HIGHWAYS AGENCY

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London Orbital and M23 to Gatwick Route Strategy Evidence Report Technical Annex

April 2014

An executive agency of the Department for Transport

Document History

Technical annex to London Orbital and M23 to Gatwick route-based strategy evidence report

Highways Agency

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0.2	31 Jan 2014	Draft for stakeholder comments	Stephen Hall	
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Table of Contents

Part A Supporting evidence 4

A1 Introduction 5

A1.3 Route description 5

A2 Route capability, condition and constraints 12

A2.1 Route performance 12

A2.2 Road safety 32

A2.3 Asset condition 37

A2.4 Route Operation 45

A2.5 Technology 59

A2.6 Vulnerable road users 67

A2.7 Environment 68

A3 Future considerations 83

A3.2 Economic development and surrounding environment 83

A3.3 Network improvements and operational changes 97

A3.4 Wider transport networks 98

A4 Key challenges and opportunities 101

A4.2 Operational challenges and opportunities 101

A4.4 Capacity challenges and opportunities 101

Part B Stakeholder engagement 25

B1 Stakeholder engagement 26

B1.1 Engagement events 26

Part C Bibliography 66

C1 Introduction 67

C1.3 Route description 67

C2 Route capability, condition and constraints 67

C2.1 Route performance 67

C2.2 Road safety 67

C2.3 Asset condition 67

C2.4 Route operation 67

C2.5 Technology 68

C2.6 Vulnerable road users 68

C2.7 Environment....68

C3 Future considerations....68

C3.2 Economic development and surrounding environment....68

C3.3 Network improvements and operational changes....72

C3.4 Wider transport networks....72

C4 Key challenges and opportunities....73

C4.2 Operational challenges and opportunities....73

C4.4 Capacity challenges and opportunities....73

Part A Supporting evidence

A1 Introduction

A1.3 Route description

A1.3.5

There are many potentially ambiguous / conflicting information in the public domain regarding the Trans-European Network (TEN-T). The evidence base used in this study comes from a consultation paper by the DfT on the *Future Trans-European Network – Transport (TEN-T) Policy*. Annex 2 of this paper lists all the routes on the TEN-T in the UK.

A1.3.6

General description, although previous reports including the *Orbit Study Final Report* were reviewed for consistency.

A1.3.7

Selected events from 2013 are quoted from an events register 2010-2015 (sporting, music, holidays etc) provided by Connect Plus, and an extract of this follows showing those events considered by Connect Plus to have a high impact on the Design Build, Finance and Operate area of the strategic road network (known as Area 5).

Event			Start Time	End Time	Location/Venue	Contact Details / Website	Attendance	Likely Impact to Area 5 Network	Proposed Action	Comments / Feedback	RSBS	SRW
England V's Scotland RBS 6 Nations.	Sat 02/Feb/2013	Sat 02/Feb 2013	14:30	19:00	Twickenham Stadium	http://www.rfu.com/TwickenhamStadium/WhatIsOn.aspx	82,000	High	No total closures on A316, M3 and M25 jct 12 slip roads.NOC to monitor and advise ERCC of any issues and feedback to Route Managment Team.			224639
England vs Brazil	Wed 06-Feb-13	Wed 06-Feb-13	19:00	23:59	Wembley Stadium	http://www.wembleystadium.com	50,000+	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			9999999
England V's France RBS 6 Nations.	Sat 23/Feb/2013 ????????????	Sat 23/Feb/2013 ????????????	15:00	20:00	Twickenham Stadium	http://www.rfu.com/TwickenhamStadium/WhatIsOn.aspx	82,000	High	No total closures on A316, M3 and M25 jct 12 slip roads.NOC to monitor and advise ERCC of any issues and feedback to Route Managment Team.			2224668
England V's Italy RBS 6 Nations.	Sat 23/Feb/2013 ????????????	Sat 23/Feb/2013 ????????????	12:00	19:00	Twickenham Stadium	http://www.rfu.com/TwickenhamStadium/WhatIsOn.aspx	82,000	High	No total closures on A316, M3 and M25 jct 12 slip roads.NOC to monitor and advise ERCC of any issues and feedback to Route Managment Team.			
UEFA Champions League Final	Sat 25/May/2013	Sat 25/May/2013	19:00	23:59	Wembley Stadium	http://www.wembleystadium.com	80,000	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2372614
England vs Republic of Ireland	Wed 29/May/2013	Wed 29/May/2013	19:00	23:59	Wembley Stadium	http://www.wembleystadium.com	65,000+	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2372627
Investec DerbyDay	Fri 31/05/2013	Sat 01/06/2013	12:00	20:00	Epsom Downs Race Course	http://www.epsomdowns.co.uk/whats-on-archive/all	125,000	High	No total closures on A3, M25 Jct 8 or Jct 9. NOC to monitor traffic conditions and report issues to ERCC.		32316	
Bruce Springsteen	Sat 15-Jun-13	Sat 15-Jun-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	65,000+	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2503865
The Killers	Sat 22-Jun-13	Sat 22-Jun-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	65,000+	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2503915
Robbie Williams	Sat 29-Jun-13	Sun 30-Jun-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	65,000+	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2503933
Hard Rock Calling	Sat 29-Jun-13	Sun 30-Jun-13	12:00	23:59	Queen Elizabeth Olympic Park	www.londonlegacy.co.uk	60,000	High	No total closures on M11, A12, A13, M25 Jct 27/28/29/30		44345	2511036
Robbie Williams	Tue 02-Jul-13	Tue 02-Jul-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	65,000+	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2503978
Robbie Williams	Fri 05-Jul-13	Fri 05-Jul-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	65,000+	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2503987
Mumford & Sons	Sat 06-Jul-13	Sat 06-Jul-13	12:00	23:59	Queen Elizabeth Olympic Park	www.londonlegacy.co.uk	60,000	High	No total closures on M11 NB links, A12 and A13 NB slips, M25 jct 27/28/29/30 carriageway.		44348	2511050
Wireless	Fri 12-Jul-13	Sun 14-Jul-13	12:00	23:59	Queen Elizabeth Olympic Park	www.londonlegacy.co.uk	60,000	High	No total closures on M11 NB links, A12 and A13 NB slips, M25 jct 27/28/29/30		41441	2428526
Go Local/Electric Daisy Carnival	Fri 19-Jul-13	Sat 20-Jul-13	12:00	23:59	Queen Elizabeth Olympic Park	www.londonlegacy.co.uk	60,000	High	No total closures on M11 NB links, A12 NB and A13 EB slips, M25 jct 27/28/29/30 carriageway.		44350	2511060
Lakeside Speedway	Fri 26-Jul-13	Fri 26-Jul-13	18:00	23:59	Essex Raceway	http://www.lakesidehammers.co	2-4,000	High	No total closures on M25 Jct 30 or Jct 31 and QEII Bridge until midnight		45639	2540283
London Anniversary Games	Fri 26-Jul-13	Sun 28-Jul-13	12:00	23:59	Queen Elizabeth Olympic Park	www.londonlegacy.co.uk	60,000	High	No total closures on M11 NB links, A12 and A13 NB slips, M25 jct 27/28/29/30 carriageway.		44351	2511088
Lakeside Speedway	Fri 02-Aug-13	Fri 02-Aug-13	18:00	23:59	Essex Raceway	http://www.lakesidehammers.co	2-4,000	High	No total closures on M25 Jct 30 or Jct 31 and QEII Bridge until midnight		45642	2540367
Lakeside Speedway	Fri 09-Aug-13	Fri 09-Aug-13	18:00	23:59	Essex Raceway	http://www.lakesidehammers.co	2-4,000	High	No total closures on M25 Jct 30 or Jct 31 and QEII Bridge until midnight		45643	2540388
England V Scotland	Wed 14-Aug-13	Wed 14-Aug-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	TBC	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2547484
Lakeside Speedway	Fri 16-Aug-13	Fri 16-Aug-13	18:00	23:59	Essex Raceway	http://www.lakesidehammers.co	2-4,000	High	No total closures on M25 Jct 30 or Jct 31 and QEII Bridge until midnight		45645	2540398
V Festival	Fri 16-Aug-13	Mon 19-Aug-13	12:00	12:00	Hylands Park, Chelmsford	web@vfestival.com	120,000	High	No slip closures at Jct 28		45126	2528135
Lakeside Speedway	Fri 30-Aug-13	Fri 30-Aug-13	18:00	23:59	Essex Raceway	http://www.lakesidehammers.co	2-4,000	High	No total closures on M25 Jct 30 or Jct 31 and QEII Bridge until midnight		45647	2540412
England V Moldova (WCQ)	Fri 06-Sep-13	Fri 06-Sep-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	TBC	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2547509
Kempton Park Twilight Racing & Conor Maynard Live	Sat 14-Sep-13	Sat 14-Sep-13	15:00	23:00	Kempton Park	01932 782292 http://www.kempton.co.uk/Fixtures-and-tickets?PageName=Fixtures-and-tickets&VirtualName=Fixtures-and-tickets	3000+	High	No total closures on A316 and M3 jct 1. NOC to monitor traffic conditions and report issues to ERCC			2577877
Roger Waters - The Wall	Sat 14-Sep-13	Sat 14-Sep-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	TBC	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2555355
NFL Minnesotta Vikings vs Pittsburgh Steelers	Sun 29-Sep-13	Sun 29-Sep-13	12:00	23:59	Wembley Stadium	http://www.wembleystadium.com	90,000	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2555431
England V Montenegro (WCQ)	Fri 11-Oct-13	Fri 11-Oct-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	TBC	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2555431
England V Poland (WCQ)	Tue 15-Oct-13	Tue 15-Oct-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	TBC	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2555453
Heineken Cup Saracens vs Toulouse	Fri 18-Oct-13	Fri 18-Oct-13	15:00	23:59	Wembley Stadium	http://www.wembleystadium.com	60,000	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2621974
NFL Jacksonville Jaguars vs San Francisco 49ers	Sun 27-Oct-13	Sun 27-Oct-13	12:00	23:59	Wembley Stadium	http://www.wembleystadium.com	90,000	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			99999
The 'Big Hit' Rugby League World Cup Semi-Final Double Header	Sat 23-Nov-13	Sat 23-Nov-13	10:00	20:00	Wembley Stadium	http://www.wembleystadium.com	60,000	High	No total closures on M40 links, M1 or M4 or M25 Jct 14 to Jct 17. NOC to monitor traffic conditions and report issues to ERCC			2622070
William Hill Winter Festival	Wed 26-Dec-12	Thu 27-Dec-12	11:00	20:00	Kempton Park	01932 782292 http://www.kempton.co.uk/Fixtures-and-tickets?PageName=Fixtures-and-tickets&VirtualName=Fixtures-and-tickets	20,000	High	No total closures on A316 and M3 jct 1. NOC to monitor traffic conditions and report issues to ERCC			2577692

A1.3.8

An extract from the Agency's *Network Evidence Reports* showing the top 50 M25 entries is shown below. On the M25 from junction 12 to junction 13 AADF is 95,099 counter clockwise and 94,441 clockwise. The two-way flow is 189,540 AADF.

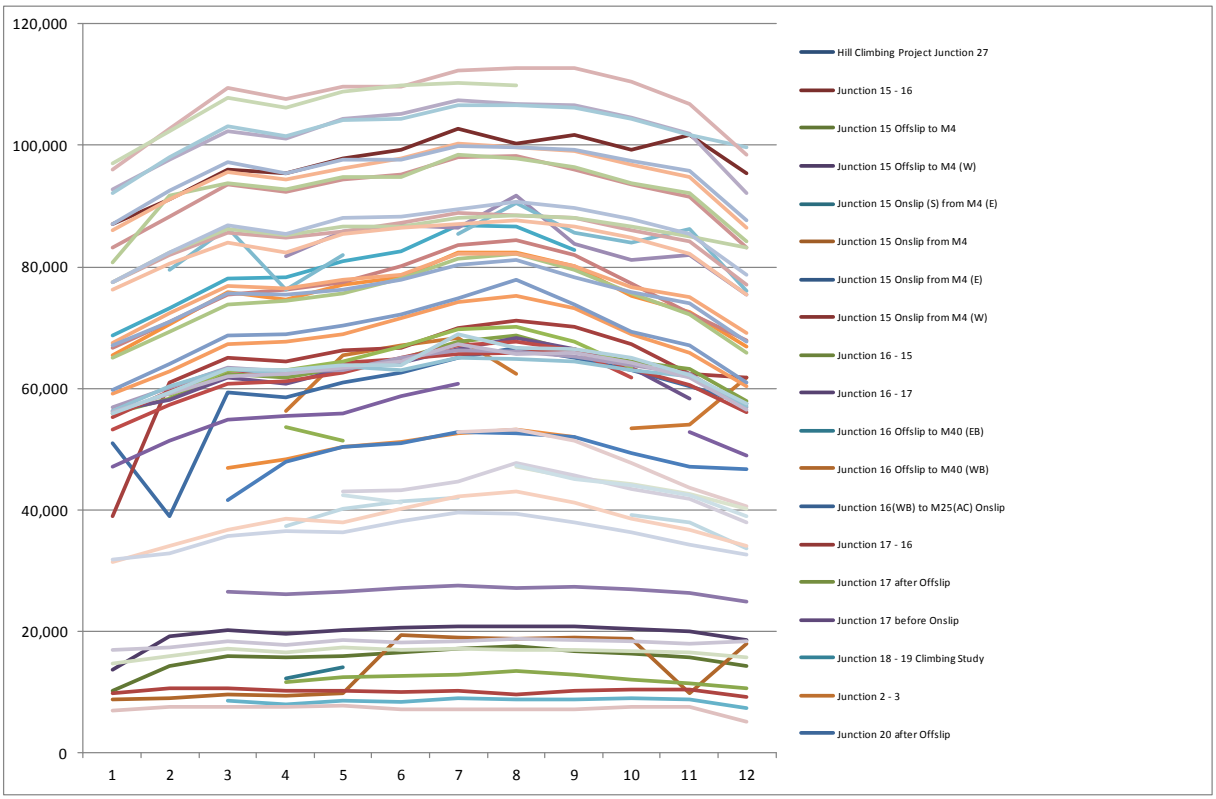
Between junction 16 and 17 AADF was 70,770 counter clockwise and 74,192 clockwise, coming to a total two-way flow of 144,962. Between junction 19 and 20 AADF was 60,380 counter clockwise and 67,739 clockwise, so the total two-way flow is 128,119.

RoadLinkReference	RoadLinkDescription	AADF vehicles per day	AADF National Rank (out of 2475 road links - rank 1 is the busiest)	RBS Route Code	RBS Route Description	Current Road Link
LM308	M25 between M25 J15 and M25 J14 (LM308)	107,057	1	2	London Orbital and M23 to Gatwick	TRUE
LM307	M25 between M25 J14 and M25 J15 (LM307)	106,712	2	2	London Orbital and M23 to Gatwick	TRUE
LM306	M25 between M25 J14 and M25 J13 (LM306)	101,772	3	2	London Orbital and M23 to Gatwick	TRUE
LM305	M25 between M25 J13 and M25 J14 (LM305)	101,551	4	2	London Orbital and M23 to Gatwick	TRUE
LM309	M25 between M25 J15 and M25 J16 (LM309)	96,401	5	2	London Orbital and M23 to Gatwick	TRUE
LM310	M25 between M25 J16 and M25 J15 (LM310)	95,144	6	2	London Orbital and M23 to Gatwick	TRUE
LM304	M25 between M25 J13 and M25 J12 (LM304)	95,099	7	2	London Orbital and M23 to Gatwick	TRUE
LM303	M25 between M25 J12 and M25 J13 (LM303)	94,441	8	2	London Orbital and M23 to Gatwick	TRUE
LM302	M25 between M25 J12 and M25 J11 (LM302)	92,028	10	2	London Orbital and M23 to Gatwick	TRUE
LM301	M25 between M25 J11 and M25 J12 (LM301)	91,242	11	2	London Orbital and M23 to Gatwick	TRUE
LM300	M25 between M25 J11 and M25 J10 (LM300)	86,724	13	2	London Orbital and M23 to Gatwick	TRUE
LM299	M25 between M25 J10 and M25 J11 (LM299)	83,834	15	2	London Orbital and M23 to Gatwick	TRUE
LM315	M25 between M25 J18 and M25 J19 (LM315)	81,159	17	2	London Orbital and M23 to Gatwick	TRUE
LM316	M25 between M25 J19 and M25 J18 (LM316)	77,962	30	2	London Orbital and M23 to Gatwick	TRUE
LM362	M25 between M25 J8 and M25 J7 (LM362)	76,215	33	2	London Orbital and M23 to Gatwick	TRUE
LM361	M25 between M25 J7 and M25 J8 (LM361)	75,690	37	2	London Orbital and M23 to Gatwick	TRUE
LM366	M25 between M25 J9 Anti Clockwise and M25 J9 Anti Clockwise (LM366)	74,572	40	2	London Orbital and M23 to Gatwick	TRUE
LM298	M25 between M25 J10 and M25 J9 (LM298)	74,444	41	2	London Orbital and M23 to Gatwick	TRUE
LM311	M25 between M25 J16 and M25 J17 (LM311)	74,192	43	2	London Orbital and M23 to Gatwick	TRUE
LM364	M25 between M25 J9 and M25 J8 (LM364)	74,150	44	2	London Orbital and M23 to Gatwick	TRUE
LM363	M25 between M25 J8 and M25 J9 (LM363)	73,823	46	2	London Orbital and M23 to Gatwick	TRUE
LM314	M25 between M25 J18 and M25 J17 (LM314)	73,532	48	2	London Orbital and M23 to Gatwick	TRUE
LM297	M25 between M25 J9 and M25 J10 (LM297)	72,141	53	2	London Orbital and M23 to Gatwick	TRUE
LM365	M25 between M25 J9 Clockwise and M25 J9 Clockwise (LM365)	72,141	53	2	London Orbital and M23 to Gatwick	TRUE
LM323	M25 between M25 J20 and M25 J21 (LM323)	72,069	57	2	London Orbital and M23 to Gatwick	TRUE
LM312	M25 between M25 J17 and M25 J16 (LM312)	70,770	65	2	London Orbital and M23 to Gatwick	TRUE
LM331	M25 between M25 J23 and M25 J24 (LM331)	70,331	68	2	London Orbital and M23 to Gatwick	TRUE
LM360A	M25 between M25 J7 and M25 J6 (LM360A)	69,358	72	2	London Orbital and M23 to Gatwick	TRUE
LM332	M25 between M25 J24 and M25 J23 (LM332)	69,088	75	2	London Orbital and M23 to Gatwick	TRUE
LM1073	M25 between M25 J1A and M25 J1B (LM1073)	68,819	76	2	London Orbital and M23 to Gatwick	TRUE
LM324	M25 between M25 J21 and M25 J20 (LM324)	68,467	78	2	London Orbital and M23 to Gatwick	TRUE
LM321	M25 between M25 J19 and M25 J20 (LM321)	67,739	80	2	London Orbital and M23 to Gatwick	TRUE
LM359A	M25 between M25 J6 and M25 J7 (LM359A)	67,015	87	2	London Orbital and M23 to Gatwick	TRUE
LM329	M25 between M25 J22 and M25 J23 (LM329)	66,584	91	2	London Orbital and M23 to Gatwick	TRUE
LM333	M25 between M25 J24 and M25 J25 (LM333)	66,422	93	2	London Orbital and M23 to Gatwick	TRUE
LM334	M25 between M25 J25 and M25 J24 (LM334)	66,154	96	2	London Orbital and M23 to Gatwick	TRUE
LM345A	M25 between M25 J2 and M25 J3 (LM345A)	64,325	113	2	London Orbital and M23 to Gatwick	TRUE
LM360B	M25 between M25 J6 and M25 J5 (LM360B)	64,298	114	2	London Orbital and M23 to Gatwick	TRUE
LM336	M25 between M25 J26 and M25 J25 (LM336)	62,957	125	2	London Orbital and M23 to Gatwick	TRUE
LM339	M25 between M25 J27 and M25 J28 (LM339)	62,911	126	2	London Orbital and M23 to Gatwick	TRUE
LM330	M25 between M25 J23 and M25 J22 (LM330)	62,898	127	2	London Orbital and M23 to Gatwick	TRUE
LM335	M25 between M25 J25 and M25 J26 (LM335)	62,864	129	2	London Orbital and M23 to Gatwick	TRUE
LM337	M25 between M25 J26 and M25 J27 (LM337)	62,864	129	2	London Orbital and M23 to Gatwick	TRUE
LM327	M25 between M25 J21A and M25 J22 (LM327)	62,698	131	2	London Orbital and M23 to Gatwick	TRUE
LM340	M25 between M25 J28 and M25 J27 (LM340)	62,125	136	2	London Orbital and M23 to Gatwick	TRUE
LM346A	M25 between M25 J3 and M25 J2 (LM346A)	62,065	138	2	London Orbital and M23 to Gatwick	TRUE
LM341	M25 between M25 J28 and M25 J29 (LM341)	61,480	148	2	London Orbital and M23 to Gatwick	TRUE
LM359B	M25 between M25 J5 and M25 J6 (LM359B)	61,079	153	2	London Orbital and M23 to Gatwick	TRUE
LM322	M25 between M25 J20 and M25 J19 (LM322)	60,380	168	2	London Orbital and M23 to Gatwick	TRUE
LM338	M25 between M25 J27 and M25 J26 (LM338)	59,869	174	2	London Orbital and M23 to Gatwick	TRUE

A1.3.10

Monthly travel flows for the M23 and the M25 come from the Agency's TRADS database. Each route is broken down into sections and flows are available for all months. These are graphically presented below.

M25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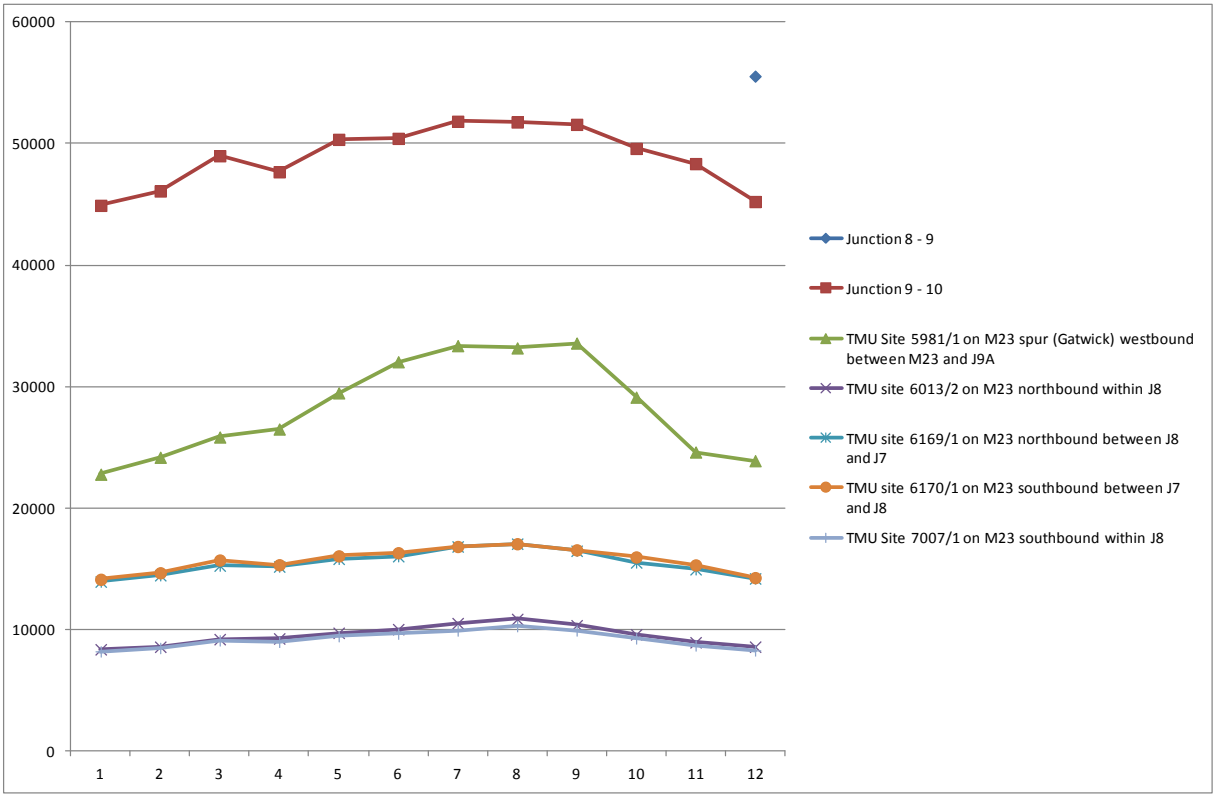
Hill Climbing Project Junction 27
Junction 15 - 16
Junction 15 Offslip to M4
Junction 15 Offslip to M4 (W)
Junction 15 Onslip (S) from M4 (E)
Junction 15 Onslip from M4
Junction 15 Onslip from M4 (E)
Junction 15 Onslip from M4 (W)
Junction 16 - 15
Junction 16 - 17
Junction 16 Offslip to M40 (EB)
Junction 16 Offslip to M40 (WB)
Junction 16(WB) to M25(AC) Onslip
Junction 17 - 16
Junction 17 after Offslip
Junction 17 before Onslip
Junction 18 - 19 Climbing Study
Junction 2 - 3
Junction 20 after Offslip

M23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Junction 8 - 9
Junction 9 - 10
TMU Site 5981/1 on M23 spur (Gatwick) westbound between M23 and J9A
TMU site 6013/2 on M23 northbound within J8
TMU site 6169/1 on M23 northbound between J8 and J7
TMU site 6170/1 on M23 southbound between J7 and J8
TMU Site 7007/1 on M23 southbound within J8

A1.3.11

An extract from the Agency's *Network Evidence Reports* showing M23 entries is shown below. Between junctions 8 and 9 the AADF is 57,709 clockwise and 57,190 counter clockwise, total two-way flow of 114,899. North of the of the junction with the M25, between junction 7 and 8 the AADF is 15,617 clockwise and 15,406 counter clockwise, total two-way flow of 31,025.

RoadLinkReference	RoadLinkDescription	AADF vehicles per day	AADF National Rank (out of 2475 road links - rank 1 is the busiest)	RBS Route Code	RBS Route Description	Current Road Link
LM292	M23 between M23 J8 and M23 J9 (LM292)	57,709	212	2	London Orbital and M23 to Gatwick	TRUE
LM291	M23 between M23 J9 and M23 J8 (LM291)	57,190	221	2	London Orbital and M23 to Gatwick	TRUE
LM294	M23 between M23 J9A and M23 J9 (LM294)	28,893	954	2	London Orbital and M23 to Gatwick	TRUE
LM293	M23 between M23 J9 and M23 J9A (LM293)	28,307	981	2	London Orbital and M23 to Gatwick	TRUE
LM290	M23 between M23 J7 and M23 J8 (LM290)	15,617	1,786	2	London Orbital and M23 to Gatwick	TRUE
LM289	M23 between M23 J8 and M23 J7 (LM289)	15,406	1,799	2	London Orbital and M23 to Gatwick	TRUE

A1.3.12

An extract from the Agency's *Network Evidence Reports* showing M1, M3, M4 and M11 entries is shown below.

On the M4, immediately within the M25 between junction 3 and 4, the AADF is 72,472 westbound and 71,778 eastbound, total two-way flow of 144,250.

The M1, between junctions 5 and 6, has a total two-way flow of 90,413 with 44,096 northbound and 46,317 southbound.

The M11, between junctions 4 and 5, has a total two-way flow of 87,921 with 45,770 northbound and 42,151 southbound.

The M3 has a total-two way flow of 57,006 between junctions 1 and 2. Southbound the AADF is 27,525 and northbound the AADF is 29,481.

RoadLinkReference	RoadLinkDescription	AADF vehicles per day	AADF National Rank (out of 2475 road links - rank 1 is the busiest)	RBS Route Code	RBS Route Description	Current Road Link
LM560	M4 between M4 J4 and M25 J15 (LM560)	80,392	21	2	London Orbital and M23 to Gatwick	TRUE
LM561	M4 between M25 J15 and M4 J4 (LM561)	79,281	24	2	London Orbital and M23 to Gatwick	TRUE
LM562	M4 between M4 J3 and M4 J4 (LM562)	72,472	51	2	London Orbital and M23 to Gatwick	TRUE
LM563	M4 between M4 J4 and M4 J3 (LM563)	71,778	59	2	London Orbital and M23 to Gatwick	TRUE
LM554	M4 between M4 J1 and M4 J2 (LM554)	51,149	342	2	London Orbital and M23 to Gatwick	TRUE
LM556	M4 between M4 J2 and M4 J3 (LM556)	51,149	342	2	London Orbital and M23 to Gatwick	TRUE
LM555	M4 between M4 J2 and M4 J1 (LM555)	47,711	404	2	London Orbital and M23 to Gatwick	TRUE
LM557	M4 between M4 J3 and M4 J2 (LM557)	46,945	414	2	London Orbital and M23 to Gatwick	TRUE
LM248	M1 between M1 J6 and M1 J5 (LM248)	46,317	432	2	London Orbital and M23 to Gatwick	TRUE
LM113	M11 between M11 J4 and M11 J5 (LM113)	45,770	443	2	London Orbital and M23 to Gatwick	TRUE
LM245	M1 between M1 J4 and M1 J5 (LM245)	44,105	488	2	London Orbital and M23 to Gatwick	TRUE
LM247	M1 between M1 J5 and M1 J6 (LM247)	44,096	489	2	London Orbital and M23 to Gatwick	TRUE
LM246	M1 between M1 J5 and M1 J4 (LM246)	43,564	503	2	London Orbital and M23 to Gatwick	TRUE
LM114	M11 between M11 J5 and M11 J4 (LM114)	42,151	543	2	London Orbital and M23 to Gatwick	TRUE
LM115	M11 between M11 J5 and M11 J6 (LM115)	37,729	657	2	London Orbital and M23 to Gatwick	TRUE
LM116	M11 between M11 J6 and M11 J5 (LM116)	36,426	693	2	London Orbital and M23 to Gatwick	TRUE
LM250	M1 between M1 J6A and M1 J6 (LM250)	36,011	711	2	London Orbital and M23 to Gatwick	TRUE
LM204	M1 between M1 J4 and M1 J2 (LM204)	35,636	727	2	London Orbital and M23 to Gatwick	TRUE
LM249	M1 between M1 J6 and M1 J6A (LM249)	35,395	734	2	London Orbital and M23 to Gatwick	TRUE
LM203	M1 between M1 J2 and M1 J4 (LM203)	35,285	737	2	London Orbital and M23 to Gatwick	TRUE
LM559	M4 between M4 J4 and M4 J4A (LM559)	29,875	912	2	London Orbital and M23 to Gatwick	TRUE
LM433	M3 between M3 J2 and M3 J1 (LM433)	29,481	931	2	London Orbital and M23 to Gatwick	TRUE
LM434	M3 between M3 J1 and M3 J2 (LM434)	27,525	1,009	2	London Orbital and M23 to Gatwick	TRUE
LM558	M4 between M4 J4A and M4 J4 (LM558)	27,404	1,018	2	London Orbital and M23 to Gatwick	TRUE
LM201	M1 between M1 J1 and M1 J2 (LM201)	23,239	1,250	2	London Orbital and M23 to Gatwick	TRUE
LM202	M1 between M1 J2 and M1 J1 (LM202)	22,923	1,274	2	London Orbital and M23 to Gatwick	TRUE

A1.3.13

An extract from the Agency's *Network Evidence Reports* showing A13 and A1089 entries is shown below. The total two-way flow at junction 30, between the M25 and the A13, is 101,622: 51,536 from the A126 to the M25 and 50,886 going from the M25 to A126.

RoadLinkReference	RoadLinkDescription	AADF vehicles per day	AADF National Rank (out of 2475 road links - rank 1 is the busiest)	RBS Route Code	RBS Route Description	Current Road Link
AL2324	A13 between A126 and M25 J30 (AL2324)	51,536	331	2	London Orbital and M23 to Gatwick	TRUE
AL2325	A13 between M25 J30 and A126 (AL2325)	50,086	362	2	London Orbital and M23 to Gatwick	TRUE
AL1837	A13 between A1012 and A1089 (AL1837)	43,605	502	2	London Orbital and M23 to Gatwick	TRUE
AL1835	A13 between A1089 and A1012 (AL1835)	43,199	517	2	London Orbital and M23 to Gatwick	TRUE
AL1645	A13 between A1306 and M25 J30 (AL1645)	41,906	549	2	London Orbital and M23 to Gatwick	TRUE
AL1644	A13 between M25 J30 and A1306 (AL1644)	40,657	591	2	London Orbital and M23 to Gatwick	TRUE
AL1827	A13 between A1012 and A126 (AL1827)	38,517	634	2	London Orbital and M23 to Gatwick	TRUE
AL1829	A13 between A126 and A1012 (AL1829)	36,295	697	2	London Orbital and M23 to Gatwick	TRUE
AL3780	A1089 between A126 and Tilbury (AL3780)	12,748	1,969	2	London Orbital and M23 to Gatwick	TRUE
AL3781	A1089 between Tilbury and A126 (AL3781)	12,725	1,971	2	London Orbital and M23 to Gatwick	TRUE
AL1832A	A1089 between A13 and A126 (AL1832A)	11,114	2,071	2	London Orbital and M23 to Gatwick	TRUE
AL1838A	A1089 between A126 and A13 (AL1838A)	10,355	2,128	2	London Orbital and M23 to Gatwick	TRUE

A1.3.14

An extract from the Agency's *Network Evidence Reports* is shown below, showing those M25 links with the highest proportion of goods vehicle traffic. On the M25 between junction 26 and 27 clockwise freight traffic is 38% of all traffic and counter clockwise it is 50% of all traffic. From junction 21a to 27 goods vehicles account for an average of 26% of all traffic.

RoadLinkReference	RoadLinkDescription	Goods vehicles (>5.2m long) as a proportion of all traffic
LM338	M25 between M25 J27 and M25 J26 (LM338)	50%
LM330	M25 between M25 J23 and M25 J22 (LM330)	38%
LM329	M25 between M25 J22 and M25 J23 (LM329)	38%
LM327	M25 between M25 J21A and M25 J22 (LM327)	31%
LM332	M25 between M25 J24 and M25 J23 (LM332)	29%
LM333	M25 between M25 J24 and M25 J25 (LM333)	22%
LM334	M25 between M25 J25 and M25 J24 (LM334)	21%
LM335	M25 between M25 J25 and M25 J26 (LM335)	20%
LM337	M25 between M25 J26 and M25 J27 (LM337)	20%
LM336	M25 between M25 J26 and M25 J25 (LM336)	20%
LM331	M25 between M25 J23 and M25 J24 (LM331)	19%

Comments on congestion refer to the Agency's plan of vehicle delay, which is presented in A2.1.5 to A2.1.16 below.

A1.3.15

Data on daily flows and holiday periods for the M23 came from the Agency's TRADS data.

A1.3.16

An extract from the Agency's *Network Evidence Reports* is shown below, showing goods vehicle traffic on the A1089 and A13. On the A1089 between A126 and A13 goods vehicles are 32% of all traffic. In the reverse direction they are 29% of all traffic. On the A13 between the A1089 and the A1012 it is 18% and in the reverse direction it is 17%.

RoadLinkReference	RoadLinkDescription	Goods vehicles (>5.2m long) as a proportion of all traffic
AL1838A	A1089 between A126 and A13 (AL1838A)	32%
AL1832A	A1089 between A13 and A126 (AL1832A)	29%
AL3781	A1089 between Tilbury and A126 (AL3781)	25%
AL3780	A1089 between A126 and Tilbury (AL3780)	25%
AL1829	A13 between A126 and A1012 (AL1829)	20%
AL1644	A13 between M25 J30 and A1306 (AL1644)	20%
AL1645	A13 between A1306 and M25 J30 (AL1645)	18%
AL1835	A13 between A1089 and A1012 (AL1835)	18%
AL1827	A13 between A1012 and A126 (AL1827)	18%
AL2325	A13 between M25 J30 and A126 (AL2325)	18%
AL2324	A13 between A126 and M25 J30 (AL2324)	17%
AL1837	A13 between A1012 and A1089 (AL1837)	17%

A2 Route capability, condition and constraints

A2.1 Route performance

Table 2.1

This shows data from the Agency's *Network Evidence Reports*.

A2.1.3

Extracts from the Agency's *Network Evidence Reports* are shown below, showing goods vehicle traffic on various road links on the route.

RoadLinkReference	RoadLinkDescription	Goods vehicles (>5.2m long) as a proportion of all traffic	Goods Vehicle Rank (out of 1977 road links - rank 1 has highest Goods traffic proportion)	Flow_Bin1 vehicles (<5.2m long) as a proportion of all traffic	Flow_Bin2 vehicles (5.2m to 6.6m long) as a proportion of all traffic	Flow_Bin3 vehicles (6.6m to 11.6m long) as a proportion of all traffic	Flow_Bin4 vehicles (>11.6m long) as a proportion of all traffic	RBS Route Code
LM344	M25 between M25 J30 and M25 J29 (LM344)	29%	164	71%	9%	5%	15%	2
LM1072	M25 between M25 J1B and M25 J1A (LM1072)	28%	182	72%	6%	6%	16%	2
LM343	M25 between M25 J29 and M25 J30 (LM343)	25%	277	75%	5%	5%	15%	2
LM350	M25 between M25 J31 and M25 J30 (LM350)	25%	287	75%	7%	6%	13%	2
LM320A	M25 between M25 J2 and M25 J1B (LM320A)	23%	344	77%	5%	5%	13%	2
LM1073	M25 between M25 J1A and M25 J1B (LM1073)	23%	373	77%	6%	5%	11%	2
LM319A	M25 between M25 J1B and M25 J2 (LM319A)	21%	490	79%	4%	4%	12%	2

RoadLinkReference	RoadLinkDescription	Goods vehicles (>5.2m long) as a proportion of all traffic	Goods Vehicle Rank (out of 1977 road links - rank 1 has highest Goods traffic proportion)	Flow_Bin1 vehicles (<5.2m long) as a proportion of all traffic	Flow_Bin2 vehicles (5.2m to 6.6m long) as a proportion of all traffic	Flow_Bin3 vehicles (6.6m to 11.6m long) as a proportion of all traffic	Flow_Bin4 vehicles (>11.6m long) as a proportion of all traffic	RBS Route Code
AL1838A	A1089 between A126 and A13 (AL1838A)	32%	86	68%	7%	6%	20%	2
AL1832A	A1089 between A13 and A126 (AL1832A)	29%	151	71%	5%	5%	18%	2
AL3781	A1089 between Tilbury and A126 (AL3781)	25%	286	75%	5%	5%	16%	2
AL3780	A1089 between A126 and Tilbury (AL3780)	25%	298	75%	4%	5%	16%	2

RoadLinkReference	RoadLinkDescription	AADF vehicles per day	AADF National Rank (out of 2475 road links - rank 1 is the busiest)
LM292	M23 between M23 J8 and M23 J9 (LM292)	57,709	212
LM291	M23 between M23 J9 and M23 J8 (LM291)	57,190	221
LM294	M23 between M23 J9A and M23 J9 (LM294)	28,893	954
LM293	M23 between M23 J9 and M23 J9A (LM293)	28,307	981
LM290	M23 between M23 J7 and M23 J8 (LM290)	15,617	1,786
LM289	M23 between M23 J8 and M23 J7 (LM289)	15,406	1,799

RoadLinkReference	RoadLinkDescription	Goods vehicles (>5.2m long) as a proportion of all traffic	Goods Vehicle Rank (out of 1977 road links - rank 1 has highest Goods traffic proportion)	Flow_Bin1 vehicles (<5.2m long) as a proportion of all traffic	Flow_Bin2 vehicles (5.2m to 6.6m long) as a proportion of all traffic	Flow_Bin3 vehicles (6.6m to 11.6m long) as a proportion of all traffic	Flow_Bin4 vehicles (>11.6m long) as a proportion of all traffic
LM290	M23 between M23 J7 and M23 J8 (LM290)	13%	1358	87%	6%	4%	3%
LM289	M23 between M23 J8 and M23 J7 (LM289)	13%	1380	87%	6%	4%	3%
LM291	M23 between M23 J9 and M23 J8 (LM291)	13%	1387	87%	6%	4%	3%
LM292	M23 between M23 J8 and M23 J9 (LM292)	12%	1637	88%	5%	4%	3%
LM294	M23 between M23 J9A and M23 J9 (LM294)	8%	1945	92%	4%	2%	2%
LM293	M23 between M23 J9 and M23 J9A (LM293)	8%	1950	92%	4%	2%	2%

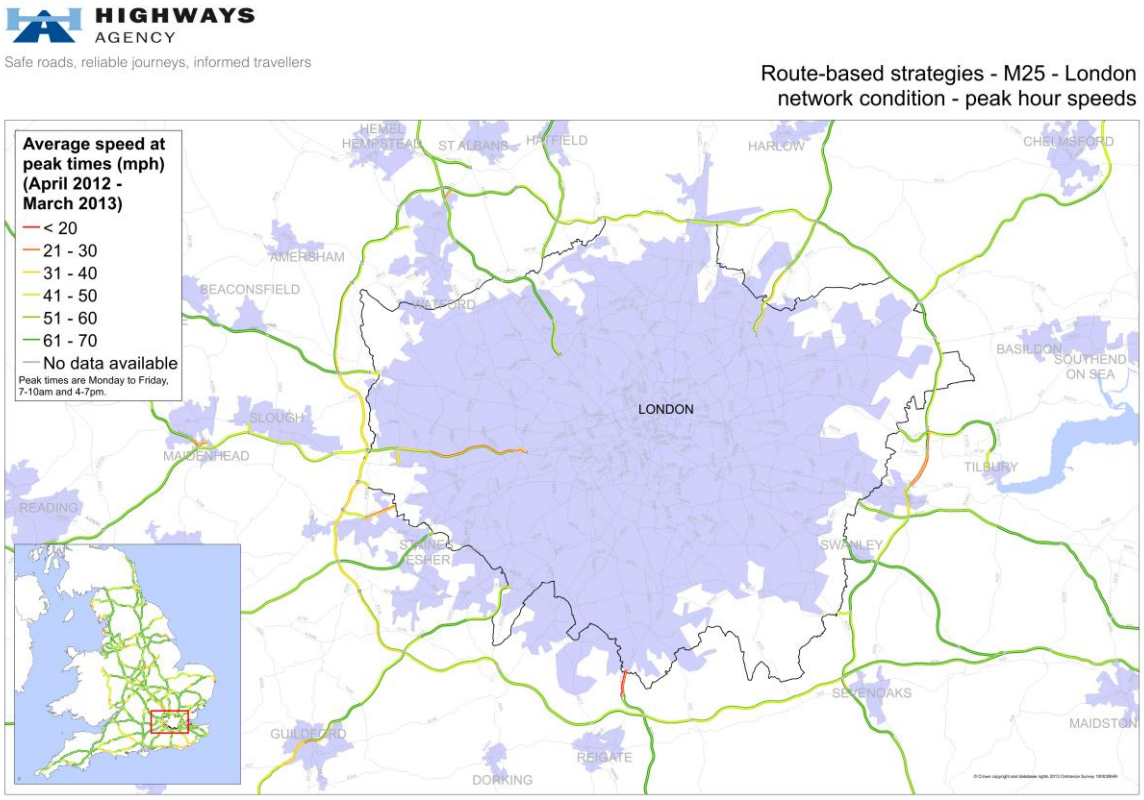
RoadLinkReference	RoadLinkDescription	Goods vehicles (>5.2m long) as a proportion of all traffic	Goods Vehicle Rank (out of 1977 road links - rank 1 has highest Goods traffic proportion)	Flow_Bin1 vehicles (<5.2m long) as a proportion of all traffic	Flow_Bin2 vehicles (5.2m to 6.6m long) as a proportion of all traffic	Flow_Bin3 vehicles (6.6m to 11.6m long) as a proportion of all traffic	Flow_Bin4 vehicles (>11.6m long) as a proportion of all traffic
LM248	M1 between M1 J6 and M1 J5 (LM248)	23%	377	77%	12%	7%	4%
LM562	M4 between M4 J3 and M4 J4 (LM562)	20%	595	80%	14%	4%	2%
LM247	M1 between M1 J5 and M1 J6 (LM247)	19%	629	81%	11%	5%	4%
LM557	M4 between M4 J3 and M4 J2 (LM557)	17%	793	83%	14%	3%	1%
LM563	M4 between M4 J4 and M4 J3 (LM563)	17%	811	83%	12%	4%	2%
AL2214	A3113 between A3044 and M25 J14 (AL2214)	17%	841	83%	5%	7%	5%
AL2213	A3113 between M25 J14 and A3044 (AL2213)	17%	843	83%	5%	7%	5%
LM115	M11 between M11 J5 and M11 J6 (LM115)	16%	899	84%	7%	5%	5%
LM201	M1 between M1 J1 and M1 J2 (LM201)	16%	931	84%	6%	5%	4%
LM116	M11 between M11 J6 and M11 J5 (LM116)	16%	959	84%	6%	5%	5%
LM202	M1 between M1 J2 and M1 J1 (LM202)	16%	967	84%	6%	5%	4%
AL2341	A2 between A2018 and M25 J2 (AL2341)	15%	1006	85%	8%	4%	3%
LM113	M11 between M11 J4 and M11 J5 (LM113)	15%	1033	85%	7%	5%	4%
LM114	M11 between M11 J5 and M11 J4 (LM114)	15%	1048	85%	6%	5%	4%
LM204	M1 between M1 J4 and M1 J2 (LM204)	15%	1105	85%	6%	5%	4%
LM246	M1 between M1 J5 and M1 J4 (LM246)	14%	1144	86%	7%	5%	3%
LM203	M1 between M1 J2 and M1 J4 (LM203)	14%	1196	86%	6%	5%	3%
AL3154	A23 between M23 J7 and A23 (AL3154)	14%	1319	86%	7%	4%	3%
AL2467	A1 between M25 J23 and A5135 (AL2467)	13%	1367	87%	6%	4%	2%
AL2468	A1 between A5135 and M25 J23 (AL2468)	13%	1374	87%	6%	4%	2%
AL644	A3 between A245 and M25 J10 (AL644)	12%	1519	88%	6%	3%	3%
AL1702	A3 between A423 and A309 (AL1702)	12%	1548	88%	8%	3%	1%
AL2338	A2 between A2 and A2018 (AL2338)	12%	1594	88%	6%	4%	2%
AL2340	A2 between M25 J2 and A2018 (AL2340)	12%	1613	88%	6%	4%	2%
AL1310	A405 between M1 J6 and M25 J21a (AL1310)	11%	1686	89%	4%	4%	3%
AL3155	A23 between A23 and M23 J7 (AL3155)	11%	1700	89%	5%	4%	2%
AL1640	A20 between M25 J3 and A20 (AL1640)	11%	1708	89%	6%	4%	2%
AL1311	A405 between M25 J21a and M1 J6 (AL1311)	11%	1709	89%	4%	4%	3%
AL1641	A20 between A20 and M25 J3 (AL1641)	11%	1730	89%	5%	3%	2%
AL790	A30 between A3044 and A30 (AL790)	11%	1732	89%	4%	4%	2%
AL792	A30 between A3044 and M25 J13 (AL792)	10%	1760	90%	4%	4%	2%
AL647	A3 between M25 J10 and A245 (AL647)	10%	1769	90%	4%	3%	2%
LM434	M3 between M3 J1 and M3 J2 (LM434)	10%	1774	90%	4%	4%	2%
AL1768	A30 between M25 J13 and A3044 (AL1768)	10%	1775	90%	4%	4%	2%
LM433	M3 between M3 J2 and M3 J1 (LM433)	10%	1782	90%	4%	4%	2%
LM245	M1 between M1 J4 and M1 J5 (LM245)	10%	1786	90%	4%	3%	2%
AL789	A30 between A30 and A3044 (AL789)	10%	1825	90%	4%	4%	2%
LM554	M4 between M4 J1 and M4 J2 (LM554)	10%	1834	90%	6%	3%	1%
LM556	M4 between M4 J2 and M4 J3 (LM556)	10%	1834	90%	6%	3%	1%
AL1699	A3 between A309 and A244 (AL1699)	10%	1844	90%	5%	3%	1%
AL2339	A2 between A2018 and A2 (AL2339)	10%	1845	90%	6%	4%	0%
AL1700	A3 between A244 and A309 (AL1700)	9%	1861	91%	5%	3%	1%
AL1745A	A23 between M23 J9A and A23 (AL1745A)	9%	1866	91%	4%	3%	2%
AL1697	A3 between A244 and A245 (AL1697)	9%	1897	91%	4%	3%	1%
AL1747A	A23 between A23 and M23 J9A (AL1747A)	9%	1909	91%	4%	3%	2%
AL1698	A3 between A245 and A244 (AL1698)	9%	1914	91%	4%	3%	1%
AL1770	A316 between A316 and M3 J1 (AL1770)	9%	1923	91%	4%	3%	2%
AL1769	A316 between M3 J1 and A316 (AL1769)	9%	1928	91%	4%	3%	2%
LM558	M4 between M4 J4A and M4 J4 (LM558)	8%	1946	92%	4%	3%	2%
LM559	M4 between M4 J4 and M4 J4A (LM559)	8%	1961	92%	4%	3%	1%
LM555	M4 between M4 J2 and M4 J1 (LM555)	7%	1965	93%	4%	2%	1%

Table 2.2

This shows data from the Agency's *Network Evidence Reports*.

A2.1.8 to A2.1.13

Speed information is based on the Agency's plan that follows. It shows the average speeds (in mph) during the weekday peak hours (7am-10am and 4pm to 7pm) from April 2012 to March 2013. Peak hours are averaged out, so slower speeds in one direction, for instance into London, could be averaged out by faster speeds during the other peak period. It does not necessarily show the busiest (highest traffic flows) parts of the route, but those where speeds are low. Speeds need to be compared to the speed limit of the road, for example a road link may be shown in red and having an average speed of 20-30pmh, but the speed limit on the road may be 30mph, so is not actually an issue.



Possible causes of poor peak hour speeds have been discussed with the Agency's South East Regional Intelligence Unit. The most relevant comments are included in the main report, with a more comprehensive extract below:

M25 Junctions 10-16, both directions

(i) The six-lane section between junctions 14 and 15 is not operating efficiently in either direction. In the northbound direction, a possible cause may be that three of the lanes are diverges, with only three through lanes. The reverse is true for the southbound direction with merging movements. The merge from M4 at junction 15 may be causing a knock-on effect upstream impacting on peak hour speeds, based on microsimulation modelling undertaken in previous years.

(ii) Junctions 13 to 12 southbound is also operating inefficiently, likely due to a large diverge to the M3 within this section.

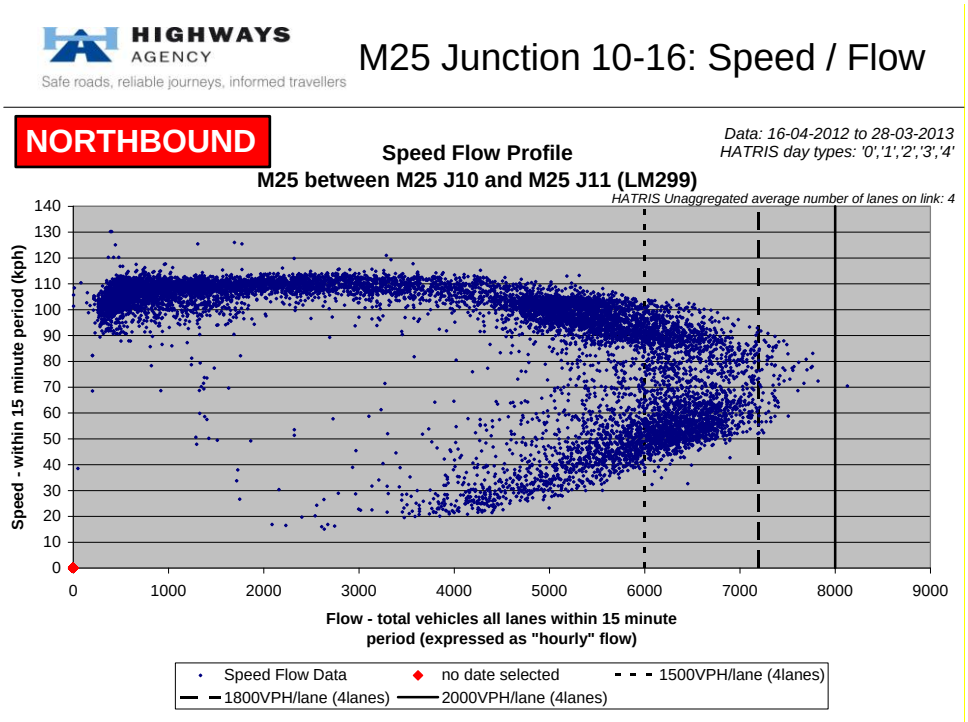
(iii) In general, lanes that are reserved for diverges, for example lane drops on approach to major junctions, tend to be more prone to flow breakdowns.

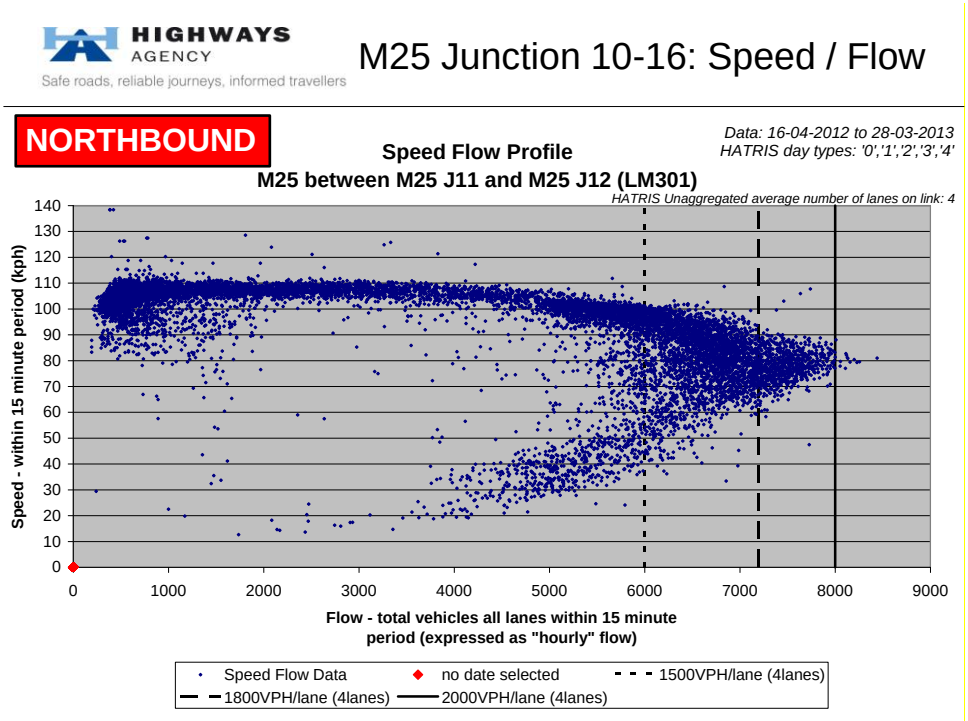
(iv) It is not thought that single hops to adjacent junctions would impact on overall network performance. Indeed the movement itself may be efficient as the vehicles are more likely to remain on the nearside lane(s).

(v) Data for some sections, particularly junctions 12 to 13 northbound, shows a gap in the speed flow curve indicating sudden breakdown of traffic, rather than a gradual deterioration. This would appear logical where there is a high traffic flow joining a busy mainline with extensive weaving, eg M3 to M25. The same breakdown is not immediately apparent at junctions 15 to

16, where there are flow breakdown issues further upstream at junctions 14 to 15.

Speed flow profiles for M25 junctions 10 to 16 in both directions are shown below:





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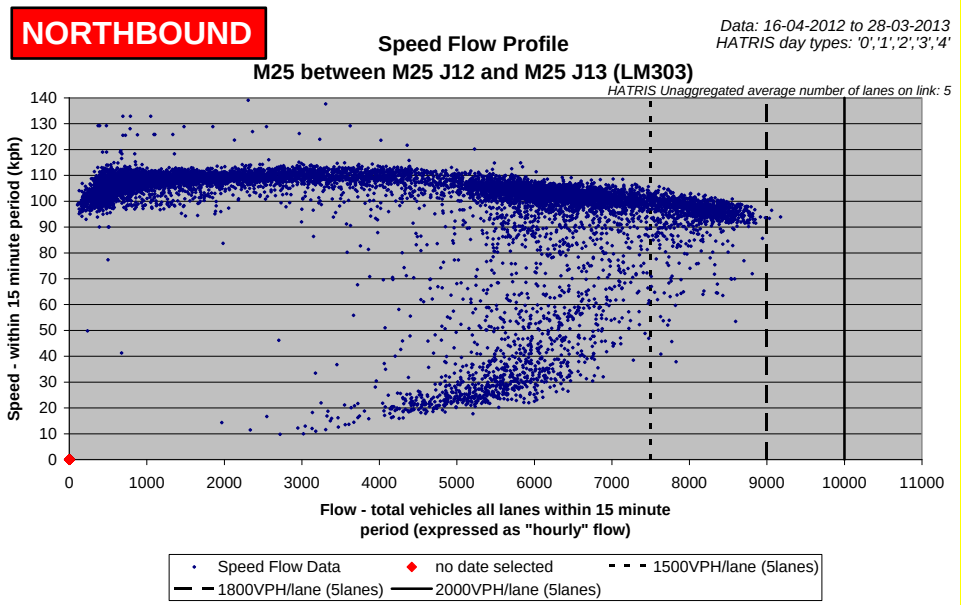
M25 Junction 10-16: Speed / Flow



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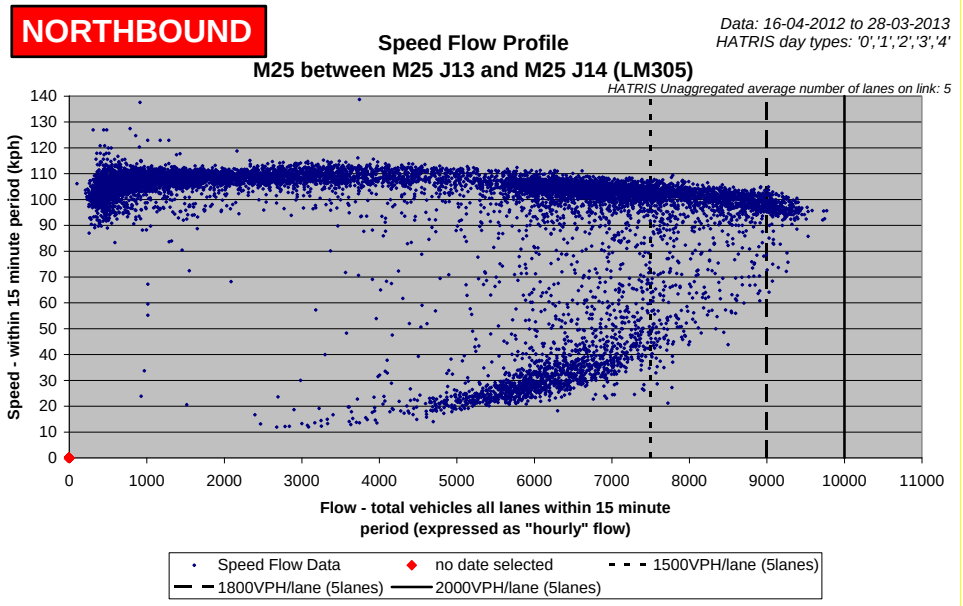
M25 Junction 10-16: Speed / Flow



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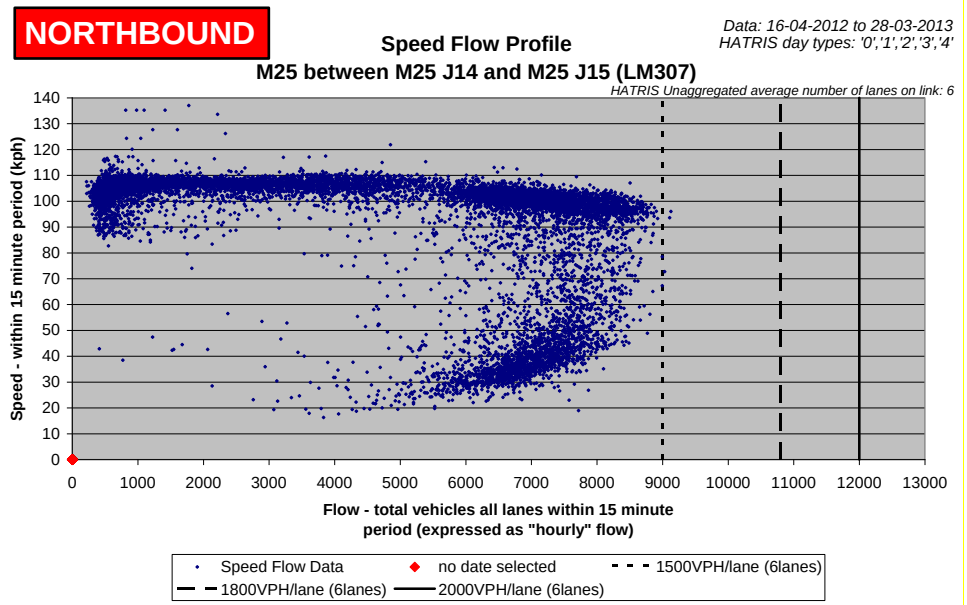
M25 Junction 10-16: Speed / Flow



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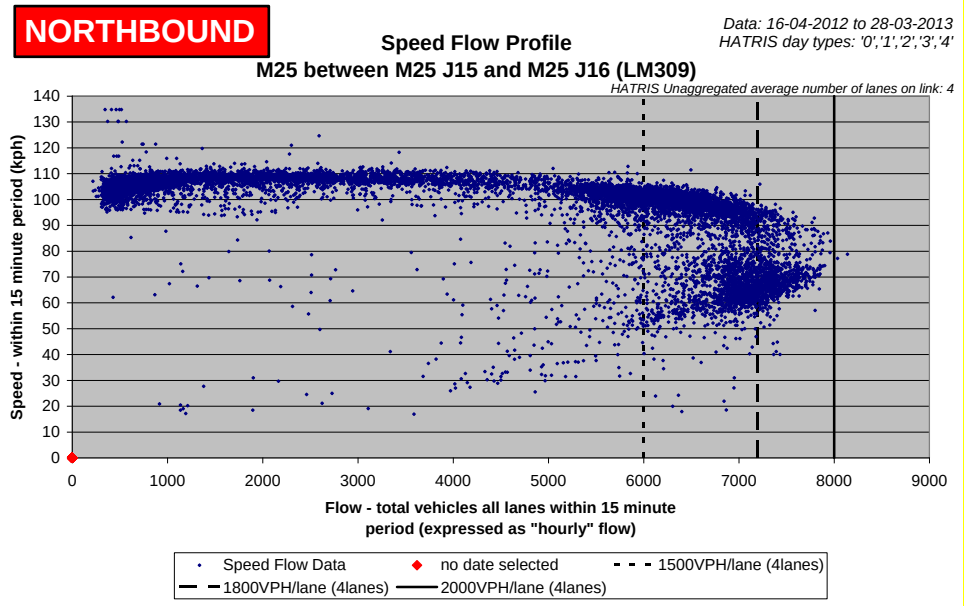
M25 Junction 10-16: Speed / Flow



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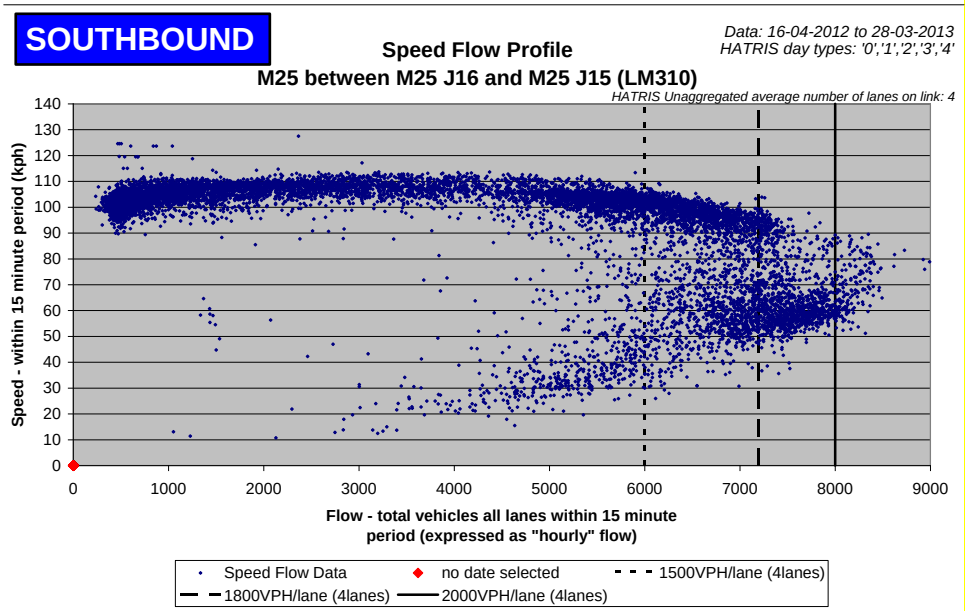
M25 Junction 10-16: Speed / Flow

SOUTHBOUND



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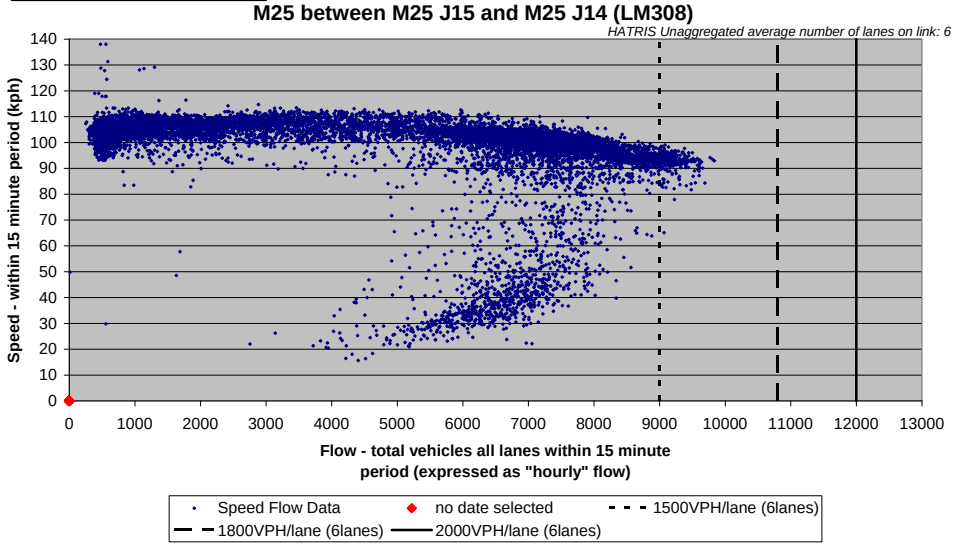
M25 Junction 10-16: Speed / Flow

SOUTHBOUND



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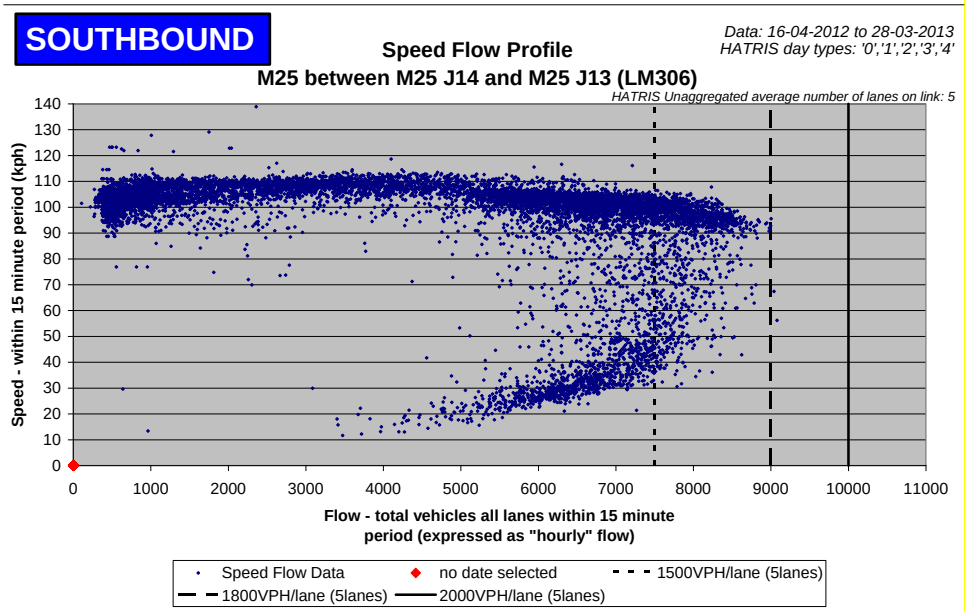
M25 Junction 10-16: Speed / Flow

SOUTHBOUND



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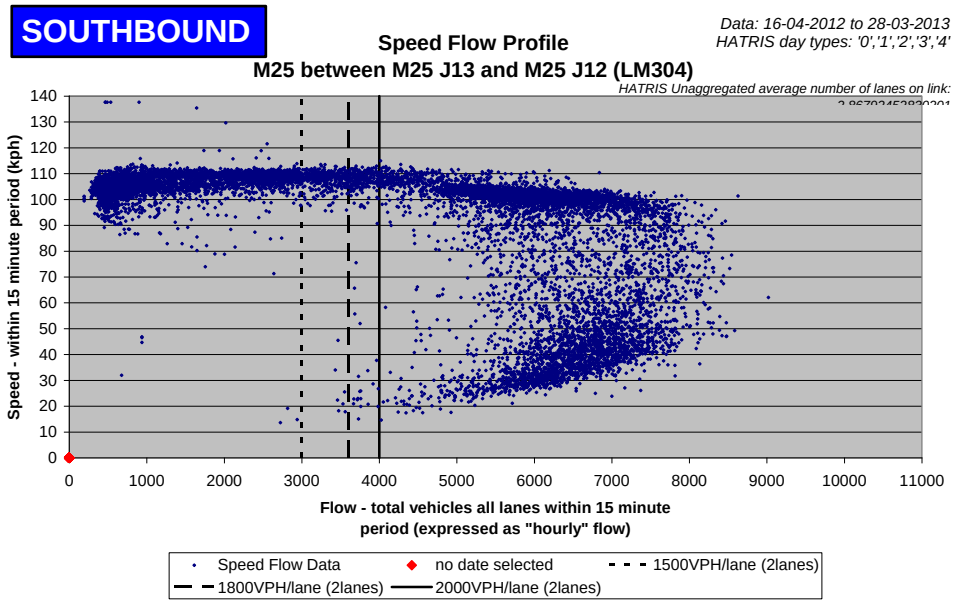
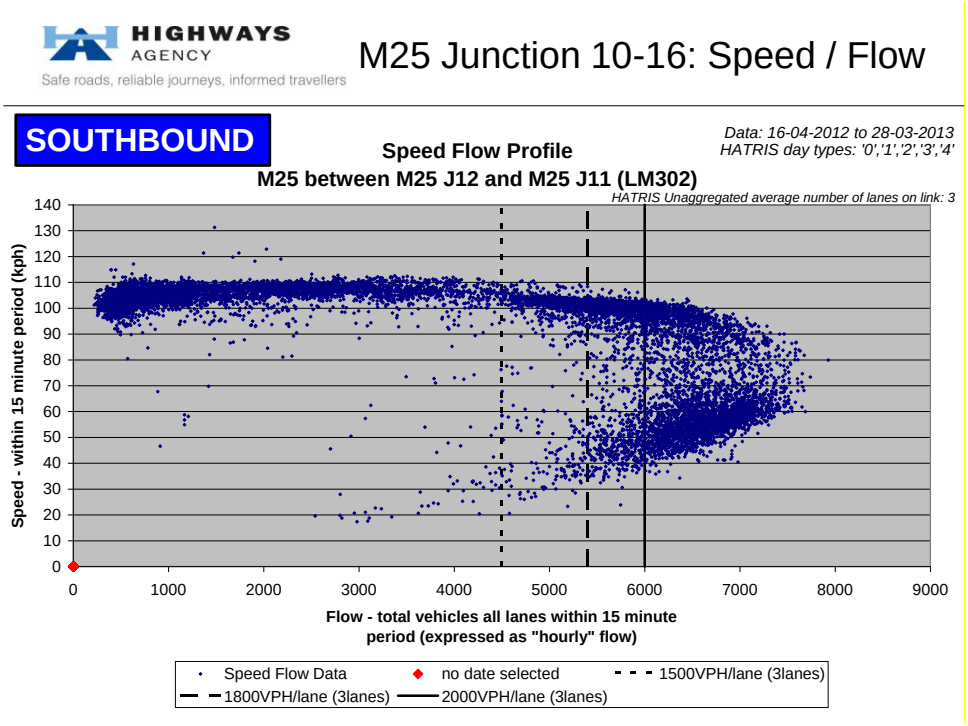
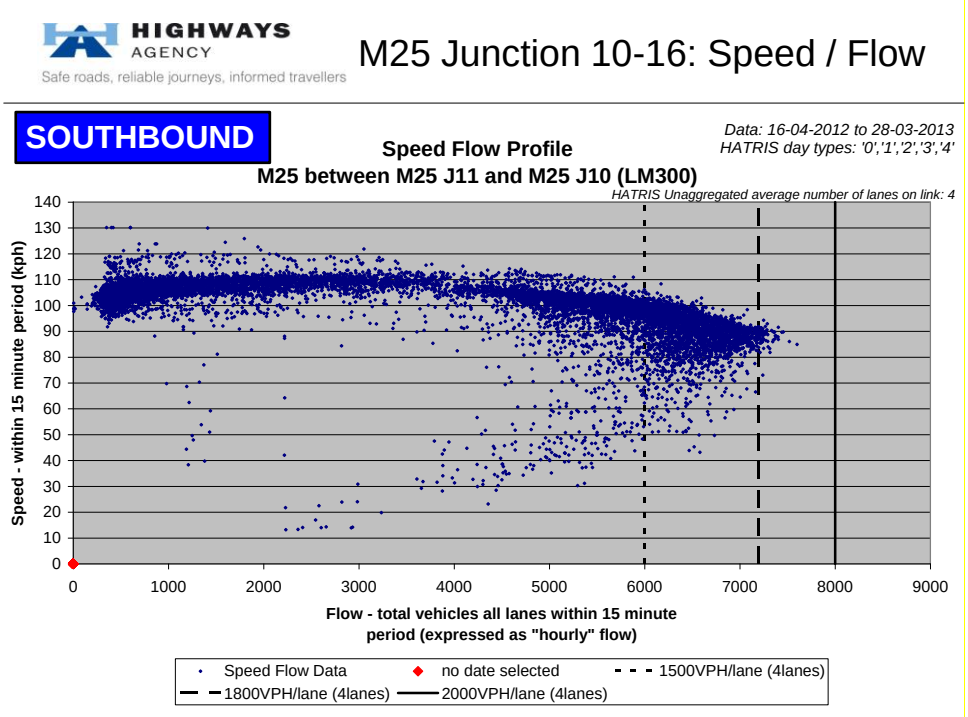
M25 Junction 10-16: Speed / Flow

SOUTHBOUND







M25 Junctions 5-6, both directions

Speed/ flow data indicates that roadworks have had a significant effect in reducing speeds, although the flow has been efficient, with no apparent evidence of flow breakdown.

However, the data also shows a significant drop in performance at peak hours even without the roadworks. For the westbound direction, a possible cause may be the high volume of traffic joining from the M26 and the A21. Another contributing factor may be that the positioning of HGVs through junction 5 travelling clockwise may have

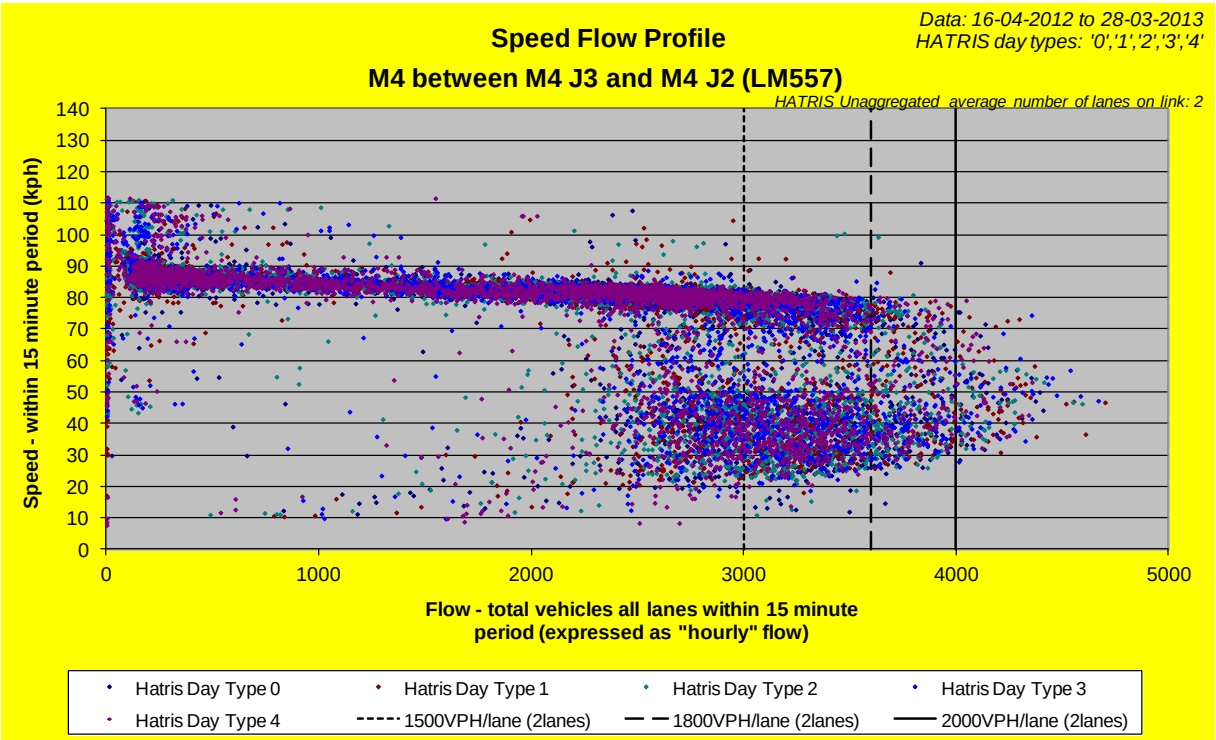
an effect on other traffic, causing it to travel at a similar speed. For the eastbound direction, the drop in performance is less severe, and the possible causes are not clear.

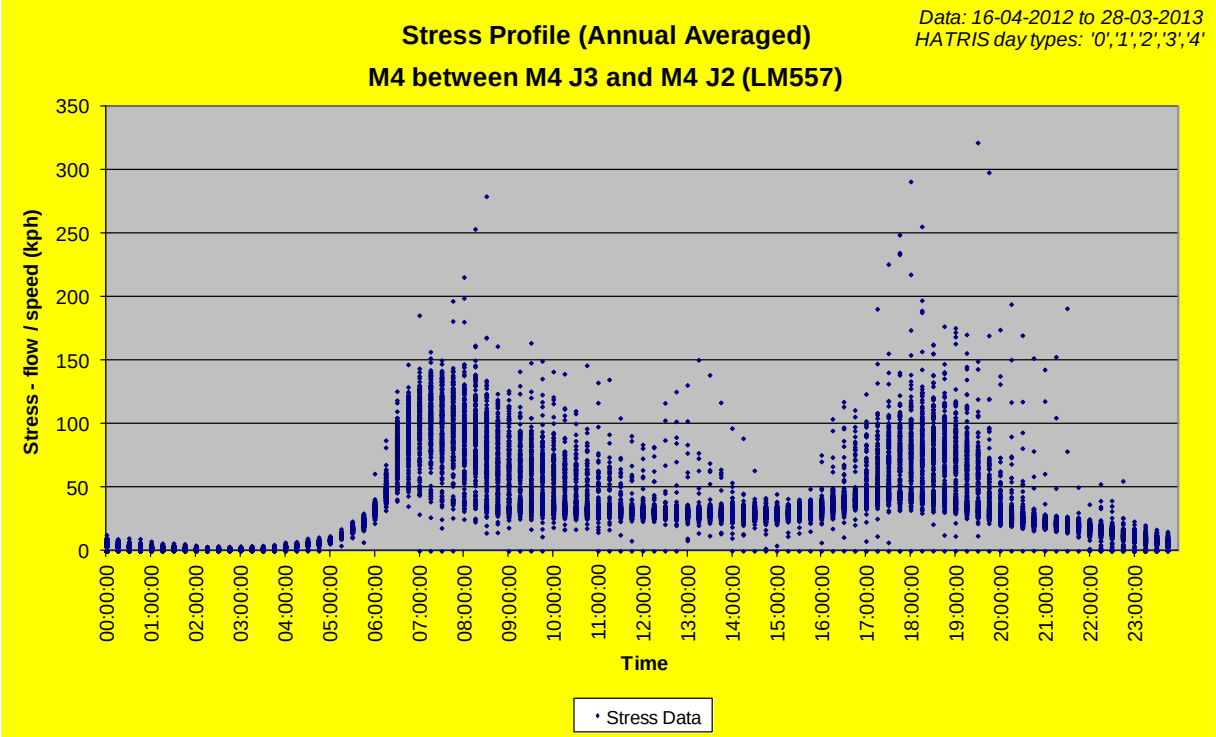
M11 junctions 5-4, southbound

Speed/ flow data indicates that traffic throughput remains efficient as it approaches the A406 North Circular Road, where the speed limit reduces. Flow breakdown does not appear to be a significant issue.

M4 junctions 3-2 eastbound

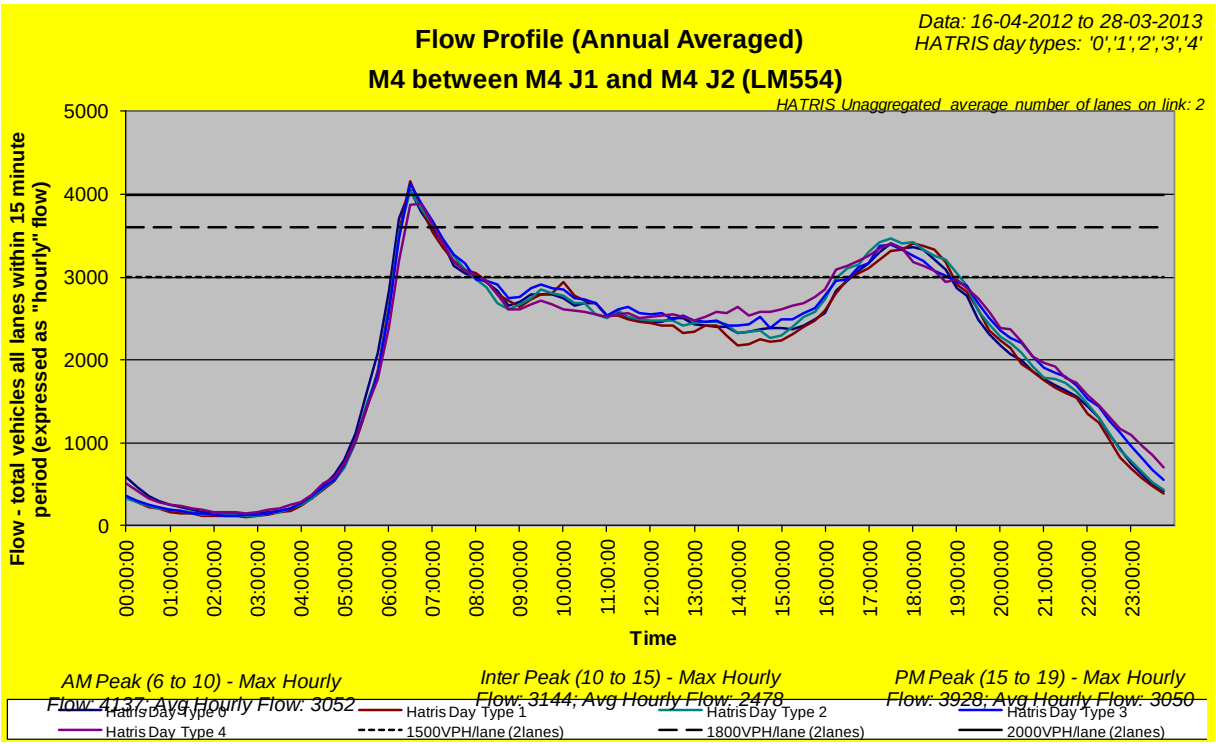
Speed/ flow data indicates that there are flow breakdowns, but tend to be unpredictable with no clear cause. This suggests unreliable congestion and is consistent with reports on network performance received by RIU throughout 2013. These reports have indicated that journey time reliability performance on this link is deteriorating. Traffic profiles of this section are shown in the graphs that follow.

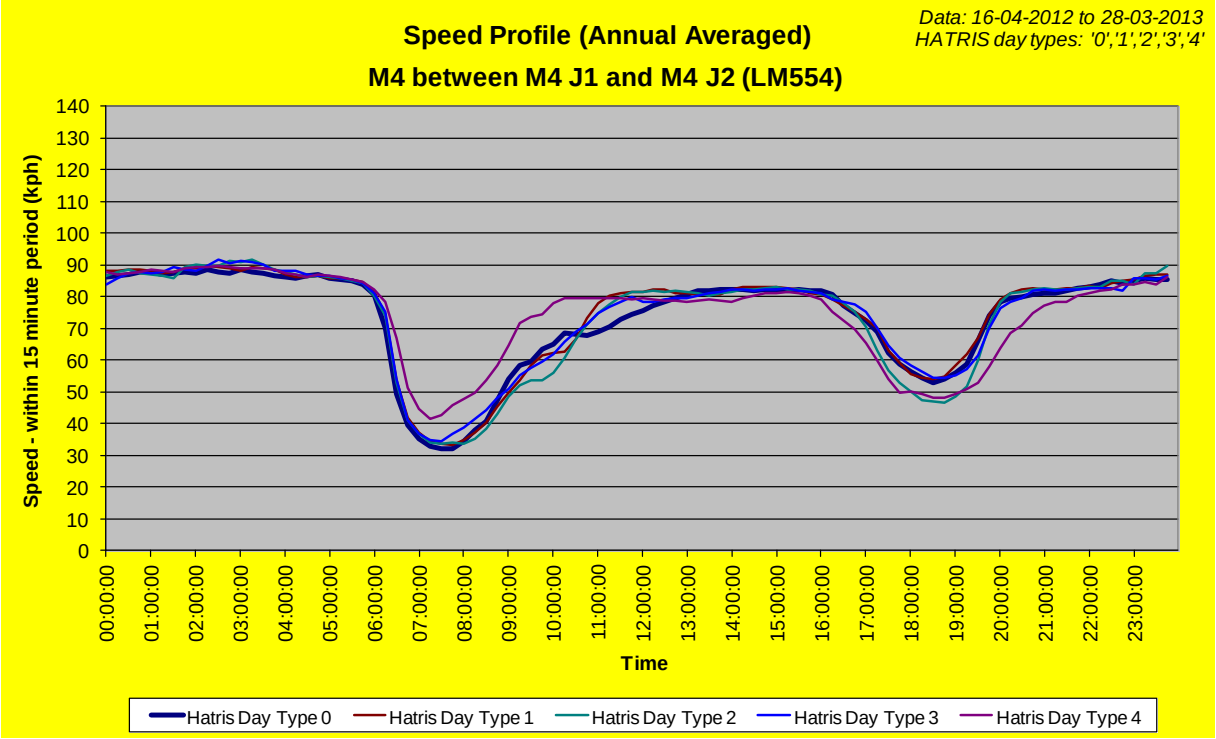


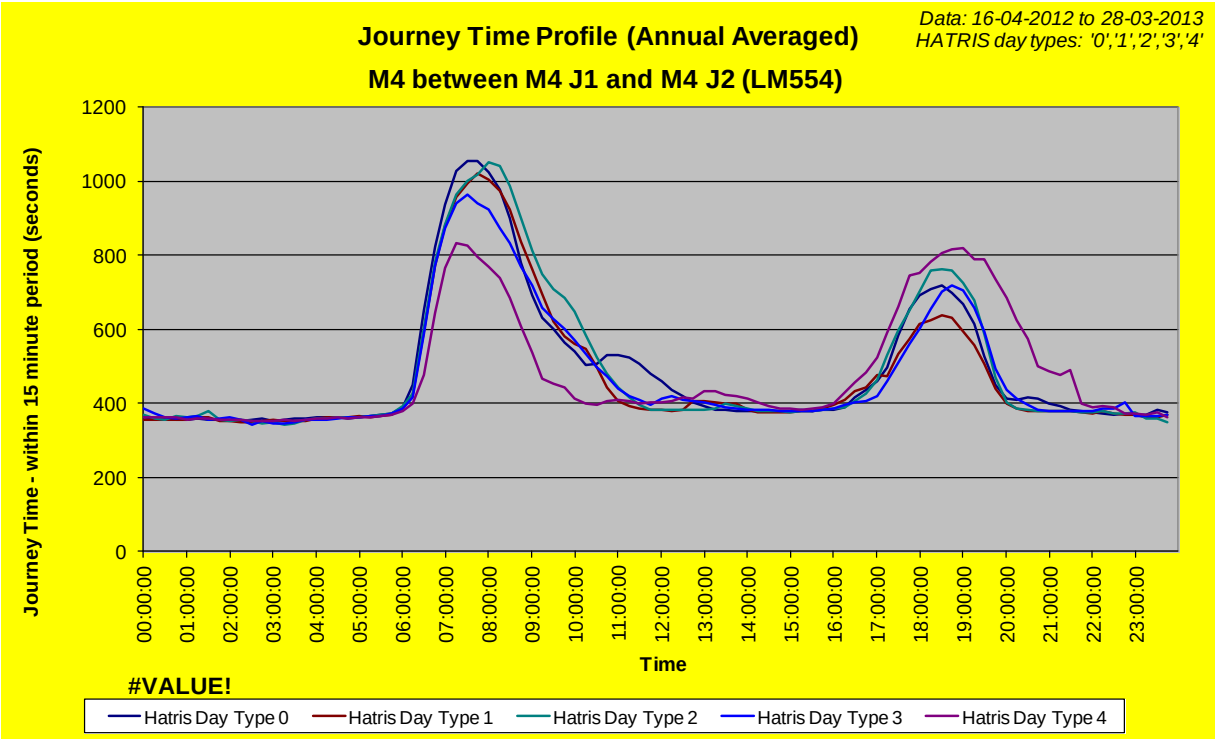


M4 junctions 1-2 westbound

Similar to the above, in addition there is no bottleneck along the route to explain the congestions observed in the westbound direction. Traffic profiles of this section are shown in graphs that follow.

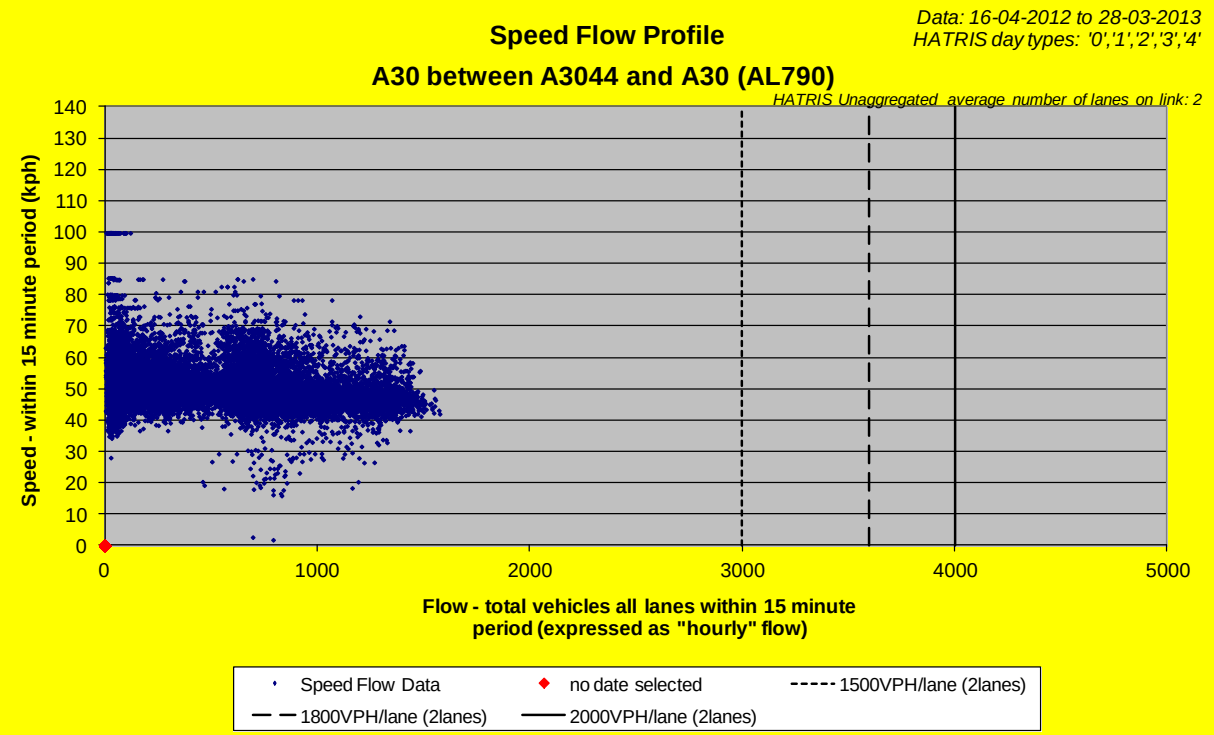


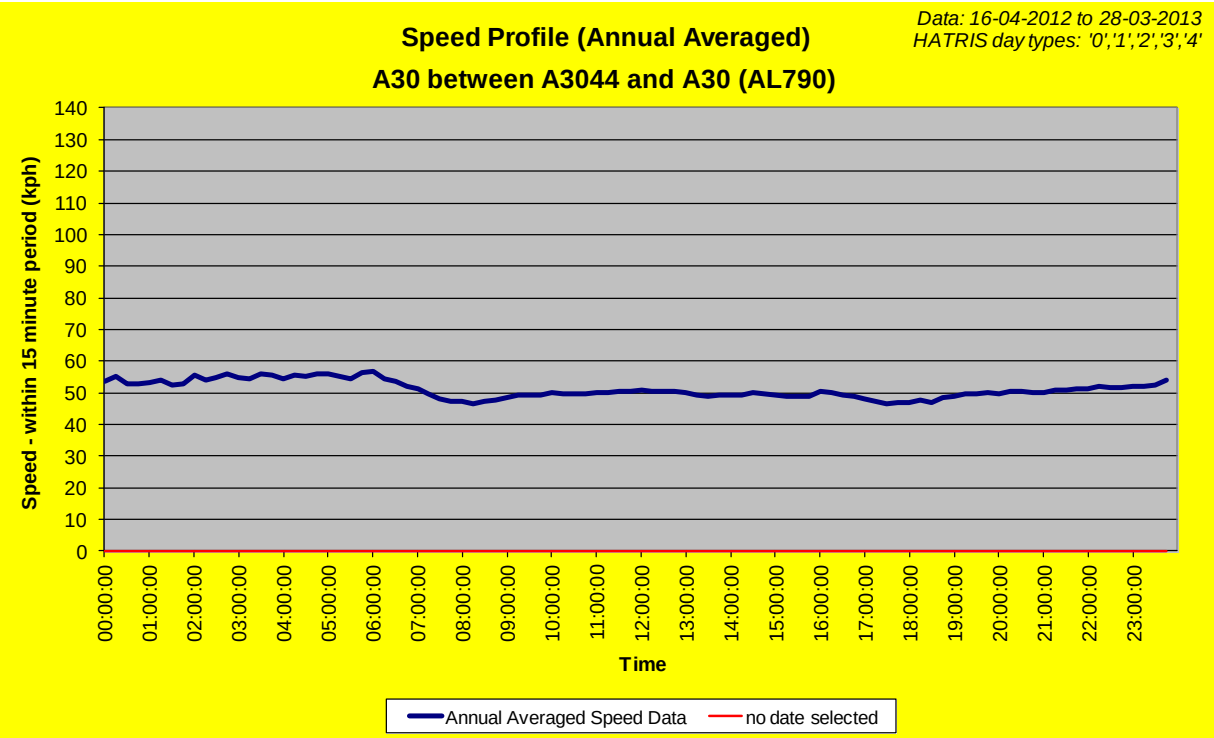


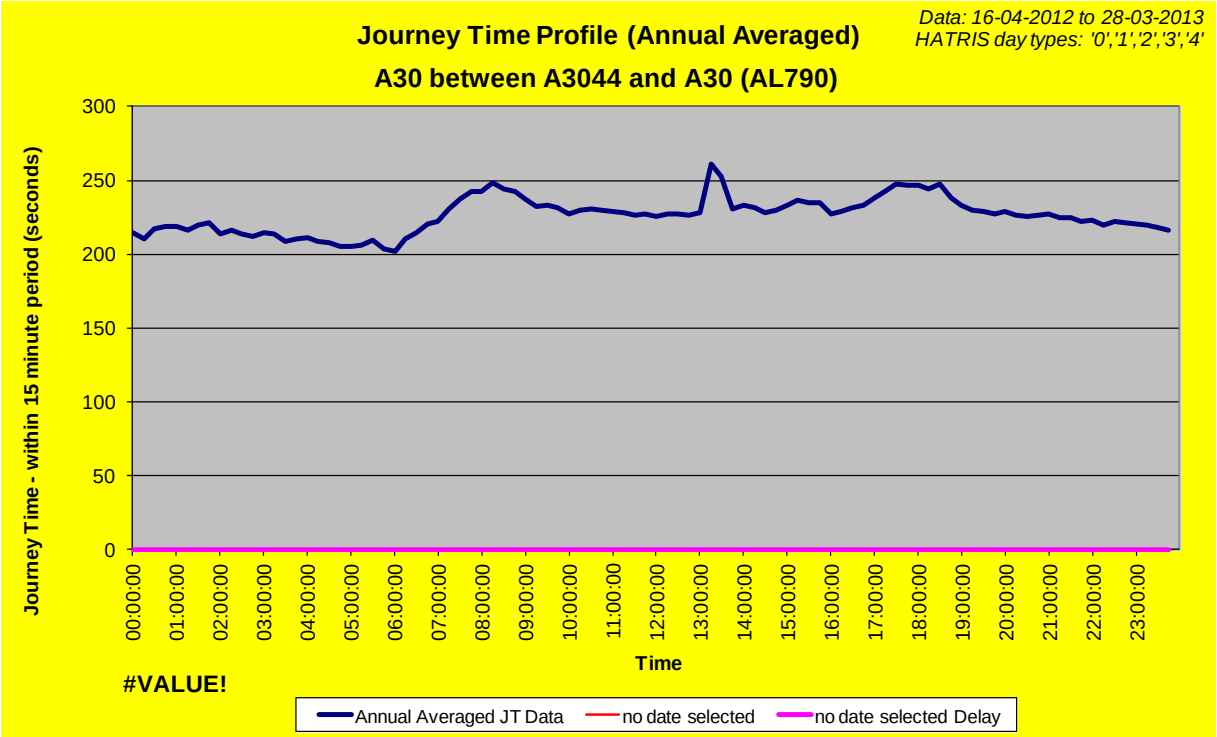


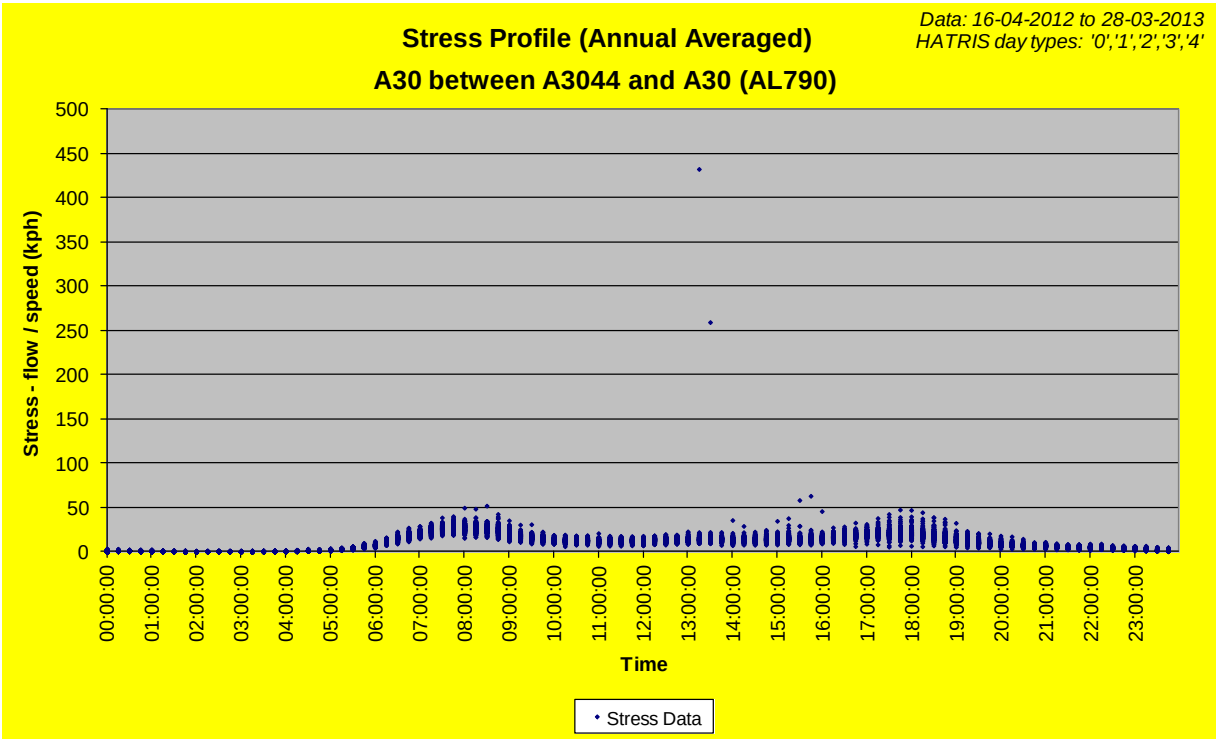
A30, from M25 to TfL boundary, both directions

Speed/flow data indicates no congestion between M25 and the Crooked Billet roundabout. All the delay appears to be between Crooked Billet and the TfL boundary. Traffic profiles of this section are shown in graphs that follow.


Speed Flow Profile
A30 between A3044 and A30 (AL790)
Data: 16-04-2012 to 28-03-2013
HATRIS day types: '0','1','2','3','4'
HATRIS Unaggregated average number of lanes on link: 2
Speed - within 15 minute period (kph)
Flow - total vehicles all lanes within 15 minute period (expressed as "hourly" flow)
Speed Flow Data
no date selected
1500VPH/lane (2lanes)
1800VPH/lane (2lanes)
2000VPH/lane (2lanes)

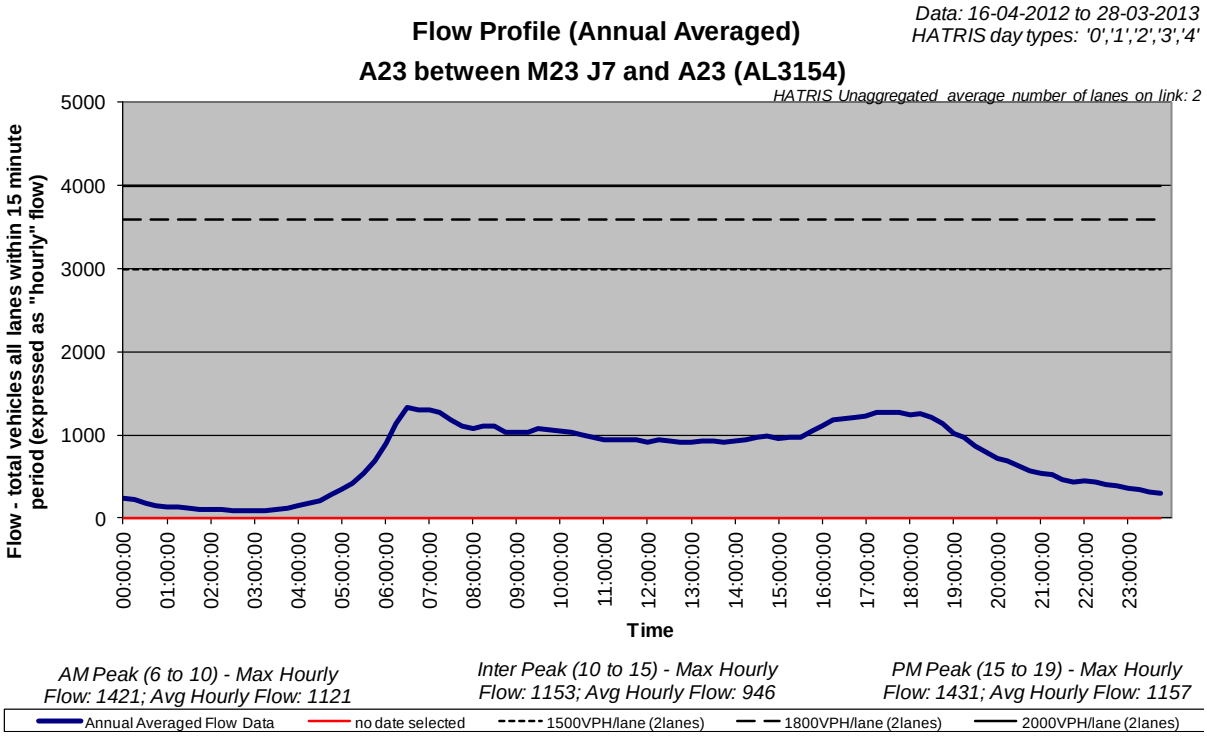

Speed Profile (Annual Averaged)
A30 between A3044 and A30 (AL790)
Data: 16-04-2012 to 28-03-2013
HATRIS day types: '0','1','2','3','4'
Speed - within 15 minute period (kph)
Time
Annual Averaged Speed Data
no date selected

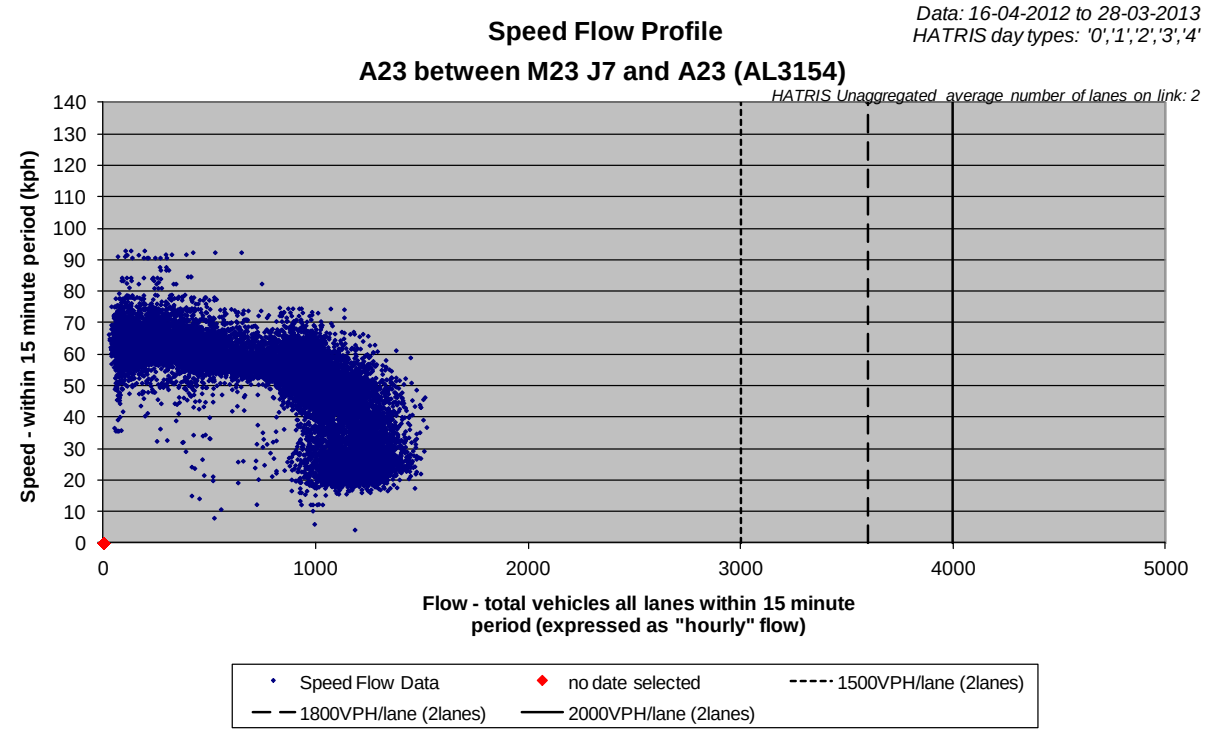


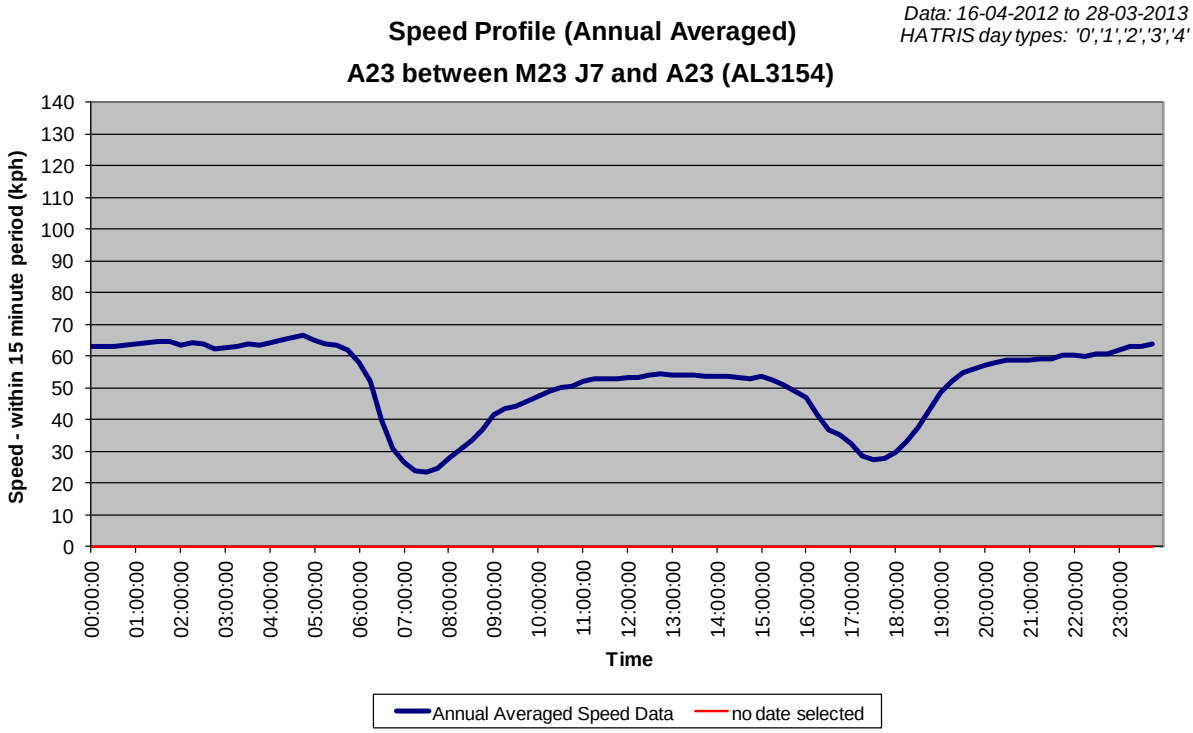


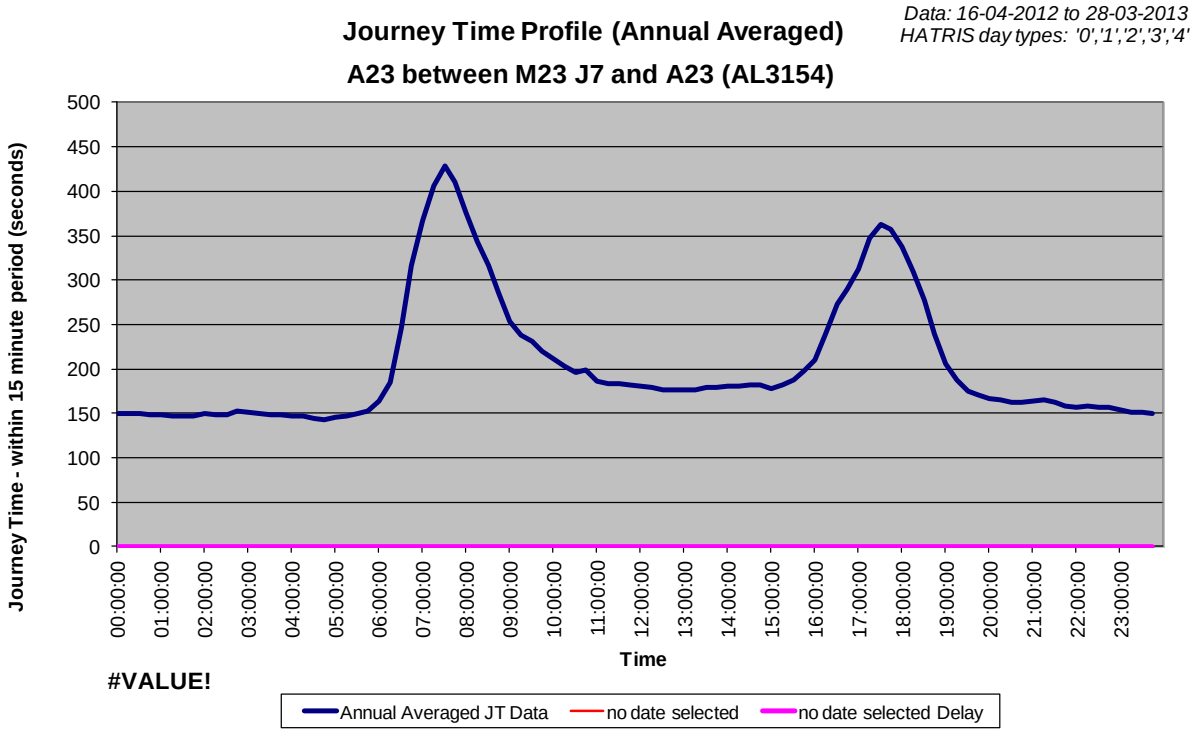
A23 northbound - M23 junction 7 to TfL boundary

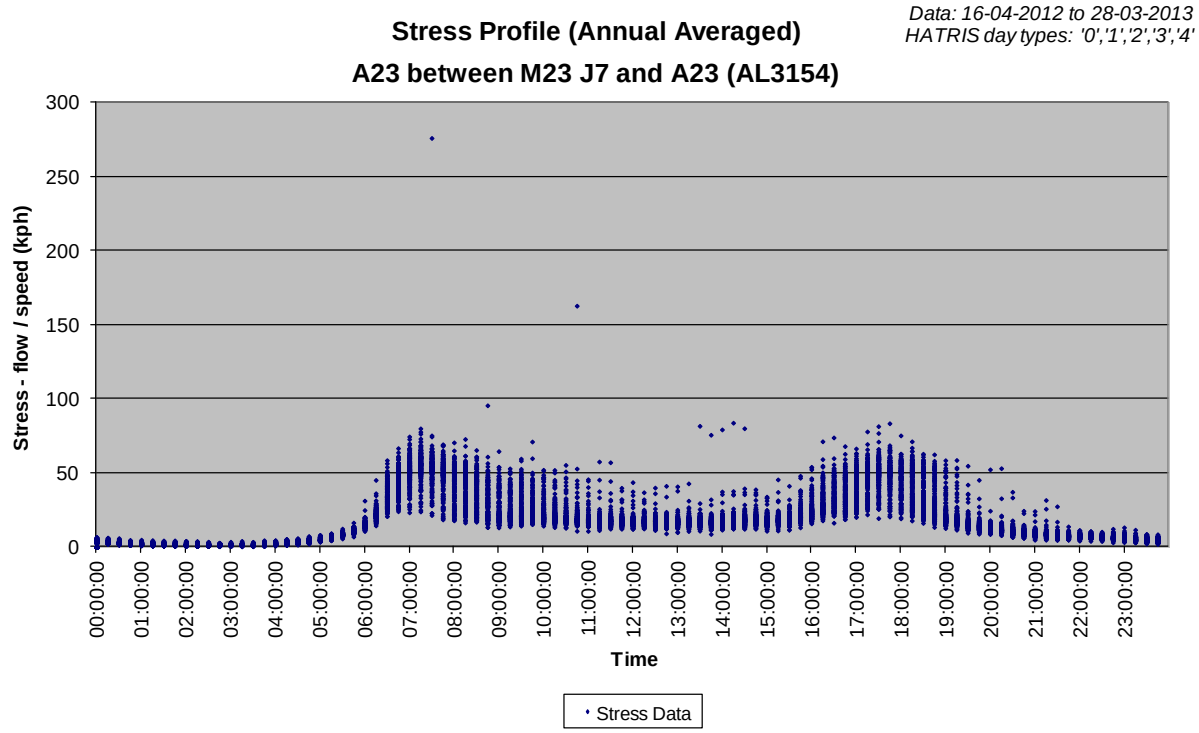
Speed/flow data indicates no congestion on the M23 north of M25. All the delay appears to be on the A23 north of M23. Traffic profiles of this section are shown in graphs that follow.


Flow Profile (Annual Averaged)
A23 between M23 J7 and A23 (AL3154)
Data: 16-04-2012 to 28-03-2013
HATRIS day types: '0','1','2','3','4'
HATRIS Unaggregated average number of lanes on link: 2
Flow - total vehicles all lanes within 15 minute period (expressed as "hourly" flow)
5000
4000
3000
2000
1000
0
00:00:00
01:00:00
02:00:00
03:00:00
04:00:00
05:00:00
06:00:00
07:00:00
08:00:00
09:00:00
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
Time
AM Peak (6 to 10) - Max Hourly
Flow: 1421; Avg Hourly Flow: 1121
Inter Peak (10 to 15) - Max Hourly
Flow: 1153; Avg Hourly Flow: 946
PM Peak (15 to 19) - Max Hourly
Flow: 1431; Avg Hourly Flow: 1157
Annual Averaged Flow Data
no date selected
1500VPH/lane (2lanes)
1800VPH/lane (2lanes)
2000VPH/lane (2lanes)


Speed Flow Profile
A23 between M23 J7 and A23 (AL3154)
Data: 16-04-2012 to 28-03-2013
HATRIS day types: '0','1','2','3','4'
HATRIS Unaggregated average number of lanes on link: 2
Speed - within 15 minute period (kph)
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
0
1000
2000
3000
4000
5000
Flow - total vehicles all lanes within 15 minute period (expressed as "hourly" flow)
Speed Flow Data
no date selected
1500VPH/lane (2lanes)
1800VPH/lane (2lanes)
2000VPH/lane (2lanes)


Data: 16-04-2012 to 28-03-2013
HATRIS day types: '0','1','2','3','4'
Speed Profile (Annual Averaged)
A23 between M23 J7 and A23 (AL3154)
Speed - within 15 minute period (kph)
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
00:00:00
01:00:00
02:00:00
03:00:00
04:00:00
05:00:00
06:00:00
07:00:00
08:00:00
09:00:00
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
Time
Annual Averaged Speed Data
no date selected


Data: 16-04-2012 to 28-03-2013
HATRIS day types: '0','1','2','3','4'
Journey Time Profile (Annual Averaged)
A23 between M23 J7 and A23 (AL3154)
Journey Time - within 15 minute period (seconds)
500
450
400
350
300
250
200
150
100
50
0
00:00:00
01:00:00
02:00:00
03:00:00
04:00:00
05:00:00
06:00:00
07:00:00
08:00:00
09:00:00
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
Time
#VALUE!
Annual Averaged JT Data
no date selected
no date selected Delay



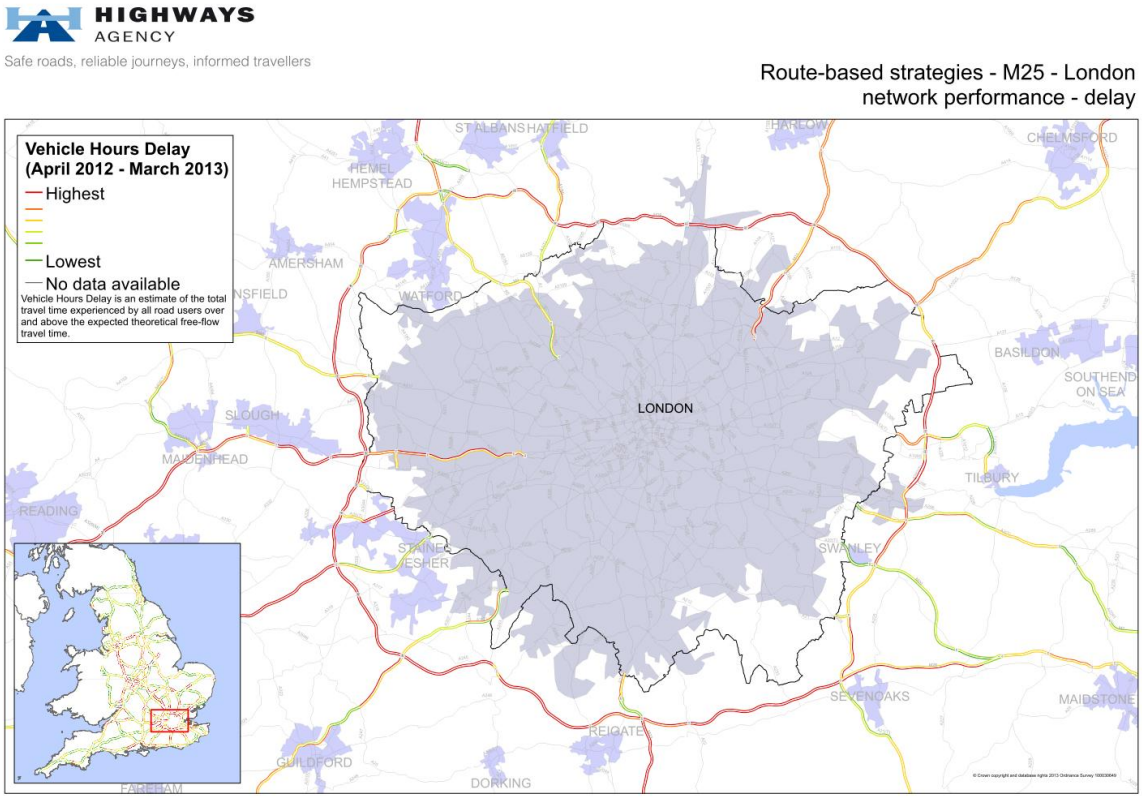
A2.1.14

Junction capacity information is based on intelligence from stakeholders, Connect Plus and within the HA, including any modelling that is available. The table that follows shows a schedule of the junctions and where the evidence has come from. Any junctions highlighted as red or orange appear on Figure 2.1 as congested junctions.

M25 junctions	Sources	Other M junctions	Sources	A road junctions	Sources
1a	Cited in CP Network Resilience Action Plan	M4 1		A282/ M25	(see M25 J31, J1a)
1b	Cited at Maidstone workshop	M4 2		A405/ M25 & M1	(see M25 J21A, M1 J6)
2	Cited in CP Network Resilience Action Plan Cited in 2002 RMS	M4 3	Rectory Farm & Southall Gas Works TRANSYT modelling 2013 and 2009 Cited in the Hounslow Strategic Transport Study 2013	A3113/ A3044 Stanwell Moor	
3		M4 4	Cited by Heathrow Airport Limited Cited at High Wycombe workshop	A3113	(see M25 J14)
4		M4 4a		A30/ A308 Crooked Billet	Cited in 2002 RMS
5	Cited in CP Network Resilience Action Plan Cited at Maidstone, Gatwick and London workshops Cited in 2002 RMS	M4 4b	(see M25 J15)	A30/ B378 Bulldog	Cited in 2002 RMS Modelling for Tesco development
6		M1 1	Modelling supplied by TfL (not yet reviewed)	A30/ M25	(see M25 J13)
7	Gatwick Airport modelling Cited at Reading workshop	M1 2		A3/ A245 Painshill	
8	Cited in CP Network Resilience Action Plan	M1 3		A3/ A244 Copsem	
9	Cited in CP Network Resilience Action Plan Cited in 2002 RMS	M1 4		A3/ M25	(see M25 J10)
10	Cited at London and Basingstoke workshops Cited in CP Network Resilience Action Plan Cited in 2002 RMS	M1 5	Watford Health Campus TRANSYT model 2008 Cited at Herts workshop Cited by Herts CC in the Watford Congestion Study	A23 Star Lane	HA RBS Delay plot - delay must be caused by this junction
11		M1 6		A23 Netherdene Drive	HA RBS Delay plot - delay must be caused by this junction
12	Cited at Basingstoke workshop Cited in 2002 RMS	M1 6a	(see M25 J21)	A23/ M23	(see M23 J7)
13	Cited in 2002 RMS	M3 J1		A20/ M25	(see M25 J3)
14		M3 J2	(see M25 J12)	A2/ A2018	
15	M4/M25 scheme modelling Cited at High Wycombe workshop	M23 J7		A2/ M25	(see M25 J2)
16		M23 J8	(see M25 J7)	A13/ A1089	
17	HS2 modelling 2013	M23 J9	Gatwick Airport modelling	A13/ A1012	
18		M11 J4	Cited at London workshop	A13/ A126	
19	Note: Cited in CP Network Resilience Action Plan,but discussed with Connect Plus	M11 J5		A13/ M25	(see M25 J30)
20	Cited at Herts workshop	M11 J6	(see M25 J27)	A1089 Asda	
21				A1089/ A126	
21A	Cited at London and Herts workshops Cited in 2002 RMS Radlett Strategic Freight Interchange modelling			A1089/ A13	(see A13/ A1089)
22	Cited in CP Network Resilience Action Plan Cited at Herts workshop Radlett Strategic Freight Interchange modelling			A1/ M25	(see M25 J23)
23	Cited in CP Network Resilience Action Plan Cited in 2002 RMS Cited at Herts workshop				
24					
25	Cited in CP Network Resilience Action Plan Cheshunt and Waltham Cross A10 Study modelling Cited in 2002 RMS Cited at London and Herts workshops Cited by Herts CC at the examination of Broxborne's LDF in 2011				
26	Cited at Chelmsford workshop				
27	Cited by CP in project development work				
28	Cited in CP Network Resilience Action Plan Cited at London and Chelmsford workshops Cited in 2002 RMS				
29	Note: Cited at Chelmsford workshop, but discussed with Connect Plus				
30	Cited in CP Network Resilience Action Plan Cited at London and Chelmsford workshops Cited in 2002 RMS Modelling work for Major Projects (assumed)				
31	Cited in CP Network Resilience Action Plan Cited at London and Chelmsford workshops				
Key					
	Evidence of, or cited as, over capacity				
	Likely to be over capacity				
	We think is within capacity				
	Evidence of within capacity				

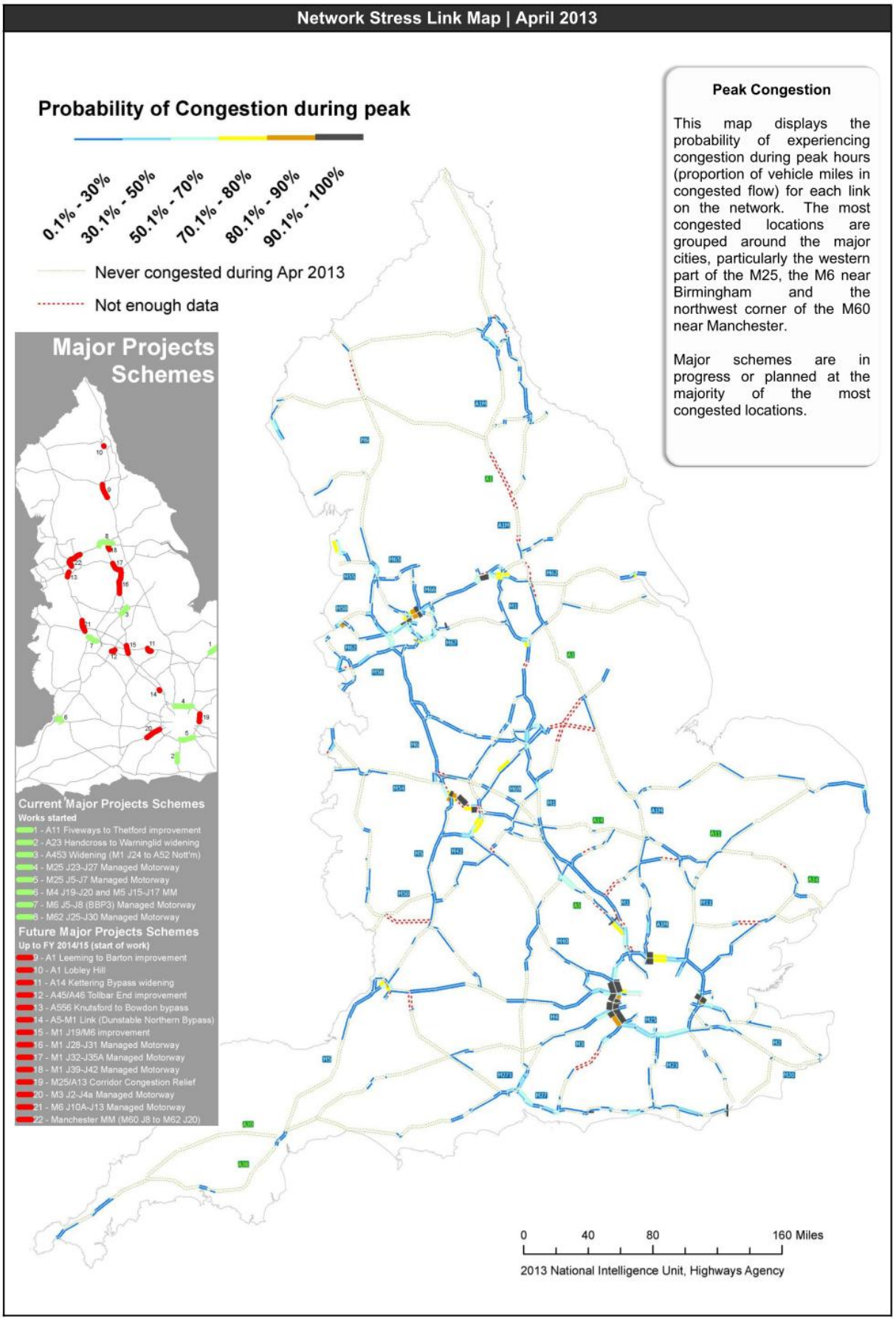
A2.1.15 to A2.1.16

Delay information is based on the Agency's plan that follows. It shows the amount of delay on the route as a measure of congestion in the AM and PM peaks from April 2012 to March 2013. The data is measured as Vehicle Hours Delay (VHD) which is calculated from the traffic flow and the duration of the journey time above the standard free flow speed. It does not necessarily show the busiest (i.e. highest traffic counts) parts of the route, but those where there is high traffic volumes and the journey times are significantly slower than what may be possible



A2.1.17

The probability of congestion comes from the Agency's *Quarterly Network Performance Report*. This includes data up to April 2013, and a copy of the corresponding map follows.


Network Stress Link Map | April 2013
Probability of Congestion during peak
0.1% - 30%
30.1% - 50%
50.1% - 70%
70.1% - 80%
80.1% - 90%
90.1% - 100%
Never congested during Apr 2013
Not enough data
Peak Congestion
This map displays the probability of experiencing congestion during peak hours (proportion of vehicle miles in congested flow) for each link on the network. The most congested locations are grouped around the major cities, particularly the western part of the M25, the M6 near Birmingham and the northwest corner of the M60 near Manchester.
Major schemes are in progress or planned at the majority of the most congested locations.
Major Projects Schemes
Current Major Projects Schemes
Works started
1 - A11 Fiveways to Thetford improvement
2 - A23 Handcross to Warninglid widening
3 - A453 Widening (M1 J24 to A52 Nott'm)
4 - M25 J23-J27 Managed Motorway
5 - M25 J5-J7 Managed Motorway
6 - M4 J19-J20 and M5 J15-J17 MM
7 - M6 J5-J8 (BBP3) Managed Motorway
8 - M62 J25-J30 Managed Motorway
Future Major Projects Schemes
Up to FY 2014/15 (start of work)
9 - A1 Leeming to Barton improvement
10 - A1 Lobley Hill
11 - A14 Kettering Bypass widening
12 - A45/A46 Tollbar End improvement
13 - A556 Knutsford to Bowdon bypass
14 - A5-M1 Link (Dunstable Northern Bypass)
15 - M1 J19/M6 improvement
16 - M1 J28-J31 Managed Motorway
17 - M1 J32-J35A Managed Motorway
18 - M1 J39-J42 Managed Motorway
19 - M25/A13 Corridor Congestion Relief
20 - M3 J2-J4a Managed Motorway
21 - M6 J10A-J13 Managed Motorway
22 - Manchester MM (M60 J8 to M62 J20)
0
40
80
160 Miles
2013 National Intelligence Unit, Highways Agency

A2.2 Road safety

A2.2.1 to A2.2.22

The evidence used to compile this section is listed in the Bibliography. In addition, a meeting was held with the Connect Plus safety team on 22/10/2013. Evidence not considered essential for this study includes:

- Detailed collision reports at specific sites. These are no longer prepared apart from the top three sites investigated by Connect Plus each year.
- M25 DBFO Route Safety Plan 2013, Connect Plus. This would update the *M25 DBFO Route Safety Plan 2012*, but was not available at time of writing.
- Previous years Route Safety Plans.
- Ad-hoc site specific safety analyses for specific schemes or network issues.

M25 DBFO contract area

The *M25 DBFO Route Safety Plan* has summarised collisions on the DBFO network from 2009 to 2011 by year and severity. This is included in the main report. The two tables below break down the data further, by motorways, and trunk roads. The data is unvalidated so may need to be modified following review by the Police.

Collisions on motorway network by year and severity:

Collisions	Fatal	Serious	Slight	Total	KSI TOTAL
2009	19	117	1051	1187	136
2010	17	114	1075	1206	131
2011	13	86	1033	1132	99
Total	49	317	3159	3525	366

Collisions on trunk road network by year and severity:

Collisions	Fatal	Serious	Slight	Total	KSI TOTAL
2009	3	19	203	225	22
2010	6	28	236	270	34
2011	3	29	218	250	32
Total	12	76	657	745	88

The table that follows from the *Route Safety Plan* shows the Top 20 cluster sites in the DBFO contract area. A cluster site has a minimum of six collisions within a 50m radius. Note: Sites 1, 3, 8, 11, 13, 15 are not part of the route.

A8 Cluster Sites

Site	Location	OSGR	Route	Accidents
1.	Near: BROOK STREET J/W BRENTWOOD BYPASS	556895 / 192383	A12	35
2.	Near: STIFFORD INTERCHANGE RAB BETWEEN J/W STIFFORD CLAYS RD	560824/180264	A1012	25
3.	Near: M4 EB MP 29/5B LANGLEY	502883/178179	M4	23
4.	Near: STAINS BY-PASS J/W STANWELL ROAD	504367/171920	A30	19
5.	Near: A282 DARTFORD CROSSING, KENT	556018 / 175178	A282	18
6	Near: M25 R/A JCT 10 WISELY	508024/159296	A30	15
7	Near: DARTFORD TOLL CROSSING AT THE BOOTH TOWARDS ESSEX	556142 / 175351	A282	14
8	Near: A13 SLIP ROAD LONDON BOUND TOWARDS GRAYS	560686 / 180277	A13	11
9	Near: M4 MP29/4B, SLOUGH	502926 / 178178	M4	10
10	Near: M25 J/W SOUTHEND ARTERIAL ROAD	558443 / 188317	M25	10
11	Near: A1001 ROEHYDE ROUNDABOUT AT J3 OF A1(M), HATFIELD J/W A	521166 / 207457	A1001	10
12	Near: M25 'B', DARENTH, KENT	554396 / 170498	M25	10
13	Near: M4 MP 29/3B LANGLEY SLOUGH	503016 / 178174	M4	9
14	Near: M25 'B' MARKERPOST 4/1 - 4/7, SWANLEY, KENT (MAPPE	552562 / 167401	M25	9
15	Near: M4 E/B LANGLEY, SLOUGH MP 29/6	502729 / 178183	M4	8
16	Near: A2 DARENTH, DARTFORD, KENT.	554526 / 172057	A2	8
17	Near: SLIP ROAD OFF M25 ONTO JUNCTION 10 A3	508156 / 159288	M25	8
18	Near: A3 WISLEY INTERCHANGE 20 METRES WEST OF M25 SLIP OFF WI	508046 / 159342	A3	8
19	Near: M4 SLIP ROAD RUNDABOUT J/W M4 SPUR ROAD	507395 / 178599	M4	8
20	Near: NFL M4 500 M E J/W THE PARKWAY	509911 / 178290	M4	8

Top 20 Cluster Sites

The following motorway and trunk road junctions, according to the *Route Safety Plan* have the highest number of recorded collisions (although not necessarily clustered). Note: A40 Denham is not part of the route.

- The 'Top 5' motorway junctions and A road junctions with the highest number of recorded collisions were:
  - M25 J23
  - M25 J30
  - M25 J10
  - M25 J21a
  - M25 J15
  - A40 Denham Roundabout
  - A13 Stifford Interchange
  - A30 Crooked Billet
  - A282 Junction 1a
  - A282 Junction 1b

The following links, according to the *Route Safety Plan* have the highest collision rates (although M3 south of M25, M4 J4b-5, A1023 and A3 south of M25 are not part of the route; and the first table omits A23 TfL to M23 J7 which is mentioned later in the *Route Safety Plan*).

- Five motorway links and three A road links were above the national average collision rate:
  - M23 South of M25
  - M3 South of M25
  - M4 J4b – J5
  - M25 J30 – J31
  - M25 J2 – J3
  - A1023 M25 J28 – Essex Boundary
  - A405 M25 J21a – M1 J6
  - A30 Crooked Billet - TfL Boundary
- The 'Top 5' motorway links and A road links with the highest number of recorded collisions were:
  - M25 J8 – J9
  - M25 J10 – J11
  - M25 J9 – J10
  - M4 J4b – J5
  - M25 J27 – J28
  - A282 M25 J31 – A282 J1a
  - A2 M25 J2 – TfL Boundary
  - A3 South of M25 J10
  - A282 J1a – J1b
  - A3 Copsem Lane – TfL Boundary

Collision data from the MISTRAS system for 2009-2011 was obtained from the Connect Plus safety team, as the analysis required was not contained in the *Route Safety Plan*. An analysis of the collision data has been undertaken and included in the main evidence report.

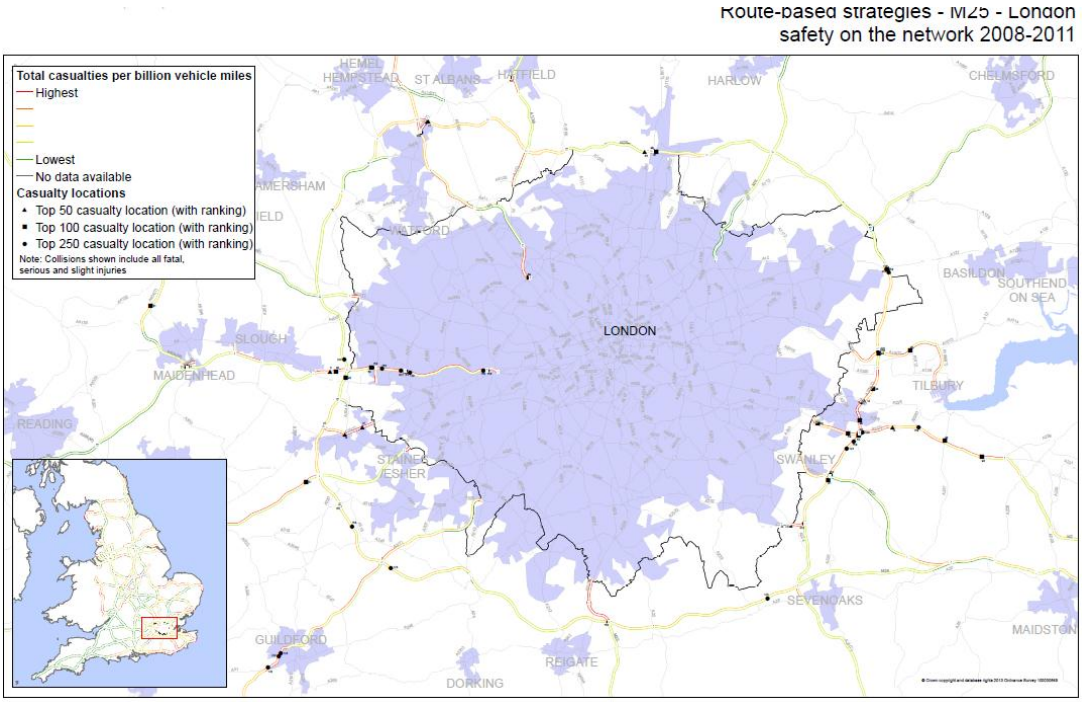
Information on safety hotpots is compiled independently by the Agency, and shown on the plan that follows. It shows the national top 250 casualty sites and casualty rates on the route. Like the Connect Plus data, this is also for the period 2009-2011, but unlike the Connect Plus data it shows casualties, not collisions. This can make the results look quite different, for instance if a coach overturns, there may be only one collision but multiple casualties.

Casualties include fatalities, serious and slight injuries. Slight injuries have been included as in many cases, it is luck that stops it being a more serious incident, and because the definitions of serious and slight injuries mean that there may not be much difference between the nature of the injury. Collisions which do not result in a casualty, ie damage only, are not shown. All the data is validated from 'STATS19' forms used by the Police to record all road accidents which involve injury.

Because the casualty rates are calculated per billion vehicle miles travelled, short road links or links with low traffic flows can show a disproportionately high casualty rate. Similarly, very busy or long road links may have a disproportionately low casualty rate.

A number of junctions feature in the national top 250 casualty sites, but have low collision rates and are therefore not highlighted in the main report, including:

- M25 J11 – national rank 60, but only 1 collision per year.
- M25 J28 – national rank 81, but only 5 collisions per year.
- M4 J2 and J4; and M25 J7– all national rank 158.
- M1 J6; and M25 J4 – both rank 202.



A brief review of the *M25 Route Management Study* and *M4 Route Management Study* (both from 2002) did not identify any clear locations with ongoing safety issues.

Connect Plus' *Network Resilience Action Plan* cites locations with safety problems, which are extracted in the table below. However, when we have cross-compared these to *Route Safety Plan* and the Agency's data, some locations are not supported by evidence. The locations that we have considered are:

- Suicide hotspots at M25 J1a & 1b south of Dartford; M25 J25 (J26 is incorrectly cited) at Enfield; and M25 J8 at Reigate.
- M25 J7 – ranked number 158 in the casualty locations nationally, but does not have enough collisions per year to make the top ten hotspots.
- M1 J6 – ranked number 202 in the casualty locations nationally, but does not have enough collisions per year to make the top ten hotspots.
- A282 Dartford crossing link speed issues – this link does indeed have a high casualty rate, but it's not clear from the *Route Safety Plan* that this is speed related. There are average speed cameras in force on this link.
- M4 J4a-4 Heathrow spur – this was already highlighted above as a high casualty rate for the northbound movement.
- M4 J4-4b – evidence of safety issues is for the reverse direction into London.

Road	From	To	Description	Cause	Effect	Category
M1	6	6	Tight radius to/from A405	Speed / alignment	RTCs	Safety - Junction
M11	6	6	E to N Link road alignment	sub standard alignment	Lorries turning over load unstable	Safety - Junction
M25	15	15	Alignment of link road	Incident / accident	Link road / lane closure	Safety - Junction
M1	3	3	Access to Scratchwood Depot. Tight radius on southbound carriageway	Location of depot / carriageway alignment / access point	Abrupt breaking / RTCs / large turning vehicles	Safety - Junction
M25	27	27	High sided vehicles (slip roads)	Adverse camber / alignment / speed	RTCs, closures	Safety - Junction
M25	7	7	Junction 7 link roads / bollards	Road layout	Incidents / RTCs	Safety - Junction
M25	5	5	Link Road - Transition / alignment	Poor motorway design	Incidents	Safety - Junction
M25	7	8	Steep gradient	High speeds (downhill)	Incidents	Safety - Link
M25	23	24	A carriageway collision black spot	Alignment and severe weather (rain)	Incidents lane/carriageway closures.	Safety - Link
M25	26	27	Bell Common alignment	Curvature of road and M11 bifurcation	Weaving traffic Increase risk of incident	Safety - Link
A282			Speeding traffic on down slope - escape lane on LHS	Down slope / end of restrictions	Incidents	Safety - Link
A282			Speed limit confusion over bridge	Change in speed limit / ineffective signage	Incidents	Safety - Link
M4	3	1	No hardshoulder into/out of London	Design / location restrictions	No refuge / No access / clearance delays	Safety - Link
M4	4	4a	Heathrow to M25 hotspot weaving	Traffic weaving	RTC	Safety - Link
M25	24	28	Low sun glare in open areas	Dawn/dusk sunshine	RTC / stranded vehicles	Safety - Link
M25	5	6	Carriageway alignment	Rising setting sun	Increased risk of incidents	Safety - Link
M4	4	4b	Road Layout	Alignment	Increased incidents	Safety - Link
M25	7	8	Lane Discipline	Driver behaviour	Congestion / Incidents	Safety - Link
M25	25	25	Suicide site	Frequently used for attempted suicides	Road closure delayed recovery police lead incident	Safety - Suicide site
M23	8	8	High Structures	Suicide attempts	Loss of lanes / carriageway closure	Safety - Suicide site
M25	1A / 1B	1A / 1B	Suicide Hotspot	Attempted suicides	Congestion	Safety - Suicide site

M23 to Gatwick

The relevant road links are identified in the extract that follows from the *Area 4 Road Safety Statement*:

Table 5.32: M23 Link sections

Link Reference	Urban or Rural	Description
Link A	R - 70	Area 4 Boundary (A25 Orbital/Bridge) to Kings Lodge Foot bridge
Link B	R - 70	Kings Lodge Foot Bridge to 1.2Km South of Green Lane Overbridge
Link C	R - 70	1.2Km South of Green Lane Overbridge to south of Junction 9
Link D	R - 70	West of Junction 9 to east of Junction 9a

Traffic flows and casualty rates on these links are shown in the extracts from the *Road Safety Statement* that follow.

Traffic flows

Average Annual Daily Traffic (AADT) data has been obtained from permanently located Automatic Traffic Counting sites (ATCs) at the following locations:

Table 5.31: M23 Traffic Flows

Link	Counter Site	Counter Reference	AADT (2011)
Link A / B / C	Between Junction 8 and 9.	6003	60,023
	Junction 9 Northbound access road (Slip road)	30025854	19,974
	Between Junction 9 and 8.	30013170	38,623
Link D	Between Junction 9a and 9.	30015253	25,438
	Between Junction 9 and 9a.	30015254	28,224

Table 5.35: Casualty rates for M23 – Jan 09 to Dec 11

Link	Urban or Rural	Length (Miles)	AADT (2009-2011) Average	Number of casualties			Total	Total KSI Casualty	PICs/Year/ miles	Casualty Rate PICS/100m veh miles
				Jan 09 - Dec 09	Jan 10 - Dec 10	Jan 11 - Dec 11				
Link A	R	1.5	116511	12	14	4	**30**	2	6.5	15.2
Link B	R	2.2	116511	8	6	9	**23**	1	3.4	8.1
Link C	R	2.5	116511	29	19	14	**62**	3	8.4	19.6
Link D	R	0.7	56206	13	4	3	**20**	2	9.3	45.2

Two of these four links are identified in the *Road Safety Statement* for further investigation:

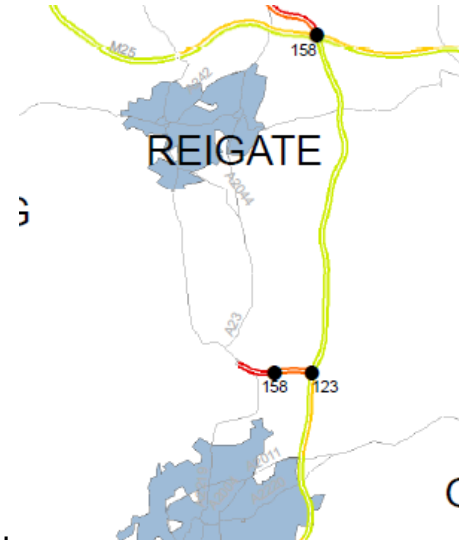
- Link C - M23, 1.2km south of Green Lane overbridge to south of junction 9. (38 collisions, 65 casualties, 3KSIs – 2009-11). A scheme to improve road markings and signing for southbound approach to junction 9; and improvements to eastbound approach to junction 9 and dedicated northbound off slip at junction 9 have been identified.

- Link D – M23 west of junction 9 to east of junction 9a (11 collisions, 20 casualties, 1 KSI – 2009-11). A recommendation has been made to carry out a safety study and to continue to monitor.

Junction 9 is identified the *Road Safety Statement* as a priority investigation site. This is ranked number 4 in Area 4 and has 26 collisions in a three year period, ie around 9 collisions per year.

As for the M25 DBFO area, the Agency's information on safety hotpots has been reviewed, and the safety plan that follows shows hotspots for Area 4 based on casualties, rather than collisions. Two junctions feature in the national top 250 casualty sites, however neither junction features in the top ten junctions for the route as a whole, and therefore neither features in the main report:

- M23 J9 – national rank 123.
- M25 J9a – national rank 158.



A2.3 Asset condition

The evidence used to compile this section is listed in the Bibliography. In addition, meetings were held with Connect Plus on 17/10/2013 (pavement), 23/10/2013 (structures) and 7/11/2013 (lighting), and correspondence took place with the Area 4 service providers.

The evidence not received or reviewed is listed below. Most of this is not considered essential for this study:

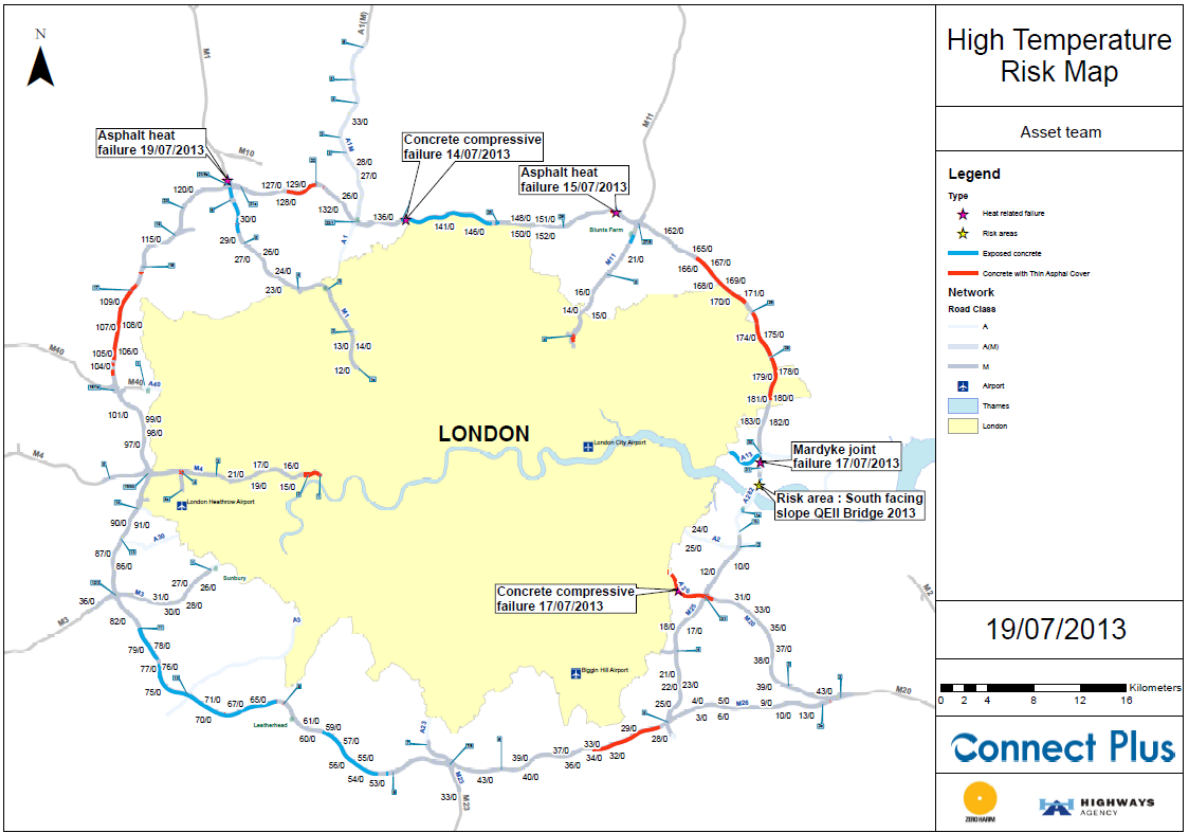
- Area 4 assets from the Managing Agent Contractor. This would provide more detail of asset condition for the M23 to Gatwick. Area 4 has only provided information on geotechnical assets.
- Pavement depths and pavement condition from the Agency's Pavement Management System (HAPMS) and ad-hoc surveys. This would provide more detail on the condition of the pavement structure and the residual life.

- 2014 Pavement Strategy, Connect Plus. This is not available at time of writing.
- Structures inspection reports.
- Structures maintenance strategies.
- Records of earthworks construction from the Agency's Geotechnical Management System (HAGMS). This could be then correlated against risk factors such as drainage.
- Construction records from recent widening projects on the M25, such as drainage information. This could cover for example junctions 16 to 23, junctions 23 to 27, and junctions 5 to 7.
- Drainage records from the Agency's Drainage Management System (HADDMS).

A2.3.3 to A2.3.12

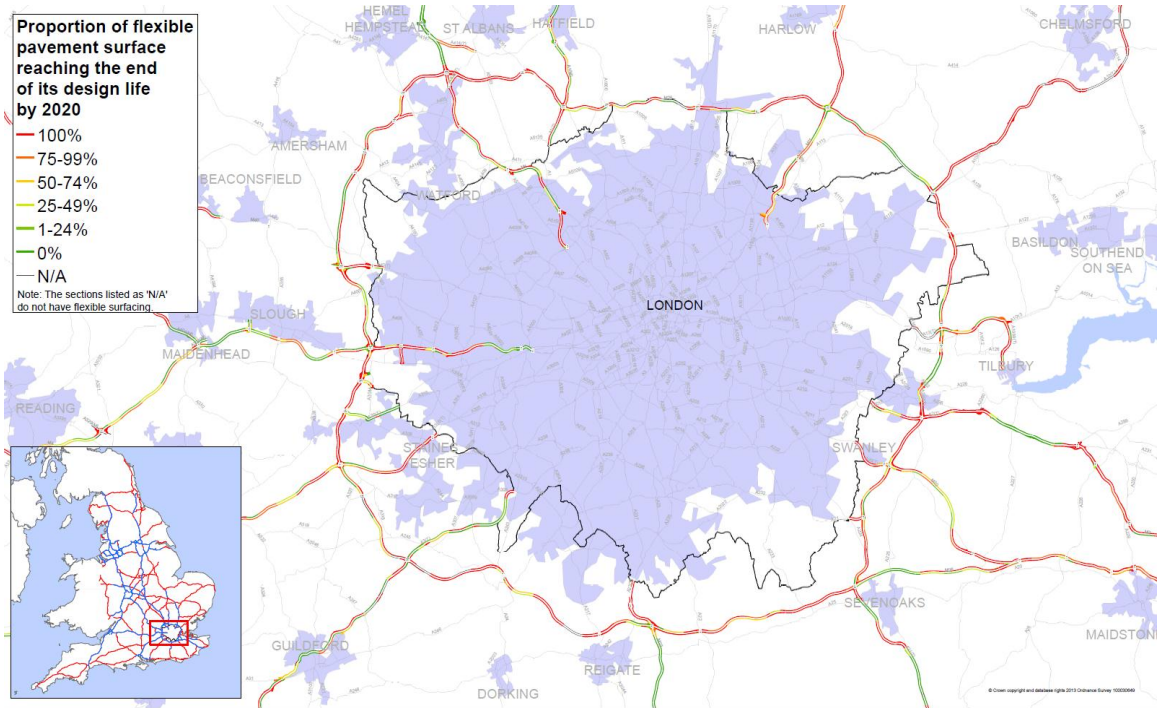
Carriageway surface

The plan that follows was prepared by Connect Plus and shows the parts of the route with concrete construction in blue (exposed) and in red (with a thin asphalt surface). See also Table 2.1.2 of the *Condition Report* (not reproduced here).

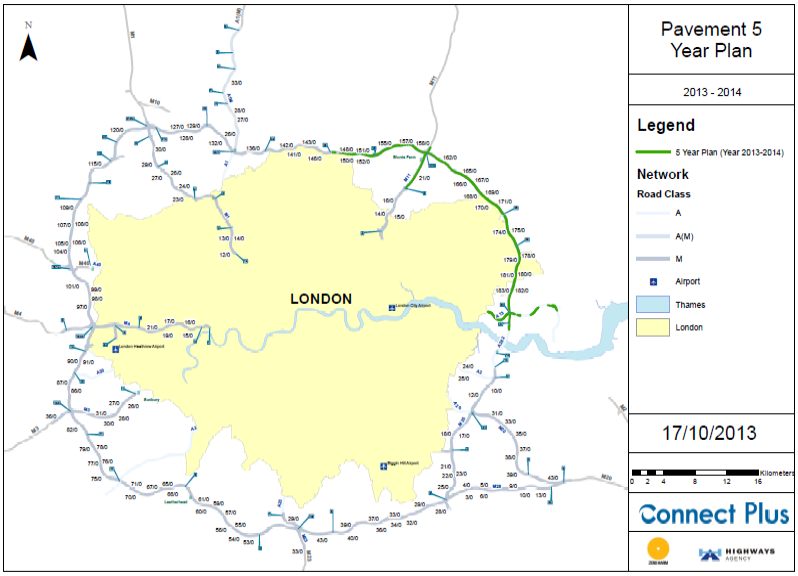


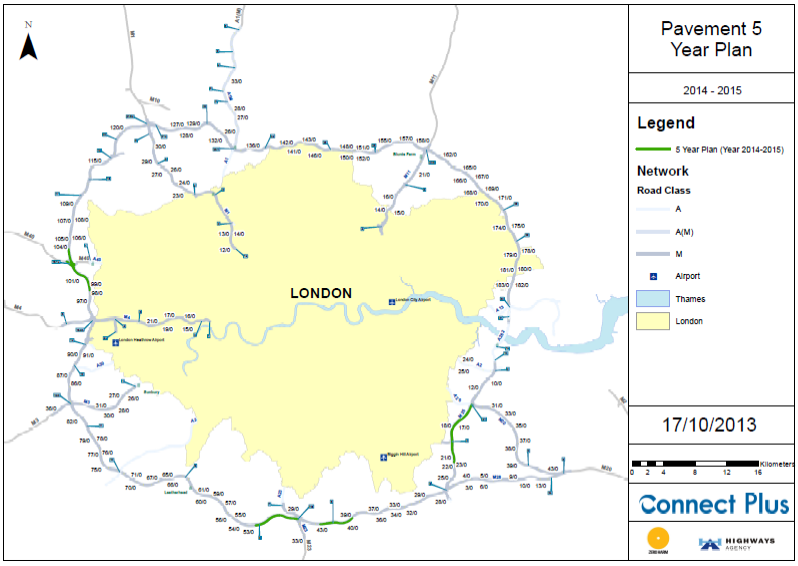
The plan that follows uses the Agency's HAPMS data – for lane 1 of the road only - to show the proportion of flexible pavement surfacing reaching the end of its design life by 2020. It makes a simple assumption of a 12 year life for thin surfacing and 25 year life for hot rolled asphalt. This does not take account of structural defects,

deterioration modelling, the differences between different lanes of the road nor volume of the traffic. Many parts of the strategic road network have been successfully maintained beyond the design life of the surface, so this measure is by no means the sole driver for maintenance or renewal works. Concrete surfacing does not deteriorate in the same way as flexible surfacing, so is excluded.



The plans that follow use data taken from Connect Plus' *Asset Management Forward Plan* and show the extent of planned resurfacing from 2013 to 2018.




Pavement 5 Year Plan
2014 - 2015
Legend
5 Year Plan (Year 2014-2015)
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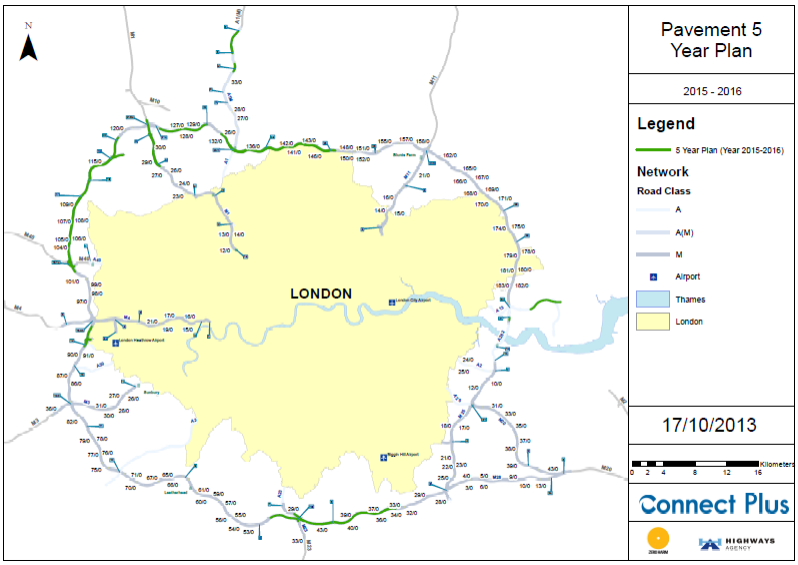
LONDON
17/10/2013
Connect Plus
HIGHWAYS AGENCY


Pavement 5 Year Plan
2015 - 2016
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5 Year Plan (Year 2015-2016)
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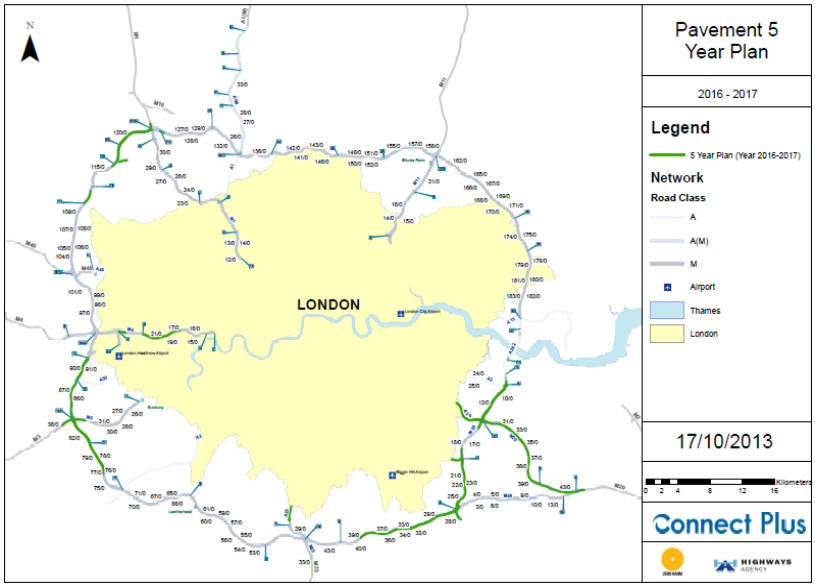
Pavement 5 Year Plan
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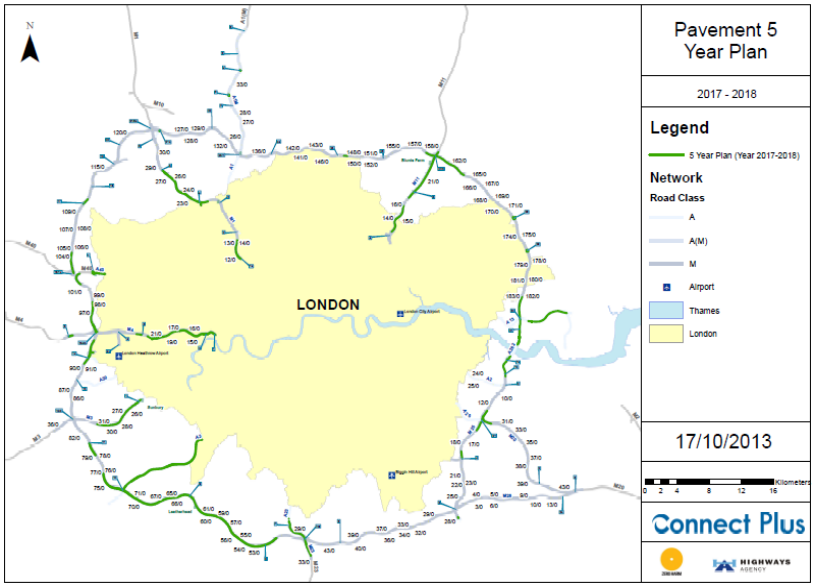


A2.3.13 to A2.3.23

Structures

48 bridge structures have been defined as 'strategic' and the average condition of these is fair. The condition scores are given in the extracts from the Connect Plus *Condition Report* which follow. The first score is for all elements of the structure, and the second score is for very high importance elements.

The Dartford crossings - ie the two tunnels and the QEII bridge – and the other tunnels – ie Bell Common and Holmsdale – are listed in separate tables. Note: Hatfield tunnel is cited but is not part of the route.

Table 2.5.7.2 Condition PI for each Strategic Asset - Bridges

Structure Key	Name	Condition PI (avg-all)	Condition Description	Condition PI (avg-vh)	Condition Description
9105	South Orbital I/C West	80	Good	71	Fair
25526	A2/A282 East to North Link Flyover	86	Good	81	Good
9109	South Orbital I/C East	79	Fair	74	Fair
6608	Denham Viaduct	52	Poor	57	Poor
36	Fw I/C Flyover Northbnd	81	Good	80	Good
33	Fw I/C Viaduct N/B Slip	88	Good	81	Good
1451	M1 I/C M1 Southbound	78	Fair	81	Good
17557	M1 I/C M1 Northbound	84	Good	81	Good
2986	Seven Span Viaduct	83	Good	81	Good
2988	Woodford Roundabout West Viaduct	85	Good	81	Good
2989	Woodford West Viaduct	79	Fair	81	Good
2992	Woodford East Viaduct	82	Good	81	Good
2993	Woodford Roundabout East Viaduct	78	Fair	81	Good
3297	Merstham Viaduct	77	Fair	71	Fair
3299	Hooley-Reigate	75	Fair	72	Fair
3300	Crawley-Godstone	76	Fair	72	Fair
9107	South Orbital I/C Centre	82	Good	81	Good

3372	Godstone-Hooley	76	Fair	71	Fair
3373	Reigate-Crawley	75	Fair	71	Fair
3697	New Haw Viaduct Rly Span	76	Fair	81	Good
3700	New Haw Viad't River Wey	85	Good	81	Good
3385	M25 Over Slip Roads Sth	82	Good	81	Good
782	M25 Over M3	81	Good	81	Good
3386	M25 Over Slip Roads Nth	85	Good	81	Good
6164	Runnymede Old	84	Good	81	Good
12532	Runnymede New	87	Good	81	Good
15058	Viaduct Over M4 (B6)	86	Good	81	Good
12129	Berry Lane Viaduct	76	Fair	76	Fair
16235	Gade Valley Viaduct	87	Good	81	Good
1438	M1 I/C Top Link	80	Good	81	Good
1460	M1 I/C Bottom Link	83	Good	81	Good
12996	New River Aqueduct	85	Good	81	Good
893	Chiswick Flyover	66	Fair	46	Poor
892	Elevated Road Piers 1-5	70	Fair	62	Poor
894	Kew Curve Piers 5-8	73	Fair	65	Fair
895	Elevated Road Piers 8-31	71	Fair	64	Poor
896	Lionel Road I/C Piers 31-61	75	Fair	64	Poor
897	Lionel Rd Ebnd Off Slip	82	Good	75	Fair
898	Lionel Road Ebnd On Slip	82	Good	75	Fair
899	Lionel Rd Wbnd Off Slip	81	Good	69	Fair

900	Lionel Road Wbnd On Slip	82	Good	75	Fair
901	Elevated Road Piers 61-105	77	Fair	67	Fair
902	Boston Manor Viaduct Piers 105-109	77	Fair	73	Fair
903	Boston Manor Viaduct Piers 109-112	76	Fair	69	Fair
904	Boston Manor Viaduct Piers 112-122	75	Fair	68	Fair
905	Boston Manor Viaduct Pier 122-Abut	72	Fair	75	Fair
15051	Langley-Poyle Via (B13)	85	Good	81	Good
15052	Hayes-Denham Via (B12)	85	Good	81	Good

Table 2.6.7.2: Condition PI for each Queen Elizabeth II Structure

Structure Key	Name	Condition PI (avg-all)	Condition Description	Condition PI (avg-vh)	Condition Description
23014	QEII Bridge North Viaduct	80	Good	76	Fair
23000	QEII Cable Stayed Bridge	82	Good	77	Fair
23015	QEII Bridge South Viaduct	80	Good	76	Fair

Table 2.7.7.2: Condition Descriptions for Tunnel Condition PI

Tunnel	Condition PI (avg-all)	Condition Description	Condition PI (avg-vh)	Condition Description	Condition PI (Crit)	Condition Description
DARTFORD EAST	60	Poor	69	Fair	54	Poor
DARTFORD WEST	54	Poor	67	Fair	49	Poor
HATFIELD	57	Poor	48	Poor	35	Very Poor
HOLMESDALE	79	Fair	74	Fair	66	Fair
BELL COMMON	94	Very Good	90	Very Good	88	Good

A2.3.24 to A2.3.34

Other key asset issues for routes

Geotechnical

The *Condition Report* identifies that the overall geotechnical asset for the M25 DBFO area is in an acceptable steady state condition, with only 4% of the network length exhibiting visible defects.

The Area 4 service providers advised on specific issues for the M23 to Gatwick section through correspondence.

Drainage

Information used is taken from the *Condition Report*, but is not reproduced here.

Lighting

When surveyed in 2011 for the *Condition Report*, about two-thirds of the lights in the DBFO contract area were in less than satisfactory condition, but since then a large number on the M25 have or are being replaced as part of the Initial Upgraded Sections or Later Upgraded Sections.

From discussions with Connect Plus, a large number of lights require renewals, but LEDs are not yet sufficiently developed to adopt widely.

A2.4 Route Operation

The evidence used to compile this section is listed in the Bibliography. In addition, meetings were held with Traffic Management Directorate on 29/10/2013 and 7/11/2013.

The evidence not received or reviewed is listed below:

- Interrogation of NILOs. This would provide more evidence about the length and severity of incidents on the route, but not considered essential for this study. At this stage, only general information supplied by the Agency has been used.
- Area 4 operations data. Limited information received at the time of writing.
- Flood risk sites could verified through a full set of pollution control plans from Connect Plus Environment Team, local authorities' knowledge, and more detailed catchment modelling, however this evidence is not yet available.

A2.4.1 to A2.4.7

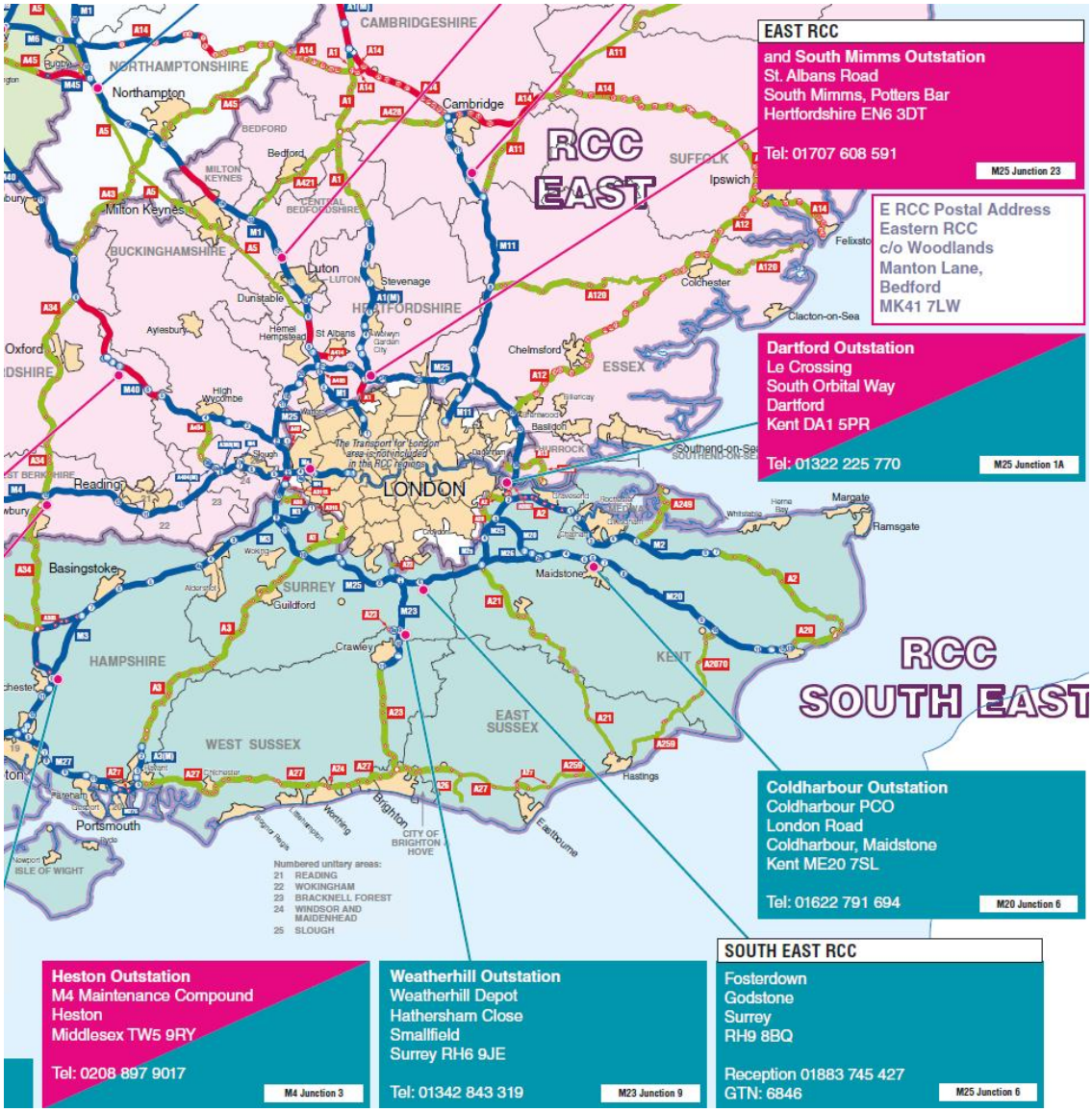
Traffic Officer Services

The Agency's plan below shows that the control of the M25 area is split between two Regional Control Centres (RCCs): East (north of the Thames) and South East (south of the Thames). The operation was originally designed on the basis of incident data from the Police, and administrative boundaries from the Government Office of the South East (GOSE), with the aim of providing service areas with similar demands.

The RCC East area is much larger than the RCC South East area but has a lower density of strategic road network and traffic levels, therefore the demands on the service for each area are reasonably similar.

Since 1 October 2013, the Agency's traffic officer service has been managed as a single southern region, bringing together East and South East, although the control centres and associated technology remain split as described.

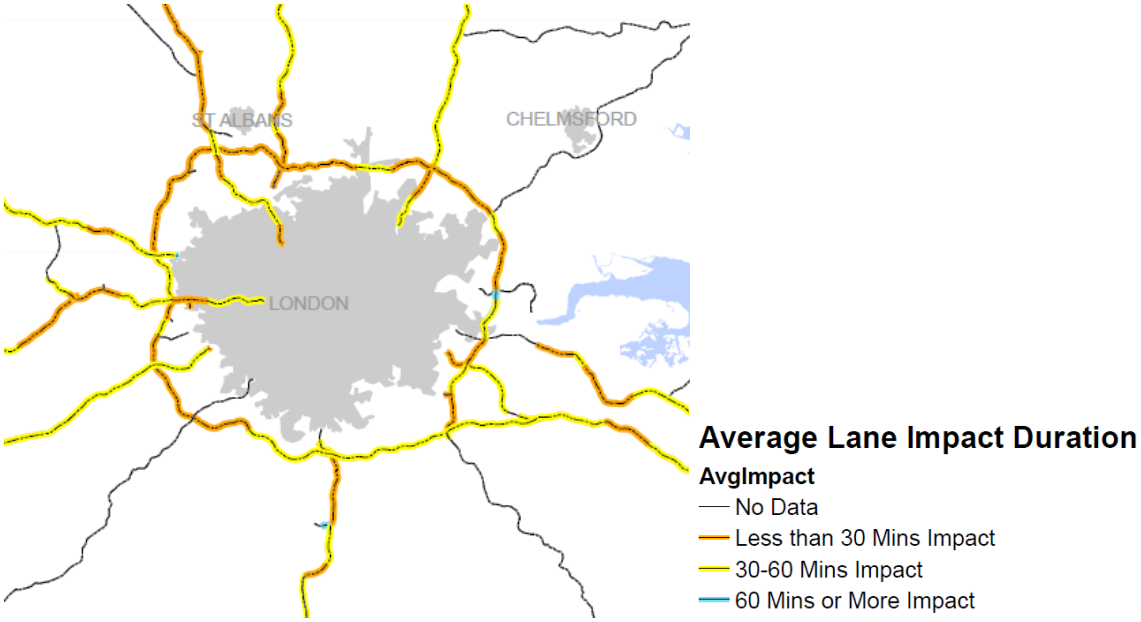
The M25, radial motorways and M23 to Gatwick are shown in blue, which means that they have the highest level of coverage of traffic officer services ('Level A'), with a dedicated on-road response – as shown in the key that follows the plan. Note: the short length of M25 between junctions 14 and 15 is illustrated with a lower level of service ('Level B'), but in discussions with TMD (7/11/2013) this is an error; the entire London Orbital motorway is a level of service A.



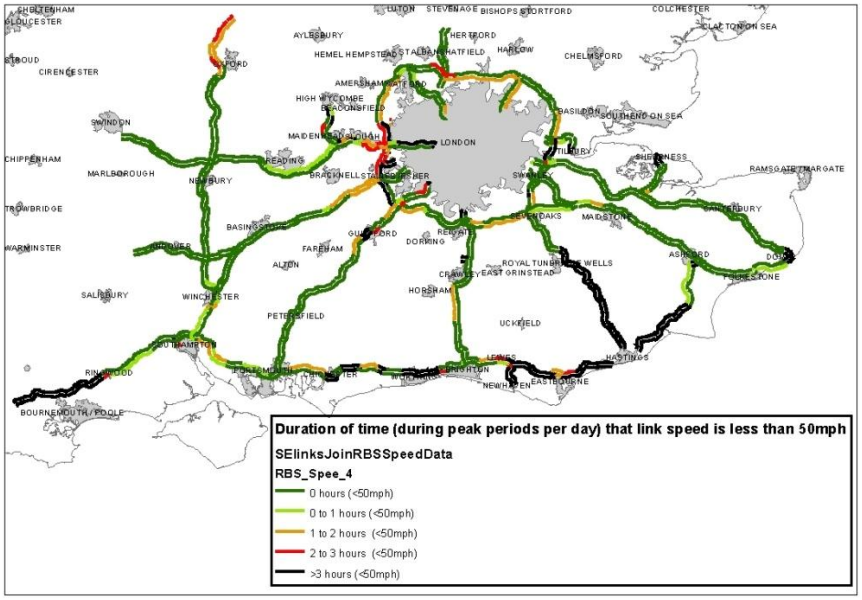
Funct		TMD Services	A Key Motorways and APTRs	B Additional Motorways and APTRs	C Rest of the Network
NTOC	1.	Customer information – Smart phone apps, Traffic England etc.	✓	✓	✓
	2.	Incident detection (virtual patrolling)	✓	✓	✓
	3.	NTOC overview, Strategic Traffic Operations (STO) Event planning and co-ordination (CMM)	✓	✓	✓
RCCS	4.	RCC co-ordination of incident management resource (Police/contractors/TOS etc.)	✓	✓	✓
	5.	Control of on-road technology – ERTs, CCTV, VMS, MM etc.	✓	✓ (where available)	✓ (where available)
On-road	6.	National Vehicle Recovery Service (NVRS)	✓	✓ (where available)	✓ (exceptional circumstances)
	7.	Limited TOS on-road response capability (exceptional circumstances)	×	×	✓
	8.	Partial TOS on-road response capability (when required and available)	×	✓	×
	9.	Full TOS on-road response capability (dedicated resource)	✓	×	×

The Agency has prepared an operational management plan, which follows. This shows that the average lane impact duration is under an hour on all roads, with some small exceptions at the M25 J30 (A13) and M23 J9 Gatwick turn. Generally the longer duration incidents are on the southern half of the network and on the radial routes.

Trunk roads have a lower level of response, with no regular on-road traffic officer patrols ('Level C'). Apart from the A1 and A20, there is no data on the average lane impact duration on trunk roads.



The Agency has prepared a plan (which follows) showing the roads which have low traffic speeds for extended parts of the day, indicating which are the most congested parts of the network. Speeds drop below 50mph for many hours per day on the south-west and west parts of the London Orbital, M4 inbound and Dartford crossing. There is no striking correlation between traffic congestion, performance and level of service; or evidence that any parts of the network are difficult for traffic officers to access.



Discussions with TMD indicate that the lack of patrols on trunk roads is a weakness, although the trunk road of greatest concern, the A12, is not part of the route. TMD also has concerns about the lack of in-car technology, such as Ipads to speed up reporting processes, although Traffic Officers have now been issued with 'Incident Screens', two portable message signs and a portable CCTV camera to use on critical or long duration incidents.

A2.4.8 to A2.4.11

Diversion routes

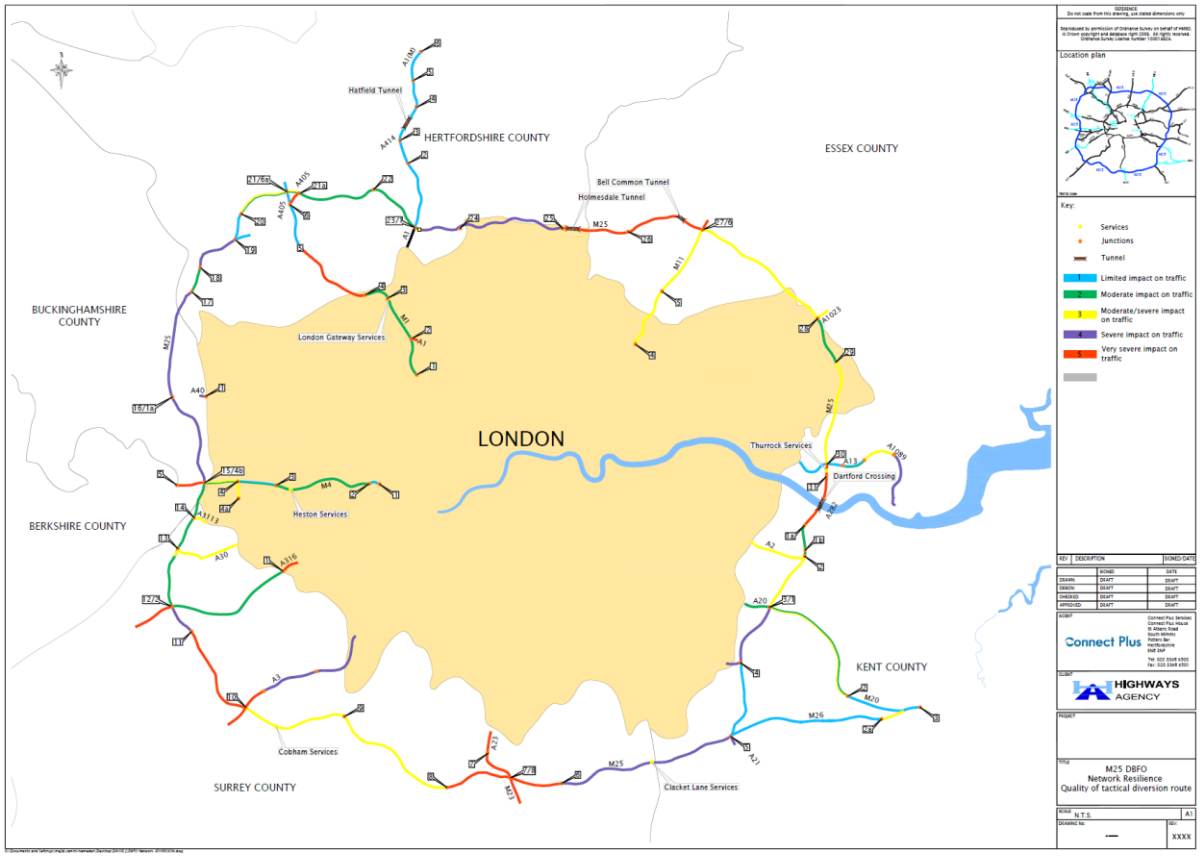
The responsibility for operating diversion routes falls on several organisations:

- The Agency (TMD), who maintain and set the VMS messages on the strategic road network;
- Connect Plus, who operate the diversions – by checking that they are clear and erecting black and yellow temporary diversion signs (planned closures); or using existing signs, such as symbols 'patched' on sign faces or 'flip plate' signs (unplanned closures);
- Other highway authorities, who maintain the signs on the diversion routes, set VMS messages on those routes and operate the traffic signals along the route.

The routes are described in the Connect Plus *Tactical Diversion Route Document* and many are also available on Agency maps that form part of 'Battlebags' used by TMD. They have changed little since they were established several years ago. The only route that has changed is M25 junctions 10 to 12, which was first introduced for the Olympic cycle events and has become a legacy.

The quality of the diversion routes was assessed by Connect Plus in May 2011 in their *Diversion Route Quality Assessment* on a scale of 1 to 5 using the criteria below, and summarised on the plan that follows.

Quality of diversion route. *(The following factors have been taken into account)*	**Criticality Level**
All dual carriageway, Similar length, Limited access, limited impact on traffic	**1**
>75% Dual carriageway < 25% longer Some access, minor impact on traffic	**2**
>50% Dual carriageway <50% Longer Village/hamlets, some impact on traffic	**3**
>25% Dual carriageway <75% Longer Regular access, moderate impact on traffic	**4**
No Dual carriageway >75% Longer Regular access, severe impact on traffic	**5**



Although the entire DBFO contract road has been rated, there are no published diversion routes for the trunk roads – also not for the M4 east of junction 3 or the M1 junctions 4 to 5. In their assessment of these roads, Connect Plus identified diversion routes that might be capable of taking motorway traffic and applied similar criteria to the published diversion routes to provide a best estimate of their quality.

Two critical routes – the A282 Darford crossing and M25 junctions 25 to 27 - are discussed in the main report, based on information in the *Tactical Diversion Route Document*. More details on the other routes can be found in the same document, including many other inconvenient routes such as:

- M25 J23-J25 (Potters Bar) rated as 'severe' rather than 'very severe' impact, but was also cited twice in the Network Resilience Plan. This is a 30km diversion via TfL roads through north London (A406 North Circular), through 21 sets of traffic lights, and a 4.7m headroom restriction, that the Police have provided escorts for in the past. An alternative diversion through Hertfordshire to the north (A414) has been signed for large vehicles, this is longer but takes a similar time.
- M25 J27-J28 – rated 'moderate to severe' impact, but cited in the Network Resilience Plan. This is a 30km diversion through multiple sets of traffic lights.
- M25 J8-J10 – rated 'moderate' impact, but a 30km diversion through Ewell, through 10 sets of traffic lights, with a 4.6m headroom restriction at the railway bridge close to the A3; and there is no specific diversion for J8-J9, so traffic has to use the same extended diversion and therefore network recovery takes longer. Note: J9 is not attractive for diversions because the traffic would block access to and from the depot.

Connect Plus raised issues as part of their *Network Resilience Action Plan*, many of which are route-specific. These are in the table that follows.

Road	From	To	Description	Cause	Effect	Category
M25	23	25	Long diversion route 19 miles - including height restriction	Design / location restrictions	Congestion, delays on HA/LA networks, 4.7m restriction causes disruption to HGVs, route confusion	Operations - Diversions
M25	25	27	Long diversion route 18 miles. Route includes hospital and Middlesex University	Design / location restrictions	Congestion, delays on HA/LA networks, route confusion, restricts access to hospital/university	Operations - Diversions
M25	1	31	Tactical diversion routes	All routes not agreed and inappropriate signage	Congestion / unnecessary driver movements	Operations - Diversions
M25	8	9	No diversion route. Only J8-10 diversion route.	Poor local roads; little option.	Major congestion delayed recovery.	Operations - Diversions
M25	25	26	Lack of diversion route	Inadequate local road network	Delay increased recovery time	Operations - Diversions
M25	23	25	Inadequate Diversion route	4.7 m height restriction	Traffic delays on local road network	Operations - Diversions
M25	17	18	Unsuitable diversion routes	Unsuitable diversion routes	Long delays, unnecessary driver movement, local road congestion	Operations - Diversions
M25	27	28	Long diversion route 29 Miles	Design / location restrictions	Congestion, delays on HA/LA networks, route confusion	Operations - Diversions
A282			Long Diversion Route	Closure (Long term)	Inconvenience to travellers	Operations - Diversions
M11	4	5	Diversion route	Poor quality diversion route	disruption and delayed recovery	Operations - Diversions

Discussions with TMD have not identified any major concerns with the diversion route tactics, but instead a number of issues that apply to all the routes:

- The responsibilities for operating the diversions are split between different agencies, which can result in a lack of coordination and the driver experiencing inconsistencies in messaging.
- An absence of liaison meetings between local authorities, the Agency and Connect Plus to share intelligence.
- A lack of maintenance of diversion signs on other authorities' roads (the Agency funded their installation, but about 20% were outstanding when funding was withdrawn, and over time, some signs have been removed or altered). Note: Connect Plus should inspect the signs in the DBFO contract area annually.

- Lack of public awareness and understanding of symbols, for instance they are not part of the process of driver learning.
- Lack of surveillance of diversion routes, for instance through cameras.
- Information is not being collected to understand how diversions have performed, for instance were the routes checked and cleared first, what journey times were experienced on the affected route and diversion, what did signs and messages say, did people understand the signs, were signal timings altered on the diversion route, did traffic actually use the official diversion routes or find its own way? Consequently there is no evidence of learning and continuous improvement in the operations. Note: Connect Plus has been asked to seek feedback from local authorities following incidents in the DBFO contract area.
- Information on which diversions were used is not being assessed, therefore there is no understanding of which diversion routes might be the most important and/or why they are being activated more frequently than others. Note: the data should be available on the Agency's NILO reports.
- There are gaps in the messaging capability on diversion routes, for example a number of additional VMS signs could create a seamless information service.
- Some parts of the M25 have a greater proportion of long distance traffic, particularly the north-east quadrant, but there are no corresponding plans for diversions across multiple junctions, or evidence that these are being used.

Resilience and other operational matters

The table below taken from the *Network Resilience Action Plan* highlights a number of issues relating to liaison between adjoining authorities and the resilience of the network.

Road	From	To	Description	Cause	Effect	Category
M25	1	31	Boundary with other areas	Unsatisfactory liaison	Delayed response / recovery	Operations - Liaison
M25	2	7	Boundary with Area 4	Liaison with other body	Slower incident clear up	Operations - Liaison
M1	6	6	Strategic signage	Lack of strategic signage / incident causes closure	Delay / confusion among road users	Operations - Resilience
M25	27	27	Interchange bridges M25 B carriageway	Parapet damage will require temporary barrier to be placed in lane as there is no hard shoulder over 2 bridges	Long term lane 1 closure awaiting fabrication of replacement parapet	Operations - Resilience
M25	7	7	Strategic Structure	Link Road Parapet damage	Link road lane closures	Operations - Resilience
A282			High vehicles when ET closed	Maintenance / incident in ET	Potential disruption on plaza	Operations - Resilience
M25	24	25	Lack of turnaround points	Lack of turnaround points available during carriageway blockage	Trapped traffic, long incident response times	Operations - Resilience
A282			High vehicles on plaza approach	High vehicles transferring lanes on Plaza approach	Delay / Congestion	Operations - Resilience
M25	17	18	No H/S on Gade Valley	Design / location restrictions	RTC / No refuge / long delay / operational impact	Operations - Resilience
M25	27	27	Complex closure at Junction 27	Incident	Delay in establishing closures / additional disruption	Operations - Resilience
M25	5	6	Braested gate turnaround	Abuse from road users	Safety / damage to asset causing delayed response	Operations - Resilience
M25	1	31	Insufficient emergency turn around points	Poor motorway design	Congestion, ability to respond	Operations - Resilience
M25	31	31	Restrictions/capacity of Junction 31 during bridge closure	Bridge closure for works/emergency	Congestion / Incidents	Operations - Resilience
M25	7	7	Gatwick closure	Closure at Gatwick combined with inadequate diversion	Congestion	Operations - Resilience
M25	24	24	Lack of hard signage	Insufficient signage	Uninformed/misinformed road users	Operations - Resilience
A23			Lack of access	Incidents	Congestion / restricted response / recovery	Operations - Resilience
A282			Resource issue during closures at Dartford	Any incident that requires closure	Congestion / Delays	Operations - Resources
M25	1	31	Police not dedicated to Motorway	Insufficient resourcing	Inconsistent / reduced support	Operations - Resources
M25	23	23	Congestion on roundabout	Incident use of junction as part of diversion route	Congestion. Access/Egress to Depot for gritter and staff	Operations - Resilience

One issue raised in the table is a lack of turnaround points. Through correspondence, Connect Plus has identified those turnaround points that currently exist on the route within the DBFO contract area, and these are tabulated below.

M25 J8-J9 Cen Res Gate MP55/3A
M26 Jct 1 - 2 Crossing Point
M25 Jct 8-9 Crossing MP59/2
Access & Egress M25 J8 - 9
M25 J5/J6 Central Res Gate
M4 J3 - J2 Central Res Gate
M25 J24-25 Emer-Xing Cnt-Res
M20 J1-2 Emer Xing Cen-Res
M25 J25 Holmesdl Tnl Gate S/B
M25 J25 Holmesdl Tnl Gate N/B
M25 J27 Bell Cmn Tnl Gate S/B
M25 J27 Bell Cmn Tnl Gate N/B

M23 to Gatwick

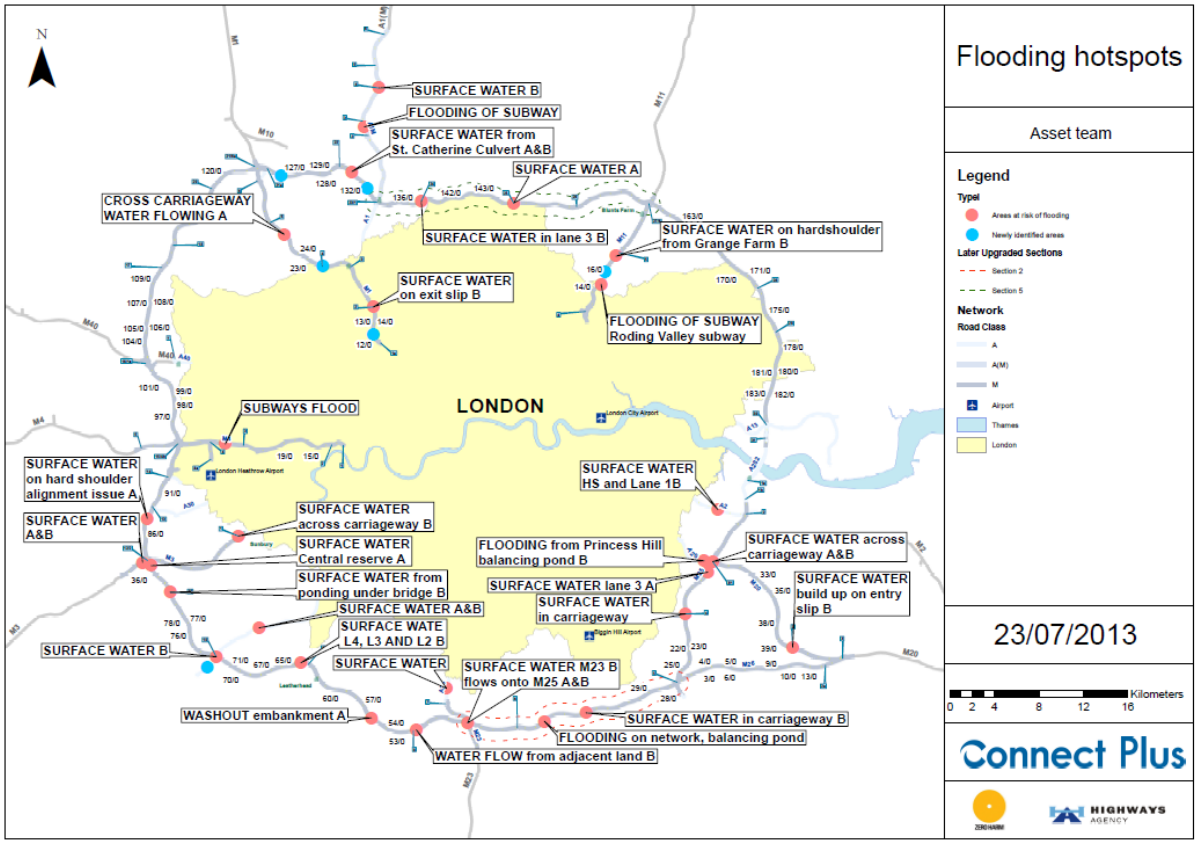
Area 4 has advised that there are severe problems with diversion routes. The nearest alternative routes to the M23 are the A217 Reigate Road, A24 through Dorking or the A22 to the east, but the junctions are busy and worsening.

Area 4 has also advised that the Gatwick peak hour is different to standard network peak hours.

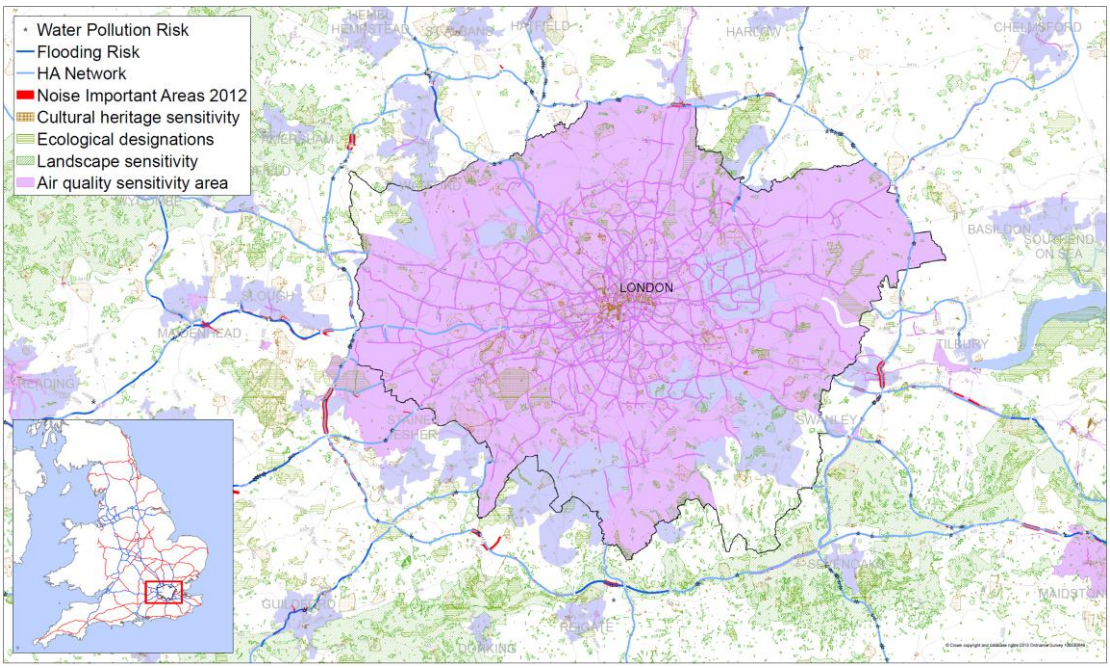
A2.4.13 to A2.4.16

Flooding

The Connect Plus *Severe Weather Plan* includes the following plan showing sites which are known to be prone to flooding within the DBFO contract area. Hotspots are based on Connect Plus' experience of operating the network. Problems can be caused by maintenance defects, severe weather, or a combination of the two. The plan does not show the cause or the frequency of occurrence, although more details can be found in Section 1.3.4 of the document.



Sites prone to flooding can also be identified from a top-down analysis of catchment, ground conditions and topography. The Agency's Environment plan uses data held in the HADDMS database to highlight such sites with a dark blue line, however there are few of these and they do not coincide with Connect Plus' hotspots.



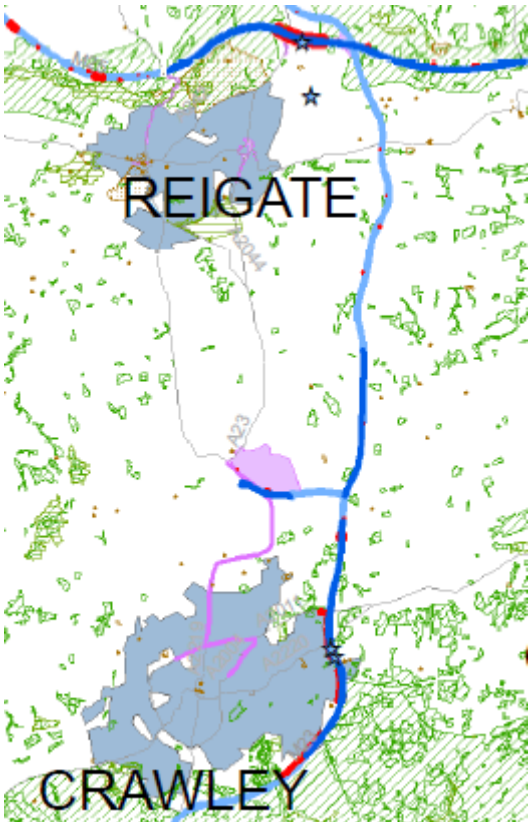
The Connect Plus *Network Resilience Action Plan* independently identifies a number of flooding hotspot locations, as shown in the extract below.

Road	From	To	Description	Cause	Effect	Category
M25	7	7	Flooding	Severe weather / inadequate drainage	Congestion / Incidents	Flooding
M25	10	11	Flooding	Blocked drainage	Congestion Incidents	Flooding
M25	5	6	Flooding	Severe weather	Incidents / Congestion	Flooding
M25	9	10	Flooding	Loss of lane availability	Congestion / Incidents	Flooding
M1	4	5	Surface water (Hot spots)	Heavy rainfall, drainage failure	Loss of lanes partial lane closures	Flooding
M1	4	5	Flooding from adjacent land	Farmer fields, ditch, climate change, severe weather, etc	Flooding / standing water / RTC	Flooding

The Connect Plus *Climate Change Adaptation Strategy* verifies several sites - M25 junctions 5 to 6, junctions 9 to 10 and junctions 11 to 12 - as high flood risk locations; however through discussions with Connect Plus, the issues are not severe and between junctions 5 and 6 have been resolved. There are traffic signs between junctions 10 and 11 that warn drivers of flooding, however Connect Plus believe that these are historic and that this section of the route is no longer prone to flooding. Overall, Connect Plus' view is that the route is not vulnerable to flooding. The highest risk site identified is M1 junctions 4 to 5, which has a risk rating of severe. At this site, Connect Plus has identified cross carriageway flowing water from neighbouring fields from Hill Field footbridge to A41 Green bridge. The Agency's Environment plan highlights a flood risk area further north of junction 5.

Increased flooding events in the winter months from increased rainfall due to climate change is highlighted as the top risk in the *Climate Change Adaptation Strategy*. This means that the number of high risk sites is likely to increase, and the impact of these events is likely to worsen in future.

The extract from the Agency's Environment plan that follows for the M23 to Gatwick suggests there are areas at risk of flooding around junction 9a and north of junction 9, however there is no evidence from the Area 4 Managing Agent Contractor that flooding has occurred in these areas.



A2.4.17 to A2.4.20

Severe Weather (non-flooding)

The table below is derived from the Connect Plus *Network Resilience Action Plan*, and shows various severe weather issues highlighted.

Road	From	To	Description	Cause	Effect	Category
M25	5	7	Poor Visibility	Fog	Increased risk of incidents	Severe Weather - Fog
M25	8	8	Extreme visibility	Fog / Sun glare	Congestion Incidents	Severe Weather - Fog
A3			Heathland fires	Dry Summers, Littering, veg management.	Poor visibility, Carriageway closure	Severe Weather - Heat
A30			Heathland fires	Dry Summers, Littering, veg management.	Poor visibility, Carriageway closure	Severe Weather - Heat
M3	1	3	Heathland fires	Dry Summers, Littering, veg management.	Poor visibility, Carriageway closure	Severe Weather - Heat
M25	7	8	Snowfall results in gridlock main carriageway and slips (Reigate Hill)	Snow	Congestion	Severe Weather - Snow & ice
M25	1	31	Severe weather on bridge decks	Snow / ice	Ice / snow slow to dissipate from bridge decks, asset damage	Severe Weather - Snow & ice
M25	24	25	Area vulnerable to severe weather	Snow / ice / heavy rain	Accidents / congestion / closures	Severe Weather - Snow & ice
M25	26	28	Jack knifed lorries / snow / weather	Weather / snow etc.	RTC / stranded vehicles	Severe Weather - Snow & ice
M25	26	27	Slow lorries and icy roads	Steep hill	Potential for increase in incidents	Severe Weather - Snow & ice
A2	A2 B	M25 B	Significant gradient	Severe weather susceptibility	Congestion	Severe Weather - Snow & ice
M1	4	4	Link to A41 freeflow	Loss of control in severe weather	RTCs	Severe Weather - Snow & ice
M25	18	18	Impact of steep gradient in winter conditions	Snow / ice, alignment	Stuck HGVs, congestion	Severe Weather - Snow & ice
M25	20	21	Gade Valley Viaduct vulnerable to severe weather	Winter weather, snow/ice	Stuck HGVs, congestion	Severe Weather - Snow & ice
M25	20	21	Steep climbs, need for establishing Winter Service requirement	Snow / ice	Potential closure additional gritting	Severe Weather - Snow & ice
M25	5	4	Steep incline	Lack of grip on incline for HGVs in severe winter weather	HGVs stuck on incline, congestion	Severe Weather - Snow & ice
M25	8	9	Steep hill on approach to Jct 9	High speed / driver behaviour	Incidents / Closures	Severe Weather - Snow & ice
A282			Severe Weather	High winds	Bridge closure, congestion	Severe Weather - Wind
A282			Bridge closure in high winds	High winds	Short - long term closure	Severe Weather - Wind
M1	4	6	Catenary lighting	High Winds	Falling Luminaries	Severe Weather - Wind

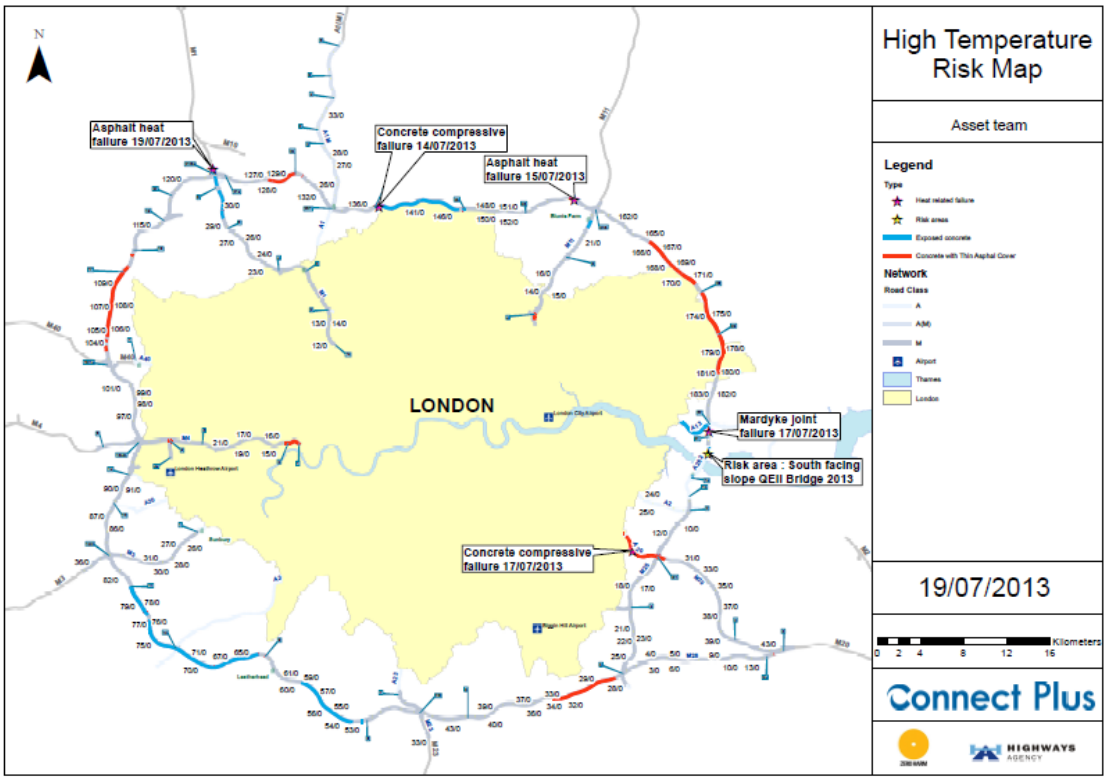
Fog

M25 junctions 5 to 8 are cited above as vulnerable to fog forming.

Heat

Heathlands in the Staines and Esher area (A3, M3 and A30) are cited above as a fire risk in the summer months.

A number of pavement failures occurred on the network during the hot summer of 2013, which are shown on the plan prepared by Connect Plus that follows. Compressive failures of joints in concrete pavement and heat failures of asphalt are a risk. The south facing slope of the QEII bridge can attract high surface temperatures and therefore is at risk of pavement failure.



The Connect Plus *Climate Change Adaptation Strategy* Bridge identifies that bearings and joints across the network are at increased risk of failure from increases in temperature resulting from climate change.

Snow and ice

Parts of the network are vulnerable to snow fall, particularly where the network is undulating and gradients are steep. Locations identified in the *Severe Weather Plan* are: M25 J3 slips; M25 J4 slips; M25 J4-J5; M25 J5 slips; M25 J8 slips; M25 J7-8 (clockwise); M25/M4 slip; M25 J16-J19; M25 J23-J25; M25 J27-J28; M25/ M11 slip; M1 J1-2 slip; and M1 J4-J5.

Through discussions with Connect Plus, the most vulnerable of these locations have been highlighted in the main report.

Bridge decks are susceptible to ice forming and damage to the asset, particularly the biggest structures such as Gade Valley Viaduct and New Haw Viaduct.

High Winds

The impact of high winds is usually localised and difficult to predict. The *Climate Change strategy* highlights several high risk locations, of which Dartford Crossing has a history of being closed to traffic due to high winds about once per year:

- Road closure - Dartford Crossing (QEII bridge)
- Falling trees – J18-J19 and A3
- Asset failure (e.g. signs, lights and gantries) – M1 and M25 J29
- Overturn of vehicles – M25 J29

Such failures will be increasingly likely under climate change forecasts. For example, data from Connect Plus in March 2014 shows that the QEII bridge was closed nine times due to high winds during the winter 2013-2014.

M23 to Gatwick

This section of the route is not particularly susceptible to severe weather, although Gatwick airport is sensitive to incidents or closures. The most vulnerable locations are listed below, but they are not significant enough to highlight in the main report:

- M23 Coopers Hill viaduct – susceptible to high winds, icing, snow and fog, although it has not experienced problems in practice.
- M23 Tilgate Park Railway Bridge – susceptible to ice forming, although it has not experienced problems in practice.
- M23 Junction 9a to A23 Gatwick north roundabout – a history of congestion including in winter weather.

A2.5 Technology

The evidence used to compile this section is listed in the Bibliography. In addition, meetings were held with Connect Plus on 22/10/2013 and 7/11/2013; the Agency 'Videolink' site was consulted for CCTV; the Agency's Enforcement team made a presentation in November 2013; public websites such as Google maps were consulted; and correspondence was carried out with the TechMAC team maintenance contractors.

Evidence not received or reviewed:

- Area 4 TechMAC information. This would provide more details for the M23 to Gatwick. Area 4 has not provided to date.
- Technology details of the Dartford Free Flow Charging scheme. Further time needed to discuss with DFFC team. This evidence is not considered essential for this study
- Confirmation of technology coverage north of the Thames from the East TechMAC
- COBS / Site Data plans from Intelligent Transport Systems, showing the locations of technology on the route. This would be useful to verify the existing technology. The plans were too large to be supplied.

A2.5.1 to A2.5.12

Roles and responsibilities

Currently, in the DBFO contract area, Connect Plus maintains the technology for the Dartford crossing and the loops in the highway, including at the ramp metering sites. All other technology, including the cables and feeder pillars that serve the loops, is maintained by two TechMACs – the East TechMAC north of the Thames, and the South TechMAC south of the Thames.

In April 2014, a single Road Technology Maintenance Contract (RTMC) will be created to cover the M25 region, which will be administered by Connect Plus. This will supplement the DBFO contract, and will cover all M25 technology, except for Dartford Free Flow Charging, which will be administered by the Agency; and the loops which will remain in the DBFO contract. The M23 will switch over to a new RTMC for Area 4 at the same time.

General provision on road links

The table that follows is based on discussions with the TechMACs, with the boxes in red showing draft information as this has not yet been verified by the East TechMAC. The table shows the overall provision of technology on the route. All the motorways have basic facilities in place:

- Emergency telephones, normally located at 1.0-1.5km intervals.
- Surveillance CCTV to give real time information to assist with the control of traffic.

- The National Motorway Communications System, which provides facilities for the Police Control Offices to operate motorway communications and to answer calls from emergency telephones.

Road	Section	Telephones	CCTV	Motorway signals (Electronic Message Signs)			Controls	Controlled Motorway
				MS1	MS2-4	Gantry	MIDAS	
M25	J1b-3	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	J3-5	Yes	Yes	Yes	Spot locations	No	Yes	No
	J5-7	Yes	Yes	No?*	Yes*	Yes*	Yes?*	Yes u/c*
	J7-10	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	J10-16	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	J16-23	Yes	Yes	Yes	Yes	Yes	Yes	Yes u/c*
	J23-27	Yes	Yes	No?*	Yes*	Yes*	Yes?*	Yes u/c*
	J27-30	Yes	Yes	Yes	Yes	Yes	Yes	Yes*
A282	J30-1b (Dartford)	Yes	Yes	Yes	Spot locations?	Yes	Yes	No
M1	J1-6	Yes	Yes	Yes?	Yes	No	?	No
A405	M1-M25 link	No	No	No	No	No	No	No
M4	J1-3	Part	Yes	Yes	Spot locations	Part	Part	No
	J3-4b	Yes	Yes	No?*	Yes*	Yes*	Yes*	Yes future*
A3113	to Heathrow	?	?	?	?	?	?	No
A30	to TfL boundary	?	?	?	?	?	?	No
M3	J1-2	Yes	Yes	Yes	Yes	Yes	Yes	No
A3	to TfL boundary	No	Yes	No	Yes	No	No	No
A23	to TfL boundary	No	No	No	No	No	No	No
M23	J8-9	Yes	Yes	Yes*	Yes	Yes	Yes*	No
A20	to TfL boundary	No	No	No	Yes	No	No	No
A2	to TfL boundary	Yes	Yes	Yes	Yes	Yes	Yes	No
A13	to TfL boundary	No	No	No	No	Spot	No	No
A1089	to Tilbury	No	No	No	No	No	No	No
M11	J4-6	Yes	Yes	Yes?	No?	No?	No	No
A1	to TfL boundary	?	?	?	?	?	?	No

* - is when the 'Smart' motorways are installed on these sections as underway or committed in future.

The sections that follow give more details of the technologies identified in the table.

CCTV coverage

The Agency's VideoLink shows all the camera positions on a live web map. This shows that the A1, A405, A30, A23, A20, A2, A282 (Dartford crossing), A13 and A1089 are not covered, although TechMAC has clarified that the A2 is actually covered and that there are CCTV cameras on the Dartford crossing not shown on VideoLink.

Enforcement technology coverage

Discussions with the Agency's Enforcement team have identified four types of safety camera technology that are in use or are being developed for use on the route:

- HADEX 2 & 2.5 cameras – one camera per lane mounted on the gantries. These are in place on most of the M25 (excluding J3-J5) but not on the radial stubs and tails. HADEX technology is not used on trunk roads.
- HADEX 3 cameras – one camera on the gantry covers all lanes, with a verification camera separately mounted to view the speed limit signs. This technology is being developed to install on the new smart motorways, and is not yet in place.
- Average Speed Cameras – a pair of these at the beginning and at the end of the controlled section of route, suitable for a fixed speed limit, and often used

for road-works. These are in use on the A282 Dartford crossing in both directions and are installed on the M3 J2 outbound from London. There are proposals to introduce this on the A13 from west of M25 J30 to the A1089 as part of a congestion relieving scheme.

- Fixed cameras – there are eight 'GATSO' cameras on the network – one on the A3 (near Hook), one on the M11 (near junction 4 TfL boundary), one on the Heathrow Terminal 5 spur road and five on the M4 (junctions 3 to 2). Following a national review of fixed safety cameras on the SRN, these are being phased out, because they need manual change of film, and the film is now difficult to develop. The recommendations are to upgrade the A3 camera and the M4 cameras to an Average Speed Camera system; and to change the M11 and Heathrow T5 cameras to fixed digital cameras.

The M23 does not have enforcement technology, but the smart motorway pipeline scheme should include HADEX cameras in its scope. The smart motorway pipeline scheme for M4 junctions 3 to 12 includes junctions 3 to 4b, which should include HADEX cameras as well.

ANPR cameras

From discussions with the TechnMACs, it is understood that the network is fully covered with these cameras, and that there are no gaps or issues.

Variable Message Signing (VMS)

The *M25 Route Management Study* identified that motorway signals have evolved over time:

- MS1s – post mounted central reserve signs that can display speed restrictions, land restrictions and fog warnings. These will generally be phased out in favour of near-side mounted signs such as MS3 and MS4, which are easier and safer to access and maintain.
- MS2s, 3s and 4s – cantilever mounted signals that comprise a variable or enhanced message sign, on two or more lines.
- Gantry mounted signals – similar to the cantilever mounted signals, but mounted on gantries.

From discussions with the TechMACs, the M25 and Dartford crossing are now well covered. The main gaps are the M11; the M4 elevated (east of junction 3); and some trunk roads, such as the A405, A23, A13 and A1089.

MIDAS

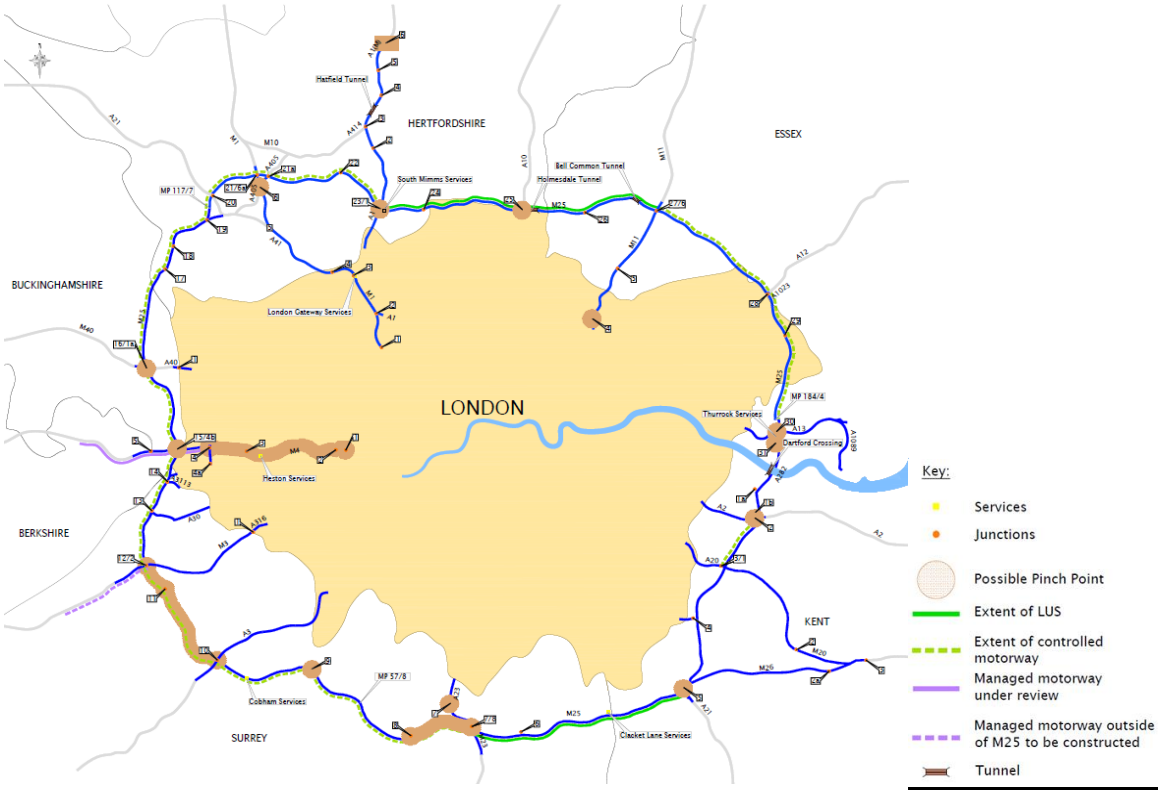
The Motorway Incident Detection and Automatic Signalling system (MIDAS) uses inductive loops in the carriageway to detect the movement of traffic and formation of queues. MIDAS then automatically sets suitable signals on overhead gantries, such as variable speed limits, to warn approaching traffic. MIDAS can support controlled motorways as well (see below), the difference being that it sets mandatory rather than variable speed limits on the gantries.

MIDAS covers most of the M25, and when the committed schemes from junctions 23 to 27 and junctions 5 to 7 are complete by 2015, and the pipeline scheme on the M23 is complete, it will cover most of the route. The gaps would be the M25 junctions 3 to 5, the A-roads, the M1, the M11 and M4 east of junction 3. A proposal was developed

to install MIDAS on the M4 to create a controlled motorway prior to the Olympic Games, but this did not secure funding.

Controlled motorways

The controlled motorways have different technology on the gantries – with mandatory speed limits, rather than advisory. The plan that follows was prepared by Connect Plus, and shows the extent of controlled motorway with a dotted green line, illustrating the point that it will be in place on almost the entire M25 once the committed and pipeline schemes are complete. The gaps will be junctions 3 to 5, A282 Dartford crossing and all radial trunk roads and motorways.



Smart motorways

These are being installed on M25 junctions 23 to 27 and junctions 5 to 7 to complete in 2015. They bring together various new technologies including the next generation of VMS and HADEX 3 cameras, otherwise in technology terms are similar to controlled motorways. They will also make use of MIDAS.

Control of the motorway signals

All VMS, MIDAS, controlled and in future, smart motorways display signals that are controlled from computers in the Regional Control Centres (RCCs), called Control Office Based Systems (COBS). The COBS only operates these signals – other technology such as CCTV and traffic signals is operated separately.

The M25 is split into two Traffic Management Directorates (East and South East) and has two RCCs, which run different technology platforms (CIRCO north of the Thames and PEEK south of the Thames). In addition, the Metropolitan Police and adjoining authorities, such as Transport for London, are also running different systems. This

has been raised as an issue by TMD when communicating consistent messages to the public around the M25.

Summary of recent upgrade projects

This information is taken from the Agency's website.

- M25 J16-23 – gantry mounted and cantilever signals and MIDAS. Completed
- M25 J23-27 Smart motorway – gantry mounted and cantilever signals. Completes 2015.
- M25 J27-30 – gantry mounted and cantilever signals and MIDAS. Completed
- M25 J1b-3 – gantry mounted and cantilever signals and MIDAS. Completed
- M25 J5-7 Smart motorway – gantry mounted and cantilever signals. Completes 2015.
- M25 J7-8 - gantry mounted and cantilever signals. Completing early 2014.

Dartford

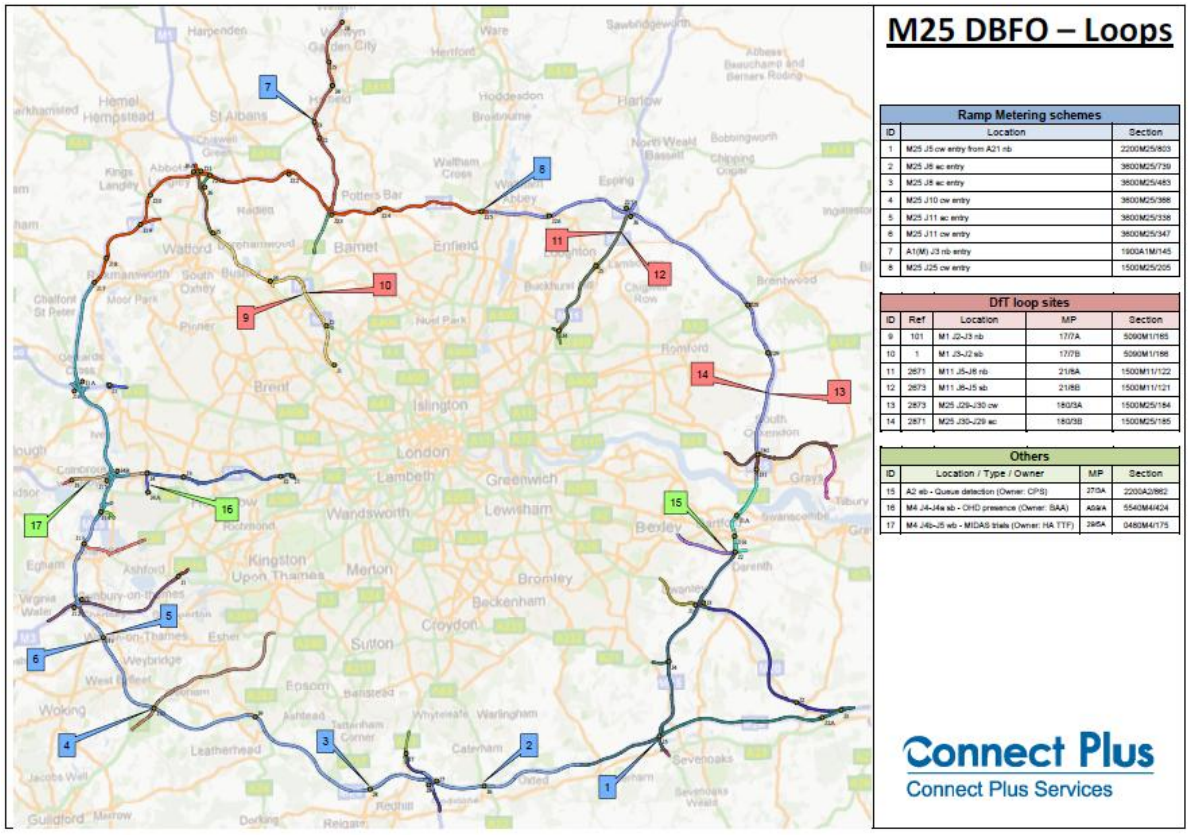
The technology to support the Dartford Free Flow project is due to be operating by 2015.

Ramp metering

Ramp metering has been in use across the Agency since April 2008 and it is currently operational at approximately 90+ sites across the strategic road network. Installation was driven by schemes and projects wishing to deploy some form of traffic management.

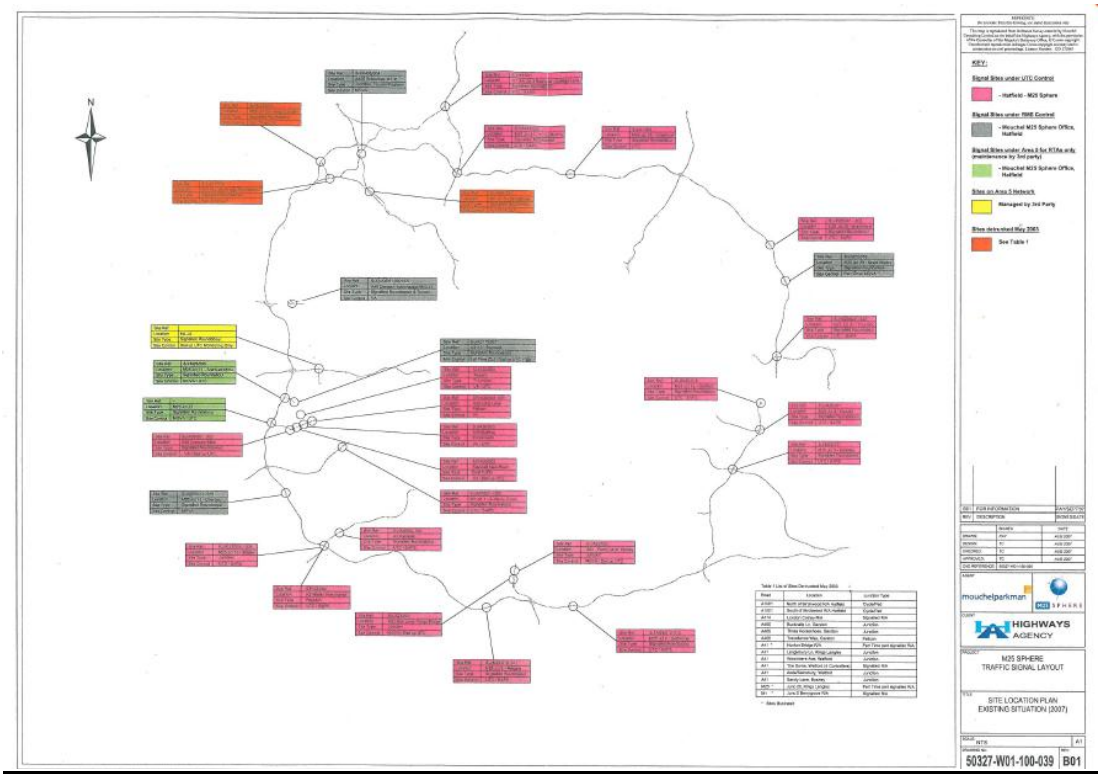
The plan that follows was prepared by Connect Plus and shows all the loops that are not MIDAS or NTIS: the ramp metering loops are shown in blue. Eight sites are listed, but one is on the A1(M), therefore not on this route, and through discussions with Connect Plus three at M25 junction 5, junction 10 and junction 25 have been decommissioned, although the loops remain in the ground. This leaves four sites operating on the route:

- M25 junction 6: one site (anticlockwise on-slip)
- M25 junction 8: one site (anticlockwise on-slip)
- M25 junction 11: two sites (clockwise and anticlockwise on-slips)



Traffic signals at junctions

The plan that follows shows the location of traffic signal sites collated by the previous Managing Agent, Mouchel. The boxes in orange highlight de-trunked sites.



The table that follows has been collated from various sources including the plan above, Schedule 3 of the DBFO contract, discussions with the TechMACs and public mapping. It shows the responsibilities and technology on all the 62 junctions on the route. Signalled junctions are shown in blue – dark blue for a TechMAC site, where the Agency is responsible; and light blue where another authority, such as TfL, is responsible. This indicates 32 signalled junctions, of which 24 are TechMAC and eight are local authority. More than half the junctions run on signals, but only two run on SCOOT control.

Some junctions are not Agency highway, but the Agency operate the signals. This is because in the past a perceived benefit to the Agency was identified to protect the adjacent strategic road network. These are M25 junctions 6, 8 and 11; M3 junction 1; and A3 Painshill. Conversely, there are junctions such M4 junction 3 and M25 junction 31 where the Agency owns the highway, but does not control the signals.

M25 junctions	Type	Description	Other M junctions	Type	Description	A road junctions	Type	Description
1a		Free flow dumb-bell roundabout	M4 1	(TfL)	Signalled roundabout	A282/ M25		(see M25 J31, J1a)
1b	UTC	Signalled roundabout	M4 2		Free flow grade separated interchange	A405/ M25 & M1		(see M25 J21A, M1 J6)
2	UTC	Signalled roundabout	M4 3	SCOOT (TfL)	Signalled roundabout	A3113/ A3044 Stanwell Moor	UTC	At-grade signalled roundabout
3	UTC	Signalled roundabout	M4 4	UTC	Signalled roundabout	A3113		(see M25 J14)
4		Free flow two level roundabout	M4 4a	(BAA)	At-grade signalled gyratory	A30/ A308 Crooked Billet	UTC	At-grade signalled roundabout
5		Free flow interchange, 8 out of 12 movements	M4 4b		(see M25 J15)	A30/ B378 Bulldog	UTC	At-grade signal crossroads
6	UTC	Signalled roundabout	M1 1	(TfL)	Partially at-grade signalled roundabout	A30/ M25		(see M25 J13)
7		Free flow four level interchange	M1 2		Free flow interchange	A3/ A245 Painshill	UTC	Grade-separated signalled roundabout
8	UTC	Signalled roundabout	M1 3 S'Wood		Free flow interchange, service area only	A3/ A244 Copsem Lane		Grade-separated roundabout
9	MOVA	Split free flow roundabouts; 1x part time signalled roundabout	M1 4		Free flow roundabout, movements to and from A41(S) only	A3/ M25		(see M25 J10)
10	UTC	Signalled roundabout	M1 5	CLF (Herts)	Signalled roundabout	A23 Star Lane	UTC	At-grade signalled crossroads
11	MOVA	Signalled roundabout	M1 6		Give-way part cloverleaf (Note: signal U-turn adjacent to junction)	A23 Netherdene Drive	UTC	At-grade signalled T-junction
12		Free flow interchange	M1 6a		(see M25 J21)	A23/ M23		(see M23 J7)
13	UTC	Signalled roundabout	M3 J1	UTC	Signalled roundabout	A20/ M25		(see M25 J3)
14	UTC	Signalled roundabout	M3 J2		(see M25 J12)	A2/ A2018		Grade-separated roundabout
15		Free flow four level interchange	M23 J7		Free flow interchange	A2/ M25		(see M25 J2)
16		Free flow interchange	M23 J8		(see M25 J7)	A13/ A1089		Free flow interchange
17		Free flow roundabout	M23 J9		Partially signalled roundabout (leading to Airport Way free flow roundabout)	A13/ A1012		Grade-separated roundabout
18	(Herts)	Signalled roundabout	M11 J4		Free flow interchange	A13/ A126		Grade-separated dumb-bell roundabouts, 4 out of 6 movements possible
19		Free flow interchange	M11 J5		Free flow/ give way, movements to and from M11 south only	A13/ M25		(see M25 J30)
20	CLF (Herts)	Part-time signalled roundabout	M11 J6		(see M25 J27)	A1089 Asda roundabout		At-grade roundabout
21		Free flow interchange, 4 out of 8 movements				A1089/ A126 Marshfoot		Grade-separated interchange and roundabout
21a		Free flow roundabout with restricted movements				A1089/ A13		(see A13/ A1089)
22		Free flow dumb-bell roundabout				A1/ M25		(see M25 J23)
23	UTC	Signalled roundabout						
24		Free flow roundabout						
25	UTC	Signalled roundabout						
26		Free flow roundabout						
27		Free flow two level interchange						
28	UTC	Signalled roundabout						
29	MOVA	Signalled roundabout						
30	MOVA	Signalled roundabout, with SCOOT fallback						
31	(Thurrock)	Signalled roundabout						

Key

Contract road
Other authority road
50:50 contract road and other authority
Area 8 contract road
TechMAC operated and maintained
Other authority operated and maintained

Technology resilience

The following table is taken from the Connect Plus *Network Resilience Action Plan*.

Road	From	To	Description	Cause	Effect	Category
M25	1	31	Visibility of incidents	Lack of CCTV, TOS, VMS on some stubs/tails	incident occurs in an area where there is no coverage, Slower response; unable to inform road users	Technology
M25	8	8	Signals	Not RCC controlled	Congestion / Incidents	Technology
M1	1	6	High speed	Road prone to speeding users / lack of cameras/signage	RTCs	Technology
A23			Lack of visibility	no TOS, VMS, CCTV	Slower response; unable to inform travellers	Technology
A282			Technology control of Dartford signalling	No back-up in case of plant failure	Temporary misuse of signals	Technology
M25	30A	30A	CCTV at 30A	Lack of coverage	Visibility to SERCC	Technology
M4	4a	4	Lack of VAS/VMS to warn of incidents on Network	Lack of information to public	Confusion / unnecessary driver movements	Technology
M25	1	31	Enforcement of route	No enforcement cameras	Speeding / non compliance with law	Technology
M25	9	9	Signalled junction	Not 24 hr Signals	Congestion / Incidents	Technology
M25	2	3	Technology - controlled MIDAS cameras not commissioned as part of widening works	3rd party contractors	Inability to warn, inform, and identify incidents	Technology
M3	1	2	CCTV Coverage	Lack of coverage	Lack of visibility / poor recovery / response	Technology
A30			CCTV	Lack of CCTV	Lack of visibility / poor recovery / response	Technology

A2.6 Vulnerable road users

A2.6.1

This is a generic comment which has been surmised following limited feedback from stakeholders during the workshop event and subsequent contact with Public Rights of Way (PRoW) officers.

A2.6.2

Data has been extracted from Network Cycle Network website:

http://www.sustrans.org.uk/ncn/map?lat=56.54737192673878&lng=-3.142090281250036&zoom=5&route-type=all-routes&filters=

A2.6.3

Data has been extracted from National Trails website:

http://www.nationaltrail.co.uk/

A2.6.4

Feedback from PRoW officers at Essex and Kent County Council's provide the evidence for this statement. The following transcripts are taken from email correspondence with the two authorities:

"Concerns have been raised that the bridge over the M11 where BR1 Theydon Garnon (Essex Way) crosses, is particularly alarming for equestrians – the parapets are too low and of open railing type construction, so horses could be scared by the sight of traffic approaching the bridge. Previous calls for the parapets to be filled in were rejected due to the 'wind-loading' effect on the bridge (a narrow strip was filled in, near bridge deck level). Another proposal raised, but not carried out, was to provide mounting blocks at each end of the bridge, allowing riders to dismount and lead their horses over and re-mount. These could be within pens, to prevent horses running away, if scared by the noise of traffic on the motorway. I understand

Bridleway 62, Stansted Mountfitchet is a similar problem where it passes over a slip road for the M11 at J8." Garry White, Essex Highways

"Bridge parapets: These were almost universally were of a standard inadequate for equestrian use and as such deterred equestrians form crossing motorways via bridges. There is some work to be done to identify those crossings of greatest value to equestrians as I expect that latent demand will reflect the quality of the linking PROW and Road networks for equestrian users." Graham Rusling, Public Rights of Way & Access Manager for Kent County Council

A2.6.5

Comments from PRoW offers provide evidence of a lack of lighting and flooding in underpasses.

"Generally, underpasses for the M11 & M25 have no lighting or where lighting is provided, it does not work satisfactorily." Garry White, Essex Highways

*"Two underpasses in the Swanley area carrying PRoW and farm traffic have been an issue for over 20 years. I suspect that the initial drainage design was inadequate as a result of which they are continually flooded. Clearance by either the HA or KCC demands revenue funding that is simply not available. A fundamental re design / rebuild of the drainage systems is required."*Graham Rusling, Public Rights of Way & Access Manager for Kent County Council

A2.6.6

Specific schemes highlighted in this paragraph are detailed in Table 3.3 of the Evidence Report

A2.7 Environment

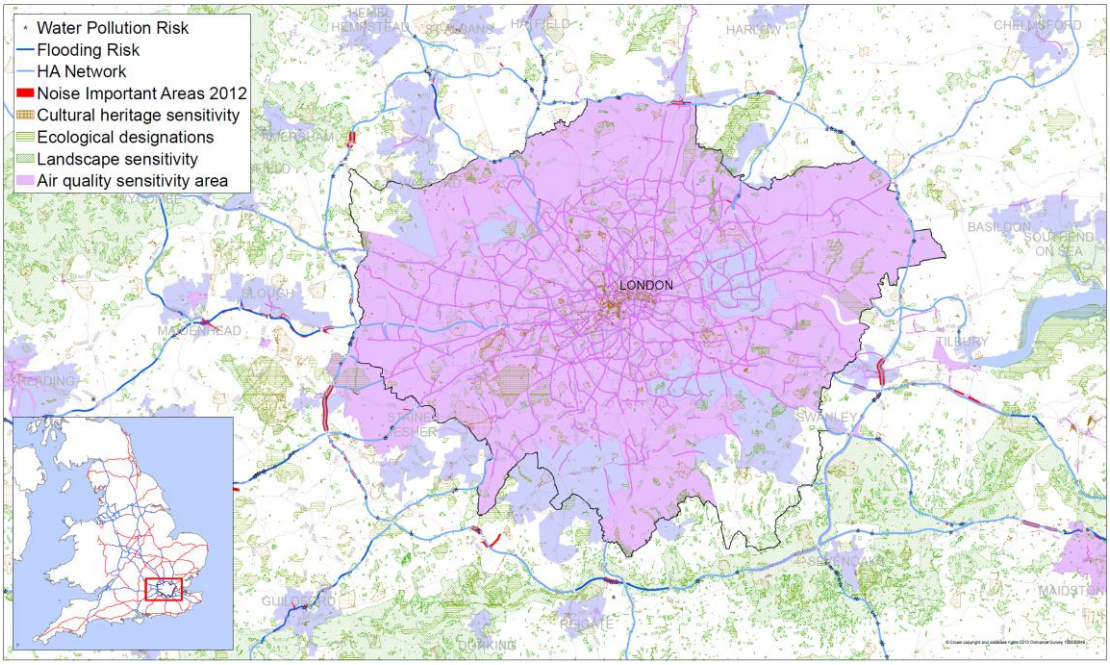
The evidence used to compile this section is listed in the Bibliography. In addition, a meeting was held with Connect Plus on 12/11/2013, and some use was made of the public websites Magic.gov.uk; DEFRA; and Natural England. The Agency's Environment plan has also been used.

Evidence not considered essential for this study:

- Data that underpins the Environment Plan. This would verify the information collected. This may be available through the Agency's GIS systems.
- Further investigation of the detailed information available on Magic.gov.uk; DEFRA; and Natural England.
- Environmental Statements and Assessment reports for the M25 widening projects. Large parts of the M25 have been widened in recent years, and the following reports are available to review: J12-J15 (1994); J16-J23 (2007); J23-J27 (2012); J27-J30 (2007); J1b-J3 (2006); J5-J7 (2012). There has not been time to review these, but this might be appropriate for Stage 2 of the RBS process if any schemes are being considered along these parts of the route, so that local sites and environmental issues can be checked.
- Site specific noise plans. Several hundred of these have been drafted by the Agency.

- Local authority AQMAs and action plans. The key issues should have been picked up in the Connect Plus *Air Quality Management Plan*.
- Ad-hoc ecological inspections of assets as part of the Connect Plus watching brief to manage ecological issues across the network, for instance ponds and ditches have been inspected as part of the surface water drainage survey process. This information is incomplete, and therefore is not part of the evidence base.
- JNCC website can be used to pick up specific species in specific locations, but there has not been time to carry out these checks. If needed, they could be done when individual schemes come forward.
- Local authority local plans, for instance to review details of local landscapes.

The Agency's Environment plan for the London Orbital area is shown below. This will be referred to in the sections that follow. The layers of information overlap, so additional plans have been sourced to provide clarity.



A2.7.2 to A2.7.8

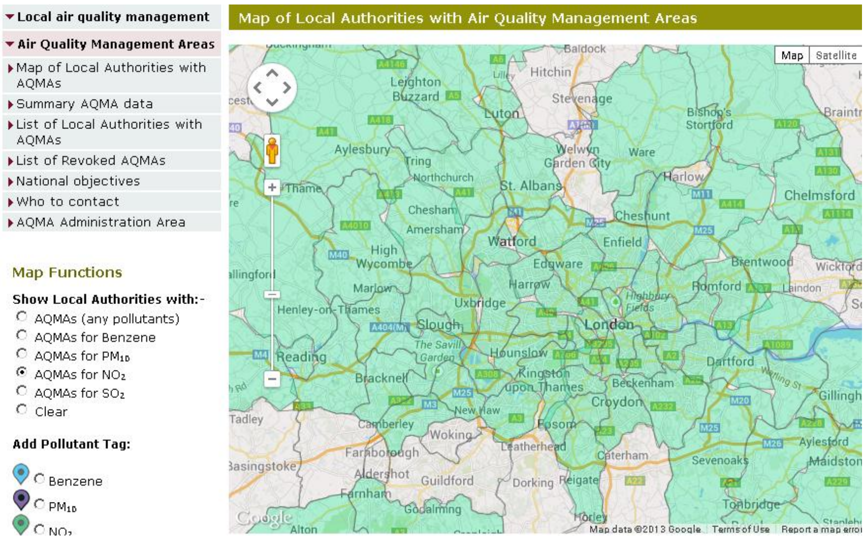
Air quality

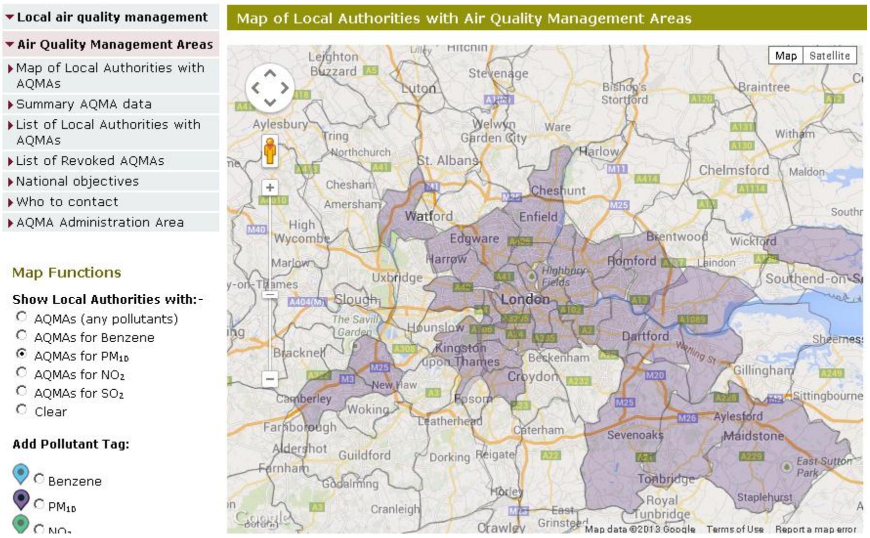
The main sources of evidence are the Connect Plus *Air Quality Management Plan* and DEFRA.

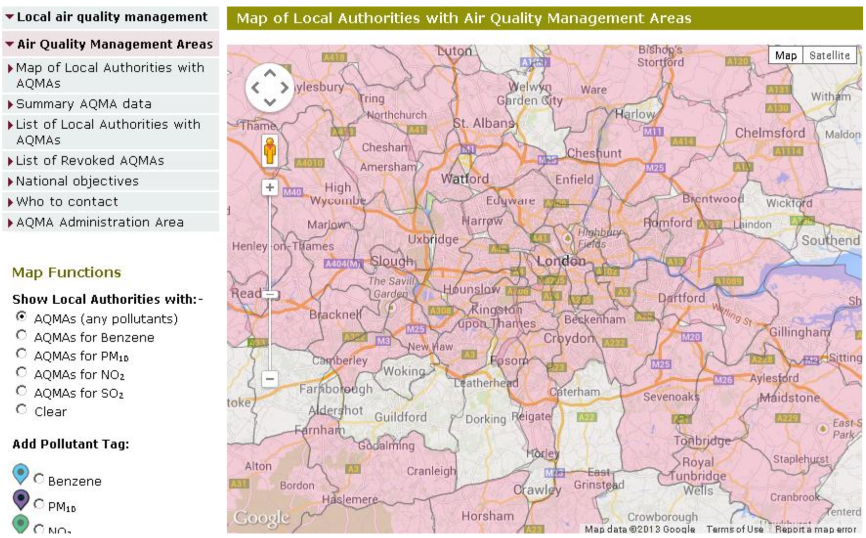
The plans that follow are taken from the DEFRA website, http://aqma.defra.gov.uk/aqma/maps.php, and show Air Quality Management Areas (AQMAs) for:

- NO2 in green (clearly NO2 is the key pollutant);
- PM10 in purple;

- any pollutants in pink.

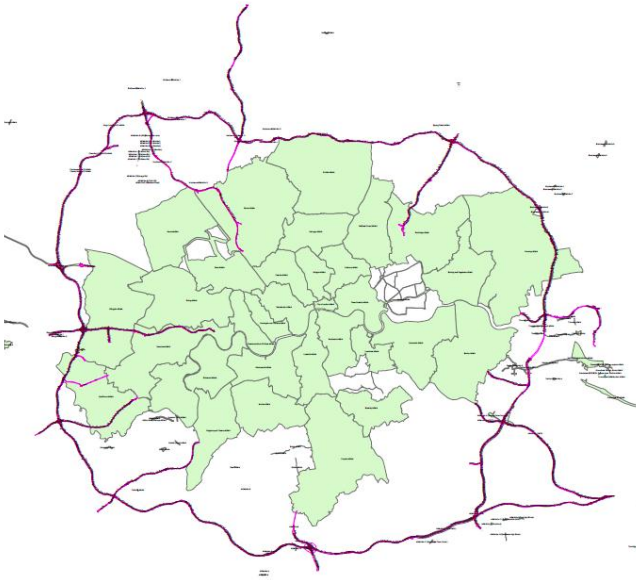




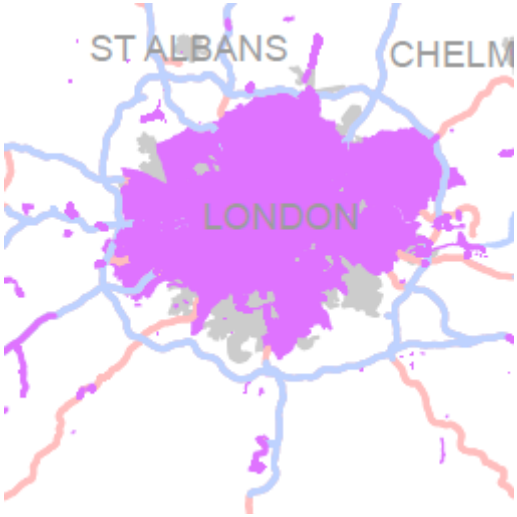


AQMAs can be whole, or part, of an authority. DEFRA's summary maps do not show the specific parts, which are often AQMAs for just a few properties within an authority

area, therefore the actual extent of AQMAs is smaller than shown on these maps. Connect Plus has a plan of the AQMAs (2011) affecting the M25 DBFO area, shown in green below. This matches the 'air quality sensitive areas' plan on the Agency's Environment plan (coloured purple). The Connect Plus plan is understood to be up to date, except for Hooley on the A23 and for an AQMA on the M25 near Egham, which is defined as a narrow strip between junctions 11 and 13 of the M25.



The Agency's plan that follows shows the AQMAs for the wider area including the M23 to Gatwick. It shows no AQMAs on the M23 corridor, but an AQMA around Gatwick near junction 9a and Airport Way.



The AQMAs do not show the locations with the highest levels of exceedance. Also, not all exceedances are within designated AQMAs, but outside the AQMAs, there is less information and therefore less evidence of where the problems are.

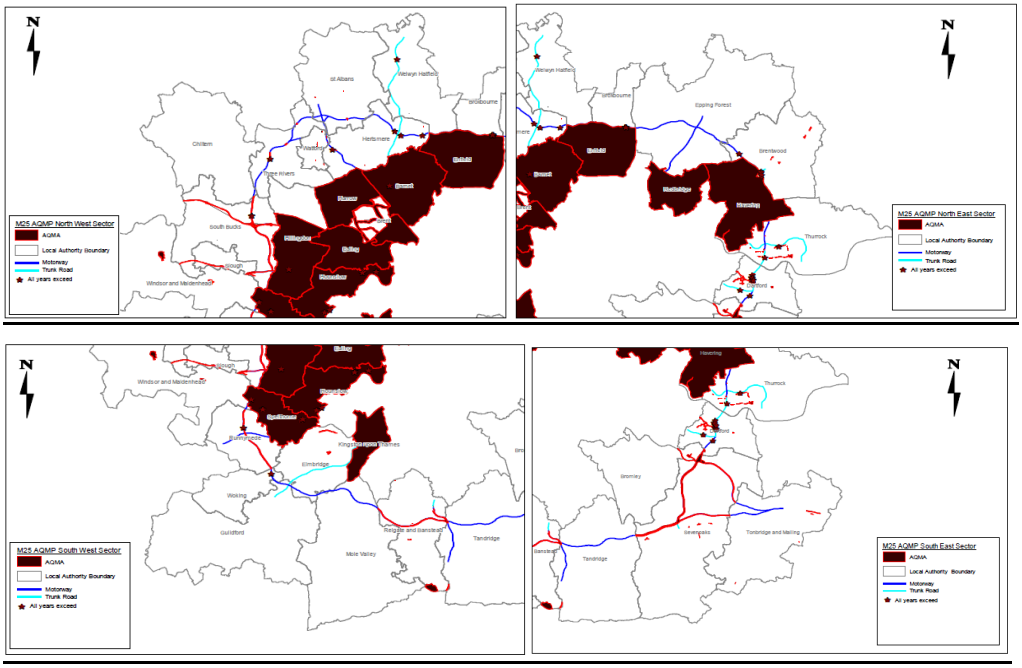
Generally, areas of congestion have poorer air quality, and air quality improves with distance from the carriageway. There are seasonal fluctuations, consequently monitoring sites need to be in place for over a year.

The M25 passes through 37 local authority areas, all of whom were contacted by Connect Plus to provide their air quality monitoring data. The small circular blobs on the plans below (*taken from the Air Quality Management Plan*) show individual local

authority monitoring sites with consistent exceedances of European air quality limits of nitrogen dioxide. These are based on data from 2004-2008. The map shows that:

- Approximately 18 (17 excluding A1(M) which is not on the route) locations outside the AQMAs showed consistent exceedances over the last 2-5 years.
- There is a cluster of sites around the Dartford crossings, and a number of sites in the north-east, north, north-west, west and south-west quadrants of the M25.

Although no sites are shown in the south and south-east parts of the M25, Sevenoaks District Council has declared a narrow AQMA corridor between junctions 2 and 6 (reference http://aqma.defra.gov.uk/1aqma/aqma_detail.php?aqma_id=626).



Problem areas include those where poor air quality impacts on sensitive receptors.

In their *Air Quality Management Plan*, Connect Plus identified 26 sensitive receptors (houses, schools, hospitals etc) for the M25 DBFO area – but outside the AQMAs - within 200m of the strategic road network as shown in the table below. They are mostly scattered within Surrey, Kent and Essex.

Table 4.3 – Points of Relevant Exposure outside AQMAs

Local Authority	Easting	Northing	Scheme Section Affected
Tandridge	531154	151754	M23 between Junctions 8 and 9
Tandridge	538426	153841	M25 between Junctions 5 and 6
Tandridge	536943	152812	M25 between Junctions 5 and 6
Tandridge	536791	153057	M25 between Junctions 5 and 6
Tandridge	533855	152777	M25 between Junctions 6 and 7
Tandridge	533108	152819	M25 between Junctions 6 and 7
Tandridge	532819	152840	M25 between Junctions 6 and 7
Tandridge	531146	153343	M25 between Junctions 6 and 7

Local Authority	Easting	Northing	Scheme Section Affected
Tandridge	531239	152962	M25 between Junctions 6 and 7
Mole Valley	520478	155567	M25 between Junctions 8 and 9
Mole Valley	520220	156052	M25 between Junctions 8 and 9
Mole Valley	516395	158466	M25 between Junctions 8 and 9
Mole Valley	515413	158847	M25 between Junctions 9 and 10
Mole Valley	515327	158512	M25 between Junctions 9 and 10
Elmbridge	509805	157996	M25 between Junctions 9 and 10
Elmbridge	509396	158468	M25 between Junctions 9 and 10
Elmbridge	508877	158880	M25 between Junctions 9 and 10
Woking	506286	160020	M25 between Junctions 10 and 11
Woking	505844	160651	M25 between Junctions 10 and 11
Woking	505484	161624	M25 between Junctions 10 and 11
Woking	505688	161606	M25 between Junctions 10 and 11
Epping Forest	550606	197807	M25 between Junctions 27 and 28
Brentwood	552590	196430	M25 between Junctions 27 and 28
Brentwood	553644	195531	M25 between Junctions 27 and 28
Thurrock	558218	183568	M25 between Junctions 29 and 30
Thurrock	557624	181255	M25 between Junctions 29 and 31

Receptors in Woking and Brentwood correspond with areas of known exceedance, therefore are problem areas, both for having high levels of pollution and for having sensitive receptors.

Designated sites are also sensitive receptors, and they may be away from the the highway. Epping Forest is a designated Site of Special Scientific Interest and Special Area of Conservation, and is therefore a sensitive receptor. The Agency needs to demonstrate that any traffic diversions that pass through it for a significant length of time – for instance, for planned maintenance or improvement works on the M25 – would not deteriorate air quality.

A2.7.9 to A2.7.11

Cultural Heritage

The Agency's HAGIS database identifies 242 statutorily designated (Level 1) assets within 500m of the DBFO contract area. Of these, the Connect Plus *Cultural Heritage Asset Management Plan* identifies seven scheduled monuments, four listed buildings and nine registered parks and gardens within or immediately adjacent to the Agency estate boundary.

Of these, 12 are identified as High Value assets, however two of these are on the A1(M) and therefore outside this RBS. This leaves ten High Value Assets, listed in the main report.

For the M23, the *Area 4 Landscape Management Plan* states that there are no priority assets identified in the Cultural Heritage Asset Management Plan for this section of the route.

A2.7.12 to A2.7.14

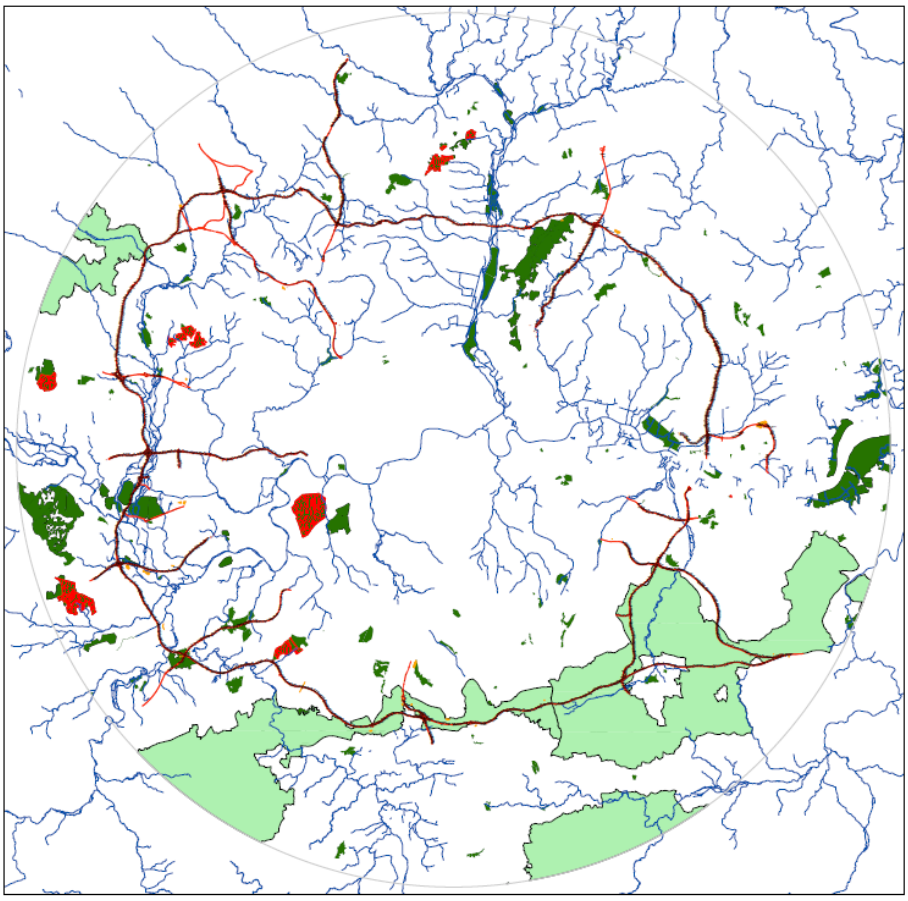
Ecology

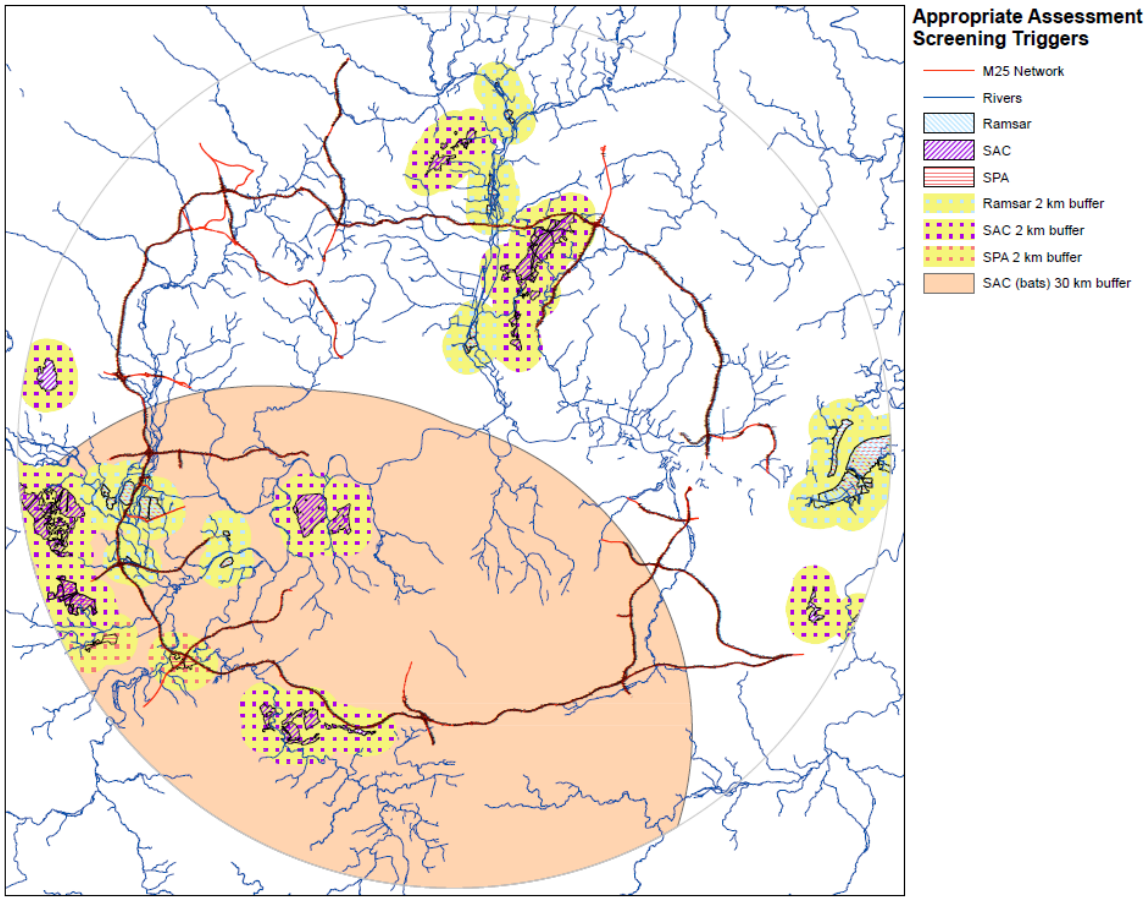
The most important designated nature conservation sites that apply to this route are:

- Sites of Special Scientific Interest (SSSIs) - give legal protection to the best sites for wildlife and geology in England. The first SSSIs were identified in 1949 when the then Nature Conservancy notified local authorities of SSSIs, so their conservation interest could be taken into account during the development planning process. Many SSSIs are also Local Nature Reserves.
- Special Areas of Conservation (SACs) - have special protection under the European Union's Habitats Directive. SACs provide increased protection to a variety of wild animals, plants and habitats and are a vital part of global efforts to conserve the world's biodiversity.
- Special Protection Areas (SPAs) - have been identified as being of international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds found within the European Union. SPAs are European designated sites, classified under the European Wild Birds Directive which affords them enhanced protection.
- Ramsar sites - are wetlands of international importance, designated under the Ramsar Convention. The Ramsar Convention is an international agreement which provides for the conservation and good use of wetlands. The UK Government ratified the Convention and designated the first Ramsar sites in 1976.

Habitats can change frequently, making it difficult to pin down sensitive sites, but designated sites are the starting point.

Connect Plus has plotted SSSIs, SACs, SPAs and Ramsar sites along the route, and these are shown on two plans that follow. The second plan shows buffer areas around the designated sites that trigger the need for an assessment.


RoD Trigger Sites
M25 Network
Rivers
Scheduled Monuments
AONB
National Nature Reserve
SSSI
Ramsar
SAC
SPA


Appropriate Assessment Screening Triggers
M25 Network
Rivers
Ramsar
SAC
SPA
Ramsar 2 km buffer
SAC 2 km buffer
SPA 2 km buffer
SAC (bats) 30 km buffer

These sites, along with a number of smaller important sites are highlighted in the Connect Plus *Landscape Management Plan* in four quadrants as listed below. Note: Scheduled Ancient Monuments were covered in the Cultural Heritage section.

Denham Plan

Local Designations

Type	Route	Name	Map Location
Site of Special Scientific Interest	M25	REDWELL WOOD Redwell Wood is a complex site comprising both ancient woodland of the Pedunculate Oak/Hornbeam type and heathland, together with well developed scrub and secondary woodland.	TL 213025
Site of Special Scientific Interest	M25	KINGCUP MEADOWS & OLDHOUSE WOOD constitutes an intimate mosaic of habitats adjacent to the River Alderbourne, which includes woodland, unimproved pastures and semi and unimproved meadowland	TQ030851
Site of Special Scientific Interest	M1	M1 BRICKET WOOD COMMON Bricket Wood Common is a large remnant of a formerly extensive lowland heath that developed on heavy, base deficient soils of the Boulder Clay.	TL 130010
Site of Special Scientific Interest	M1	BRENT RESERVOIR The Brent Reservoir is of interest primarily for breeding wetland birds and in particular for significant numbers of nesting great crested grebe	TQ 217873
Area of Outstanding Natural Beauty	M25	Chilterns	
Scheduled Ancient Monument	M25	LITTLE LONDON MOATED SITE AND SURROUNDING EARTHWORK ENCLOSURES, KINGS LANGLEY	507667.566957 / 201789.451314
Scheduled Ancient Monument	M1	BROCKLEY HILL ROMANO-BRITISH POTTERY AND SETTLEMENT	517352.771504 / 194038.810103
Site of Special Scientific Interest	A1	CASTLE LIME WORKS QUARRY It is the finest exposure of clay-filled pipes in the Chalk Karst of England	TL 229026
Site of Special Scientific Interest	A1	WATER END SWALLOW HOLES Water End Swallow Holes are the only major sinkholes in chalk which are a permanent feature of the landscape, and they constitute the drainage outlet for the largest enclosed karstic basin in England.	TL 230043
Site of Special Scientific Interest	A1	SHERRARDSPARK WOOD The acid soils support an extensive ancient semi-natural sessile oak/hornbeam *Quercus petraea/Carpinus betulus* woodland.	TL 230139
Scheduled Ancient Monument	A1	SOUTH MIMMS MOTTE AND BAILEY CASTLE	523013.851236 202554.771624
Site of Special Scientific Interest	A40	FRAY'S FARM MEADOWS are one of the last remaining examples of relatively unimproved wet alluvial grassland in Greater London and the Colne Valley.	TQ 057861

Blunts Farm

Local Designations

Type	Route	Name	Map Location
Special Area of Conservation / Site of Special Scientific Interest	M25	EPPING FOREST Epping Forest owned and managed by the Corporation of London under the Epping Forest Act of 1878. is one of only a few remaining large-scale examples of ancient wood-pasture in lowland Britain and has retained habitats of high nature conservation value including ancient semi-natural woodland, old grassland plains and scattered wetland.	TL 475035 to TQ 405865
Site of Special Scientific Interest	M25	CURTISMILL GREEN It is a small, separate relic of the ancient Forest of Waltham, of which Epping Forest is the largest surviving fragment. The varying soil conditions give rise to both damp and dry grassland containing several species which are uncommon, decreasing or unusual in the county.	TQ 514968 / TQ 524953
Site of Special Scientific Interest	M25	PURFLEET CHALK PITS evidence contained at Purfleet clearly indicates the importance of this site in the scientific study of both the evolution of the Thames and Northern European interglacial sequences.	TQ 560 784 / TQ 563 785 / TQ 566 785 / TQ 569 786
Site of Special Scientific Interest	M25	WEST THURROCK LAGOON & MARSHES West Thurrock Lagoon and Marshes is one of the most important sites for wintering waders and wildfowl on the Inner Thames Estuary	TQ 585766
Scheduled Ancient Monument	M25	HILL HALL, BRICK KILN AND DESERTED MANORIAL SETTLEMENT OF MOUNT HALL	549024.6482 / 199442.062378
Site of Special Scientific Interest	M11	RODING VALLEY MEADOWS Roding Valley Meadows form one of the largest continuous areas of species-rich grassland in Essex, comprising traditionally managed hay meadows, flood meadows and marsh.	TQ 436953
Site of Special Scientific Interest	A13	PURFLEET ROAD, AVELEY The Aveley Silts and Sands have yielded important assemblages of molluscs, insects, pollen and mammal remains which are indicative of temperate, or interglacial, conditions.	TQ 556799
Scheduled Ancient Monument	A13	SAM CROP MARK COMPLEX, ORSETT	563126.772925 / 181255.379355

Leatherhead Plan

Local Designations

Type	Route	Name	Map Location
Site of Special Scientific Interest	M25	MOLE GAP TO REIGATE ESCARPMENT Woodland, chalk grassland, chalk scrub and heathland form an interrelated mosaic which supports a wide diversity of characteristic plants and animals, of which many are Site of Special Scientific Interest local or rare.	TQ 158 539; TQ 185 537 / TQ 185 514; TQ 200 530 / TQ 245 520
Site of Special Scientific Interest	M25	EPSOM & ASHTEAD COMMONS The site carries four nationally rare invertebrates and several others which are uncommon in Surrey. The range of habitats present promotes a rich community of breeding birds.	TQ 181602
Special Protection Area / Site of Special Scientific Interest	M25	OCKHAM & WISLEY COMMONS This site consists of a large tract of heathland lying between the Mole and Wey Rivers near Cobham, containing areas of heath, bog, open water, secondary woodland and scrub. This variety of habitats supports a rich community of heathland plants and animals, including a large number of rare and local insects.	TQ 070585, TQ 082585 / TQ 084592, TQ 078595
RAMSAR / Site of Special Scientific Interest	M25 & A30	STAINES MOOR Staines Moor represents the largest area of alluvial meadows in Surrey and supports a rich flora while the reservoirs hold nationally important populations of wintering wildfowl.	TQ 040730
RAMSAR / Site of Special Scientific Interest	M25	Wraysbury Reservoir Wraysbury reservoir regularly supports nationally important numbers of wintering cormorant *Phalacrocorax carbo*, great crested grebe *Podiceps cristatus* and shoveler *Anas clypeata*.	TQ 025745
Scheduled Ancient Monument	M25	BRONZE AGE SETTLEMENT, W OF RUNNYMEDE BRIDGE	501842.706257 171924.35733
Area of Outstanding Natural Beauty	M25, M23 & A23	Surrey Hills	
Site of Special Scientific Interest	A3	ESHER COMMONS Heathland, grassland, scrub, woodland and areas of marsh, bog, and open water, present a rich variety of habitats supporting many species of plants and animals	TQ 130623
RAMSAR / Site of Special Scientific Interest	M3	THORPE PARK NO. 1 GRAVEL PIT is of national importance for wintering gadwall	TQ 028681
Scheduled Ancient Monument	M3	LARGE UNIVALLATE HILLFORT AND 14TH CENTURY CHAPEL AT ST ANN'S HILL	502642.28108 167593.695002
Scheduled Ancient Monument	M3	CHERTSEY ABBEY: A BENEDICTINE MONASTERY ON THE BANKS OF ABBEY RIVER	504224.152726 167230 /.196394 & 504502.399576 / 167253.832577
Site of Special Scientific Interest	A30	Staines Moor represents the largest area of alluvial meadows in Surrey and supports a rich flora while the reservoirs hold nationally important populations of wintering wildfowl. A pond at the site carries an aquatic flora which is of national importance.	TQ 040730

Swanley Plan

Local Designations

Type	Route	Name	Map Location
Site of Special Scientific Interest	M25	Lullingstone Park This site includes old pollard trees and other woodland supporting important communities of invertebrates, lichens, breeding birds and fungi.	TQ 513641
Site of Special Scientific Interest	M25	WESTERHAM WOOD This site is an example of one of the few remaining ancient woodlands on Gault Clay in Kent. The wood has a rich ground flora and an outstanding breeding bird community.	TQ 439550
Site of Special Scientific Interest	M25	TITSEY WOODS This site, comprising Titsey, Cladket, Church and Square Woods is selected primarily as an example of wet semi-natural woodland on the Gault Clay	TQ 420541
Site of Special Scientific Interest	M20	FARNINGHAM WOOD The ground flora is particularly rich and there is also a varied invertebrate fauna. A series of ponds in the centre of the wood supports several species of amphibian.	TQ 540683
Site of Special Scientific Interest	M26	HALLING TO TROTTISCLIFFE ESCARPMENT The site is representative of Chalk grassland in west Kent and beech woodland on the chalk. Outstanding assemblages of plants and invertebrates are present.	TQ 616596-704660
Scheduled Ancient Monument	M25	MEDIEVAL MOATED SITE WITH ASSOCIATED FISHPONDS, FLOWER LANE	535620.900596,152563.503671

Sites outside the route many also be affected. For instance, the Thames Estuary is a SPA and a RAMSAR site which is fed by a number of tributaries in the London region, many of which cross the route. Activities on the route could impact on conditions in the Thames Estuary.

It is also possible for upstream sites to be affected, eg salmon spawning sites, although no evidence of this has been provided.

The Connect Plus *Maintenance and Operation Environmental Management Plan (MOEMP)* identifies several protected fauna species highlighted in the main report. Otters and dormice are priorities as set out in the Agency's Biodiversity Action Plans. Lowland heathland and lowland calcareous grassland are the priority flora species in the Action Plans.

The *M25 Orbital Motorway* describes how underpasses were designed into the plans for the M25 to allow animals to follow their accustomed routes; how fences were used at Epping Forest to prevent deer from accessing the highway; and how certain plant habitats were retained and protected during construction.

The *Area 4 Landscape Management Plan* highlights few nature conservation constraints on the M23 section of the route. Most of those identified are in the northern part of the M23, closer to the M25, but few could be identified in magic.gov.uk.

Nature Conservation Designations: SAC:	Three Bat SACs occur within 30km of the M23 route corridor : Mole Gap to Reigate Escarpment, Ebernoe Common, The Mens.
SSSI:	Worth Forest, Quarry Hangers, Chipstead Downs, Farthing Downs, Buchan Hill Ponds and Happy Valley SSSI.
Local Nature Reserve:	Target Hill Park, Tilgate Forest, Grattons Park, Earlswood Common.

A2.7.15 to A2.7.18

Landscape

The Areas of Outstanding Natural Beauty (AONB) are shown in light green on the Connect Plus Record of Determination Trigger Sites plan discussed under Ecology above. The biggest impact is in the southern part of the London Orbital, where junctions 3 to 8 pass through the Kent Downs and the Surrey Hills. The M23 and A23 near junction 8 pass through the Surrey Hills. To the north-west, the M25 encroaches on the edge of the Chilterns north of junction 18. Note: the North Downs lies within the Kent Downs and Surrey Hills AONBs.

AONBs are protected under the National Parks and Access to the Countryside Act 1949 to conserve and enhance their natural beauty. The table that follows is taken from the Natural England website and shows that all three AONBs were designated between 1958 and 1968 - well before the M25 was built through them.

AONB	Area (sq km)	Date of Designation Order	Date of Confirmation Order	Local authorities within AONB	Coincidence with other designated areas
Chilterns	833	26 May 1964	16 December 1965	**Counties:** Buckinghamshire, Hertfordshire, Oxfordshire **Districts:** Aylesbury Vale, South Bucks, Chiltern, Wycombe, North Hertfordshire, Three Rivers, South Oxfordshire	the AONB's south-west boundary abuts the North Wessex Downs AONB along the Thames

				Boroughs: Dacorum, Luton **Unitary Authority**: Central Bedfordshire	
Kent Downs	878	19 December 1967	23 July 1968	**Counties:** Kent **Districts:** Dover, Sevenoaks, Shepway, **Borough:** Ashford, Gravesham, Maidstone, Swale, Tonbridge & Malling, Bromley London **Unitary authorities:** Medway, Bromley **City council**: Canterbury,	the Dover-Folkestone and South Foreland Heritage Coast (14km) and abuts the Surrey Hills AONB
Surrey Hills	419	13 September 1956	8 May 1958	**Counties:** Surrey **Districts:** Tandridge, Mole Valley, **Borough:** Guildford, Reigate and Banstead, Waverley	abuts the Kent Downs and Sussex Downs AONBs

The *M25 Orbital Motorway* describes how the Department of Transport's in-house landscape architects were fully involved in design and mitigation, and summarised in the main report..

The Connect Plus *MOEMP* identifies that landscape assets are vulnerable to visual intrusion from gantries and signs; light pollution; noise intrusion from traffic and loss of tree screens (therefore similar to already listed for the parks and gardens cultural heritage assets).

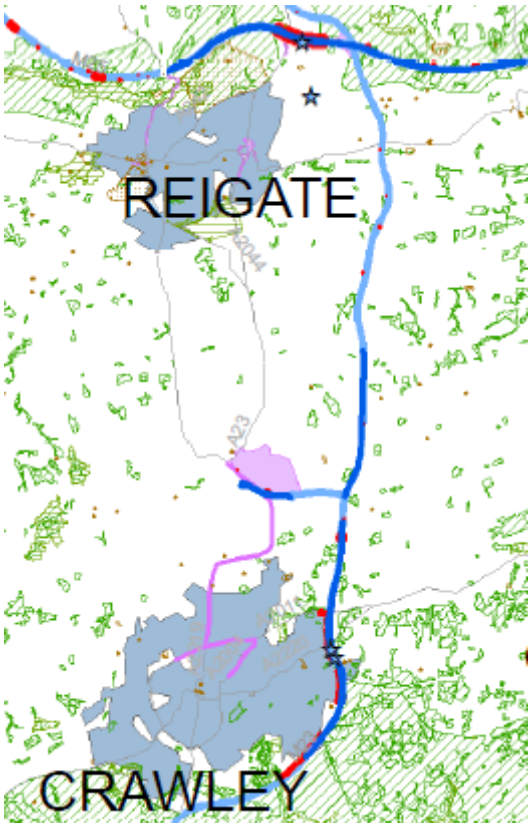
The *Area 4 Landscape Management Plan* does not identify any particular landscape issues on the M23 corridor.

A2.7.19 to 2.7.25

<u>Noise</u>

Noise Action Planning Important Areas were plotted by DEFRA in 2011. They were identified using strategic noise mapping, giving an indication of those places that are exposed to the highest levels of noise and the sensitivity of the receptors - not just the noise level.

For roads, First Priority Areas and Other Important Areas were identified. Together they show the top 1% of noisy locations on England's major roads, based on conditions in 2006. The Agency's Environment plan shows these in red. Generally, the largest sites on the route are First Priority Areas close to urban areas, and these are cited in the main report. There are no Noise Important Areas for the M23 to Gatwick as shown on the extract that follows for this part of the route.



Referring to the High Temperature Risk map (see Asset Condition section of this annex), there is no obvious correlation between the noise level and the pavement type.

There is a lack of noise data for the DBFO contract area as a whole, although the Connect Plus *MOEMP* (Section 7.8) identifies that noise surveys have been arranged for the recently widened sections of the M25 and therefore more information will become available in the coming years

From internal discussions, parts of the network cited in the main report have had noise barriers installed.

From internal discussions, several hundred site specific noise plans have been drafted. The general approach to mitigating noise problems is to use low noise surfacing when the surface is due for renewal, for instance changing from hot rolled asphalt to stone mastic asphalt.

A2.7.26 to 2.7.27

Water pollution risk

The Agency's Priority Outfalls programme addresses the risk of water pollution from outfalls, i.e. the surface water quality where drains discharge into a watercourse. The Highways Agency Water Risk Assessment Tool (HAWRAT) is a predictive tool that prioritises outfalls by the risk of pollution, rather than actual surveyed pollution levels.

The Connect Plus *Surface Water Outfall Plan Implementation Report* identifies 398 outfalls on the M25 DBFO network. The Very High Risk and High Risk outfalls are listed below.

G2 Category A (Very High Risk) due to spillage risk

TL2310_0153a – risk ≥ 0.005 (outfall is within a Local Nature Reserve)

G3 Category A (Very High Risk) due to exceeding EQS limits

TL2800_2521b	TL4300_6794a	TQ0384_4400a	TQ3699_4895a
TL3000_0256a	TL4500_7847c	TQ0384_4805a	TQ3753_9253a
TL3000_2249a	TQ0367_5773a	TQ0479_2444a	TQ4099_4186a
TL3500_0400a	TQ0383_4499a	TQ0958_9810b	
TL4200_4268b	TQ0384_3709a	TQ2951_6396a	

G4 Category B (High Risk)

Outfalls that passed EQS limits and spillage risk, but failed to meet the soluble and sediment limits.

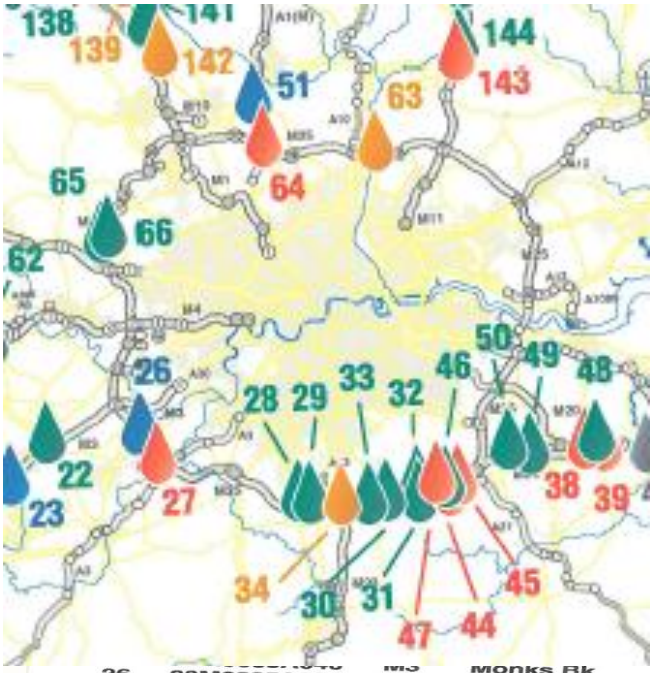
TL2200_3302a	TQ0476_0450a	TQ0767_4446a	TQ3753_7551a
TL2300_8806a	TQ0476_0769a	TQ1894_0927a	TQ4154_6338a
TL2900_9854a	TQ0477_2818a	TQ1894_6141a	TQ6258_4425a
TL3000_0255a	TQ0561_5462a	TQ2299_2842a	
TQ0374_1363a	TQ0659_6964a	TQ3753_7451a	

Eight of these sites are identified in the *Surface Water Outfall Plan Implementation Report* for improvements in the next five years. The other sites will be reviewed when more data is available to verify the assumptions that have been made in the assessments. These sites – excluding two sites that lie outside the route (M26 and A1(M)) are summarised in the table below.

Code	Name	Year	Comments
M25_DD_158_4A_1	Brookhouse Brook, M25 158/4A	1	Fails EQS, soluble and sediment
TL4200_4268b	Copped Hall Brook, M25 154/9A	1	Fails EQS
TL4300_6794a	Copped Hall Park, M25 156/2A	2	Fails EQS and soluble. Within Grade II listed garden
TL3000_0256a	Woodhurst Farm, M25 142/0A	2	Fails EQS and soluble
TQ0958_9810b	Brickfield Copse, M25 70/2B	3	Fails EQS, soluble and sediment, also an EA priority
TQ1894_0227a, TQ1894_0927a	M1 J4, M1 21/0A	4	Fails EQS (in combination) and soluble

An alternative source of information is the Agency's Environment plan, which is based on the Agency's HADDMS database and shows about 100 locations for high/ very high risk pollution sites, which is significantly more than the 37 sites identified in the *Surface Water Outfall Plan Implementation Report*. It is not known whether the HADDMS database will be updated to reflect the Connect Plus analysis.

In 2006, the Agency prepared a plan and list of priority sites – see the following. None of these sites appear in the 37 sites identified by Connect Plus, therefore might already have been treated or are now classified as a lower priority.



26	03M0025A008	M25	Bourne (S)
27	03M0025A009	M25	Wey
28	03M0025A016	M25	Redhill Bk
29	03M0025A019	M25	Redhill Bk
30	03M0025A020	M25	Gibbs Bk
31	03M0025A021	M25	Gibbs Bk
32	03M0025A022	M25	Gibbs Bk
33	03M0025A023	M25	Gibbs Bk
34	03M0025A024	M25	Redhill Bk
35	03M0027D014	M27	Monks Bk
36	03M0027D015	M27	Cadnam R
37	03M0027D016	M27	Cadnam R
38	04M0020A001	M20	Leybourne Strm
39	04M0020A002	M20	Leybourne Strm
40	04M0020A003	M20	Ditton Strm
41	04M0020A005	M20	Len
42	04M0020A006	M20	Len
43	04M0020A017	M20	East Stour
44	04M0025A001	M25	Darent
45	04M0025A002	M25	Darent
46	04M0025A003	M25	Darent
47	04M0025A004	M25	Darent
48	04M0026A001	M26	Leybourne Strm
49	04M0026A003	M26	Bourne
50	04M0026A004	M26	Darent
51	05A0001A004	A1	Colne
52	05M0004A001	M4	Sul
53	05M0004A012	M4	Foudry Bk
54	05M0004A027	M4	Emm Bk
55	05M0004A030	M4	Liden Bk
56	05M0004A032	M4	Liden Bk
57	05M0004A034	M4	Winterbourne
58	05M0004A037	M4	Pang
59	05M0004A038	M4	Pang
60	05M0004A072	M4	Cut
61	05M0004A073	M4	Cut
62	05M0004A077	M4	Cut
63	05M0025A002	M25	Cobbins Bk
64	05M0025A004	M25	Mimmshall Bk
65	05M0025B001	M25	Colne Bk
66	05M0025B006	M25	Misbourne
67	07A0001A001	A1	Nene
68	07A0001A003	A1	Nene

Area 4 has not raised any concerns for the M23 to Gatwick section of route. The plan above shows that in 2006, no sites had been identified on this section.

Regarding groundwater pollution, the Agency's Priority Soakaways programme addresses the risk of water pollution from soakaways, i.e. the surface water quality where drains discharge to groundwater. No further details of specific sites are available at the time of writing,

A3 Future considerations

A3.2 Economic development and surrounding environment

A3.2.2

Housing and economic growth data presented in paragraph 3.2.2, table 3.1 and figure 3 were compiled from various sources. For this reason, some data may overlap in geographical coverage, but their quantum may not be consistent. However, any such differences are not considered significant enough to alter the overall theme presented in the main evidence report.

The table that follows (about 10 pages long) shows development sites considered for our route, found in various local plans and other development plans over the period from August 2013 to December 2013. A list of all the local plans studied is shown in Part C – Bibliography.

Housing and economic growth proposals from local plans

Row Labels	Sum of Housing by 2021	Sum of Housing by 2031	Sum of Jobs by 2021	Sum of Jobs by 2031
Buckinghamshire Thames Valley	**3380**	**1310**	**0**	**0**
High Wycombe Urban Area	2400	1310	0	0
Princes Risborough	480	0	0	0
RAF Daws Hill	500	0	0	0
Coast to Capital	**31361**	**13923**	**49002**	**24649**
Redhill Town Centre	542	0	0	0
125-163 Preston Road	225	225	583	583
A2300 Business Park Strategic Development	0	0	2423	2422
Adur (Numerous Developments)	2315	1131	4340	0
Angmering	0	0	1000	800
Area 2A Redhill Town Centre	0	0	583	0
Arun (Numerous Developments)	0	0	0	0
Betts Way	0	0	0	0
Bognor Regis Enterprise Zone	0	0	5300	2200
Bognor Regis, Eco-Quarter	1900	600	0	0
Bolnore Village Phases 4 & 5, SouthWest of Haywards Heath	655	0	0	0
Brighton (numerous sites)	1906	2074	9024	6199
Brighton Marina, Gas Works & Black Rock Area	970	970	309	309
Burgess Hill (Main)	1635	484	385	371
Burgess Hill Strategic Development	1750	1900	2300	3500
Chichester (Numerous Sites)	0	0	0	0
Churchill Square	0	0	1052	0
Circus Street	80	80	133	133
Courtwick Farm	600	0	346	0
Crawley (Numerous sites)	0	0	393	0
Crawley Down	0	0	195	77
East of Kings Way Strategic Development	250	250	0	0

Edward Street Quarter	65	0	833	833
Epsom	130	0	117	0
Faraday Road	0	0	0	0
Former Thales Site	0	0	0	0
Freshfield Rd Business Park & Gala Bingo Hall	0	0	903	903
Graylingwell	700	0	0	0
Hasler	300	0	0	0
Haywards Heath	1662	309	932	741
Hove Station	100	100	500	500
Hurstpierpoint/Keymer	0	0	139	139
Morrisons, Littlehampton	0	0	280	0
NE Chichester	250	250	263	263
New England Quarter	83	83	833	833
New Monks Farm	450	0	475	0
North East Sector	1475	425	0	0
North Street Corner	0	0	416	0
Portfield Quarry	0	0	249	0
Preston Barracks and Brighton University	150	150	442	442
Principal Park	0	0	0	0
River Arun	700	300	50	25
Royal Sussex Hospital	0	0	2500	0
Shopwyke Lakes	500	0	297	0
Shoreham Airport	0	0	1253	0
Shoreham Harbour				
Shoreham Harbour - Aldrington Basin	92	108	1561	0
Shoreham Harbour - South Portslade	92	108	885	0
Shoreham Harbour - Western Arm	615	915	166	0
Shoreham-by-Sea (exc Shoreham Harbour)	516	0	0	0
Site 6 Felpham	500	200	0	0
Site 6 North Bersted	650	0	0	0
Sompting Fringe	250	0	0	0
Southways Park	0	0	0	0
Springfield Drive, Leatherhead	0	0	662	0
St Modwens	0	0	243	0
Tangmere	500	500	526	526
Teville Gate	0	0	1057	0
The Atrium	0	0	150	0
The Beach Hotel	0	0	156	156
The Warren Hill	0	0	160	160
Three Villages (Arun ID: H1)	1900	600	0	0
Toads Hole Valley	233	466	728	1455
Toddington Nurseries	1260	0	1083	0
Town Centre North	0	0	0	0
West Durrington	700	0	0	0
West of Bewbush	1650	850	800	131

West of Chichester City	500	500	526	526
West of Horsham	1797	210	900	100
Windry Ride Farm	0	0	0	0
Woollards Field South	0	0	208	208
Worthing(Numerous Sites	0	0	0	0
Maidstone	713	135	206	114
Medway UA	0	0	137	0
Enterprise M3	**15040**	**12487**	**15303**	**8396**
Addlestone urban area	868	74	872	0
Aldershot Urban Extension	2250	2250		
Area 3 - The Low Weald , NE Horley	710	0	0	0
Area 3 - The Low Weald, NW Horley	1570		0	0
Chertsey urban area	203	317	0	0
East of Basingstoke	450	450		
Egham and Englefield Green urban area	391	87	626	42
Farnborough Town Centre			450	450
Former DERA site, Longcross	516	884	6820	3103
Land at Gosden Hill Farm, Merrow Lane, Guildford	300	1331	0	0
Land south of Ash Lodge and east of Manor Road, Ash	685	0	0	0
Land west of Fairlands, Guildford	0	519	0	0
Land within and adjacent to Slyfield industrial estate, Guildford	0	1000	0	0
North East Hook	250	250		
North of Popley Fields	450			
Princess Royal Barracks, Deepcut, Surrey Heath	1200		0	0
Queen Elizabeth Barracks	435	435		
Razors Farm	480			
Royal Holloway University of London, Egham and Englefield Green	1000	1500	1833	2750
Sheerwater Redevelopment	500		0	0
The Elmsleigh Centre & adjoining land, Staines	65	0	947	0
Woking Town Centre	1412	768	2299	1257
Woking Town Centre & Butts Rd/Poole Rd Employment Area	0	0	1456	794
Canterbury	1305	2622	0	0
Hertfordshire	**49713**	**60168**	**17482**	**33618**
Broxbourne	3360	3600	0	0
Dacorum	6451	8708	0	10000
East Herts	7551	7873	0	0
Hertsmere	4340	4080	0	0
North Herts	6530	8660	0	0
St Albans	5381	4185	0	0
Stevenage	3530	5999	2408	3440
Three Rivers	2563	2492	1665	2378
Watford	4669	7304	3920	5600
Welwyn	5338	7267	9489	12200
London	**83438**	**70026**	**46344**	**6456**
Earls Court and West Kensington	7583		9500	

1. Mecca Bingo site	0	0	0	0
13. Sainsbury's Superstore	65	0	0	0
144-164 Uxbridge Rd & 1-3 Westminster Terrace	0	0	0	0
15. Northwick Park Hospital	0	0	0	0
16. Morrison's Supermarket	164	0	0	0
165-171 The Broadway Highlands House, 165-171 The Broadway,Wimbledon, SW19 1NE	0	0	0	0
17. Alpine House	120	0	0	0
19. Stonebridge Schools	50	0	0	0
20. Former Unisys & Bridge Park Centre	245	0	0	0
23. Vale Farm Sports Centre	0	0	0	0
24. Wembley Point	104	0	0	0
3. Dollis Hill Estate	140	0	0	0
30. Gaumont State Cinema	0	0	0	0
4. Royal Mail sorting offi ce site	0	0	0	0
49-69 Uxbridge Road	0	0	0	0
5. Priestly Way, North Circular Road	0	0	0	0
7, 8 and 12 Waterside Way 7, 8 and 12 WatersideWay, Tooting, London, SW17 0HB	0	0	0	0
8. Orangery Square	0	0	0	0
9. Harlesden Plaza	300	0	0	0
A1. Alperton House	120	0	0	0
A3. Former B&Q and Marvelfairs House	441	0	0	0
A4. Atlip Road	372	0	0	0
A5. Sunleigh Road	180	0	0	0
A6. Woodside Avenue	220	0	0	0
A7. Mount Pleasant / Beresford Avenue	100	0	0	0
ACT2 Acton Gateway	0	0	0	0
ACT3 Oaks Shopping Centre and Churchfield Road Car Park	0	0	0	0
ACT4 Beechworth House	0	0	0	0
ACT5 Acton Central Station Yard	0	0	0	0
Acton Crossrail Station & 239/265/267/305/307 Horn Lane	0	0	0	0
Aerodrome Road	4180	0	760	0
B/C1. Oriental City and Asda	975	0	0	0
B/C2. Sarena House / Grove Park / Edgware Road	745	0	0	0
B/C3. Capitol Way	650	0	0	0
Barking & Dagenham (numerous sites)	5282	12800	0	0
Barking Riverside	0	10800	0	0
Barking Rugby Club & Goresbrook Leisure Centre	0	0	0	0
Barnet (numerous sites)	9810	8170	1030	500
Beaconsfield Road/South Road	0	0	0	0
Beacontree Heath – Seabrook Hall	0	0	0	0
Beacontree Heath – Wider Site	164	0	0	0
Bexley (numerous sites)	0	300	0	2600
Brent (numerous sites)	9380	800	0	0
Brent Cross – Cricklewood Regeneration Area	0	5510	0	0
Bromley (numerous sites)	0	1650	0	0

BW12: FELNEX TRADING ESTATE	0	0	0	0
BW17: ST HELIER HOSPITAL	0	0	0	0
BW19: CANON HOUSE, MELBOURNE ROAD, WALLINGTON	0	0	0	0
BW23: FORMER BIBRA SITE, WOODMANSTERNE ROAD, CARSHALTON	0	0	0	0
BW24: INSTITUTE OF CANCER RESEARCH LAND, ADJACENT TO SUTTON HOSPITAL, BELMONT	0	0	0	0
BW6: SUTTON HOSPITAL	0	0	0	0
BW7: ORCHARD HILL	0	0	0	0
CCOS11 822 (Tesco) High Road, Goodmayes	533			
CE1. Church End Local Centre	120	0	0	0
CE6. Asiatic Carpets	200	0	0	0
Central Leeside (Meridian Water)	750	4250	0	0
Colindale Avenue	2370	0	200	0
Copley Close Estate	0	0	0	0
Craven House, Bilton House, & land to rear of Cavalier House	0	0	0	0
Croydon (numerous sites)	0	1334	0	0
EAL10 93-113 Uxbridge Road	0	0	0	0
EAL13 Former BT Telephone Exchange	0	0	0	0
EAL14 Maitland Yard	0	0	0	0
EAL16 59-119 New Broadway and New Ealing House	0	0	0	0
EAL2 Ealing Broadway Crossrail Station	0	0	0	0
EAL3 Arcadia	0	0	0	0
EAL4 Ealing Broadway Shopping Centre	0	0	0	0
EAL5 Sandringham Mews	0	0	0	0
EAL6 Cinema	0	0	0	0
Ealing (numerous sites)	0	0	0	0
EC15 RUSKIN SQUARE COMMERCIAL	0	0	0	0
EC16 RUSKIN SQUARE RESIDENTIAL	0	0	0	0
EC17 CHERRY ORCHARD PLOT A	0	0	0	0
EC18 PLOT B	0	0	0	0
EC19 PLOT D	0	0	0	0
Edgware Road	925	0	0	0
Enderby's Wharf	0	770	0	0
Enfield (numerous sites)	4250	4250	10000	0
Enfield Town Station	500	0	10000	0
Erith Quarry	0	0	0	0
Erith Western Gatweway	0	300	0	0
Fair Field Masterplan	0	0	0	0
Former Mitcham Gasworks 49 Seagas House,Western Road, Mitcham, CR4 3ED	0	0	0	0
Goresbrook Village	250	0	0	0
Grahame Park Way	2335	0	70	0
GRE1 Ravenor Park Farm	0	0	0	0
Greenford Green	0	0	0	0

Greenwich (numerous sites)	259	5201	0	0
Greenwich Peninsula Masterplan	0	0	0	0
Hammersmith & Fulham (numerous sites)	7583	0	9500	0
Hammersmith Town Centre and Riverside	0	0	0	0
Harlington Road Depot, Hillingdon - Policy SA 8	0	0	0	0
Harrow (numerous sites)	1888	0	2460	0
Haslemere Industrial Estate Haslemere Industrial Estate, 20 Ravensbury Terrace,Wimbledon Park, SW18 4RL	0	0	0	0
Havelock Estate	0	0	0	0
Havering & Redbridge (numerous sites)	2683	0	0	0
Hedgecock Centre	60	0	0	0
Hillingdon (numerous sites)	0	0	0	0
Hotel & Ballroom Facility	0	0	0	0
Howbury Park Rail Freight Terminal	0	0	0	2600
Iceland, Quality Foods & 63-95 South Rd	0	0	0	0
Johnson Street	0	0	0	0
Kingston Town Centre	0	0	0	0
Land at Bushey Road 84-88 Bushey Road, Raynes Park, London, SW20 0JH	0	0	0	0
Land on Corner of Weir Road/Durnsford Road Homebase and Vantage House, 1Weir Road,Wimbledon, SW19 8UG	0	0	0	0
Lovell's Wharf	0	667	0	0
Lymington Fields	600	0	0	0
M1 – Former Alfa Laval Site and Baltic Centre, Great West Road	0	0	0	0
M2 - Wallis House, Great West Road	0	0	0	0
M3- Kew Bridge Site, Kew Bridge Road	0	0	0	0
M8 - 'Brentford Waterside', Land South of the High Street, Brentford	0	0	0	0
Mark's Gate Regeneration Sites	157	0	0	0
Merton (numerous sites)	0	0	0	0
Mid Croydon Masterplan	0	1334	0	0
Mill Hill East Development Area	0	2660	0	500
Morden Station Offices and Retail Units 66A-82 London Road, Morden, Surrey, SM4 5BE	0	0	0	0
North Circular (including New Southgate)	2000	0	0	0
Old Oak	0	0	0	0
Old Town Masterplan	0	0	0	0
OS02 Mill House.	0	0	0	0
OS04 60-70 Roden Street and land between Chapel Road and Roden Street.	0	0	0	0
OS07 Land adjacent to Cranbrook Road, High Road and the railway, incorporating Station Road	0	0	0	0
OS20 Rear of Lynton House.	0		0	
OS25 Redbridge Enterprise andI lford Retail Park.	600		300	

Park Royal Southern Gateway	0	0	0	0
Policy SA 10 British Gas Works, Cowley Mill Road, Uxbridge	0	0	0	0
Policy SA 5 - RAF Eastcote	0	0	0	0
Policy SA 6 - RAF West Ruislip	0	0	0	0
POLICY SSA 1 – HAROLD WOOD HOSPITAL	750			
POLICY SSA 11 – BEAM PARK	0	0	0	0
POLICY SSA 12 – RAINHAM WEST	0	0	0	0
POLICY SSA 13 – RAINHAM - LAND BETWEEN RAILWAY AND BROADWAY	0	0	0	0
POLICY SSA 16 – RAINHAM CENTRAL	0	0	0	0
POLICY SSA 2 – WHITWORTH AND BROXHILL CENTRES	600			
POLICY SSA 7 – ROMFORD ICE RINK	0	0	0	0
Ponders End & Southern Brimsdown (NE Enfield)	1000	0	0	0
PR1. Former Guinness Brewery	0	0	0	0
PR2. First Central	500	0	0	0
PR3. Former Central Middlesex Hospital	0	0	0	0
Robin Hood Public House	26	0	0	0
ROMSSA1 – ANGEL WAY	200			
ROMSSA2 – BRIDGE CLOSE	0	0	0	0
ROMSSA6 – STATION GATEWAY AND INTERCHANGE	0	0	0	0
Sainsbury's (Peel House) Car Park Car Park RO 127 to 149 Kenley Road, Morden SM4 5BE	0	0	0	0
Sanofi Aventis Site 2	500	0	0	0
Site 08: CA and Civic Amenity and Council Depot			100	
Site 11: Tesco			130	
Site 13 - Warren/Royal Arsenal Masterplan	0	3711	0	0
Site 13: Greenhill Way car park	0	0	0	0
Site 14 - DLR over-station scheme	0	53	0	0
Site 14: Bradstowe House			150	
Site 15: College Road west			340	
Site 16 - Love Lane	259	0	0	0
Site 17 - Travelodge, Powis Street	0	0	0	0
Site 2 - Crossrail Station	0	0	0	0
Site 2: Kodak and Zoom Leisure	985		1230	
Site 21: Lyon Road	287		160	
Site 3 - Arsenal Way	0	0	0	0
Site 4: ColArt			130	
Site 5: Wealdstone infills			100	
Site 7: Harrow Leisure Centre	0	0	0	0
Site 9: Civic Centre			120	
Site A: Bromley North Station	0	250	0	0
Site C: Former Town Halls and South Street Car Park	0	0	0	0
Site E: The Pavilion	0	0	0	0
Site F: Bromley Civic Centre	0	20	0	0
Site G: West of the High Street	0	1180	0	0

SITE GB1: ROYAL NATIONAL ORTHOPAEDIC HOSPITAL, BROCKLEY HILL, STANMORE, HA7 4LP	127			
SITE H14: EDGWARE TOWN FOOTBALL CLUB, BURNT OAK BROADWAY, EDGWARE, HA8 5AQ	189			
Site K: Westmoreland Road Car Park	0	200	0	0
Site R4: Anmer Lodge and Stanmore Car Park, The Broadway, Stanmore	0	0	0	0
Site: EM1 Northolt Road Business Use Area (North and South), South Harrow	150			
Site: EM2 Rayners Lane Offices, Imperial Drive, Rayners Lane	150			
SK1. Queen's Park Station Area	187	0	0	0
SK2. British Legion, Marshall House & Albert Rd Day Centre	326	0	0	0
SK4. Canterbury Works	218	0	0	0
SK5. Moberley Sports Centre	104	0	0	0
South Dagenham East	0	2000	0	0
South Dagenham West & Dagenham Leisure Park	2000	0	0	0
South Fulham Riverside	0	0	0	0
South West (numerous sites)	0	0	0	0
Southall Crossrail Station	0	0	0	0
Southall East	0	0	0	0
Southall Market	0	0	0	0
Southall West	0	0	0	0
SSA01 - Hawkswood School and Centre, Antlers Hill	0	0	0	0
SSA13 - Former Walthamstow Dogs Stadium, Chingford Road	0	0	0	0
SSA27 - Ravenswood Industrial Estate, Waltham Forest	0	0	0	0
SSA35 - Whipps Cross Hospital	0	0	0	0
SSA48 - Hainault Road Triangle	0	0	0	0
SSA49 - Norlington Road sites	0	0	0	0
St Bernard’s Hospital	0	0	0	0
STCC1: NORTH OF LODGE PLACE, SUTTON	0	0	0	0
STCC2: SOUTH OF LODGE PLACE, SUTTON	0	0	0	0
STCN1: CROWN ROAD/HIGH STREET SITES	216	144	0	0
STCS1: NORTH OF SUTTON COURT ROAD, SUTTON	0	0	0	0
STCS2: SOUTH OF SUTTON COURT ROAD, SUTTON	278	0	0	0
STCS3: SUTTON STATION AND CAR PARK, SUTTON	90	364	0	0
STCS4: SHOPS OPPOSITE STATION			32	128
STCS5: SUTHERLAND HOUSE, BRIGHTON ROAD, SUTTON	0	0	0	0
STCS6: BRIGHTON ROAD SITES, SUTTON	0	0	0	0
STCW1: CIVIC CENTRE SITE, ST NICHOLAS WAY, SUTTON	0	0	0	0
Sutton (numerous sites)	584	508	32	128
Thames View Regeneration Sites	500	0	0	0
The Gants Hill Redevelopment	0	0	0	0
The Green	0	0	0	0
TW1 Former Post Office Sorting Office, open land South of River Crane and buildings to South	0	0	0	0

University Of East London	1000	0	0	0
Upney Lane Centre	25	0	0	0
W1. Wembley West End	250	0	0	0
W10. Wembley Chiltern Embankments	290	100	0	0
W3. Brent Town Hall	156	0	0	0
W4. Shubette House / Karma House / Apex House	158	0	0	0
W5. Wembley Eastern Lands	1000	500	0	0
W6. Amex House	150	0	0	0
W7. Chesterfield House	0	0	0	0
W8. Brent House and Elizabeth House	330	0	0	0
W9. Wembley High Road	400	200	0	0
Waltham Forest (numerous sites)	0	0	0	0
West Croydon Masterplan	0	0	0	0
Western Avenue Sites North Of Park View	0	0	0	0
Western Avenue Sites South Of Park View To North Of Railway	0	0	0	0
Western Avenue Sites South Of Railway	0	0	0	0
White City Opportunity Area	0		0	
Wickes	0	0	0	0
Wilson Hospital Cranmer Road, Mitcham, Surrey, CR4 4LD	0	0	0	0
Wimbledon Greyhound Stadium Plough Lane, Tooting, London, SW17 0BL	0	0	0	0
Wimbledon YMCA 190-200 and 220 – 224 The Broadway,Wimbledon, London, SW19 1RY	0	0	0	0
Worsfold House / Chapel Orchard Church Road, Mitcham,	0	0	0	0
South East	**165011**	**116930**	**135670**	**113109**
Arisdale Industrial Estate, South Ockendon	664	0	0	0
Ashford (numerous sites)	11548	0	0	0
Askew Farm Lane, Grays	521	0	0	0
Aveley Village Extension	340	0	0	0
Bat & Ball Enterprise Centre, Sevenoaks	0	0	375	125
Bata Field, East Tilbury	315	0	0	0
Birch Road industrial estate	0	0	242	242
Blue Circle Sports Ground	700	0	0	0
Bockhanger Works	650	0	0	0
Brisish Telecom, Sevenoaks	0	0	375	125
Canal Basin Area	225	425	0	225
Canal District (Existing area)	1100	0	0	0
Central Bexhill	0	0	125	125
Cheeseman's Green	1100	0	0	0
Cheeseman's Green Extension	350	0	0	0
Chilmington Green	1690	0	0	0
Cory's Wharf	659	0	0	0
Creekside, Queenborough	350	1350	0	0
Crown Quay Lane, Sittingbourne	0	500	0	0

Dartford (numerous sites)	11002	3668	17300	5750
Dartford Northern Gateway	1530	510	900	300
Dartford Town Centre	772	258	275	75
Discovery Park	600	0	0	0
East of Hermitage Lane	325	275	0	0
Eastbourne Town Centre	351	351	0	0
Ebbsfleet Valley	4340	1527	7125	2375
Erith Quarry, Fraser Road, Erith	425	280	0	0
Erith Western Gateway	360	240	0	0
Fiddler's Reach	1244	0	0	0
Fiddlers Reach (Phase 1 & 2), Wouldham Road, South Stifford	1244	0	0	0
Former Cement Works	300	250	0	0
Globe Works, Towers Road, Little Thurrock, Grays	583	0	0	0
Gravesend (numerous sites)	805	994	0	3615
Gravesend Heritage Quarter	0	0	0	487
Grays Northern Extension	533	0	508	0
GRI02 Former Murco Oil Depot, Askew Farm Lane Grays	0	596	0	0
Hammonds Drive Industrial Estate	0	0	54	54
Hastings Town centre	0	0	539	539
Haynes Brothers Ltd, Ashford Road	0	0	0	850
Home Farm	900	300	0	0
Hope Farm, Hawkinge	600	0	0	0
Interface Land, Chatham Maritime	336	189	0	0
Ivyhouse Lane	0	0	120	120
Kaneb Terminal Former GSTX (STS) Terminal, Askew Farm Lane	0	886	0	0
Kings Hill	645	0	0	0
Lakeside	4723	0	1408	0
Lakeside Basin	500	3950	0	0
Lakeside shopping centre northern extension	0	0	0	0
Lakeside Zone C1 - East & West of Heron Way, West Thurrock	0	300	0	0
Land adjacent to Wheelbarrow Industrial Estate, Pattenden Lane	0	0	0	150
Land at Church Farm and Land at Mascalls Court Road	490	160	0	0
Land at Dittons Road	0	0	97	388
Land at East Hailsham	200	400	0	0
Land at Fishers Farm	0	500	0	0
Land at Knights Park	900	300	0	0
Land at Moorstock Lane, Sellindge North	700	0	0	0
Land at Newnham Park	0	0	0	5500
Land at North Hailsham	233	466	186	373
Land at South Polegate & East Willingdon	140	560	108	432
Land at Stone Cross	239	239	0	0
Land at West Uckfield	500	500	359	359
Land at Westfield Sole Road	0	500	0	0
Land at Westwood, Margate	500	0	0	0
Land at Whitworth Road	0	0	237	237
Land at Woodcut Farm, Ashford Road	0	0	0	1350

Land north of Quinton Road, Sittingbourne	0	750	0	0
Land off Manor Road, Grays	153	0	0	0
Land south of Coldharbour Road	0	0	0	281
Land south of Sutton Road	0	1175	0	0
Land to the East of Church Road and North of Sutton Road	0	1800	0	0
Land west of Goudhurst Road, Marden	0	600	0	0
Langley Park	320	280	0	0
Leybourne Grange Hospital Site	553	0	0	0
Little Thurrock	0	0	400	0
Lodge Hill MoD Estate	2175	2100	668	572
London Road, Sevenoaks	0	0	850	280
Maidstone (numerous sites)	645	10130	0	9400
Maidstone Urban Extension	0	4500	0	0
Marline Fields	0	0	187	187
Media House, Swanley	0	0	375	125
Mid-Kent College	0	0	142	0
Moreton Industrial Estate	0	0	375	125
Morewood Close, Sevenoaks	0	0	780	260
NE Bexhill	433	866	865	1729
New Generation Community Hospital Development	0	0	100	0
New Town Works	700	0	0	0
Nickolls Quarry Site, Martello Lakes	1050	0	0	0
Northeast Sittingbourne	0	0	0	1150
Northfleet Embankment	0	0	0	2314
Northfleet Embankment West	180	352	0	0
Northwest Sittingbourne	0	0	1050	900
NW of New Romney site, Cockreed Lane	600	0	0	0
Park Farm South and East	780	0	0	0
Peters Pit Site	900	0	0	0
Ponds Farm	0	0	800	0
Ponds Farm 2	0	0	0	0
Port Area (Folkestone seafront)	700	0	0	0
Priory quarter	0	0	1240	1240
Project Next, Tilbury Port, Thurrock	0	0	0	0
Project Sweden	0	0	0	0
Purfleet Centre (Botany Way Industrial Estate), Purfleet	1200	0	0	0
Purfleet Farm	0	0	400	0
Queensway North	0	0	324	324
Rathmore Road/Parrock Street/Lord street, Gravesend	0	0	0	308
Repton Park	1167	0	0	0
Residential development at the former Arndale School	150	0	0	0
Risborough Barracks, Folkestone	900	0	0	0
Rochester Riverside	1167	833	689	0
Rochester, Chatham & Gillingham (numerous sites)	2669	1776	1379	342
Royal Opera House	0	0	100	0
Sevenoaks (numerous sites)	1500	330	4560	1520

Sevenoaks Town Centre	1000	330	0	0
Singleton	559	0	0	0
Sittingbourne (numerous sites)	0	1250	1050	2050
South Thames Regional Health Authority Land	0	0	342	0
Southern Cross Industrial Estate	0	0	400	140
Sovereign Harbour	0	0	1250	1250
Station Road, Edenbridge	0	0	4000	1300
Stone Area	1950	650	150	50
Strood Riverside	80	444	0	0
Swan Mill, Goldsel Road, Swanley	0	0	550	180
Swanley (numerous sites)	495	165	4570	1510
Swanley Town Centre	495	165	0	0
Teardrop Industrial Estate, Swanley	0	0	720	240
Temple Waterfront	360	260	0	0
Thames Waterfront	2810	940	8850	2950
The Technology Centre, Swanley	0	0	400	140
Thurrock (numerous sites)	11586	5732	2208	0
Tilbury Marshes and Riverfront	1175	0	0	0
Titan Works, Hogg Lane, Grays	1100	0	0	0
Town Centre	1627	0	0	0
Uckfield town centre	0	0	263	263
Vestry Road, Sevenoaks	0	0	2250	750
Victoria Way South	620	0	0	0
Victory Pier	726	50	0	0
Waterbrook	605	0	0	0
Waterside Park, Land south of M20 J8 and East of Old Mill Lane	0	0	0	1700
West Bexhill	0	0	208	208
West Kent Cold Store	500	0	0	0
Wested Lane Industrial Estate, Swanley	0	0	1750	560
Westerham Trading Centre, Westerham	0	0	780	260
Western Link, Faversham	0	0	0	350
William Ball site	154	0	0	0
WTS19 Lyndale Estate, Stoneness Road, West Thurrock	551	0	0	0
WTS53 Zone C2 (Junction - in vacant site)	500	0	0	0
Baberg	5450	4642	6790	9700
Braintree	4251	4575	7840	8400
Brentwood	2209	3632	2160	5400
Chelmsford	10441	0	6720	0
Colchester	10803	10914	9940	0
Tendring	5512	0	5600	0
Uttlesford	6335	6534	4046	4913
Epping Forest	2384	0	0	0
Thurrock	12859	21431	17010	24300
Medway	0	0	206	0
Maidstone	0	3700	0	550
Canterbury	2600	5550	0	0

Swale	1100	0	0	750
Medway UA	0	0	0	342
Thames Valley Berkshire	**14445**	**14810**	**12171**	**3100**
Amen Corner (South), Binfield	725	0	2163	0
Arborfield Garrison SDL	2470	3120	0	0
Berkshire Brewery	0	0	2900	2900
Former TRL, Crowthorne	1000	0	0	0
Heart of Slough	1425	0	3208	0
Land at Warfield	1200	1000	100	0
Land north of Manor Farm	550	550	0	0
Newbury Racecourse	1500	1500	100	100
North of Wokingham SDL	1283	1373	0	0
Sandleford	200	2000	0	0
Slough Trading Estate	0	0	3600	0
South of the M4 SDL	2172	2502	0	0
South of Wokingham SDL	1645	2490	0	0
Worton Grange	275	275	100	100
Grand Total	**362388**	**289654**	**275972**	**189328**

Figures for Essex and Hertfordshire in Figure 3, and the site-specific, Watford Junction development data in Table 3.1, are provided by AECOM, shown in the tables that follow.

Housing and employment growth - Hertfordshire

	Housing to 2021	Housing to 2031	Jobs to 2021	Jobs to 2031	County
Baberg	5450	4642	6790	9700	Essex
Braintree	4251	4575	7840	8400	Essex
Brentwood	2,209	3632	2,160	5400	Essex
Chelmsford	10,441	0	6,720	0	Essex
Colchester	10,803	10914	9,940	0	Essex
Tendring	5512	0	5600	0	Essex
Uttlesford	6,335	6534	4,046	4913	Essex
Epping Forest	2,384	0	0	0	Essex
Thurrock	12,859	21431	17,010	24300	Essex
Broxbourne	3,360	3600	0	0	Hertfordshire
Dacorum	6,451	8708	0	10000	Hertfordshire
East Herts	7551	7873	0	0	Hertfordshire
Hertsmere	4340	4080	0	0	Hertfordshire
North Herts	6530	8660	0	0	Hertfordshire
St Albans	5381	4185	0	0	Hertfordshire
Stevenage	3530	5999	2408	3440	Hertfordshire
Three Rivers	2563	2492	1665	2378	Hertfordshire
Watford	4669	7304	3,920	5600	Hertfordshire
Welwyn	5338	7267	9489	12200	Hertfordshire

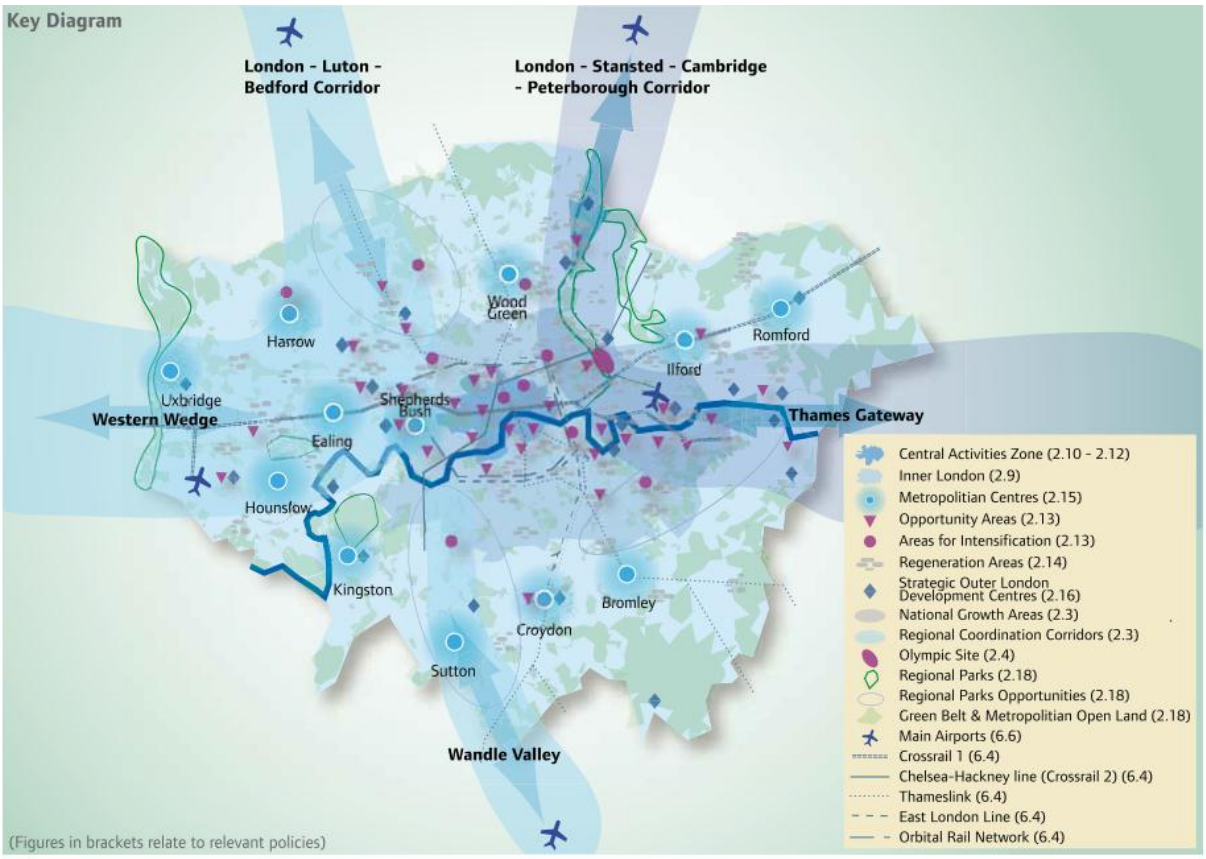
Watford Junction site specific data

Site		
Strategic Site Name	SPA2 Watford Junction	
Status	Unknown	
Land Use Quantum: Dwellings	1,500 units	
Land Use Quantum: Other (please state)	1,350-2,350 jobs. Offices; appropriate retail, café and restaurant floor space; Hotel and conference facilities; Commercial leisure facilities; Social facilities; Primary school.	
Grid reference	510994, 197314	
Scale of Development (RBS period)	RBS Short Term: 2015-2020	RBS Longer Term: 2021 and beyond
Land Use Quantum: Dwellings	1,500 units	
Land Use Quantum: Other (please state)	1,350-2,350 jobs. Offices; appropriate retail, café and restaurant floor space; Hotel and conference facilities; Commercial leisure facilities; Social facilities; Primary school.	
Data Source Name (if different from above)	Core Strategy p.26	
Source Location (web link)	N/A	

We have also included anticipated growth in passenger numbers at both Heathrow and Gatwick airports, which are directly served by this route. Figures are based on the Department for Transport's *UK Aviation Forecasts* (table 5.5, page 77). We have chosen to quote this source ahead of other technical papers produced by other airports, because we consider this is more likely to represent an impartial view of future aviation growth, particularly as the Davies commission is yet to announce its preferred option at the time of producing this report.

A3.2.4

The corridors quoted originate from the *London Plan* (page 73):



A3.2.6 and A3.2.8

Refer to stakeholder comments detailed in section A4.

A3.3 Network improvements and operational changes

Table A3.2

Location	Scheme Type	Source
M25 J30 and A13 approaches	Improvements to junctions and approaches, and speed enforcement	http://www.highways.gov.uk/roads/road-projects/M25-Junction-30A13-Corridor-Relieving-Congestion-Scheme
M25 J23 - J27	Smart Motorway – all lanes running	http://www.highways.gov.uk/roads/road-projects/M25-Junctions-23-27
M25 J5 - J6/7	Smart Motorway – all lanes running	http://www.highways.gov.uk/roads/road-projects/M25-Junctions-5-7
A282	Dartford Free-Flow Charging	http://www.highways.gov.uk/roads/road-projects/Dartford-Free-Flow-Charging-Project-
M3 J2-4a	Smart Motorway – all lanes running	http://www.highways.gov.uk/roads/road-projects/M3-Junctions-2-4a
M25 J7-J8	Controlled Motorway	Highways Agency TechMAC
M1 J1	Developer funded scheme	Planning conditions for the Brent Cross/ Cricklewood development
M1 J5	Developer funded scheme	Planning conditions for the Watford

		Health Campus development
M4 J3	Developer funded scheme	Planning conditions for the Southall Gas Works development
A30 Bulldog	Developer funded scheme	Planning conditions for the Tesco's development
A1089 Asda roundabout	Developer funded scheme	Planning conditions for London Business Park

Table A3.3

Location	Source
M4 J3 – J12	http://www.highways.gov.uk/roads/road-projects/M4-Junctions-3-12 HM Treasury – Investing in Britain's future June 2013 – Table A4 (page 74)
M23 J8 – J10	HM Treasury – Investing in Britain's future June 2013 – Table A4 (page 74)
A2 Ebbsfleet junction	HM Treasury – Investing in Britain's future June 2013 – Table A4 (page 76)
M1 J6	Highways Agency LMNS programme
M25 J21a	Highways Agency LMNS programme
A30 cycleway phase 3	Highways Agency LMNS programme

A3.4 Wider transport networks

Table A3.4

Project	Scheme Type	Completion Year	Source
Crossrail 1	Rail	2018	London Plan 2011 (updated October 2013), Table 6.1 (page 178)
Thameslink programme	Rail	2018	London Plan 2011 (updated October 2013), Table 6.1 (page 179)
A13 North Stifford Interchange (Thurrock)	Highway	2014	https://www.thurrock.gov.uk/sites/default/files/ assets/documents/strategy_transport_2013_delivery_2008.pdf

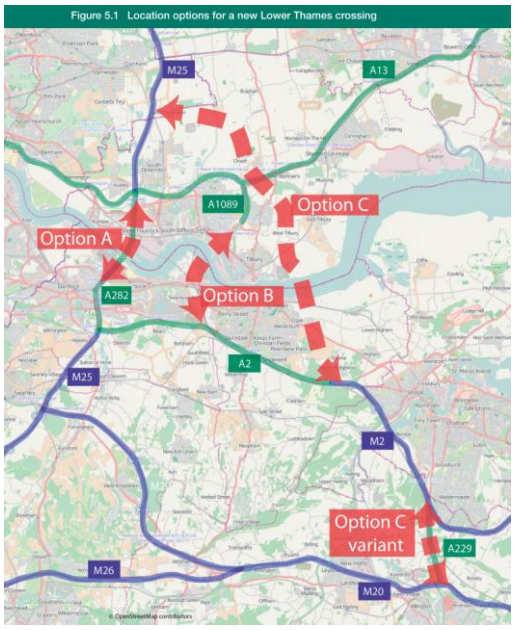
A3.4.3

Information regarding the Lower Thames Crossing is primarily obtained from the DfT consultation website

https://www.gov.uk/government/collections/lower-thames-crossing

This is a live website, any materials posted to the website after end of November 2013 would not have been considered in the main evidence report.

Construction start and end dates are based on journals that DfT is quoted as suggesting (Local Transport Today Issue 627, 26 July to 8 August 2013).



Source:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/200489/map-of-options.pdf

A3.4.4

TfL has a consultation website specific to their river crossing proposals – Woolwich Ferry replacement and the proposed new Silvertown tunnel:

https://consultations.tfl.gov.uk/river/crossings

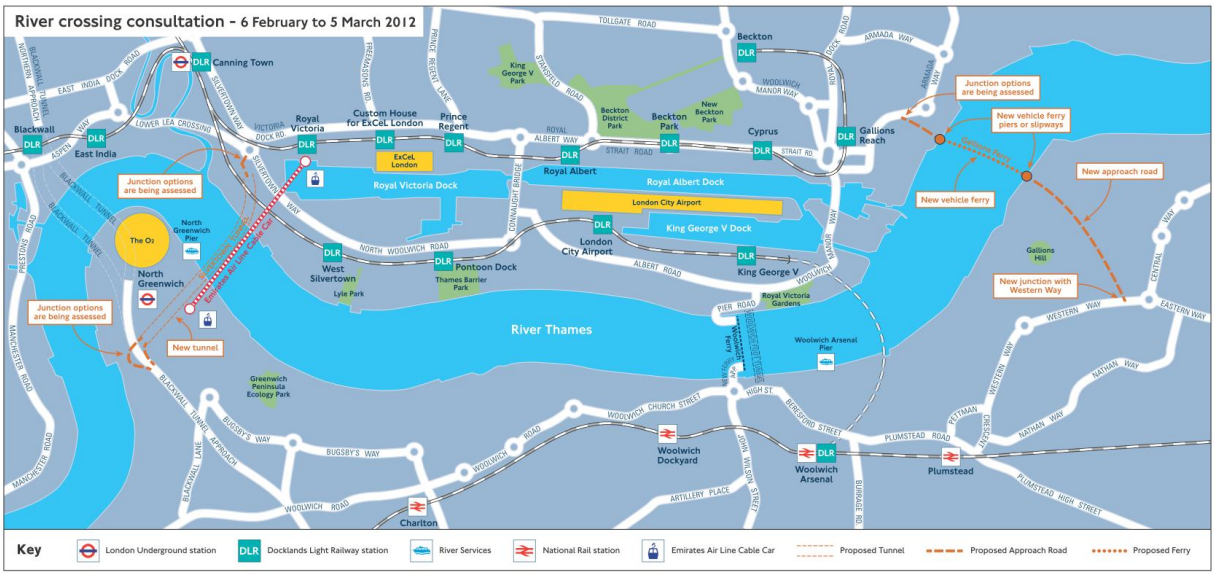
Supplemented by this consultation response document, TfL River Crossings programme Responses to issues raised:

https://consultations.tfl.gov.uk/rivercrossings/consultation/user_uploads/responses-to-issues-raised.pdf

An indicative map of the proposed river crossings is shown in the following (click on source link for a higher resolution image). As implied within the consultation response document, no decision has been made yet regarding the final form – or the location – of the Woolwich Ferry replacement and the Gallions Reach crossing. Indeed, there is no firm proposal as to whether the two will co-exist. The timescales suggested by TfL are also shown within the consultation response.

Source:

https://consultations.tfl.gov.uk/river/crossings/supporting_documents/River%20Crossings%20consultation%20map_final_high%20res_v2.pdf



A3.4.5

The draft airport commission report, published 17 December 2013, has recommended expansion plans at Heathrow and Gatwick airports, with the prospective Thames Estuary airport subject to further feasibility study during the first half of 2014. The report is accessible via:

https://www.gov.uk/government/organisations/airports-commission

In parallel, Network Rail has developed proposals for a direct rail link connecting the Great Western Main Line from Reading and Slough to Heathrow airport. The scheme, known as Western Rail Access, will undergo public consultation in due course. Subject to planning permission and a satisfactory business case, the scheme could be completed in 2021.

In February 2014 Network Rail issued a press release which could be accessed via:

http://www.networkrail.co.uk/news/2014/feb/Proposals-for-a-direct-rail-link-from-the-west-to-Heathrow/

A3.4.7

The main report does not feature a paragraph 3.4.7 as the following is not a committed scheme, or one that is undergoing public consultation. Within the South East LEP Growth Deal and Strategic Economic Plan (SEP, published December 2013), there is a call to trunk for sections of A13 / A1014, and a call for funding to provide improvements along the A13 corridor. These calls are in response significant growth that the SELEP is predicting in light of planned developments at London Gateway, and others. The SEP can be accessed via the link below. The corresponding paragraph is 5.33.

http://www.southeastlep.com/images/pdf/activites/South%20East%20LEP%20Strategic%20Economic%20Plan%20Preliminary%20Submission%20FULL.pdf

A4 Key challenges and opportunities

Information reported in section 4 of the stage 1 evidence report was derived from the evidence and discussion in sections 2 and 3 of the stage 1 evidence report and alongside further information resulting from the engagement events, reported in the engagement event report listed in section B1 of this Technical Annex.

We have also reviewed customer care data gathered from the Highways Agency Information Line (HAIL) for the period between January and December 2013. This allows us to, where possible, quantify or support observed challenges expressed by stakeholders. Relevant extracts are detailed below.

A4.2 Operational challenges and opportunities

A4.2.5

Selected statistics from HAIL for the M25:

- 18% of contacts were about the CJV works at J5 between 1/1/13 and 31/3/13.
- 12% of contacts related to all aspects of road works.
- 9% related to all aspects of traffic management.
- 3% of complaints were about behaviour; evenly split between other road users and road workers.
- Approx 1% of contacts about noise from road works related to the junction 10 works in November

It would appear that there were no contacts specifically related to diversion routes during 2013.

A4.2.15

Selected statistics from HAIL:

For the A282 / Dartford River Crossing:

- 29% of contacts related to provision (or lack of) information including VMS.

For the M25:

- 9% of contacts were about information provided, primarily on VMS. (Emergency diversion routes had <1% of complaints.)
- 9% related to all aspects of traffic management.

A4.4 Capacity challenges and opportunities

A4.4.6

Selected statistics from HAIL:

For the A282 / Dartford River Crossing:

- 35% of the contacts related to issues concerning various aspects of charging (including Free Flow.
- 14% of contacts related to congestion issues.

Total number of contacts received in 2013:

M25	777
M25- J5 Spur	1
M25-M1	1
M25-M11	4
M25-M23	2
M25-M3	3
M25-M4	2
M25-M40	3
M25 Total:	**793**
A282	801
A2-A282	1
A282 Total:	**802**

Table A4.1 is a schedule of challenges and opportunities relevant to this route, either identified by the Agency or raised by stakeholders. Each issue is assigned a colour code to represent how it has been used:

Orange – generic issues that have been passed to the national RBS team to review and have not been considered further in this evidence report.

Yellow –location-specific issues that have been selected to illustrate in Figure 4, as well as Table 4.1, of the main evidence report,

White –issues that have been selected to include in Table 4.1 of the main evidence report (but not in Figure 4),

Grey – issues that have not been included in either Table 4.1 or Figure 4 of the main report,

Table A4.1 Schedule of challenges and opportunities

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Route Operation	Generic	Better education will be required to get the full operational benefits of Smart Motorways	No	X			Yes		X	
Route Operation	M25 junction 23–junction 27 M25 junction 5-junction 7 Other M25 Controlled Motorways	Better education will be required to get the full operational benefits of Smart Motorways being delivered on this route	No	X			Yes		X	
Route Operation	Generic	Incidents need to be attended to and cleared quickly, particularly with Smart Motorways	No	X			Yes	X		
Route Operation	M23 junction 9 M25 junction 30	Incidents at these two locations take over an hour to clear	Yes	X			No	X		
Route Operation	Generic	A lack of places for vehicle turnaround places in an emergency on the strategic route network	No	X			Yes	X		
Route Operation	Route-wide	A lack of vehicle turnaround places in an emergency on this route	No	X			Yes	X		
Route Operation	A282 Dartford Crossing	The disruption to traffic caused by high vehicles trying to use tunnels	No	X			Yes	X		
Route Operation	A282 Dartford Crossing	The disruption to traffic caused by waiting for vehicles carrying hazardous loads to be convoyed through tunnels	No	X			Yes	X		
Route Operation	Route-wide	A lack of hard shoulders, for instance on viaducts, making it harder to access incidents or needing to cone off the inside lane when repairing	No	X			Yes		X	

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Route Operation	M25 junctions 3, 9 and 23	Congestion on local roads makes it difficult to access M25 DBFO contractor's depots at Leatherhead, Swanley and South Mimms	No		X		Yes	X		
Route Operation	Diversion for A282 Dartford crossing	43km diversion with 4m height restriction, very severe traffic impact	Yes	X			Yes	X		
Route Operation	Diversion for M25 junction 25-junction 27	30km diversion past a hospital with no agreed diversion for junction 25-junction 26, very severe local traffic impact	Yes	X			Yes	X		
Route Operation	Diversion for M1 junction 4-junction 5	Severe local traffic impacts from this diversion	Yes	X			Yes	X		
Route Operation	Diversion for M23 junction 8-junction 9	Severe local traffic impacts from this diversion	Yes	X			Yes	X		
Route Operation	Diversion for M25 junction 6-junction 8	Severe local traffic impacts from this diversion	Yes	X			Yes	X		
Route Operation	Diversion for M25 junction 23-junction 25	Severe local traffic impacts from this diversion	Yes	X			Yes	X		
Route Operation	Diversion for M25 junction 27-junction 28	Severe local traffic impacts from this diversion	Yes	X			Yes	X		
Route Operation	Diversion for M25 junction 8-junction 10	Severe local traffic impacts from this diversion	Yes	X			Yes	X		
Route Operation	Diversion routes – various	Lack of VMS and CCTV on diversion routes	No		X		No	X		
Route Operation	Diversion routes – various	Lack of maintenance of diversion signs on diversion routes	No		X		No	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Route Operation	Diversion routes – particularly M25 north eastern quadrant	Lack of multiple junction diversion routes designed for longer distance traffic	No		X		No	X		
Route Operation	Generic Diversion routes	Lack of VMS and CCTV on diversion routes	No		X		No	X		
Route Operation	Generic Diversion routes	Lack of maintenance of diversion signs on diversion routes	No		X		No	X		
Route Operation	Generic Diversion routes	Lack of multiple junction diversion routes designed for longer distance traffic	No		X		No	X		
Route Operation	Generic Diversion routes	Lack of feedback on use of diversion routes, type of traffic using them, whether people understand the signs and how they experienced them	No		X		No	X		
Route Operation	A405	No CCTV despite congestion and safety issues on the route	Yes		X		No	X		
Route Operation	A405	No VMS or safety cameras despite congestion and safety issues on the route	Yes		X		No	X		
Route Operation	A30	No CCTV, VMS, or safety cameras despite congestion and safety issues on the route	Yes		X		No	X		
Route Operation	A23	No CCTV despite congestion and safety issues on the route	Yes		X		No	X		
Route Operation	A23	No VMS or safety cameras despite congestion and safety issues on the route	Yes		X		No	X		
Route Operation	A13	No CCTV, VMS, or safety cameras despite congestion and safety issues on the route	Yes		X		No	X		
Route Operation	All trunk roads	No traffic officer patrols	Yes		X		No	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Route Operation	All trunk roads except A1 and those listed above	No CCTV coverage of these routes, except A3113 and A3, and no safety cameras, and no VMS, except A1, A2, A3 and A20	Yes		X		No	X		
Route Operation	All trunk roads	No MIDAS and no Controlled Motorway technology despite congestion problems	Yes			X	No	X		
Route Operation	Route-wide	Control of the M25 is split between two RCCs, with different technology, and different to external agencies, causing problems with communications	No		X		No	X		
Route Operation	M25 junction 31	Traffic signals are not controlled by the Agency, even though the Agency owns the junction	Yes		X		No	X		
Route Operation	M4 junction 3	Traffic signals are not controlled by the Agency, even though the Agency owns the junction	Yes			X	No	X		
Route Operation	Route-wide	Only a few of the approx 30 traffic signals are running on the most modern control system .	Yes		X		No	X		
Route Operation	M25 junction 6 (e/b) M25 junction 8 (e/b) M25 junction 11 (both)	Only these four sites are running ramp metering, three other sites are no longer operating (due to local congestion), and therefore lengths of the M25 are congested but not controlled by ramp metering	Yes		X		Yes	X		
Route Operation	M11, M23	No safety cameras operating	Yes		X		No	X		
Route Operation	M1 junction 1-junction 6, M4 junction 4b-junction 1	No safety cameras operating, despite safety issues on these routes	Yes		X		No	X		
Route Operation	M25 junction 3 – junction 5	No Controlled Motorway, MIDAS or safety cameras, despite congestion J4-J5	Yes		X		No	X		
Route Operation	A282 Dartford crossing	No Controlled Motorway, despite loop detectors in place and high levels of congestion.	Yes		X		No	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Route Operation	M4 junction 4b – junction 1 M11 junction 4 –junction 6	No VMS, MIDAS (M4 true for elevated section) or Controlled Motorway, despite congestion	Yes		X		No	X		
Route Operation	M23 junction 8- junction 9	No MIDAS or Controlled Motorway, despite congestion	Yes		X		No	X		
Route Operation	M1 junction 1-junction 6	No MIDAS or Controlled Motorway	Yes		X		No	X		
Route Operation	M3	No Controlled Motorway	Yes		X		No	X		
Asset - Pavement	All routes except M23, M11 and A30, and the most significant routes listed separately	Surfacing reaching end of design life and requires renewal.	Yes		X		Yes	X		
Asset - Pavement	M4 junction 3 – junction 1	Surfacing on elevated section reaching end of design life and requires renewal.	Yes		X		Yes		X	
Asset - Pavement	A282 Dartford crossing	Surfacing on QEII bridge reaching end of design life and requires renewal.	Yes		X		Yes		X	
Asset - Pavement	M25 junction 8 – junction 11	Exposed concrete surfacing reaching end of design life and requires renewal, and risk that the proposed fine milling treatment might not be effective, requiring additional visits or alternative treatment.	Yes		X		Yes		X	
Asset - Structures	A282 Dartford crossing	QEII bridge movement joints to be replaced, and painting of cable stays, pylons and bridge deck	Yes		X		Yes	X		
Asset - Structures	M4 junction 3 – junction 1	Elevated concrete structures require steelwork strengthening and concrete renewals	Yes	X	X	X	Yes		X	

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Asset - Structures	M25 junction 20 – junction 21	Gade Valley viaduct movement joints to be replaced. Issues found on structure being investigated, risk of unplanned works	Yes		X		Yes	X		
Asset - Structures	M25 junction 10 – junction 11	New Haw viaduct movement joints to be replaced	Yes		X		Yes	X		
Asset - Structures	M25 junction 15 (M4 junction 4b)	Movement joints to be replaced	Yes		X		Yes	X		
Asset - Structures	M4 junction 3 – junction 2	Issues on elevated Boston Manor viaduct being investigated, risk of unplanned works	Yes		X		Yes	X		
Asset - Structures	M1 junction 2 and elsewhere	Risk of unplanned works to post-tensioned structures (about 25 such strategic structures)	Yes		X		Yes	X		
Asset – Geotechnical	M25 junction 6 – junction 7	Embankments on both sides have moved following widening works. Risk of unplanned works	Yes		X		Yes	X		
Asset – Geotechnical	A3113, M11/M25, M11 junction 5 – junction 6, M25 junction 16, M25 junction 23 –junction 24, M25 junction 26 – junction 27	Issues at these sites that could result in unplanned works	Yes		X		Yes	X		
Asset – Geotechnical	M23 junction 9 – junction 9a	Cracking is visible and there is a risk of full failure affecting the carriageway	Yes	X			No	X		
Asset – Geotechnical	M23 junction 8 – junction 9 (near South Nutfield)	Cracking is visible on the west side adjacent to the drainage channel	Yes	X			No	X		
Asset - Drainage	All below ground drainage not yet surveyed	Risk of unplanned works	Yes		X		Yes	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Asset - Drainage	Surface drainage in poor condition	Risk of unplanned works	Yes		X		Yes	X		
Asset - Drainage	M1 junction 4 – junction 5	Flooding of the carriageway, poor drainage condition is believed to be a factor	Yes		X		Yes		X	
Asset - Drainage	M25 junction 7 – junction 8	Flooding of the carriageway, poor drainage condition is believed to be a key factor	Yes		X		Yes	X		
Asset - Lighting	Network wide, except for recently upgraded sections such as M25 junction 16 – junction 23	A large number of the lights have reached the end of their serviceable life	Yes		X		Yes	X		
Asset - Lighting	A2, A282 Dartford crossing, A1, M25 junction 12, M3 junction 1	Lighting renewal works will take place in the next two years at these locations	Yes		X		Yes	X		
Asset - Lighting	M1 junction 4 – junction 5	Trial to switch off lighting to reduce carbon emissions	Yes		X		Yes	X		
Capacity - Link	A23	Unreliable - National rank 11 & 13 (each direction) on the SRN. Average speed northbound less than 20mph. Improvements required to facilitate growth in Croydon.	Yes		X		Yes			X
Capacity - Link	A405	Unreliable - National rank 12 for southbound journeys on the SRN	Yes		X		Yes			X

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Capacity - Link	A282 Dartford crossing (from M25 junction 31 to M25 junction 2)	Unreliable – National rank 19/ 29/ 32/ 63 on the SRN. Peak average speeds fall below 30mph (speed limit is 50mph). Improvements required to facilitate growth in the Thames Gateway.	Yes		X		Yes			X
Capacity - Link	A282 Dartford crossing	Free flow, whilst helps relieving congestion / providing additional capacity, may worsen traffic impacts on TLRN, Strategic Road Network in London, and other local roads			X		Yes		X	
Capacity - Link	M25 junction 5-6	Unreliable – National rank 42 & 60 (each direction) on the SRN	Yes		X		No	X		
Capacity - Link	M23 junction 8-9	Unreliable – National rank 33 for southbound journeys on the SRN. Improvements required to facilitate growth at Gatwick.	Yes		X		Yes			X
Capacity - Link	M25 junction 10-16	Peak average speeds fall between 30-50mph (variable speed limit). May be caused by high volume of traffic interchanging with other roads and lack of capacity to enter and leave the M25. Improvements required to facilitate growth at Heathrow.	Yes		X		Yes		X	

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Capacity - Link	M11 junction 5-4	Peak morning average speeds towards London fall below 40mph (speed limit is 50mph). Improvements required to facilitate growth at Lower Lee Valley.	Yes		X		Yes		X	
Capacity - Link	M4 junction 3-1	Peak morning average speeds towards London fall below 30mph (speed limit is 60mph-40mph)	Yes		X		No	X		
Capacity - Link	A30	Peak speeds fall below 30mph. Improvements required to facilitate growth at Heathrow.	Yes		X		No	X		
Capacity - Junction	A282 junction 1a	Over capacity, leading to local congestion. Cited at London workshop. Improvements needed to facilitate growth in Thames Gateway and Bexley Riverside.	No		X		Yes		X	
Capacity - Junction	A282 junction 1b	Over capacity, leading to local congestion. Cited at London and Maidstone workshops. Improvements needed to facilitate growth in Thames Gateway and Bexley Riverside.	No		X		Yes			X
Capacity - Junction	M25 junction 2/ A2/ A282	Over capacity. Improvements needed to facilitate growth in Thames Gateway.	No		X		No		X	
Capacity - Junction	M25 junction 5	Over capacity. Cited at Kent, Gatwick and London workshops. Stakeholders cited capacity issues due to merging goods vehicles.	No		X		Yes			X

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Capacity - Junction	M25 junction 6	Over capacity	No		X		No	X		
Capacity - Junction	M25 junction 7/ M23 junction 8	Over capacity. Gatwick airport supplied modelling as evidence. Cited at Reading workshop. Improvements needed to facilitate Gatwick expansion.	Yes		X		Yes		X	
Capacity - Junction	M25 junction 8	Over capacity	No		X		No	X		
Capacity - Junction	M25 junction 9	Over capacity. Improvements needed to facilitate growth in Leatherhead.	No		X		No		X	
Capacity - Junction	M25 junction 10/ A3	Over capacity. Cited at London and Basingstoke workshops.	No		X		Yes		X	
Capacity - Junction	M25 junction 12/ M3 junction 2	Over capacity. Cited at Basingstoke workshop.	No		X		Yes		X	
Capacity - Junction	M25 junction 13/ A30	Over capacity. Improvements needed to facilitate growth in Heathrow.	No		X		No		X	
Capacity - Junction	M25 junction 15/ M4 junction 4b	Over capacity. Cited at High Wycombe workshop. The Agency has microsimulation modelling. Improvements needed to facilitate growth in Heathrow.	Yes		X		Yes		X	
Capacity - Junction	M25 junction 16	Over capacity	No		X		No	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Capacity - Junction	M25 junction 20	Over capacity. Cited at Herts workshop.	No		X		Yes	X		
Capacity - Junction	M25 junction 21a/ A405	Over capacity. Cited at London workshop.	Yes		X		Yes		X	
Capacity - Junction	M25 junction 22	Over capacity. Cited at Herts workshop.	Yes		X		Yes	X		
Capacity - Junction	M25 junction 23/ A1	Over capacity. Cited at Herts workshop.	No		X		Yes	X		
Capacity - Junction	M25 junction 25	Over capacity. A10 corridor modelling supplied as evidence. Cited at London and Herts workshops. Stakeholders cited issues with HGV access. Improvements needed to facilitate growth in Upper Lee Valley. No access to Junction 26 exacerbates the congestion problem.	Yes		X		Yes			X
Capacity - Junction	M25 junction 26	Over capacity. Cited at Chelmsford workshop.	No		X		Yes	X		
Capacity - Junction	M25 junction 27/ M11 junction 6	Over capacity	No		X		Yes	X		
Capacity - Junction	M25 junction 28	Over capacity. Cited at London and Chelmsford workshops. Confusing signing and layout leads to junction operating inefficiently.	No		X		Yes		X	
Capacity - Junction	M25 junction 29	Over capacity. Cited Chelmsford workshop but discussed with Connect Plus.	No		X		Yes	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Capacity - Junction	M25 junction 30/ A13	Over capacity. Major Projects will have models. Cited at London and Chelmsford workshops. Improvements needed to facilitate growth in Thames Gateway.	Yes		X		Yes			X
Capacity - Junction	M25 junction 31/ A282	Over capacity. Cited at London and Chelmsford workshops. Improvements needed to facilitate growth in Thames Gateway.	No		X		Yes			X
Capacity - Junction	M4 junction 1	Over capacity	No		X		No	X		
Capacity - Junction	M4 junction 3	Over capacity. Modelling for Southall gasworks development. Improvements needed to facilitate growth in Southall and Heathrow.	Yes		X		No		X	
Capacity - Junction	M4 junction 4/ Heathrow spur	Over capacity. Cited by Heathrow Airport limited. Cited at High Wycombe workshop. Improvements needed to facilitate growth in Heathrow.	No		X		Yes		X	
Capacity - Junction	M4 junction 4a	Over capacity. Improvements needed to facilitate growth in Heathrow.	Yes		X		No	X		
Capacity - Junction	M1 junction 1	Over capacity. Modelling for Brent Cross development. Improvements needed to facilitate growth in Brent Cross and Cricklewood.	Yes		X		No	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Capacity - Junction	M1 junction 4	Over capacity. Improvements needed to facilitate growth in Colindale/ Burnt Oak.	No		X		No	X		
Capacity - Junction	M1 junction 5	Over capacity. Modelling for Watford Health Campus. Cited at Herts workshop. Improvements needed to facilitate growth in Watford.	Yes		X		Yes		X	
Capacity - Junction	M1 junction 6/ A405	Over capacity	No		X		No	X		
Capacity - Junction	M3 junction 1	Over capacity	No		X		No	X		
Capacity - Junction	M23 junction 7	Over capacity. Cited at London workshop. Stakeholders cited 3-4 lanes converging into one causes congestion. Improvements needed to facilitate growth in Croydon.	No		X		Yes		X	
Capacity - Junction	M23 junction 9	Over capacity. Gatwick airport supplied modelling as evidence. Improvements needed to facilitate expansion in Gatwick.	Yes		X		Yes		X	
Capacity - Junction	M11 junction 4	Over capacity. Improvements needed to facilitate growth in Ilford and Lower Lea Valley.	No		X		Yes		X	

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Capacity - Junction	A30 Crooked Billet	Over capacity. Improvements needed to facilitate growth in Heathrow.	No		X		No	X		
Capacity - Junction	A30 Bulldog	Over capacity. Modelling for Tesco development. Improvements needed to facilitate growth in Heathrow.	Yes		X		No	X		
Capacity - Junction	A3 Painshill	Over capacity. Improvements needed to facilitate growth in Ockham.	No		X		No	X		
Capacity - Junction	A23 Netherdene Drive	Over capacity. Improvements needed to facilitate growth in Croydon.	Yes		X		No		X	
Capacity - Junction	A23 Star Lane	Over capacity. Improvements needed to facilitate growth in Croydon.	Yes		X		No		X	
Capacity - Junction	A13 Dumbbells	Over capacity. Lack of east facing slips causes pressure on other junctions. Improvements needed to facilitate growth in Thames Gateway.	No		X		Yes			X
Capacity - Junction	A13 North Stifford	Over capacity. Improvements needed to facilitate growth in Thames Gateway.	No		X		No	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Safety - Junction	M25 junction 23	Highest number of collisions on the route, but few severe, therefore few casualties.	Yes	X			Yes		X	
Safety - Junction	M25 junction 30	Short term improvements completed, for longer term improvements see Section 3	Yes	X			Yes			X
Safety - Junction	M25 junction 10	Ranked number 1 for casualties on the SRN, being studied by Connect Plus.	Yes	X			Yes			X
Safety - Junction	M25 junction 21a	Ranked number 21 for casualties on the SRN. Safety scheme due to complete, see Section 3. Also collisions during snowy and icy conditions.	Yes	X			Yes		X	
Safety - Junction	M25/ M4 junction 15/4b	Ranked number 3 for casualties on the SRN for the M4 eastbound approach, being studied. Also collisions during snowy and icy conditions, steep slip roads.	Yes	X			Yes	X		
Safety - Junction	M25 junction 29		Yes	X			Yes	X		
Safety - Junction	M25 junction 3	Also collisions during snowy and icy conditions, steep slip roads.	Yes	X			Yes	X		
Safety - Junction	M25 junction 13	Ranked number 21 for casualties on the SRN.	Yes	X			Yes	X		
Safety - Junction	M25 junction 25		Yes	X			Yes	X		
Safety - Junction	M25 junction 2	Also collisions during snowy and icy conditions, steep slip roads.	Yes	X			Yes	X		
Safety - Junction	A30 Crooked Billet	Ranked number 14 for casualties on the SRN.	Yes	X			Yes		X	

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Safety - Junction	A13 North Stifford Interchange	Committed signalisation scheme, see Section 3. Also collisions during snowy and icy conditions.	Yes	X			Yes		X	
Safety - Junction	A30 Bulldog	Committed junction improvement scheme, see Section 3.	Yes	X			Yes		X	
Safety - Junction	A282 Dartford junction 1a	Ranked number 3 for casualties on the SRN. Also a suicide hotspot.	Yes	X			Yes		X	
Safety - Junction	A282 Dartford junction 1b	A suicide hotspot.	Yes		X		Yes	X		
Safety - Junction	M25 junction 5	Issues with under 25 drivers.	Yes		X		Yes	X		
Safety - Junction	M25 junction 7	Collisions during snowy and icy conditions.	Yes		X		Yes	X		
Safety - Junction	M4 junction 4	Collisions during snowy and icy conditions.	Yes		X		Yes	X		
Safety - Junction	M25 junction 8	A suicide hotspot	Yes		X		Yes	X		
Safety - Junction	M25 junction 25	A suicide hotspot	Yes		X		Yes	X		
Safety – Link	A282, Dartford Crossing; M25 junction 31 - junction 2	High accident rate, 11-15 accidents per 100 million vehicle miles, also a suicide hostpot	Yes		X		Yes		X	
Safety – Link	M25 junction 8 - junction 11	High accident rate	Yes		X		Yes	X		
Safety – Link	M4 junction 4b – junction 1	High accident rate, also issues with under 25 drivers.	Yes		X		Yes			

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Safety – Link	M4 Heathrow spur junction 4a – junction 4	High accident rate	Yes		X		Yes	X		
Safety – Link	M23 junction 8 – junction 9	High accident rate	Yes		X		Yes	X		
Safety – Link	A30	High accident rate	Yes		X		Yes	X		
Safety – Link	A405	High accident rate, also collisions during snowy and icy conditions.	Yes		X		Yes	X		
Safety – Link	A2	High accident rate, and collisions with lamp columns.	Yes		X		Yes	X		
Safety – Link	A23	High accident rate	Yes		X		Yes	X		
Safety – Link	A3	High accident rate	Yes		X		Yes	X		
Safety – Link	A13	Issues with under 25 drivers	Yes		X		Yes	X		
Social	M25 junction 25 – junction 26	Need for better access to from industrial areas in Upper Lee Valley to promote regeneration and minimise unwanted / unintended consequences of congestion on local network	Yes		X		Yes			X
Social	Route-wide	Lack of HGV parking. Improved availability of HGV parking would reduce the need to be on the network in peaks and social impacts of unwanted parking	No		X		Yes		X	
Social	Generic	Lack of HGV parking. Improved availability of HGV parking would reduce the need to be on the network in peaks and social impacts of unwanted parking	No		X		Yes		X	

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Environment – air quality	M4 junction 4b – junction 1	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	A282 Dartford crossing	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	M1 junction 1 – junction 6	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	M3 junction 1 – junction 2	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	M11 junction 4 – junction 5	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Environment – air quality	A30	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	A23	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	M25 junction 13- junction 15	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	M25 junction 24- junction 25	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	M25 junction 28- junction 30	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Environment – air quality	M25 junction 2- junction 6	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	M25 junction 10–junction 11	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	M25 junction 27–junction 28	Nitrogen dioxide is above statutory limits, and close to sensitive receptors such as houses, schools etc. Any road widening, traffic reallocation, or traffic increase could be in breach of the UK's statutory duties.	Yes	X			Yes	X		
Environment – air quality	Epping Forest (off route, on diversion route)	Nitrogen dioxide is above statutory limits and in a special protected area. Any planned work on the route that diverts traffic into the area for any length of time needs to show that air quality will not suffer.	Yes	X			Yes	X		
Environment – cultural heritage	Runnymede Bridge, Cropmark Orsett, Surrey Iron Railway Earthworks, Stane Street scheduled monuments	Any works must avoid impacting on buried deposits.	Yes			X	Yes	X		
Environment – cultural heritage	Dovecote at Hawley, Rowhurst Grade II* listed buildings	Any works must protect the building setting.	Yes			X	Yes	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Environment – cultural heritage	Painshill Park, Osterley Park, Combe Bank Gardens, RHS Wisley	Any works must protect the gardens setting.	Yes			X	Yes	X		
Environment – Ecology	M25 junction 26 – junction 27	Epping Forest SSSI and SAC designated site of high nature conservation value.	Yes			X	Yes	X		
Environment – Ecology	M25 junction 10	Ockham and Wisley Commons SSSIs and LNR designated sites	Yes			X	Yes	X		
Environment – Ecology	M25 junction 13 – junction 14 and A30	Staines Moor SSSI; Wraysbury Reservoir SSSI; Wraysbury & Hythe End gravel pit; SW London Waterbodies RAMSAR designated sites	Yes			X	Yes	X		
Environment - Landscape	M25 junction 3 – junction 6	Kent Downs designated AONB	Yes			X	Yes	X		
Environment - Landscape	M25 junction 5 – junction 8; and M23/A23 near junction 7	Surrey Hills designated AONB	Yes			X	Yes	X		
Environment - Landscape	M25 junction 18	Chiltern Hills designated AONB	Yes			X	Yes	X		
Environment - Landscape	Various local landscapes	Epping Forest, Colne Valley, Darenth Valley, Lee Valley, Roding Valley, Mardyke Valley	Yes			X	Yes	X		
Environment - Noise	M25 junction 25 – junction 26 at Holmesdale tunnel	Noise Important Area identified by DEFRA at Waltham Cross, requiring an action plan to be put in place	Yes		X		No	X		
Environment - Noise	M1 junction 5 – junction 6	Noise Important Area identified by DEFRA at north Watford, requiring an action plan to be put in place	Yes		X		No	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Environment - Noise	M25 junction 18	Noise Important Area identified by DEFRA at Chorley and Rickmansworth, requiring an action plan to be put in place	Yes		X		No	X		
Environment - Noise	M25 junction 12 – junction 13	Noise Important Area identified by DEFRA at Egham and Staines, requiring an action plan to be put in place	Yes		X		No	X		
Environment - Noise	M25 junction 9	Noise Important Area identified by DEFRA at Ashtead and Leatherhead, requiring an action plan to be put in place	Yes		X		No	X		
Environment - Noise	A282 junction 1a – junction 2	Noise Important Area identified by DEFRA at Dartford, requiring an action plan to be put in place	Yes		X		No	X		
Environment - Noise	Various other Important Areas	Smaller Noise Important Areas identified by DEFRA, including in open countryside	Yes		X		No	X		
Environment – Water pollution	M25 junction 26 – junction 27	Outfalls at Brookhouse Brook and Copped Hall Park fail quality standards	Yes	X			Yes	X		
Environment – Water pollution	M25 junction 24 – junction 25	Outfall at Woodhurst Farm fail quality standards	Yes	X			Yes	X		
Environment – Water pollution	M25 junction 9 – junction 10	Outfall at Brickfield Copse fail quality standards	Yes		X		Yes	X		
Environment – Water pollution	M4 junction 4	Various outfalls fail quality standards	Yes		X		Yes	X		
Environment - flooding	M1 junction 4 – junction 5	Flooding of the carriageway, poor drainage condition is believed to be a key factor. Covered under Asset – Drainage.	Yes		X		Yes	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Environment - flooding	M25 junction 7 – junction 8	Flooding of the carriageway, poor drainage condition is believed to be a key factor. Covered under Asset – Drainage.	Yes		X		Yes	X		
Environment - flooding	M25 junction 11 – junction 12	Flooding of the carriageway under heavy rainfall.	Yes		X		Yes	X		
Environment - flooding	M25 junction 9 – junction 10	Flooding of the carriageway under heavy rainfall.	Yes		X		Yes	X		
Environment - flooding	M25 junction 5 – junction 6	Flooding of the carriageway under heavy rainfall.	Yes		X		Yes	X		
Environment – Severe Weather	M25 junction 7 – junction 8 Reigate Hill	Vulnerable to snow fall and ice formation	Yes		X		Yes		X	
Environment – Severe Weather	A282 QEII bridge	Vulnerable to snow fall and ice formation, high winds and heat failure on southern slope	Yes		X		Yes		X	
Environment – Severe Weather	M25 junction 23–junction 25	Vulnerable to snow fall and ice formation	Yes		X		Yes	X		
Environment – Severe Weather	M25 junction 27-junction 28	Vulnerable to snow fall and ice formation	Yes		X		Yes	X		
Environment – Severe Weather	M25 junction 4 – junction 5	Vulnerable to snow fall and ice formation	Yes		X		Yes	X		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Top Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Environment – Severe Weather	M25 junction 3 slips	Vulnerable to snow fall and ice formation. Covered under Safety.	Yes		X		Yes	X		
Environment – Severe Weather	M25 junction 18-junction 19	Vulnerable to falling trees in high winds	Yes		X		Yes	X		
Environment – Severe Weather	A3	Vulnerable to falling trees in high winds	Yes		X		Yes	X		
Environment – Severe Weather	M1 junction 1 – junction 6	Vulnerable to asset failure (e.g. parts coming loose) in high winds	Yes		X		Yes	X		
Environment – Severe Weather	M25 junction 29	Vulnerable to asset failure (e.g. parts coming loose) and overturning vehicles in high winds	Yes		X		Yes	X		

Part B Stakeholder engagement

B1 Stakeholder engagement

B1.1 Engagement events

The Highways Agency hosted a series of Engagement Events within the South East region which encompasses London prior to commencing the drafting of the Stage 1 Evidence Report. The details of the Engagement Events in South East Region can be found in the following reports:

- London – 27 September 2013
- South East LEP Area – South of Thames (Maidstone) – 25 September 2013
- South East LEP Area (Essex) – 25 September 2013
- Hertfordshire LEP – 1 October 2013
- Bucks Thames Valley LEP (High Wycombe) – 30 September 2013
- Thames Valley Berkshire LEP (Reading) – 4 October 2013
- Solent and Enterprise M3 LEP Areas (Basingstoke) - 7 October 2013
- C2C LEP area (Gatwick) – 9 October 2013
- Oxfordshire LEP – 11 October 2013

Comments from stakeholders documented in the Stage 1 evidence report were taken from these engagement event reports. Two comprehensive tables showing i) a schedule of challenges and opportunities as recorded at engagement events, and ii) a schedule of priority challenges, are shown in tables B1 and B2 that follow.

Table B1 – Schedule of challenges and opportunities as recorded at engagement events

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
London	M25 – entire route	Pavement condition reaching end of life. Consequential roadwork could cause delays. Consideration of long term approach to asset management including design life of materials used therefore important	Y		Y	Y		Y			Yes			5
London	Enfield	Acute need for better access to M25 junctions from large industrial areas to promote regeneration.					Y	Y			Sort of - development plans	London Plan / Borough Plans / Strategic Opportunity Areas		5
London	Dartford Crossing	Free flow in 2014, whilst helps relieving congestion / providing additional capacity, may worsen traffic impacts on TLRN, Strategic Road Network in London, and other local roads Other Lower Thames Crossing options may also increase traffic on M11	Y					Y			Yes			4
London	M25 J7 (with M23), M11 corridor	Growth areas in northeast London, Croydon, Stansted and Lea Valley corridors (including others identified in London Plan, and other emerging locations in London) - additional traffic demand will require HA to provide extra capacity to accommodate growth	Y					Y			No			4
London	Junction 30/31	Bring improvement schemes forward before Dartford free flow as these junctions will be the next bottleneck	Y						Y		No			4

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
London	Network wide	Incident management – Travel news currently patchy, making it difficult to manage where traffic should go during and immediately after an incident. This affects journey time reliability. Travel info needs better coordination, particularly between highway authorities		Y		Y		Y			No	Examples of past incidents – what the issues were and how they were dealt with, lessons learned	Luke Meechan, Metis	3
London	M11 south of M25, and NE quadrant of M25	Network flow implications on M11 south of M25, and on the M25 following the introduction of the Silvertown link, and probability of a further additional river crossing facility in the Thamesmead area	Y						Y		No			3
London	General	Resilience and reliability of the network needs to improve. HGVs cost £1 per minute to operate so every delay is expensive. Journey time variability means planning shifts is inefficient due to contingency time which has to be built in.		Y			Y	Y			No	Data on HGV costs	NC	3
London	M25 J7 , M23 and A23	3-4 lanes along M23/A23 northbound reducing to a single lane into Croydon causes congestion. Situation likely to worsen in future with Croydon Council's plan to transform Croydon into a business hub	Y					Y			Yes	Further trip data in relation to the business hub can be provided	Rowland Gordon, LB Croydon	2
London	Thurrock – in particular M25 J30/31	With the freight industry looking to move more of their operations overnight, night time roadwork could lead to more congestions on the SRN, or more traffic diverted onto local roads in future	Y		Y				Y		No			2
London	M25 J30-31	Until M25 J30-31 improvement work is delivered, extra congestion expected due to Dartford free flow	Y					Y			No			2

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
London	Network wide	Incident management / shared problems – Coordination between HA / TfL / Local Highway Authorities – Continue good communications between TfL / HA to manage incidents.	Y			Y		Y			No			2
London	General	Provision of HGV parking and a potential to link with park & ride (P&R day time, HGV night time)		Y			Y	Y			No	Industry info	NC	2
London	Upper Lea Valley	HGV parking needs to be planned into developments for overnight and "comfort" day time parking		Y			Y	Y			No	No		2
London	Dartford Crossing	!	Y			Y		Y			Yes	Any traffic information and journey time reliability information		2
London	Junction 5	Full facility junctions are required at each location esp J5	Y					Y			No			2
London	Network wide	Need to align RBS and other studies (e.g. Road Task Force) so that there is a commonality / direct interface in how different categories of roads will be used, as well as a common understanding of where the growth / opportunity areas will be	Y				Y	Y			Not fully	As above	As above	1
London	Bexley / location of new Thames crossing	Another new Thames crossing east of Tower Bridge / Beckton / Thamesmead could lead to local road within Bexley / Greenwich becoming more congested	Y						Y		No			1
London	Network wide	Changes in capacity and cost of public transport and radial routes into London could influence route choices, thus impact on the SRN	Y						Y		No			1

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
London	M11 J4 (with A406)	Congested junction	Y					Y			No			1
London	M25 (entire length) and in Thurrock	Lack of secure lorry parking on HA roads	Y				Y	Y			No			1
London	General	HA's network improvement solutions need to be joined up with those from TfL and local highway authorities				Y		Y			No			1
London	Network wide	Driver information including more clever use of VMS required to better influence driver decision in order to achieve network resilience, and help influence decision prior to them approaching key junctions	Y			Y		Y			No			1
London	General	Economic costs of disruption are not being fully recognised and incidents need to be cleared up more quickly.	Y	Y		Y		Y			No	Number of incidents and time to clear up		1
London	General	The accuracy and currency of VMS signs needs to improve as people will ignore them. And, vague messages should not be used as drivers start to ignore the signs thinking there is no information of value on them e.g. "Don't drive tired" is useful once, but if it is on everyday for a period one stops reading the sign and would miss an important message.		Y		Y		Y			No			1
London	General	The need for a systematic approach to maintenance of bridges and roads			Y		Y	Y			Yes - the M25 is wearing out and no information about when it is being worked on.			1

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
London	General	Need to retain the strategic importance of the HA network whilst supporting growth					Y		Y		No	London Plan / Borough Plans / Strategic Opportunity Areas		1
London	General	Traffic light phasing needs to be sorted between SRN and local roads	Y			Y		Y			No			1
London	General	Average speed cameras are better as they smooth flow and should be more widely used	Y	Y		Y		Y			No	Compliance data		1
London	Network wide	Speed compliance and enforcement – particularly off-peak		Y		Y		Y			No	Speeding figures	Should be available to HA direct	0
London	Bexley	Freight operations within Bexley, e.g. forthcoming Tesco.com distribution near Thamesmead could lead to additional lorry traffic on local roads and SRN, including night time and off-peak periods	Y						Y		No			0
London	Network wide	Consensus needed on future options of road user charging / managing demand / ramp metering, and linked to this educating road users on travel choices	Y				Y	Y			No			0
London	Whole of the London London Orbital Route	Managing short hops. SRN not intended to be used in this way – thus causing additional weaving, delays and journey time reliability issues. Causations may include local public realm schemes leading to traffic reassignment	Y					Y			No			0
London	Network wide	Some junctions are more accident prone – e.g. M4 J2 and M25 J10 (with A3). Need to understand causation of accidents to improve safety and driver behaviour		Y				Y			No			0

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
London	M11 J5	The possible south-facing off slip could lead to significant congestions on road networks within Essex CC and LB Redbridge	Y						Y		No			0
London	Brimsdown M25 east of J25	Need new junction with A1010 to relieve congestion and improve journey time reliability due to lorry traffic feeding on/ off local road network	Y					Y			No			0
London	General	Knock-on effects on the SRN due to 20mph zone expansions. This includes congestion as well as air quality issues	Y	Y		Y	Y	Y			No			0
London	M25 J28-31	To accommodate growth in Thurrock and east London, these junctions require improvements to improve operation and capacity	Y			Y		Y			No			0
London	Network wide	Operation and incident management – needs to look at ways to reduce long closures when dealing with incidents – avoid full closures in the first instance, and reopen any full closures sooner. This helps traffic staying on the M25 and minimise impact on local roads	Y			Y		Y			No			0
London	M11 corridor, but also applies network wide	Asset management and planned maintenance strategy, e.g. M11 corridor needs coordination with other modes (e.g. rail) to avoid impacting on each other	Y					Y			No			0
London	Network wide	Emerging government attitude to network function in regards to development may require HA to reconsider its attitude between managing demand and providing additional capacity	Y					Y			No			0
London	Network wide	Need to apply a uniform operation and charging arrangement across the UK with no change in approach at GLA boundary				Y		Y			No			0

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
London	A2	Lack of consultation with industry about closing lay-bys		Y				Y			No			0
London	General	Drivers need educating about how to engage with new systems eg managed motorways, all lane running	Y	Y		Y		Y			No			0
London	Pinchpoints	FTA pinch points are not a prioirty for HA	Y	Y		Y		Y			No	Industry info	NC	0
London	General	What is happening to replace IDM	Y			Y		Y			No			0
London	General	Working together across admin and highway boundaries	Y	Y	Y	Y	Y	Y			No			0
London	General	How accurate are the figures in the planning assessments? London's population is growing faster then expected.	Y								No	London Plan		0
London	General	Integration of systems for managing incidents and providing information between TfL, Boroughs and HA.				Y	Y				No			0
London	Upper Lea Valley	Substantial housing growth planned and needs connections to M25					Y		Y		Sort of - development plans	London Plan / Borough Plans / Strategic Opportunity Areas		0
London	Harrow	Substantial housing growth planned and needs considered when looking at M25 in NW quadrant - the figures on the plans appear low.					Y		Y		Incorrectly			0
London	General	Education to explain how to use new systems eg All Lane Running and Hardshoulder	Y	Y		Y		Y			No			0

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
		Running												
London	General	Helicopters could be used to clear incidents				Y		Y			No			0
London	M4 (M25 Junction 16)	Noise reduction surfaces required as this impacts on business and residents`			Y		Y	Y			No			0
London	General	Using the same metrics and calculation tools would assist with planning for the networks in London	Y					Y			No	Enfield has developed a system for prioritising pinch points	RC	0
London	General	Contract incentives to promote speedy clear up after incidents	Y			Y	Y	Y			No			0
London	General	Road safety on SRN should be linked to London Road Safety targets		Y							No			0
London	General	Managed motorways make access by recovery vehicles very difficult - not joined up when considering clearing up incidents	Y	Y		Y		Y			No			0
London	Junction 11	Ramp metering - does it work? What are the environmental impacts of congestion	Y			Y		Y			No			0
London	General	Need to devise an overall strategy to prevent pushing traffic issues onto local road network	Y					Y			No	LCAP and other modelling data to determine existing journey time, journey time reliability, and capacity issues	Andrew Ulph and Andrew Mak (both TfL) in collaboration with the HA	
London	Network wide	Air quality is not recognised as a primary environmental concern					Y	Y			In part			

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
London	Network wide *(discussed but not made available for voting)*	Congestion due to driver behaviour, e.g. lane hogging – may need driver education	Y					Y			No			
Gatwick	Generic	The M25 is the only option for freight as the A27 doesn't work for demand between the Solent and Dover.	Y					Y			NO			2
Gatwick	Gatwick	Need to be aware of possible impacts of a new runway at Gatwick / airport expansion	Y				Y	Y	Y	Y		Davies Commission submission		
Basingstoke	M3 J2 - 4a	Congested peak times - knock on impact on local network - will managed motorways help?	Y					Y						
Basingstoke	A3 Junction 10 / M25	Wisley development. Capacity / access needs to be improved	Y						Y					
Basingstoke	M3 junction 1 and M25 J12	Congestion around M3 junction 1 and M25 J12	Y					Y	Y	Y				
Basingstoke	Heathrow	Impacts of Heathrow expansion on network	Y						Y					
Basingstoke	Generic	Focus on key bottlenecks in area (M3/M25, A34/M3 J9, A331, A334, A27, A32, A31, A338 and others)	Y					Y	Y					2
Basingstoke	M25 Corridor and wider	Heathrow expansion is critical to economic growth however could well swamp the network. Journey time reliability is the critical issue and the catchments in Guildford, Basingstoke, Southampton and Woking are all relevant	Y			Y			Y	Y				6

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
High Wycombe	M4/M25 into London (particular focus on Heathrow Junction - M4 J4)	Tidal flow in and out of London on the M4 starting at M4 J8/9. Capacity constraints now not only restricted to peak periods, rather capacity issues throughout the day. Issue will become exacerbate if Heathrow airport expands.	Y					Y					London Heathrow Economic Impact Study - Sept 2013. Executive Summary provided.	
High Wycombe	M4/M25 into / out off London	Impact of incidents high				Y		Y						
High Wycombe	M4/M25 into / out off London	AQMA area - related to emissions from Transport					Y	Y					Designated AQMA area	
High Wycombe	M25 / M40 / M1 Buckinghamshire -	HS2 Construction traffic for HS2 will impact SRN	Y						Y				Transport Assessment being produced	2
Maidstone	Dartford Crossing	Not enough capacity at the junctions upstreams and downstream of the crossing leads to local congestion. Journey times very unreliable.	Y	Y			Y	Y			y			6
Maidstone	Dartford Crossing	Driver behaviour at the crossing (N->S) movements affects (E->W) traffic	Y	Y				Y						
Maidstone	Dartford Crossing	Impacts on Air Quality within Dartford					Y	Y						
Maidstone	M25 J5	Missing east facing slips from A21 leads to congestion on local roads	Y			Y		Y						2
Maidstone	A2 Ebbsfleet and Bean Junctions	Junction improvements requried to maximise growth in the Thames Gateway	Y				Y	Y						4
Maidstone	M25 J1b	Congestion from M25 spills onto local road network through a residential area into Dartford town centre. No cycle provision and the pedstrian provision is not on the desire line	Y				Y	Y						0

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Maidstone	SELEP	Getting the SELEP SEP to sit alongside the RBS to avoid duplication - timeframes are similar												2
Maidstone	Cross Channel	Traffic growth from Cross Channel trips increasing pressure on Channel Corridor	Y								HA already has evidence in form of multi-modal study	No additional evidence provided		5
Maidstone	Lorry Parking	Lorry parking under provided, pushes HGVs into industrial and residential area KCC have a lorry parking study		Y		Y					No	None provided		
Maidstone	Dartford Crossing	Provision of a Lower Thames Crossing	Y	Y		Y	Y							
Maidstone	M25 J5	Lack of east facing slips, has a knock on effect to west Kent and villages on A25/A228 network	Y											
Maidstone	3rd Thames Crossing (LTC?)	Impact on surrounding network and need for requried upgrading for whole corridor												2
Maidstone	M2 J5a	New junction to relieve J5 as longer term option (post 2021) as subregional development (Kent Science Park and SE Sittingbourne)	Y							Y				1
Maidstone	Major new attractor	Understand new SRN's would likely to be needed in response to a major new attractor. Depending on national airport policy and Thanet Local Plan, Marston Airport might (at sometime) represent such an attractor												1
Reading	M25/M23	Strategic capacity of the Heathrow to London Gatwick link	Y					Y			NO	Evidence of journey time reliability and demand	**REQUEST:** Info from Heathrow/LGW	
Reading	M4/M25	Junction of M4 with M25 is a serious safety issue: the 3rd highest national area		Y				Y			YES			

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Reading	M4/M25	ITS information can encourage local drivers off the M25 onto the M4. The challenge is that too much information is provided.				Y		Y			NO	n/a		
Reading	M25	Congestion: the HA could get more information to drivers in order to help relieve congestion. Journey time info on the HA website should indicate messages such as: "This journey would be quicker by rail", etc.				Y		Y			NO	n/a		
SELEP	A12/M11 jct 28	The capacity and general delay at this junction is seen as causing significant problems regarding the growth of the region. There is a high desire to see this area improved	Y			Y		Y			Yes – evidence map for 'Vehicle Hours Delay' shows as having moderate to high delays.	Essex CC is due to publish a report on the A12 in October.		0

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SELEP	A12	The operational conditions of the A12 in general is seen as bad. · There are constraints at M25/A12 (jct28 of the M25) · Constraints near Brentwood, the road should have 3 lanes throughout, not 2 lanes then 3 · Jcts around Chelmsford need to be improved	Y			Y		Y			Yes – evidence map for 'Vehicle Hours Delay' shows as having moderate to high delays. Yes - evidence map for 'Peak Hours Speeds' shows as having moderate peak speeds. No – evidence map for 'safety on the network' shows the section to currently experience a low to moderate collision risks	Essex CC is due to publish a report on the A12 in October.		0
SELEP	M25 jct 26	The level of demand at this junction is seen as being too high, but is affected mainly by traffic heading into and out of Epping.	Y			Y		Y			Yes – evidence map for 'Vehicle Hours Delay' shows as having moderate to high delays.			0

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SELEP	M11 Junction 5, M25 jct 26	M25 J26 is seen as operating above capacity. This is believed to be due to people leaving the M11 at junction 5 and travelling through Loughton as a short cut to junction 26 on the M25	Y			Y		Y			Yes – evidence map for 'Vehicle Hours Delay' shows as having moderate to high delays.			3
SELEP	Area wide	Delegates considered that proposals for high levels of growth within the SELEP region could put significant pressure on the highway network in general. Planning of land use and transport means that individual junctions are struggling and it is hard to see how much more capacity can be drawn out of the current layouts.	Y	Y	Y	Y	Y		Y	Y	Maps indicate that there are areas that experience problems currently and there are areas in which growth is proposed, which is likely to exacerbate problems if no changes are made to the network.	Evidence is anecdotal and based on an individuals' experience, but there seemed to be consensus from some of the delegates that this issue was commonplace. See comment in previous box	Chris Stevenson (Essex CC) stated that 150,000 houses and 150,000 jobs are expected across the area by 2021. Derek Stebbing (Chelmsford CC) indicated that there are expected to be an additional 18,000 houses each for Colchester and Chelmsford between 2021 and 2036.	0

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SELEP	M25 Junction 28	Significant growth proposed within the Brentwood urban area. Delegates concerned that this could have an impact at the M25 / A12 junction.	Y			Y			Y	Y	Key Growth map indicates that there will be development in and around Brentwood up to 2031	Perception as a potential future problem without any specific evidence being provided by delegates. Delegates stated that they had not seen any modelling of the junction but expect there to be an impact from development. Derek Stebbing (Chelmsford CC) indicated that M25 Junction 28 is perceived as one of the M25 junctions with the highest level of stress.	None	0

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SELEP	M25 Junction 28	Counter-clockwise traffic joining A12 northbound from the M25 is currently an issue due to confusing lane allocation – can lead to operational issues.		Y		Y		Y			Yes – the delay map indicates that this section has one of the highest levels of vehicle delay in the area.	Evidence is anecdotal and based on an individuals' experience, but there seemed to be consensus from some of the delegates that this issue was commonplace.	None	0
SELEP	Dartford Crossing	The existing Dartford Crossing experiences high levels of congestion and delay – there is a lack of an alternative route	Y			Y		Y			Dartford Crossing not included on the maps but evidence of delay on the M25 north of the crossing.	Evidence is anecdotal and based on an individuals' experience, but there seemed to be consensus from some of the delegates that this issue was commonplace.	None	0
SELEP	Free Flow Tolling	The Delegates stated that free flow tolling should be put in place along the M25, and should also replace existing toll systems, such as the system in the Dartford Crossing	Y			Y		Y			The delay map indicates that this section of the route currently experiences high levels of delay			5

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SELEP	M25 Dartford Crossing to Junction 28 Southbound	Delegates discussed issues of disruption from people coming on at Brentwood and backing up from J28. They also felt that general congestion in this section of the M25 was a priority.	Y			Y		Y			The delay map indicates that this section of the route currently experiences high levels of delay			6
SELEP	M25 Junction 30 & 31	Delegates considered Thurrock to be a major growth area (£6 billion investment) which is caused by the bridge area and crossing. Improvements planned to Junction 31 but delegates felt that it would not be able to take the level if traffic as there is already congestion issues. It is also believed that the growth will affect junction 30, which already has congestion problems and subsequently cause issues on the A13. Delegates also reported accidents at this junction with slow clearing times.	Y			Y		Y	Y	Y	The delay map indicates that this section of the route currently experiences high levels of delay Some growth along this route is shown in the Key Growth map.	Perception as a potential future problem without any specific evidence being provided by delegates.	Karen Gearing (Southend on Sea BC)	3
SELEP	M25 Junction 28	Delegates discussed issues of disruption from people coming on at Brentwood and backing up from J28.	Y			Y		Y			The delay map indicates that there are some sections of this route that currently experience high levels of delay.	Evidence is anecdotal and based on an individuals' experience, but there seemed to be consensus from some of the delegates that this issue was		3

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			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
												commonplace.		
SELEP	M25, Junction 30/31 (Thurrock)	Delegates discussed proposals for residential and retail expansions next to lakeside which would put pressure on the network. There is an expansion due into the entrance of Lakeside.	Y	Y	Y	Y	Y		Y		The delay map indicates that there are some sections of this route that currently experience high levels of delay. Some growth along this route is shown in the Key Growth map.			
SELEP	A13	It was considered that there has been an increase in traffic on the A13. This growth was cited due to an increased number of developments along this route, and with the completion of London Gateway there is likely to be more traffic.	Y			Y		Y			The delay map indicates that there are some sections of this route that currently experience moderate levels of delay.			7

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SELEP	M25, Junction 28/ A12	Delegates suggested that there is a disruption from people coming on from the A12 Brentwood in the AM Peak. There is regularly a ten mile queue which sometimes goes back to J27.	Y			Y		Y			The delay map indicates that there are some sections of this route that currently experience high levels of delay.			
SELEP	A13/ A126 East Facing Slips	There are currently only West facing slips. There are also major development proposals for this section which could exacerbate problems				Y			Y	Y	The growth map shows that there will be growth in the area.	Evidence is anecdotal and based on an individuals' experience, but there seemed to be consensus from some of the delegates that this issue was commonplace.		5
SELEP	M25 Junction 29	It was felt by delegates that Junction 29 caused issues for those travelling into Southend. Additionally, there is only one route into Southend which is also a freight route.	Y			Y		Y			The delay map indicates that there are some sections of this route that currently experience high levels of delay.			

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SELEP	M11 Junction 5	There is lots of congestion south of this junction.	Y			Y		Y			The delay map indicates that there are some sections of this route that currently experience high levels of delay.			
Hertfordshire LEP	M25 in general	Hertfordshire's location in close proximity to London and the associated arterial roads means that any problems on the M25 have a significant impact on the local road network in Hertfordshire.	Y			Y		Y			High levels of delay on the M25 between Junction 21 and 24 shown on the delay map partially support this – the A414 acts as an alternative route for this section of the M25.	Evidence is anecdotal and based on a few individual's experience in this specific area of the network, although it was not contradicted by other delegates.	None	0

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Hertfordshire LEP	M25 west of junction 21	There are significant problems on the M25 in the west of the county. This is considered to be a constraint to development in this area due to the route already being at capacity.	Y					Y	Y	Y	Evidence of delay on the M25 to the west of junction 21 is shown on the delay map, which partially supports this.	Evidence is anecdotal and based on individuals' experience, but there seemed to be consensus from many of the delegates that this issue was commonplace.	None	2
Hertfordshire LEP	M25 Junction 21a to M1 Junction 6 (A405)	There are concerns regarding the A405 link between M25 Junction 21a and M1 Junction 6 and the constraint that this limited capacity into Watford has on the potential for growth in the area.	Y					Y	Y	Y	Delay maps show that there is some delay on this link of the A405.	Evidence is anecdotal and based on delegates' experience in this specific area of the network, although it was not contradicted by other delegates.	None	7

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Hertfordshire LEP	A414 and M1 Junction 8	There are concerns that St Albans growth could have an impact on the operation of the A414 and Junction 8 of the M1. There is the possibility that 4,000 houses and significant employment could be built on land between St Albans and Hemel Hempstead. A potential M1 Junction '8a' could be considered as a solution.	Y			Y			Y	Y	The delay maps show some existing delay on the M1 in this location. Furthermore there is significant development (particularly employment) proposed for Hemel Hempstead near to Junction 8 at Maylands Business Park.	No further evidence was discussed – St Albans City and District development plans are not yet known.	None	8
Hertfordshire LEP	Area wide	There are concerns that the capacity and quality of the rail services to and from London in the future may result in a shift to car use in the county following planned growth.	Y			Y			Y	Y	No	Not discussed	None	0

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Hertfordshire LEP	M25 in general	Alternative east-west routes to the M25 are poor across the area, which puts pressure on the operation of the M25. Suggestions that there needs to be an outer east-west ring road other than the A414 to provide another suitable alternative route.	Y		Y	Y		Y			The maps indicate that there are generally significant levels of delay on the M25 within the Herts area.	Not discussed	None	5
Hertfordshire LEP	East – west movements through the county	A study of the A602 indicated that to encourage growth there needed to be a greater provision of east-west movements for freight traffic. A number of existing routes are not considered to be of a sufficient standard.	Y		Y	Y		Y			No	Not explicitly discussed, however an A602 study may provide further detail.	Sanjay Patel - HCC	0

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Hertfordshire LEP	Area wide	There are concerns that the three areas where the highest levels of growth are proposed, are the areas that currently experience the most congestion on the network (Watford, St Albans/ Hemel Hempstead and Stevenage).	Y					Y	Y	Y	This is generally supported by the growth map (although details of St Albans growth are unclear at the moment) and the network delay map.	N/A	None	0
Hertfordshire LEP	M1 Junction 5	Delegates highlighted that northbound queuing occurs on the offslip at M1 Junction 5, back to the mainline carriageway and that this forms a major access route to Watford.	Y					Y			No	Evidence is anecdotal and based on a few individual's experience in this specific area of the network, although it was not contradicted by other delegates.	None	0

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Hertfordshire LEP	A414 Park Street roundabout	This junction is considered to be a safety concern, which could be exacerbated by the Rail Freight Interchange planned nearby.		Y				Y	Y	Y	No	Evidence is anecdotal and based on delegates' experience in this specific area of the network, although it was not contradicted by other delegates	None	2
Hertfordshire LEP	M25 Junction 22	One delegate observed peak hour queuing from the slip roads onto the mainline carriageway.	Y			Y		Y			The delay maps indicate that there is delay on the mainline links around junction 22 but there is no specific junction information.	Evidence is anecdotal and based on an individuals' experience, but there seemed to be consensus from many of the delegates that this issue was commonplace.	None	0

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Hertfordshire LEP	Congestion on the A405T and poor linkage between M25, A405 and M1 (between St Albans and Watford).	The section of the A405 between the M1 J6 and M25 J21a experiences severe congestion, especially southbound during the AM peak period. This can cause traffic to block back onto the anti-clockwise offslip at J21a, with traffic on occasions queuing onto the mainline carriageway which poses significant safety concerns.	Y	Y		Y		Y			Yes / No – the Network Performance delay map shows the A405T to be experiencing moderate levels of delay, however the peak hour speeds map shows low to moderate speeds. Most significantly, the safety on the network 2008-2011 map shows that the A405T experiences the highest level of total casualties per billion vehicle miles, that M25 J21a is a top 50 casualty location, and that M1 J6 is a top 250 casualty location.	N/A	None	6

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Hertfordshire LEP	M1 J4 – J6 congestion	Experience occurs on the M1 between J4 and J6.	Y			Y		Y			Yes/No – the Network Performance delay map shows this section of the M1 experienced moderate levels of vehicle hours delay between April 2012 and March 2013. The peak hour speeds map shows speeds closer to the national speed limit.	N/A	None	0
Hertfordshire LEP	A41 Western Avenue / Watford Road Roundabout congestion	Congestion at the A41 Western Avenue / Watford Road Roundabout (adjoining the spur to M25 Junction 19). The delegate noted that the junction is some way from the M25 and therefore congestion may not have a knock-on effect.	Y			Y		Y			No	Not discussed	None	0

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Hertfordshire LEP	M25 Junction 20 congestion	The signalised gyratory currently experiences congestion.	Y			Y		Y			No - The congestion issues are understood to occur on the signalised gyratory and therefore will not show up on the maps	Not discussed	None	0
Hertfordshire LEP	M25 underpass near to J23 South Mimms - flooding	Flooding regularly occurs on the new footway/cycleway underpass route near M25 Junction 23 South Mimms (Wash Lane – Dancers Lane (‘Great North Way’)		Y			Y	Y			No	Not discussed	None	0
Hertfordshire LEP	A414 – used as an alternative to the M25 especially during times of congestion	The A414 through Hertfordshire is used as an alternative route to the M25 especially during times of congestion which leads to severe congestion including to the south of St Albans, around Hatfield and in Hertford. The A414 already experiences high traffic flows without issues occurring on the M25. This issue points to a wider issue regarding the quality of east-west routes across Hertfordshire which is an existing deficit and is likely to become more important in the future.	Y	Y	Y	Y	Y	Y			No	Not discussed	None	0

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Hertfordshire LEP	M25 J23 South Mimms congestion from A1(M) Southbound onto M25 Clockwise	The merge from the A1(M) onto the M25 clockwise experiences congestion especially during the PM peak period.	Y	Y		Y		Y			No	Not discussed	None	0
Hertfordshire LEP	A10/M25 Junction 25 north-south footway/cycleway underpass linking Broxbourne and Enfield	A10/M25 Junction 25 north-south footway/cycleway underpass linking Broxbourne and Enfield needs to be improved.		Y			Y	Y			No	Not discussed	None	0
Hertfordshire LEP	Poor east-west routes across Hertfordshire which has consequences on SRN	There is a lack of good quality east-west routes across Hertfordshire. Some major road links such as the A414 vary in standard/capacity. Congestion occurs which causes traffic to seek other routes. If east-west routes can be improved, not just road but also public transport, this may take the pressure off the SRN by providing new/alternative journey opportunities.	Y	Y	Y	Y	Y	Y		Y	No	Not discussed	None	5
Hertfordshire LEP	Expansion of Luton and Stansted Airports	Future expansion of nearby airports presents a challenge to the operation of the SRN.	Y	Y	Y	Y	Y		Y		No	Not discussed	None	0
Hertfordshire LEP	A414T Park Street Roundabout congestion	A414T Park Street Roundabout currently experiences severe congestion	Y	Y		Y		Y			No	Not discussed	None	4
Hertfordshire LEP	Need to re-start the Influencing Travel Behaviour Programme in recognition of existing and possible future capacity issues	There is a need to re-start the Influencing Travel Behaviour Programme in recognition of existing and possible future capacity issues, as it can provide benefits and comparatively low cost.	Y	Y	Y	Y	Y		Y		No	Not discussed	None	0
Hertfordshire LEP	M25 section in the vicinity of the M4 and M40 congestion	The section of the M25 in the vicinity of where the M40 (J16) and M4 (J15) join still experiences congestion, even though the	Y			Y		Y			No	Not discussed	None	0

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		section has been upgraded												
Hertfordshire LEP	M25 Junction 25 – pressure from proposed development growth	M25 Junction 25 (with the A10) could experience increased cumulative pressure from Enfield, Broxbourne and East Hertfordshire.	Y	Y		Y			Y		No	Not discussed	None	0
Hertfordshire LEP	Poor cycle linkage between St Albans and Hemel Hempstead along A414 corridor	There is poor cycle linkage between St Albans and Hemel Hempstead, with a need for a cycle route alongside the A414T corridor. Potential future development growth east of Hemel Hempstead and west of St Albans could increase travel demand on this corridor.					Y	Y			No	Not discussed	None	0
Hertfordshire LEP	A1(M) Junctions 3-4	Capacity issues between A1(M) junctions 3 and 4 which are partially caused by the A414 (delegates felt this was a major factor of congestion) have constrained development especially in Hatfield and to the East of St Albans. Welwyn Hatfield DC is under pressure to deliver housing and employment growth in the borough therefore this issue may hinder development in the future.	Y			Y		Y			The performance delay maps indicate that there are currently some high levels of delay between these junctions.	Not discussed in detail, however Sue Tiley indicated that modelling work is being undertaken.		0
Hertfordshire LEP	A414, M25	Delegates felt that the A414 was used as an alternative route to the M25 and that the A414 can regularly experience congestion because traffic is possibly diverting off the M25.	Y			Y		Y			The network performance delay maps indicates high vehicle hours delay on the M25, in particular between J21a and J24.	N/A	No	0

Event	Location	Description of challenge	Type of challenge					When does this issue become critical?			Is the evidence for this challenge shown on our maps?	If not, what evidence is there to show this is/will become a challenge?	Promises to provide supporting evidence by (name, org)	Number of sticky dots received
			Capacity	Safety	Asset Condition	Operational	Society & Environment	Already is	2018-21	After 2021				
Hertfordshire LEP	A10, M25 Junction 25	Delegates discussed M25Junction 25 with the A10 and raised concern that the current mainline widening works do not comprise of any alterations to the slip roads to increase capacity. Delegates felt that this could be an issue in Broxbourne if slip road capacity is not improved as there are reported to be existing capacity issues at the junction.	Y			Y		Y			The performance delay maps indicate that there are currently high levels of delay at this junction. Growth in Broxbourne is shown on the Key Growth map.	Broxbourne BC indicated that evidence existed which demonstrated that this is/will be a challenge.	Colin Haigh will forward data.(ELHAM Model is being used to determine forecast traffic flows)	8
Hertfordshire LEP	M25	There are issues with congestion on non HA roads when the M25 is congested.	Y			Y		Y			Not possible to show this on the maps presented	Evidence is anecdotal and based on an individuals' experience, but there seemed to be consensus from many of the delegates that this issue was commonplace.	No	0

Table B2 – Schedule of priority challenges

Event	Description of challenge / Location	Type of challenge					Why is this considered to be a priority?	How does this compare to other priorities?	Capture any solutions that are proposed and ensure people feel heard, but re-focus on discussing their views on the priorities. Solution Type (& additional notes) Maintenance & renewals / Operational / Junction improvement / Adding capacity / New road / other
		Capacity	Safety	Asset Condition	Operational	Society & Environment			
London	Growth areas in northeast London (including others identified in London Plan, and other emerging locations in London) - additional traffic demand	Y					HA needs to develop network to accommodate new developments, i.e. investment needs to follow growth		HA to invest in local road network to deliver joint solutions (Capacity / new road)
London	Growth regions outside London – cumulative traffic demand in Dartford, Shellhaven, and along Thames Gateway Corridor. Also Stansted and Lee Valley growth	Y		Y	Y	Y	Combined effects mean HA needs to accommodate growth expected in these areas. Maintenance programme also needs to be balanced between preserving asset conditions and minimising resulting congestion		HA to invest in local road network and deliver joint solutions with local highway authorities (Capacity / new road)
London	Operation and incident management		Y		Y		Needs to look at ways to reduce long closures when dealing with incidents – avoid full closures in the first instance, and reopen any full closures sooner		Understand what constitute current clear up times for major and minor incidents, and identify ways to reduce (Operational)
London	Incident management / shared problems – Coordination between HA / TfL / Local Highway Authorities	Y	Y		Y		Needs coherent and coordinated strategy when dealing with incidents, ensuring traffic stays on the M25 where appropriate. If traffic is to be diverted, ensure coherent messages are sent to drivers		Close liaison with LSTCC so appropriate contingencies can be implemented (Operational)
London	HA / TfL Strategy coordination	Y				Y	Coordination of improvements to road network Interface and operational coordination		
London	Driver information	Y			Y		The more able HA / TfL / LHAs are at coordinating and providing driver info, the better likelihood of improving network resilience		Provide / promote driver training to influence their attitude and perspective? (Education?)

Event	Description of challenge / Location	Type of challenge					Why is this considered to be a priority?	How does this compare to other priorities?	Capture any solutions that are proposed and ensure people feel heard, but re-focus on discussing their views on the priorities. Solution Type (& additional notes) Maintenance & renewals / Operational / Junction improvement / Adding capacity / New road / other
		Capacity	Safety	Asset Condition	Operational	Society & Environment			
London	M23 corridor incl M25 J7	Y					A23 congestion can be expected with anticipated Gatwick expansion		
London	M25 – new junction east of J25	Y					Needs new junction to accommodate HGV traffic		HGV only exits / slip roads? (Capacity / Operational)
London	Asset management and planned maintenance strategy, e.g. M11 corridor including coordination with other modes	Y		Y	Y		Some corridors are much more sensitive to capacity reduction and consequential impacts on other modes, e.g. between M11 and rail		
London	Network wide – air quality					Y	This is often not at the top of the issues agenda and therefore needs more consideration New car technology such as Stop / Start technology – how does it impact on environment and road safety?		
London	HGV Issues		Y		Y	Y	Safety - drivers need to have rest breaks Operational - parking needs to be provided so HGVs do not park at inappropriate locations Society - provision needs to be planned so it does not impose on local communities (noise, rubbish, large vehicles parked in the wrong place)	Very well, as it also impacts on the economy - HGVs need to operate efficiently (with drivers having sufficient rest breaks)	Work with planning authorities to provide parking. The need is strategic (i.e. Long distance drivers on the SRN) but provision is local and often not well supported.
London	Developments need to have connectivity to the network through new links and all movement junctions	Y					Substantial growth in London (and its outer boroughs) needs to have strategic connectivity to work	Very well, as it has economy impacts and working together implications	Better liaison in planning process. Changes to statutory processes to enable highway links to be built if they have a strategic role - even if they are local roads

Event	Description of challenge / Location	Type of challenge					Why is this considered to be a priority?	How does this compare to other priorities?	Capture any solutions that are proposed and ensure people feel heard, but re-focus on discussing their views on the priorities. Solution Type (& additional notes) Maintenance & renewals / Operational / Junction improvement / Adding capacity / New road / other
		Capacity	Safety	Asset Condition	Operational	Society & Environment			
London	Signing and VMS needs to be improved and consistent with Borough / TfL information to assist with incident management	Y	Y		Y	Y	Provides greater ability to manage incidents across the whole network	Incidents are a cause of delay and cost business so need to be managed better (using good information)	Provide each body with everyone else's information.
London	Crossing the Thames	Y			Y		Very important link for economy	High priority due to impact on users	New Thames Crossing, resolve J30/31
London	Congestion and hotspot mapping	Y			Y		Planning can identify and resolve issues before they happen	Medium	Develop single set of metrics to prioritise pinch point locations from different user perspectives
Gatwick	Site-specific improvements: - M23/A23	Y					Surrey-Gatwick capacity; Hooley/Star Lane improvements		A proposed P&R site linked to Croydon regeneration plans
Basingstoke	Gateways - Access to ports and airports	Y			Y		Global Competitiveness, journey time reliability. Perception of being well connected - SRN must facilitate this in this region. Are we 'fit for purpose/business?' More capacity? Improving communications. Retaining what we have got. Speed of delivery.		
Maidstone	Lower Thames Crossing	Y	Y		Y	Y			
Maidstone	Foreign trucks								

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		Capacity	Safety	Asset Condition	Operational	Society & Environment			
Maidstone	Airport Strategy (post 2012)								
Maidstone	Dartford Crossing	Y	Y		Y	Y	Improvement of national significance, with major local repercussions		
Maidstone	Lower Thames Crossing	Y	Y		Y	Y			
SELEP	M25, junction 26 needs to be improved as it is affecting traffic on the local roads	Y					Junction 26 is causing problems for Epping Forest Council as they are queues backing up to junction 27. This is causing motorists to leave at junction 5 of the M11 and use the A121 as a shortcut to the junction, which is causing problems for the local area, particularly Loughton. This is an issue as the forest just outside Loughton is a protected green zone and there are environmental concerns regarding the amount of traffic on the road.	3 Votes The group considered that this would be a low priority to be addressed before 2015.	Not discussed
SELEP	A12 between Colchester and Chelmsford in general has a number of existing small issues that need to be addressed.	Y	Y		Y		This section of the A12 is perceived to operate poorly currently.	Not discussed.	Improved signing, laybys, junction and slip road improvements, speed cameras to manage speed, reduce incidents and increase capacity.
SELEP	There is an absence of HGV parking areas in major towns		Y		Y		If specific HGV areas are not provided then they use laybys to park in which can be a safety and operational concern.	Not discussed.	Provision of more HGV parking in major towns.

Event	Description of challenge / Location	Type of challenge					Why is this considered to be a priority?	How does this compare to other priorities?	Capture any solutions that are proposed and ensure people feel heard, but re-focus on discussing their views on the priorities. Solution Type (& additional notes) Maintenance & renewals / Operational / Junction improvement / Adding capacity / New road / other
		Capacity	Safety	Asset Condition	Operational	Society & Environment			
SELEP	There is concern that the expansion at Tilbury and London Gateway could put pressure on the operation and capacity of the A13.	Y			Y		Not discussed	Not discussed.	Upgrade of the A13 to three lanes.
SELEP	The operation of M25 junctions 30 and 31 are a concern in the long term.	Y					Not discussed.	Not discussed.	Provision of the Lower Thames Crossing (Option C) to take traffic away from the M25 and therefore ease pressure on junctions 30 and 31.
SELEP	There are currently only one way facing slip roads at M11 junction 5 which is considered to be a problem.				Y		Both directions are required on the slip roads to improve the operation of the M11.	Not discussed specifically but seemed to be a bit of an afterthought.	Slip roads should be provided in both directions.
SELEP	Free Flow Tolling	Y			Y		Delegates felt that free flow tolling would improve issues.	5 Votes	Not discussed
SELEP	M25 Dartford Crossing to Junction 28 Southbound	Y			Y		Delegates discussed issues of disruption from people coming on at Brentwood and backing up from J28. They also felt that general congestion in this section of the M25 was a priority.	6 Votes	Not discussed
SELEP	A13 Widening/ London gateway Current and Additional	Y			Y		Impact from the London Gateway was highlighted as a priority.	7 Votes	Widen the A13 to help increase the capacity of the road.
SELEP	M25, Junction 28 Southbound	Y			Y		Traffic Flow Improvements at this junction were rated as priority.	3 Votes	Not discussed
SELEP	M25 Junction 30-31 congestion	Y			Y		Delegates considered Thurrock to be a major growth area (6 billion pound investment) which is cursed by the bridge area and crossing. Improvements planned to Junction	3 Votes	Not discussed

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		Capacity	Safety	Asset Condition	Operational	Society & Environment			
							31 but delegates felt that it would not be able to take the level of traffic as there is already congestion issues. There are currently congestion problems at Junction 30 which subsequently cause issues on the A13. Delegates also reported accidents at this junction with slow clearing times.		
SELEP	A13/ A126 East Facing Slips				Y		There are currently only West facing slips. There are also major development proposals for this section which could exacerbate problems	5 Votes	Introduction of East facing slips
Hertfordshire LEP	The link between M25 junction 21a and M1 junction 6 (the A405 link road) experiences safety and capacity issues.	Y	Y				The link between the two is considered to be sub-standard, especially considering that it links two of the most important motorways in the country. It also functions as a local distributor route between St Albans and Watford.	This link was discussed in detail and was considered a high priority amongst the delegates as it is an existing issue that will get worse if it is not addressed.	A 'free flow' interchange link between the M1 and M25 was discussed as a potential solution.
Hertfordshire LEP	There are considered to be significant issues with congestion on the M25 between Junction 21 to Junction 10 (A3).	Y					The M25 is crucial to the national economy and this section includes access to Heathrow Airport, therefore its successful operation is important.	It could be considered a lower priority due to the majority of the route being outside the Hertfordshire LEP area, however no trade offs were discussed amongst the group	Not discussed.

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		Capacity	Safety	Asset Condition	Operational	Society & Environment			
Hertfordshire LEP	There is a concern regarding the potential impact of the potential Radlett Rail Freight Interchange on the operation of the A414 Park Street roundabout.		Y				There are current safety concerns at the A414 Park Street roundabout that future growth could exacerbate these issues.	This is considered to be one of the key safety issues within the Herts LEP.	Not discussed.
Hertfordshire LEP	The impact of construction traffic associated with the Croxley Rail Link is considered to potentially be a concern.	Y			Y		This was not discussed in great detail.	This was considered a priority for one delegate but was not discussed by other delegates in detail.	Not discussed.
Hertfordshire LEP	There are concerns that the impact of proposed growth could cause problems at M25 Junction 25.	Y			Y		This was not discussed in great detail.	This was mentioned briefly at the end of the session and was not discussed in detail.	Not discussed.
Hertfordshire LEP	There is a lack of capacity on east-west routes, which could constrain proposed development across the LEP area.	Y					Proposed developers (particularly employment development with high levels of HGVs) may be dissuaded from locating in some areas due to the lack of good quality east west routes. This lack of east-west options also puts significant pressure on other similar routes (M25 and A414).	This was discussed in detail and considered a relatively high priority.	A505 Hitchin Bypass or other new east-west routes.
Hertfordshire LEP	Congestion on the A405T and poor linkage between M25, A405 and M1 (between St Albans and Watford). The section of the A405 between the M1 J6 and M25 J21a experiences severe congestion, especially southbound during the AM peak period. This can cause	Y	Y		Y		It is an existing issue which presents risks to motorists' safety (in particular traffic which is reported to be queuing on the M25 J21a anti-clockwise offslip). This issue could intensify in the future, especially with proposed growth coming forward in the Watford area.	No trade-offs were discussed. This was identified as one of the highest priorities.	Improve the layout of M1 Junction 6 and M25 Junction 21a or create a 'free-flow' interchange link between the M25-A405 and M1.

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		Capacity	Safety	Asset Condition	Operational	Society & Environment			
	traffic to block back onto the anti-clockwise offslip at J21a, with traffic on occasions queuing onto the mainline carriageway which poses significant safety concerns.								
Hertfordshire LEP	A414T Park Street Roundabout (south of St Albans) The existing unsignalised roundabout at the end of the A414T experiences severe congestion especially during peak periods	Y	Y		Y		It is an existing issue that could intensify in the future.	No trade-offs were discussed.	It was suggested the junction needs to be signalised.
Hertfordshire LEP	Poor east-west routes across Hertfordshire which has consequences on SRN There is a lack of good quality east-west routes across Hertfordshire. Some major road links such as the A414 vary in standard/capacity. Congestion occurs which causes traffic to seek other routes. If east-west routes can be improved, not just road but also public transport, this may take the pressure off the SRN by providing new/alternative journey opportunities.	Y	Y	Y	Y	Y	There is an existing lack of good quality east-west routes in Hertfordshire. As pressures on the SRN and other parts of the transport network increase in the future, there could be a greater need for improved east-west routes. Improvements could present an opportunity as it could take pressure off parts of the SRN, and potentially avoid the need to improve parts of the SRN in the longer term.	No trade-offs were discussed.	Improvement to the A414, especially where it runs through towns such as Hertford and at linkages with key roads such as the A1(M) at Junction 4. Linkage between Stansted and Luton Airports – A120/A505/A602 improved links (may allow traffic to avoid using the M25). New rail links and potential with Crossrail 2 to/from Hertfordshire – would make more sense to extend Crossrail 2 to Stansted Airport.
Hertfordshire LEP	M25 Junction 25 - Capacity issues on the slips roads.	Y			Y		It is a current issue and therefore the problem may intensify in the future unless it is addressed.	No trade-offs discussed	Not discussed

Part C Bibliography

C1 Introduction

C1.3 Route description

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C2 Route capability, condition and constraints

C2.1 Route performance

a) HA Network Evidence Reports – dated 7 November 2013

b) HA Quarterly Network Performance Report. Data to April 2013 (produced Jun2 2013)

c) Map: Route-based strategies – M25 – London network condition – peak hour speeds

d) Map: Route-based strategies – M25 – London network performance – delay

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C2.2 Road safety

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b) Safety plan 2009-2011, HA National Intelligence Unit.

c) Network Resilience Action Plan 2011, Connect Plus. Note: this document has not been officially issued

d) M25 Route Management Study 2002

e) M4 Route Management Study 2002

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C2.3 Asset condition

a) Asset Management Forward Plan 2013-14, Connect Plus

b) Condition Report 2012, Connect Plus

C2.4 Route operation

a) Traffic Officer Coverage and incident duration data, from HA (2013)

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C2.5 Technology

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b) Network Resilience Action Plan 2011, Connect Plus. Note: this document has not been officially issued.

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C2.6 Vulnerable road users

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C2.7 Environment

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C3 Future considerations

C3.2 Economic development and surrounding environment

a) HCA's Employment Densities Guide (2nd edition, 2010)

b) London Plan (2011)

c) Department for Transport's UK Aviation Forecasts (2013)

d) Housing and employment data were sourced from documents in this table:

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C3.3 Network improvements and operational changes

a) HM Treasury – Investing in Britain's future June 2013

b) Highways Agency road projects - http://www.highways.gov.uk/roads/road-projects

C3.4 Wider transport networks

a) The London Plan (2011)

b) DfT Lower Thames Crossing consultation - https://www.gov.uk/government/collections/lower-thames-crossing

c) TfL river crossings consultation - https://consultations.tfl.gov.uk/river/crossings

d) Airports commission draft report (2013) - https://www.gov.uk/government/organisations/airports-commission

e) A Planning and Transport Strategy for Thames Gateway South Essex (2013)

f) Network Rail Western Rail Access press release (2014) - http://www.networkrail.co.uk/news/2014/feb/Proposals-for-a-direct-rail-link-from-the-west-to-Heathrow/

g) South East LEP Growth Deal and Strategic Economic Plan (2013) - http://www.southeastlep.com/images/pdf/activites/South%20East%20LEP%20Strategic%20Economic%20Plan%20Preliminary%20Submission%20FULL.pdf

C4 Key challenges and opportunities

C4.2 Operational challenges and opportunities

a) HAIL customer care contacts January to December 2013

C4.4 Capacity challenges and opportunities

a) HAIL customer care contacts January to December 2013

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