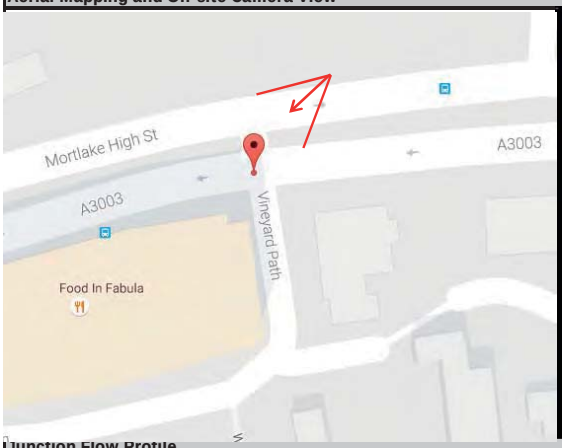
Client:	PBA	**Date of Survey:**	17.11.2016
Project Number:	ID02940	**Junction Name:**	A30003 Mortlake High Street/Vineyard Path
Junction Number:	Site 4	**Junction Type:**	T-Junction

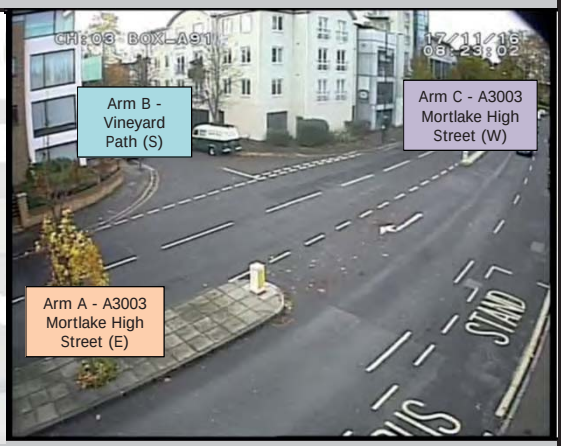
X Coordinate	Y Coordinate	Google Maps Link	
51.469710	-0.264914	Click Here	
AM Peak Conditions	**PM Peak Conditions**		
Dry	Dry		

Junction Layout

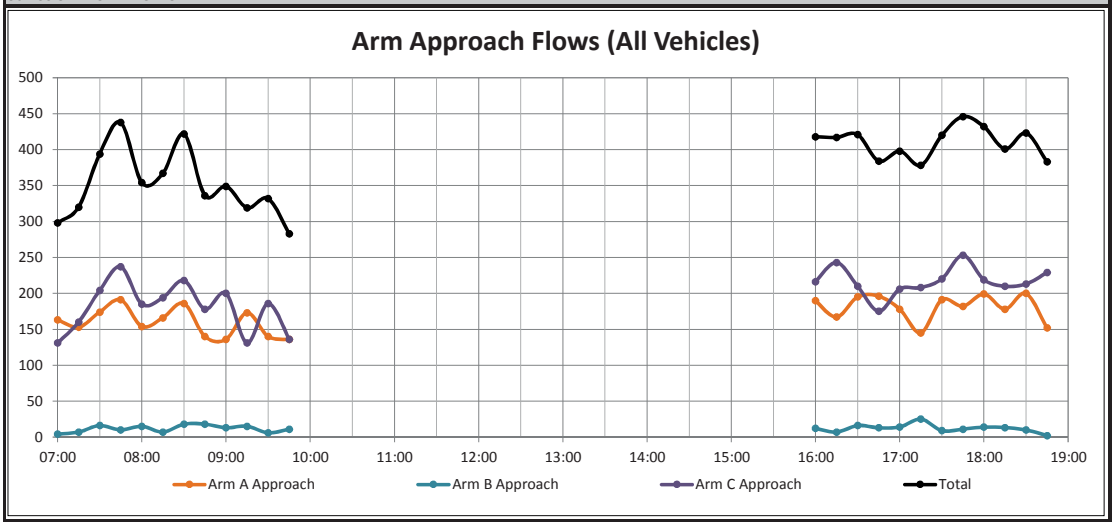


Aerial Mapping and On-site Camera View





Junction Flow Profile



Additional Notes (Factors which may impact on survey results such as accidents, roadworks, special events):

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 4

Date of Survey: 17.11.2016
Junction Name: A30003 Mortlake High Street/Vineyard Path
Junction Type: T-Junction

Arm A: A3003 Mortlake High Street (E)
Arm B: Vineyard Path (S)
Arm C: A3003 Mortlake High Street (W)

	A to A								A to C								A to B							
Time	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total
07:00								0	131	21	2	0	1	3	4	162	1	0	0	0	0	0	0	1
07:15								0	110	27	3	0	2	5	5	152	1	0	0	0	0	0	0	1
07:30								0	133	21	3	0	2	3	10	172	1	1	0	0	0	0	0	2
07:45								0	143	22	4	1	1	9	8	188	3	0	0	0	0	0	0	3
08:00								0	128	14	1	1	1	1	7	153	0	1	0	0	0	0	0	1
08:15								0	145	14	2	1	1	0	0	163	3	0	0	0	0	0	0	3
08:30								0	151	18	5	0	2	1	8	185	1	0	0	0	0	0	0	1
08:45								0	106	19	1	0	1	3	10	140	0	0	0	0	0	0	0	0
09:00								0	107	14	0	2	1	3	7	134	1	1	0	0	0	0	0	2
09:15								0	143	17	4	0	1	3	4	172	1	0	0	0	0	0	0	1
09:30								0	106	20	2	0	1	4	2	135	1	2	0	0	0	0	2	5
09:45								0	105	22	1	0	2	3	2	135	1	0	0	0	0	0	0	1
16:00								0	136	35	1	1	1	6	7	187	2	0	0	0	0	0	1	3
16:15								0	125	30	1	0	0	1	9	166	0	0	0	0	0	0	1	1
16:30								0	146	35	4	0	3	3	4	195	0	0	0	0	0	0	0	0
16:45								0	145	30	3	0	2	6	7	193	2	0	0	0	0	0	1	3
17:00								0	121	39	3	0	1	3	9	176	2	0	0	0	0	0	0	2
17:15								0	90	33	4	0	2	6	10	145	0	0	0	0	0	0	0	0
17:30								0	139	20	0	1	0	7	20	187	4	0	0	0	0	0	0	4
17:45								0	127	21	1	0	2	14	12	177	4	1	0	0	0	0	0	5
18:00								0	139	22	2	0	1	7	24	195	4	0	0	0	0	0	0	4
18:15								0	138	13	2	0	1	5	17	176	2	0	0	0	0	0	0	2
18:30								0	140	23	0	0	2	8	27	200	0	0	0	0	0	0	0	0
18:45								0	115	11	1	0	3	8	13	151	1	0	0	0	0	0	0	1
Start Time	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**
07:00	0	0	0	0	0	0	0	0	517	91	12	1	6	20	27	674	6	1	0	0	0	0	0	7
07:15	0	0	0	0	0	0	0	0	514	84	11	2	6	18	30	665	5	2	0	0	0	0	0	7
07:30	0	0	0	0	0	0	0	0	549	71	10	3	5	13	25	676	7	2	0	0	0	0	0	9
07:45	0	0	0	0	0	0	0	0	567	68	12	3	5	11	23	689	7	1	0	0	0	0	0	8
08:00	0	0	0	0	0	0	0	0	530	65	9	2	5	5	25	641	4	1	0	0	0	0	0	5
08:15	0	0	0	0	0	0	0	0	509	65	8	3	5	7	25	622	5	1	0	0	0	0	0	6
08:30	0	0	0	0	0	0	0	0	507	68	10	2	5	10	29	631	3	1	0	0	0	0	0	4
08:45	0	0	0	0	0	0	0	0	462	70	7	2	4	13	23	581	3	3	0	0	0	0	2	8
09:00	0	0	0	0	0	0	0	0	461	73	7	2	5	13	15	576	4	3	0	0	0	0	2	9
16:00	0	0	0	0	0	0	0	0	552	130	9	1	6	16	27	741	4	0	0	0	0	0	3	7
16:15	0	0	0	0	0	0	0	0	537	134	11	0	6	13	29	730	4	0	0	0	0	0	2	6
16:30	0	0	0	0	0	0	0	0	502	137	14	0	8	18	30	709	4	0	0	0	0	0	1	5
16:45	0	0	0	0	0	0	0	0	495	122	10	1	5	22	46	701	8	0	0	0	0	0	1	9
17:00	0	0	0	0	0	0	0	0	477	113	8	1	5	30	51	685	10	1	0	0	0	0	0	11
17:15	0	0	0	0	0	0	0	0	495	96	7	1	5	34	66	704	12	1	0	0	0	0	0	13
17:30	0	0	0	0	0	0	0	0	543	76	5	1	4	33	73	735	14	1	0	0	0	0	0	15
17:45	0	0	0	0	0	0	0	0	544	79	5	0	6	34	80	748	10	1	0	0	0	0	0	11
18:00	0	0	0	0	0	0	0	0	532	69	5	0	7	28	81	722	7	0	0	0	0	0	0	7

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 4

Date of Survey: 17.11.2016
Junction Name: A30003 Mortlake High Street/Vineyard Path
Junction Type: T-Junction

Arm A: A3003 Mortlake High Street (E)
Arm B: Vineyard Path (S)
Arm C: A3003 Mortlake High Street (W)

	B to B								B to A								B to C							
Time	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total
07:00								0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	4
07:15								0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	7
07:30								0	2	3	0	0	0	0	1	6	7	3	0	0	0	0	0	10
07:45								0	1	1	0	0	0	0	0	2	5	1	0	0	0	0	2	8
08:00								0	0	0	0	0	0	0	0	0	12	3	0	0	0	0	0	15
08:15								0	1	0	0	0	0	0	0	1	3	2	0	0	0	1	0	6
08:30								0	2	3	0	0	0	0	0	5	10	2	0	0	0	1	0	13
08:45								0	1	3	0	0	0	0	0	4	11	3	0	0	0	0	0	14
09:00								0	2	0	0	0	0	0	0	2	9	1	0	0	0	1	0	11
09:15								0	1	0	0	0	0	0	0	1	12	1	0	0	0	0	1	14
09:30								0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	6
09:45								0	1	0	0	0	0	0	0	1	8	2	0	0	0	0	0	10
16:00								0	1	2	0	0	0	0	0	3	6	2	0	0	0	1	0	9
16:15								0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	7
16:30								0	3	1	0	0	0	0	0	4	10	2	0	0	0	0	0	12
16:45								0	1	0	0	0	0	0	0	1	11	1	0	0	0	0	0	12
17:00								0	2	0	0	0	0	0	0	2	11	1	0	0	0	0	0	12
17:15								0	0	0	0	0	0	0	0	0	20	5	0	0	0	0	0	25
17:30								0	3	0	0	0	0	0	0	3	4	2	0	0	0	0	0	6
17:45								0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	1	11
18:00								0	3	0	0	0	0	0	0	3	11	0	0	0	0	0	0	11
18:15								0	3	0	0	0	0	0	0	3	10	0	0	0	0	0	0	10
18:30								0	2	0	0	0	0	1	0	3	7	0	0	0	0	0	0	7
18:45								0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
Start Time	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**
07:00	0	0	0	0	0	0	0	0	3	4	0	0	0	0	1	8	22	5	0	0	0	0	2	29
07:15	0	0	0	0	0	0	0	0	3	4	0	0	0	0	1	8	31	7	0	0	0	0	2	40
07:30	0	0	0	0	0	0	0	0	4	4	0	0	0	0	1	9	27	9	0	0	0	1	2	39
07:45	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	8	30	8	0	0	0	2	2	42
08:00	0	0	0	0	0	0	0	0	4	6	0	0	0	0	0	10	36	10	0	0	0	2	0	48
08:15	0	0	0	0	0	0	0	0	6	6	0	0	0	0	0	12	33	8	0	0	0	3	0	44
08:30	0	0	0	0	0	0	0	0	6	6	0	0	0	0	0	12	42	7	0	0	0	2	1	52
08:45	0	0	0	0	0	0	0	0	4	3	0	0	0	0	0	7	35	8	0	0	0	1	1	45
09:00	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	32	7	0	0	0	1	1	41
16:00	0	0	0	0	0	0	0	0	5	3	0	0	0	0	0	8	33	6	0	0	0	1	0	40
16:15	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	7	38	5	0	0	0	0	0	43
16:30	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	7	52	9	0	0	0	0	0	61
16:45	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6	46	9	0	0	0	0	0	55
17:00	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5	45	8	0	0	0	0	1	54
17:15	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6	45	7	0	0	0	0	1	53
17:30	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	9	35	2	0	0	0	0	1	38
17:45	0	0	0	0	0	0	0	0	8	0	0	0	0	1	0	9	38	0	0	0	0	0	1	39
18:00	0	0	0	0	0	0	0	0	8	0	0	0	0	1	0	9	30	0	0	0	0	0	0	30

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 4

Date of Survey: 17.11.2016
Junction Name: A30003 Mortlake High Street/Vineyard Path
Junction Type: T-Junction

Arm A: A3003 Mortlake High Street (E)
Arm B: Vineyard Path (S)
Arm C: A3003 Mortlake High Street (W)

	C to C								C to B								C to A							
Time	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total
07:00								0	3	0	0	0	0	0	0	3	79	23	1	0	2	8	15	128
07:15								0	1	0	0	0	0	0	0	1	95	39	3	0	4	4	14	159
07:30								0	1	1	0	0	0	0	0	2	112	52	3	0	3	10	22	202
07:45								0	3	3	0	0	0	1	0	7	153	37	5	0	1	3	31	230
08:00								0	2	2	0	0	0	0	0	4	115	26	4	0	1	8	27	181
08:15								0	2	3	0	0	0	0	0	5	125	25	6	0	2	6	25	189
08:30								0	12	1	0	0	0	0	0	13	146	26	4	0	1	6	22	205
08:45								0	12	0	0	0	0	0	0	12	103	32	3	1	1	9	17	166
09:00								0	6	0	0	0	0	1	0	7	125	42	1	1	1	2	21	193
09:15								0	5	0	0	0	1	0	0	6	87	22	2	0	2	1	11	125
09:30								0	1	2	0	0	0	0	0	3	128	36	2	0	1	5	11	183
09:45								0	2	0	0	0	0	0	0	2	102	22	1	1	1	3	4	134
16:00								0	5	0	0	0	0	0	0	5	172	29	3	0	1	4	2	211
16:15								0	7	3	0	0	0	0	0	10	186	36	1	1	1	4	4	233
16:30								0	8	2	0	0	0	1	0	11	168	24	2	0	1	3	1	199
16:45								0	4	0	0	0	0	0	0	4	147	17	2	0	2	1	2	171
17:00								0	6	0	0	0	0	0	0	6	167	20	3	0	1	6	3	200
17:15								0	3	0	0	0	0	1	0	4	175	17	0	0	1	8	3	204
17:30								0	1	1	0	0	0	0	0	2	190	22	0	0	1	1	4	218
17:45								0	10	0	0	0	0	0	0	10	208	24	0	0	1	2	8	243
18:00								0	6	2	0	0	0	0	0	8	185	14	1	0	0	2	9	211
18:15								0	5	0	0	0	0	0	1	6	179	14	0	0	1	3	7	204
18:30								0	2	0	0	0	0	0	0	2	184	11	3	0	1	5	7	211
18:45								0	3	0	0	0	0	1	0	4	203	9	1	0	1	3	8	225
Start Time	Rolling Hour							Total	Rolling Hour							Total	Rolling Hour							Total
07:00	0	0	0	0	0	0	0	0	8	4	0	0	0	1	0	13	439	151	12	0	10	25	82	719
07:15	0	0	0	0	0	0	0	0	7	6	0	0	0	1	0	14	475	154	15	0	9	25	94	772
07:30	0	0	0	0	0	0	0	0	8	9	0	0	0	1	0	18	505	140	18	0	7	27	105	802
07:45	0	0	0	0	0	0	0	0	19	9	0	0	0	1	0	29	539	114	19	0	5	23	105	805
08:00	0	0	0	0	0	0	0	0	28	6	0	0	0	0	0	34	489	109	17	1	5	29	91	741
08:15	0	0	0	0	0	0	0	0	32	4	0	0	0	1	0	37	499	125	14	2	5	23	85	753
08:30	0	0	0	0	0	0	0	0	35	1	0	0	1	1	0	38	461	122	10	2	5	18	71	689
08:45	0	0	0	0	0	0	0	0	24	2	0	0	1	1	0	28	443	132	8	2	5	17	60	667
09:00	0	0	0	0	0	0	0	0	14	2	0	0	1	1	0	18	442	122	6	2	5	11	47	635
16:00	0	0	0	0	0	0	0	0	24	5	0	0	0	1	0	30	673	106	8	1	5	12	9	814
16:15	0	0	0	0	0	0	0	0	25	5	0	0	0	1	0	31	668	97	8	1	5	14	10	803
16:30	0	0	0	0	0	0	0	0	21	2	0	0	0	2	0	25	657	78	7	0	5	18	9	774
16:45	0	0	0	0	0	0	0	0	14	1	0	0	0	1	0	16	679	76	5	0	5	16	12	793
17:00	0	0	0	0	0	0	0	0	20	1	0	0	0	1	0	22	740	83	3	0	4	17	18	865
17:15	0	0	0	0	0	0	0	0	20	3	0	0	0	1	0	24	758	77	1	0	3	13	24	876
17:30	0	0	0	0	0	0	0	0	22	3	0	0	0	0	1	26	762	74	1	0	3	8	28	876
17:45	0	0	0	0	0	0	0	0	23	2	0	0	0	0	1	26	756	63	4	0	3	12	31	869
18:00	0	0	0	0	0	0	0	0	16	2	0	0	0	1	1	20	751	48	5	0	3	13	31	851

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 4

Date of Survey: 17.11.2016
Junction Name: A30003 Mortlake High Street/Vineyard Path
Junction Type: T-Junction

	Arm A Approach								Arm A Exit							
Time	**Cars**	**LGV**	**OGV1**	**OGV2**	**Buses**	**M/C**	**Cycle**	**Total**	**Cars**	**LGV**	**OGV1**	**OGV2**	**Buses**	**M/C**	**Cycle**	**Total**
07:00	132	21	2	0	1	3	4	163	79	23	1	0	2	8	15	128
07:15	111	27	3	0	2	5	5	153	95	39	3	0	4	4	14	159
07:30	134	22	3	0	2	3	10	174	114	55	3	0	3	10	23	208
07:45	146	22	4	1	1	9	8	191	154	38	5	0	1	3	31	232
08:00	128	15	1	1	1	1	7	154	115	26	4	0	1	8	27	181
08:15	148	14	2	1	1	0	0	166	126	25	6	0	2	6	25	190
08:30	152	18	5	0	2	1	8	186	148	29	4	0	1	6	22	210
08:45	106	19	1	0	1	3	10	140	104	35	3	1	1	9	17	170
09:00	108	15	0	2	1	3	7	136	127	42	1	1	1	2	21	195
09:15	144	17	4	0	1	3	4	173	88	22	2	0	2	1	11	126
09:30	107	22	2	0	1	4	4	140	128	36	2	0	1	5	11	183
09:45	106	22	1	0	2	3	2	136	103	22	1	1	1	3	4	135
16:00	138	35	1	1	1	6	8	190	173	31	3	0	1	4	2	214
16:15	125	30	1	0	0	1	10	167	186	36	1	1	1	4	4	233
16:30	146	35	4	0	3	3	4	195	171	25	2	0	1	3	1	203
16:45	147	30	3	0	2	6	8	196	148	17	2	0	2	1	2	172
17:00	123	39	3	0	1	3	9	178	169	20	3	0	1	6	3	202
17:15	90	33	4	0	2	6	10	145	175	17	0	0	1	8	3	204
17:30	143	20	0	1	0	7	20	191	193	22	0	0	1	1	4	221
17:45	131	22	1	0	2	14	12	182	208	24	0	0	1	2	8	243
18:00	143	22	2	0	1	7	24	199	188	14	1	0	0	2	9	214
18:15	140	13	2	0	1	5	17	178	182	14	0	0	1	3	7	207
18:30	140	23	0	0	2	8	27	200	186	11	3	0	1	6	7	214
18:45	116	11	1	0	3	8	13	152	203	9	1	0	1	3	8	225
Start Time	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**
07:00	523	92	12	1	6	20	27	681	442	155	12	0	10	25	83	727
07:15	519	86	11	2	6	18	30	672	478	158	15	0	9	25	95	780
07:30	556	73	10	3	5	13	25	685	509	144	18	0	7	27	106	811
07:45	574	69	12	3	5	11	23	697	543	118	19	0	5	23	105	813
08:00	534	66	9	2	5	5	25	646	493	115	17	1	5	29	91	751
08:15	514	66	8	3	5	7	25	628	505	131	14	2	5	23	85	765
08:30	510	69	10	2	5	10	29	635	467	128	10	2	5	18	71	701
08:45	465	73	7	2	4	13	25	589	447	135	8	2	5	17	60	674
09:00	465	76	7	2	5	13	17	585	446	122	6	2	5	11	47	639
16:00	556	130	9	1	6	16	30	748	678	109	8	1	5	12	9	822
16:15	541	134	11	0	6	13	31	736	674	98	8	1	5	14	10	810
16:30	506	137	14	0	8	18	31	714	663	79	7	0	5	18	9	781
16:45	503	122	10	1	5	22	47	710	685	76	5	0	5	16	12	799
17:00	487	114	8	1	5	30	51	696	745	83	3	0	4	17	18	870
17:15	507	97	7	1	5	34	66	717	764	77	1	0	3	13	24	882
17:30	557	77	5	1	4	33	73	750	771	74	1	0	3	8	28	885
17:45	554	80	5	0	6	34	80	759	764	63	4	0	3	13	31	878
18:00	539	69	5	0	7	28	81	729	759	48	5	0	3	14	31	860

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 4

Date of Survey: 17.11.2016
Junction Name: A30003 Mortlake High Street/Vineyard Path
Junction Type: T-Junction

	Arm B Approach								Arm B Exit							
Time	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total	Cars	LGV	OGV1	OGV2	Buses	M/C	Cycle	Total
07:00	3	1	0	0	0	0	0	4	4	0	0	0	0	0	0	4
07:15	7	0	0	0	0	0	0	7	2	0	0	0	0	0	0	2
07:30	9	6	0	0	0	0	1	16	2	2	0	0	0	0	0	4
07:45	6	2	0	0	0	0	2	10	6	3	0	0	0	1	0	10
08:00	12	3	0	0	0	0	0	15	2	3	0	0	0	0	0	5
08:15	4	2	0	0	0	1	0	7	5	3	0	0	0	0	0	8
08:30	12	5	0	0	0	1	0	18	13	1	0	0	0	0	0	14
08:45	12	6	0	0	0	0	0	18	12	0	0	0	0	0	0	12
09:00	11	1	0	0	0	1	0	13	7	1	0	0	0	1	0	9
09:15	13	1	0	0	0	0	1	15	6	0	0	0	1	0	0	7
09:30	3	3	0	0	0	0	0	6	2	4	0	0	0	0	2	8
09:45	9	2	0	0	0	0	0	11	3	0	0	0	0	0	0	3
16:00	7	4	0	0	0	1	0	12	7	0	0	0	0	0	1	8
16:15	6	1	0	0	0	0	0	7	7	3	0	0	0	0	1	11
16:30	13	3	0	0	0	0	0	16	8	2	0	0	0	1	0	11
16:45	12	1	0	0	0	0	0	13	6	0	0	0	0	0	1	7
17:00	13	1	0	0	0	0	0	14	8	0	0	0	0	0	0	8
17:15	20	5	0	0	0	0	0	25	3	0	0	0	0	1	0	4
17:30	7	2	0	0	0	0	0	9	5	1	0	0	0	0	0	6
17:45	10	0	0	0	0	0	1	11	14	1	0	0	0	0	0	15
18:00	14	0	0	0	0	0	0	14	10	2	0	0	0	0	0	12
18:15	13	0	0	0	0	0	0	13	7	0	0	0	0	0	1	8
18:30	9	0	0	0	0	1	0	10	2	0	0	0	0	0	0	2
18:45	2	0	0	0	0	0	0	2	4	0	0	0	0	1	0	5
Start Time	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**
07:00	25	9	0	0	0	0	3	37	14	5	0	0	0	1	0	20
07:15	34	11	0	0	0	0	3	48	12	8	0	0	0	1	0	21
07:30	31	13	0	0	0	1	3	48	15	11	0	0	0	1	0	27
07:45	34	12	0	0	0	2	2	50	26	10	0	0	0	1	0	37
08:00	40	16	0	0	0	2	0	58	32	7	0	0	0	0	0	39
08:15	39	14	0	0	0	3	0	56	37	5	0	0	0	1	0	43
08:30	48	13	0	0	0	2	1	64	38	2	0	0	1	1	0	42
08:45	39	11	0	0	0	1	1	52	27	5	0	0	1	1	2	36
09:00	36	7	0	0	0	1	1	45	18	5	0	0	1	1	2	27
16:00	38	9	0	0	0	1	0	48	28	5	0	0	0	1	3	37
16:15	44	6	0	0	0	0	0	50	29	5	0	0	0	1	2	37
16:30	58	10	0	0	0	0	0	68	25	2	0	0	0	2	1	30
16:45	52	9	0	0	0	0	0	61	22	1	0	0	0	1	1	25
17:00	50	8	0	0	0	0	1	59	30	2	0	0	0	1	0	33
17:15	51	7	0	0	0	0	1	59	32	4	0	0	0	1	0	37
17:30	44	2	0	0	0	0	1	47	36	4	0	0	0	0	1	41
17:45	46	0	0	0	0	1	1	48	33	3	0	0	0	0	1	37
18:00	38	0	0	0	0	1	0	39	23	2	0	0	0	1	1	27

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 4

Date of Survey: 17.11.2016
Junction Name: A30003 Mortlake High Street/Vineyard Path
Junction Type: T-Junction

	Arm C Approach								Arm C Exit							
Time	**Cars**	**LGV**	**OGV1**	**OGV2**	**Buses**	**M/C**	**Cycle**	**Total**	**Cars**	**LGV**	**OGV1**	**OGV2**	**Buses**	**M/C**	**Cycle**	**Total**
07:00	82	23	1	0	2	8	15	131	134	22	2	0	1	3	4	166
07:15	96	39	3	0	4	4	14	160	117	27	3	0	2	5	5	159
07:30	113	53	3	0	3	10	22	204	140	24	3	0	2	3	10	182
07:45	156	40	5	0	1	4	31	237	148	23	4	1	1	9	10	196
08:00	117	28	4	0	1	8	27	185	140	17	1	1	1	1	7	168
08:15	127	28	6	0	2	6	25	194	148	16	2	1	1	1	0	169
08:30	158	27	4	0	1	6	22	218	161	20	5	0	2	2	8	198
08:45	115	32	3	1	1	9	17	178	117	22	1	0	1	3	10	154
09:00	131	42	1	1	1	3	21	200	116	15	0	2	1	4	7	145
09:15	92	22	2	0	3	1	11	131	155	18	4	0	1	3	5	186
09:30	129	38	2	0	1	5	11	186	109	23	2	0	1	4	2	141
09:45	104	22	1	1	1	3	4	136	113	24	1	0	2	3	2	145
16:00	177	29	3	0	1	4	2	216	142	37	1	1	1	7	7	196
16:15	193	39	1	1	1	4	4	243	131	31	1	0	0	1	9	173
16:30	176	26	2	0	1	4	1	210	156	37	4	0	3	3	4	207
16:45	151	17	2	0	2	1	2	175	156	31	3	0	2	6	7	205
17:00	173	20	3	0	1	6	3	206	132	40	3	0	1	3	9	188
17:15	178	17	0	0	1	9	3	208	110	38	4	0	2	6	10	170
17:30	191	23	0	0	1	1	4	220	143	22	0	1	0	7	20	193
17:45	218	24	0	0	1	2	8	253	137	21	1	0	2	14	13	188
18:00	191	16	1	0	0	2	9	219	150	22	2	0	1	7	24	206
18:15	184	14	0	0	1	3	8	210	148	13	2	0	1	5	17	186
18:30	186	11	3	0	1	5	7	213	147	23	0	0	2	8	27	207
18:45	206	9	1	0	1	4	8	229	117	11	1	0	3	8	13	153
Start Time	**Rolling Hour**							**Total**	**Rolling Hour**							**Total**
07:00	447	155	12	0	10	26	82	732	539	96	12	1	6	20	29	703
07:15	482	160	15	0	9	26	94	786	545	91	11	2	6	18	32	705
07:30	513	149	18	0	7	28	105	820	576	80	10	3	5	14	27	715
07:45	558	123	19	0	5	24	105	834	597	76	12	3	5	13	25	731
08:00	517	115	17	1	5	29	91	775	566	75	9	2	5	7	25	689
08:15	531	129	14	2	5	24	85	790	542	73	8	3	5	10	25	666
08:30	496	123	10	2	6	19	71	727	549	75	10	2	5	12	30	683
08:45	467	134	8	2	6	18	60	695	497	78	7	2	4	14	24	626
09:00	456	124	6	2	6	12	47	653	493	80	7	2	5	14	16	617
16:00	697	111	8	1	5	13	9	844	585	136	9	1	6	17	27	781
16:15	693	102	8	1	5	15	10	834	575	139	11	0	6	13	29	773
16:30	678	80	7	0	5	20	9	799	554	146	14	0	8	18	30	770
16:45	693	77	5	0	5	17	12	809	541	131	10	1	5	22	46	756
17:00	760	84	3	0	4	18	18	887	522	121	8	1	5	30	52	739
17:15	778	80	1	0	3	14	24	900	540	103	7	1	5	34	67	757
17:30	784	77	1	0	3	8	29	902	578	78	5	1	4	33	74	773
17:45	779	65	4	0	3	12	32	895	582	79	5	0	6	34	81	787
18:00	767	50	5	0	3	14	32	871	562	69	5	0	7	28	81	752

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 4

Date of Survey: 17.11.2016
Junction Name: A30003 Mortlake High Street/Vineyard Path
Junction Type: T-Junction

	Total Junction Flow							
Time	**Cars**	**LGV**	**OGV1**	**OGV2**	**Buses**	**M/C**	**Cycle**	**Total**
07:00	217	45	3	0	3	11	19	298
07:15	214	66	6	0	6	9	19	320
07:30	256	81	6	0	5	13	33	394
07:45	308	64	9	1	2	13	41	438
08:00	257	46	5	1	2	9	34	354
08:15	279	44	8	1	3	7	25	367
08:30	322	50	9	0	3	8	30	422
08:45	233	57	4	1	2	12	27	336
09:00	250	58	1	3	2	7	28	349
09:15	249	40	6	0	4	4	16	319
09:30	239	63	4	0	2	9	15	332
09:45	219	46	2	1	3	6	6	283
16:00	322	68	4	1	2	11	10	418
16:15	324	70	2	1	1	5	14	417
16:30	335	64	6	0	4	7	5	421
16:45	310	48	5	0	4	7	10	384
17:00	309	60	6	0	2	9	12	398
17:15	288	55	4	0	3	15	13	378
17:30	341	45	0	1	1	8	24	420
17:45	359	46	1	0	3	16	21	446
18:00	348	38	3	0	1	9	33	432
18:15	337	27	2	0	2	8	25	401
18:30	335	34	3	0	3	14	34	423
18:45	324	20	2	0	4	12	21	383
Start Time	**Rolling Hour**							**Total**
07:00	995	256	24	1	16	46	112	1450
07:15	1035	257	26	2	15	44	127	1506
07:30	1100	235	28	3	12	42	133	1553
07:45	1166	204	31	3	10	37	130	1581
08:00	1091	197	26	3	10	36	116	1479
08:15	1084	209	22	5	10	34	110	1474
08:30	1054	205	20	4	11	31	101	1426
08:45	971	218	15	4	10	32	86	1336
09:00	957	207	13	4	11	26	65	1283
16:00	1291	250	17	2	11	30	39	1640
16:15	1278	242	19	1	11	28	41	1620
16:30	1242	227	21	0	13	38	40	1581
16:45	1248	208	15	1	10	39	59	1580
17:00	1297	206	11	1	9	48	70	1642
17:15	1336	184	8	1	8	48	91	1676
17:30	1385	156	6	1	7	41	103	1699
17:45	1379	145	9	0	9	47	113	1702
18:00	1344	119	10	0	10	43	113	1639

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 4

Date of Survey: 17.11.2016
Junction Name: A30003 Mortlake High Street/Vineyard Path
Junction Type: T-Junction

Arm A: A3003 Mortlake High Street (E) **Arm B:** Vineyard Path (S) **Arm C:** A3003 Mortlake High Street (W)

	PCU Summary								
Time	**A to A**	**A to C**	**A to B**	**B to B**	**B to A**	**B to C**	**C to C**	**C to B**	**C to A**
07:00	0	160	1	0	0	4	0	3	115
07:15	0	151	1	0	0	7	0	1	154
07:30	0	168	2	0	5	10	0	2	186
07:45	0	183	3	0	2	6	0	6	209
08:00	0	151	1	0	0	15	0	4	160
08:15	0	168	3	0	1	5	0	5	174
08:30	0	186	1	0	5	12	0	13	189
08:45	0	133	0	0	4	14	0	12	153
09:00	0	132	2	0	2	10	0	6	179
09:15	0	172	1	0	1	13	0	8	120
09:30	0	134	3	0	0	6	0	3	175
09:45	0	136	1	0	1	10	0	2	133
16:00	0	182	2	0	3	8	0	5	211
16:15	0	159	0	0	0	7	0	10	232
16:30	0	198	0	0	4	12	0	10	200
16:45	0	190	2	0	1	12	0	4	174
17:00	0	171	2	0	2	12	0	6	198
17:15	0	140	0	0	0	25	0	3	198
17:30	0	169	4	0	3	6	0	2	216
17:45	0	163	5	0	0	10	0	10	237
18:00	0	175	4	0	3	11	0	8	204
18:15	0	163	2	0	3	10	0	5	198
18:30	0	177	0	0	2	7	0	2	207
18:45	0	141	1	0	0	2	0	3	219
Start Time	**Rolling Hour**								
07:00	0	662	7	0	7	27	0	12	664
07:15	0	653	7	0	7	38	0	13	709
07:30	0	670	9	0	8	37	0	17	729
07:45	0	688	8	0	8	39	0	28	732
08:00	0	637	5	0	10	47	0	34	676
08:15	0	618	6	0	12	42	0	36	695
08:30	0	622	4	0	12	50	0	39	642
08:45	0	571	6	0	7	44	0	29	627
09:00	0	574	7	0	4	40	0	19	608
16:00	0	729	5	0	8	39	0	29	816
16:15	0	718	4	0	7	43	0	30	803
16:30	0	699	4	0	7	61	0	24	770
16:45	0	669	8	0	6	55	0	15	786
17:00	0	643	11	0	5	53	0	21	849
17:15	0	647	13	0	6	52	0	23	854
17:30	0	669	15	0	9	37	0	25	854
17:45	0	677	11	0	8	38	0	25	845
18:00	0	655	7	0	8	30	0	19	827

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Junction Number: Site 4

Date of Survey: 17.11.2016
Junction Name: A30003 Mortlake High Street/Vineyard Path
Junction Type: T-Junction

Arm A: A3003 Mortlake High Street (E)
Arm B: Vineyard Path (S)
Arm C: A3003 Mortlake High Street (W)

Count Method: Vehicles **Classes Included:** All Classes *Select the count method and desired user classes from the drop-downs in cells D10 and G10*

Maximum 15-minute Junction Flow:

AM Peak	**from:**	07:45	**until:**	08:00	**flow:**	438
PM Peak	**from:**	17:45	**until:**	18:00	**flow:**	446

Period Starting: 07:00 *Select the time from the drop-down in cell D17 to show the 15-minute data for that period*

Movement Counts

From \ To	A	B	C	Total
A	0	1	**162**	**163**
B	0	0	4	4
C	128	3	0	131
Total	128	4	**166**	298

HGV Proportions

From \ To	A	B	C	Total
A	0.0%	0.0%	1.9%	1.8%
B	0.0%	0.0%	0.0%	0.0%
C	**2.3%**	0.0%	0.0%	**2.3%**
Total	**2.3%**	0.0%	1.8%	2.0%

Maximum Hourly Junction Flow:

AM Peak	**from:**	07:45	**until:**	08:45	**flow:**	1581
PM Peak	**from:**	17:45	**until:**	18:45	**flow:**	1702

Period Starting: 07:00 *Select the time from the drop-down in cell D32 to show the hourly data for that period*

Movement Counts

From \ To	A	B	C	Total
A	0	7	674	681
B	8	0	29	37
C	**719**	13	0	**732**
Total	**727**	20	703	1450

HGV Proportions

From \ To	A	B	C	Total
A	0.0%	0.0%	2.8%	2.8%
B	0.0%	0.0%	0.0%	0.0%
C	**3.1%**	0.0%	0.0%	**3.0%**
Total	**3.0%**	0.0%	2.7%	2.8%

Bold entries in the above tables indicate the maximum movement, approach and exit flows for the selected time period, and similarly with the HGV proportions

Intelligent Data Collection Limited
Richmond Revision

Client:	PBA
Project Number:	ID02940
Site Number:	Site 1
Site Name:	Strand Drive
Date of Survey:	23.11.2016
Survey Type:	Pedestrian and Cycle Count

Quality Assurance and Issue Record

Quality Assurance

Revision	Rev A			
Date	13.12.2016			
Prepared by	Gabriela Zelenkova			
Signature				
Checked by	Luke Martin			
Signature				
Project Director	Paul O'Neill			
Signature				
Project number	ID02940			
File Ref	ID02940 Richmond Revision - Pedestrian Count - Site 1			

Issue Sheet

	Date			
Issued to	13.12.2016			
Stephanie Yu	E-mail			

Contents Page

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 1
Site Name: Strand Drive
Date of Survey: 23.11.2016
Survey Type: Pedestrian and Cycle Count

X Coordinate	Y Coordinate	Google Maps Link
51.479348	-0.278816	Click Here
AM Peak Conditions	**PM Peak Conditions**	
Dry	Dry	

Site Layout

Additional Notes (Factors which may impact on survey results such as accidents, roadworks, special events)

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 1
Site Name: Strand Drive
Date of Survey: 23.11.2016
Survey Type: Pedestrian and Cycle Count

Input by: Gabriela Zelenkova
Checked by: Luke Martin

	Movement 1			Movement 2		
Time	Peds	Cycles	Total	Peds	Cycles	Total
06:00	0	0	**0**	0	0	**0**
06:15	0	0	**0**	0	0	**0**
06:30	1	0	**1**	1	0	**1**
06:45	0	0	**0**	2	0	**2**
07:00	1	0	**1**	2	0	**2**
07:15	0	0	**0**	4	0	**4**
07:30	1	0	**1**	10	0	**10**
07:45	1	0	**1**	8	0	**8**
08:00	2	0	**2**	7	0	**7**
08:15	1	0	**1**	7	0	**7**
08:30	0	0	**0**	8	0	**8**
08:45	3	0	**3**	5	0	**5**
09:00	1	0	**1**	5	0	**5**
09:15	2	0	**2**	4	0	**4**
09:30	0	0	**0**	3	0	**3**
09:45	1	0	**1**	4	0	**4**
10:00	0	0	**0**	1	0	**1**
10:15	0	0	**0**	1	0	**1**
10:30	2	0	**2**	4	0	**4**
10:45	0	0	**0**	0	0	**0**
11:00	3	0	**3**	2	0	**2**
11:15	1	0	**1**	0	0	**0**
11:30	1	0	**1**	1	0	**1**
11:45	1	0	**1**	1	0	**1**
12:00	1	0	**1**	1	0	**1**
12:15	1	0	**1**	1	0	**1**
12:30	1	0	**1**	0	0	**0**
12:45	0	0	**0**	5	0	**5**
13:00	1	0	**1**	0	0	**0**
13:15	1	0	**1**	0	0	**0**
13:30	0	0	**0**	1	0	**1**
13:45	0	0	**0**	3	0	**3**
14:00	4	0	**4**	1	0	**1**
14:15	0	0	**0**	2	0	**2**
14:30	1	0	**1**	0	0	**0**
14:45	0	0	**0**	0	0	**0**
15:00	0	0	**0**	2	0	**2**
15:15	3	0	**3**	2	0	**2**
15:30	3	0	**3**	0	0	**0**
15:45	6	0	**6**	1	0	**1**
16:00	3	0	**3**	2	0	**2**
16:15	3	0	**3**	2	0	**2**
16:30	1	0	**1**	3	0	**3**
16:45	2	0	**2**	1	0	**1**
17:00	1	0	**1**	0	0	**0**
17:15	1	0	**1**	0	0	**0**
17:30	1	0	**1**	3	0	**3**
17:45	1	0	**1**	1	0	**1**
18:00	3	0	**3**	1	0	**1**
18:15	1	0	**1**	1	0	**1**
18:30	2	0	**2**	3	0	**3**
18:45	5	0	**5**	2	0	**2**
19:00	0	0	**0**	0	0	**0**
19:15	1	0	**1**	2	0	**2**
19:30	3	0	**3**	1	0	**1**
19:45	1	0	**1**	0	0	**0**
Total	**73**	**0**	**73**	**121**	**0**	**121**

Intelligent Data Collection Limited
Richmond Revision

Client:	PBA
Project Number:	ID02940
Site Number:	Site 2
Site Name:	Strand Drive
Date of Survey:	23.11.2016
Survey Type:	Pedestrian and Cycle Count

Quality Assurance and Issue Record

Quality Assurance

Revision	Rev A			
Date	13.12.2016			
Prepared by	Gabriela Zelenkova			
Signature				
Checked by	Luke Martin			
Signature				
Project Director	Paul O'Neill			
Signature				
Project number	ID02940			
File Ref	ID02940 Richmond Revision - Pedestrian Count - Site 2			

Issue Sheet

	Date			
Issued to	13.12.2016			
Stephanie Yu	E-mail			

Contents Page

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 2
Site Name: Strand Drive
Date of Survey: 23.11.2016
Survey Type: Pedestrian and Cycle Count

X Coordinate	Y Coordinate	Google Maps Link
51.480216	-0.276723	Click Here
AM Peak Conditions	**PM Peak Conditions**	
Dry	Dry	

Site Layout

Additional Notes (Factors which may impact on survey results such as accidents, roadworks, special events)

Intelligent Data Collection Limited

Client: PBA
Project Number: ID02940
Site Number: Site 2
Site Name: Strand Drive
Date of Survey: 23.11.2016
Survey Type: Pedestrian and Cycle Count

Input by: Gabriela Zelenkova
Checked by: Luke Martin

	Movement 1			Movement 2		
Time	Peds	Cycles	Total	Peds	Cycles	Total
06:00	0	0	**0**	0	0	**0**
06:15	0	0	**0**	0	0	**0**
06:30	0	0	**0**	0	0	**0**
06:45	0	0	**0**	1	0	**1**
07:00	0	0	**0**	2	0	**2**
07:15	1	1	**2**	2	0	**2**
07:30	0	0	**0**	4	0	**4**
07:45	0	0	**0**	4	0	**4**
08:00	1	0	**1**	6	0	**6**
08:15	3	0	**3**	1	0	**1**
08:30	0	0	**0**	6	0	**6**
08:45	1	0	**1**	3	0	**3**
09:00	0	0	**0**	1	1	**2**
09:15	0	1	**1**	3	0	**3**
09:30	0	0	**0**	2	0	**2**
09:45	0	0	**0**	1	0	**1**
10:00	0	0	**0**	0	0	**0**
10:15	1	0	**1**	2	0	**2**
10:30	2	0	**2**	1	0	**1**
10:45	3	0	**3**	3	0	**3**
11:00	2	0	**2**	0	0	**0**
11:15	0	0	**0**	1	0	**1**
11:30	0	0	**0**	2	0	**2**
11:45	1	0	**1**	1	0	**1**
12:00	1	0	**1**	1	0	**1**
12:15	1	0	**1**	3	0	**3**
12:30	0	0	**0**	1	0	**1**
12:45	2	0	**2**	2	0	**2**
13:00	1	0	**1**	0	0	**0**
13:15	1	0	**1**	0	0	**0**
13:30	0	0	**0**	1	0	**1**
13:45	0	0	**0**	1	0	**1**
14:00	3	0	**3**	2	1	**3**
14:15	0	0	**0**	1	0	**1**
14:30	3	0	**3**	1	0	**1**
14:45	0	0	**0**	1	0	**1**
15:00	0	0	**0**	4	0	**4**
15:15	1	0	**1**	3	0	**3**
15:30	2	1	**3**	0	0	**0**
15:45	3	0	**3**	1	0	**1**
16:00	3	0	**3**	3	0	**3**
16:15	2	0	**2**	0	0	**0**
16:30	2	0	**2**	2	1	**3**
16:45	0	0	**0**	1	0	**1**
17:00	2	0	**2**	1	0	**1**
17:15	0	0	**0**	0	1	**1**
17:30	1	0	**1**	3	0	**3**
17:45	0	0	**0**	0	0	**0**
18:00	0	0	**0**	0	0	**0**
18:15	3	0	**3**	0	0	**0**
18:30	0	0	**0**	1	0	**1**
18:45	1	0	**1**	2	0	**2**
19:00	1	0	**1**	0	0	**0**
19:15	0	0	**0**	0	0	**0**
19:30	1	0	**1**	0	0	**0**
19:45	1	0	**1**	0	0	**0**
Total	**50**	**3**	**53**	**81**	**4**	**85**

Appendix N PBA Strategic Modelling Notes

TECHNICAL NOTE

Project Name:	Stag Brewery
Project Ref:	38262
Note No:	38262/Modelling/TN001
Note Title:	SoLHAM Base Year Model Review
Date:	17/10/2017
Prepared by:	Jamie Pound and Andrew Bagnall
Reviewed by:	Kevin Lumsden

1 Introduction

1.1 Overview

1.1.1 This Technical Note details work undertaken by Peter Brett Associates (PBA) to review and enhance the suitability of using Transport for London's (TfL) "**So**uth of **L**ondon **H**ighway **A**ssignment **M**odel" (SoLHAM) for the purpose of assessing the potential strategic transport impacts associated with the proposed redevelopment of the Stag Brewery site in Mortlake.

1.1.2 SoLHAM is a strategic SATURN model which covers south London in simulation and the rest of the wider London area as buffer. Figure 1 illustrates the simulation area of SoLHAM in pink.

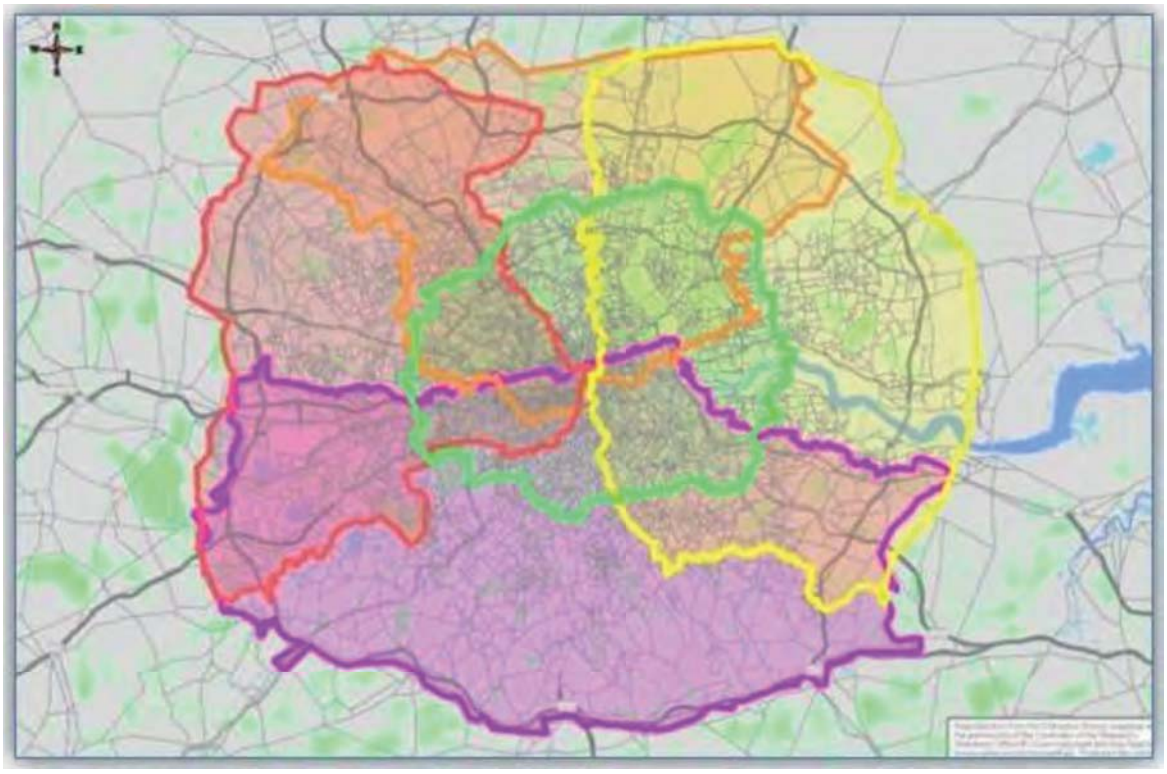


Figure 1 SoLHAM simulation coverage (Pink Area)

1.1.3 TfL Dashboard and network audit spreadsheets which have been submitted as part of this base model review, in line with the TfL Highway Assignment Model Guidance v2.5, and a summary of the key base model analysis is provided in this Note.

1.2 Model Review

1.2.1 At a meeting held on 3rd July 2017 with TfL and PBA, TfL indicated that they anticipated that SoLHAM provides a good base year validation and representation of base year travel demand (travel patterns and vehicle flows) and supply (transport network) in and around the proposed Stag Brewery Site (within a 2km 'sphere of influence' radius of the proposed site). As a consequence, TfL considered only modest changes may be required to the base year model for the purposes of understanding the strategic impacts of the proposed STAG Brewery development.

1.2.2 It was agreed that the assessment should include the potential strategic impacts of the proposed development to be understood on the highway network (agreed as being within 2km radius around the proposed site), including potential impacts on the Chalkers Corner junction, which has been identified as being a particularly sensitive junction.

1.2.3 This model review involved checking the base year model suitability for:

- testing the potential strategic transport network impacts, as a result of the introduction of the proposed development; and
- providing data that may be used to inform the traffic impact assessment of the proposed development.

1.2.4 The following model characteristics were reviewed as part of this task:

- Comparison of Modelled versus Observed Traffic Counts (presented in Section 2);
- Comparison of Modelled versus Observed Journey Times (presented in Section 2);
- Node Checks (presented in Section 3);
- Link Checks (presented in Section 3); and
- Zone Checks (presented in Section 3).

1.3 Study Area

1.3.1 The development being assessed by PBA is Stag Brewery, located in Mortlake just south of the River Thames in South West London. It is a proposed re-development of an existing site that will provide a residential led, mixed-use development.

1.3.2 The proposed development comprises of up to 730 new homes plus a care centre providing up to a further 123 assisted living units with a secondary school also located on site. Other proposed uses, which are intended to provide local facilities both for the new community and the existing Mortlake community, include; retail (including local restaurants and bars), leisure (including a new local cinema), a new hotel and community facilities (including a new health care centre).

1.3.3 It is important to note in the context of this study, that the forecast level of trip making predicted at this re-development site will add no more than 200 vehicles arriving\departing in the AM Peak and 120 vehicles arriving\departing in the PM Peak in the opening year of 2031. This is discussed further in Section 4.

1.3.4 Figure 2 illustrates the location of the site (red dot) and a 2km radius study area, within which the SoLHAM model has been reviewed.

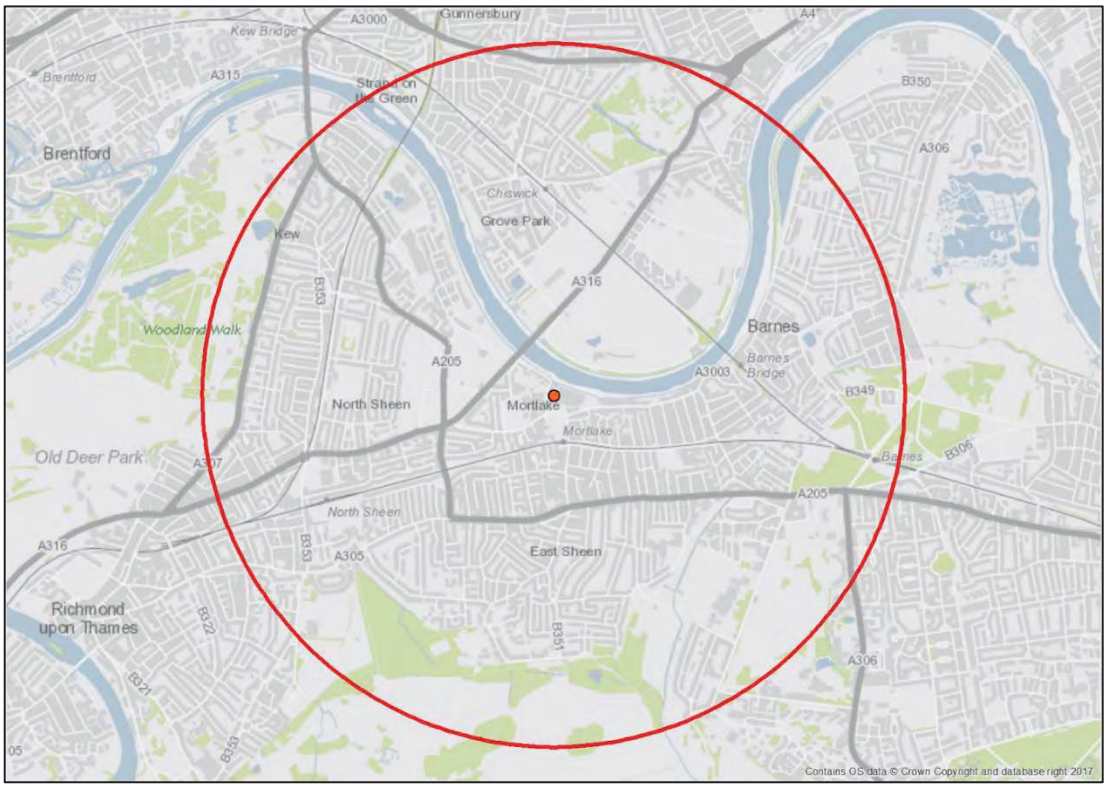


Figure 2: Stag Brewery Study Area

2 Modelled vs Observed Data Comparisons

2.1 Overview

2.1.1 The TfL HAM dashboard was used to compare modelled and observed traffic counts as well as a selection of defined journey time routes. This was undertaken for the **calibrated version of the SoLHAM base model** (i.e. prior to any local adjustments or refinements). A summary of these comparisons is presented below.

2.2 TfL Traffic Counts

2.2.1 There are 33 directional traffic counts within the 2km study area. The location of these is illustrated in Figure 3.

2.2.2 It is noted that there is limited data relating to the Lower Richmond Road and Mortlake High Street corridor and Sheen Lane, which are key local links providing access to the Stag development site. There are no count sites on Mortlake High Street (between Sheen Lane and White Hart Lane), on Lower Richmond Road (Between the A306 and Sheen Lane) or on Sheen Lane (north of the South Circular). Specific local counts were commissioned and processed by PBA at these locations and are described in Section 2.4 below.

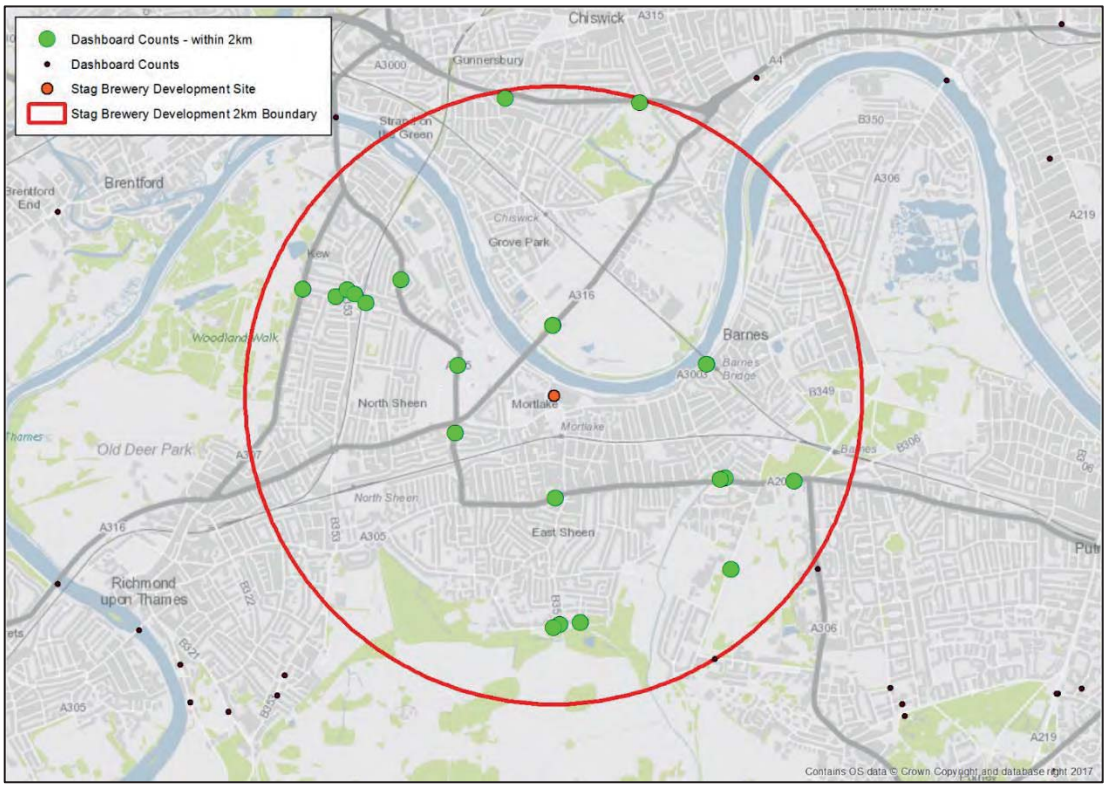


Figure 3: TfL Dashboard Traffic Counts

2.2.3 The level of modelled flow to observed count correlation for the study area is broadly in line with the equivalent model-wide statistics in the AM and slightly poorer in the PM peak as follows:

- AM Peak: 25 (76%) of the 33 count comparisons satisfy the WebTAG flow criteria; 22 (67%) have a GEH of less than 5, and 26 (79%) have a GEH less than 7.5; and
- PM Peak: 21 (64%) of the 33 count comparisons satisfy the WebTAG flow criteria; 19 (58%) have a GEH of less than 5, and 21 (64%) have a GEH less than 7.5.

2.2.4 Overall, it is considered to be broadly acceptable for a strategic model of this type, which has been prepared for generic and varied applications. However, it should be noted that there is variation in the modelled flows relative to observed, and this is highlighted below when looking at local traffic count comparisons. When comparing modelled flows and observed counts, it should also be borne in mind that there can be considerable fluctuations in observed data alone on a regular basis.

2.3 Strategic Screenlines

2.3.1 There is one SoLHAM strategic screenline within the study area, which was used as part of the model calibration and matrix estimation process. This is the Thames (west) screenline, which has data in both northbound and southbound directions. The screenline extends from the M25 at Staines-upon-Thames in the west to Putney Bridge at Fulham in the east. The screenline location in the vicinity of the Stag Brewery development is illustrated in Figure 4.

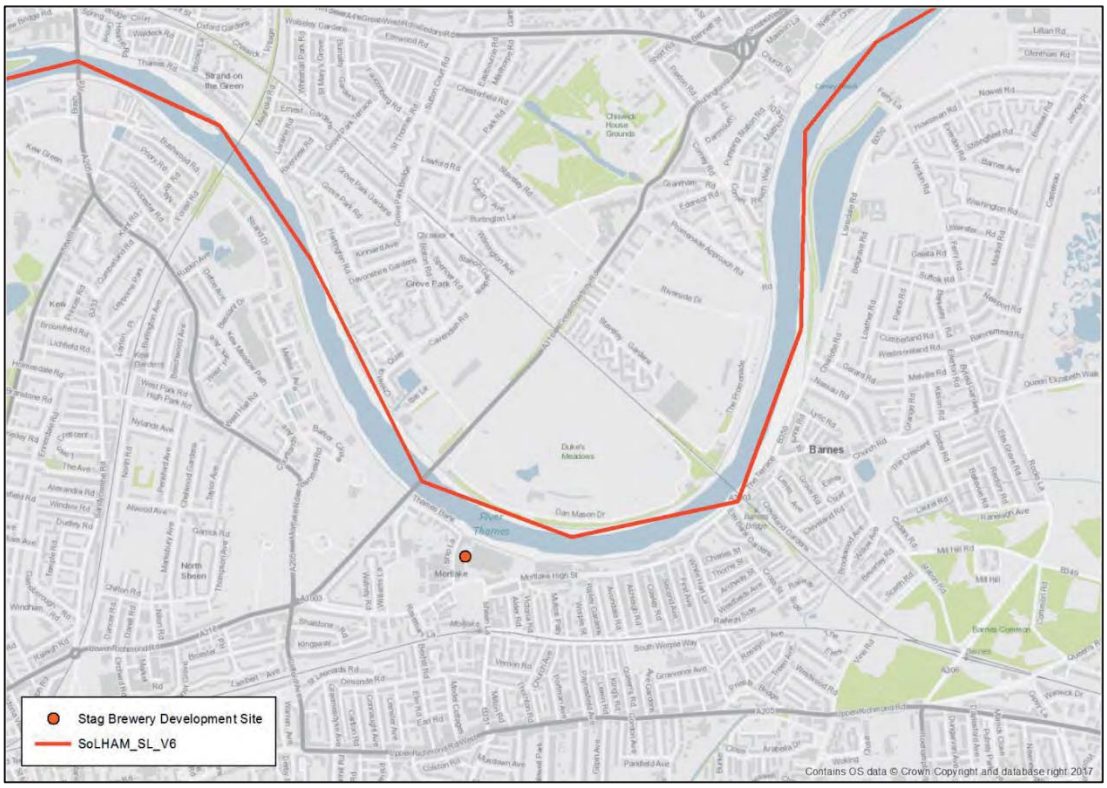


Figure 4: Thames West Screenline

2.3.2 In the AM peak, the Thames West screenline matches the required WebTAG criteria. In the PM peak, flow criteria match well in terms of percentage difference, but falls slightly outside the recommended GEH difference. This indicates an acceptable level of calibration

2.4 Local Traffic Counts

2.4.1 To provide a more detailed understanding of traffic within the study area, PBA commissioned a series of traffic counts in June 2016 and June 2017. This included sixteen directional ATCs at the following locations and illustrated in Figure 5:

- Mortlake High St;
- Sheen Lane;
- South Circular Road;
- Lower Richmond Road (2 locations);
- Clifford Avenue;
- The Terrace; and
- White Hart Lane.

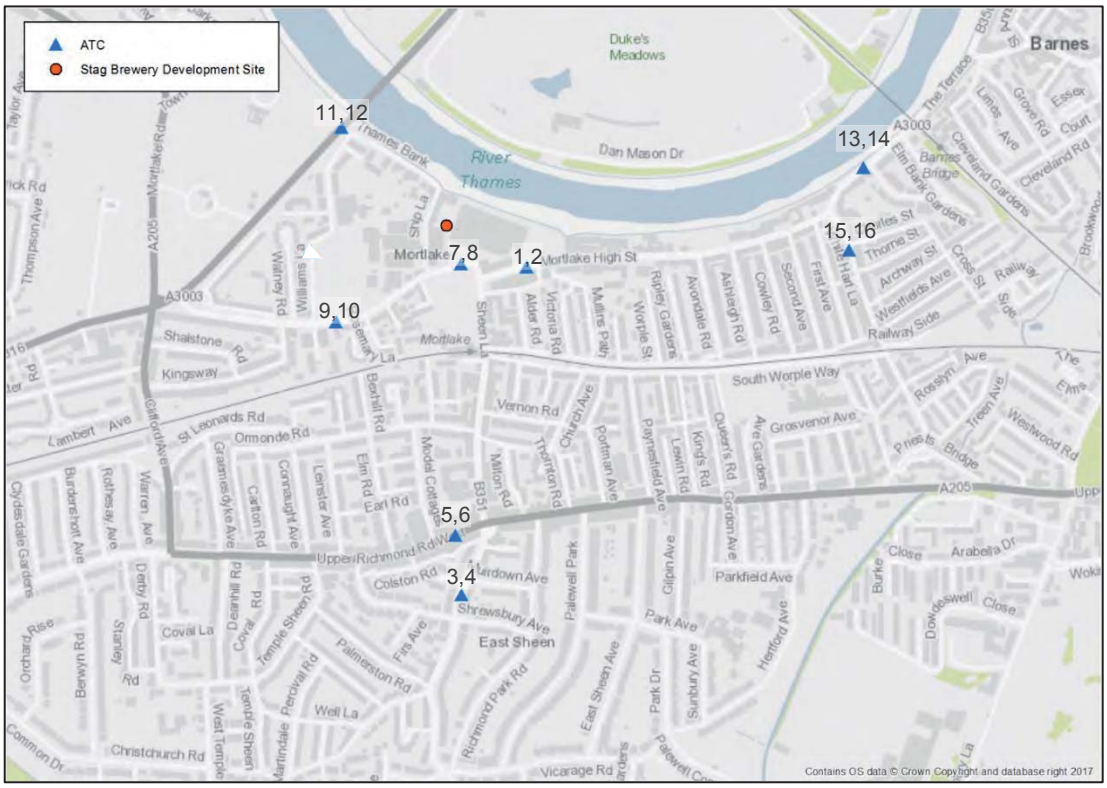


Figure 5: Local Traffic Counts

2.4.2 As suggested by TfL, no adjustments were made to the local counts to take account of the fact the model has a base year of 2012 and the PBA counts are from 2016 and 2017. This is due to there being no clear evidence of traffic growth since 2012 and that day to day variation can be greater.

2.4.3 Comparison of the local traffic count data collected by PBA against the equivalent base year calibration modelled flows of SoLHAM is presented in Table 1 and Table 2. Inspection of these indicates the following key points:

- In the AM peak, 7 (44%) of the 16 count comparisons satisfy the WebTAG flow criteria; 8 (50%) have a GEH of less than 5, 10 (63%) have a GEH of less than 7.5, and 5 (31%) have a GEH greater than 10;
- In the PM peak, 3 (19%) of the 16 count comparisons satisfy the WebTAG flow criteria, 4 (25%) have a GEH of less than 5, 9 (56%) have a GEH of less than 7.5, and 5 (31%) have a GEH greater than 10;
- This indicates a relatively poor level of validation for the AM and PM peaks in the local area. In general, **the modelled flows are higher than observed** on the majority of links with 12 out of 16 (75%) of the count comparisons having higher modelled than observed flows in both time periods; and
- The poorest comparisons are on Lower Richmond Road westbound in the AM peak, which is directly outside the proposed development. The observed flow is around 600, whereas the model has a flow of around 1,200. This could have a notable influence on the assessed impact of the development where the high modelled flows may result in overstatement of congestion. However, the high modelled flows may also dilute the impact of development trips on the network. Mortlake High Street is also demonstrating a higher modelled flow (~900 vehicles) when compared to the observed (~600 vehicles).

2.4.4 This level of validation should be considered in the context of the proposed development assessment.

Table 1 Traffic Flows Comparison – Calibrated Base Model – AM Peak Hour (vehicles)

Site	Location	Direction	Observed	Modelled	Diff.	% Diff.	GEH
1	Mortlake High Street	E	702	788	+86	+12%	3.1
2	Mortlake High Street	W	603	913	+311	+52%	11.3
3	Sheen Lane	N	191	266	+74	+39%	4.9
4	Sheen Lane	S	205	59	-146	-71%	12.7
5	South Circular Road	E	505	629	+124	+25%	5.2
6	South Circular Road	W	407	400	-7	-2%	0.4
7	Lower Richmond Road	E	633	751	+118	+19%	4.5
8	Lower Richmond Road	W	595	1,219	+623	+105%	20.7
9	Lower Richmond Road	E	631	798	+167	+26%	6.2
10	Lower Richmond Road	W	596	1,185	+589	+99%	19.7
11	Clifford Avenue	N	1,265	1,575	+310	+25%	8.2
12	Clifford Avenue	S	954	962	+8	+1%	0.3
13	The Terrace	E	715	785	+70	+10%	2.5
14	The Terrace	W	564	534	-30	-5%	1.3
15	White Hart Lane	N	166	370	+204	+123%	12.4
16	White Hart Lane	S	152	147	-5	-3%	0.4

Table 2 Traffic Flows Comparison – Calibrated Base Model – PM Peak Hour (vehicles)

Site	Location	Direction	Observed	Modelled	Diff.	% Diff.	GEH
1	Mortlake High Street	E	720	867	+147	+20%	5.2
2	Mortlake High Street	W	608	1,035	+427	+70%	14.9
3	Sheen Lane	N	190	128	-62	-33%	4.9
4	Sheen Lane	S	217	115	-102	-47%	7.9
5	South Circular Road	E	537	654	+117	+22%	4.8
6	South Circular Road	W	435	768	+333	+77%	13.6
7	Lower Richmond Road	E	692	887	+196	+28%	7.0
8	Lower Richmond Road	W	600	918	+319	+53%	11.6
9	Lower Richmond Road	E	657	865	+208	+32%	7.5
10	Lower Richmond Road	W	610	911	+301	+49%	10.9
11	Clifford Avenue	N	1,307	1,284	-23	-2%	0.6
12	Clifford Avenue	S	1,128	1,314	+186	+17%	5.3
13	The Terrace	E	673	864	+191	+28%	6.9
14	The Terrace	W	590	758	+168	+28%	6.5
15	White Hart Lane	N	145	150	+5	+3%	0.4
16	White Hart Lane	S	225	71	-154	-68%	12.7

2.5 Journey Times

2.5.1 There are six defined model validation journey time routes in the study area as part of the SoLHAM validation and these are illustrated in Figure 6.

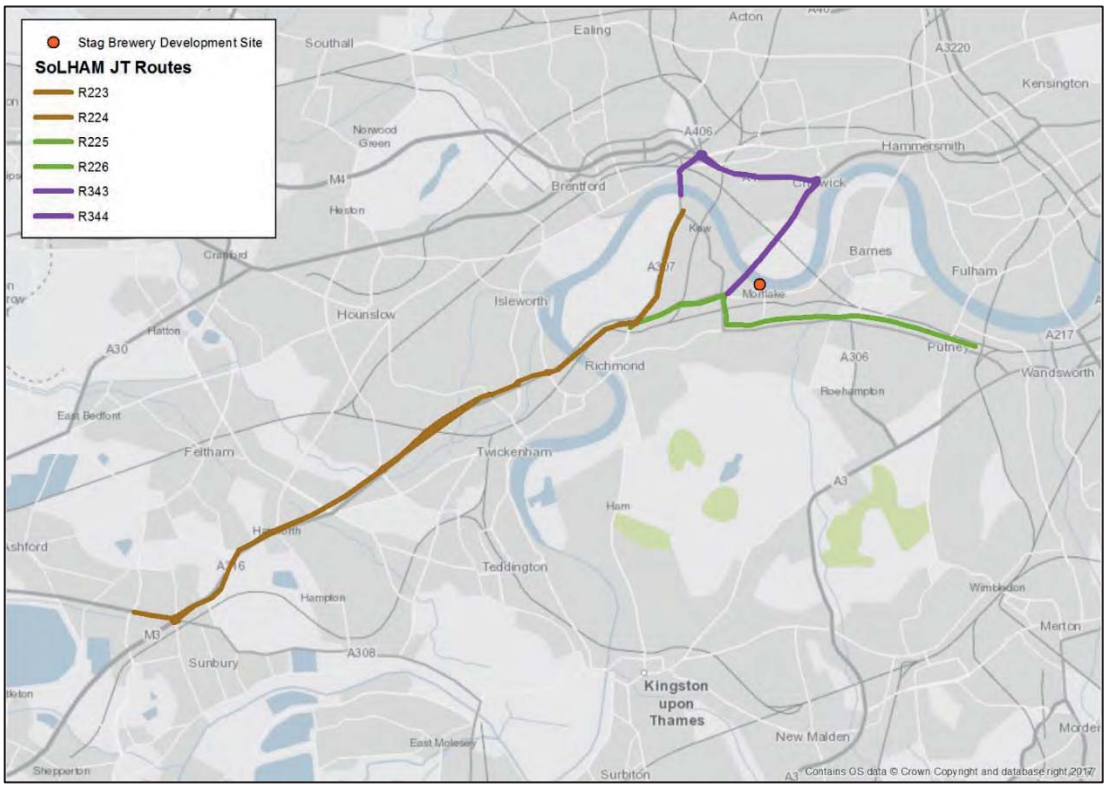


Figure 6: Strategic Journey Time Routes

2.5.2 Journey time routes included in the dashboard do not cover the local roads adjacent to the proposed Stag Brewery development. Following discussions with TfL, local journey time routes were defined to provide insight to local network validation covering Lower Richmond Road and Mortlake High Street as illustrated in Figure 7.

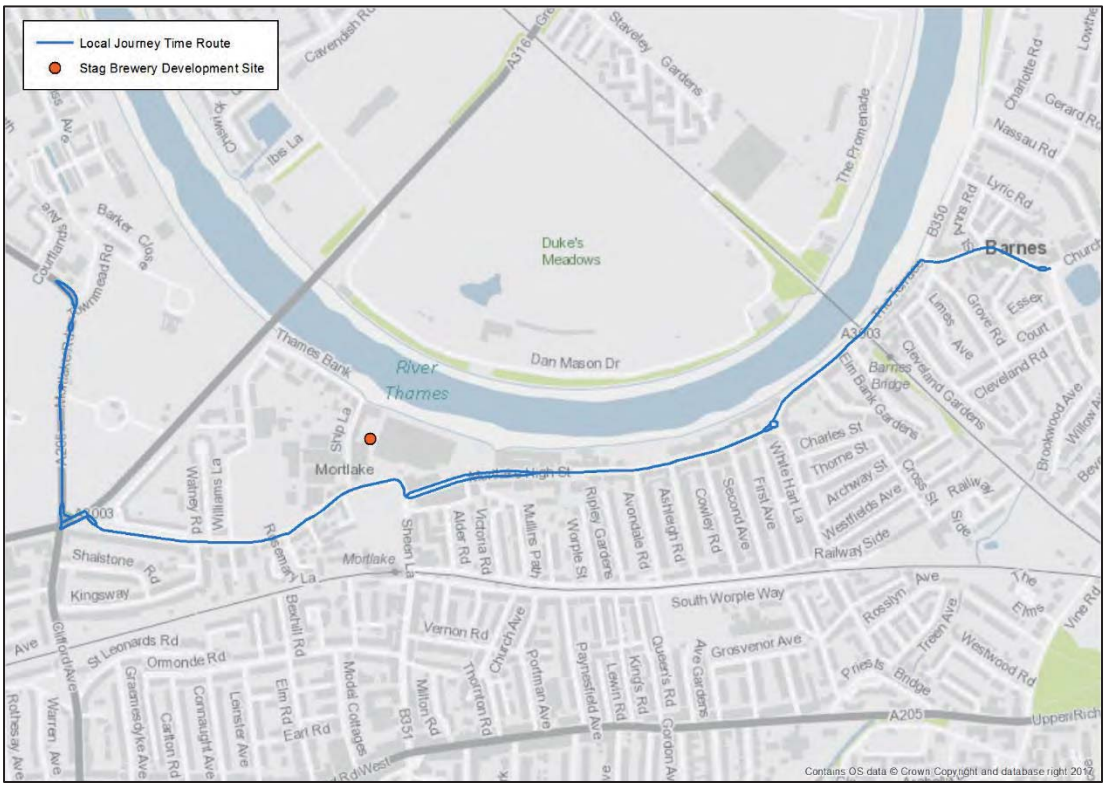


Figure 7: Local Journey Time Routes

2.5.3 Table 3 and Table 4 present the journey time validation for each of the routes in the AM and PM peak hours respectively.

Table 3 Journey Time Validation – AM Peak Hour (seconds)

Description	Route ID	Direction	Observed	Modelled	Diff.	% Diff.
A316 Sunbury to A317 Kew Green	R223	Eastbound	1,793	1,704	-89	-5%
A317 Kew Green to A316 Sunbury	R224	Westbound	1,413	1,494	+81	+6%
A316 Richmond to A205 Putney	R225	Eastbound	1,385	1,673	+288	+21%
A205 Putney to A316 Richmond	R226	Westbound	2,089	1,826	-264	-13%
Chertsey Road	R343	Anticlockwise	1,109	1,053	-56	-5%
Chertsey Road	R344	Clockwise	956	1,019	+63	+7%
Mortlake High Street + Lower Richmond Road	R381	Eastbound	497	653	+156	+31%
Mortlake High Street + Lower Richmond Road	R382	Westbound	764	652	-112	-15%

Table 4 Journey Time Validation – PM Peak Hour (seconds)

Description	Route ID	Direction	Observed	Modelled	Diff.	% Diff.
A316 Sunbury to A317 Kew Green	R223	Eastbound	1,448	1,475	+27	+2%
A317 Kew Green to A316 Sunbury	R224	Westbound	1,851	1,592	-259	-14%
A316 Richmond to A205 Putney	R225	Eastbound	2,544	1,824	-721	-28%
A205 Putney to A316 Richmond	R226	Westbound	2,350	1,871	-479	-20%
Chertsey Road	R343	Anticlockwise	918	977	+60	+7%
Chertsey Road	R344	Clockwise	1,060	1,206	+146	+14%
Mortlake High Street + Lower Richmond Road	R381	Eastbound	588	828	+240	+41%
Mortlake High Street + Lower Richmond Road	R382	Westbound	978	772	-206	-21%

2.5.4 In the AM peak, six out of eight routes meet the validation criteria of being within 15% of the observed journey time and in the PM peak, four out of eight meet the criteria. The following routes fail to meet the validation criteria:

- Route R225/R226 (A316 Richmond to A205 Putney) eastbound in the AM (modelled time 21% greater than average observed), eastbound in the PM (modelled time 28% less than average observed), and westbound in the PM (modelled time 20% less than average observed); and
- Route R381/R382 (Mortlake High Street + Lower Richmond Road) westbound in the AM (modelled 21% slower than average observed), eastbound in the PM (modelled time 41% greater than average observed), and westbound in the PM (modelled time 21% less than average observed).

2.5.5 This broadly indicates an over-representation of congestion in the AM Peak and an under-representation of congestion in the PM Peak at a key part of the road network for the Stag Brewery development assessment. Notwithstanding that the modelled traffic is broadly higher than observed, specifically on the South Circular Road, west of Sheen Lane.

3 Model Review and Refinement

3.1 Overview

3.1.1 Following the review of the existing calibrated version of the SoLHAM base model, summarised in Section 2, a series of checks and refinements of the model were made to better represent the local area around the proposed development within the base model.

3.2 Node Checks

3.2.1 All nodes within the 2km radius of the site were checked for consistency and that the network coding is as expected.

3.2.2 A record of the checks and any proposed network changes were saved in a network audit spreadsheet. The proposed changes as detailed in the network change log will be made to the model once agreed with TfL, and the consequent impact on base year model validation is reported below.

3.2.3 A large number of the comments relate to stacking capacities being coded as higher than would be expected. Following discussion with TfL, stacking capacities have been recoded based on default distance-based calculations in SATURN.

3.2.4 A review of the signal-controlled nodes at Chalkers Corner was undertaken in in tandem with the model validation against observed traffic count and journey time data. This identified some inconsistencies between the model coding and staging/phasing/timings taken from TfL's traffic network databases, including average SCOOT cycle and stage times which were updated accordingly.

3.3 Link Checks

3.3.1 Checks were made of the distances, speeds and speed flow curves for all links within the 2km radius. This was a visual check to see if the link characteristics varied by direction and if there were any errors in terms of distances. Any inconsistences found were noted in the network audit spreadsheet.

3.3.2 It was noted that level crossing signal timings on Sheen Lane and White Hart Lane were not representative of the actual time for which the barrier was down. Timings observed by PBA demonstrated that, in both the AM and PM peaks hours, the barrier was down for roughly 70% of the time. This is much higher than that represented in the model coding.

3.4 Zone Checks

3.4.1 The general level of zonal detail within the 2km sphere of influence is considered acceptable for this study. However, we disaggregated the Mortlake zone (No.58139) (within which the proposed development is situated) into five separate zones. This is to better represent the loading of traffic to\from the development on to the wider transport network. Figures 8 and 9 illustrate the 'without' and 'with' changes respectively.

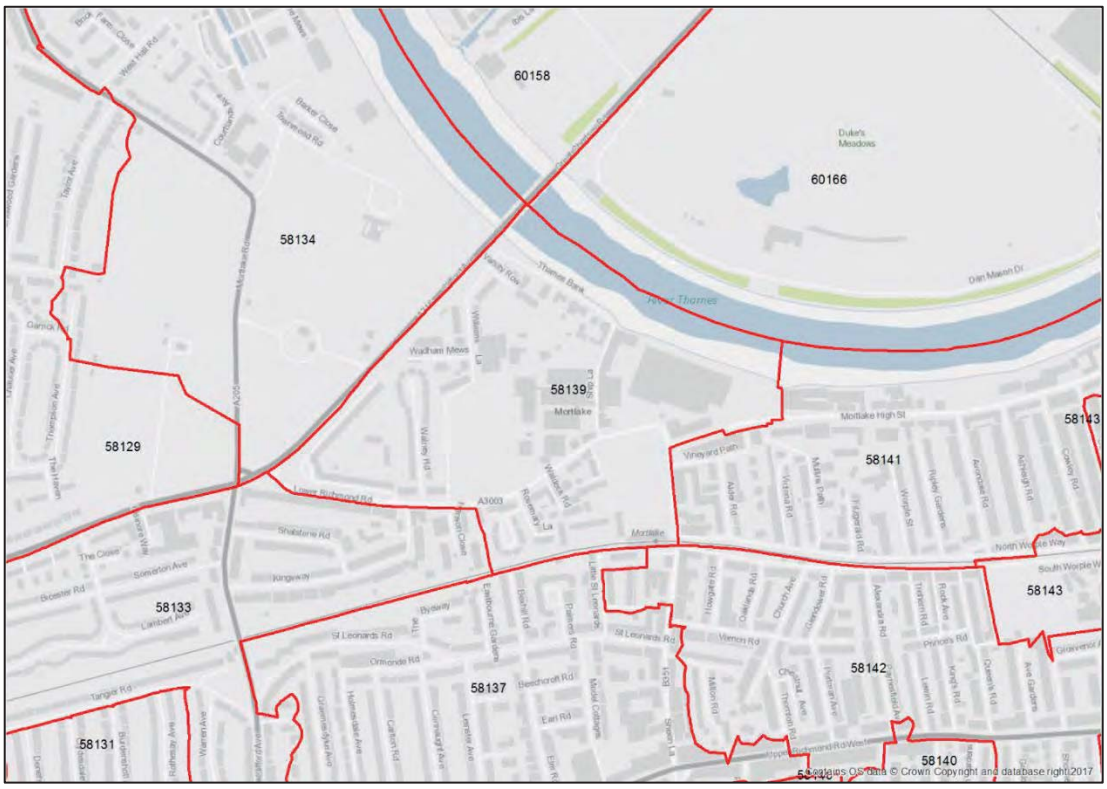


Figure 8: Existing SoLHAM Zones

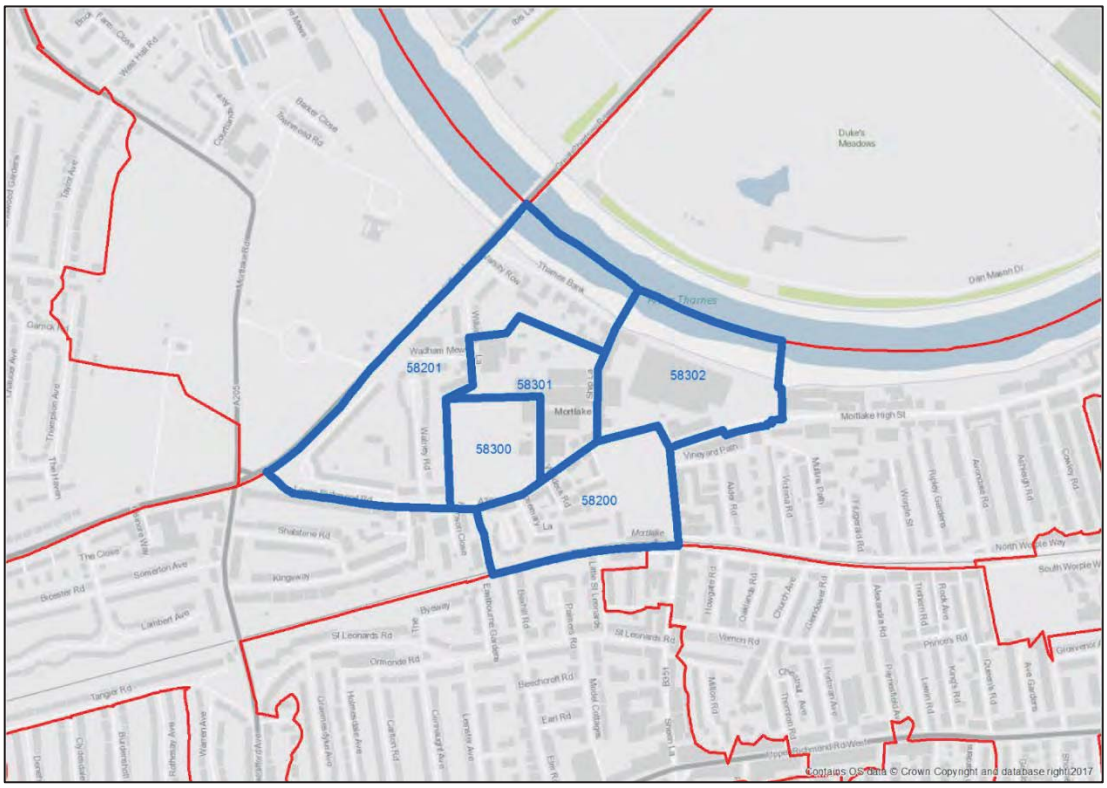


Figure 9: Proposed SoLHAM Zones

3.4.2 As can be seen in Figures 8 and 9, the zonal changes involved splitting zone 58139 into five zones. This is made up of three development zones (58300-58302) and a further two zones (58200-58201) for the existing land-use in the remaining area. Figure 10 illustrates the associated zone connectors for the new zones with new spigot connectors to the north and south of Lower Richmond Road for the existing land use zones and access to the development zones via a spigot near Ship Lane, as per the current Mortlake model zone.

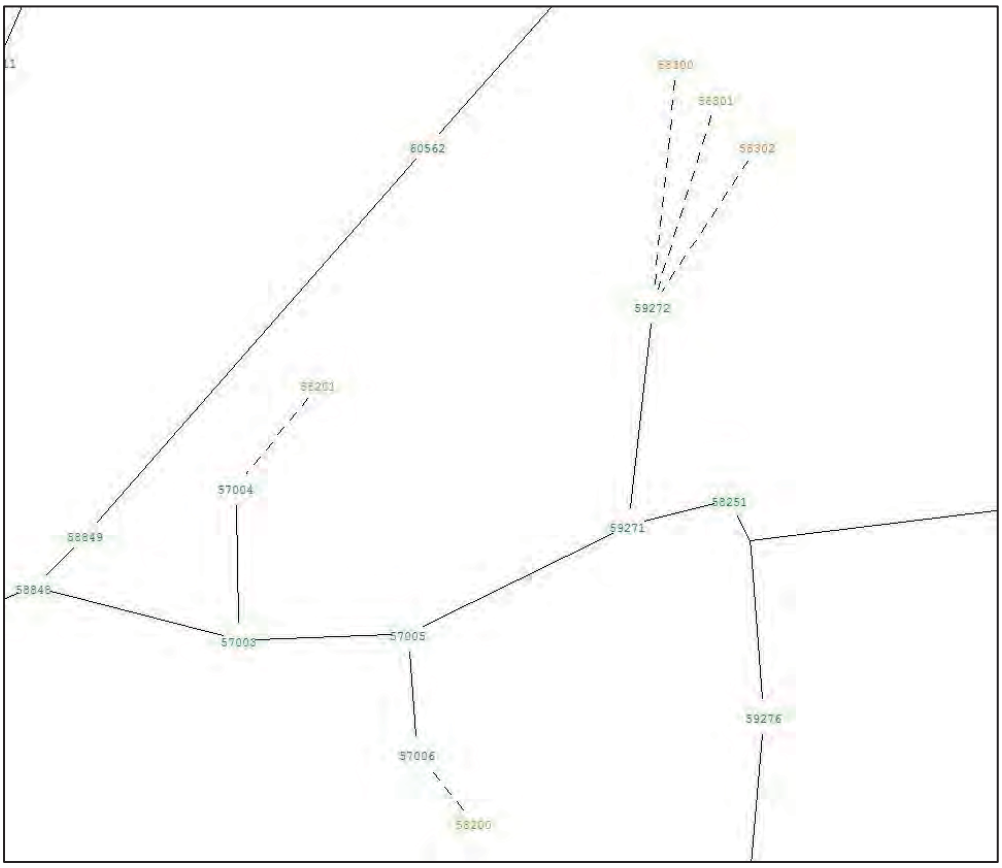


Figure 10: Proposed Zone Connectivity

3.5 Assignment of Updated Networks

3.5.1 Following discussions with TfL regarding the checks and comparisons detailed above, the model was run with PBA's network refinements included.

3.5.2 While undertaking the PM assignment, the model crashed due to a floating point error. Referencing the SATURN documentation, it was found to be a known error in Version 11.3.12U which was fixed in version 11.3.12W. Hence, both the AM and PM assignments were run in SATURN Version 11.3.12W.

3.5.3 Figure 11 and Figure 12 present the change in assigned flows as a result of the network refinements.

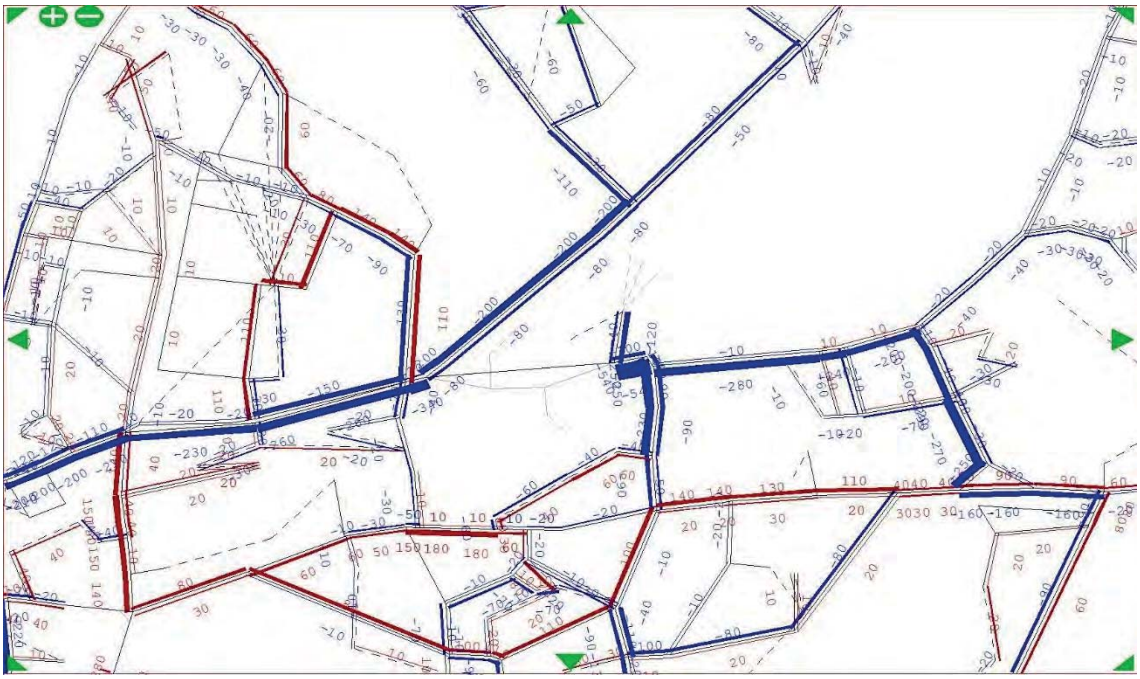


Figure 11: Actual Flow Differences (PCUs) – 2012 PBA Stag Brewery minus Calibrated Base – AM Peak Hour

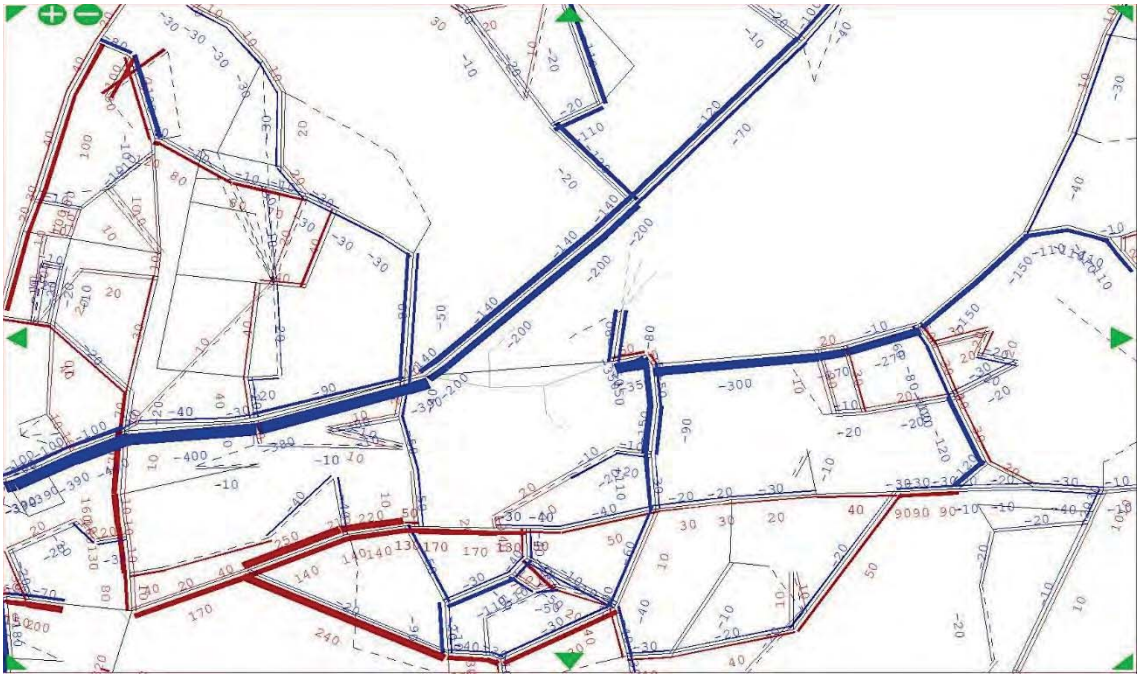


Figure 12: Actual Flow Differences (PCUs) – 2012 PBA Stag Brewery minus Calibrated Base – PM Peak Hour

3.5.4 Inspection of the above figures and the model dashboard reveals the following key points:

- the update of the modelled railway level crossing signal timings to match observed timings has the greatest impact on assigned flows;
- there is a reduction in traffic flows on White Hart Lane, Mortlake High Street, Sheen Lane and Lower Richmond Road, most notably in the Northbound/Westbound directions;
- whilst this improves the match of modelled flows against the observed local count data, there is still an overstatement of traffic demand in the study area, however as noted above, this should be considered in the context of the proposed development assessment; and
- whilst there is some wider re-assignment of traffic flows, this is relatively modest, with a minor change in assigned flows beyond the study area. There is a negligible impact on the overall model calibration and validation, although noted that there is a slightly worse performance as a result of the network amendments.

3.6 Travel Demand Matrix Adjustment

3.6.1 Following discussions with TfL, it was suggested that PBA undertake Matrix Estimation (ME) and prepare adjusted travel demand matrices for the PBASBD version of SoLHAM. The objective of this was to improve the local representation of traffic flows and network performance near the proposed Stag Brewery development site.

3.6.2 ME was undertaken for the PBASBD network in the AM and PM peak hours using the standard SoLHAM procedures supplied by TfL. It was agreed that single point traffic counts (by vehicle type) would be added to the standard ME count data for the sixteen locations presented in Figure 5.

3.6.3 Figure 13 and Figure 14 present the change in assigned flows as a result of the travel demand adjustments.

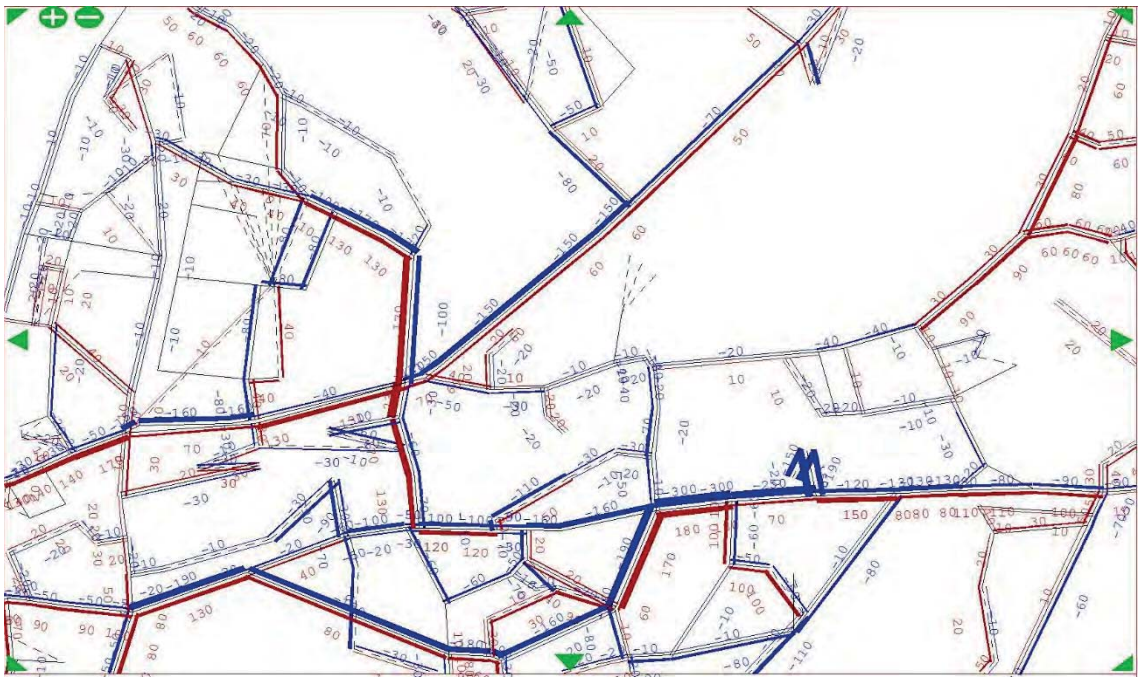


Figure 13: Actual Flow Differences (PCUs) – 2012 PBA Stag Brewery with ME minus Without ME – AM Peak Hour

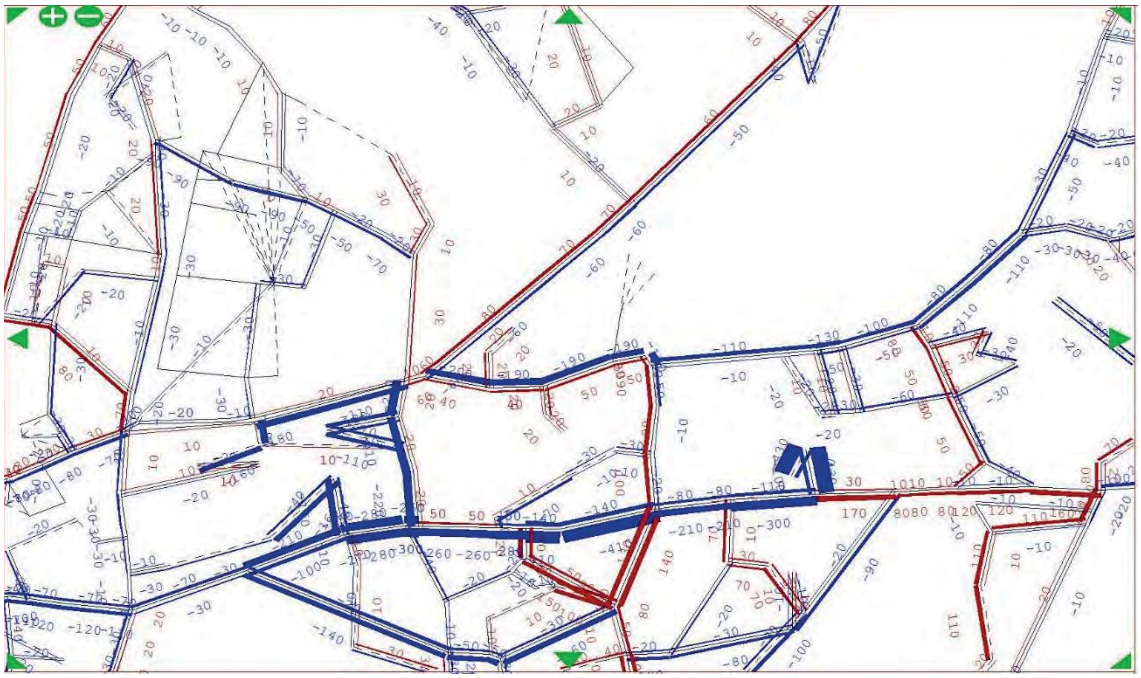


Figure 14: Actual Flow Differences (PCUs) – 2012 PBA Stag Brewery with ME minus Without ME – PM Peak Hour

3.6.4 Comparison of the local traffic count data collected by PBA against the equivalent PBASBD post-ME assigned SoLHAM flows is presented in Table 5 and Table 6.

Table 5 Traffic Flows Comparison – Post Matrix Estimation– AM Peak Hour (vehicles)

Site	Location	Direction	Observed	Modelled	Diff.	% Diff.	GEH
1	Mortlake High Street	E	702	743	+41	+6%	1.5
2	Mortlake High Street	W	603	630	+28	+5%	1.1
3	Sheen Lane	N	191	175	-16	-8%	1.2
4	Sheen Lane	S	205	208	+3	+2%	0.2
5	South Circular Road	E	505	471	-35	-7%	1.6
6	South Circular Road	W	407	386	-20	-5%	1.0
7	Lower Richmond Road	E	633	671	+38	+6%	1.5
8	Lower Richmond Road	W	595	632	+36	+6%	1.5
9	Lower Richmond Road	E	631	674	+43	+7%	1.7
10	Lower Richmond Road	W	596	634	+38	+6%	1.5
11	Clifford Avenue	N	1,265	1,206	-59	-5%	1.7
12	Clifford Avenue	S	954	942	-12	-1%	0.4
13	The Terrace	E	715	794	+79	+11%	2.9
14	The Terrace	W	564	577	+13	+2%	0.6
15	White Hart Lane	N	166	172	+6	+3%	0.4
16	White Hart Lane	S	152	118	-34	-22%	2.9

Table 6 Traffic Flows Comparison – Post Matrix Estimation – PM Peak Hour (vehicles)

Site	Location	Direction	Observed	Modelled	Diff.	% Diff.	GEH
1	Mortlake High Street	E	720	741	+22	+3%	0.8
2	Mortlake High Street	W	608	717	+109	+18%	4.2
3	Sheen Lane	N	190	199	+8	+4%	0.6
4	Sheen Lane	S	217	255	+38	+18%	2.5
5	South Circular Road	E	537	485	-52	-10%	2.3
6	South Circular Road	W	435	413	-22	-5%	1.1
7	Lower Richmond Road	E	692	726	+34	+5%	1.3
8	Lower Richmond Road	W	600	606	+6	+1%	0.3
9	Lower Richmond Road	E	657	715	+58	+9%	2.2
10	Lower Richmond Road	W	610	612	+1	+0%	0.0
11	Clifford Avenue	N	1,307	1,214	-93	-7%	2.6
12	Clifford Avenue	S	1,128	1,060	-68	-6%	2.1
13	The Terrace	E	673	784	+111	+16%	4.1
14	The Terrace	W	590	501	-90	-15%	3.8
15	White Hart Lane	N	145	127	-17	-12%	1.5
16	White Hart Lane	S	225	147	-78	-35%	5.7

3.6.5 Table 7 and Table 8 show the journey time validation for each of the routes in the AM and PM peak hours respectively. Appendix A contains a series of graphs showing the journey time validation along each of the routes.

Table 7 Journey Time Validation – Matrix Estimation Sensitivity Test – AM Peak Hour (seconds)

Description	Route ID	Direction	Observed	Modelled	Diff.	% Diff.
A316 Sunbury to A317 Kew Green	R223	Eastbound	1,793	1,709	-84	-5%
A317 Kew Green to A316 Sunbury	R224	Westbound	1,413	1,493	+80	+6%
A316 Richmond to A205 Putney	R225	Eastbound	1,385	1,816	+431	+31%
A205 Putney to A316 Richmond	R226	Westbound	2,089	1,896	-194	-9%
Chertsey Road	R343	Anticlockwise	1,109	901	-208	-19%
Chertsey Road	R344	Clockwise	956	1,018	+62	+6%
Mortlake High Street + Lower Richmond Road	R381	Eastbound	497	559	+62	+13%
Mortlake High Street + Lower Richmond Road	R382	Westbound	764	677	-87	-11%

Table 8 Journey Time Validation – Matrix Estimation Sensitivity Test – PM Peak Hour (seconds)

Description	Route ID	Direction	Observed	Modelled	Diff.	% Diff.
A316 Sunbury to A317 Kew Green	R223	Eastbound	1,448	1,475	+27	+2%
A317 Kew Green to A316 Sunbury	R224	Westbound	1,851	1,513	-338	-18%
A316 Richmond to A205 Putney	R225	Eastbound	2,544	1,773	-772	-30%
A205 Putney to A316 Richmond	R226	Westbound	2,350	2,013	-338	-14%
Chertsey Road	R343	Anticlockwise	918	993	+76	+8%
Chertsey Road	R344	Clockwise	1,060	1,100	+40	+4%
Mortlake High Street + Lower Richmond Road	R381	Eastbound	588	630	+42	+7%
Mortlake High Street + Lower Richmond Road	R382	Westbound	978	875	-103	-11%

3.6.6 Trip length distribution (TLD) analysis was checked for the entire model comparing the base year AM and PM Peaks and the base year + network edits + ME with additional local counts. This analysis excluded external to external trips, which would otherwise dominate the demand volumes. Figure 15 and Figure 16 illustrate the modelled trip length distribution for the calibrated base Post ME and PBASBD Post ME in the AM peak hour and PM peak hour respectively.

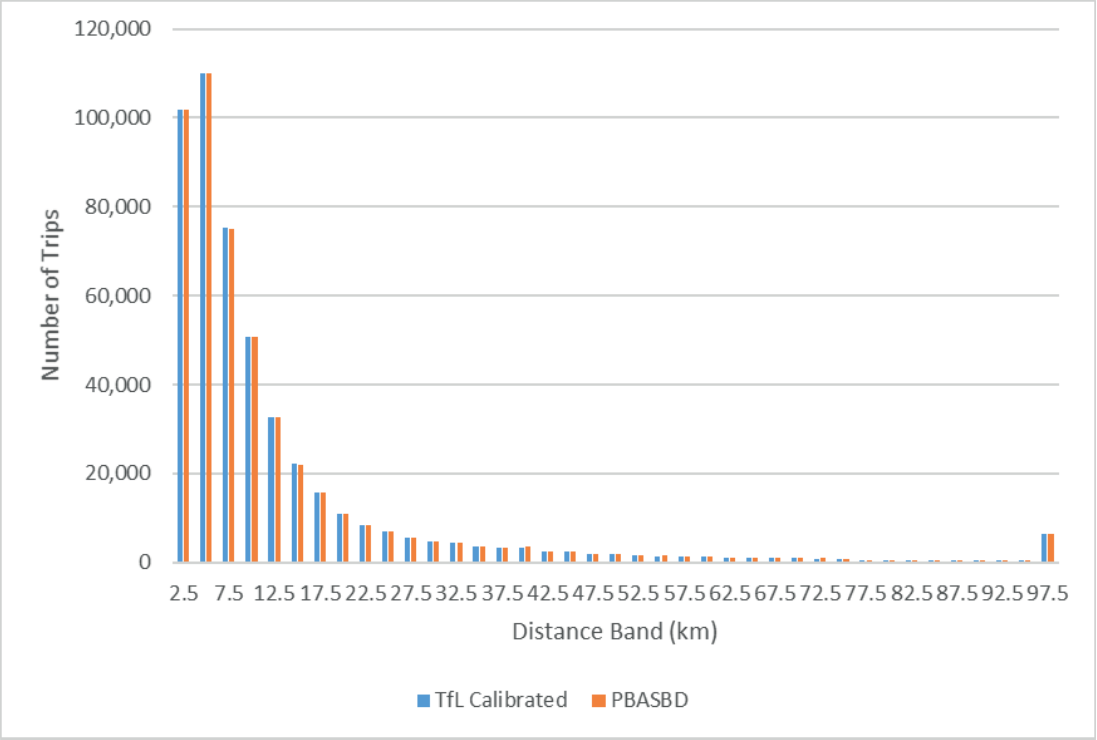


Figure 15: Trip Length Distribution Analysis - AM Peak Hour

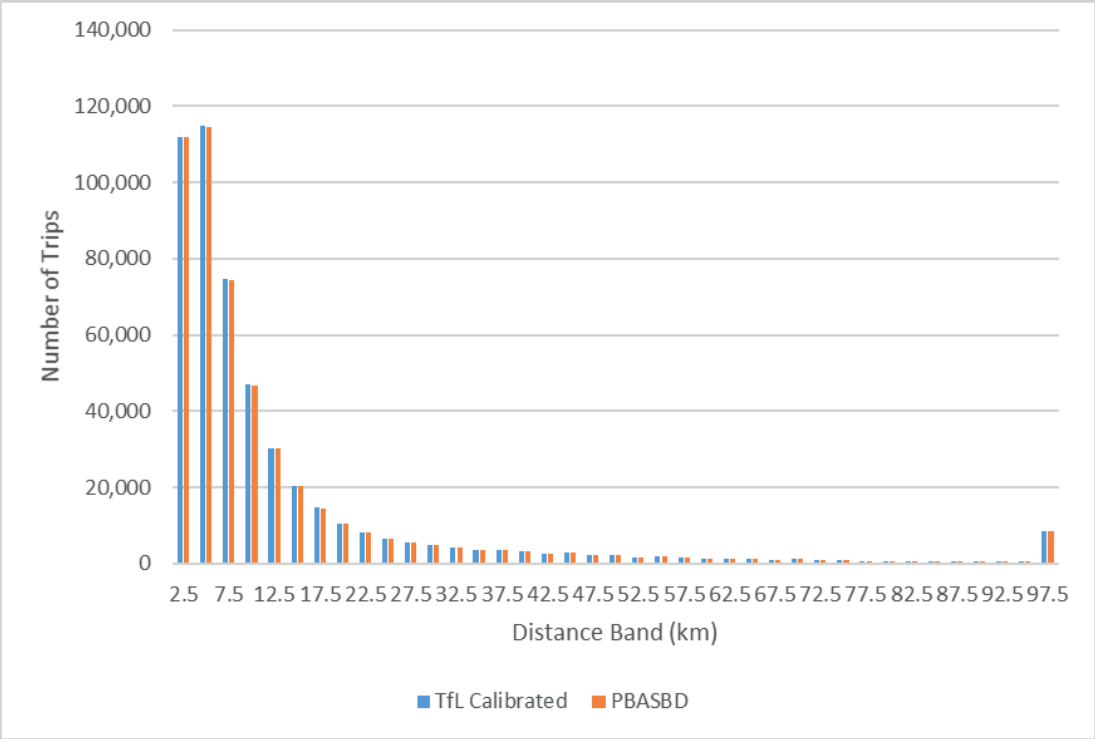


Figure 16: Trip Length Distribution Analysis - PM Peak Hour

3.6.7 Inspection of the above figures and tables and the model dashboard reveals the following key points:

- In the AM peak, 16 (100%) of the 16 count comparisons satisfy the WebTAG flow criteria, and have a GEH less than 5;
- In the PM peak, 14 (88%) of the 16 count comparisons satisfy the WebTAG flow criteria, 15 (94%) have a GEH of less than 5, and 16 (100%) have a GEH of less than 7.5;
- As expected, given the matrix estimation method applied, this indicates a good level of calibration for the AM and PM peaks in the local area;
- Modelled traffic flows have broadly reduced in the local area in both time periods where matrix estimation has decreased the travel demand matrices to match the counts;
- Inspection of the network flow difference plots reveals a reduction in demand on some zone connectors in local area indicating where origin-destinations trips have been removed from the demand matrices. Closer inspection of the travel demand matrices indicates a reduction of between 7% and 10% (circa 450 to 700 trips) in demand in origin/destination zones in the Stag Brewery study area, however, this is negligible in the overall model (0%);
- Inspection of the journey time validation indicates that six out of eight routes meet the validation criteria in the AM peak and PM peak. The local journey time route on Mortlake High Street and Lower Richmond Road, immediately adjacent to the proposed development, meets the validation criteria in both directions in both time periods and shows a reasonable match against observed times along the route (as shown in Appendix A). The level of validation is in line with the strategic model and is considered acceptable for assessing the impact of the proposed Stag Brewery development.
- There is a minor impact on the overall model calibration and validation with some positive and negative impacts on screenline/enclosure flow comparisons and some minor negative impacts on journey time validation where a small number of routes no longer achieve the validation criteria; and

- The matrix estimation has had a negligible impact on overall trip length distribution, indicating that the travel demand matrices have not been distorted with the inclusion of local traffic counts.

3.6.8 Based on the above, we would suggest the PBASBD adjusted travel demand matrices are suitable for the purpose of assessing the Stag Brewery strategic traffic impacts.

4 Proposed Forecasting Methodology

4.1 Overview

4.1.1 Once the base year model has been agreed, forecasting will be carried out to test the impact of the proposed Stag Brewery development. Changes made to the base year will follow through to the future year models. The following forecast scenarios are proposed:

- 2031 Forecast Year without Stag Brewery Development;
- 2031 Forecast Year with Stag Brewery Development; and
- 2031 Forecast Year with Stag Brewery Development plus Highway Mitigation.

4.1.2 The Reference Case will be adjusted to remove any proposed development/background growth in the locality of the Stag Brewery development to avoid double counting.

4.1.3 For the development test, the proposed Stag Brewery trip distribution will be taken from an adjacent zone that has similar trip purposes. It may be necessary to use a combination of zones to cover all of the various trips purposes. This distribution will be reviewed to check it is appropriate and representative of the proposed development and anticipated travel characteristics.

4.2 Forecast Year (2031) Traffic Growth

4.2.1 Table 9 and Table 10 provide a summary of the matrix totals for the 2012 Base and 2031 Forecast showing the traffic growth across the SoLHAM model extent and for zones in the Stag Brewery study area (as illustrated in Figure 16) for the AM and PM peak hours respectively.

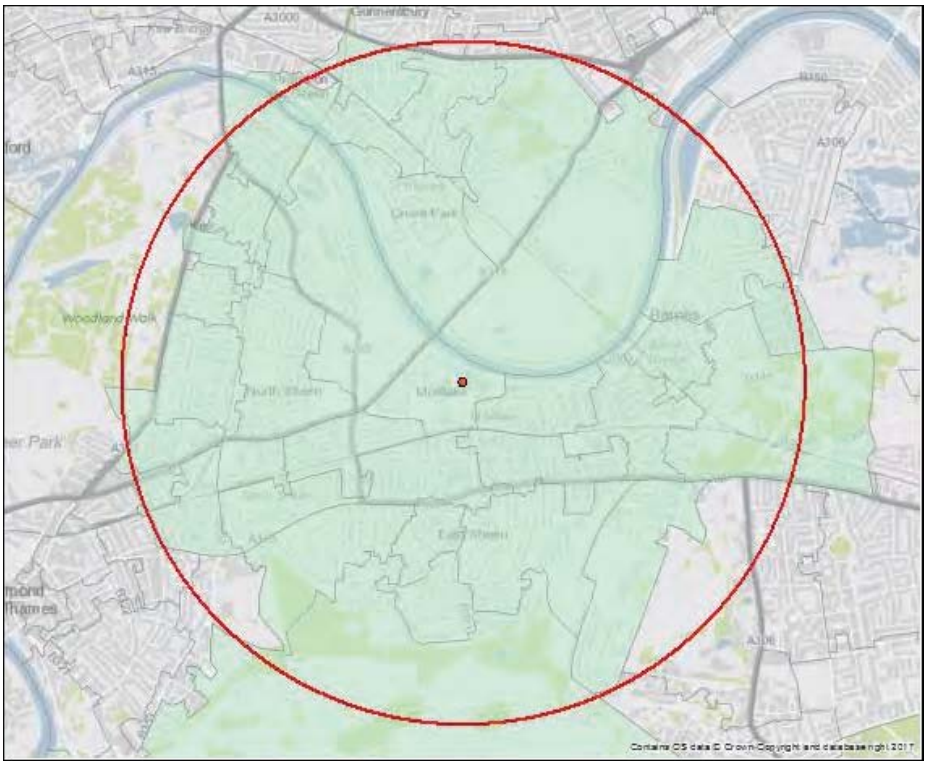


Figure 15: Study Area Zones

Table 9 Comparison of Matrix Totals (PCUs) – AM Peak Hour

	Car In-work	Car Non-work	Taxi	LGV	HGV	Total
SoLHAM All Zones						
2012 Base Year	411,096	4,889,795	23,800	142,134	119,345	5,586,171
2031 Ref Case	435,598	5,306,522	25,466	190,544	121,172	6,079,302
Growth	24,501	416,727	1,666	48,410	1,827	493,131
% Growth	6%	9%	7%	34%	2%	9%
SoLHAM Zones within Study Area - Origins						
2012 Base Year	908	4,909	18	594	357	6,786
2031 Ref Case	895	4,994	19	705	369	6,981
Growth	-13	85	1	111	12	195
% Growth	-1%	2%	7%	19%	3%	3%
SoLHAM Zones within Study Area - Destinations						
2012 Base Year	827	4,804	29	614	334	6,609
2031 Ref Case	827	4,688	31	723	350	6,619
Growth	0	-116	2	110	15	10
% Growth	0%	-2%	7%	18%	5%	0%

Table 10 Comparison of Matrix Totals (PCUs) – PM Peak Hour

	Car In-work	Car Non-work	Taxi	LGV	HGV	Total
SoLHAM All Zones						
2012 Base Year	353,183	4,735,355	39,524	125,324	72,705	5,326,091
2031 Ref Case	373,757	5,156,627	42,095	168,349	74,050	5,814,879
Growth	20,574	421,272	2,572	43,025	1,346	488,788
% Growth	6%	9%	7%	34%	2%	9%
SoLHAM Zones within Study Area - Origins						
2012 Base Year	870	5,697	32	482	149	7,230
2031 Ref Case	871	5,519	34	572	157	7,153
Growth	1	-178	2	90	7	-78
% Growth	0%	-3%	6%	19%	5%	-1%
SoLHAM Zones within Study Area - Destinations						
2012 Base Year	973	5,265	103	369	117	6,827
2031 Ref Case	962	5,234	110	455	130	6,891
Growth	-11	-31	7	86	13	64
% Growth	-1%	-1%	6%	23%	11%	1%

4.2.2 Inspection of the above tables indicates the following key points:

- with the exception of LGVs, there is modest growth in travel demand across the entire model area between 2012 and 2031 with a 9% increase in demand in both peak hours, less than 1% per annum;
- growth in LGV trips is greater at 34%, however this makes up a relatively small component of overall demand;
- there is lower growth in travel demand in origin/destination zones in the Stag Brewery study area with a minor change in overall trips (-1% to +3%);
- this masks some variation in traffic growth in each modelled user class with very low or negative growth in car trips (-1% to +3%), a modest growth in taxi (6%/7%) and HGV (3% to 11%) trips, and greater growth in LGV (18% to 23%) trips; and
- these trends would broadly indicate that any growth in traffic in the study area will be mostly attributed to through trips rather than local origin/destination trips.

4.3 Development Trip Generation

4.3.1 Table 11 shows the predicted Stag Brewery development trips for the 2031 forecast year. These are subject to confirmation and may change slightly for the final assessment.

Table 11 Stag Brewery Predicted Development Trips (Vehicles)

Peak Hour	Arrivals	Departures
AM (0800-0900)	196	196
PM (1700-1800)	129	132

4.3.2 This level of overall 2031 trip generation is considered small in the context of the overall SoLHAM model with less than 400 vehicle movements in the AM Peak and less than 250 vehicle movements in the PM Peak within total demand matrices of several million trips. However, local impacts may be more pronounced, for example on Lower Richmond Road, and this will be assessed as part of the forecast modelling.

4.3.3 Considering the appraisal of such a small development in a model of this size and nature – even at the strategic level - may be insignificant in terms of convergence variations across the model, general changes in modelled network flows, forecast traffic growth, typical variation in traffic levels, and, most notably, the difference between observed and modelled flows in the calibrated base model. In particular, the base year travel demand adjustments presented in Section 3.6, result in larger decreases in trip making in the base year than the combined total of Stag Brewery development trips and forecast background traffic growth in 2031.

5 Conclusions

5.1 Summary

5.1.1 This Technical Note has described a review of the suitability of using TfL's strategic SoLHAM to assess the potential transport impacts associated with the proposed redevelopment of the Stag Brewery site in Mortlake.

5.1.2 This review has highlighted that the SoLHAM is calibrated and validated to an acceptable standard for the entire model area. In the local study area, however, modelled traffic flows are generally higher than equivalent local traffic counts with a general overstatement of demand. Converse to this, the modelled journey time validation is broadly acceptable in the morning peak hour, with some understatement of congestion in the evening peak hour.

5.1.3 A series of network refinements were identified to create a PBA Stag Brewery Development (PBASBD) version of SoLHAM to improve the model representation local to the proposed development, most notably changes to increase railway level crossing delays, based on observed data. These refinements have improved the local traffic validation but the modelled flows were still greater than observed.

5.1.4 Adjustments were then made to the travel demand matrices through a process of matrix estimation using local traffic counts. This improved the comparison of modelled flow against local traffic flows, with a general reduction in modelled travel demand in the study area. An acceptable level of journey time validation has also been achieved with local routes adjacent to the development meeting acceptance criteria in both directions in both peak hours. A review of forecast travel demand and predicted Stag Brewery development trips indicated that the reduction in base model flows to better match observed data outstrips the predicted forecast growth.

5.1.5 Following discussion with TfL, the PBASBD version of SoLHAM (with the noted network and travel demand adjustments) will be used for the purposes of the Stag Brewery Development assessment.

5.2 Next Steps

5.2.1 Following the review of this technical note by TfL, the following tasks are required:

- Discuss feedback from this Technical Note;
- Agree a revised base year model (PBASBD version) with TfL;
- Agree forecasting (method and resultant trip ends\flows) with TfL; and
- Present resultant forecast network impacts.

DOCUMENT ISSUE RECORD

Document	Rev	Date	Prepared	Checked	Reviewed	Approved
38262\Modelling\TN001	v1	28/08/17	JP+AB	KL	KL	KL
38262\Modelling\TN001	v2	17/10/17	JP+AB	KL	KL	KL

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Appendix A Journey Time Route Validation

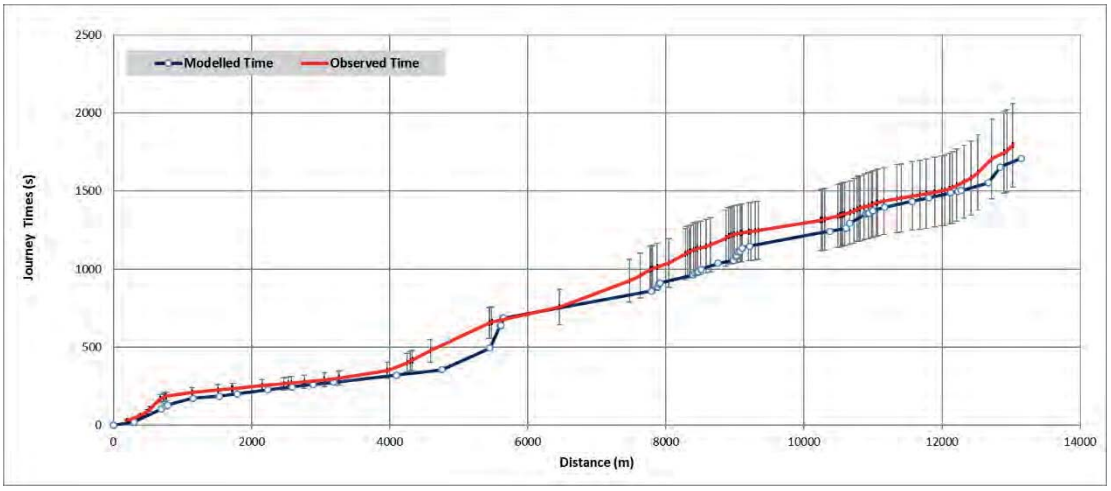

Figure A1: Journey Time Validation – Pots-ME – Route 223 (A316 Sunbury to A317 Kew Green) – AM Peak Hour

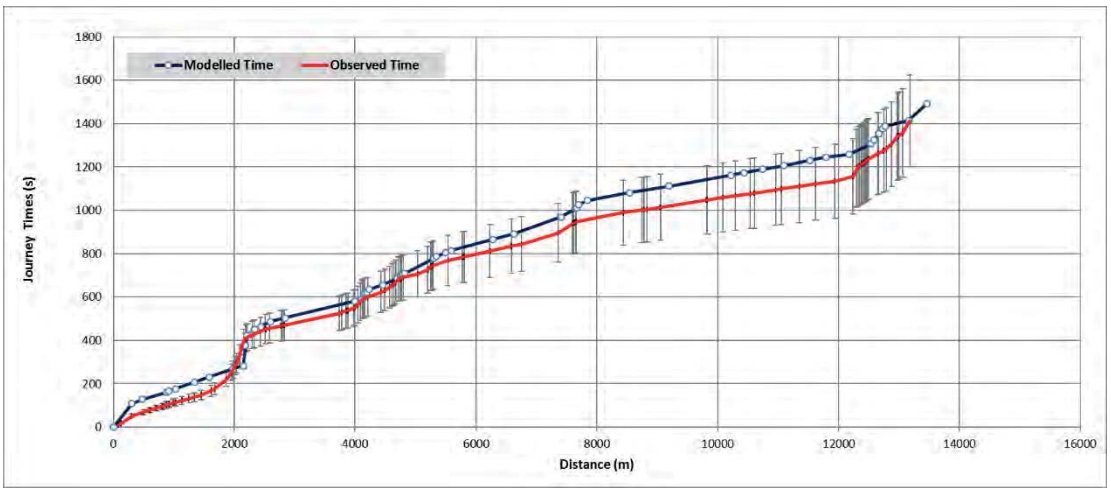

Figure A2: Journey Time Validation – Pots-ME – Route 224 (A317 Kew Green to A316 Sunbury) – AM Peak Hour

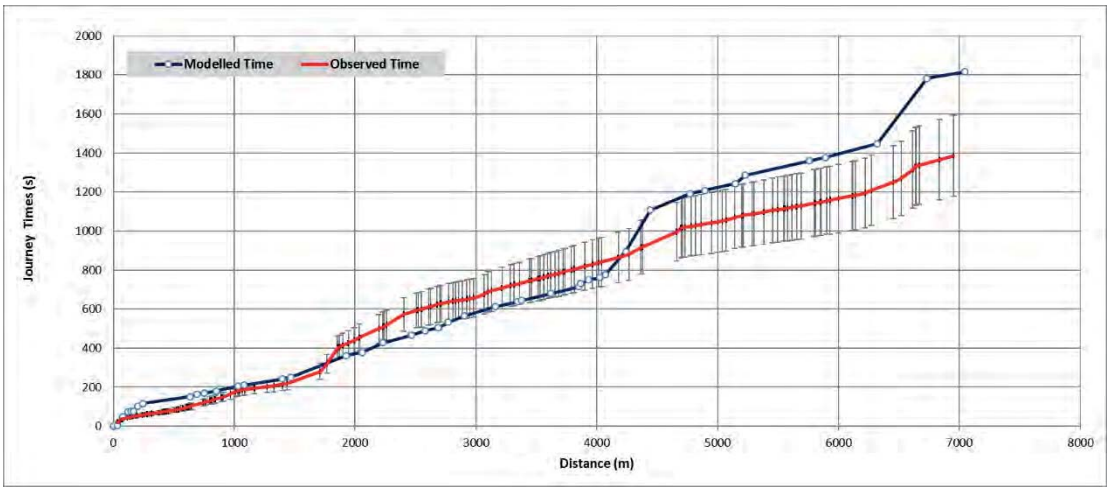

Figure A3: Journey Time Validation – Pots-ME – Route 225 (A316 Richmond to A205 Putney) – AM Peak Hour

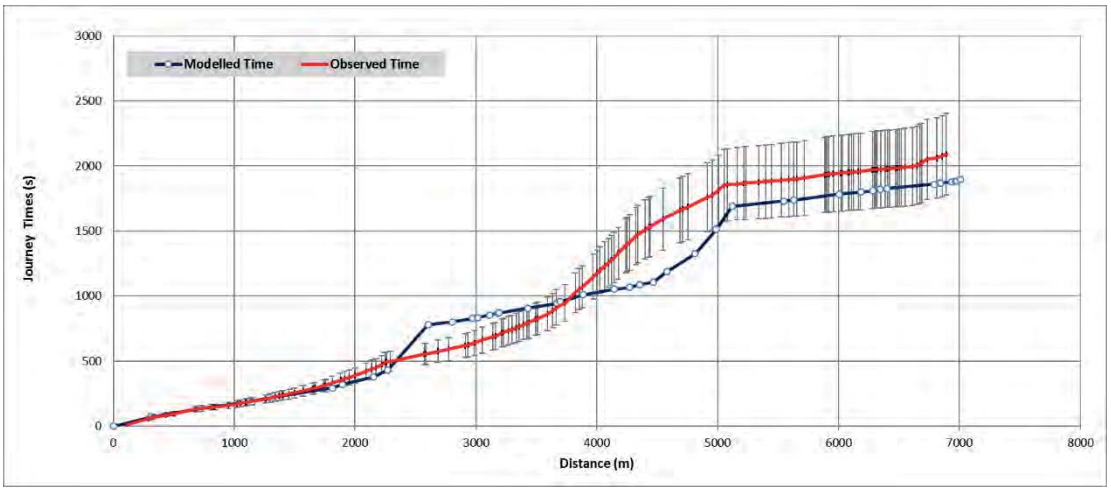

Figure A4: Journey Time Validation – Pots-ME – Route 226 (A205 Putney to A316 Richmond) – AM Peak Hour

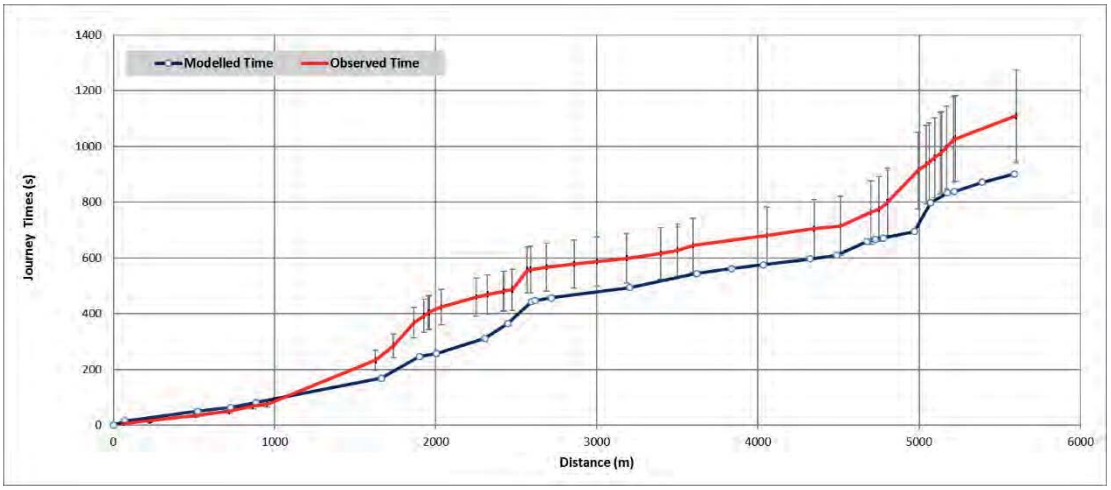

Figure A5: Journey Time Validation – Pots-ME – Route 343 (A316 (Chertsey RD) Clockwise) – AM Peak Hour

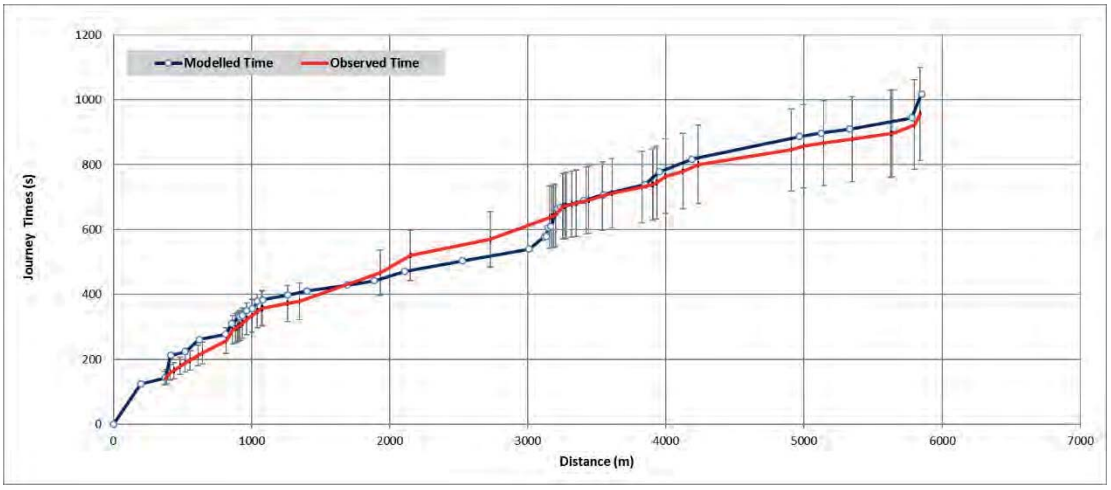

Figure A6: Journey Time Validation – Pots-ME – Route 344 (A316 (Chertsey RD) Anti-clockwise) – AM Peak Hour

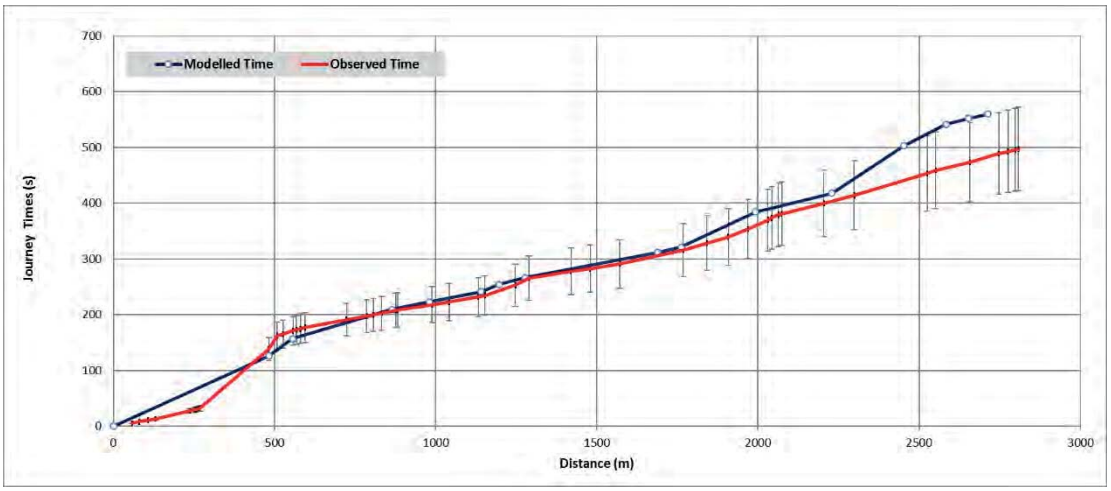

Figure A7: Journey Time Validation – Pots-ME – Route 381 (Mortlake High Street + Lower Richmond Road Eastbound) – AM Peak Hour

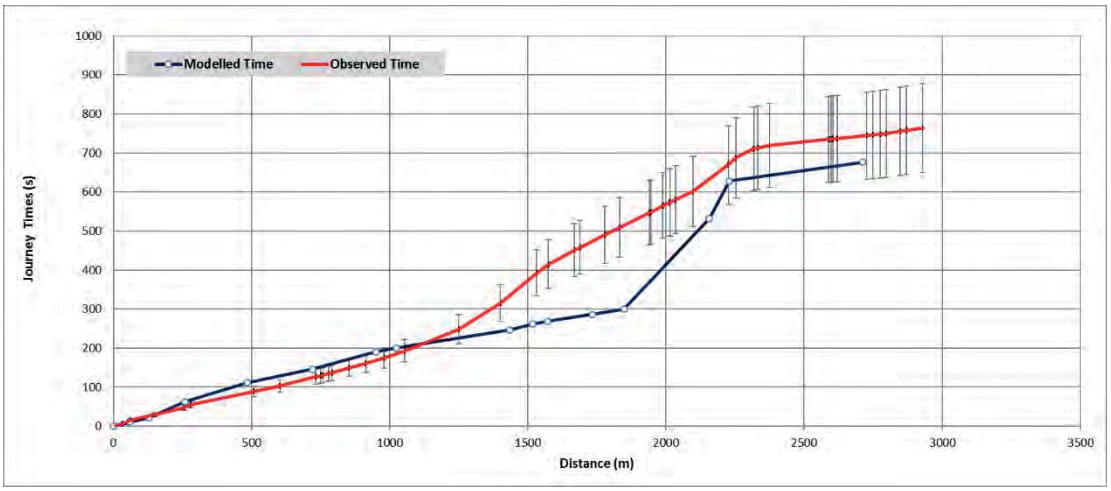

Figure A8: Journey Time Validation – Pots-ME – Route 382 (Mortlake High Street + Lower Richmond Road Westbound) – AM Peak Hour

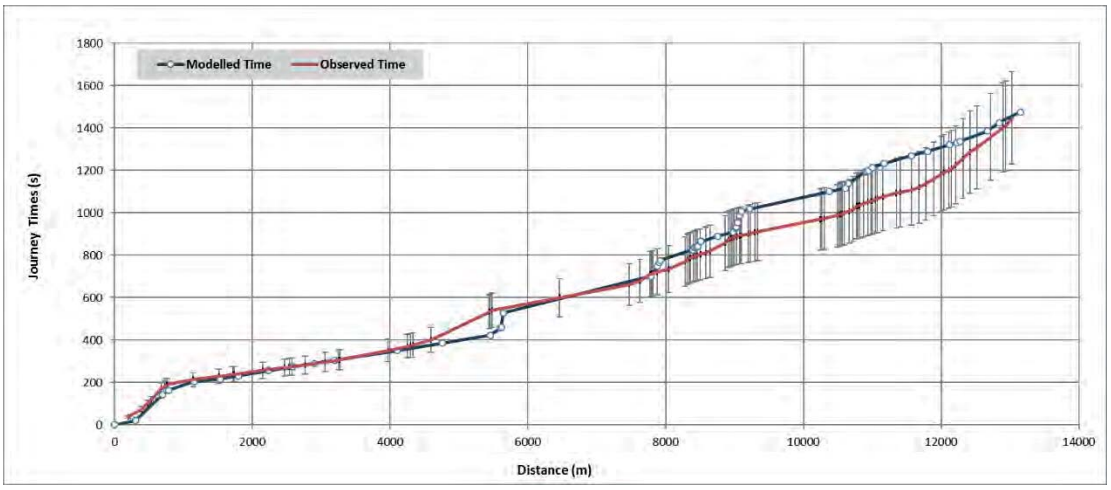

Figure A9: Journey Time Validation – Pots-ME – Route 223 (A316 Sunbury to A317 Kew Green) – PM Peak Hour

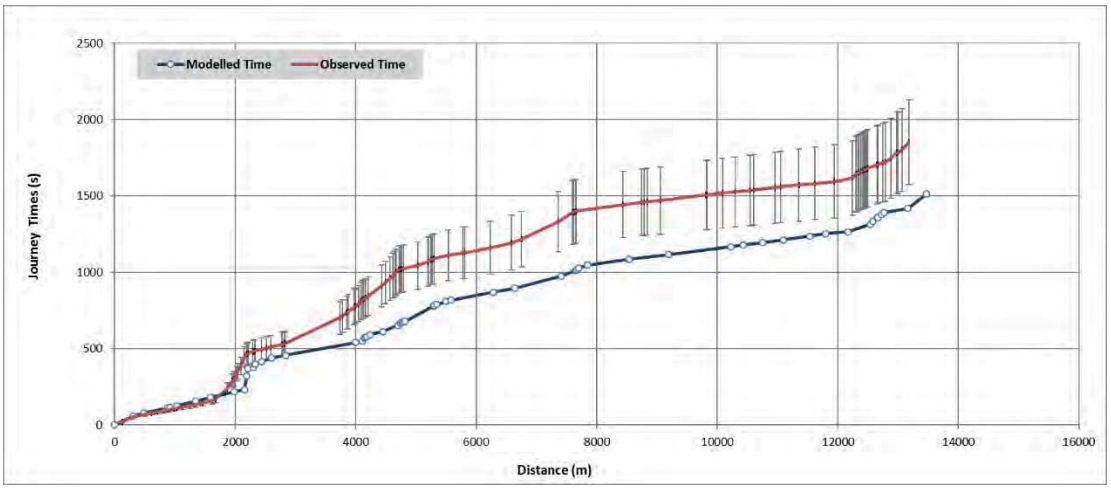

Figure A10: Journey Time Validation – Pots-ME – Route 224 (A317 Kew Green to A316 Sunbury) – PM Peak Hour

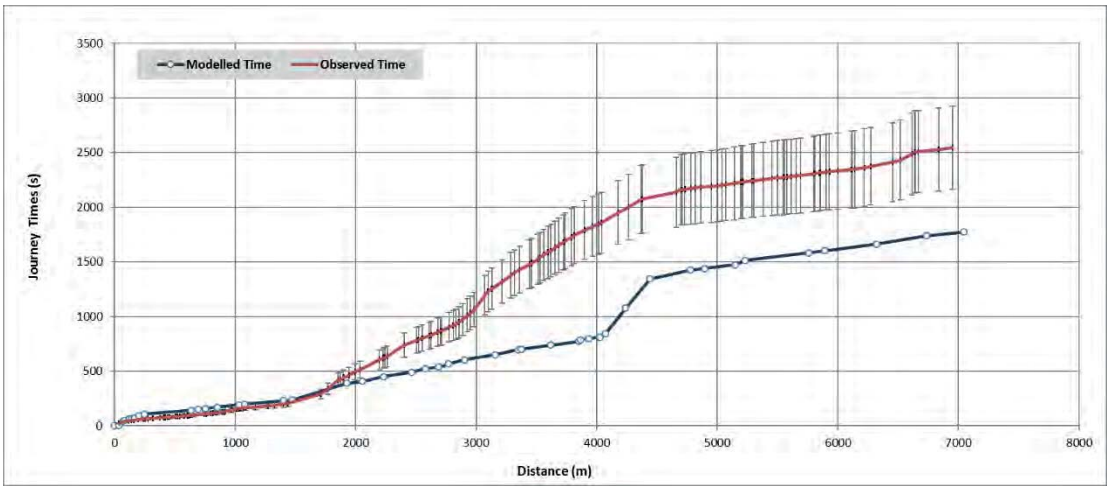

Figure A11: Journey Time Validation – Pots-ME – Route 225 (A316 Richmond to A205 Putney) – PM Peak Hour

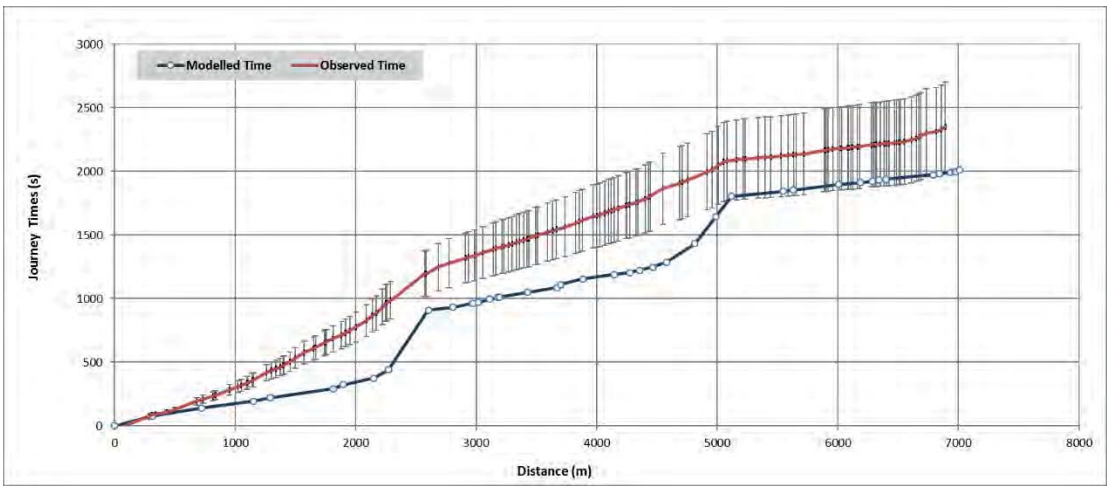

Figure A12: Journey Time Validation – Pots-ME – Route 226 (A205 Putney to A316 Richmond) – PM Peak Hour

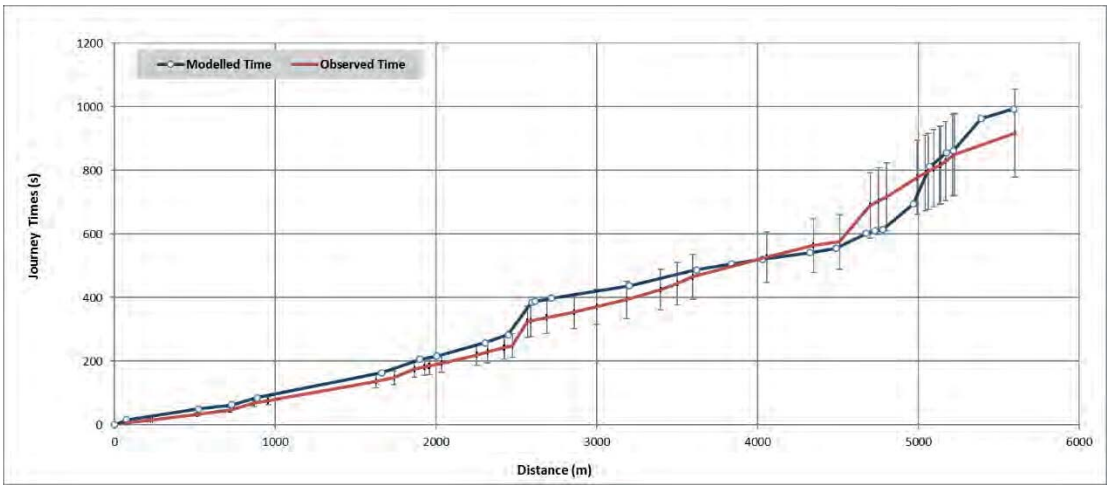

Figure A13: Journey Time Validation – Pots-ME – Route 343 (A316 (Chertsey RD) Clockwise) – PM Peak Hour

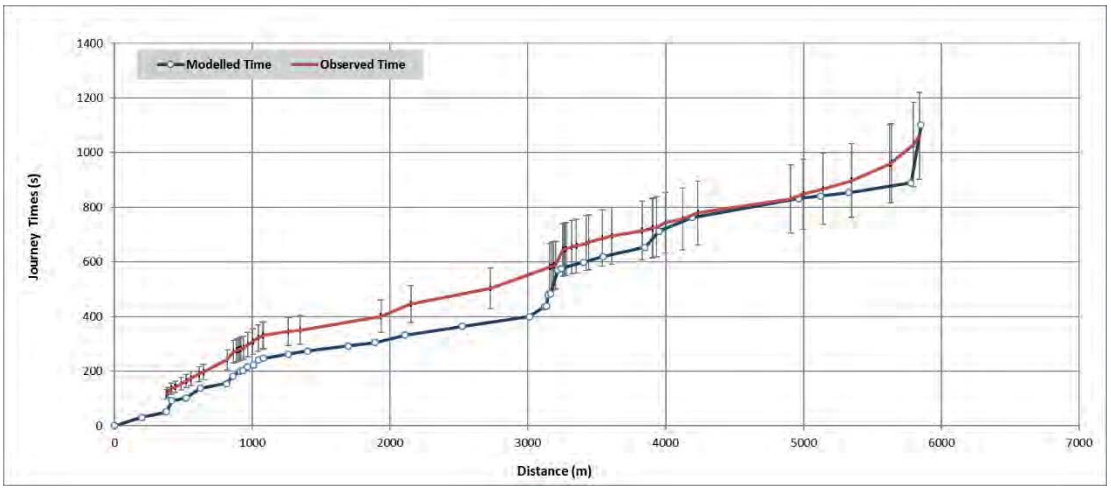

Figure A14: Journey Time Validation – Pots-ME – Route 344 (A316 (Chertsey RD) Anti-clockwise) – PM Peak Hour

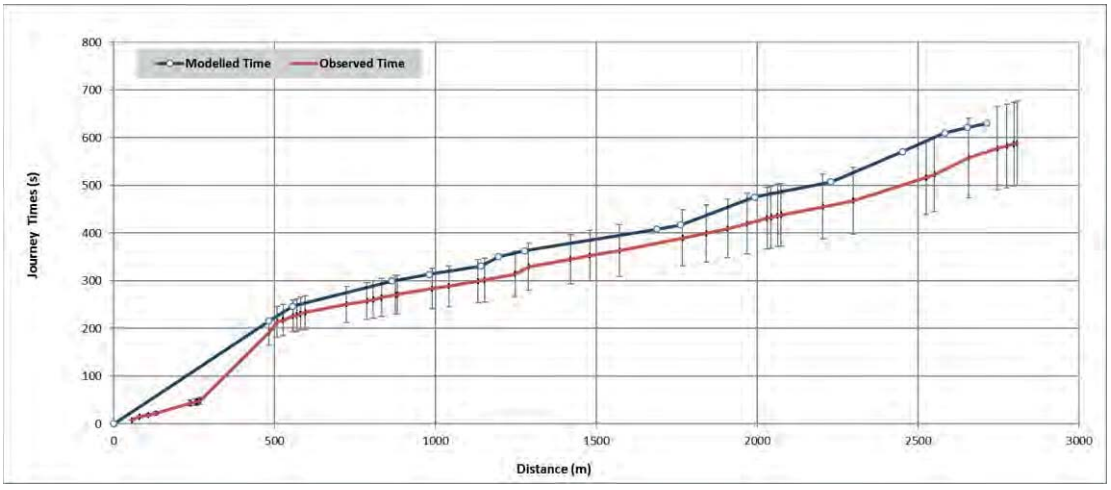

Figure A15: Journey Time Validation – Pots-ME – Route 381 (Mortlake High Street + Lower Richmond Road Eastbound) – PM Peak Hour

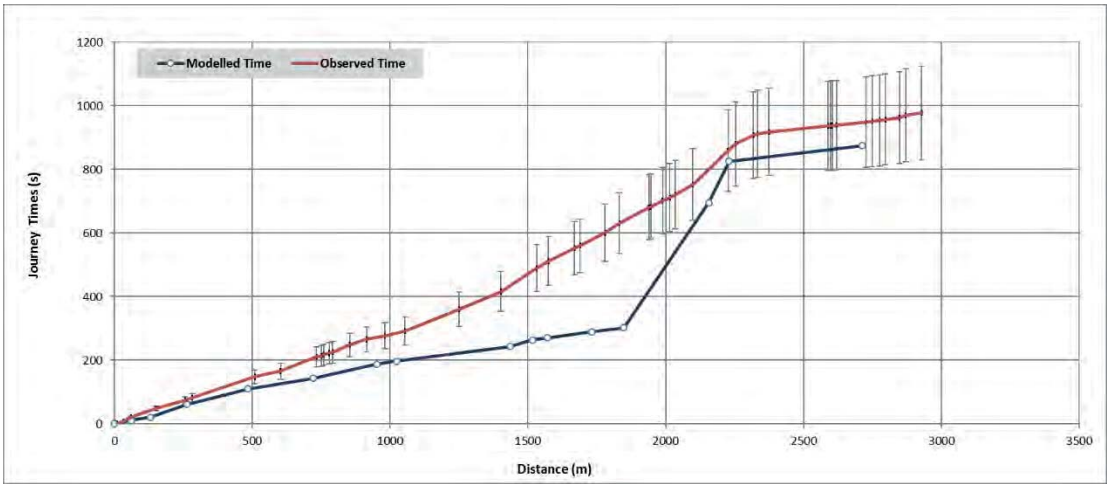

Figure A16: Journey Time Validation – Pots-ME – Route 382 (Mortlake High Street + Lower Richmond Road Westbound) – PM Peak Hour

INFORMATION NOTE

Project Name:	Stag Brewery Development
Project Ref:	38262
Note Title:	SoLHAM Forecast Assessment
Date:	02 February 2018
Prepared by:	Andrew Bagnall
Reviewed by:	Kevin Lumsden

1 Introduction

1.1 Overview

1.1.1 Transport for London's (TfL) South of London Highway Assignment Model (SoLHAM) was used as the basis for undertaking an operational performance assessment of the highway network including the Stag Brewery development. In undertaking this work, a bespoke version of SoLHAM has been prepared, which was calibrated and validated to enhance the representation of the transport network and travel demand in and around the proposed development. This updated version of SoLHAM carries the nomenclature, Peter Brett Associates (PBA) Stag Brewery Development (PBASBD) version of SoLHAM.

1.1.2 This Information Note provides a summary of the PBASBD SoLHAM Stag Brewery forecast assessment. It documents the assumptions relating to traffic generation & distribution and modelled transport infrastructure and presents the assessment of the impact of the Stag Brewery development in a 2031 forecast year.

1.1.3 The remainder of this Note is structured as follows:

- **Section 2** provides and overview of PBASBD SoLHAM;
- **Section 3** provides an overview of the preparation of the forecast scenarios;
- **Section 4** describes the PBASBD SoLHAM travel demand forecasts;
- **Section 5** describes the PBASBD SoLHAM network performance; and
- **Section 6** provides a summary & conclusion.

1.2 Study Area

1.2.1 The development being assessed by PBA is Stag Brewery, located in Mortlake just south of the River Thames in South West London. It is a proposed re-development of an existing site that will provide a residential led, mixed-use development.

1.2.2 The proposed development comprises of up to 682 new homes plus a Care Village catering for an elderly population and comprising of a nursing home and up to 150 assisted living units. The proposed development also includes a secondary school which would provide around 1,200 school places including a sixth form college. Other proposed uses, which are intended to provide local facilities both for the new community and the existing Mortlake community, include; retail (including local restaurants and bars), leisure (including a new local cinema), a new hotel and community facilities.

1.2.3 It is important to note in the context of this study, that the forecast level of trip making predicted at this re-development site will add no more than 214 vehicles arriving\departing in the AM Peak and 126 vehicles arriving\departing in the PM Peak in the opening year of 2031. This is discussed further in Section 4.

1.2.4 Figure 1.1 illustrates the location of the proposed site (red dot) and a 2km radius study area, within which the SoLHAM model has been reviewed.

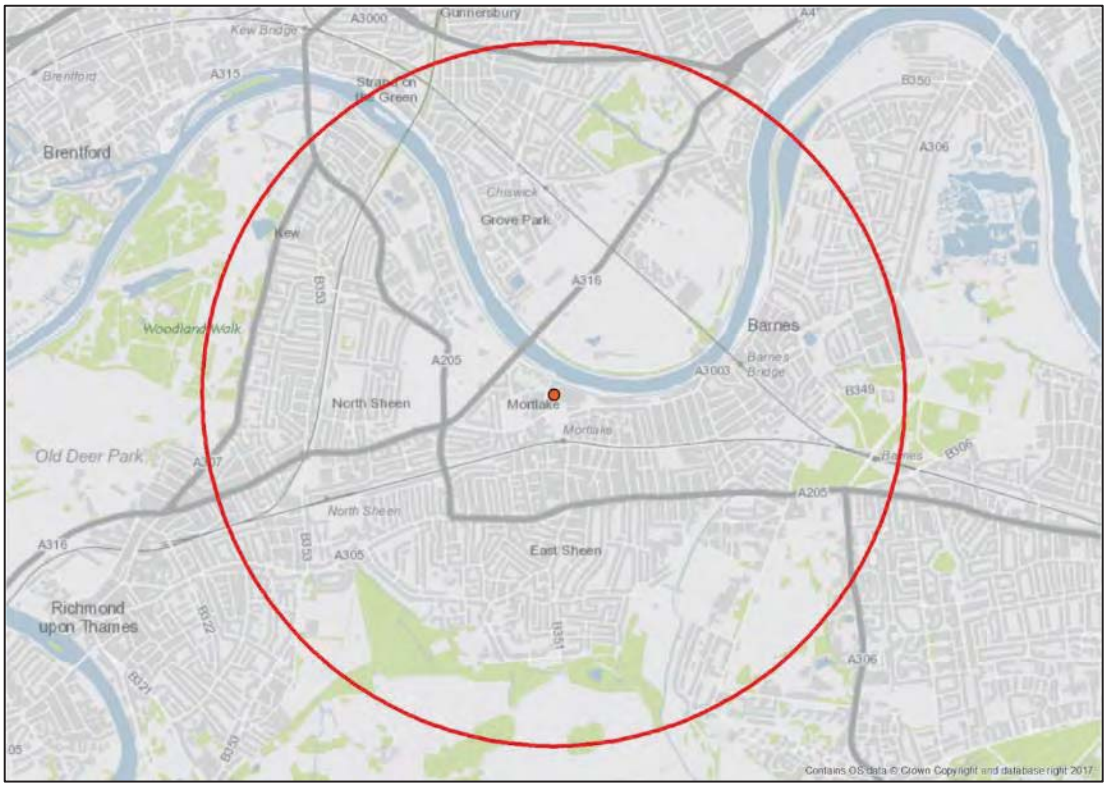

Figure 1.1 Stag Brewery Study Area

2 SoLHAM

2.1 Overview

2.1.1 TfL informed that their strategic SoLHAM model should be used to assess the potential strategic transport impacts associated with the proposed redevelopment of the Stag Brewery site in Mortlake.

2.1.2 As a first step, PBA undertook a review of the base year model in order to determine the quality of the model in and around the proposed development. The review concluded that a series of model enhancements were required to provide a more robust representation of the modelled area near the proposed development.

2.1.3 These enhancements were implemented to prepare PBASBD SoLHAM. Most notable changes from the standard SoLHAM base model included:

- Improved representation of railway level crossing delays (based on observed data); and
- adjustments to travel demand matrices (through a process of matrix estimation, using local traffic counts).

2.1.4 Detailed results of this review are documented in the Technical Note: Stag Brewery Development TN001 - SoLHAM Baseline Review (PBA, October 2017).

2.2 Model Dimensions

2.2.1 The following standard SoLHAM model time periods were used for assessing the Stag Brewery Development scenarios:

- Weekday morning peak hour: 08:00-09:00; and
- Weekday evening peak hour: 17:00-18:00.

2.2.2 The networks included pass queues from the previous hour.

2.2.3 SoLHAM includes five assigned vehicle types and journey purposes as follows:

1. Car In-Work;
2. Car Non-Work;
3. Taxi;
4. LGV; and
5. HGV.

2.3 SoLHAM Forecasts

2.3.1 2031 forecast year travel demand matrices were prepared by TfL using the CHAMP (Cube-HAM Process) process and 2031 Reference Case LTS demand forecasts. This is documented in Stag Brewery SoLHAM Matrices Note (TfL, 27 October 2017).

2.3.2 For the Stag Brewery development assessment, 2031 forecast network scenarios were prepared and modelled using the SoLHAM forecast infrastructure definitions along with the inclusion of Stag Brewery model enhancements identified during the base model review.

2.4 Journey Time Routes

2.4.1 The forecast assessment (presented in section 5) includes journey time comparisons for key journey time routes used in the PBASBD SOLHAM model validation.

2.4.2 There are six defined strategic model validation journey time routes in the study area as part of the PBASBD SoLHAM validation and these are illustrated in Figure 2.1. Journey time routes included in the model 'dashboard' were supplemented with local journey time routes adjacent to the proposed development site covering Lower Richmond Road and Mortlake High Street as illustrated in Figure 2.2.

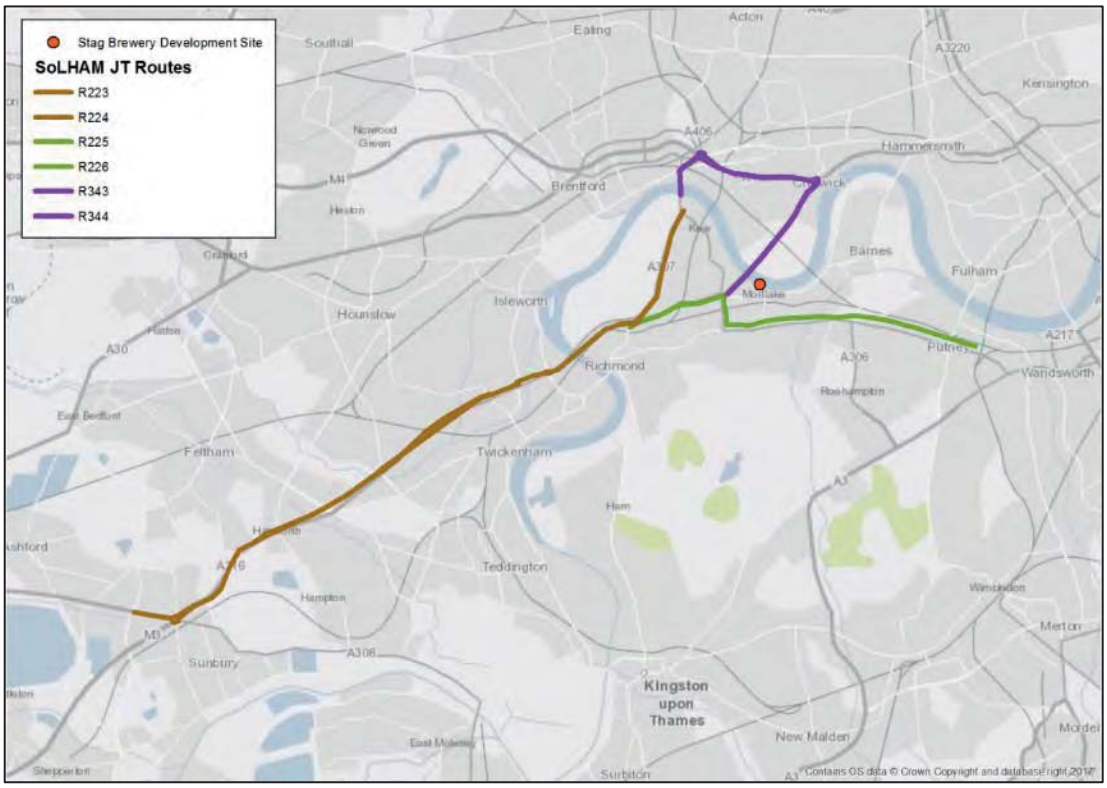

Figure 2.1 Strategic Journey Time Routes

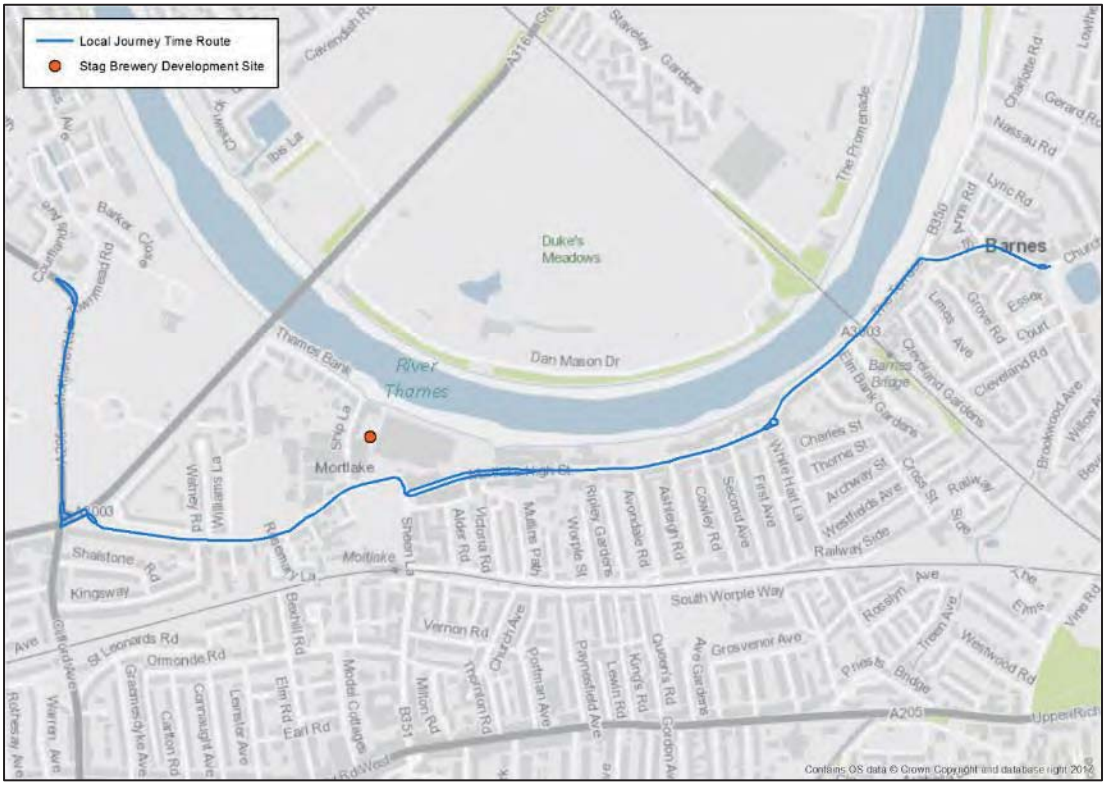

Figure 2.2 Local Journey Time Routes

3 Definition of Forecast Scenarios

3.1 Scenarios

3.1.1 Table 3.1 provides a summary of model scenarios prepared for the Stag Brewery development assessment.

Table 3.1 Summary of Model Scenarios

Scenario	Traffic Growth	Infrastructure
2015 base year	Current 2012 base year traffic levels with matrix estimation applied with inclusion of local traffic data and assumed negligible traffic growth between 2012 and 2015	2012 base year network with refinement of local network including adjustment of level crossing times on Sheen Lane and White Hart Lane
2031 forecast year *without* Stag Brewery development	SoLHAM 2031 traffic growth (from London Transportation Studies model forecasts)	2031 forecast year including refined base and committed network interventions
2031 forecast year *with* Stag Brewery development	2031 forecast year plus Stag Brewery development traffic	2031 forecast year including refined base and committed network interventions
2031 forecast year *with* Stag Brewery development plus local highway interventions	2031 forecast year plus Stag Brewery development traffic	2031 forecast year plus proposed Stag Brewery local highway interventions on Lower Richmond Road and Mortlake High Street
2031 forecast year *with* Stag Brewery development plus Chalkers Corner improvements	2031 forecast year plus Stag Brewery development traffic	2031 forecast year plus proposed Chalkers Corner improvements
2031 forecast year *with* Stag Brewery development plus local highway interventions and Chalkers Corner improvements	2031 forecast year plus Stag Brewery development traffic	2031 forecast year plus proposed Stag Brewery local highway interventions and proposed Chalkers Corner improvements

3.2 Traffic Generation

3.2.1 PBA document Final Trip Generation Summary (October 2017) sets out the trip generation figures predicted for the proposed Stag Brewery development. This is summarised in Table 3.2.

Table 3.2 Traffic Generation (PCUs/hr)

Land Use	08:00 – 09:00			17:00 – 18:00		
	Arrival	Departure	Two Way	Arrival	Departure	Two Way
Detailed Application						
Residential	33	54	88	45	29	74
Retail	7	6	13	8	10	18
Restaurant	0	0	0	6	4	10
Hotel	0	1	1	1	0	1
Office	14	3	17	5	15	20
Cinema	0	0	0	8	11	20
Gym	2	4	5	2	1	2
Community Space	0	0	0	0	0	0
HGVs	26	26	52	6	6	12
Detailed Total including HGVs	82	94	176	81	76	157
Outline Application						
Residential	17	28	46	23	15	38
Extra Care	5	4	9	4	4	8
Health Care	2	1	3	2	2	4
HGVs	2	2	4	2	2	4
Outline Total including HGVs	26	35	62	31	23	54
Detailed School Application						
Education*	105	85	191	12	27	39
Outline plus Detailed Application, Including School						
Total including HGVs	213	214	429	124	126	250

*Assumed no school HGV trips to occur during the peak hours

3.2.2 Three new zones were added to the model in order to represent the Stag Brewery development, numbered 58300, 58301 and 58302. The location of these zones is illustrated (in red) in Figure 3.1 below.

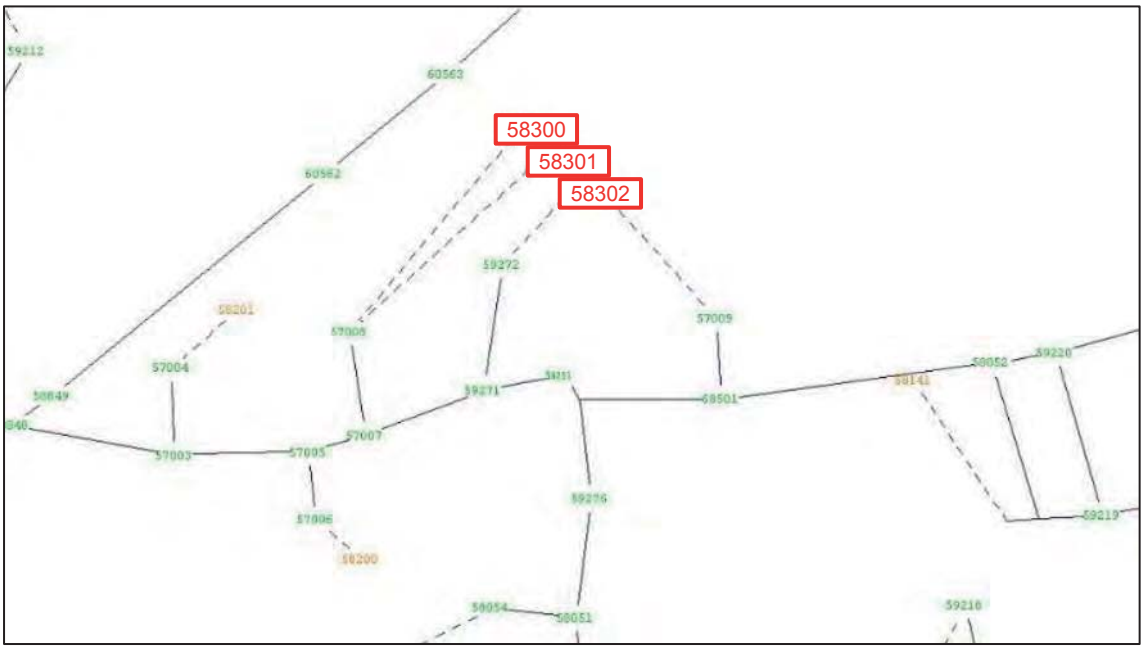

Figure 3.1 Location of New Zones Used for Stag Brewery Development

3.2.3 The forecast land-use and corresponding travel demand was allocated to these zones as follows:

- **58300** – Outline Planning Application, All Land-Uses;
- **58301** – Detailed Planning Application, School; and
- **58302** – Detailed Planning Application, All Other Land-Uses.

Zonal Connectivity

3.2.4 Stag Brewery development zones 58300 and 58301, which represent the Outline Planning Application and the Detailed School Planning Application, connects to Lower Richmond Road via a priority junction near Waldeck Road. Stag Brewery development zone 58302, which represents the Detailed Planning Application, connects to Mortlake High Street via a new priority junction east of the roundabout next to Mortlake Green and onto Lower Richmond Road via the existing priority junction with Ship lane. Appendix A illustrates the proposed development access arrangements.

3.3 Traffic Distribut ion

3.3.1 The distribution of trips to/from the proposed development was estimated using forecast traffic distribution to/from three 'donor' zones in the SoLHAM model as follows:

- 58137
- 58139
- 58141

3.3.2 The location of these 'donor' zones is illustrated (in red) in Figure 3.2 below.

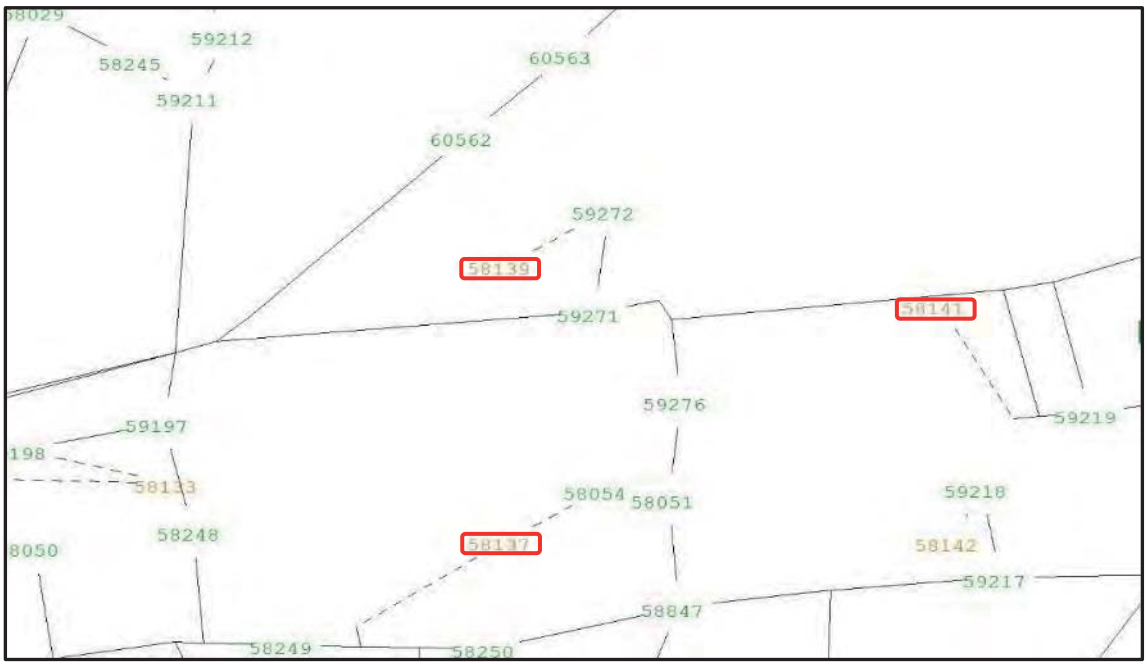

Figure 3.2 Location of 'Donor' Zones Used for Stag Brewery Distribution

3.3.3 These zones were chosen as representative sites, located near the study area and with similar land use to that proposed by the development.

3.3.4 Traffic generation was applied to the derived traffic distribution to prepare origin-destination travel demand matrices for the Stag Brewery development.

3.3.5 To provide an indication of the distribution and assignment of development trips, Figure 3.3 and Figure 3.4 show the assigned traffic to/from the Stag Brewery development zone for the traffic generation described above.

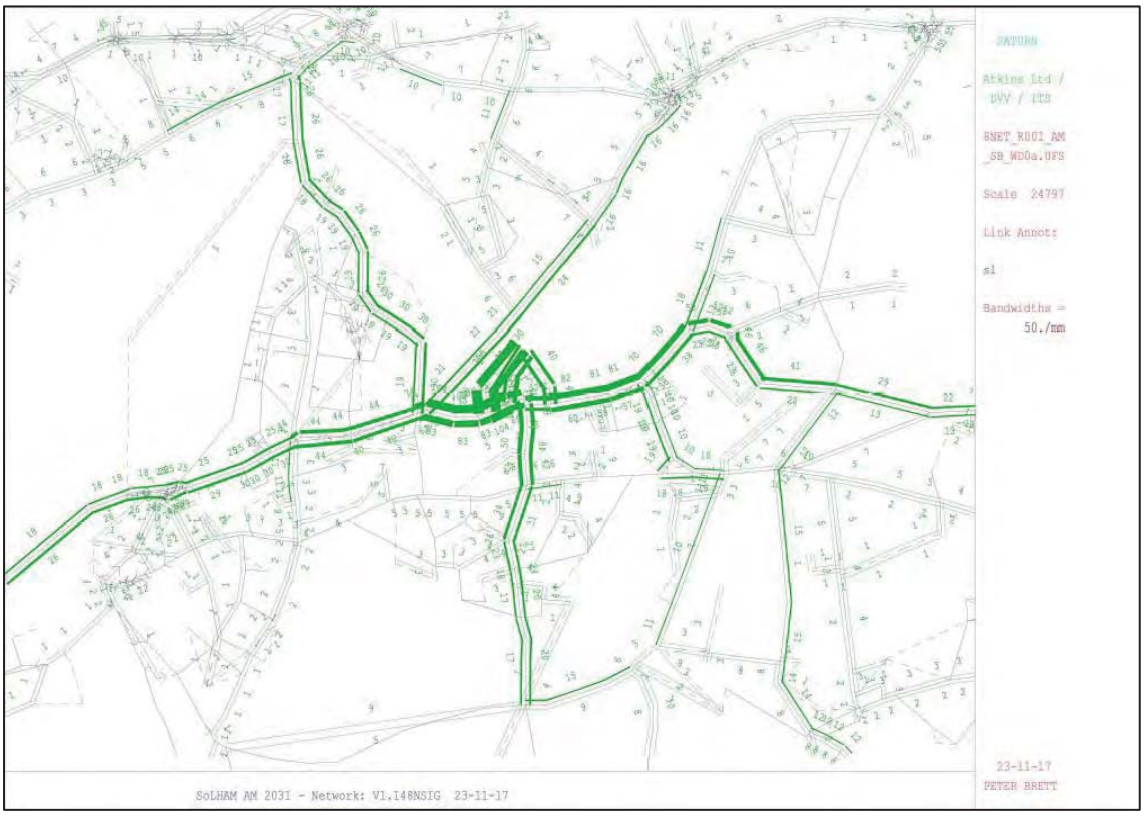

Figure 3.3 AM Development Trips (PCUs)

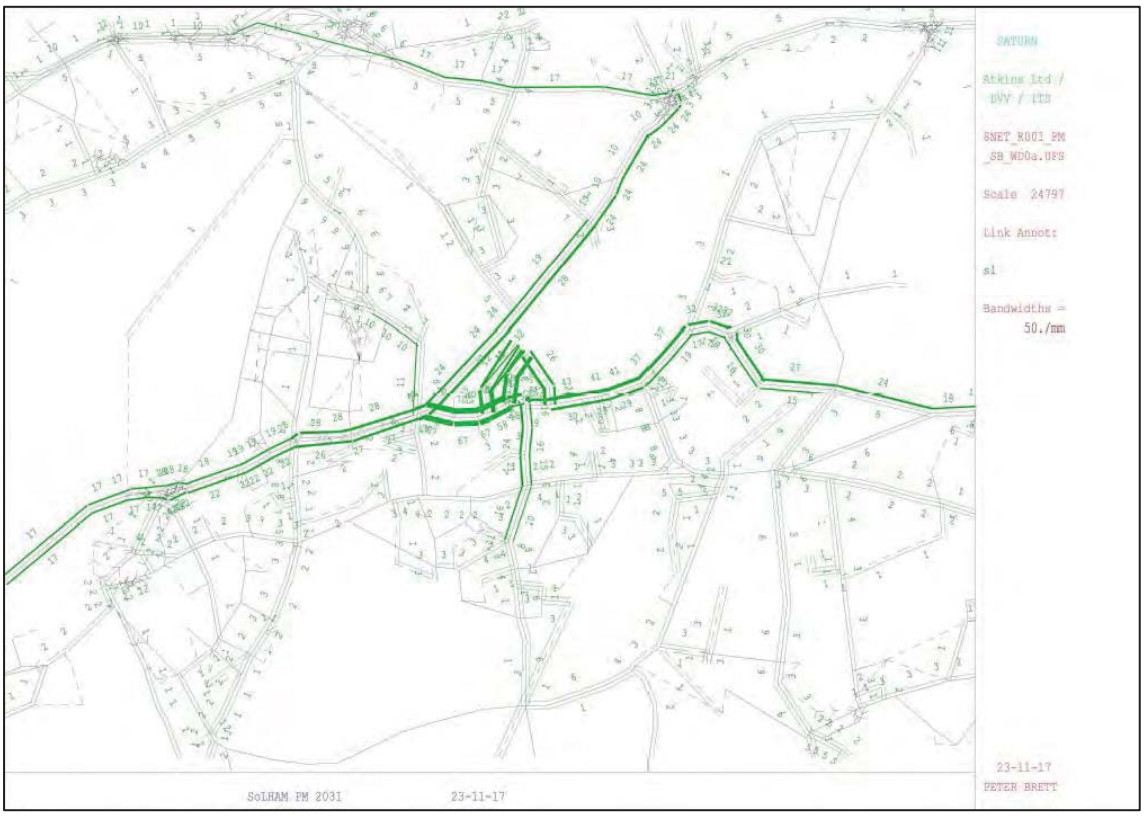

Figure 3.4 PM Development Trips (PCUs)

3.3.6 The above figures indicate a broad distribution of traffic to/from Stag Brewery development, highlighting that traffic dissipates relatively quickly. As a consequence, the traffic impact is expected to be largely confined to the local network. The main increase in traffic is predicted to be on Lower Richmond Road, immediately adjacent to the development site.

3.4 Vehicle Types and Journey Purposes

3.4.1 The trip generation included separate estimates of light and heavy vehicles. The split between light vehicles user classes was taken from the donor zones and is presented in Table 3.3 below.

Table 3.3 Modal Split Between User Classes

Land Use	08:00 – 09:00		17:00 – 18:00	
	Arrival	Departure	Arrival	Departure
Car In-Work	16%	8%	15%	7%
Car Non-Work	70%	78%	76%	76%
Taxi	1%	1%	1%	1%
LGV	13%	13%	8%	16%

3.4.2 The table above demonstrates that the majority of trips generated are predicted to be non-work car trips. This is considered appropriate for the predominantly residential and educational nature of the development.

3.5 Forecast Transport Network Infrastructure

3.5.1 This section details the coding of traffic infrastructure in PBASBD SoLHAM forecast model.

Forecast Year Network Infrastructure

3.5.2 For the 2031 future year network, the TfL SoLHAM 2031 forecast network was used, with the addition of the same network changes as applied to the base year SoLHAM network to create the PBASBD SoLHAM. The SoLHAM 2031 forecast year network does not include any significant committed highway schemes added since the base year in the vicinity of the Stag Brewery development.

Development Interventions and Potential Improvement Schemes

3.5.3 As part of the development assessment, the potential requirement for local highway network interventions and/or improvement schemes is considered. This includes the following schemes:

- local highway interventions on Lower Richmond Road and Mortlake High Street including traffic calming, changes to bus stop locations, and changes to pedestrian crossings as shown in Appendix A; and
- proposed improvement scheme at Chalkers Corner including widening of the eastern Lower Richmond Road westbound approach, as shown in Appendix B. This scheme was modelled to include adjustment of signal timings with re-allocation of green time from the Lower Richmond Road westbound approach to the Clifford Avenue approach. The signal timing changes were determined based on LinSig local junction modelling and a series of sensitivity tests to achieve a reasonable balance of network flow and performance, and this is discussed further in the model assessment presented below.

3.6 Preparation of PBASBD SoLHAM Model Runs

3.6.1 The following tasks were undertaken to prepare the forecast year model runs for each scenario:

- For the *with* Development scenario, include development traffic in the assignment matrices using the modelled distribution from the relevant 'donor' zones as described in Section 3.3;
- Include relevant network infrastructure for each scenario as described in Section 3.5; and
- Assign the relevant forecast scenario assignment matrices.

4 Model Outputs – Travel Demand

4.1 Overview

4.1.1 This Section describes the forecast travel demand for each scenario as follows:

- 2015 Base Year;
- 2031 Forecast Year without Stag Brewery Development;
- 2031 Forecast Year with Stag Brewery Development;
- 2031 Forecast Year with Stag Brewery Development plus local highway interventions;
- 2031 Forecast Year with Stag Brewery Development plus Chalkers Corner improvement; and
- 2031 Forecast Year with Stag Brewery Development plus Local Highway Interventions Chalkers Corner improvement.

4.2 Trip Origins and Destinations

4.2.1 Trip origins refer to journeys originating from a defined area (or 'zone'). Trip destinations refer to journeys destinating at a defined zone.

4.2.2 Tables 4.1 to 4.4 provide the trip origins and destinations for each modelled year and scenario. These are presented for the defined development zones, study area zones (within 2km of development), internal simulation zones, and external zones (outside the simulation area).

Table 4.1 PBASBD SOLHAM Trip Origins by Area – AM Peak Hour (PCUs)

Scenario	Development Zones	Study Area Zones	Internal Zones	External Zones	Total
2012 Base	0	6,241	405,244	5,173,946	5,585,431
2031 Without Development *versus Base*	0	6,439	433,621	5,638,503	6,078,563
	0	*+198*	*+28,377*	*+464,556*	*+493,131*
		+3%	*+7%*	*+9%*	*+9%*
2031 With Development *versus Without Development*	213	6,518	433,728	5,638,530	6,078,989
	+213	*+79*	*+108*	*+27*	*+427*
		+1%	*+0%*	*+0%*	*+0%*

Table 4.2 PBASBD SOLHAM Trip Origins by Area – PM Peak Hour (PCUs)

Scenario	Development Zones	Study Area Zones	Internal Zones	External Zones	Total
2012 Base	0	6,505	426,580	4,892,315	5,325,400
2031 Without Development *versus Base*	0 *0*	6,428 *-78* *-1%*	440,847 *+14,268* *+3%*	5,366,915 *+474,600* *+10%*	5,814,189 *+488,789* *+9%*
2031 With Development *versus Without Development*	126 *+126*	6,475 *+48* *+1%*	440,904 *+57* *+0%*	5,366,934 *+20* *+0%*	5,814,439 *+250* *+0%*

Table 4.3 PBASBD SOLHAM Trip Destinations by Area – AM Peak Hour (PCUs)

Scenario	Development Zones	Study Area Zones	Internal Zones	External Zones	Total
2012 Base	0	6,172	418,712	5,160,546	5,585,430
2031 Without Development *versus Base*	0 *0*	6,184 *+12* *+0%*	440,878 *+22,166* *+5%*	5,631,497 *+470,951* *+9%*	6,078,559 *+493,129* *+9%*
2031 With Development *versus Without Development*	214 *+214*	6,250 *+67* *+1%*	440,999 *+121* *+0%*	5,631,523 *+26* *+0%*	6,078,987 *+428* *+0%*

Table 4.4 PBASBD SOLHAM Trip Destinations by Area – PM Peak Hour (PCUs)

Scenario	Development Zones	Study Area Zones	Internal Zones	External Zones	Total
2012 Base	0	6,301	410,858	4,908,240	5,325,400
2031 Without Development *versus Base*	0 *0*	6,365 *+64* *+1%*	430,001 *+19,143* *+5%*	5,377,821 *+469,581* *+10%*	5,814,188 *+488,788* *+9%*
2031 With Development *versus Without Development*	124 *+124*	6,404 *+38* *+1%*	430,073 *+72* *+0%*	5,377,838 *+17* *+0%*	5,814,439 *+251* *+0%*

4.2.3 Inspection of the above tables reveals the following key points:

- As expected, given the methodology employed, PBASBD SOLHAM traffic generation is directly linked to the location and magnitude of land-use and development.
- There are increases in highway trips in the forecast year 2031, compared with the base year 2015, which vary spatially and by time period:
  - total traffic trips are forecast to increase by around 9% in the morning and evening peak hours, which is dominated by external trips that increase by a similar magnitude;
  - traffic originating or destined in the internal simulation area, are forecast to increase between 3% and 7% in the morning and evening peak hours with growth in the peak travel directions (AM origins and PM destinations) being greater;
  - traffic originating in the study area is forecast to increase by around 3% in the morning peak hour, however, there is a negligible change in morning peak trips destined in the study area; and
  - the forecast change in traffic originating or destined in the study area in the evening peak hour traffic is negligible at around +/- 1%.
- The forecast development traffic is relatively slight in the context of the 'background' traffic growth in the model simulation area (internal zones) but more pronounced in the study area, particularly given the limited forecast growth. In the morning peak, development traffic is around 40% of the forecast increase in origin trips between 2015 and 2031 in the study area. Development trips are greater than background traffic growth for morning peak destinations and evening peak origins and destinations in the study area.

4.3 Travel Demand on Net work

4.3.1 Figures C.1 to C.10 in Appendix C present the change in assigned peak hour total vehicle flows in PBASBD SOLHAM in the study area for each time period. Figures C.11 to C.20 in Appendix C present the change in assigned peak hour total vehicle flows in PBASBD SOLHAM in the wider network area for each time period. These are presented as total actual flows in PCUs. The 2031 Forecast Year *without* Stag Brewery Development scenario is compared with the base year, to assess the impact of predicted background traffic growth. The 2031 Forecast Year *with* Stag Brewery Development scenarios are compared against the 2031 Forecast Year *without* Stag Brewery Development scenario to assess the impact of predicted development traffic and proposed infrastructure.

4.3.2 Appendix D includes a series of figures showing modelled exit turning flows (PCUs) in PBASBD SOLHAM in the local study area adjacent to the proposed development, for each modelled scenario and time period.

4.3.3 Inspection of the figures in Appendix C and Appendix D reveals the following key points for consideration.

- As expected, modelled traffic levels on the road network are directly linked to the forecast traffic generation.
- Traffic on the highway network in the study area broadly increases in the forecast year 2031, compared with the base year 2015, however, there are some links with decreases in traffic. More notable changes in forecast traffic include:
  - increase in traffic on the A316 at Chiswick Bridge in both directions in both time periods with an increase in flows of between 70 and 200 PCUs per hour;
  - increase in traffic on the A316, west of Manor Road, westbound in the morning peak and in both directions in the evening peak with an increase in flows of between 120 and 420 PCUs per hour;

- decrease in traffic on the South Circular Road in both directions in the AM peak hour and southbound in the evening peak hour with a decrease in flows of up to 230 PCUs per hour, however, PM northbound traffic increase by up to 230 PCUs; and
- more modest changes in traffic on the local highway network in the vicinity of the development with up to 70 additional PCUs westbound on Mortlake High Street in the morning peak but a decrease in eastbound traffic of up to 90 PCUs eastbound on Lower Richmond Road in the morning peak hour. Changes in traffic in the PM peak are less pronounced with up to 60 additional PCUs on Lower Richmond Road.

- The addition of development traffic is relatively slight in the context of the forecast background traffic growth and is also relatively localised near the proposed site:
  - without any infrastructure changes, other than development, there are predicted increases in traffic on Lower Richmond Road and Mortlake High Street with up to 60 additional PCUs in each peak hour in each direction;
  - the inclusion of proposed local highway interventions has a marginal effect on forecast traffic flows with some limited re-assignment, which is not unexpected given the local focus of these measures with some traffic calming etc;
  - the proposed Chalkers Corner improvement scheme has a more pronounced effect on forecast traffic flows where the additional capacity and associated reduction in congestion on Lower Richmond Road (see Section 5) is predicted to increase westbound traffic on Mortlake High Street and Lower Richmond Road with a corresponding decrease in flow on Chiswick Bridge – this is described more in the through-traffic analysis below;
  - the combined impact of the proposed local highway interventions and Chalkers Corner improvement is broadly in line with the individual impact of Chalkers Corner reflecting the limited effect of the local highway interventions; and
  - there is a marginal change in forecast traffic flows outside the development study area on the wider network with small changes in assigned flows, which can be partially be attributed to development traffic but also general fluctuations between SoLHAM model scenarios.

4.4 Through-Traffic Analysis

4.4.1 As noted above, the introduction of the proposed Chalkers Corner improvement scheme is forecast to increase traffic on Mortlake High Street and Lower Richmond Road as a result of additional capacity and reduced congestion which make this route more attractive.

4.4.2 An analysis of modelled *through-traffic* volumes at this location was undertaken to better understand the predicted impact. A cordon of the model network was defined, as illustrated in Figure 4.1. This was used to extract modelled (Saturn) demand flow matrices for each scenario from which traffic volumes travelling through the local network could be quantified based on cordon zone origin-destinations as shown in Figure 4.1. Cordoned flow matrices were extracted as Saturn demand flows which present the maximum desired volume of through traffic. Comparison between the cordon flows and equivalent network link flows showed a good match.

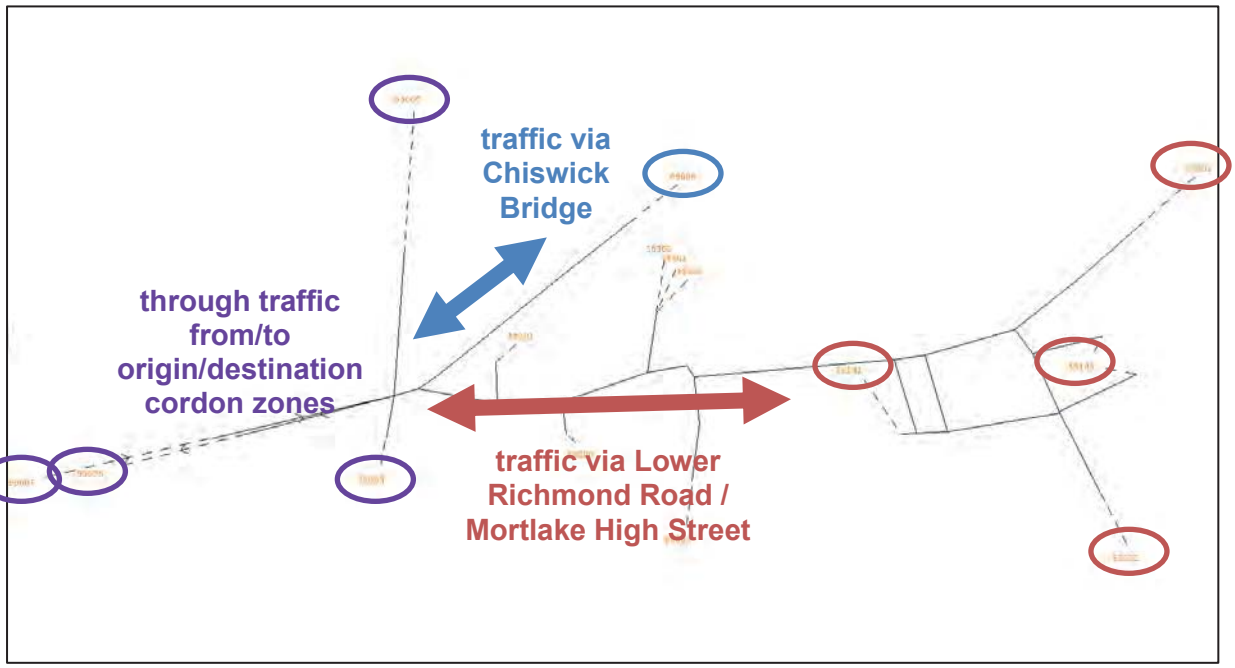

Figure 4.1 Through-Traffic Analysis Cordon

4.4.3 Table 4.5 and Table 4.6 present the modelled *through-traffic* that is predicted to route via Lower Richmond Road / Mortlake High Street for each scenario for each time period respectively. These tables also show the equivalent modelled traffic volumes routing via Chiswick Bridge. Inspection of the tables shows that the introduction of the proposed Chalkers Corner improvement scheme is forecast to increase westbound traffic on Mortlake High Street and Lower Richmond Road by around 80 PCUs in the morning peak and 140 PCUs in the evening peak with an equivalent reduction in flow on Chiswick Bridge. The forecast impact on eastbound flows is negligible in the context of the PBASBD SoLHAM traffic flows.

4.4.4 This re-routing could potentially be managed through adjustment of the signal timings at Chalkers Corner to optimise network flows and performance. As noted in Section 3.6, the proposed scheme was modelled to include adjustment of signal timings with re-allocation of green time from the Lower Richmond Road westbound approach to the Clifford Avenue approach. The signal timing changes were determined based on a series of sensitivity tests to achieve a reasonable balance of network flow and performance. The estimated change in through-traffic flows was considered alongside the equivalent modelled journey times (see Section 5) with the objective of mitigating development impacts on Lower Richmond Road and Clifford Avenue without attracting excessive through traffic. This process included consideration of local junction modelling undertaken using LinSig (see Section 6.2), noting the limitations of the strategic modelling in considering very localised impacts.

Table 4.5 Local Through Traffic Analysis – AM Peak Hour (PCUs)

Route	Direction	2012 Base	2031 Forecast Without Dev.	2031 Forecast With Dev.	2031 Forecast With Dev. plus Local Highway	2031 Forecast With Dev. plus Chalkers Corner	2031 Forecast With Dev. plus Local Highway and Chalkers Corner
Via Lower Richmond Road / Mortlake High Street	Westbound	530	574	526	518	603	607
	Eastbound	684	575	532	510	545	525
Via Chiswick Bridge	Westbound	893	1049	1053	1047	977	970
	Eastbound	1170	1430	1419	1407	1417	1420

Table 4.6 Local Through Traffic Analysis – PM Peak Hour (PCUs)

Route	Direction	2012 Base	2031 Forecast Without Dev.	2031 Forecast With Dev.	2031 Forecast With Dev. plus Local Highway	2031 Forecast With Dev. plus Chalkers Corner	2031 Forecast With Dev. plus Local Highway and Chalkers Corner
Via Lower Richmond Road / Mortlake High Street	Westbound	565	557	512	513	652	648
	Eastbound	625	654	571	551	590	549
Via Chiswick Bridge	Westbound	863	916	929	921	786	788
	Eastbound	1131	1345	1309	1347	1329	1324

5 Model Outputs – Network Performance

5.1 Overview

5.1.1 This Section describes the predicted impact of the forecast travel demand on the road network for each model scenario and time period.

5.1.2 The 2031 Forecast Year *without* Stag Brewery Development scenario is compared with the base year to assess the impact of predicted background traffic growth. The 2031 Forecast Year *with* Stag Brewery Development scenarios are compared against the 2031 Forecast Year *without* Stag Brewery Development scenario to assess the impact of predicted development traffic and proposed infrastructure.

5.2 Journey Times

5.2.1 Table 5.1 and Table 5.2 present the journey times for key routes (as illustrated in Section 2.4) for each scenario, in the AM and PM peak hours respectively. Appendix E contains a corresponding series of graphs showing the journey time comparisons along each route for each scenario.

Table 5.1 Journey Times – AM Peak Hour (seconds)

Route ID	Description	Direction	2015 Base	2031 Forecast Without Dev.	2031 Forecast With Dev.	2031 Forecast With Dev. plus Local Highway	2031 Forecast With Dev. plus Chalkers Corner	2031 Forecast With Dev. plus Local Highway and Chalkers Corner
R223	A316 Sunbury to A317 Kew Green	Eastbound	1709	2283	2307	2297	2300	2294
R224	A317 Kew Green to A316 Sunbury	Westbound	1492	2100	2113	2090	2112	2131
R225	A316 Richmond to A205 Putney	Eastbound	1815	1625	1667	1646	1677	1719
R226	A205 Putney to A316 Richmond	Westbound	1896	2584	2765	2762	2714	2663
R343	Chertsey Road	Anticlockwise	901	1101	1106	1114	1121	1127
R344	Chertsey Road	Clockwise	1018	1289	1301	1316	1350	1363
R381	Mortlake High Street + Lower Richmond Road	Eastbound	559	627	688	716	682	716
R382	Mortlake High Street + Lower Richmond Road	Westbound	677	1215	1285	1311	1110	1163

Table 5.2 Journey Times – PM Peak Hour (seconds)

Route ID	Description	Direction	2015 Base	2031 Forecast Without Dev.	2031 Forecast With Dev.	2031 Forecast With Dev. plus Local Highway	2031 Forecast With Dev. plus Chalkers Corner	2031 Forecast With Dev. plus Local Highway and Chalkers Corner
R223	A316 Sunbury to A317 Kew Green	Eastbound	1475	2432	2466	2459	2452	2451
R224	A317 Kew Green to A316 Sunbury	Westbound	1513	1852	1787	1808	1795	1789
R225	A316 Richmond to A205 Putney	Eastbound	1773	1361	1825	1851	1820	1849
R226	A205 Putney to A316 Richmond	Westbound	2013	1479	2250	2190	2103	2078
R343	Chertsey Road	Anticlockwise	993	1247	1283	1283	1294	1316
R344	Chertsey Road	Clockwise	1101	1415	1397	1403	1401	1408
R381	Mortlake High Street + Lower Richmond Road	Eastbound	630	938	776	857	843	882
R382	Mortlake High Street + Lower Richmond Road	Westbound	876	968	1094	1051	930	954

5.2.2 Inspection of the above tables and the journey time graphs presented in Appendix E reveals the following key points for consideration:

- As expected, changes in journey times are linked to the increase in travel demand with additional traffic leading to predicted longer journey times in the 2031 forecast year scenario relative to the 2015 base year.
- The combination of increases in traffic results in additional delay across most of the model network. There is a predicted increase in journey time on nearly all routes in the forecast year scenarios, relative to the base year.
- There is some fluctuation in modelled journey times, for instance routes R225 and R226 (A316 Richmond to/from A205 Putney) show a notable forecast decrease in journey time in the 2031 Forecast Without Development relative to the base. However, the With Development scenarios show journey times more in line with the Base. Closer inspection of the SoLHAM networks indicates that this mainly relates to assignment convergence at some nodes (58856 and 58884) but this does not materially affect the route choice or the overall findings of the forecast assessment.
- With the addition of the Stag Brewery development, there are modelled increases in journey times on most routes. As expected, these are most pronounced on the local journey routes (R381 and R382 - Mortlake High Street + Lower Richmond Road) immediately adjacent to the proposed development. The forecast change in journey times on routes more removed

from the development generally show lesser increases, which are not significant in the context of the forecast change over time and the application of PBASBD SoLHAM.

- The inclusion of proposed local highway interventions generally has a slight effect on modelled journey times, with an increase on the local journey routes (R381 and R382 - Mortlake High Street + Lower Richmond Road) in both time periods, which is not unexpected given the local focus of these measures with some traffic calming etc.
- The proposed Chalkers Corner improvement scheme has a more pronounced effect on journey times where the additional capacity on the westbound approach is predicted to reduce delays to the westbound traffic on Mortlake High Street and Lower Richmond Road. Inspection of journey time route R382 (Mortlake High Street + Lower Richmond Road, westbound) indicates that the proposed improvement reduces modelled journeys time below the 2031 Without Development scenario in both time periods. The effect of the improvement on eastbound journey times is more limited, which is not unexpected given most issues at Chalkers Corner at Lower Richmond Road are in the westbound direction.
- The combined impact of the proposed local highway interventions and Chalkers Corner improvement is broadly in line with the individual impact of Chalker Corners reflecting the relatively limited effect of the local highway interventions.
- It should be noted that the modelled network does not include representation of the SCOOT system, which dynamically optimises traffic signal timings relative to flows and would be expected to mitigate some of the reported modelled increases in delay and journey times.
- In addition, further adjustment of the signal timings at Chalkers Corner and other key locations will change network flows and performance in line with TfL operational strategies, for example to prioritise bus movements, which it is not possible to model in detail in SoLHAM. This has been considered through local junction modelling undertaken using LinSig (see Section 6.2).

5.3 Road Congestion and Junction Performance

5.3.1 Figures F.1 to F.10 in Appendix F present the predicted change in peak hour average queue totals (in PCUs) in PBASBD SOLHAM for each time period. The 2031 Forecast Year *without* Stag Brewery Development scenario is compared with the base year to assess the impact of predicted background traffic growth. The 2031 Forecast Year *with* Stag Brewery Development scenarios are compared against the 2031 Forecast Year *without* Stag Brewery Development scenario to assess the impact of predicted development traffic and proposed infrastructure.

5.3.2 Figures G.1 to G.12 in Appendix G present the ratio of volume to capacity (V/C) on each modelled link in PBASBD SOLHAM, for each modelled scenario and time period. The V/C ratios are shown for the average of all turns on each link. The volume to capacity ratio, also known as the degree of saturation, is calculated as the ratio between the demand volume on turn and the equivalent capacity in PCUs per hour. For the purposes of congestion illustrations in this analysis, congestion levels are defined as:

- V/C Ratio greater than 1.0 - severe congestion
- V/C Ratio of 0.90 to 1.0 - heavy congestion
- V/C Ratio of 0.70 to 0.90 - moderate congestion
- V/C Ratio of less than 0.50 - uncongested

5.3.3 These figures should be considered in the context of the strategic nature of SOLHAM where local junction detail may not be represented in full, which may influence the reported

performance indicators. In addition, the link-based average V/C ratios may mask individual turns with higher levels of congestion.

5.3.4 Inspection of the figures presented in Appendix F and Appendix G reveal the following key points for consideration:

- The identified trends of changes in queuing and congestion directly correlate with the changes in journey times noted. In combination, these model outputs can be used to identify network hotspots and where development impacts are most pronounced.
- As expected, changes in road network performance are linked to the addition of background traffic growth, leading to predicted increases in congestion in the forecast year relative to the base year. Comparing the forecast year with the 2015 base year reveals the following:
  - generally, the morning peak hour is more congested than the evening peak hour with greater levels of queuing and congestion on the PBASBD SOLHAM network in the study area;
  - there is a predicted increase in average traffic queues at the A316 junctions with Kew Road, Manor Road and Chalkers Corner in both time periods with an increase in queued lengths between 15 and 50 PCUs;
  - increase in average traffic queues on the local highway network in the vicinity of the development with around 40 additional queued PCUs westbound on Lower Richmond Road, westbound, in the morning peak; and
  - network hotspots on the local network in the 2031 forecast year include the A316 at Manor Road, A305 at Manor Road, Chalkers Corner junction, South Circular Road between Upper Richmond Road West and Sheen Lane, and South Circular Road at Priests Bridge.
- The additional traffic included in the 2031 forecast year scenarios is predicted to result in some increased congestion at the above locations, however, this is relatively slight in the context of the forecast change in network performance over time with an increase in average queues up to 10 PCUs.
- The inclusion of proposed local highway interventions generally has a slight effect on network performance with minimal changes in queuing and delay, which is not unexpected local focus of these measures with some traffic calming etc.
- The proposed Chalkers Corner improvement scheme has a more pronounced effect on network performance where the additional capacity on the westbound approach is predicted to reduce queues and delays on Lower Richmond Road in both time periods. Elsewhere impacts are more slight.
- The combined impact of the proposed local highway interventions and Chalkers Corner improvement is broadly in line with the individual impact of Chalkers Corner reflecting the relatively limited effect of the local highway interventions.
- There is a marginal change in forecast network performance outside the development study area on the wider network with small changes in traffic queues and congestion, which can be partially be attributed to development traffic but also general fluctuations between SoLHAM model scenarios. This is further illustrated in series of figures in Appendix H that present the change in average link-based delay in PBASBD SOLHAM for each time period and scenario and which show very slight differences in delay outside the study area with the addition of the Stag Brewery development.
- As noted previously, the modelled network does not include representation of the SCOOT system, which dynamically optimises traffic signal timings relative to flows and could be expected to mitigate some of the reported congestion.

6 Summary

6.1 Conclusions

6.1.1 This Note has provided a summary of the PBASBD SoLHAM forecasts for the Stag Brewery development assessment. It has described how PBASBD SoLHAM was used:

- to assess the operation of the strategic road network;
- inform the predicted traffic impacts associated with the development proposals; and
- help inform the derivation of highway interventions and improvement schemes.

6.1.2 Forecast travel demand in 2031 associated with the proposed Stag Brewery development has been presented. This represents the complete build-out of the development. This indicates increases in traffic for the forecast year 2031, compared with the base year of 2015.

6.1.3 The overall impact of the addition of Stag Brewery development traffic is relatively slight in the context of overall (committed) forecast background traffic growth. Quantifiable impacts are localised near and around the proposed Stag Brewery site and most pronounced on Lower Richmond Road and Mortlake High Street.

6.1.4 Changes in road network performance are in line with background traffic growth leading to predicted increases in congestion in the forecast year relative to the base year. Additional development traffic is predicted to result in some increased congestion mostly near the proposed site. The forecast change in network performance further away from the development is not significant in the context of the forecast change over time and the application of PBASBD SoLHAM.

6.1.5 The inclusion of proposed local highway interventions generally has a slight effect on network performance with minimal changes in queuing and delay, which is not unexpected given the local focus of these measures with some traffic calming etc. The proposed Chalkers Corner improvement scheme has a more pronounced effect on network performance where the additional capacity on the westbound approach is predicted to reduce queues and delays on Lower Richmond Road in both time periods. Conversely this reduction in congestion is forecast to increase the level of through traffic.

6.1.6 There is a marginal change in forecast network performance outside the development study area on the wider network with small changes in traffic flows, queues and congestion, which can be partially be attributed to development traffic but also general fluctuations between SoLHAM model scenarios.

6.1.7 It should be noted that the modelled network does not include representation of the SCOOT system, which dynamically optimises traffic signal timings relative to flows and would be expected to mitigate some of the reported modelled increases in delay and journey times. In addition, further adjustment of the signal timings at Chalkers Corner and other key locations may be possible to optimise network flows and performance in line with TfL operational strategies, for example to prioritise bus movements, which it is not possible to model in detail in SoLHAM.

6.2 Local Junction Modelling

6.2.1 Following the strategic model assessment, presented in this Note, a further assessment of the Stag Brewery development proposals on the Chalkers Corner junction was undertaken using a LinSig model. This assessment was informed by this PBASBD SoLHAM modelling and is reported separately.

6.2.2 The following method was applied to prepare LinSig demand forecasts and determine revised signal timings for inclusion in the Chalkers Corner improvement scheme coding in SoLHAM:

- Forecast flows were extracted from SoLHAM using cordon matrices to identify the traffic volumes through the two junctions at Chalker's Corner;
- Saturn 'demand' flows were specified for the cordon matrices to provide the maximum change in traffic flows between scenarios;
- SoLHAM cordon flows were compared to derive factors and growth observed base traffic flow matrices in LinSig for the following scenarios:
  - FutureBase_2031 (Future Base)
  - FutureBase_WDNM_2031 (Future Base plus Stag development)
  - FutureBase_WM_2031 (Future Base plus Stag development plus Chalkers Corner Improvements and Local Highway Improvements on LRR)
- LinSig optimised signal timings were reviewed for each scenario and a series of sensitivity tests undertaken in SoLHAM with adjusted signal timings applied to achieve a reasonable balance of network flow and performance;
- SoLHAM cordon flows were extracted for the sensitivity tests and LinSig traffic flows updated and signal timings adjusted where necessary, with a repeat of this feedback between the strategic and local model to check the signal timings are optimal.

6.2.3 It should be noted that there are differences between the LinSig and SoLHAM models reflecting the various data sources, levels of detail and technical methods. The LinSig provides a more detailed representation of the local junctions which is not possible in the strategic modelling when considering very localised impacts.

DOCUMENT ISSUE RECORD

Document	Rev	Date	Prepared	Checked	Reviewed	Approved
38262\Modelling\IN003	V1e	08/12/17	AB	KL	KL	RP
38262\Modelling\IN003	V2c	02/02/18	AB	KL	RP	RP

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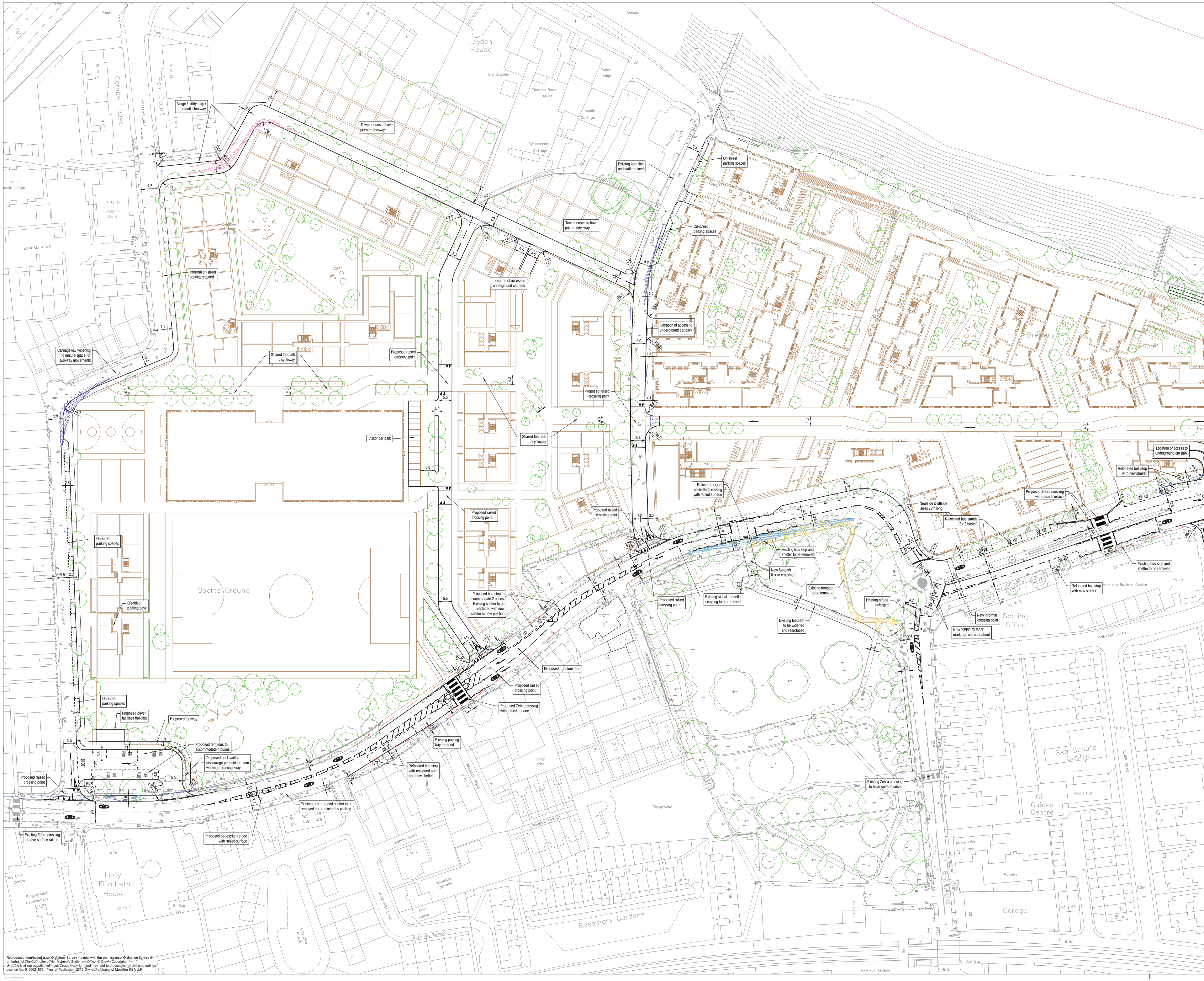
Appendix A Stag Brewery Development Proposed Local Highway Interventions



KEY

AREA OVER WHICH UNOBSTRUCTED VISIBILITY MUST BE PROVIDED FOR:

PEDESTRIANS
50m TO CROSSING 1.5m BEHIND KERB, AT 30mph (SEE TA68/98 AND LTN 2/95)

CYCLISTS
70m TO CROSSING 2.4m BEHIND KERB, AT 30mph (SEE INTERIM ADVICE NOTE 195/16 AND DMRB TD 9/93).

VEHICLES
70m TO PRIMARY SIGNAL HEAD AT 30mph (SEE TfL SPECIFICATION SQA-0064)

MATURE TREES WHICH AFFECT VISIBILITY

VISIBILITY 50m TO ZEBRA CROSSING 1.5m BEHIND KERB, AT 30mph (SEE LTN 2/95)

VISIBILITY SPLAYS AT JUNCTIONS 2.4m x 43m AT 30mph (MANUAL FOR STREETS)

VISIBILITY SPLAYS AT JUNCTIONS 2.4m x 25m AND FORWARD VISIBILITY ON BENDS 25m AT 20mph (MANUAL FOR STREETS)

FORWARD VISIBILITY ON BENDS 17m AT 15mph (MANUAL FOR STREETS)

Mark	Revision	Date	Drawn	Chkd	Appd
B	Masterplan layout updated and highway layout revised.	01.09.17	REM	-	-
A	Masterplan layout updated and highway layout revised.	22.08.17	REM	GD	RAP

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Drawing Issue Status

DRAFT FOR DISCUSSION

STAG BREWERY, MORTLAKE LOWER RICHMOND ROAD AND MORTLAKE HIGH STREET POSSIBLE HIGHWAY LAYOUT

Client

RESELTON PROPERTIES LTD

Date of 1st Issue	Designed	Drawn
09.08.2017	REM	REM
A0 Scale	**Checked**	**Approved**
1:500	GD	RAP

Drawing Number: 38262/5501/058 — Revision: B

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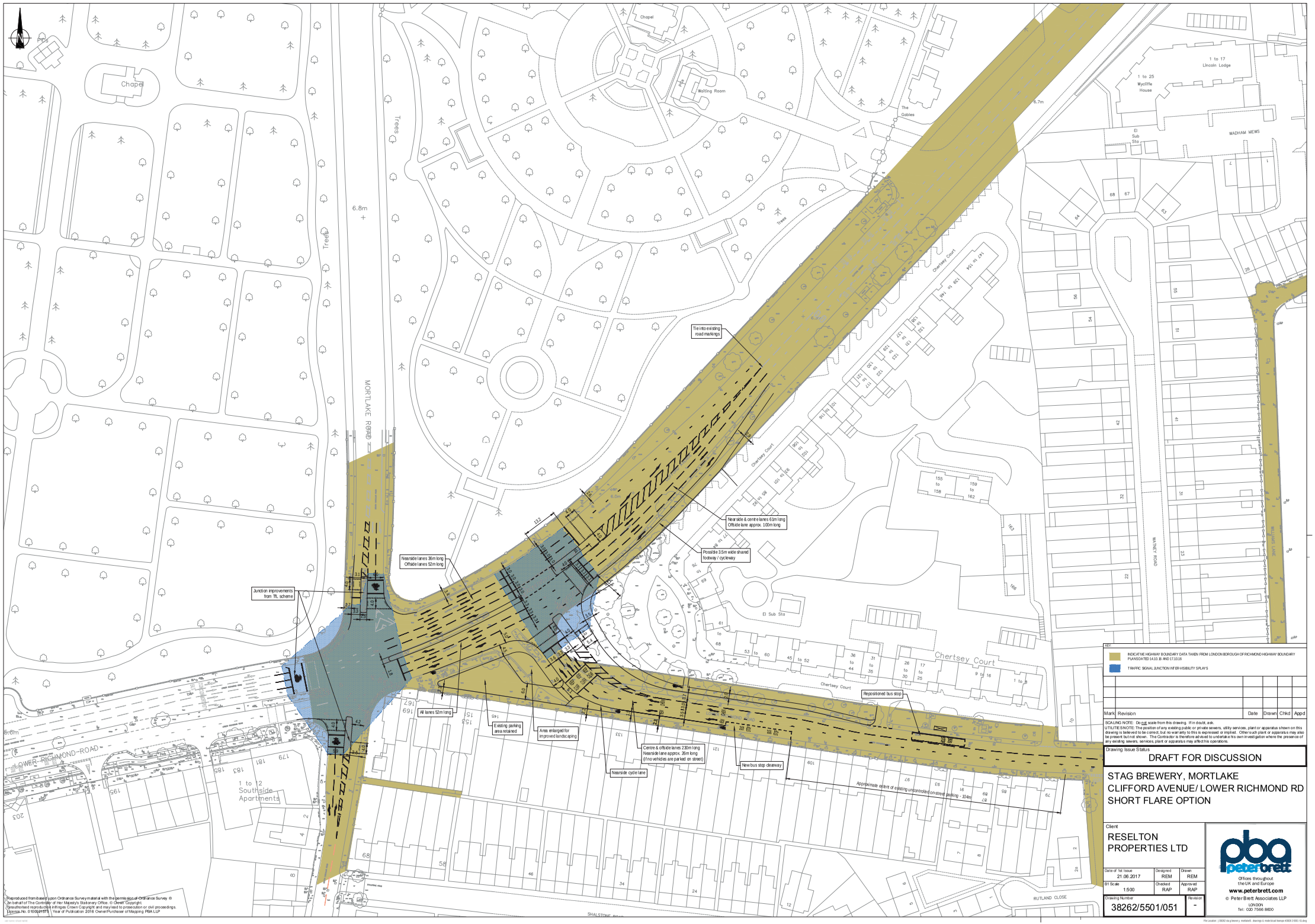
Appendix B Proposed Chalkers Corner Improvement Scheme


Tie into existing road markings
Nearside & centre lanes 63m long Offside lane approx. 100m long
Possible 3.5m wide shared footway / cycleway
Nearside lanes 36m long Offside lanes 52m long
Junction improvements from TfL scheme
All lanes 52m long
Existing parking area retained
Area enlarged for improved landscaping
Centre & offside lanes 230m long Nearside lane approx. 36m long (if no vehicles are parked on street)
Nearside cycle lane
New bus stop clearway
Repositioned bus stop
Approximate extent of existing uncontrolled on-street parking - 304m
MORTLAKE ROAD
LOWER RICHMOND ROAD
Chertsey Court
WADHAM MEWS
RUTLAND CLOSE
1 to 12 Southside Apartments
Chapel
Waiting Room
Trees
6.8m
6.7m
KEY:
INDICATIVE HIGHWAY BOUNDARY DATA TAKEN FROM LONDON BOROUGH OF RICHMOND HIGHWAY BOUNDARY PLANS DATED 14.10.16 AND 17.10.16
TRAFFIC SIGNAL JUNCTION INTER-VISIBILITY SPLAYS
Mark Revision Date Drawn Chkd Appd
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DRAFT FOR DISCUSSION
STAG BREWERY, MORTLAKE
CLIFFORD AVENUE/ LOWER RICHMOND RD
SHORT FLARE OPTION
Client
RESELTON PROPERTIES LTD
Date of 1st Issue 21.06.2017
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Drawn REM
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Approved RAP
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Appendix C Change in Assigned Flows (Actual)

Figure C.1 Change in Traffic Flow (study area) - 2031 without Stag Brewery Development minus 2015 Base Year - AM Peak Hour (PCUs, Actual Flow (study area))

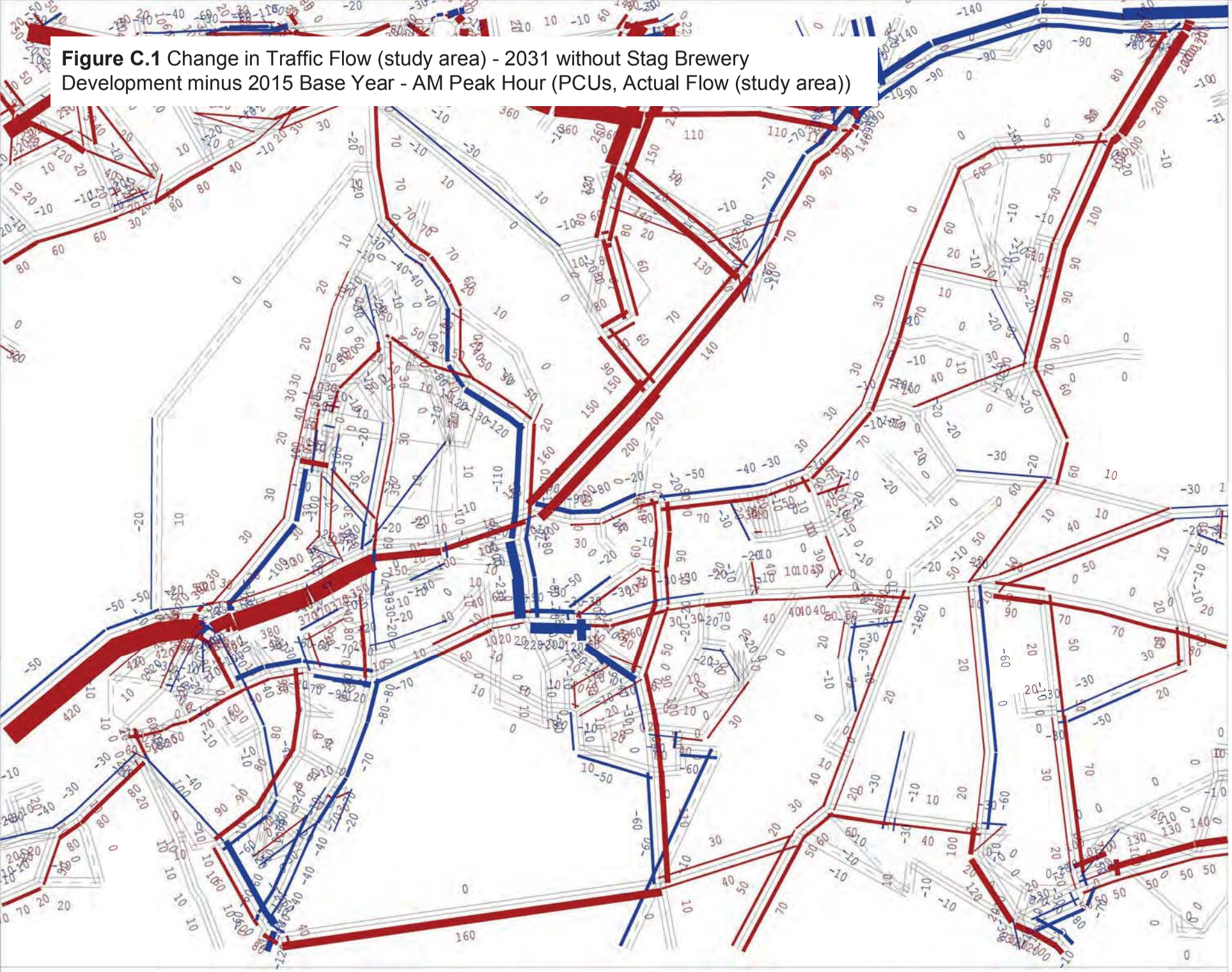

Figure C.2 Change in Traffic Flow (study area) - 2031 without Stag Brewery Development minus 2015 Base Year - PM Peak Hour (PCUs, Actual Flow (study area))

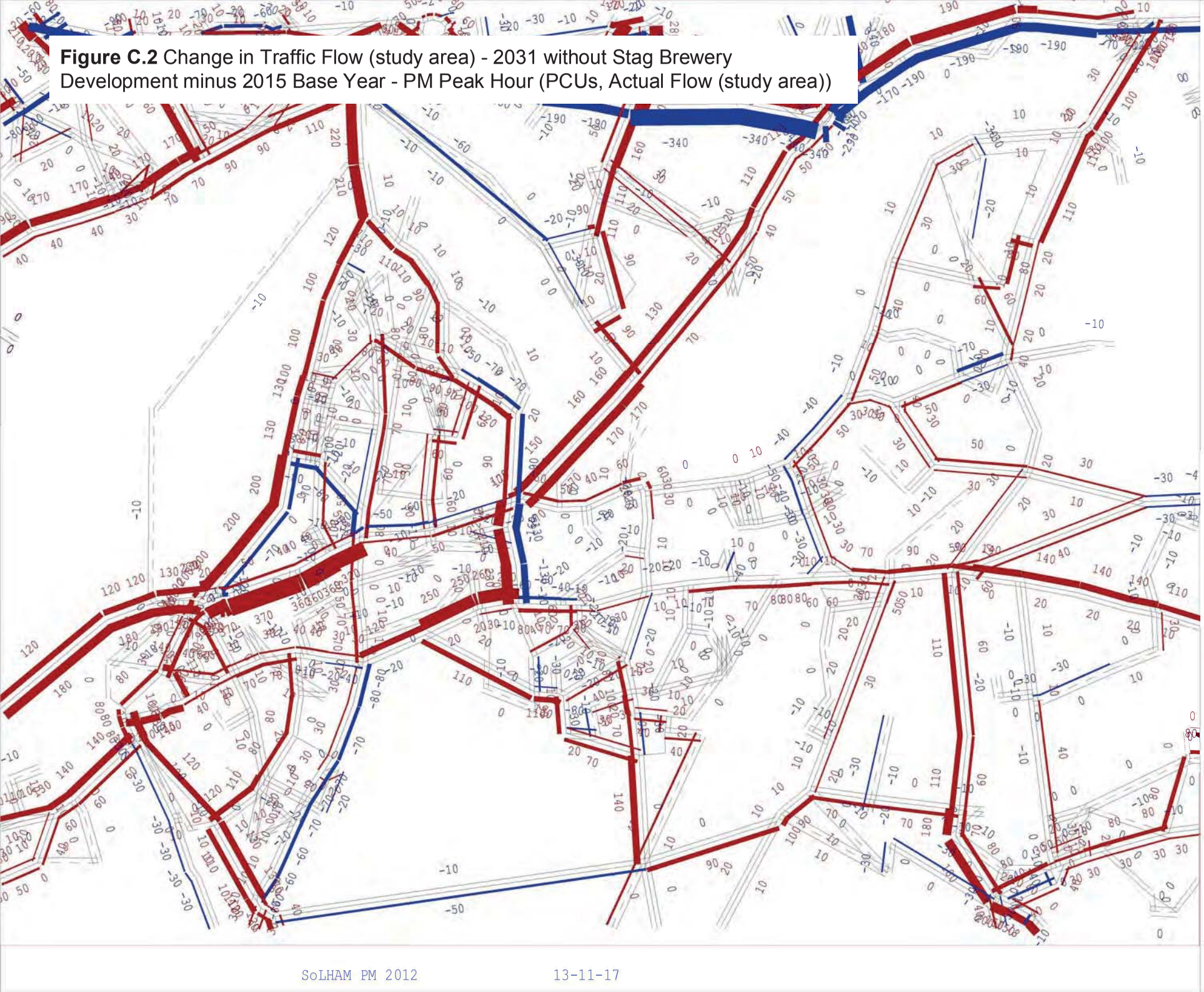

Figure C.3 Change in Traffic Flow (study area) - 2031 with Stag Brewery Development minus 2031 without Stag Brewery Development - AM Peak Hour (PCUs, Actual Flow (study area))