M25 junction 28 improvement scheme

TR010029

9.5 Transport Assessment Supplementary Information Report

Rule 8(1)(b)

Planning Act 2008

Infrastructure Planning (Examination Procedure) Rules 2010

Volume 9

December 2020

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

M25 junction 28 scheme
Development Consent Order 2020

9.5 TRANSPORT ASSESSMENT SUPPLEMENTARY INFORMATION REPORT

Regulation Number:	Regulation 5(2)(q)
Planning Inspectorate Scheme Reference:	TR010029
Application Document Reference:	TR010029/Pre-EXAM/9.5
Author:	M25 junction 28 improvement scheme project team, Highways England

Version	Date	Status of Version
Rev 0	Dec 2020	Pre-examination issue

Table of contents

Chapter Pages

Tables

Figures

Appendix Tables and Figures

1. Introduction

1.1.1 This document provides supplementary information and clarification to that presented in the Transport Assessment Report [APP-098] submitted in support of the application for a Development Consent Order (DCO) for the M25 junction 28 improvement scheme (the Scheme). Some of the information presented addresses comments made in Relevant Representations submitted by Interested Parties. Some of the information also supersedes that which was provided in the Transport Assessment Report and where this is the case it is clearly stated.

1.1.2 The additional information and clarification provided in this document specifically relates to the following:

- Updated traffic modelling results to reflect the inclusion of an extended inter-green phase in the traffic signal settings at the junction of the A12 westbound off slip with the junction 28 roundabout. This inclusion would reduce delays on the Brook Street approach to the roundabout and is now included in the Scheme, i.e. Do something (DS) scenario.
- Additional information concerning the anticipated usage of the proposed loop road and the traffic impacts of the Scheme on Gallows Corner junction and the section of A12 between this junction and junction 28 of the M25.
- An assessment of high and low traffic growth assumptions.
- An update on traffic impacts during construction of the Scheme. This information now reflects the development of the proposed temporary traffic management arrangements required to enable construction of the Scheme that have taken place since traffic modelling was initially undertaken to understand likely construction traffic impacts as reported in the Transport Assessment Report [APP-098].

2. Extended inter-green phase to reduce delays on the Brook Street approach

2.1.1 This section presents the updated traffic modelling outputs, following inclusion in the Scheme of an extended inter-green phase in the traffic signal settings at the junction of the A12 westbound off slip with the junction 28 roundabout. This inclusion would reduce delays on the Brook Street approach to the roundabout.

2.1.2 Sections 5.4 to 5.7 of the Transport Assessment Report present the traffic modelling results for the 'Core Scheme' (DS scenario); these did not include the extended inter-green phase in the traffic signal settings at the junction of the A12 westbound off slip with junction 28. Section 5.8 of the Transport Assessment Report presents traffic modelling results for what is referred to as 'Brook Street mitigation.' This is not only concerned with the introduction of the extended inter-green phase at junction 28, but also includes the potential optimisation of traffic signal timings which are the responsibility of Essex County Council at the junctions of both Nags Head Lane and Mascalls Lane with Brook Street.

2.1.3 Proposals to mitigate potential additional traffic delays on Brook Street due to the Scheme have been developed following submission of the DCO application and it is confirmed that the Scheme (DS scenario) will include the extended inter-green at junction to achieve this.

2.1.4 Highways England is also seeking to secure separate funding for the optimisation of traffic signals at the junctions of both Nags Head Lane and Mascalls Lane with Brook Street to further reduce delays along Brook Street through their designated funding programme. If funding is secured, it would be used to support Essex County Council to implement the optimisation of the traffic signals at both junctions if deemed necessary and appropriate. However, this would be a separate scheme to the junction 28 DCO Scheme.

2.1.5 To reduce traffic delays predicted on Brook Street approach to the junction 28 roundabout as a result of the Scheme an extended inter-green phase at the signal-controlled junction of the A12 westbound off slip with the roundabout would be introduced. The extended inter-green phase would provide additional time for traffic to enter the roundabout from the Brook Street approach, i.e. by providing a short period of time when traffic on both the A12 westbound off slip and the roundabout circulatory are held at a red light simultaneously, thereby introducing longer gaps in these opposing traffic flows when traffic can exit Brook Street.

2.1.6 The extended inter-green would also allow additional time for any blocking back of Brook Street traffic leaving the roundabout (heading towards Brentwood), due to downstream traffic congestion along Brook Street (that was forecast to occur without the extended inter-green, to clear prior to a green light being given to either the A12 westbound off slip or the roundabout circulatory). This would reduce the likelihood of traffic queues developing on the Brook Street eastbound carriageway and blocking back on to junction 28, causing additional congestion and safety issues.

2.1.7 The updated traffic modelling results that reflect the amended traffic signal settings at junction 28, to include the extended inter-green, are presented below and supersede the traffic modelling results presented in Sections 5.5 to 5.8 of the Transport Assessment Report.

2.1.8 The updated traffic modelling including the extended inter-green at junction 28 shows that journey times in both directions on Brook Street improve with the Scheme (DS) compared to without the Scheme, i.e. Do minimum (DM) scenario.

2.2. Scheme impact on junction 28

2022 Opening year

2.2.1 Table 2-1 shows the journey times for each movement at junction 28 during the AM and PM peak periods for the 2015 Base, and for both the DM and DS scenarios in the opening year (2022). The start and end point of each journey time route is graphically presented in Appendix A of this report and are consistent with those reported in Tables 5-4 and 5-7 of the Transport Assessment Report to enable them to be directly compared to those previously reported. The journey time routes go beyond junction 28 and therefore reflect aggregate delay over these routes, not only the delays at the junction 28 roundabout. These indicate that the Scheme with the extended inter-green phase at junction 28 (DS scenario) would have the following impacts on journey times at junction 28 in 2022 compared to the DM scenario:

- Most movements see an improvement in travel times during both peak periods compared with the DM.
- Journey time routes from Brook Street show the greatest reduction in travel time, of over ten minutes per vehicle during the AM peak period and more than five minutes per vehicle during the PM peak period.
- Journey time improvements are seen on all routes from the A12 west arm in the AM peak period, with a reduction of almost three minutes per vehicle from the A12 west to both the M25 south and Brook Street, and a reduction of almost two minutes per vehicle to the M25 north.

2.2.2 In the DS scenario, travel times from the M25 south to A12 east via the new loop road are predicted to be 28 seconds per vehicle quicker than via the roundabout during the AM peak period and 22 seconds quicker during the PM peak period.

Table 2-1: 2022 Peak period journey times (seconds)

Journey time route	2015 Base		2022 DM		2022 DS		Difference (DS v DM)	
	AM	PM	AM	PM	AM	PM	AM	PM
A12E – M25S	498	467	542	495	547	476	5	-19
A12E – A12W	447	427	455	432	459	430	5	-2
A12E – M25N	818	776	863	784	867	778	4	-6
A12E – Brook St	543	515	588	556	585	521	-3	-35
A12W – M25N	673	652	780	650	671	642	-109	-9

Journey time route	2015 Base		2022 DM		2022 DS		Difference (DS v DM)	
	AM	PM	AM	PM	AM	PM	AM	PM
A12W – A12E	435	449	479	453	454	471	-25	18
A12W – M25S	414	413	598	410	425	417	-173	7
A12W – Brook Street	482	483	667	497	493	490	-174	-7
M25N – A12E	745	776	753	795	773	817	20	23
M25N – M25S	637	651	646	662	646	660	-1	-2
M25N – A12W	718	734	699	730	713	739	15	9
M25N – Brook Street	746	754	751	780	752	776	2	-4
M25S – A12W	380	374	377	376	369	365	-7	-11
M25S – M25N	650	628	654	628	653	628	0	0
M25S – A12E (via roundabout)	493	507	493	494	536	538	43	44
M25S – A12E (via loop)	-	-	-	-	508	515	-	-
M25S – Brook Street	494	498	502	498	519	513	17	15
Brook Street – M25S	592	522	1,155	958	532	593	-623	-365
Brook Street – A12E	770	709	1,438	1,140	741	784	-698	-356
Brook Street – M25N	935	838	1,510	1,236	873	898	-636	-338
Brook Street – A12W	637	559	1,200	978	570	626	-630	-352

2.2.3 Table 2-2 and Table 2-3 show the peak period queue lengths for the 2015 base, 2022 DM and 2022 DS scenarios. These indicate that the Scheme with the extended inter-green phase at junction 28 would have the following impacts on queue lengths at junction 28 in 2022 compared to without the Scheme (DM scenario):

- Queue lengths on most approaches to M25 junction 28 are predicted to reduce during both the AM and PM peak periods.
- During the AM peak period, the greatest reduction in queue length is on the A12 eastbound off slip, with a reduction of around 330 metres (approx. 60 vehicles).
- The extended inter-green phase improves the predicted queue lengths on Brook Street. During the AM peak period the queuing is reduced by 275 metres (approx. 50 vehicles) on the Brook Street approach to junction 28 and a reduction of 337 metre (60 vehicles) predicted during the PM peak period.

Table 2-2: 2022 AM peak period queue length summary (metres)

Junction	Approach	2015 Base	2022 DM	2022 DS	Difference (DS-DM)
M25 junction 28	M25 North Off Slip (SB)	54	42	42	0
	A12 East Off Slip (WB)	103	188	228	40
	Brook Street (WB)	336	537	262	-275
	M25 South Off Slip (NB)	57	62	49	-14
	A12 West Off Slip (EB)	41	396	63	-333
	M25 Jn 28 Gyratory Section (N)	86	105	62	-43
	M25 Jn 28 Gyratory Section (E)	29	57	84	27
	M25 Jn 28 Gyratory Section (S)	50	69	88	19
	M25 Jn 28 Gyratory Section (W)	96	126	93	-33

Table 2-3: 2022 PM peak period queue length summary (metres)

Junction	Approach	2015 Base	2022 DM	2022 DS	Difference (DS-DM)
M25 junction 28	M25 North Off Slip (SB)	66	55	62	7
	A12 East Off Slip (WB)	76	128	98	-29
	Brook Street (WB)	266	512	175	-337
	M25 South Off Slip (NB)	68	73	57	-16
	A12 West Off Slip (EB)	44	54	52	-2
	M25 Jn 28 Gyratory Section (N)	114	56	58	2
	M25 Jn 28 Gyratory Section (E)	37	50	97	47
	M25 Jn 28 Gyratory Section (S)	57	71	79	8
	M25 Jn 28 Gyratory Section (W)	119	113	99	-14

2.2.4 The opening year (2022) results for an inter-peak period showing comparisons between the DM and DS is presented in Appendix B of this report.

2.2.5 An inter-peak operational traffic model shows that with the extended inter-green phase journey times are predicted to improve across the majority of the movements through junction 28 and reduce the queue lengths on the Brook Street westbound direction.

2037 Design year

2.2.6 Table 2-4 shows the journey times for each movement at junction 28 during the AM and PM peak periods for the 2015 Base and for both the DM and DS

scenarios in the design year (2037). These are based on the journey time routes presented in Appendix A and indicate that the Scheme with the extended inter-green phase at junction 28 (DS scenario) would have the following impacts on journey times at junction 28 in 2037 compared to without the Scheme (DM scenario):

- Journey time routes from the A12 west approach show the greatest reduction in travel times of more than 11 minutes per vehicle during the AM peak period.
- M25 south to A12 west travel times are predicted to improve by more than a minute per vehicle during the AM peak period, and nearly seven minutes per vehicle during the PM peak period.
- With the inclusion of the extended inter-green phase, improvements to journey times are predicted for all movements from Brook Street during both the AM and PM peak periods.
- Journey times from Brook Street reduce by up to almost five minutes per vehicle during the AM peak period and by over eight minutes during the PM peak period.

2.2.7 In the DS scenario, travel times from the M25 south to A12 east via the new loop road are predicted to be 48 seconds per vehicle quicker than via the roundabout during the AM peak period, and 71 seconds quicker during the PM peak period.

Table 2-4: 2037 Peak period journey times (seconds)

Journey time route	2015 Base		2037 DM		2037 DS		Difference (DS v DM)	
	AM	PM	AM	PM	AM	PM	AM	PM
A12E – M25S	498	467	777	737	810	582	33	-155
A12E – A12W	447	427	611	578	637	457	26	-120
A12E – M25N	818	776	1,120	1,015	1,129	896	9	-119
A12E – Brook St	543	515	831	813	864	645	33	-169
A12W – M25N	673	652	1,588	687	861	703	-728	16
A12W – A12E	435	449	1,194	456	498	477	-696	21
A12W – M25S	414	413	1,509	464	627	492	-881	28
A12W – Brook Street	482	483	1,550	578	695	586	-856	8
M25N – A12E	745	776	769	804	791	836	22	33
M25N – M25S	637	651	664	675	663	674	0	0
M25N – A12W	718	734	717	738	751	773	34	35
M25N – Brook Street	746	754	776	827	802	847	26	19
M25S – A12W	380	374	443	798	380	390	-63	-408
M25S – M25N	650	628	692	884	684	650	-7	-234
M25S – A12E (via roundabout)	493	507	557	876	568	599	10	-278

Journey time route	2015 Base		2037 DM		2037 DS		Difference (DS v DM)	
	AM	PM	AM	PM	AM	PM	AM	PM
M25S – A12E (via loop)	-	-	-	-	519	528	-	-
M25S – Brook Street	494	498	591	954	562	609	-29	-344
Brook Street – M25S	592	522	1,582	1,408	1,350	915	-233	-493
Brook Street – A12E	770	709	1,907	1,643	1,614	1,149	-292	-494
Brook Street – M25N	935	838	1,983	1,723	1,705	1,233	-278	-489
Brook Street – A12W	637	559	1,614	1,456	1,381	936	-232	-521

2.2.8 Table 2-5 and Table 2-6 show the peak period queue lengths for the 2015 base, 2037 DM and 2037 DS scenarios. These indicate that the Scheme with the extended inter-green phase (DS scenario) would have the following impacts on queue lengths at junction 28 in 2037 compared to without the Scheme (DM scenario):

- The greatest reduction in queue lengths during the AM peak period is predicted on the A12 eastbound off slip, with a reduction of 1,621 metres (approx. 200 vehicles).
- The M25 northbound off slip is also predicted to have a significant reduction of 349 metres (approx. 60 vehicles) during the AM peak period, and 1,462 metres (approx. 255 vehicles) during the PM peak period.
- There is a forecast reduction in queue length of 469 metres (approx. 80 vehicles) on the A12 westbound off slip during the PM peak period.
- The extended inter-green phase reduces queue lengths on Brook Street, particularly during the PM peak period with a reduction of 156 metres (approx. 27 vehicles).

Table 2-5: 2037 AM peak period queue length summary (metres)

Junction	Approach	2015 Base	2037 DM	2037 DS	Difference (DS-DM)
M25 junction 28	M25 North Off Slip (SB)	54	49	79	30
	A12 East Off Slip (WB)	103	937	1,160	223
	Brook Street (WB)	336	601	586	-15
	M25 South Off Slip (NB)	57	413	65	-349
	A12 West Off Slip (EB)	41	2,163	542	-1,621
	M25 Jn 28 Gyratory Section (N)	86	119	91	-27
	M25 Jn 28 Gyratory Section (E)	29	59	100	42
	M25 Jn 28 Gyratory Section (S)	50	74	98	24
	M25 Jn 28 Gyratory Section (W)	96	138	112	-26

Table 2-6: 2037 PM peak period queue length summary (metres)

Junction	Approach	2015 Base	2037 DM	2037 DS	Difference (DS-DM)
M25 junction 28	M25 North Off Slip (SB)	66	55	108	52
	A12 East Off Slip (WB)	76	815	345	-469
	Brook Street (WB)	266	610	454	-156
	M25 South Off Slip (NB)	68	1,588	125	-1462
	A12 West Off Slip (EB)	44	138	155	17
	M25 Jn 28 Gyratory Section (N)	114	90	91	1
	M25 Jn 28 Gyratory Section (E)	37	58	115	56
	M25 Jn 28 Gyratory Section (S)	57	60	88	28
	M25 Jn 28 Gyratory Section (W)	119	129	125	-4

2.2.9 The design year (2037) results for an inter-peak period showing comparisons between the DM and DS is presented in Appendix B of this report.

2.2.10 The Scheme including the extended inter-green phase is predicted to improve the operational performance of the junction 28 roundabout compared to the DM without the Scheme by reducing queuing on the slip roads approaching the roundabout and on Brook Street. This would further reduce the risk of traffic queuing back on to the M25 mainline carriageway and improve the operational resilience of the junction by providing additional traffic capacity.

2.3. Scheme impacts on Brook Street

Opening year – 2022

2.3.1 Table 2-7 presents the impact of the Scheme (including extended inter-green phase) on Brook Street westbound traffic for the 2015 base year and the 2022 opening year.

Table 2-7: 2022 Delays and queue lengths on Brook Street westbound towards M25 junction 28

Evaluation parameters	AM peak				PM peak			
	2015 Base	2022 DM	2022 DS	DS v DM	2015 Base	2022 DM	2022 DS	DS v DM
Average delays (secs)	140	135	70	-65	94	109	48	-61
Queue Length (m)	336	537	262	-275	266	512	175	-337

2.3.2 The Scheme (including extended inter-green phase) is predicted to reduce the average delay per vehicle travelling westbound on Brook Street by approximately a minute relative to the DM, during both the AM peak and PM peak periods.

2.3.3 Similarly, the queue lengths on the Brook Street westbound approach are predicted to reduce by 275m (approx. 50 vehicles) during the AM peak and 337m (approx. 60 vehicles) during the PM peak periods respectively.

2.3.4 Table 2-8 presents the impact of the Scheme (including extended inter-green phase) on Brook Street traffic in the eastbound direction for the 2015 base and 2022 forecast years.

Table 2-8: 2022 Delays and queue lengths on Brook Street eastbound towards Nags Head Lane

Evaluation parameters	AM peak				PM peak			
	2015 Base	2022 DM	2022 DS	DS v DM	2015 Base	2022 DM	2022 DS	DS v DM
Average delays – Nags Head Lane (secs)	26	25	17	-8	23	30	19	-11
Queue Length – Nags Head Lane (m)	71	93	62	-32	73	153	71	-82
Average delays – Mascalls Lane (secs)	26	24	22	-2	24	25	23	-2
Queue Length – Mascalls Lane (m)	108	86	78	-9	81	82	71	-11

2.3.5 The inclusion of the extended inter-green phase at the junction of the A12 westbound off slip with junction 28 roundabout as part of the Scheme alters the arrival profile of eastbound traffic on Brook Street travelling towards the Nags Head Lane and Mascalls Lane junctions. Therefore, the traffic conditions on Brook Street would be slightly improved in the DS scenario compared to the DM scenario as explained below.

2.3.6 The extended inter-green phase would result in minor improvement in average delay per vehicle travelling eastbound on Brook Street during both the AM peak and PM peak periods.

2.3.7 Queue lengths at the Nags Head Lane junction are predicted to reduce by 32 metres (approx. 6 vehicles) and by 82 metres (approx. 14 vehicles) during the AM and PM peak periods respectively.

2.3.8 The Scheme impact on Brook Street in the opening year (2022) for an inter-peak period relative to the DM is presented in Appendix B of this report. Minimal changes in queue length and average delays during the inter-peak period are predicted in the DS scenario compared to the DM scenario.

Design year – 2037

2.3.9 Table 2-9 presents the delays and queue lengths on Brook Street on the westbound approach to the junction 28 roundabout for the Scheme in the design year 2037, compared to the DM and the 2015 base year.

Table 2-9: 2037 Delays and queue lengths on Brook Street westbound towards M25 junction 28

Evaluation parameters	AM peak				PM peak			
	2015 Base	2037 DM	2037 DS	DS v DM	2015 Base	2037 DM	2037 DS	DS v DM
Average delays (secs)	140	165	147	-18	94	133	87	-46
Queue Length (m)	336	601	586	-15	266	610	454	-156

2.3.10 The Scheme with the extended inter-green phase is expected to reduce westbound delays on Brook Street by 18 seconds per vehicle compared to the DM during the AM peak period, and by 46 seconds per vehicle during the PM peak period.

2.3.11 Similarly, the Scheme is predicted to reduce queue lengths on the Brook Street westbound approach by around 150 metres (approx. 26 vehicles) during the PM peak period.

2.3.12 Table 2-10 presents delays and queue lengths on Brook Street in the eastbound direction for the 2015 base year and 2037 opening year.

Table 2-10: 2037 Delays and queue lengths on Brook Street eastbound towards Nags Head Lane

Evaluation parameters	AM peak				PM peak			
	2015 Base	2037 DM	2037 DS	DS v DM	2015 Base	2037 DM	2037 DS	DS v DM
Average delays – Nags Head Lane (secs)	26	29	25	-4	23	41	32	-9
Queue Length – Nags Head Lane (m)	71	110	99	-11	73	310	262	-48
Average delays – Mascalls Lane (secs)	26	27	23	-4	24	30	23	-7
Queue Length – Mascalls Lane (m)	108	100	83	-17	81	95	78	-17

2.3.13 The Scheme with the extended inter-green phase is predicted to marginally reduce average eastbound delays on the Brook Street approaches to the Nags Head Lane and Mascalls Lane junctions in 2037 by a few seconds per vehicle, during both the AM and PM peak periods.

2.3.14 Eastbound queue lengths are also predicted to reduce at both junctions along Brook Street during both the AM and PM peak periods compared with the DM scenario.

2.3.15 An inter-peak period assessment showing the Scheme impact on Brook Street in the design year (2037) is presented in Appendix B of this report.

2.3.16 The Scheme including the extended inter-green at junction 28 is predicted to reduce peak period traffic delays and queue lengths on Brook Street in both directions compared to without the Scheme.

2.4. Scheme impacts on the benefit to cost ratio

2.4.1 There are greater overall journey time savings with the extended inter-green at junction 28 compared to the core scheme without it as previously reported in the Tables 5-4 and 5-7 of the Transport Assessment Report. Consequently, the user benefits increase, resulting in an improvement in the benefit to cost ratio (BCR) as reported at paragraphs 4.4.17 and 4.4.23 in the Case for the Scheme and Schedule of Accordance with National Policy Statement [APP-095]. The revised initial BCR with the extended inter-green at junction 28 improves from 2.33 to 4.10 and the adjusted BCR improves from 2.46 to 4.21.

3. Usage of the proposed loop road

3.1.1 Table 3-1 shows the proportions of traffic from the M25 south to A12 east that are forecast to use the existing roundabout and the new loop road with the Scheme in place.

Table 3-1: Proportional split of traffic between the new loop road and existing roundabout

Route	2022			2037		
	AM	IP	PM	AM	IP	PM
Via roundabout	43%	43%	44%	42%	44%	39%
Via loop road	57%	57%	56%	58%	56%	61%

3.1.2 Traffic modelling of the Scheme indicates that up to 44% of the traffic from the M25 south (anticlockwise) to the A12 east uses a route via the existing roundabout in the DS scenarios, rather than the new loop road, with the proportion varying by time of day. This is not unexpected because, although the new loop road provides the quickest route (by up to 28 seconds per vehicle in 2022 and between 48 seconds and over a minute per vehicle in 2037), it is longer in distance by approximately 1.5 km than the route via the roundabout. Consequently, the route that drivers are forecast to take depends on a combination of the comparative journey times and distances. The comparative journey times for the two alternative routes changes in response to traffic delays on the roundabout, which in turn is determined by the traffic volumes using the roundabout. The traffic model dynamically reassigns traffic via the two alternative routes until equilibrium is achieved, which results in different proportions of traffic using the two alternative routes at different times. This is a conservative approach, which predicts good journey time benefits particularly for the trips using the A12 eastbound off slip.

3.1.3 Also, the traffic modelling does not take account of the effectiveness of direction signposting. The routeing choices in the traffic model are determined by the most beneficial route for drivers based on a combination of the quickest and shortest alternative. Consequently, the traffic modelling is likely to overestimate the proportion of M25 northbound traffic heading for the A12 east that would use the junction 28 roundabout, rather than the new loop road.

4. Traffic impacts at Gallows Corner junction and on A12

4.1.1 This section provides additional information on the traffic impacts of the Scheme on Gallows Corner junction and on the section of the A12 between Gallows Corner and junction 28 on the M25.

4.1.2 As explained in Section 3 of the Transport Assessment Report [APP-098], the traffic models used to evaluate the traffic impacts of the Scheme consist of a strategic traffic assignment model that covers the road network over a large area around the north east quadrant of the M25, including Gallows Corner junction, and a more detailed (VISSIM based) operational traffic model that covers the road network in the immediate vicinity of M25 junction 28 (and the Scheme), but does not include Gallows Corner junction nor the local road network in the vicinity of Gallows Corner junction. The extent of the VISSIM based operational model was determined based on the strategic traffic model assignments which showed that the changes in traffic flows on the road network at, and in the vicinity of, Gallows Corner junction due to the Scheme are forecast to be small, therefore indicating that the Scheme would not have a significant impact on the operational performance or capacity of this part of the road network.

4.2. Impact on road network in the vicinity of Gallows Corner junction

4.2.1 Figures 4-1 to 4-6 show the forecast changes in traffic flow due to the Scheme on roads in the vicinity of Gallows Corner junction during the peak periods in the opening year 2022 and Design year 2037. These are taken from the strategic traffic model and show that the forecast changes in traffic flows are small, representing 6% or less change on the A12, A127 and roads connecting to Gallows Corner junction.

Figure 4-1: 2022 AM peak changes in traffic flows near Gallows Corner

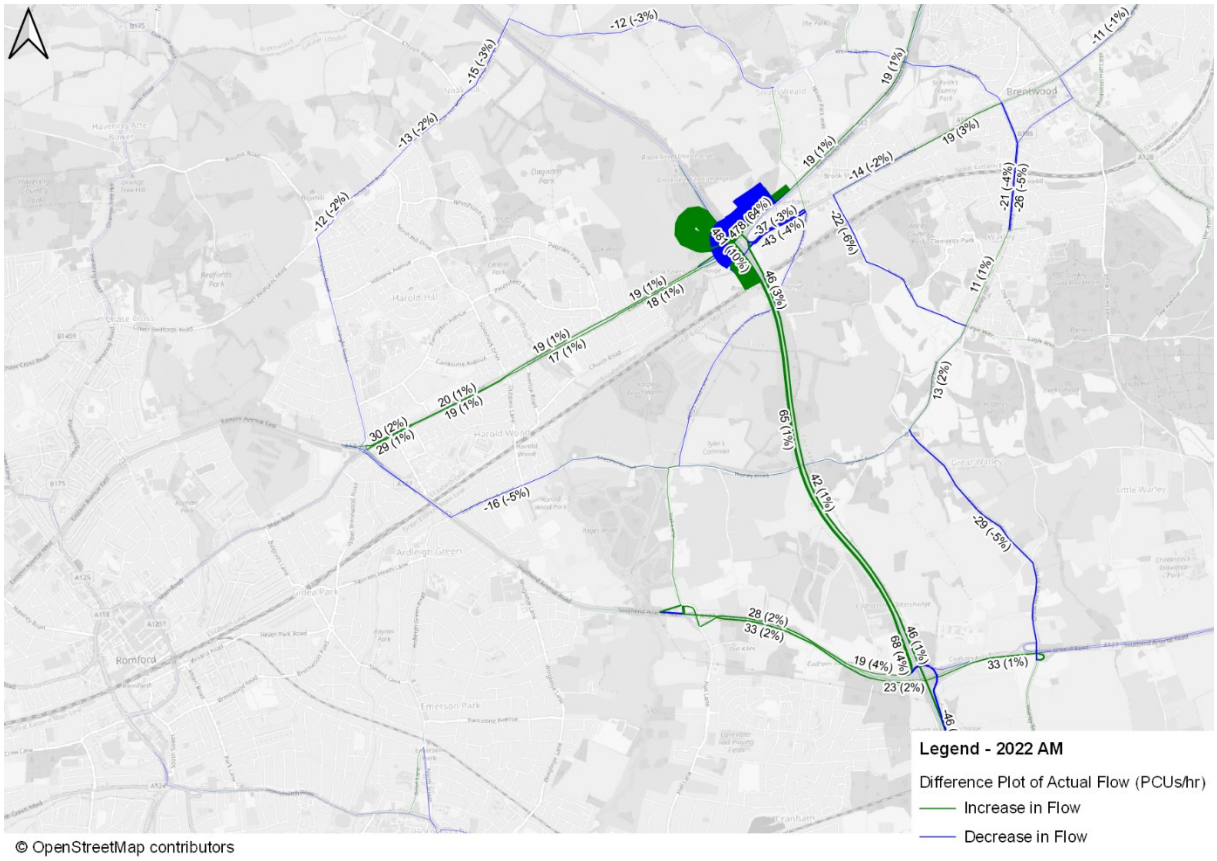


Figure 4-2: 2022 Inter-peak changes in traffic flows near Gallows Corner

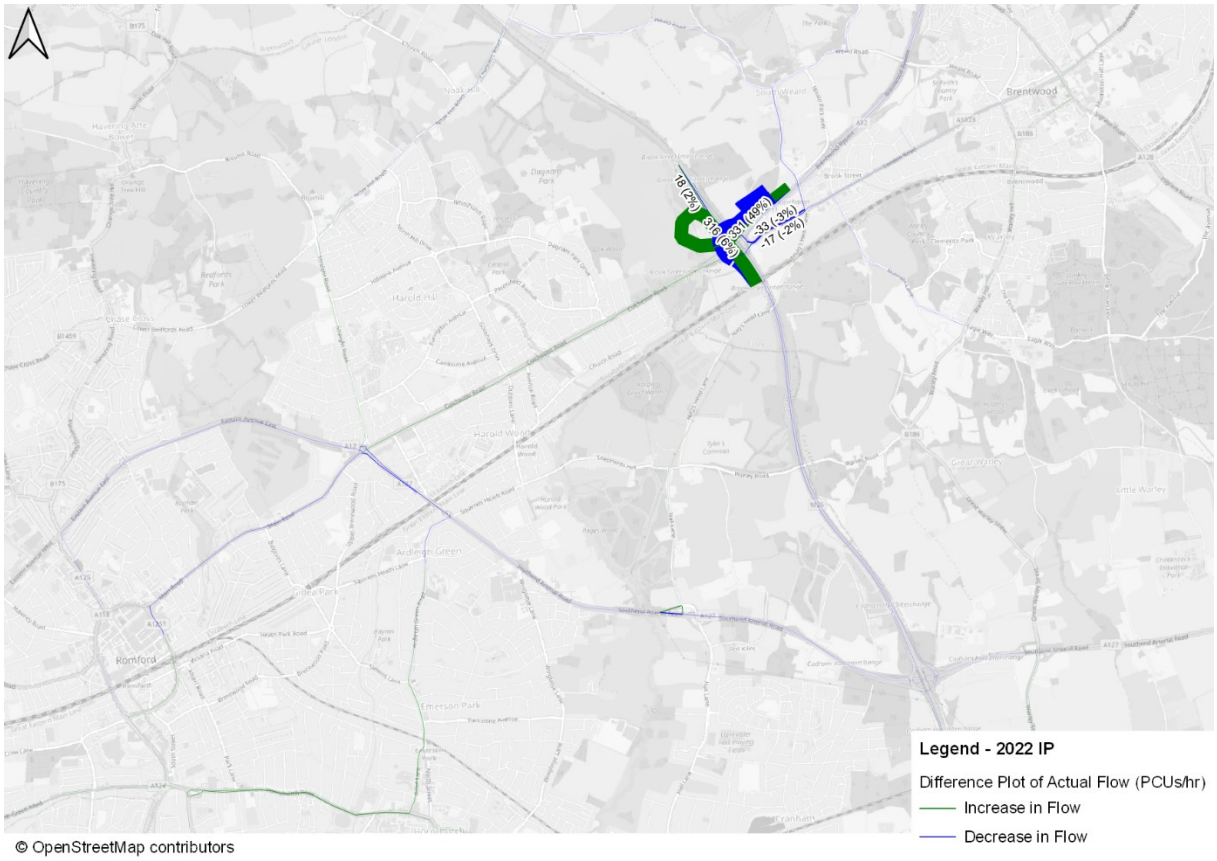


Figure 4-3: 2022 PM peak changes in traffic flows near Gallows Corner

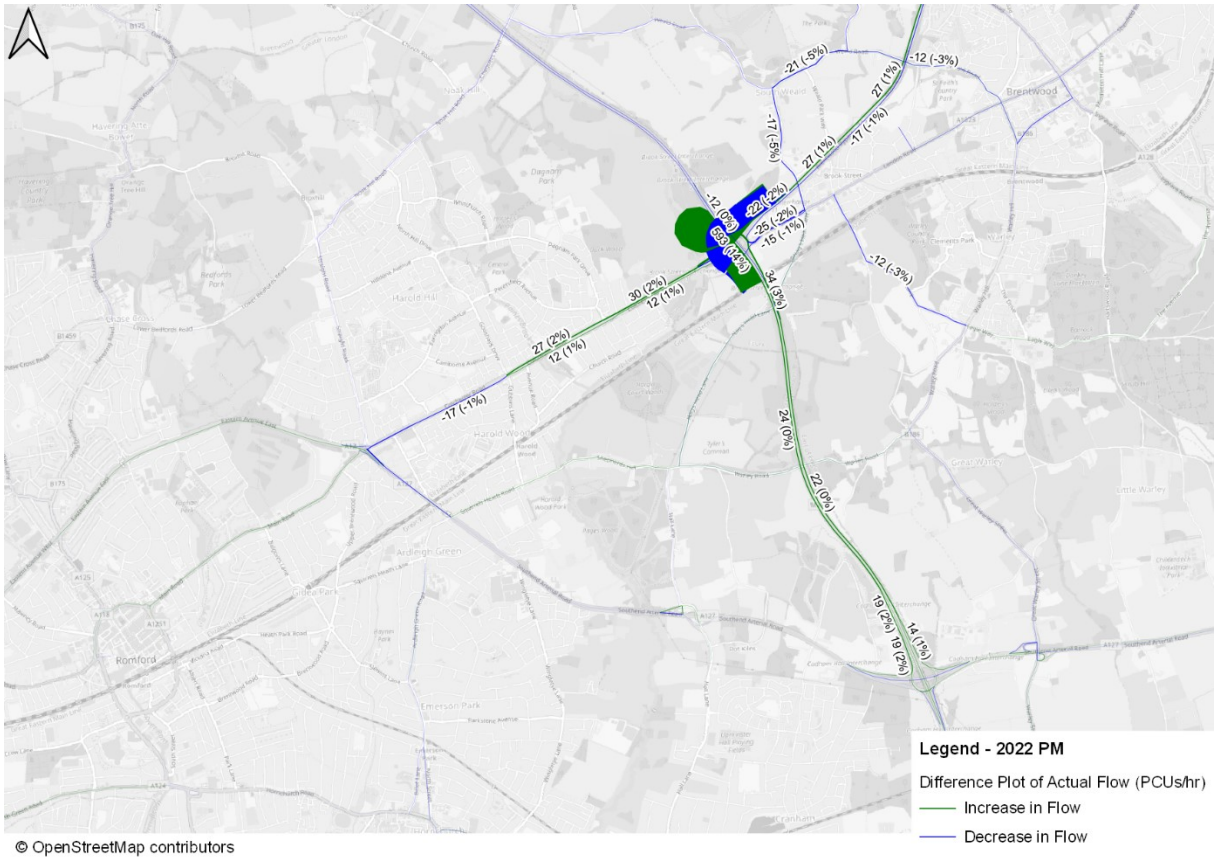


Figure 4-4: 2037 AM peak changes in traffic flows near Gallows Corner

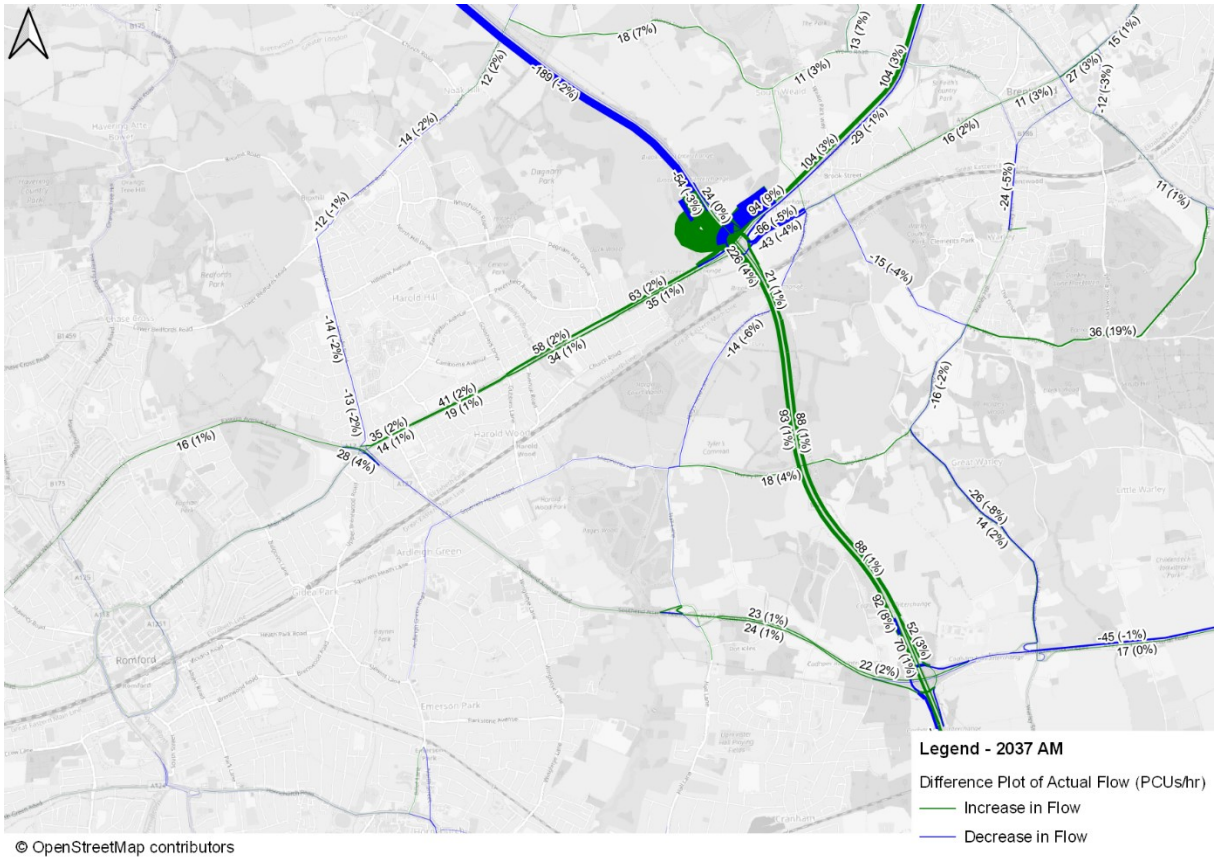


Figure 4-5: 2037 Inter-peak changes in traffic flows near Gallows Corner

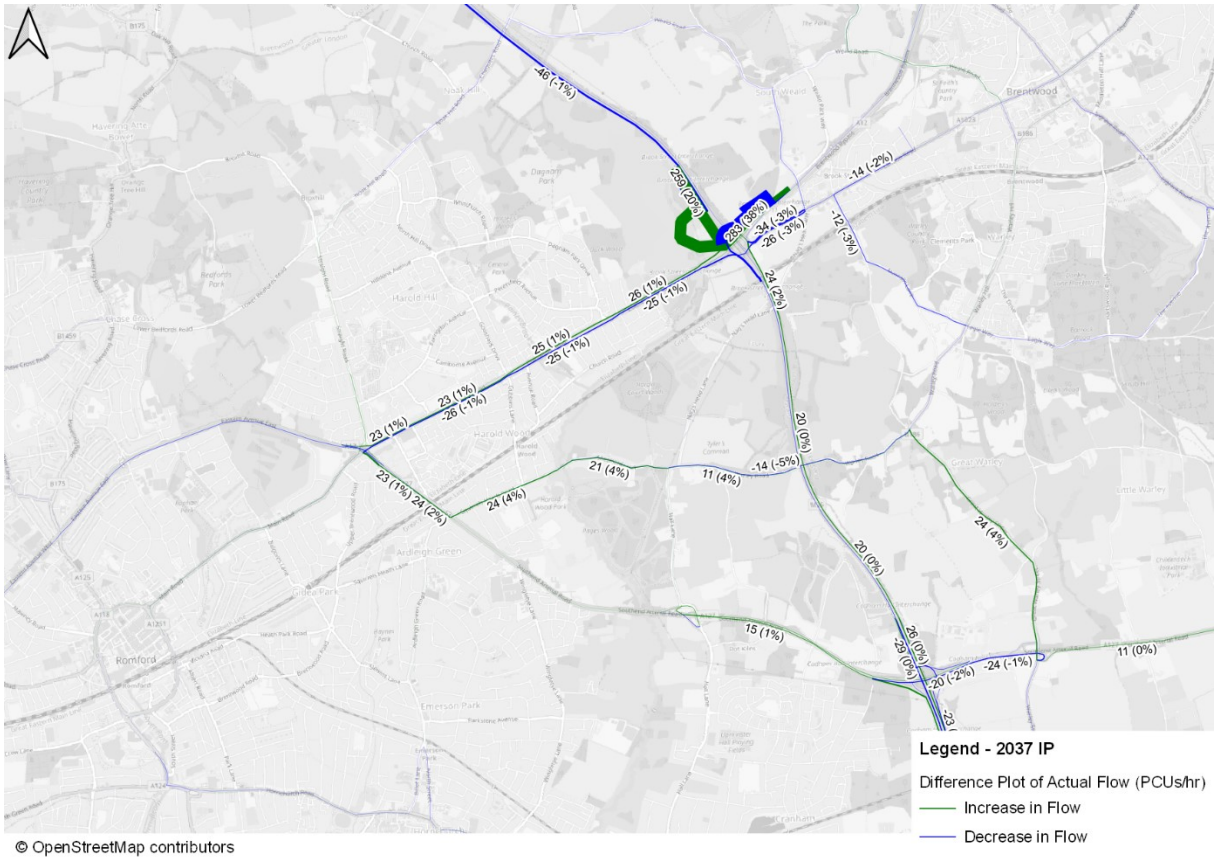
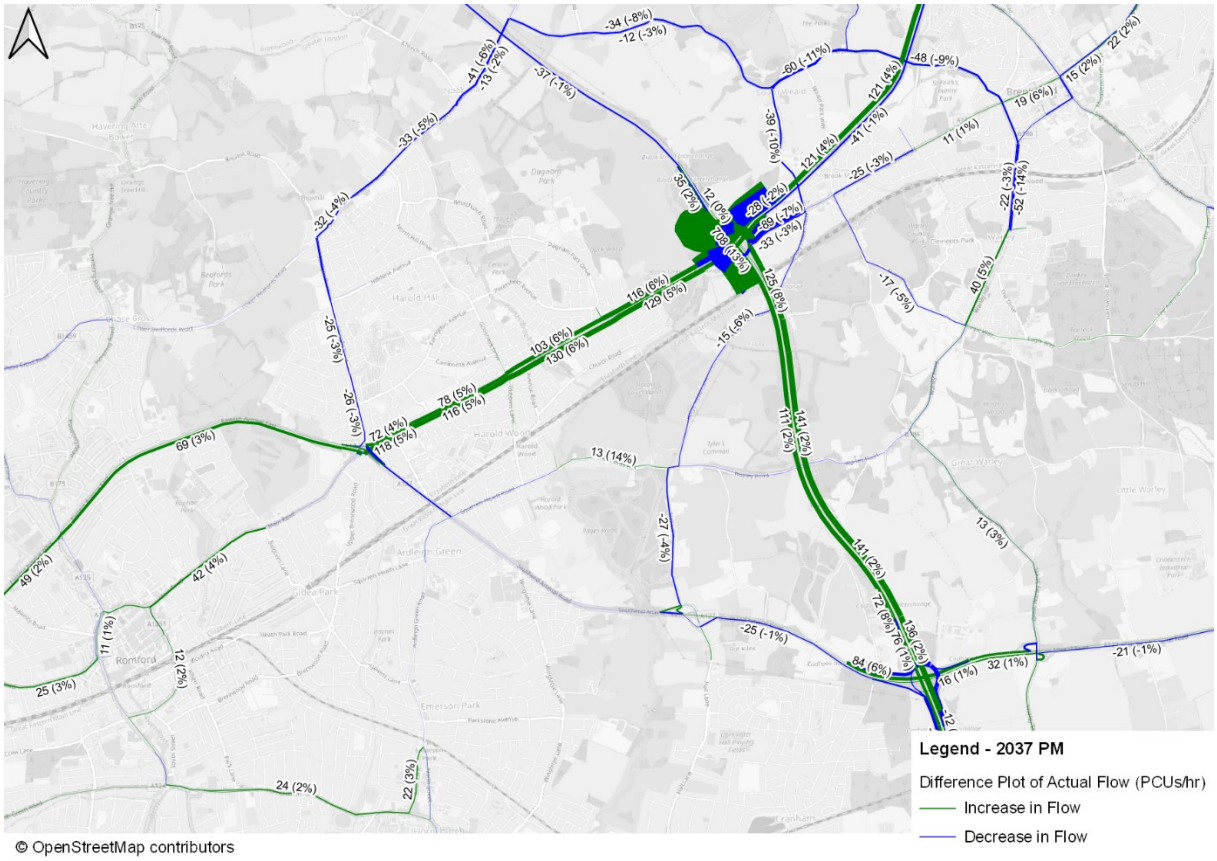


Figure 4-6: 2037 PM peak changes in traffic flows near Gallows Corner



4.2.2 Table 4-1 provides the forecast changes in traffic flows on the approach roads to Gallows Corner and the total forecast change in traffic throughput due to the Scheme, excluding traffic using the A127 / A12 flyover. The total forecast change in traffic throughput at Gallows Corner due to the Scheme represents less than a 1% change and therefore the Scheme would have a negligible impact at the junction.

Table 4-1: Forecast percentage changes in traffic throughput at Gallows Corner junction

Approach	2022 DS v DM				2037 DS v DM			
	AADT	AM	IP	PM	AADT	AM	IP	PM
A12 Eastbound	0.1%	1.5%	0.0%	-1.2%	0.2%	0.4%	1.8%	-3.2%
Straight Road	-0.1%	-0.1%	0.0%	-0.1%	0.2%	-0.1%	0.5%	-0.1%
A12 Westbound	0.4%	1.8%	0.6%	-1.1%	0.9%	0.7%	-1.7%	5.2%
A127	-2.2%	-3.1%	-2.3%	-1.2%	1.2%	-3.9%	5.0%	-0.8%
Main Road	-0.1%	0.6%	-0.9%	0.7%	-0.7%	0.7%	0.6%	-4.0%
Total	**-0.2%**	**0.6%**	**-0.4%**	**-0.6%**	**0.4%**	**-0.1%**	**0.6%**	**0.5%**

4.2.3 Table 4-2 and Table 4-3 present the forecast changes in the volume to capacity ratio as a percentage during peak periods due to the Scheme at Gallows Corner junction and at junctions along the A12 between Gallows Corner junction and junction 28 for 2022 and 2037 respectively.

4.2.4 Table 4-2 and Table 4-3 show that the changes in volume to capacity ratios (capacity) at any of the junctions due to the Scheme are less than 1.1% in 2022 and no more than 5% in 2037.

4.2.5 The information presented above demonstrates that the Scheme would have a minimal impact on traffic flows and the operational performance of the road network in the vicinity of Gallows Corner junction. Consequently, detailed impact assessment of this part of the road network using operational or local junction models is not necessary.

Table 4-2: 2022 Forecast changes in peak period volume to capacity ratios

Junction	Approach	2022 DM			2022 DS			2022 DS v DM		
		AM	IP	PM	AM	IP	PM	AM	IP	PM
Gallows Corner	A12 Eastbound	40.7	39.2	44.4	41.3	39.2	43.8	0.6	-0.1	-0.7
	Straight Road	85.3	86.3	86.0	85.4	86.3	85.9	0.1	0.0	-0.1
	A12 Westbound	71.4	56.7	78.4	71.9	56.7	77.6	0.5	-0.1	-0.8
	A127 (to Main Road)	25.5	22.0	32.8	25.4	21.0	32.9	-0.1	-1.0	0.1
	A127 (to other destinations)	30.4	24.0	30.9	29.8	23.9	30.4	-0.6	-0.1	-0.5
	Main Road	75.5	64.4	78.6	75.6	63.9	78.8	0.0	-0.6	0.2
A12 / Whitelands Way	A12 Eastbound	61.8	52.7	55.4	62.9	52.8	55.1	1.1	0.1	-0.2
	A12 Westbound	60.9	46.9	61.0	61.5	47.1	60.5	0.6	0.2	-0.5
	Whitelands Way	81.1	51.7	71.3	80.9	51.7	71.8	-0.3	0.0	0.4
A12 / Gooshays Drive / Gubbins Lane	A12 Eastbound	51.1	40.7	44.3	51.7	40.7	44.2	0.6	0.0	-0.1
	Gooshays Drive	38.6	19.1	34.2	38.8	19.1	33.6	0.2	0.0	-0.6
	A12 Westbound	56.4	42.9	56.0	56.9	43.1	56.3	0.5	0.2	0.3
	Gubbins Lane	41.7	19.8	33.4	41.8	19.8	34.1	0.1	0.0	0.7
A12 / Petersfield Avenue	A12 Eastbound	49.7	36.9	42.3	50.1	36.9	43.0	0.5	0.0	0.7
	Petersfield Avenue	24.7	13.0	19.7	24.7	13.0	19.9	0.0	0.0	0.2
	Turning lane from A12 Westbound	106.9	95.2	109.6	106.9	95.5	109.6	-0.1	0.3	0.0
A12 / Harold Court Road	Turning lane from A12 Eastbound	26.1	25.7	25.4	26.1	25.7	25.2	0.0	0.0	-0.2
	Harold Court Road	53.2	50.8	74.6	53.2	50.8	74.8	0.0	0.0	0.2
	A12 Westbound	55.8	43.0	53.2	56.2	43.3	53.5	0.4	0.2	0.3

Table 4-3: 2037 Forecast changes in peak period volume to capacity ratios

Junction	Approach	2037 DM			2037 DS			2037 DS v DM		
		AM	IP	PM	AM	IP	PM	AM	IP	PM
Gallows Corner	A12 Eastbound	55.3	48.3	48.3	55.4	49.5	45.7	0.1	1.2	-2.6
	Straight Road	100.1	99.3	103.2	100.1	99.8	103.1	0.0	0.6	-0.1
	A12 Westbound	90.1	75.8	107.9	90.0	74.5	106.9	0.0	-1.3	-1.0
	A127 (to Main Road)	28.5	25.5	38.2	27.8	25.4	36.8	-0.8	-0.1	-1.4
	A127 (to other destinations)	45.5	35.1	32.5	44.1	36.7	36.4	-1.4	1.5	3.9
	Main Road	100.4	90.6	95.7	100.3	91.6	100.7	-0.2	1.0	5.0
A12 / Whitelands Way	A12 Eastbound	71.8	61.0	57.1	73.1	61.8	59.7	1.2	0.8	2.5
	A12 Westbound	70.6	58.0	68.1	71.2	57.2	71.5	0.6	-0.8	3.5
	Whitelands Way	92.1	61.4	80.8	92.7	61.4	82.5	0.5	0.0	1.8
A12 / Gooshays Drive / Gubbins Lane	A12 Eastbound	59.3	47.9	47.1	60.4	48.5	49.2	1.1	0.6	2.1
	Gooshays Drive	48.3	23.4	40.1	49.1	23.4	40.1	0.8	0.0	0.0
	A12 Westbound	64.1	53.5	63.6	65.0	52.8	67.2	0.9	-0.7	3.5
	Gubbins Lane	49.8	24.4	41.0	51.8	24.4	42.0	1.9	0.0	1.1
A12 / Petersfield Avenue	A12 Eastbound	56.6	44.0	46.7	58.0	44.6	49.2	1.4	0.6	2.6
	Petersfield Avenue	29.2	15.6	22.7	29.3	15.7	23.7	0.1	0.0	0.9
	Turning lane from A12 Westbound	110.8	102.4	116.2	110.3	102.4	117.7	-0.5	0.0	1.5
A12 / Harold Court Road	Turning lane from A12 Eastbound	31.7	29.4	27.7	31.3	29.3	26.7	-0.4	-0.1	-0.9
	Harold Court Road	64.1	61.9	84.6	64.1	61.9	85.2	0.0	0.0	0.6
	A12 Westbound	62.9	53.0	60.4	63.8	52.4	63.7	0.9	-0.6	3.2

5. Assessment of low and high traffic growth assumptions

5.1. Introduction

5.1.1 This section of the report explains the assessment of traffic impacts due to the Scheme with both high and low traffic growth assumptions.

5.1.2 The traffic modelling is based on a core scenario which accounts for predicted traffic growth in the opening year 2022 and design year 2037 as outlined in the DfT's National Trip End Model (NTEM) (version 7.2) and Road Traffic Forecasts (2018). This growth has been locally refined to take account of planned developments that are classified as 'near certain' or 'more than likely'.

5.1.3 Additional scenarios have been produced which account for uncertainty in future traffic growth. The low growth scenario considers a situation where traffic is forecast to grow at a lower level than core scenario and conversely the high scenario considers a higher level of forecast traffic growth than the core scenario. The low and high traffic growth scenarios have been developed in accordance with DfT's Transport Analysis Guidance (TAG) that states that the core scenario traffic demand is factored by plus or minus 2.5 times the square root of the number of years between the model's base year (2015) and the forecast years (2022 and 2037) to obtain these scenarios.

5.1.4 The high scenario is also locally adjusted through the additional inclusion of developments deemed as 'reasonably foreseeable' to go ahead. Given that such developments do not have funding and/or approval they are not included in the core and low growth scenario. This scenario also includes any road schemes defined as 'reasonably foreseeable'.

5.2. Low growth operational impact assessment

5.2.1 Figure 5-1 to Figure 5-4 show forecast changes in traffic flows from the strategic traffic model on roads in the vicinity of junction 28 during the AM and PM peak periods due to the Scheme for the low traffic growth scenario in both 2022 and 2037. The equivalent figures for the inter-peak period are provided in Appendix C.

5.2.2 These demonstrate that there would be minimal rerouting of traffic with the Scheme under the low traffic growth scenario in both 2022 and 2037.

Figure 5-1: 2022 AM peak changes in traffic flows (low growth)

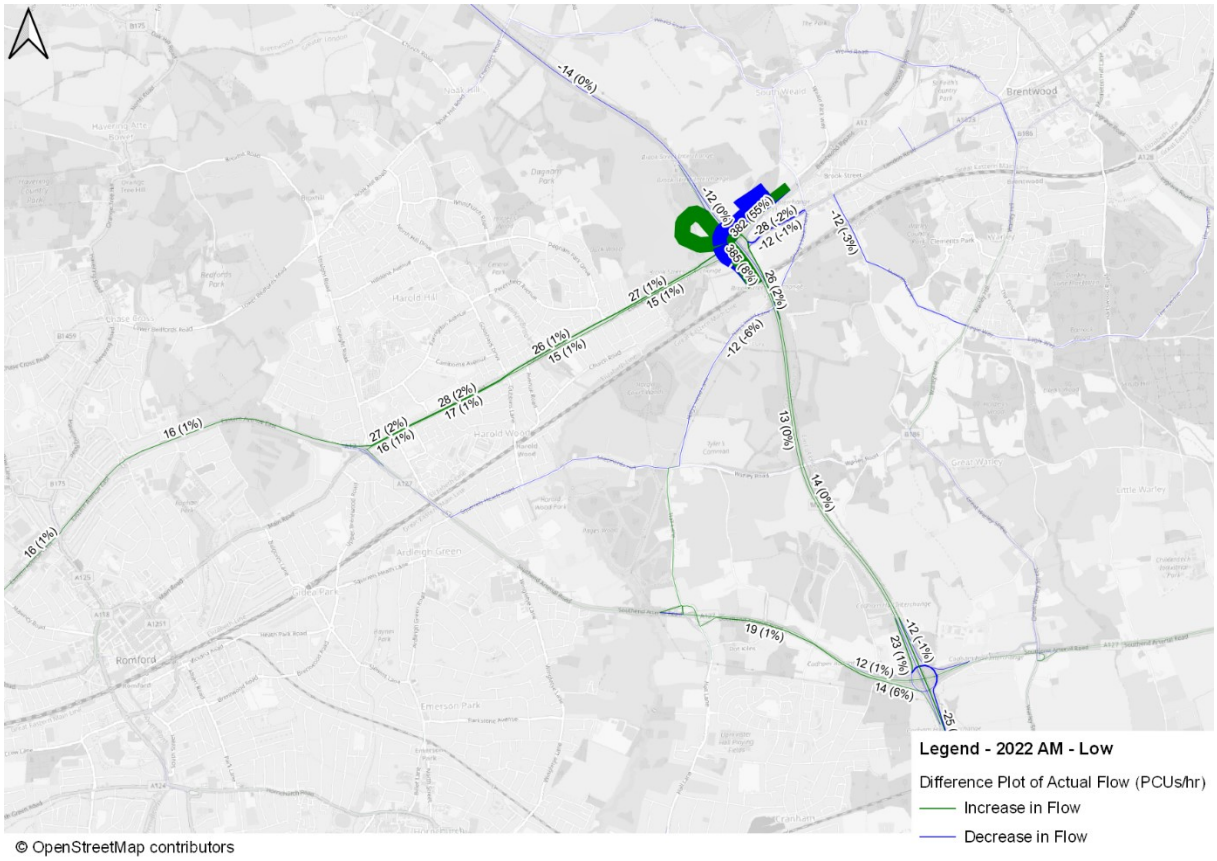


Figure 5-2: 2022 PM peak changes in traffic flows (low growth)

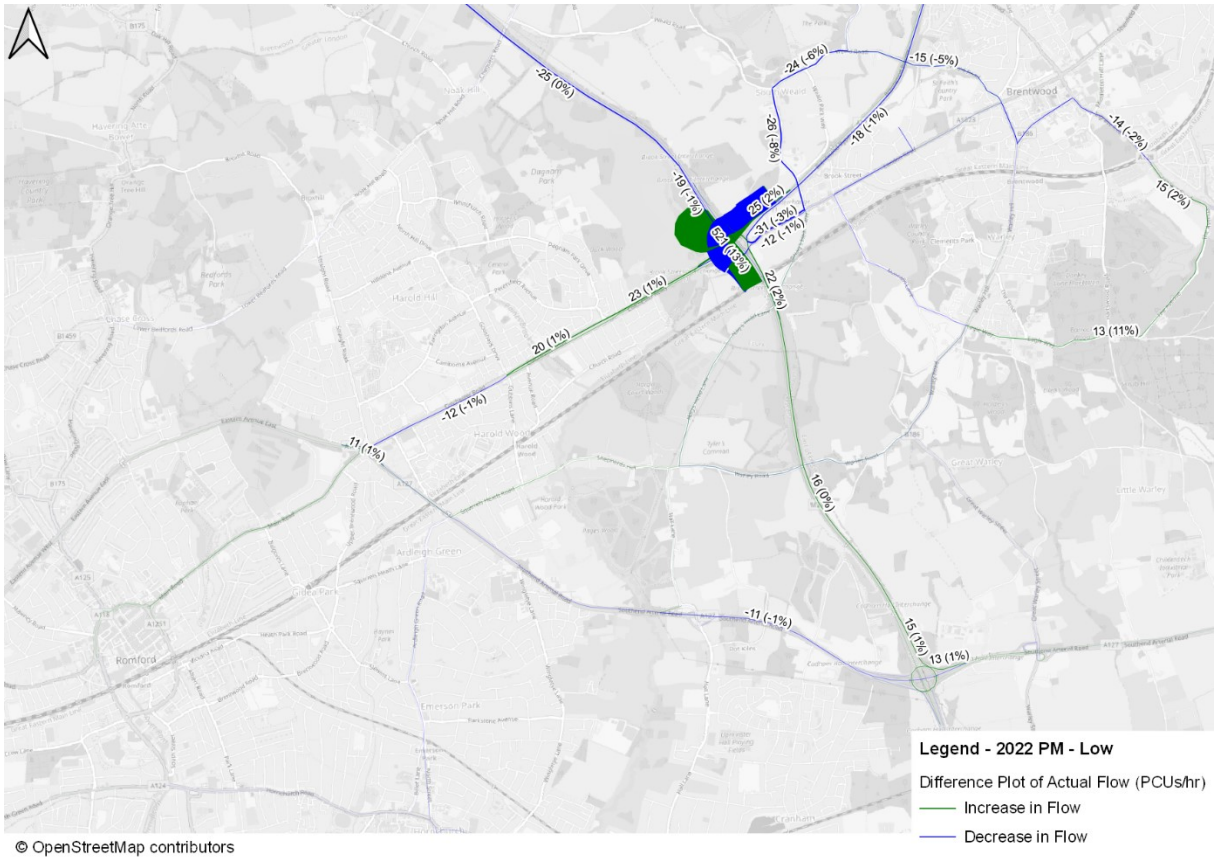


Figure 5-3: 2037 AM peak changes in traffic flows (low growth)

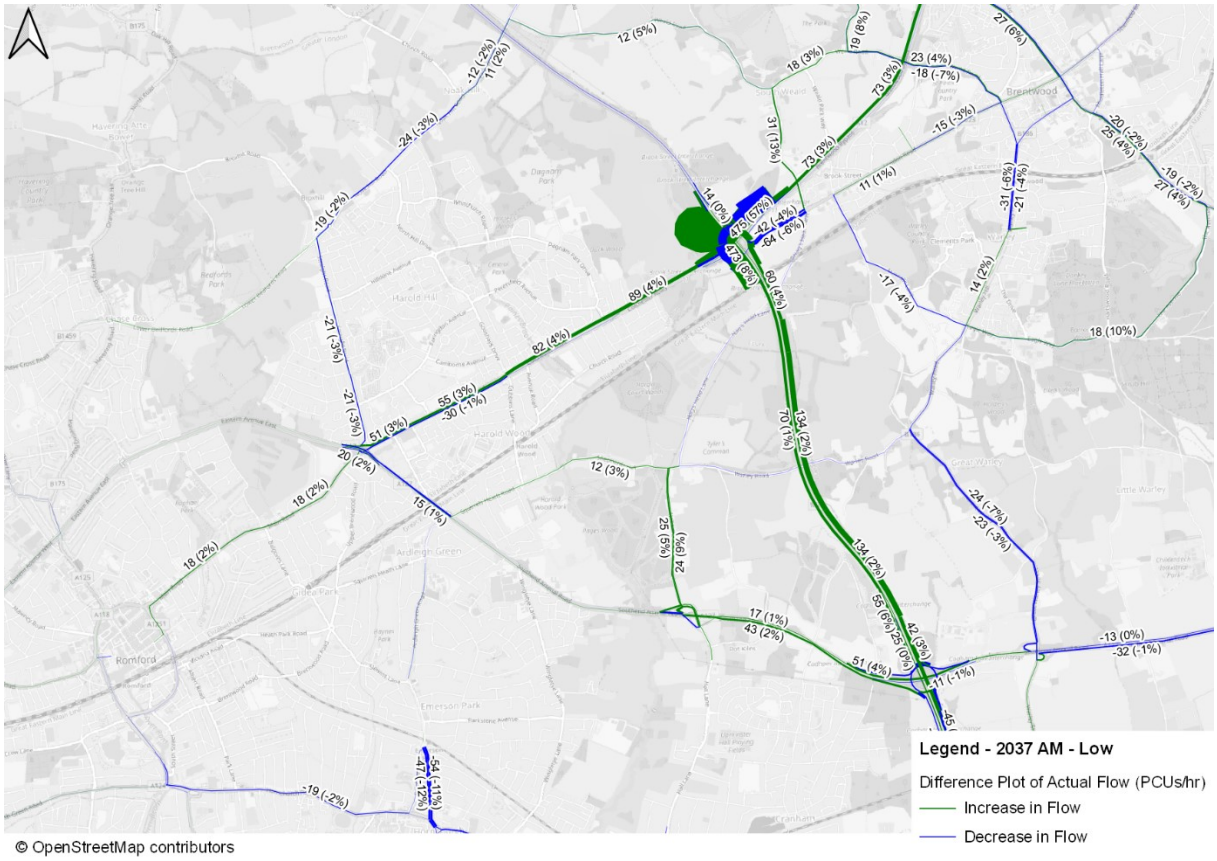
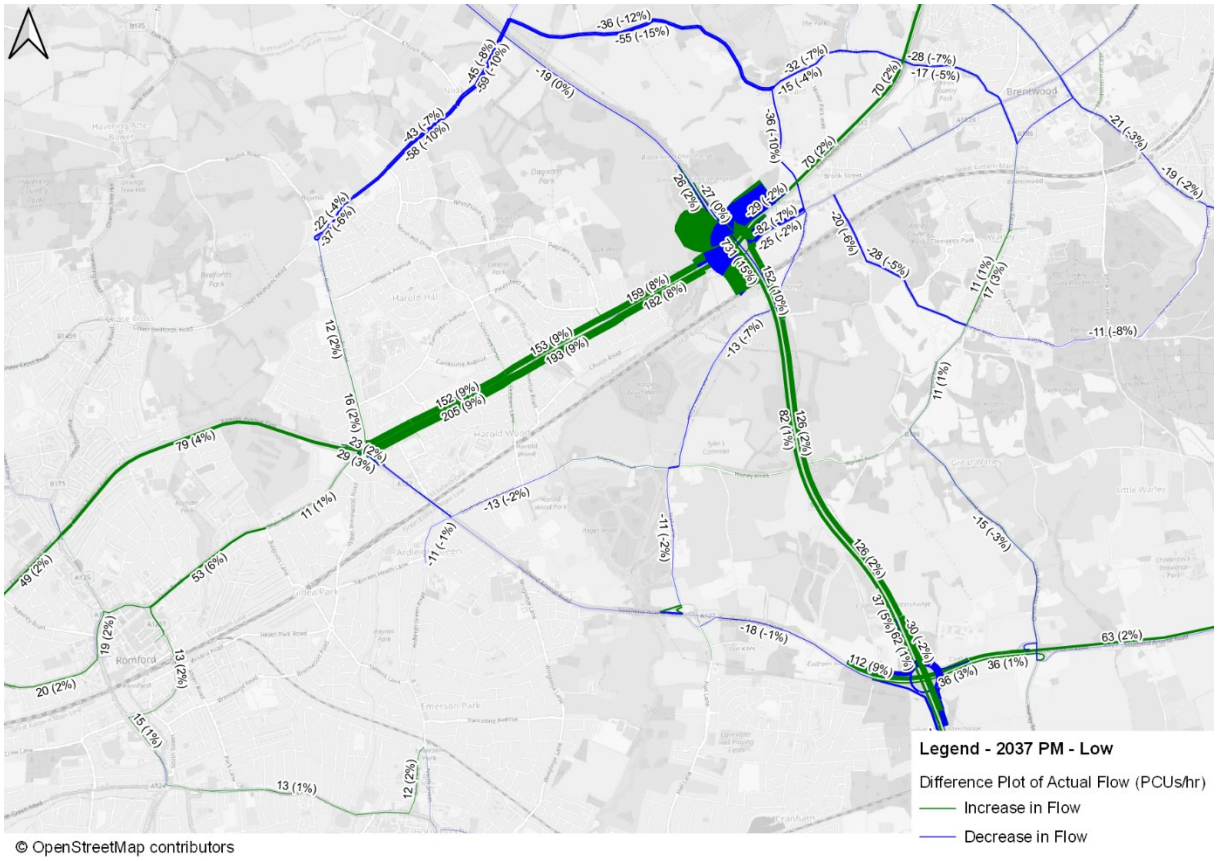


Figure 5-4: 2037 PM peak changes in traffic flows (low growth)



5.2.3 Table 5-1 and Table 5-2 presents average delays at junction 28 from the operational (VISSIM) traffic model for the low growth scenarios in the 2022 and 2037 forecast years respectively without the Scheme (DM) and with the Scheme (DS).

5.2.4 An average the delays on most approaches are predicted to reduce in the DS scenario compared to the DM scenario in all three peak periods.

Table 5-1: 2022 Average delay comparisons (sec/veh)

Approach	2022 DM			2022 DS			2022 DS v DM		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
M25 North Off Slip (SB)	26	28	34	34	29	42	6	1	8
A12 East Off Slip (WB)	53	22	33	48	27	34	-5	5	1
Brook Street (WB)	111	26	96	57	20	40	-54	-6	-56
M25 South Off Slip (NB)	39	46	36	49	62	54	10	8	8
A12 West Off Slip (EB)	85	43	35	38	32	40	-47	-3	5

Table 5-2: 2037 Average delay comparisons (sec/veh)

Approach	2037 DM			2037 DS			2037 DS v DM		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
M25 North Off Slip (SB)	27	28	41	41	29	57	14	1	16
A12 East Off Slip (WB)	73	23	101	88	27	57	15	3	-43
Brook Street (WB)	158	27	131	131	20	106	-27	-7	-26
M25 South Off Slip (NB)	56	46	82	57	61	56	1	14	-26
A12 West Off Slip (EB)	155	46	54	78	33	60	-77	-13	6

5.2.5 The comparison of queue lengths between the DM and DS scenarios from the operational traffic model for all three peak periods for the low growth scenario are presented in Table 5-3 and Table 5-4 for the 2022 and 2037 forecast years respectively.

5.2.6 Queue lengths on most approaches at the M25 junction 28 are predicted to reduce in the DS scenario compared with the DM scenario. The model predicts substantial reductions in queue lengths on the A12 west (eastbound) off slip in the 2037 DS AM peak period.

Table 5-3: 2022 Queue length comparison (metres)

Approach	2022 DM			2022 DS			2022 DS v DM		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
M25 North Off Slip (SB)	40	31	54	41	28	63	1	-3	9
A12 East Off Slip (WB)	146	81	93	133	85	91	-13	4	-2
Brook Street (WB)	443	54	450	205	34	124	-238	-19	-226
M25 South Off Slip (NB)	59	50	71	46	45	58	-13	-5	-13
A12 West Off Slip (EB)	193	43	49	54	42	50	-140	0	1

Table 5-4: 2037 Queue length comparison (metres)

Approach	2037 DM			2037 DS			2037 DS v DM		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
M25 North Off Slip (SB)	44	34	68	56	28	119	12	-6	52
A12 East Off Slip (WB)	272	84	576	577	85	154	305	1	-422
Brook Street (WB)	592	62	604	537	35	543	-55	-28	-61
M25 South Off Slip (NB)	194	52	1,409	57	46	84	-137	-6	-1,324
A12 West Off Slip (EB)	1,735	47	72	187	45	85	-1,547	-2	13

5.2.7 The operational performance of junction 28 with the Scheme under the low growth scenarios would be better than under the core scenario because traffic throughput at the junction would be lower. However, the journey time benefits of the Scheme compared to the DM scenario would be lower than those for the Core scenario, as there is less traffic congestion and delay in the DM scenario to be eliminated by the Scheme. Consequently, the BCR for the Scheme under the low growth scenario is lower than that for the Core scenario, but is still good, representing good value for money.

5.3. High growth operational impact assessment

5.3.1 Figure 5-5 to Figure 5-8 show forecast changes in traffic flows from the strategic traffic model on roads in the vicinity of junction 28 during the AM and PM peak periods due to the Scheme for the high traffic growth scenario in both 2022 and 2037. The equivalent figures for the inter-peak period are provided in Appendix C.

5.3.2 These demonstrate that there would be minimal rerouting of traffic with the Scheme under the high traffic growth scenario in both 2022 and 2037.

Figure 5-5: 2022 AM peak changes in traffic flows (high growth)

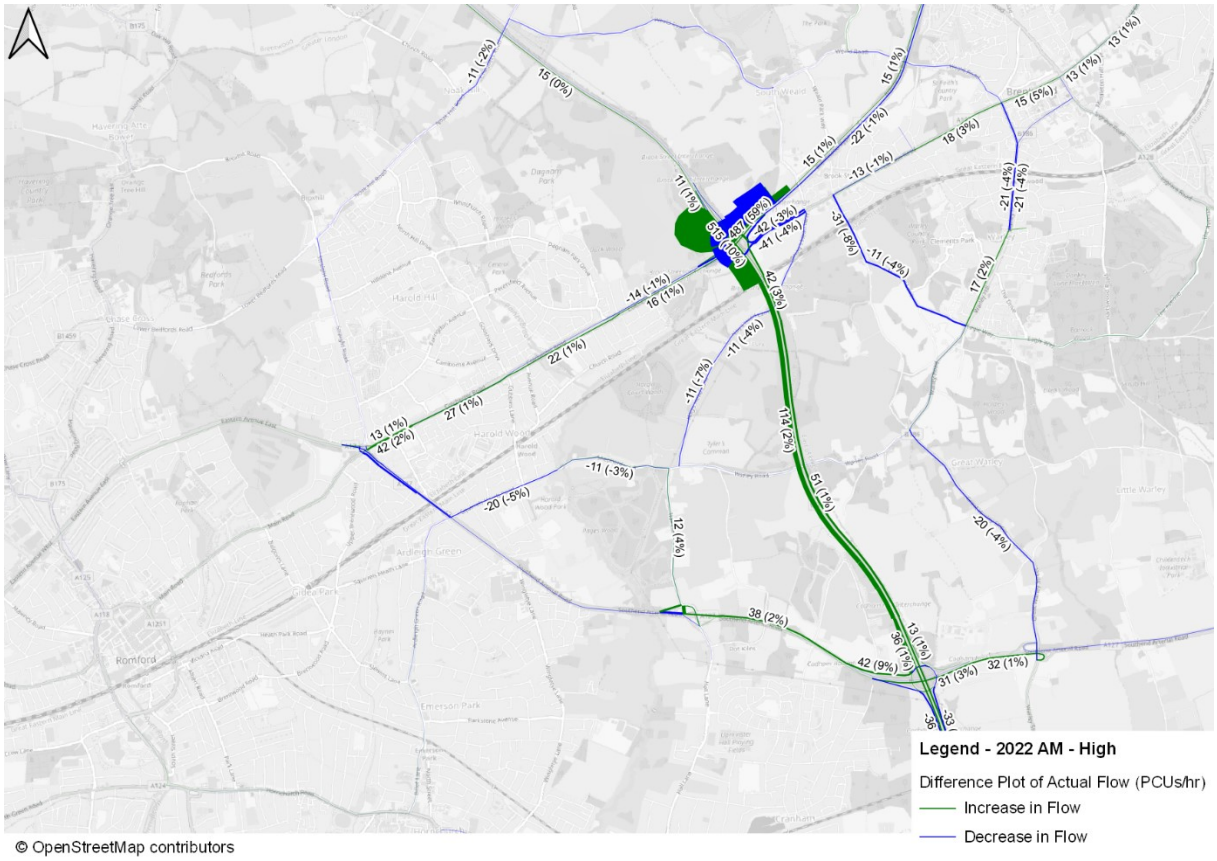


Figure 5-6: 2022 PM peak changes in traffic flows (high growth)

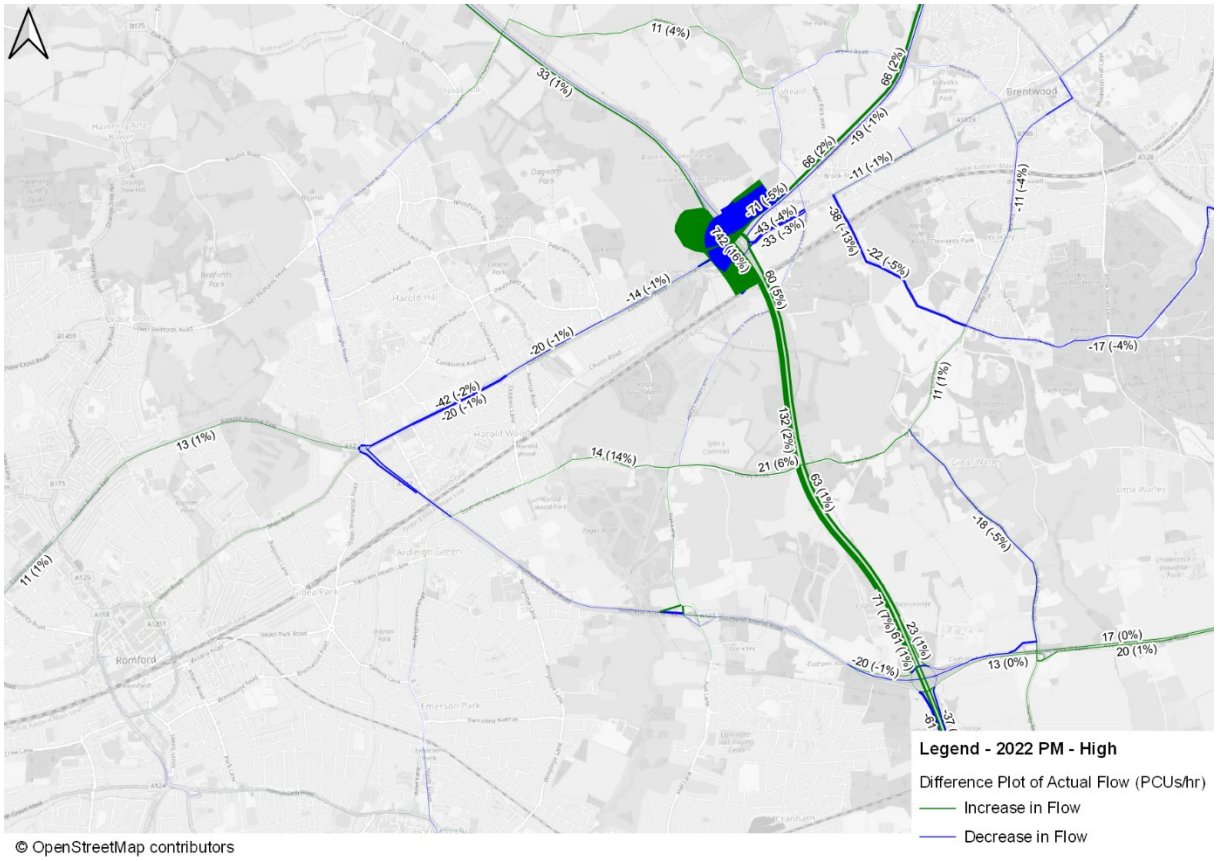


Figure 5-7: 2037 AM peak changes in traffic flows (high growth)

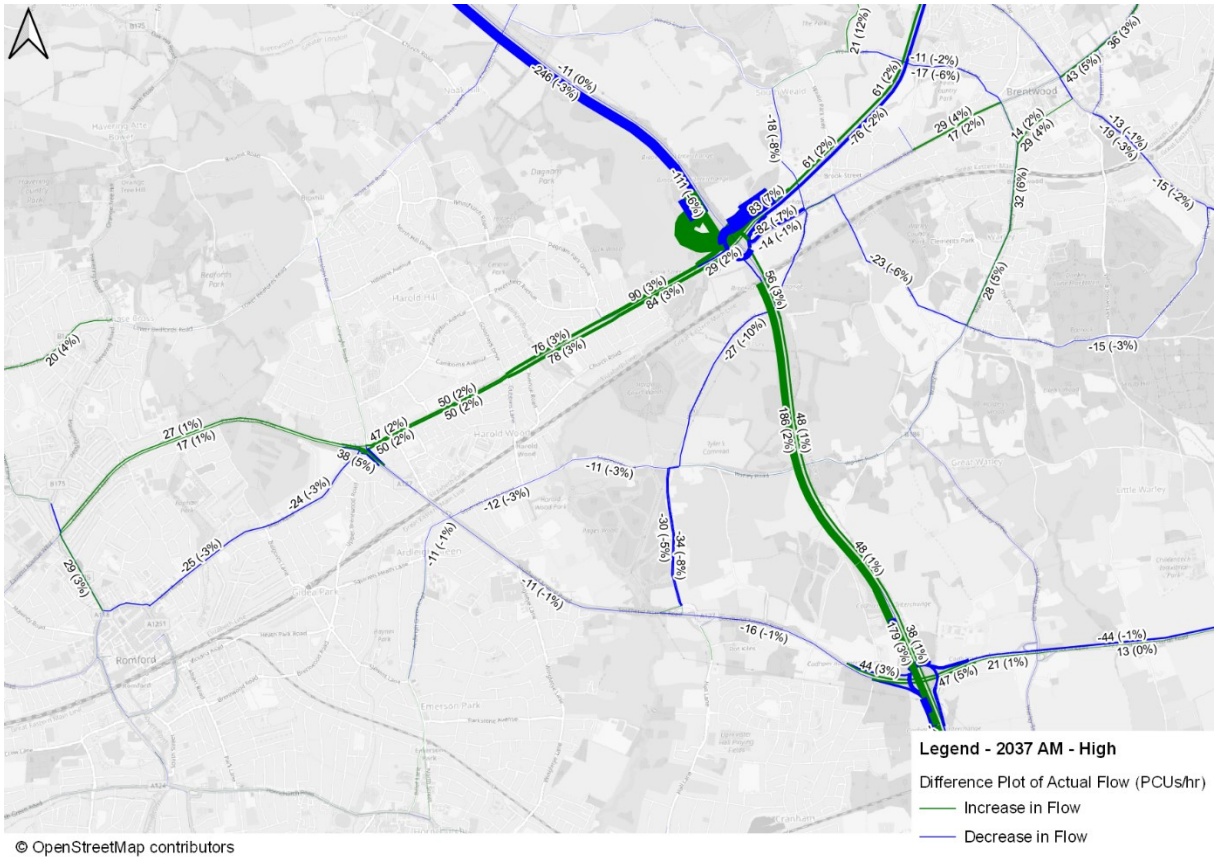
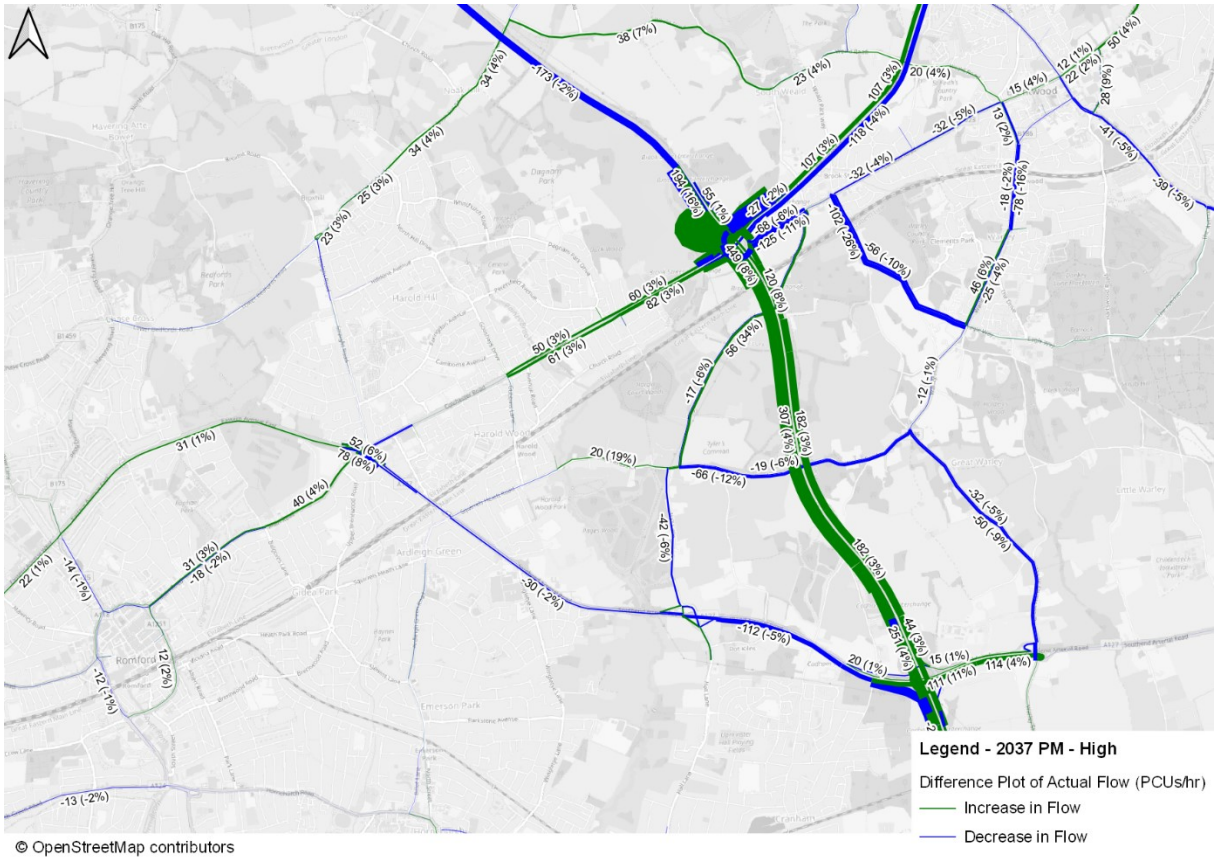


Figure 5-8: 2037 PM peak changes in traffic flows (high growth)



5.3.3 Comparisons of average delays and queue lengths at junction 28 for the high growth scenario with the Scheme (DS) and without the Scheme (DM) from the operational traffic model are presented in Table 5-5 to Table 5-8 for all three peak periods and both the 2022 and 2037 forecast years.

Table 5-5: 2022 Average delay comparisons (sec/veh)

Approach	2022 DM			2022 DS			2022 DS v DM		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
M25 North Off Slip (SB)	28	29	46	38	29	69	10	0	23
A12 East Off Slip (WB)	92	23	85	86	26	65	-6	3	-20
Brook Street (WB)	148	27	117	104	21	80	-44	-6	-37
M25 South Off Slip (NB)	43	46	56	59	62	82	16	16	26
A12 West Off Slip (EB)	114	44	59	52	33	58	-62	-11	-1

Table 5-6: 2037 Average delay comparisons (sec/veh)

Approach	2037 DM			2037 DS			2037 DS v DM		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
M25 North Off Slip (SB)	29	29	45	55	29	59	26	0	14
A12 East Off Slip (WB)	138	23	183	136	27	100	-2	4	-83
Brook Street (WB)	176	29	119	158	22	71	-18	-7	-48
M25 South Off Slip (NB)	79	47	53	68	59	80	-11	12	27
A12 West Off Slip (EB)	203	46	152	105	33	123	-98	-13	-29

Table 5-7: 2022 Queue length comparisons (metres)

Approach	2022 DM			2022 DS			2022 DS v DM		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
M25 North Off Slip (SB)	45	34	62	45	28	178	0	-6	116
A12 East Off Slip (WB)	533	81	358	550	85	155	17	4	-203
Brook Street (WB)	574	59	571	421	39	379	-153	-20	-192
M25 South Off Slip (NB)	65	50	189	56	44	116	-10	-6	-73
A12 West Off Slip (EB)	685	45	79	78	42	64	-607	-3	-16

Table 5-8: 2037 Queue length comparisons (metres)

Approach	2037 DM			2037 DS			2037 DS v DM		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
M25 North Off Slip (SB)	47	34	66	123	29	129	76	-6	63
A12 East Off Slip (WB)	1,658	89	1,602	1,828	90	556	170	1	-1,046
Brook Street (WB)	623	62	605	609	41	343	-14	-21	-246
M25 South Off Slip (NB)	479	52	105	76	45	126	-403	-8	21
A12 West Off Slip (EB)	2,285	48	851	697	43	300	-1,588	-4	-551

5.3.4 The average delays on most approaches are predicted to reduce in the DS scenario compared to the DM scenario in all three peak periods.

5.3.5 Junction 28 is forecast to operate less well under the high growth scenario than under the Core scenario, both with and without the Scheme, because traffic throughput at the junction would be greater resulting in some additional traffic congestion and delay. Nonetheless, the traffic modelling has demonstrated that the operational performance of the junction with the Scheme (DS) under the high growth scenario is still forecast to be considerably better than without the Scheme (DM). Consequently, the Scheme would provide significant journey time savings under the high growth scenario and deliver a slightly higher BCR to that for the Core scenario.

6. Traffic impacts during construction

6.1.1 This section of the report provides updated information on the likely traffic impacts of the Scheme during construction to reflect updated information on the proposed temporary traffic management measures required to enable construction of the Scheme.

6.1.2 Traffic modelling of construction works presented in Section 8 of the Transport Assessment Report [APP-098] is based on the preliminary approach to construction of the Scheme that was available when the traffic modelling was undertaken to assess potential traffic impacts. The approach to construction has subsequently been refined and updated, along with the proposed traffic management arrangements. Some of these scenarios no longer reflect the key phases in the latest construction programme, specifically phases 5 and 6 which would no longer be required.

6.1.3 The five key construction phases presented in Section 2.6 of the Environmental Statement [APP-026] reflects the latest approach to construction of the Scheme.

6.1.4 During the construction programme for the Scheme between spring 2022 and winter 2024, temporary construction traffic management arrangements would, over different periods, typically consist of narrow lanes with reduced speed limits on the M25 anti-clockwise, A12 eastbound carriageways (50mph on the M25 and 40mph on A12) and on the slip roads to and from junction 28. Lane and road closures would, as far as practicable, be restricted to weekends and/or overnight with the number of occurrences kept to a minimum. This would ensure that the existing number of traffic lanes on both roads are maintained on weekdays during the day for much of the construction works to minimise impacts on traffic congestion and delay. There would, however, be some lane closures, but not road closures, that would be in place all day, every day for longer periods of up to a few months. These are anticipated to be as follows:

- A12 Eastbound off slip – closure of nearside left turn lane for 85 days.
- Roundabout nearside lane closure – tie in of A12 off slip for 30 days.
- M25 Clockwise – off slip diverge closure for 45 days.
- M25 Clockwise off slip – lane 2 closure for 35 days.

6.1.5 Access to the main site compound located north of the A12 and to the east of the access to Maylands Golf Club access road would be left in and left out only from the A12 eastbound carriageway, i.e. no right turns to or from the A12. The satellite compound to the north of Grove Farm would be connected to the main site compound via a temporary haul road. However, the satellite compound would also have a temporary entrance off the M25 junction 28 northbound on slip to allow for some deliveries to made directly to it. The satellite compound would have minimal storage space and consequently, the entrance off the northbound on slip would only be used by a limited number of ‘just in time’ deliveries of construction materials and equipment.

6.1.6 All construction traffic for the Scheme would use the M25, A12 and A127 to access the main and satellite compounds. Construction traffic arrivals to the main compound from the M25 north and A12 east would need to make a U-turn at the A12 junction with Petersfield Avenue to access the site. Arrivals from the M25 south would use Junction 29 and the A127 westbound to access the site via Gallows Corner. Just in time deliveries to the satellite compound would be from the A12 and M25 via junction 28 and the northbound on slip. These vehicles would not need to U-turn at the A12 junction with Petersfield Avenue or use the A127 westbound and Gallows Corner. All construction traffic departures would be via the main compound and use the A12 eastbound, with traffic heading for the M25 and A12 west using the A12 eastbound off slip and junction 28 to reach their destinations.

6.1.7 To ensure that construction vehicles use the correct compound entrance, suppliers would be given the appropriate compound gate number for either the main or satellite compound when materials are ordered. This would be displayed in the vehicle windscreen. Repeatedly turning up at the wrong gate would result in enforcement action being taken by the Principal Contractor to ensure suppliers adhere to delivery instructions.

6.2. Traffic impacts due to construction temporary traffic management arrangements

6.2.1 The traffic impacts of the latest proposed temporary traffic management arrangements during construction of the Scheme have been assessed using the strategic traffic model. This has been undertaken on the basis that all the temporary traffic management arrangements described in 5.1.4 above are in place at the same time, i.e. the most disruptive period of temporary traffic management arrangements, which is only likely to be the case for one or two months. The results and outcomes of this traffic modelling are presented below and supersede those presented in Section 8 of the Transport Assessment Report [APP-098].

6.2.2 It is estimated that around 190 construction vehicle movements per day (95 arrivals and 95 departures per day) would be generated over most of the construction programme, as stated in section 8.2.17 of the Transport Assessment [APP-098]. This number of vehicles is insignificant compared to the total volumes of daily traffic using junction 28, which is forecast to be approximately 98,000 vehicles per day in 2022. Consequently, construction traffic generated by the Scheme would represent less than 0.2% of daily traffic through junction 28 and has not, therefore, been included in the traffic modelling, given that such a relatively small number of movements would have a negligible impact on the operational performance and capacity of the junction, even accounting for them being predominantly heavy goods vehicles (HGVs).

6.2.3 Figure 6-1 to Figure 6-3 below show the forecast changes in traffic flows in 2022 on the road network in the vicinity of junction 28 due to the temporary traffic management arrangements that are likely to be in place during construction of the Scheme. These show that during the most disruptive period of temporary traffic management measure there would be minimal rerouting of traffic onto the wider road network to avoid the additional traffic congestion and delay caused by them at junction 28. The most notable rerouting in the vicinity of junction 28 is between Gallows Corner junction and Brentwood via Straight Road, Noak Hill Road and Weald Road to the north of the A12. However, the additional two-way

traffic flows on this route are still very small at less than 100 vehicles during the peak periods. There is also some rerouting of longer distance traffic via the A414 to avoid the additional traffic congestion due to the temporary traffic management arrangements on the A12 eastbound.

Figure 6-1: AM peak changes in traffic flows due to construction

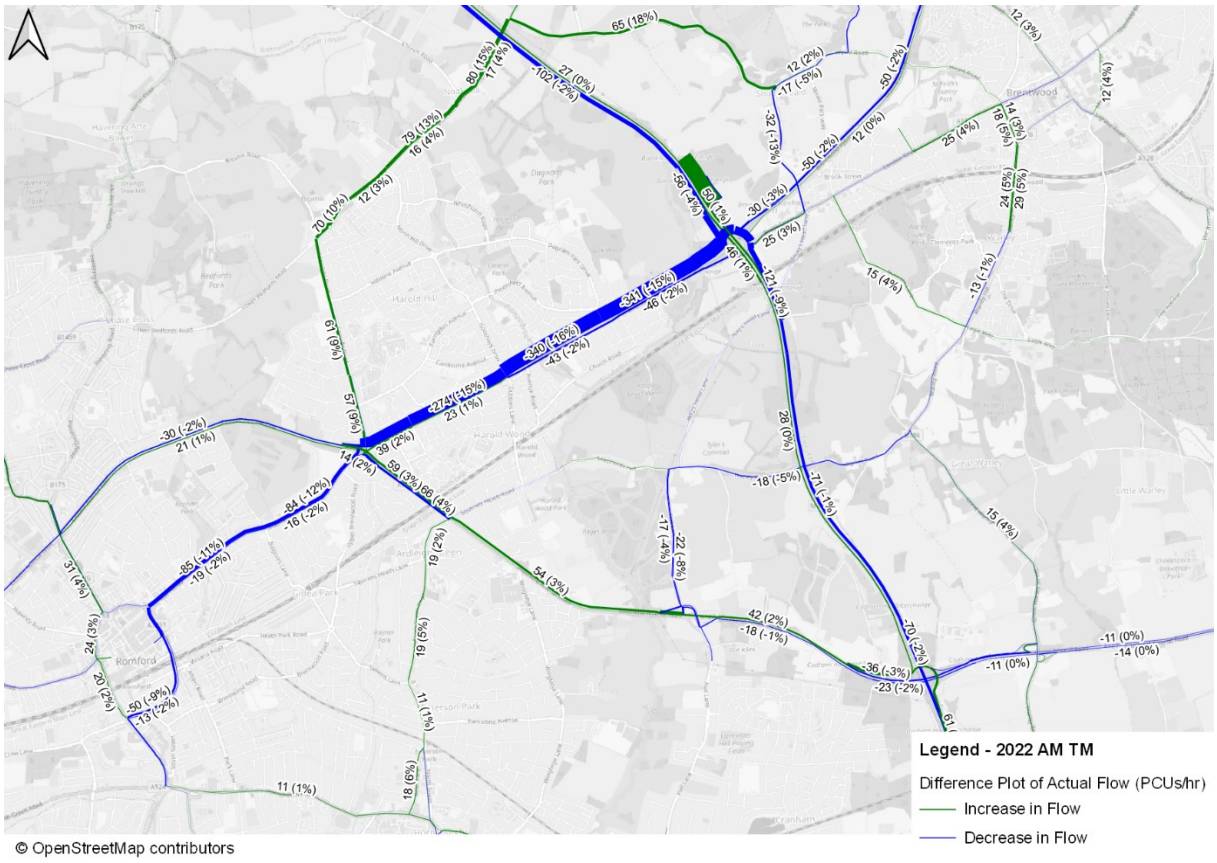


Figure 6-2: Inter-peak changes in traffic flows due to construction

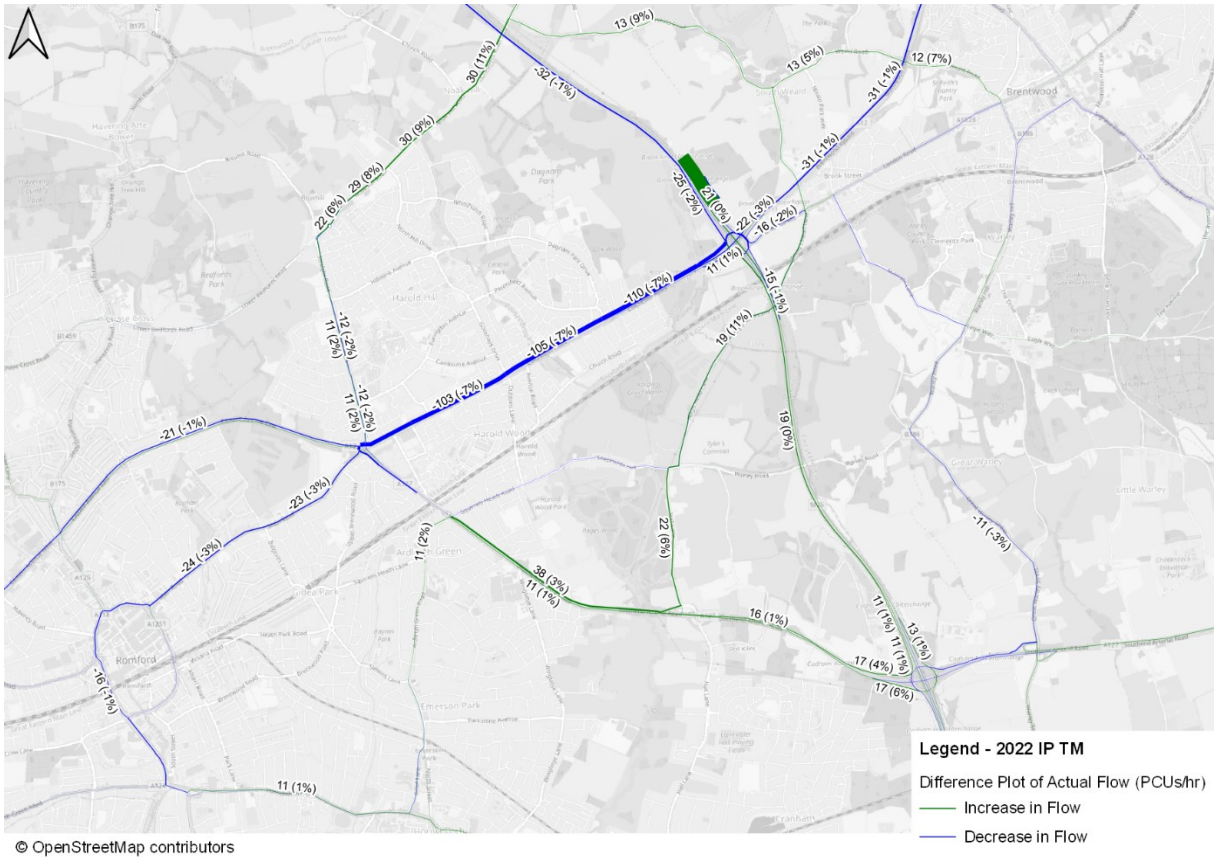
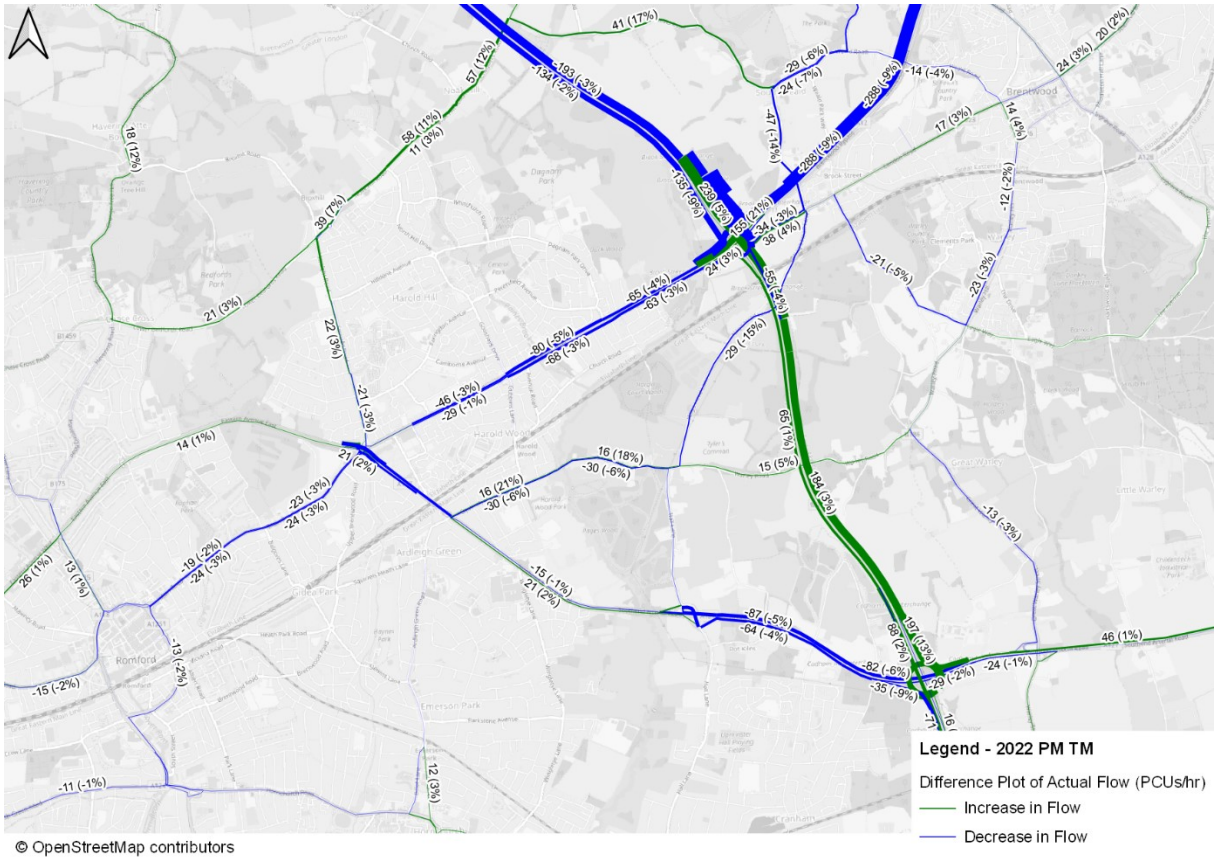


Figure 6-3: PM peak changes in traffic flows due to construction



6.2.4 Table 6-1 presents the changes in journey times forecast to result from the temporary traffic management arrangements during the most disruptive period. This shows that inevitably the temporary traffic management arrangements would result in some additional short-term traffic congestion and delay. However, Highways England would inform the public of the temporary traffic management arrangements at the junction in advance of and during the construction works via variable message signs on the road network, online and through the media. This would allow drivers to re-time their journeys or find alternative routes to reduce traffic demand at the junction during the busiest periods and thus, minimise traffic congestion and delay during the construction works.

6.2.5 Requirement 10 of the draft DCO (APP-015) requires the preparation and implementation of a traffic management plan that would have to be submitted to, and approved by, the Secretary of State following consultation with the relevant highway authority before the works can start. The traffic management plan would contain commitments such as those set out above to ensure that traffic would be managed appropriately in order to avoid, so far as practicable, adverse effects on the road network.

Table 6-1: Changes in journey times per vehicle due to construction traffic management arrangements.

Route	Change in journey time (seconds)		
	AM	IP	PM
A12E – M25S	-1	0	6
A12E – A12W	1	0	-1
A12E – M25N	17	14	9
A12E – Brook Street	0	0	-3
A12W – M25N	204	92	304
A12W – A12E	45	64	35
A12W – M25S	171	76	297
A12W – Brook Street	121	52	166
M25N – A12E	19	16	180
M25N – M25S	-1	-1	-4
M25N – A12W	7	8	28
M25N – Brook Street	-35	-7	70
M25S – A12W	0	0	1
M25S – M25N	24	23	19
M25S – A12E	-24	9	66
M25S – Brook Street	-93	-15	-49
Brook Street – M25S	3	-1	14
Brook Street – A12E	6	-2	-7
Brook Street – M25N	21	14	17
Brook Street – A12W	6	0	7

6.3. Construction impacts in combination with construction of Lower Thames Crossing

6.3.1 The early construction stage of the Lower Thames Crossing (LTC) scheme, i.e. enabling works, is currently anticipated to overlap with the construction of the M25 junction 28 Scheme, with construction of both schemes presently scheduled to commence in 2022.

6.3.2 The LTC would be mainly constructed off-line of the existing highway network, although some short-term road closures would be needed when the LTC scheme is connected to the existing highway network and for the removal and construction of new bridges.

6.3.3 All the construction sites for the LTC scheme are located to the south of junction 28, with the nearest being south of junction 29 and the others being much further to the south. It is therefore expected that nearly all the LTC construction traffic arriving and departing to and from the north of the LTC project would use the M25 viaduct over junction 28. Consequently, very little construction traffic generated by LTC is anticipated to use the A12 and interchange with the M25 via junction 28.

6.3.4 Draft traffic management strategies have been developed to inform submission documents for both the DCO applications that describe the various traffic management arrangements likely to be required to facilitate the construction of each scheme. Key objectives of both these strategies are to avoid the need for long term closures of major roads, minimise the use of the local road network for construction traffic and where possible provide construction access directly off major roads.

6.3.5 However, temporary traffic management arrangements and the estimated construction traffic that will be generated by LTC are presently under revision by that project team, following the withdrawal of its DCO application in November 2020. Consequently, the results of the impact assessment of these revisions are not yet available. Nonetheless, traffic modelling carried out by the junction 28 team of the temporary traffic management measures required to construct the junction 28 Scheme has demonstrated that they would not result in any significant diversion of traffic onto local roads. Construction of the junction 28 Scheme is not anticipated to significantly contribute to any traffic being potentially displaced onto local roads by construction of the LTC scheme.

6.3.6 Should both schemes be granted development consent, then the two project delivery teams would collaborate to ensure planned temporary traffic management measures are co-ordinated throughout the overlapping construction period of the projects to minimise traffic impacts and disruption as far as practicable.

Appendices

Appendix A. Journey time routes

Figure A-1: Journey time routes from A12 east

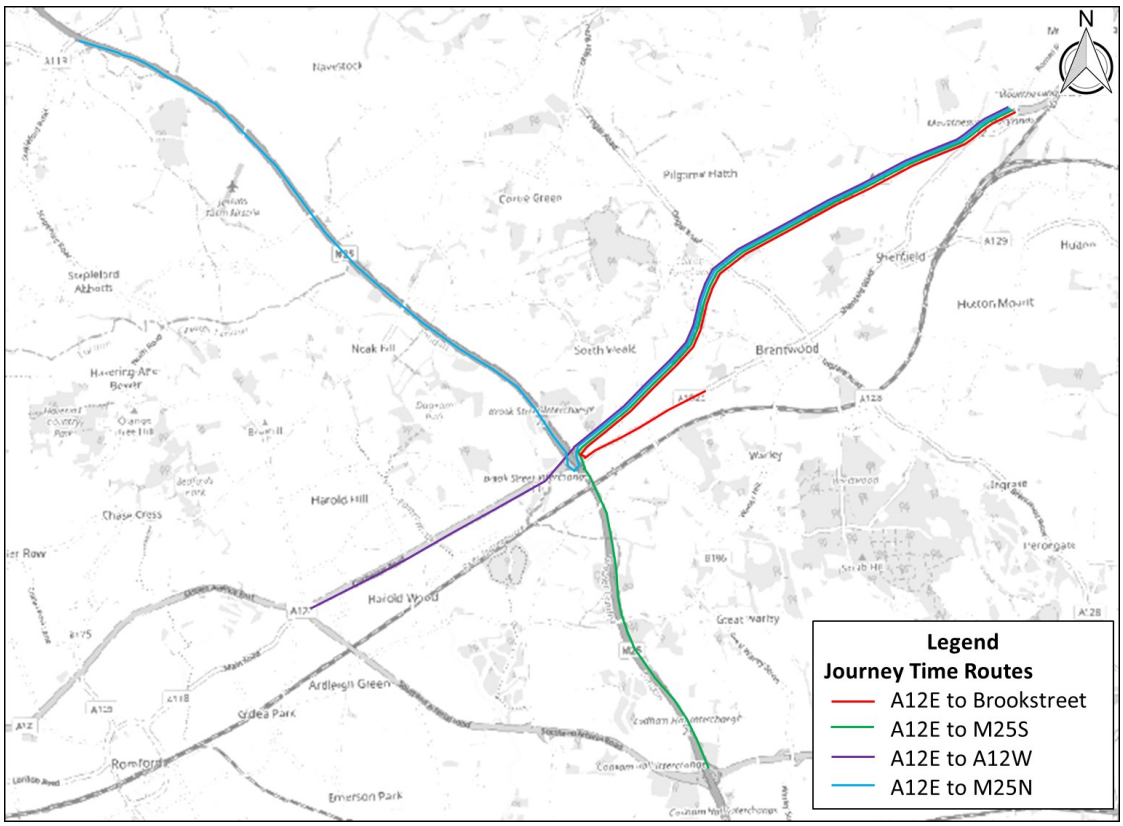


Figure A-2: Journey time routes from A12 west

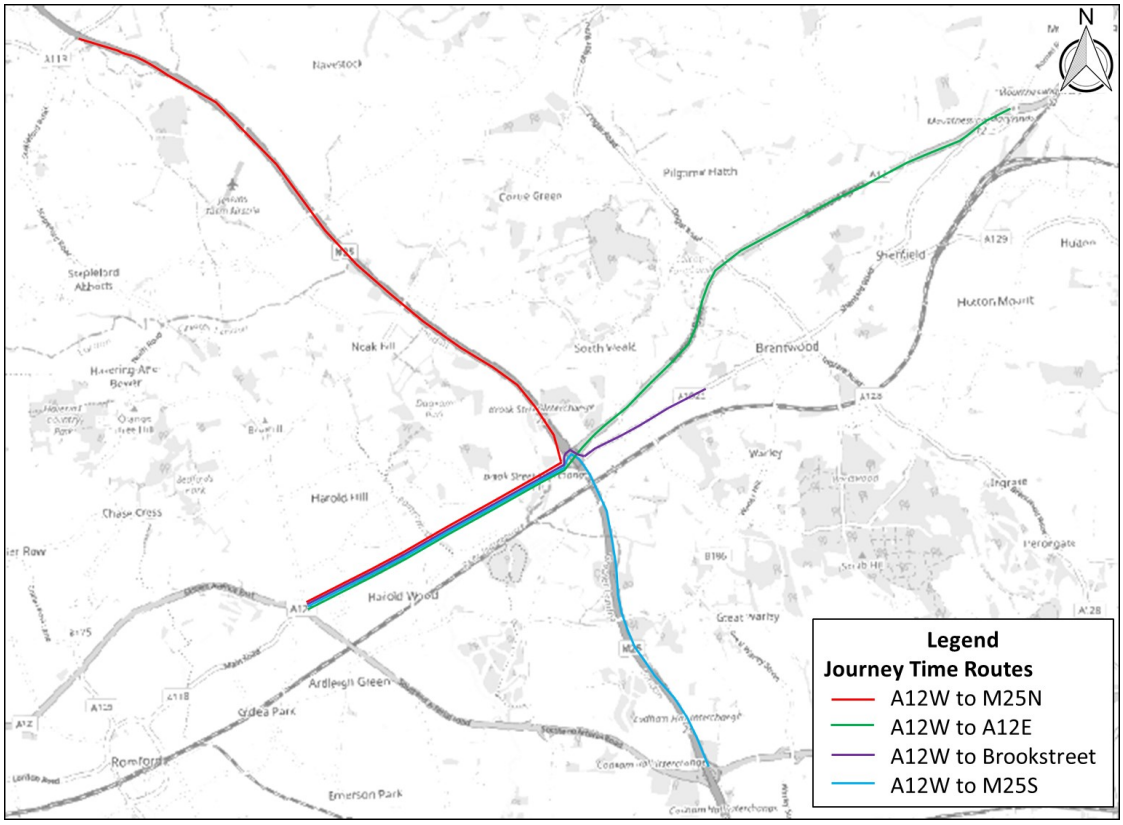


Figure A-3: Journey time routes from M25 north

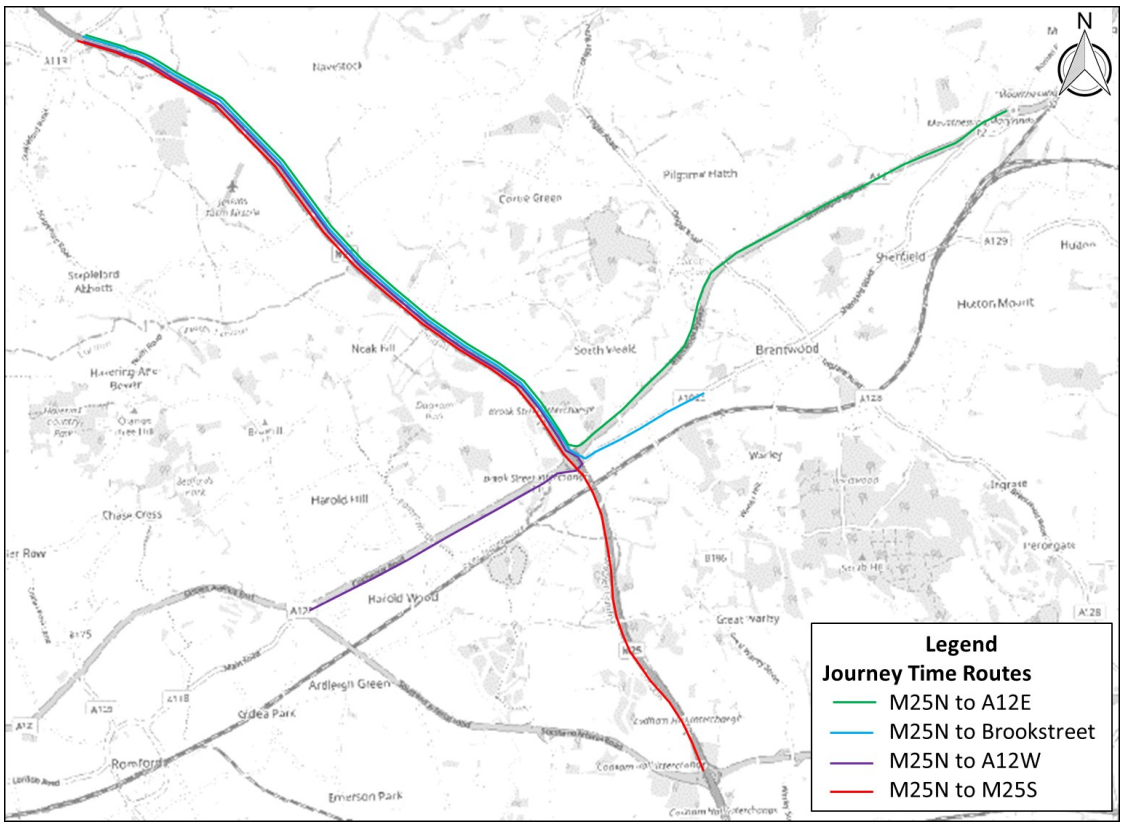


Figure A-4: Journey time routes from M25 south

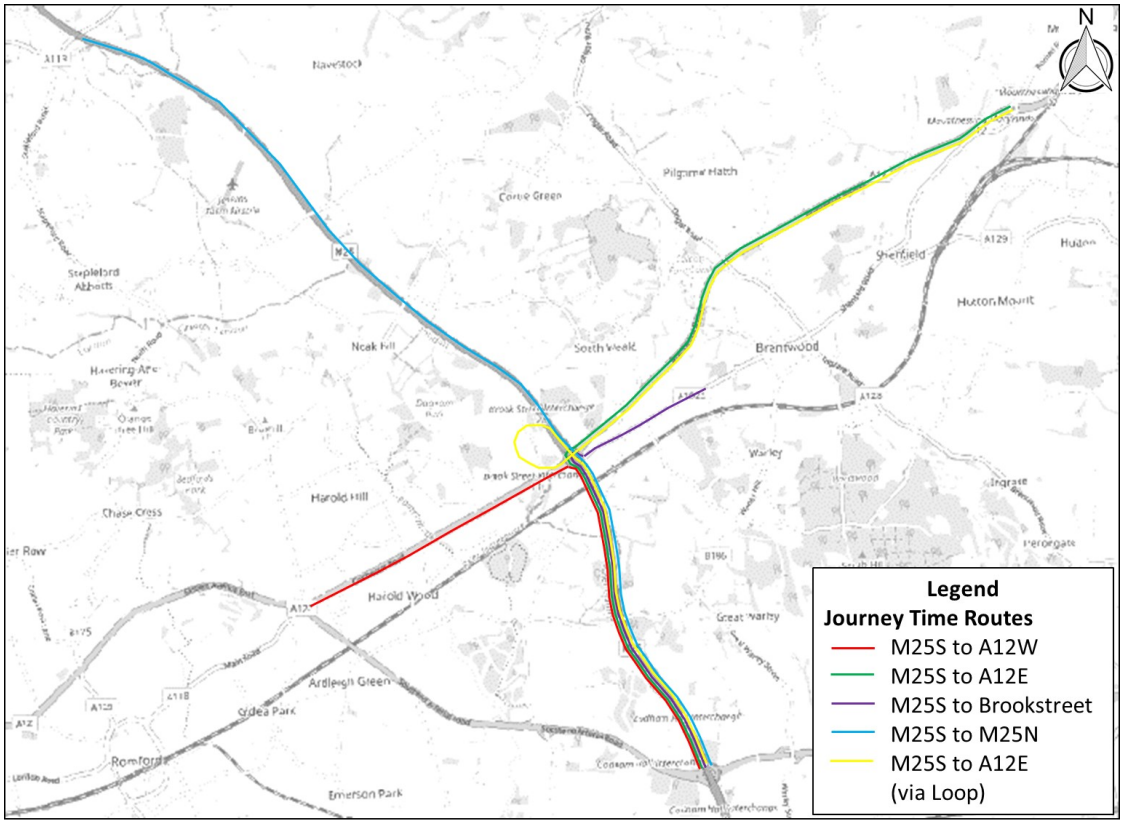
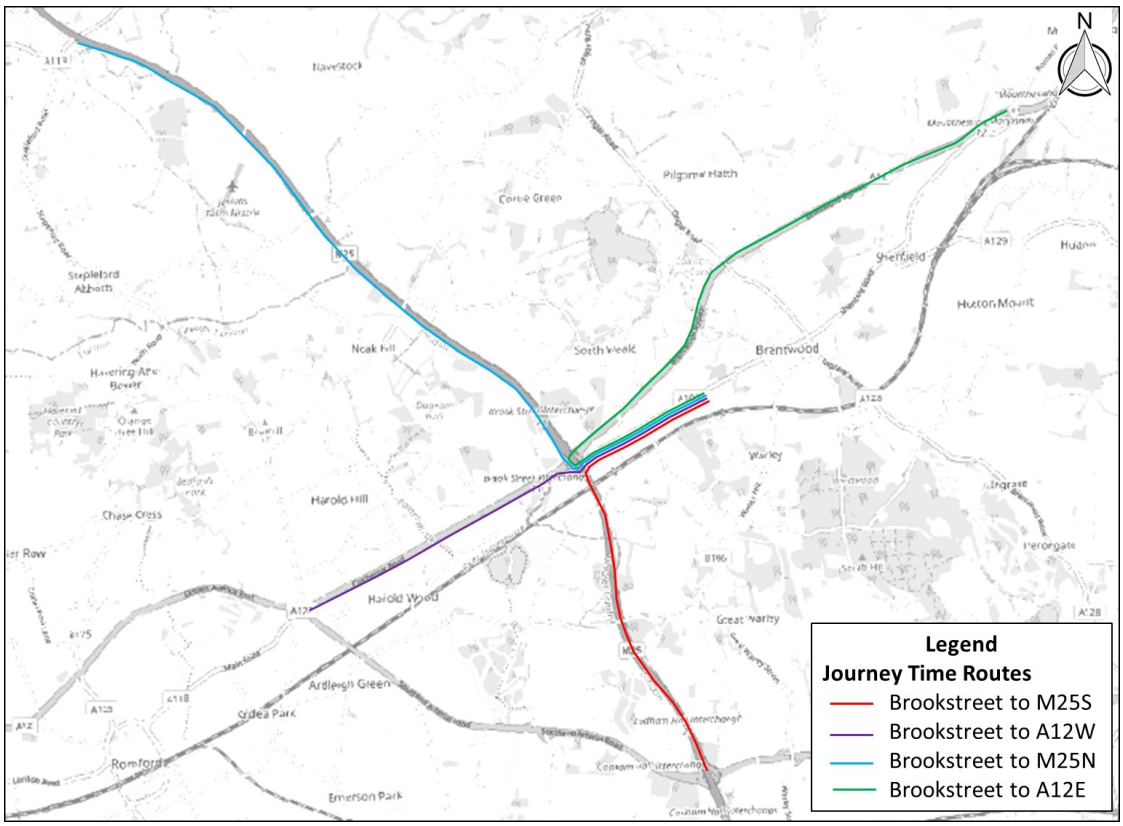


Figure A-5: Journey time routes from Brook Street



Appendix B. Inter-peak period modelling results

Table B-1: 2022 and 2037 Inter-peak journey time results (seconds)

Movement	2015 Base	2022			2037		
		DM	DS	DS v DM	DM	DS	DS v DM
A12E – M25S	472	476	471	-5	478	472	-6
A12E – A12W	426	427	427	0	428	428	0
A12E – M25N	776	779	786	7	784	790	6
A12E – Brook St	502	502	500	-2	511	503	-8
A12W – M25N	661	664	650	-14	669	653	-16
A12W – A12E	436	436	453	17	438	455	17
A12W – M25S	417	417	404	-13	420	406	-14
A12W – Brook Street	471	472	465	-7	475	465	-10
M25N – A12E	756	756	778	22	757	779	22
M25N – M25S	651	652	651	-1	656	654	-2
M25N – A12W	707	707	699	-8	712	703	-9
M25N – Brook Street	714	715	729	14	724	732	8
M25S – A12W	366	366	363	-3	368	365	-3
M25S – M25N	641	642	642	0	648	647	-1
M25S – A12E (via roundabout)	493	493	528	35	497	531	34
M25S – A12E (via loop)	-	-	507	-	-	509	-
M25S – Brook Street	474	473	491	18	476	491	15
Brook Street – M25S	407	413	406	-7	417	410	-7
Brook Street – A12E	565	589	604	15	587	597	10
Brook Street – M25N	715	723	717	-6	732	724	-8
Brook Street – A12W	445	450	441	-9	452	443	-9

Table B-2: 2022 Inter-peak queue length comparisons (metres)

Junction	Approach	2015 Base	2022		
			DM	DS	DS v DM
M25 junction 28	M25 North Off Slip (SB)	32	32	30	-2
	A12 East Off Slip (WB)	78	82	83	1
	Brook Street (WB)	50	52	32	-20
	M25 South Off Slip (NB)	51	51	42	-9
	A12 West Off Slip (EB)	42	46	42	-4
	M25 Jn 28 Gyratory Section (N)	90	94	50	-44
	M25 Jn 28 Gyratory Section (E)	21	23	67	44
	M25 Jn 28 Gyratory Section (S)	39	41	49	8
	M25 Jn 28 Gyratory Section (W)	79	79	77	-2

Table B-3: 2037 Inter-peak queue length comparisons (metres)

Junction	Approach	2015 Base	2037		
			DM	DS	DS v DM
M25 junction 28	M25 North Off Slip (SB)	32	34	28	-6
	A12 East Off Slip (WB)	78	84	86	2
	Brook Street (WB)	50	59	44	-15
	M25 South Off Slip (NB)	51	52	45	-7
	A12 West Off Slip (EB)	42	46	44	-2
	M25 Jn 28 Gyratory Section (N)	90	99	52	-47
	M25 Jn 28 Gyratory Section (E)	21	21	67	46
	M25 Jn 28 Gyratory Section (S)	39	41	49	8
	M25 Jn 28 Gyratory Section (W)	79	81	82	1

Table B-4: Inter-peak delays and queue lengths on Brook Street Westbound towards M25 junction 28

Evaluation parameters	2015 Base	2022			2037		
		DM	DS	DS v DM	DM	DS	DS v DM
Average delays (secs)	24	26	20	-6	28	22	-6
Queue Length (m)	50	52	32	-20	59	44	-15

Table B-5: Inter-peak delays and queue lengths on Brook Street eastbound towards Nags Head Lane

Evaluation parameters	2015 Base	2022			2037		
		DM	DS	DS v DM	DM	DS	DS v DM
Average delays – Nags Head Lane (secs)	11	11	12	1	13	12	-1
Queue Length – Nags Head Lane (m)	32	33	36	3	36	37	1
Average delays – Mascalls Lane (secs)	17	17	18	1	18	18	0
Queue Length – Mascalls Lane (m)	46	46	48	2	50	48	-2

Appendix C. Low and high growth inter-peak traffic impacts

Figure C-1: 2022 Inter-peak changes in traffic flows (low growth)

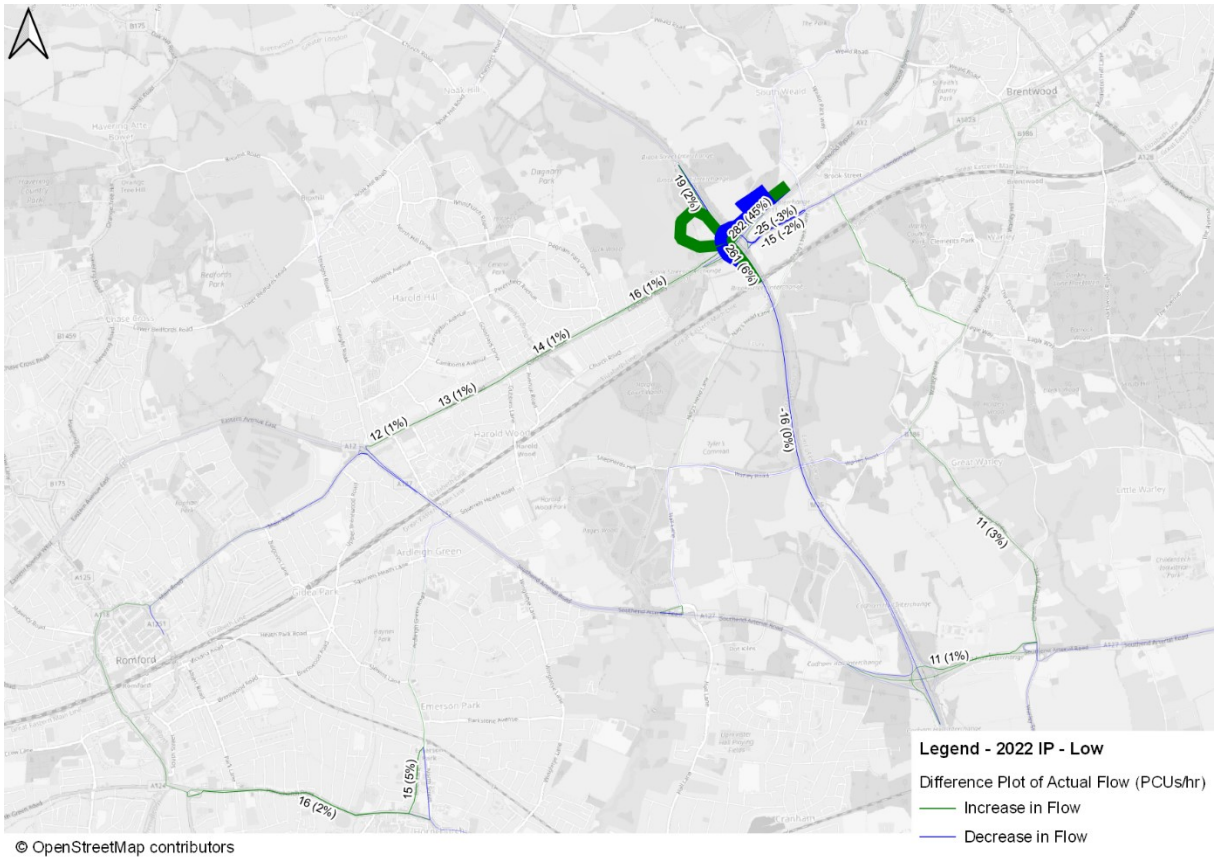


Figure C-2: 2037 Inter-peak changes in traffic flows (low growth)

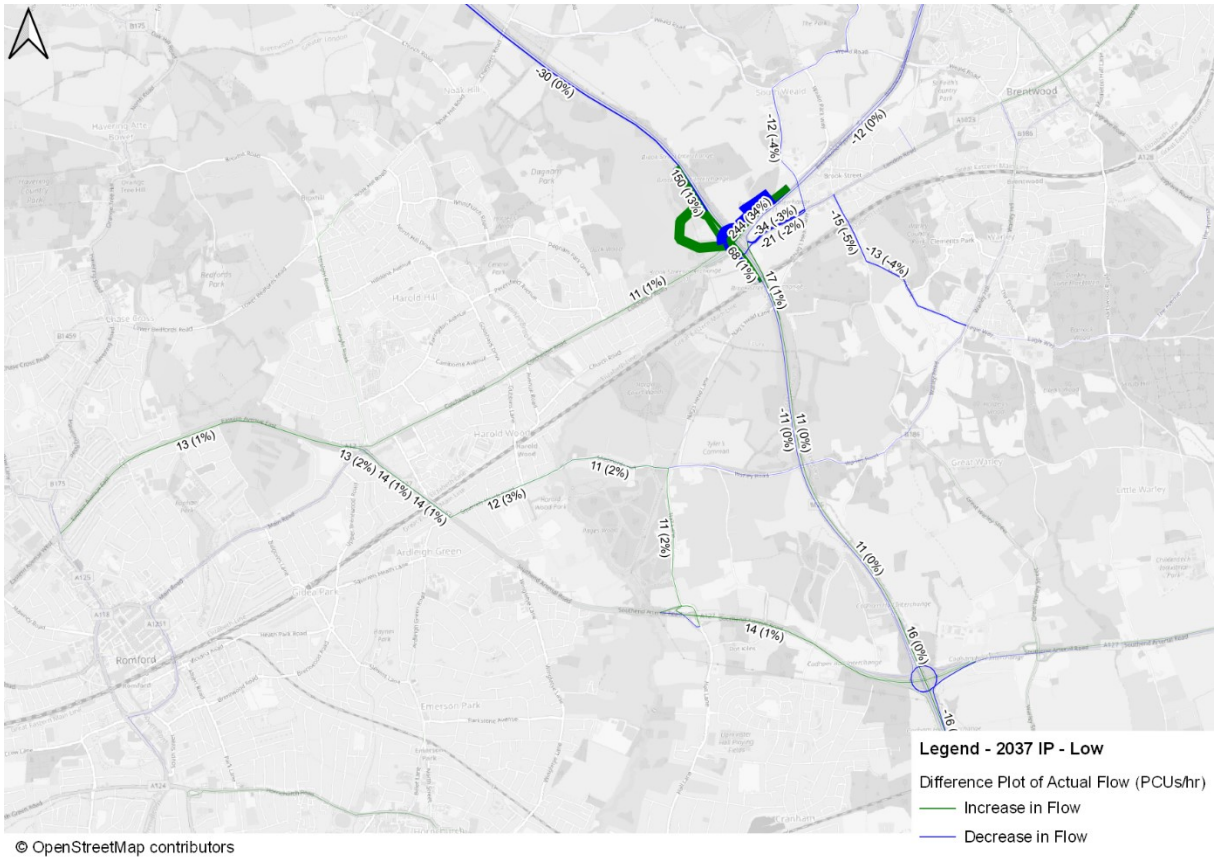


Figure C-3: 2022 Inter peak changes in traffic flows (high growth)

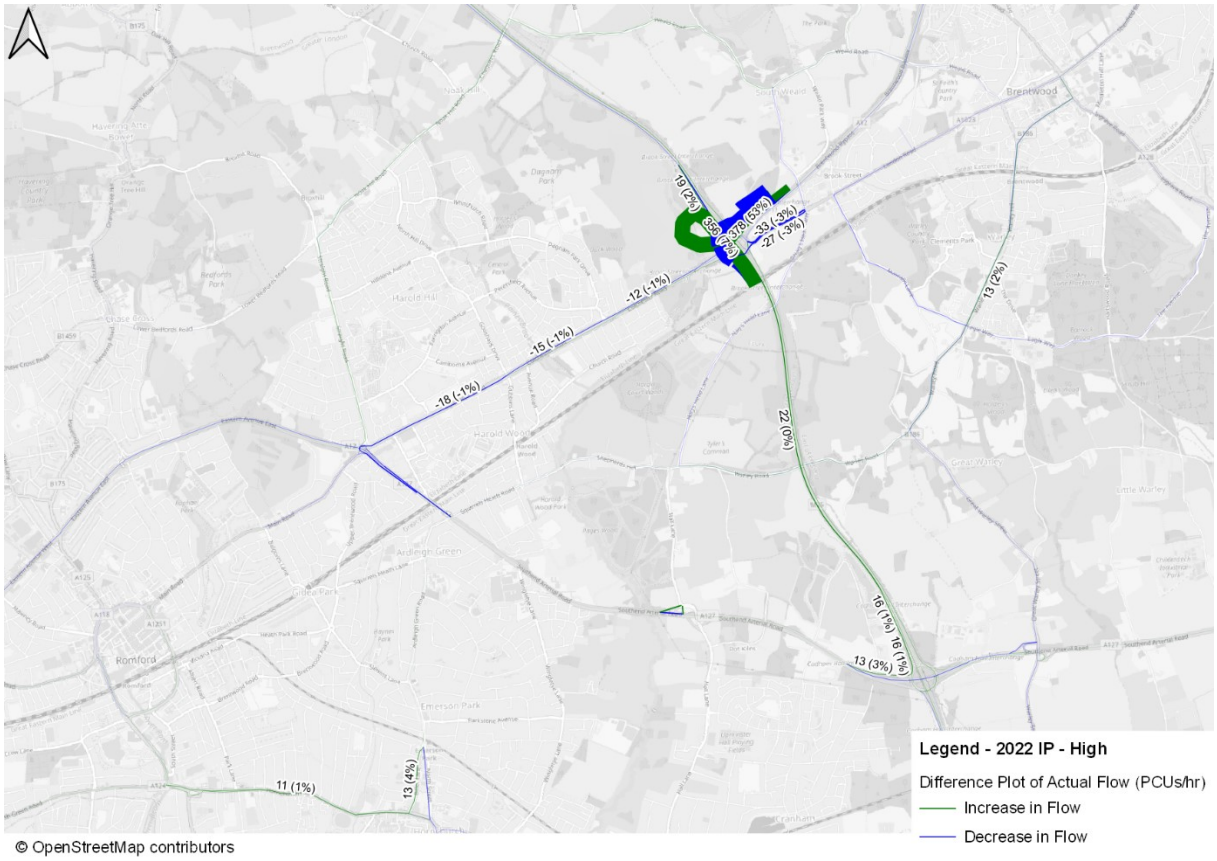
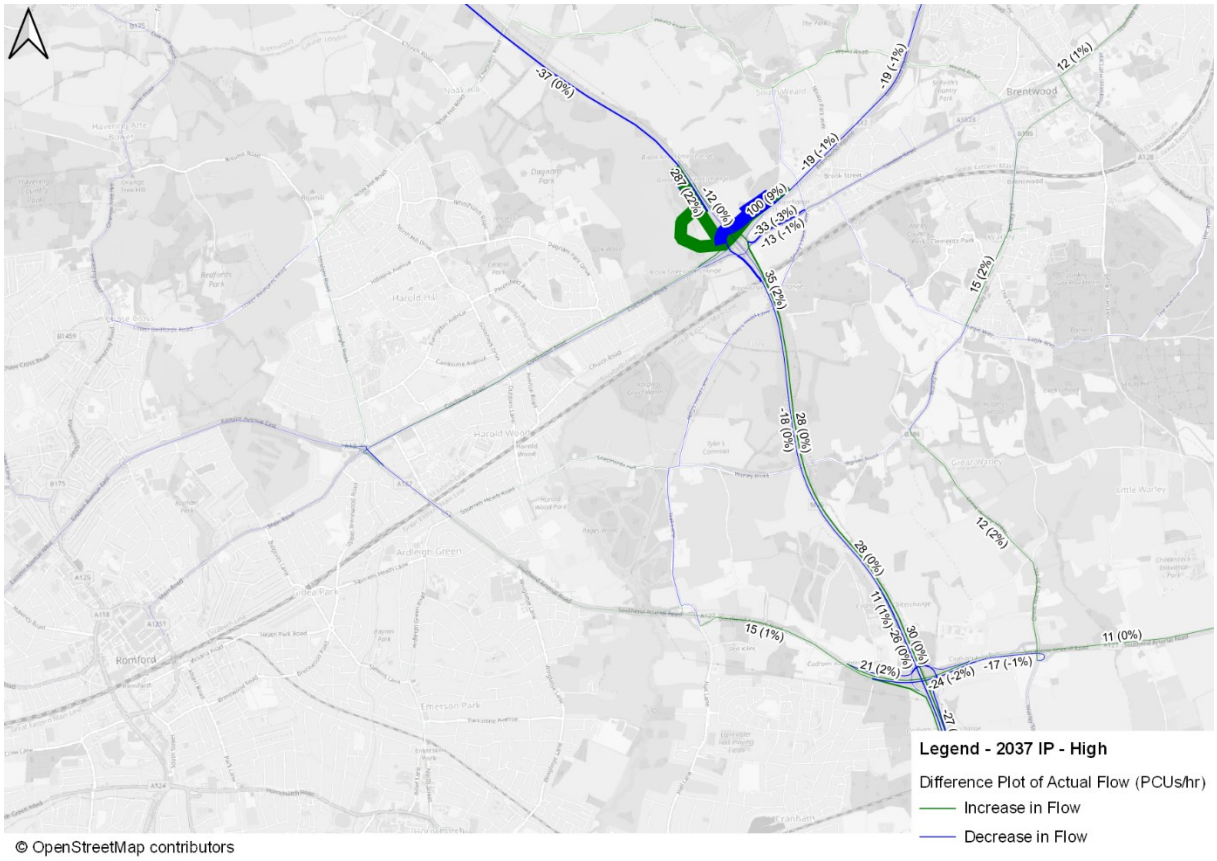


Figure C-4: 2037 Inter peak changes in traffic flows (high growth)



Printed on paper from well-managed forests and other controlled sources.

Registered office Bridge House, 1 Walnut Tree Close, Guilford GU1 4LZ
Highways England Company Limited registered in England and Wales number 09346363