Lower Thames Crossing

9.15 Localised Traffic Modelling Appendix M – ASDA Roundabout Construction Assessment Report

Infrastructure Planning (Examination Procedure) Rule 2010

Volume 9

DATE: August 2023
DEADLINE 3

Planning Inspectorate Scheme Ref: TR010032
Examination Document Ref: TR010032/EXAM/9.15

VERSION: 1.0

Lower Thames Crossing

9.15 Localised Traffic Modelling Appendix M – ASDA Roundabout Construction Assessment Report

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1 Introduction

1.1 Purpose of document

1.1.1 This report presents the findings from the traffic operational appraisal of the Asda Roundabout (A1089/ A126 Dock Road/ London Distribution Park) in Tilbury during the construction of the A122 Lower Thames Crossing (the Project). This report presents outputs from the localised traffic model of the junction which shows the impacts of the construction activity on the performance of the junction.

1.2 Modelling software

1.2.1 Road traffic micro-simulation models represent individual vehicles travelling within the road network, providing realistic driver behaviour such as lane changing and overtaking. The micro-simulation software selected for the Project is VISSIM. The model has been developed in VISSIM version 2020 (SP13).

1.3 The Project

1.3.1 The A122 Lower Thames Crossing (the Project) would provide a connection between the A2 and M2 in Kent, south-east of Gravesend, crossing under the River Thames through a tunnel, before joining the M25 south of junction 29. The Project route is presented in Plate 1.1.

1.3.2 The A122 would be approximately 23km long, 4.25km of which would be in tunnel. On the south side of the River Thames, the Project route would link the tunnel to the A2 and M2. On the north side, it would link to the A13, M25 junction 29 and the M25 south of junction 29. The tunnel entrances would be located to the east of the village of Chalk on the south of the River Thames and to the west of East Tilbury on the north side.

1.3.3 Junctions are proposed at the following locations:

a. New junction with the A2 to the south-east of Gravesend

b. Modified junction with the A13/A1089 in Thurrock

c. New junction with the M25 between junctions 29 and 30

1.3.4 To align with National Policy Statement for National Networks (Department for Transport, 2014) policy and to help the Project meet the Scheme Objectives, it is proposed that road user charges would be levied in line with the Dartford Crossing. Vehicles would be charged for using the new tunnel.

1.3.5 The Project route would be three lanes in both directions, except for:

a. link roads

b. stretches of the carriageway through junctions

c. the southbound carriageway from the M25 to the junction with the A13/A1089, which would be two lanes

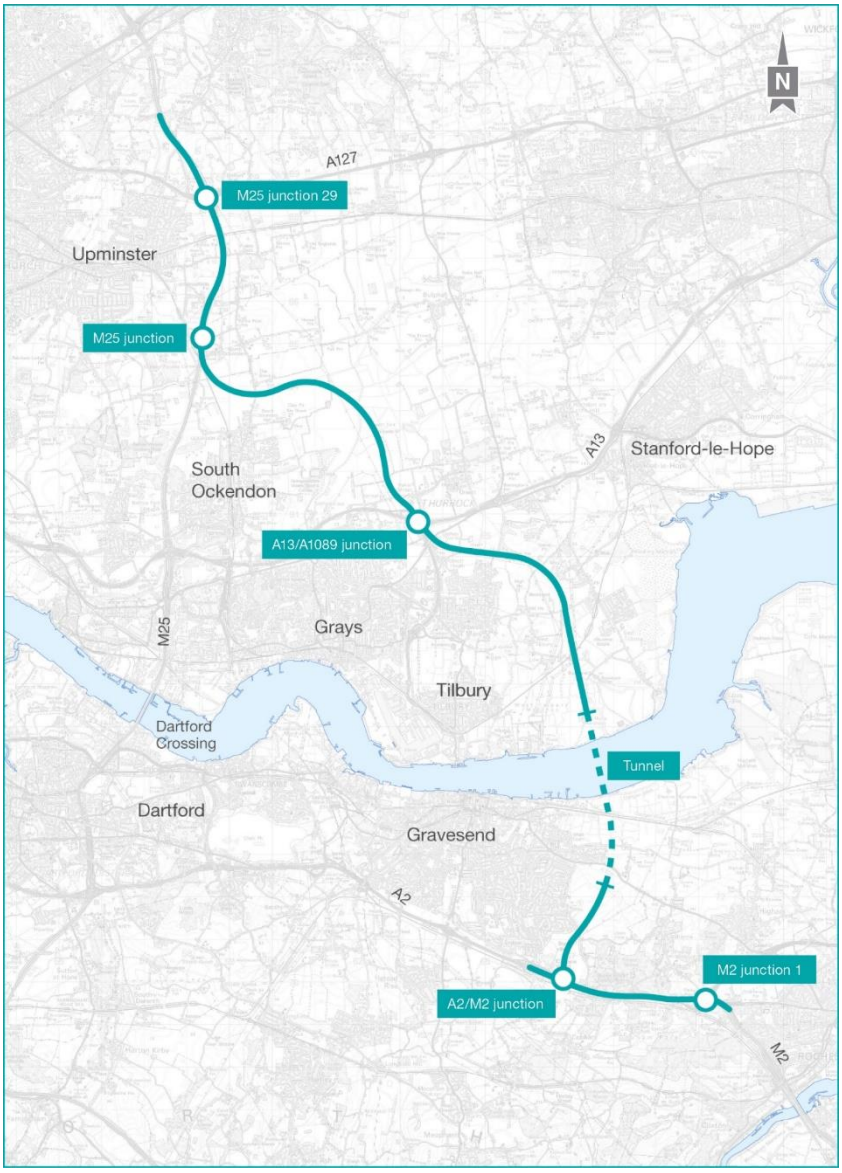
1.3.6 In common with most A-roads, the A122 would operate with no hard shoulder but would feature a 1m hard strip on either side of the carriageway. It would also feature technology including stopped vehicle and incident detection, lane control, variable speed limits and electronic signage and signalling. The A122 design outside of the tunnel would include emergency areas. The tunnel would include a range of enhanced systems and response measures instead of emergency areas.

1.3.7 The A122 would be classified as an ‘all-purpose trunk road’ with green signs. For safety reasons, walkers, cyclists, horse riders and slow-moving vehicles would be prohibited from using it.

1.3.8 The Project would include adjustment to a number of local roads. There would also be changes to a number of Public Rights of Way used by walkers, cyclists and horse riders. Construction of the Project would also require the installation and diversion of a number of utilities, including gas mains, overhead electricity powerlines and underground electricity cables, as well as water supplies and telecommunications assets and associated infrastructure.

1.3.9 The Project has been developed to avoid or minimise significant effects on the environment. Some of the measures adopted include landscaping, noise mitigation, green bridges, floodplain compensation, new areas of ecological habitat and two new parks.

Plate 1.1 Lower Thames Crossing route



2 Modelling scope

2.1 Localised traffic model of the junction

2.1.1 The VISSIM base year model was developed to reflect the road network and traffic condition of the junction in 2018. Accordingly, 9.15 Localised Traffic Modelling Appendix I - Asda roundabout VISSIM Local Model Validation Report explains how the base year model was developed and validated for two time periods, namely:

a. AM Peak Period (07:00–09:00) to capture the peak hour of the junction and A1089 (07:00–08:00) and the peak hour of the local roads (08:00–09:00)

b. PM Peak Period (17:00–18:00) to capture the peak hour of the junction.

2.1.2 An analysis of the observed traffic volume was undertaken to determine the hour with the busiest total traffic flows for each peak period. The analysis of the 2018 observed counts (illustrated in Table 2.1) shows that the busiest hours at the junction are 07:00 to 09:00 (the AM peak) and 17:00 to 18:00 (the PM peak).

Table 2.1 AM / PM peak hour analysis

Hour starting	Total flows 16 May 2018 (vehicles)	Total flows 17 May 2018 (vehicles)	Peak hour
06:00	1,906	1,918	
07:00	2,545	2,430	AM
08:00	2,648	2,398	AM
09:00	2,185	2,191	
10:00	2,391	2,124	
11:00	2,620	2,220	
12:00	2,753	2,356	
13:00	2,667	2,475	
14:00	2,492	2,379	
15:00	2,536	2,425	
16:00	2,707	2,554	
17:00	3,054	2,820	PM
18:00	2,658	2,593	
19:00	1,614	1,639	

2.1.3 Following this, the Do Minimum (DM) model representing forecast year 2030 without the Project, and a Do Something (DS) model representing forecast year 2030 with the Project were developed as set out in 9.15 Localised Traffic Modelling Appendix J - Asda roundabout VISSIM Forecasting Report.

2.1.4 This report explains how the Construction models were developed and compares results from the Construction models with the results of the 2030 DM model to show how network operating conditions are forecast to change during construction.

2.2 The study area

2.2.1 The study area extends from the Asda roundabout in the north to the Tilbury Port access in the south and includes the smaller roundabout on Dock Road as drawn in Plate 2.1.

Plate 2.1 Traffic operations study area

2.2.2 The Asda roundabout is the first at grade junction on the A1089 when travelling from the A13 to the Port of Tilbury / Tilbury2. It is an entrance to an area predominantly made up of industrial activities, transport facilities, wholesale and trade retail warehouses as well as the Tilbury residential area. As a result, the proportion of Heavy Goods Vehicles (HGV) at the junction is very high, typically 25% to 29% of total traffic in the AM peak and 14% to 17% in the PM peak in number of vehicles.

2.2.3 The key characteristics of the junction are as follows:

a. To the north, the A1089 is a dual carriageway road with a speed limit of 50mph northbound before the Marshfoot junction and 70mph southbound.

b. To the south, four corridors act as road collectors. Clockwise from the east:

i. A 30mph unnamed street providing access to the London Distribution Park (which includes Amazon)

ii. A126 Dock Road, a 30mph corridor leading to a roundabout providing access to Tilbury and a southern access to the London Distribution Park (including Amazon; it is used as their staff access)

iii. The A1089 south, a 40mph dual carriageway corridor giving direct access to the Port of Tilbury/Tilbury2

c. Thurrock Park Way, a 30mph road giving access to Asda and the industrial and commercial estate to the west

2.3 Project construction phase

2.3.1 The Project's construction phase as assessed in the DCO application was forecast to run from 1 January 2025 through to 31 December 2030.

2.3.2 On 9 March 2023, a Written Ministerial Statement was made by the Secretary of State for Transport. This statement made reference to the Lower Thames Crossing:

2.3.3 '*To date we have spent over £800 million on planning the Lower Thames Crossing. It is one of the largest planning applications ever, and it is important we get this right. We remain committed to the Lower Thames Crossing, and the development consent order process will be an important opportunity to consult further to ensure there is an effective and deliverable plan. In order to allow time for this process and given wider pressures on [Road Investment Strategy] RIS, we will look to rephase construction by two years.'*

2.3.4 The Applicant provided a response to the Examining Authority on 30 March 2023 [**AS-086**] regarding potential implications on the assessments contained within the DCO application. This concluded that no update any Application documents as a consequence of the Written Ministerial Statement was necessary. In particular, that the Project's transport model as used for the construction assessment uses a future year of 2030 for traffic not related to the construction of the Project (as set out in the Transport Assessment [**APP-529**]). This means that, notwithstanding a two year rephasing, it is considered that the model is sufficiently representative to provide a reliable basis for the assessment of the construction period.

2.3.5 A phasing plan was developed to enable the assessment of the construction phase within the Lower Thames Area Model (LTAM) for the construction scenario presented within the DCO application. Full details of the construction traffic assessment is set out in Chapter 8 of the Transport Assessment [**APP-529**].

2.3.6 The plan was based on the different elements of temporary traffic management measures and Project related construction traffic that are scheduled across the construction phase. This led to the development of 11 phases of construction traffic modelling where the traffic management (TM) and Project related construction traffic within each phase is constant.

2.3.7 The construction traffic assessment as presented in Chapter 8 of the Transport Assessment **[APP-529]** reflects a reasonable worst case and provides a proportionate assessment of the selected construction scenario.

2.3.8 The assessment presented enables consideration of the impacts that would arise and as set out at paragraph 8.1.7 of the Transport Assessment, includes a number of assumptions that were made to ensure that the construction programme is not under-represented.

2.3.9 The Applicant has also submitted a control plan which includes a number of control documents, including:

a. Outline Traffic Management Plan for Construction [REP1-174]

b. Framework Construction Travel Plan [APP-546]

c. Environmental Statement - Appendix 2.2 - Code of Construction Practice, First iteration of Environmental Management Plan - Annex B - Outline Materials Handling Plan [APP-338]

2.3.10 These documents provide a framework of principles and controls which would enable the Contractor to minimise the impact of the Project's construction on the road network.

2.3.11 The 11 phases are shown in Table 2.2.

Table 2.2: Construction Modelling Eleven Phase System

Phase	Start	End	Duration (Months)
Phase 1	01/01/2025	31/08/2025	8
Phase 2	01/09/2025	28/02/2026	6
Phase 3	01/03/2026	31/05/2026	3
Phase 4	01/06/2026	31/10/2026	5
Phase 5	01/11/2026	31/03/2027	5
Phase 6	01/04/2027	31/08/2027	5
Phase 7	01/09/2027	31/03/2028	7
Phase 8	01/04/2028	30/11/2028	8
Phase 9	01/12/2028	31/03/2029	4
Phase 10	01/04/2029	31/07/2029	4
Phase 11	01/08/2029	31/12/2030	17

2.3.12 Construction traffic modelling phases 1 and 6 have been selected for the construction assessment of the Asda roundabout as reported here, based on outputs from the construction modelling in the LTAM. The proposed temporary traffic management measures would have the greatest impact in phase 1 and the highest construction traffic flows through the Asda roundabout are forecast to occur in phase 6 .

2.3.13 The proposed temporary traffic management measures that are included in phase 1 are shown in Plate 2.2. The LTAM forecasts that the contraflow

measures on Marshfoot Road and Brentwood Road (RNTM05 & RNTM12) would shift traffic to the A1089 which would increase the volume of traffic travelling through the Asda roundabout. This has the relatively largest impact on the Asda roundabout across the 11 construction traffic modelling phases as indicated by the LTAM volume/capacity (V/C) percentages as shown in Plate 2.3 and Plate 2.4 for the A1089 northern and southern approaches.

Plate 2.2 Map of traffic measures and network changes in Phase 1

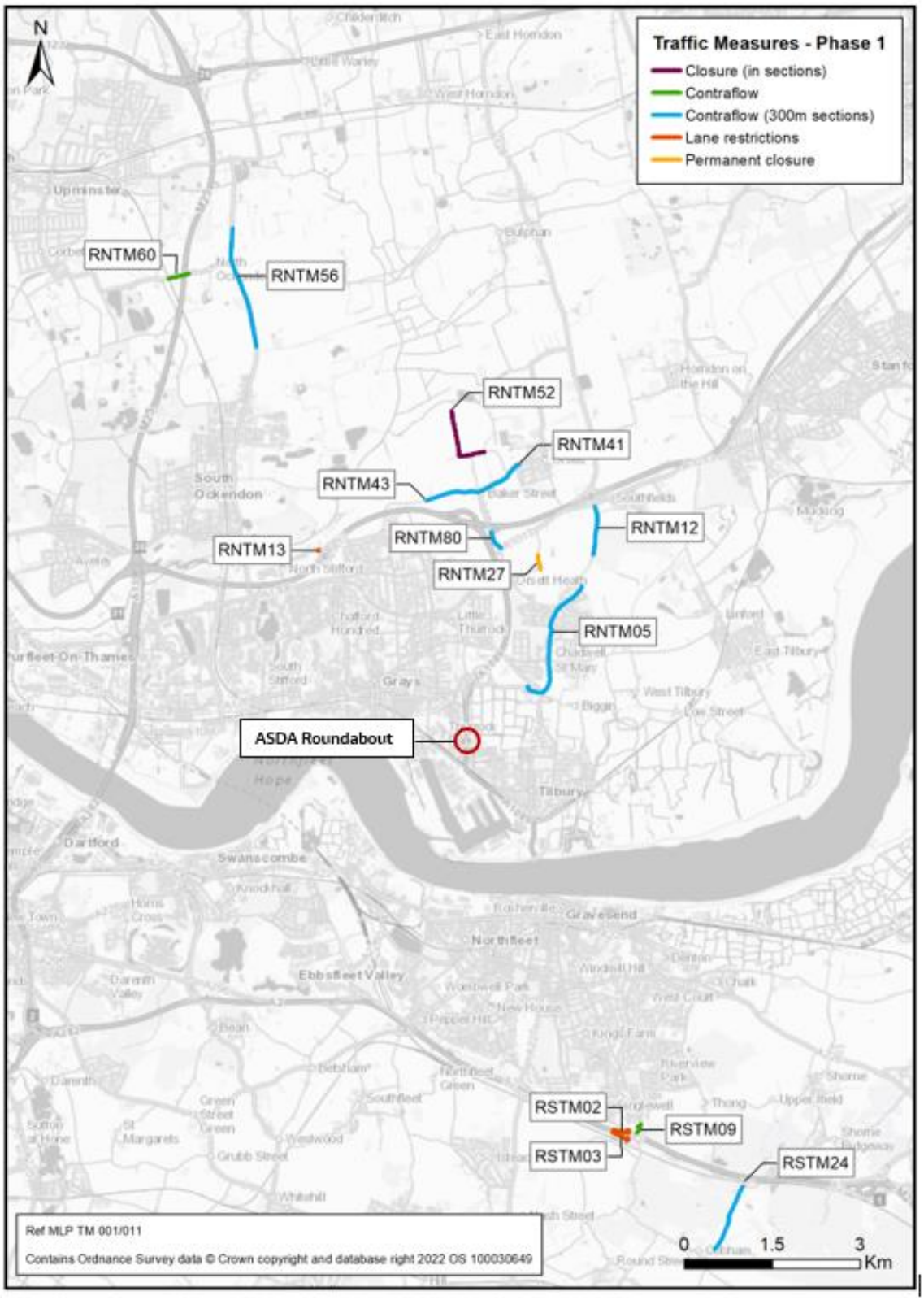


Plate 2.3 Construction phases comparison of V/C on A1089 northern approach

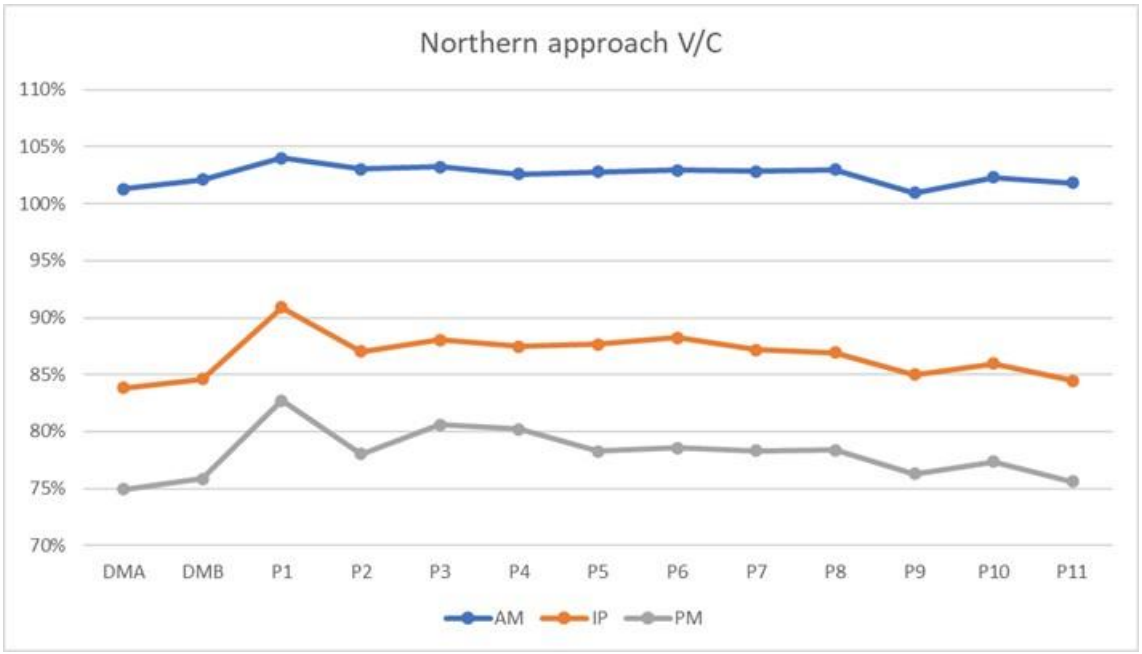
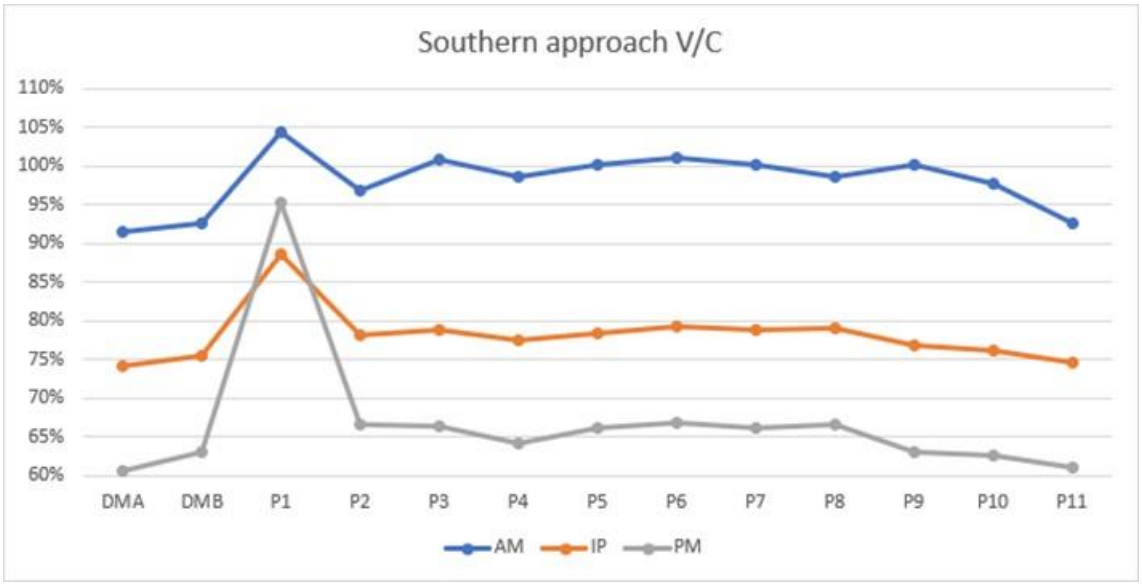
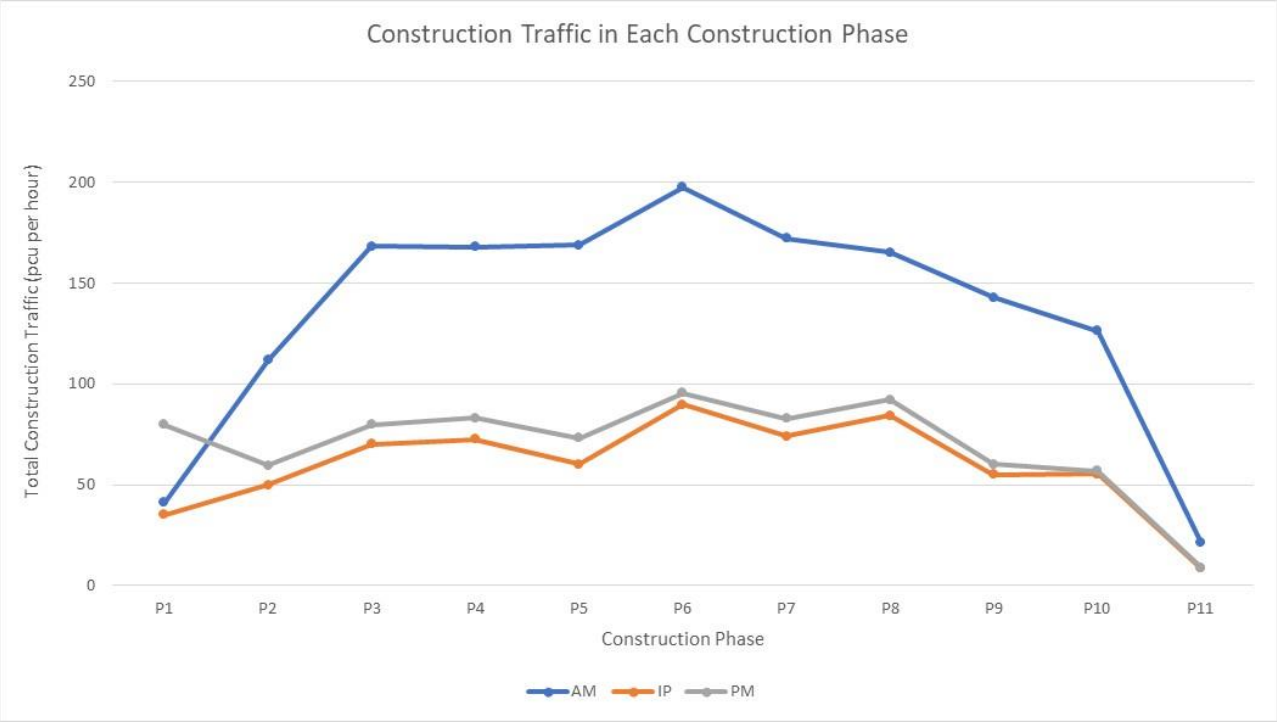


Plate 2.4 Construction phases comparison of V/C on A1089 southern approach



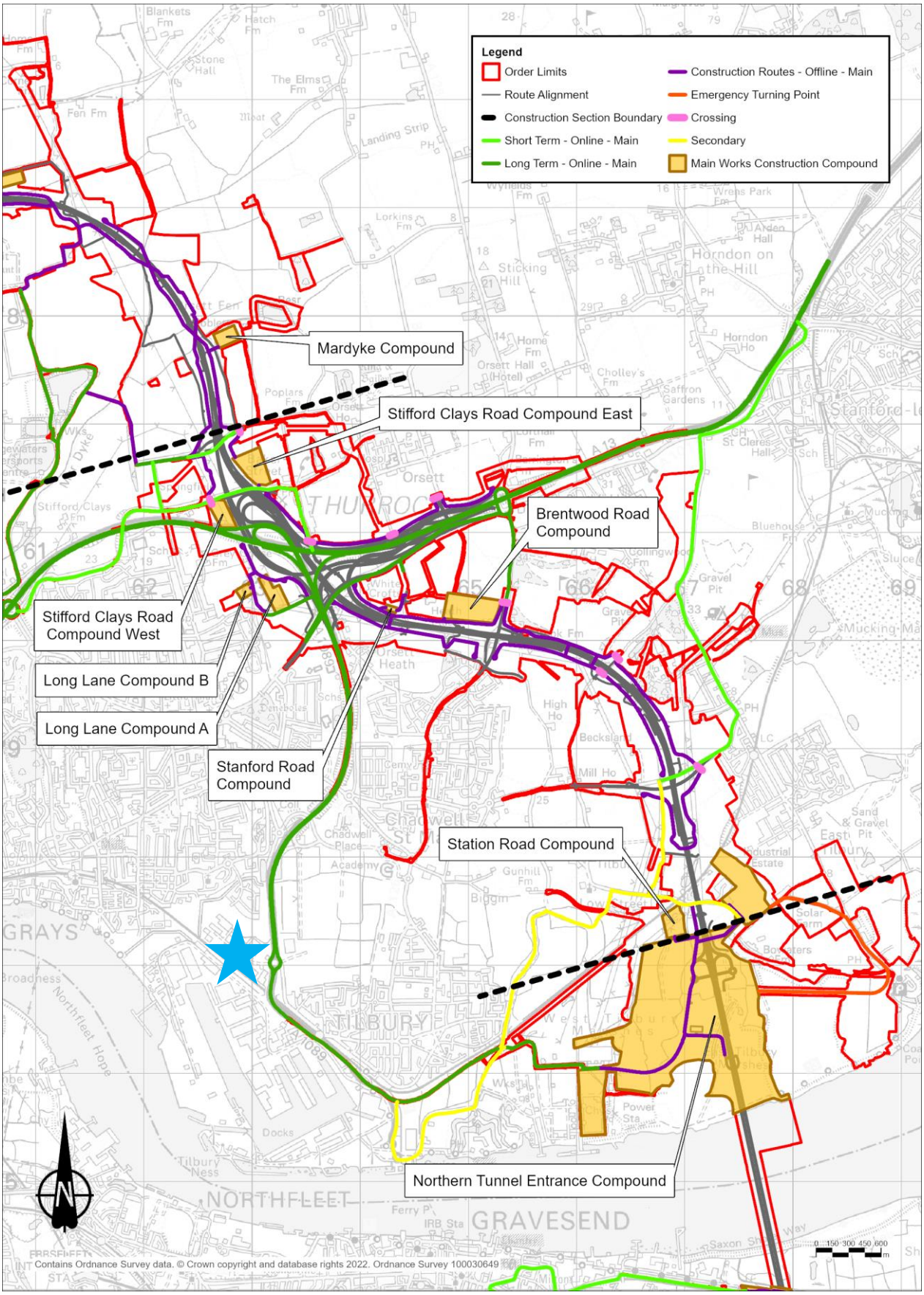
2.3.14 Construction traffic modelling phase 6 was also chosen for the construction assessment of Asda roundabout as it is forecast to have the highest construction-related traffic travelling through the Asda roundabout as shown in Plate 2.5.

Plate 2.5 Construction phases comparison of construction traffic



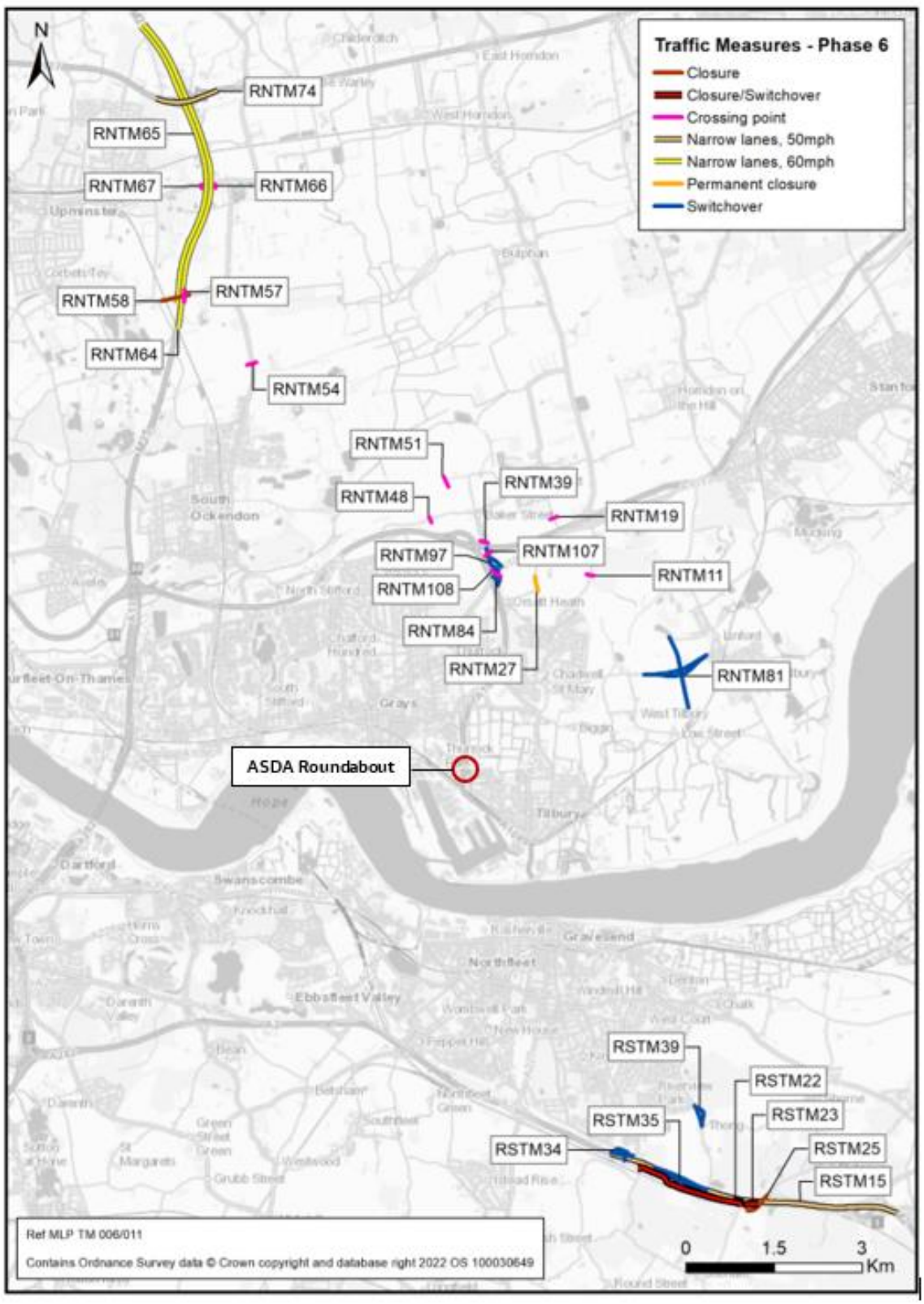
2.3.15 The location of the construction compounds and utility logistic hubs in vicinity of the Asda roundabout are shown in Plate 2.6, with the location of the Asda roundabout indicated by a blue star. Construction traffic would use the A1089 and Asda roundabout to access the construction compounds and utility logistic hubs.

Plate 2.6 Construction compounds and utility logistic hubs in the vicinity of the Asda roundabout



2.3.16 The proposed temporary traffic management measures that are included in phase 6 are shown in Plate 2.7. These traffic measures will have less impact on the Asda roundabout compared to phase 1 due to phase 6 does not have the contraflow measures on Brentwood Road.

Plate 2.7 Map of traffic measures and network changes in Phase 6



3 Forecast model development and forecasting

3.1 Introduction

3.1.1 This section describes the development of the Construction Phase 1 (P1) and Phase 6 (P6) VISSIM models in terms of:

a. Network development

b. Forecast traffic demand

c. Traffic signal optimisation

d. Model calibration

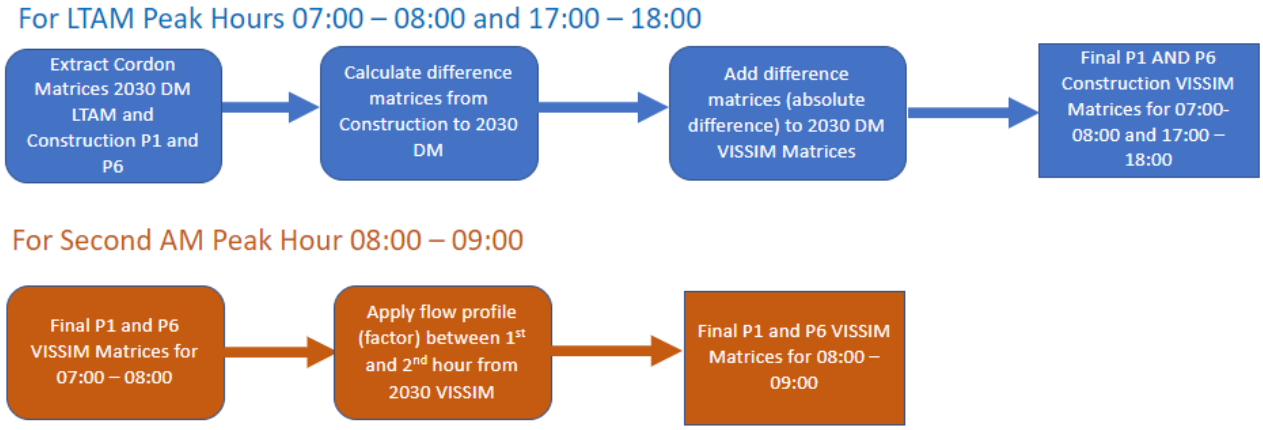
3.2 Network development

3.2.1 The P1 and P6 construction scenarios retain the same model network from the 2030 DM model.

3.3 Forecast traffic demand

3.3.1 The forecast traffic demand matrices for each vehicle type in VISSIM were calculated as shown in Plate 3.1 and described in detail in subsequent sections.

Plate 3.1 Forecast traffic demand calculation for VISSIM



3.3.2 The 2030 DM forecast traffic demand in VISSIM was determined by examining the differences in forecast traffic flows (for model zones) predicted by the 2030 DM LTAM (CM49) and 2030 LTAM construction models (V23) for the available hours of 07:00–08:00 in the AM Peak and 17:00–18:00 in the PM Peak.

3.3.3 The absolute differences in flows between these models were identified and then applied to the 2030 DM VISSIM model to develop the 2030 P1 and P6 matrices. This was undertaken on the basis of origin-destination matrices so applying a matrix of 'flow differences' to the 2030 DM matrix to create the construction phase matrices.

3.3.4 Where applying absolute differences resulted in negative values, the percentage difference was used instead of the absolute difference.

3.3.5 For the second hour in the AM (08:00–09:00), which is not available from the LTAM, the DM flow profile in VISSIM was used to factor the construction phase matrices from the first hour (07:00–08:00) to the second hour (08:00–09:00).

3.3.6 The Amazon zones were excluded from the matrix development process described above. The number of trips travelling to/from the Amazon zones were taken directly from the London Distribution Park Transport Assessment. The same number of trips were applied to the 2030 and 2045 matrices.

3.3.7 The P1 and P6 construction traffic demand matrices in VISSIM were determined using the same method as the 2030 DM, i.e., by examining the differences in forecast traffic flows predicted by the 2030 DM and P1 and P6 Construction models.

3.3.8 The P1 and P6 hourly matrices have been split into 15-minute intervals using the flow profiles from the 2030 DM VISSIM model. In summary, the comparison of the 2030 DM and construction total traffic demands in Table 3.1 indicates that overall traffic demand in construction traffic modelling phase 1 is forecast to increase by 6% in the first AM peak hour and by 9% in second AM peak hour compared to the 2030 DM. In PM peak hour, the P1 traffic increases by 11% comparing to 2030 DM flows.

3.3.9 For construction traffic modelling phase 6, the overall traffic demand increases by 2% in both AM peak hours compared to the 2030 DM. The PM peak hour increases by 1%.

Table 3.1 Traffic Volumes in study area by scenario (vehicles)

Peak	Vehicle type	2030 DM	P1	P6
AM (07:00– 08:00)	Car	2,184	2,342	2,192
	LGV	320	321	302
	HGV	842	872	906
	Total	3,345	3,535	3,399
AM (08:00– 09:00)	Car	1,887	2,133	1,918
	LGV	278	275	262
	HGV	864	890	920
	Total	3,028	3,298	3,100
PM (17:00– 18:00)	Car	2,596	2,940	2,575
	LGV	345	374	348
	HGV	582	609	633
	Total	3,523	3,923	3,556

3.4 Public transport

3.4.1 Bus services and the location of bus stops in the DM and construction phase models, were assumed to remain consistent with those in the base year model.

3.5 DM and DS VISSIM model calibration

3.5.1 The network coding method and model parameters used in the DM and construction models were kept consistent with those calibrated in the base year model.

4 Traffic condition analysis

4.1 Introduction

4.1.1 This section compares the results of the 2030 DM and P1, P6 construction VISSIM models in terms of the following traffic condition indicators:

a. Average delays per vehicle

b. Average queues

c. Predicted journey times

d. Relative delays on links

4.1.2 Consistent with the base year model validation, the results of the DM and construction models are the averages of the same 20 random seeds used in the base model validation.

4.2 Number of random seed records

4.2.1 Traffic conditions on the road are variable and this affects:

a. **Overall traffic volumes**, accounted for in VISSIM by selecting a representative peak hour.

b. **Traffic flow profiles**, corresponding to the variation in short-term flow rate within a modelled period, accounted for in VISSIM by profiling the traffic inputs into 15 minutes time periods; and

c. **Random Driver Behaviours**, Traffic conditions vary day-to-day as a result of random driver behaviours such as speed selection, lane changing, route choice and bus dwell times. The stochastic microsimulation traffic model in VISSIM attempts to replicate this day-to-day random variability by altering individual driver decisions based on random numbers. The set of random numbers is generated from an initial ‘seed’ value specified at the start of a simulation run. A single set of random numbers, generated by a single seed value, therefore represents one potential outcome, or one particular day of traffic operation. The actual value of the seed has no significance; however, the seeds for different runs must be different from each other in order to produce different outcomes. Based on UK modelling guidelines, the recommended number of random seed runs is:

   i. A minimum of 20 (TfL Traffic Modelling Guidelines, Version 4.0)

   ii. Typically recommended being 10 (Section 5.5.2 - Guidelines for the Use of Mirosimulation Software, Highways Agency).

4.2.2 The number of runs specified in the guidelines is indicative and the number of random seeds should be set based on the variability of the travel time results.

4.2.3 Model outputs based on 20 runs with different random seeds were considered adequate for the Asda roundabout VISSIM model. This is also consistent with the other VISSIM models developed for the Project (see Localised Traffic Modelling [**REP1-187**] for details).

4.3 Junction traffic conditions

4.3.1 The predicted traffic conditions at the Asda roundabout shown in Table 4.1 to Table 4.3 have been measured in terms of the total throughput flow in vehicles, average delay per vehicle and average queue length in metres for each hour within the AM and PM peak periods.

4.3.2 The total throughput flows are the sum of the flows on all movements from each approach.

4.3.3 The average delay per vehicle is calculated by taking the weighted average of the delay from all movements on each approach.

4.3.4 The average queue lengths are calculated by taking the average of the maximum queue length in each five-minute interval. This is more reliable in comparison to taking the maximum queue length over a one-hour interval, where the maximum queue can sometimes be misleading as it may have occurred only for a very short time/ single time step during the simulation.

4.3.5 Vehicles are defined to be in a queue when their headway (the distance from the vehicle in front) drops below 20 metres and speed drops below 3.1mph; and exit the queue when their speed increases above 6.2mph.

AM peak period

Table 4.1 AM 07:00–08:00 Traffic condition at Asda roundabout

Approach	Flow (vehicles)			Average delay per vehicle (seconds)			Mean maximum queue (m)		
	DM	P1	P6	DM	P1	P6	DM	P1	P6
A1089 Dock Road (North)	1,888	1,908	1,856	7	8	8	71	92	90
London Distribution Park	41	41	43	111	104	114	39	41	42
A126 Dock Road	357	505	371	26	45	29	32	99	37
A1089 St Andrew's Road (South)	625	565	663	7	10	8	45	49	46
Thurrock Park Way	273	272	282	9	10	10	13	13	14

4.3.6 Table 4.1 shows that the traffic conditions in all scenarios on the A1089 Dock Road (North), A1089 St Andrew's Road (South) and Thurrock Park Way approaches are predicted to be in free-flowing condition with delays of less than 10 seconds and short queues during the 07:00–08:00 period.

4.3.7 Delays on the London Distribution Park arm are the highest of all approaches. The high north-south flow on the A1089 produces limited gaps for traffic from the London Distribution Park to enter the roundabout, however queues are relatively short as demands from this arm are low.

4.3.8 In general, delays at the Asda roundabout are similar on most of the approaches across the three scenarios in the 07:00–08:00 period. The only exception is the A126 Dock Road approach, where delay and queues increase in the construction traffic modelling phase 1 compared to the other scenarios as flows on this approach increased by over 100 vehicles.

Table 4.2 AM 08:00–09:00 Traffic condition at Asda roundabout

Approach	Flow (vehicles)			Average delay per vehicle (seconds)			Mean maximum queue (m)		
	DM	P1	P6	DM	P1	P6	DM	P1	P6
A1089 Dock Road (North)	1,293	1,369	1,294	5	6	5	22	39	33
London Distribution Park	61	63	63	42	74	59	28	34	33
A126 Dock Road	565	714	577	42	160*	41	97	1,009	96
A1089 St Andrew's Road (South)	677	609	706	26	40	27	86	99	89
Thurrock Park Way	411	410	428	15	18	17	34	36	36

*****Combined delays on this approach at the Asda roundabout and delays on the northbound approach at the small roundabout by London Distribution Park southern access as queues extend pass the small roundabout

4.3.9 In the 08:00–09:00 period, the traffic conditions on the A1089 Dock Road (North) are predicted to be in free-flowing condition in both construction phases with delays of less than six seconds. The flow from the northern arm in the second AM hour is lower than in the first AM hour which makes it easier for the flow from the London Distribution Park to enter the roundabout. Even though the London Distribution Park approach flow is slightly higher between 08:00–09:00 than in the 07:00-08:00 hour, the delays and queues are lower.

4.3.10 The A126 Dock Road approach is predicted to experience an increase in delays and queues in construction phase 1 due to increase in flows and remain similar to the DM in construction phase 6. Construction traffic modelling phase 1 is forecast to have the highest flow on this approach across all three scenarios and the queue is predicted to extend past the small roundabout by the London Distribution Park southern access.

4.3.11 On the A1089 St Andrew’s Road (south) arm, delays and queues are forecast to increase slightly in construction traffic modelling phase 1 and remain similar to the DM in construction traffic modelling phase 6.

4.3.12 On the Thurrock Park Way arm, delays and queues are forecast to remain similar to the DM in both construction traffic modelling phases.

PM peak period

Table 4.3 PM 17:00–18:00 at Asda roundabout

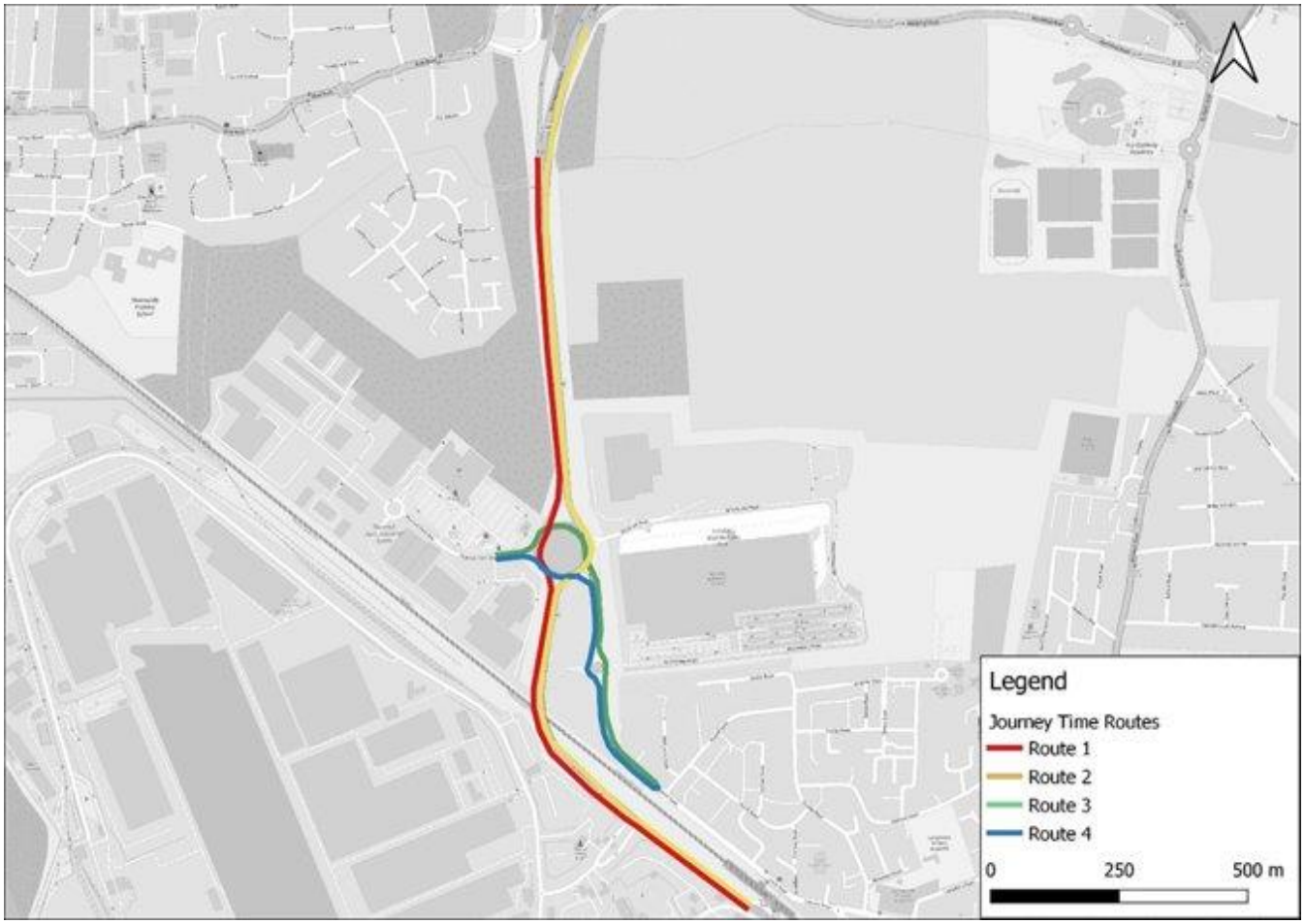
Approach	Flow (vehicles)			Average delay per vehicle (seconds)			Mean maximum queue (m)		
	DM	P1	P6	DM	P1	P6	DM	P1	P6
A1089 Dock Road (North)	1,372	1,482	1,363	6	7	7	38	42	40
London Distribution Park	68	71	71	50	66	51	32	36	33
A126 Dock Road	379	602	380	21	41	23	26	96	29
A1089 St Andrew's Road (South)	818	1,096	859	10	46	11	54	213	59
Thurrock Park Way	823	554	823	21	77	22	107	340	108

4.3.13 In the PM peak hour, traffic conditions at the Asda roundabout are generally free flowing in 2030 DM and are predicted to remain similar in construction traffic modelling phase 6. Traffic conditions at the junction are predicted to worsen in construction traffic modelling phase 1 with an increase in delays and queues on the A1089 St Andrew's Road (South) and Thurrock Park Way arms due to the increase in flows from A126 Dock Road and A1089 (South) approaches.

4.4 Journey times

4.4.1 A journey time comparison has been carried out on the same routes used for the base year model validation. These cover main movements at the roundabout illustrated in Plate 4.1.

Plate 4.1 Journey time start and end locations



4.4.2 Table 4.4 to Table 4.6 show a summary comparing the journey times for the DM and construction scenarios in 2030 for all AM and PM peak periods.

Table 4.4 Journey time comparison AM 07:00–08:00

Route ID	Route	Direction	Journey time (seconds)			Average speed (mph)		
			DM	P1	P6	DM	P1	P6
1	A1089 St Andrew's Road to A1089 Dock Road	NB	111	114	112	34	33	33
2	A1089 Dock Road to A1089 St Andrew's Road	SB	110	113	113	38	37	37
3	Thurrock Park Way to A126 Dock Road	SB	81	83	82	20	20	20

4	A126 Dock Road to Thurrock Park Way	NB	96	126	98	15	12	15

4.4.3 The journey time and average speed comparison between the scenarios for the 07:00–08:00 period show no significant change in journey times on Routes 1 to 3 between DM and both construction phases.

4.4.4 Average journey times on Route 4 from A126 Dock Road to Thurrock Park Way are predicted to increase by 30 seconds in construction Phase 1 due to delays at the A126 Dock Road approach. Construction Phase 6 has no impact on the average journey time and speed on this route.

Table 4.5 Journey time comparison AM 08:00–09:00

Route ID	Route	Direction	Journey time (seconds)			Average speed (mph)		
			DM	P1	P6	DM	P1	P6
1	A1089 St Andrew's Road to A1089 Dock Road	NB	131	147	132	28	25	28
2	A1089 Dock Road to A1089 St Andrew's Road	SB	105	107	107	40	39	39
3	Thurrock Park Way to A126 Dock Road	SB	86	88	87	19	19	19
4	A126 Dock Road to Thurrock Park Way	NB	122	341	120	12	4	12

4.4.5 The journey time comparison for the second AM peak hour shows no change in journey times between DM and construction traffic modelling phase 6 on all routes.

4.4.6 There would also be no significant change in journey time on routes 1 to 3 in construction traffic modelling phase 1 when compared to the DM.

4.4.7 Construction phase 1 will affect the journey times on route 4 from A126 Dock Road to Thurrock Park Way. The journey times on this route are predicted to increase by over three minutes in construction Phase 1 due to the increased delays on the A126 Dock Road approach at the Asda roundabout.

Table 4.6 Journey time comparison PM 17:00–18:00

Route ID	Route	Direction	Journey time (seconds)			Average speed (mph)		
			DM	P1	P6	DM	P1	P6
1	A1089 St Andrew's Road to A1089 Dock Road	NB	112	192	114	33	19	33
2	A1089 Dock Road to A1089 St Andrew's Road	SB	104	105	105	41	40	40
3	Thurrock Park Way to A126 Dock Road	SB	93	137	93	18	12	18
4	A126 Dock Road to Thurrock Park Way	NB	91	121	93	16	12	16

4.4.8 In the PM peak hour, the comparison between the DM and construction traffic modelling phase 6 shows this phase has no impact on all journey times at the junction.

4.4.9 Average journey times are predicted to increase on routes 1, 3 and 4 in construction traffic modelling phase 1 compared to the DM as delays increase on the A1089 St Andrew's Road (South), A126 Dock Road and Thurrock Park Way approaches.

4.5 Relative delays

4.5.1 The relative delay in VISSIM is the total segment delay divided by the total segment travel time on a link, with the link made up of 10m length segments.

4.5.2 The relative delay plots on all links in the network for the three scenarios are shown in Plate 4.2 to Plate 4.4 which provide a visual representation of the delays at the modelled area.

4.5.3 The locations of the delays and the change in delays between the DM and construction traffic modelling phases represented by the plots correlates to the traffic conditions described in previous sections.

Plate 4.2 Relative delay plot (2030 DM and DS 07:00–08:00)

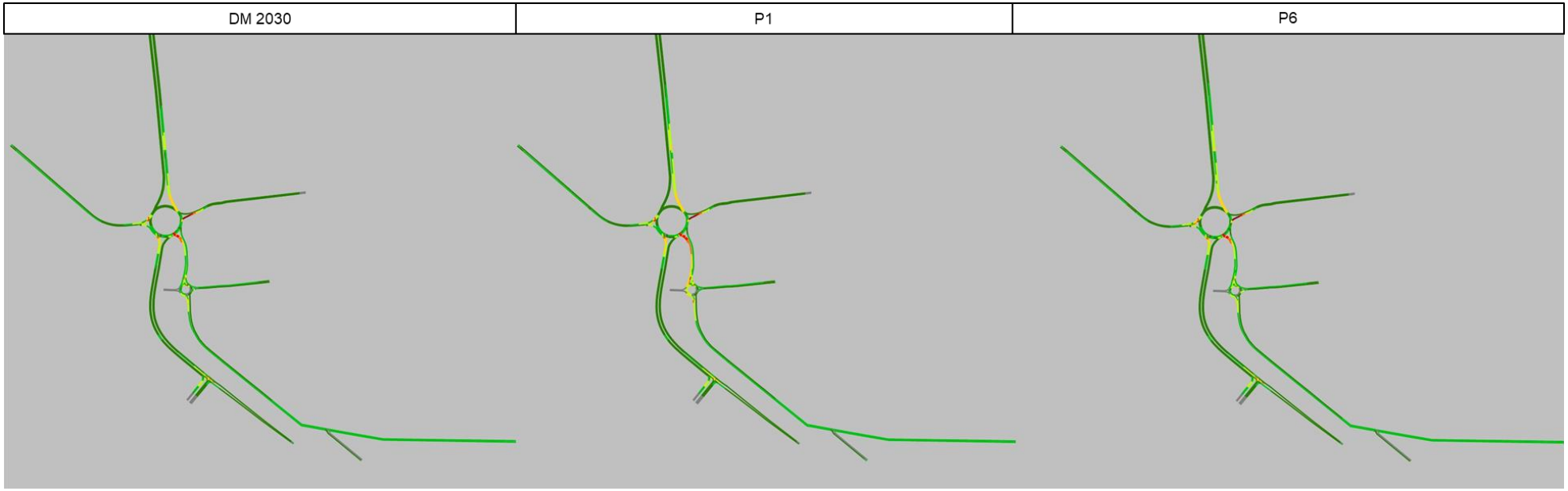


Plate 4.3 Relative delay plot (2030 DM and DS 08:00–09:00)

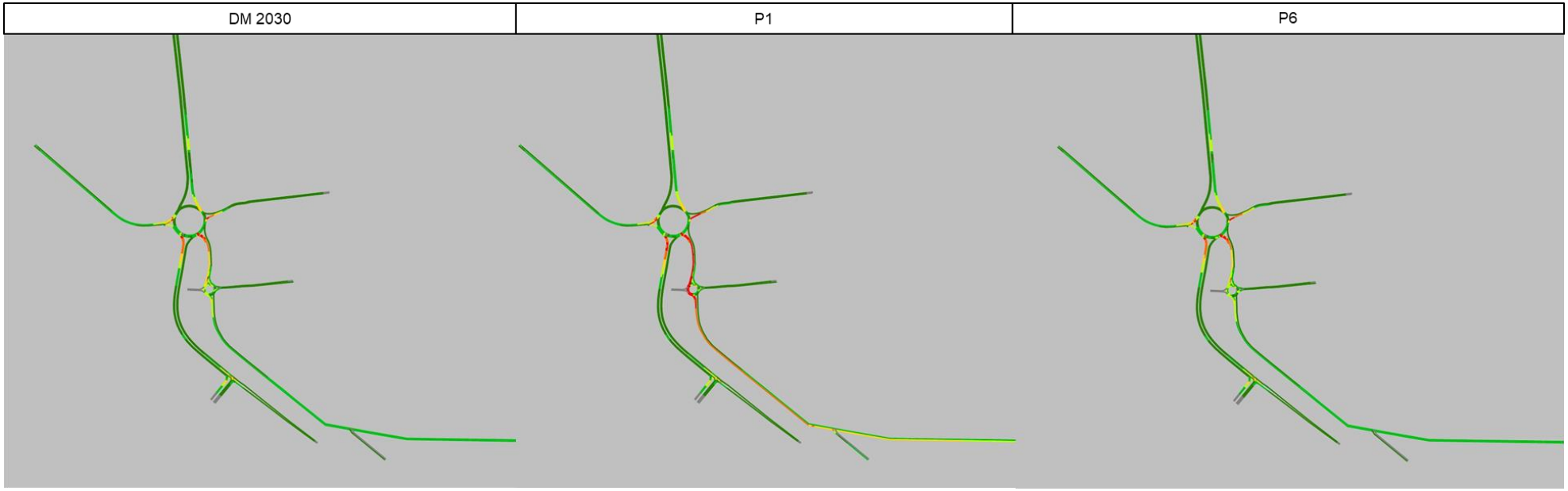
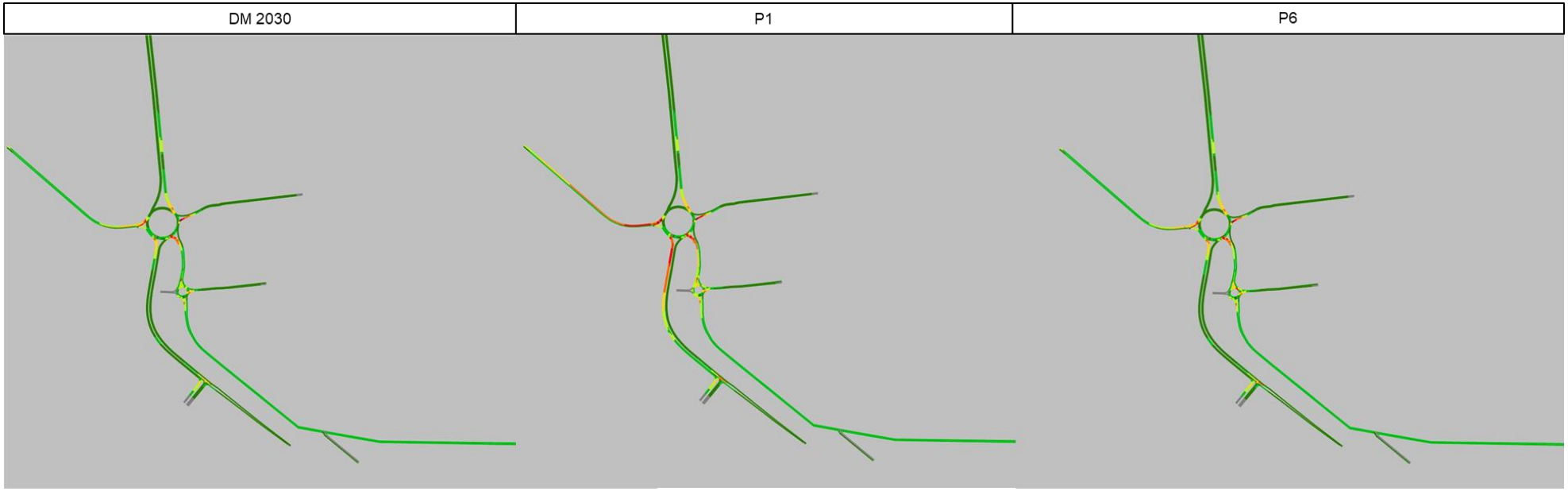


Plate 4.4 Relative delay plot (2030 DM and DS 17:00–18:00)



5 Conclusions

5.1.1 This report describes the development of the 2030 Do Minimum (DM) and construction traffic modelling phase 1 (P1) and phase 6 (P6) VISSIM models of the A1089 Asda roundabout study area. It also compares the results between the three scenarios.

5.1.2 The analysis of the traffic conditions at the Asda roundabout shows overall delays and queueing increase at the junction during construction traffic modelling phase 1. Particularly, queues on the A126 Dock Road approach to the Asda roundabout are predicted to increase by approximately 900m in the 08:00–09:00 hour.

5.1.3 Traffic conditions on the A126 Dock Road approach will worsen during construction traffic modelling phase 1 with a large increase in queues extending past the small roundabout by the London Distribution Park Southern Access due to traffic flows increasing on this approach.

5.1.4 Traffic conditions on the A1089 St Andrew's Road (south), the access route from the Port of Tilbury onto the wider strategic road network, and Thurrock Park Way approaches are also predicted to worsen in construction traffic modelling phase 1 for the PM peak with some increases in queues on these approaches. Delays on the A1089 (south) approach are predicted to increase by 36 seconds per vehicle and delays on Thurrock Park Way approach are forecast to increase by approximately one minute. These are due to the increase in opposing traffic from A126 Dock Road and the A1089 (south) approaches.

5.1.5 Traffic conditions on the A1089 St Andrew's Road (north), the access route to the Port of Tilbury are forecast to see a negligible change in both construction traffic phase 1 in both AM peak hours and the PM peak hour.

5.1.6 The modelling of construction traffic phase 6 indicated that this phase has no significant impact on traffic conditions at the Asda roundabout when compared with the DM.

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Glossary

Term	Explanation
ANPR	Automatic Number Plate Recognition
ATC	Automatic Traffic Count
DCO	Development Consent Order - Means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects (NSIPs)
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges: A comprehensive manual which contains requirements, advice and other published documents relating to works on motorway and all-purpose trunk roads for which one of the Overseeing Organisations (National Highways, Transport Scotland, the Welsh Government or the Department for Regional Development (Northern Ireland)) is the highway authority. For the Lower Thames Crossing, the Overseeing Organisation is National Highways.
Do Minimum	A future year scenario which includes changes to the road network and planned development that is forecast to go ahead, but not the Lower Thames Crossing.
Do Something	A future year scenario which includes changes to the road network and planned development that is forecast to go ahead, and the Lower Thames Crossing.
EB	Eastbound
GEH	A formula used to compare two traffic volumes, named after its originator, Geoff E. Havers. It is similar to a chi-squared test.
HGV	Heavy Goods Vehicle
LGV	Light Goods Vehicle
LinSig	A Design and Assessment Tool for Traffic Signal Junctions and Urban Networks
LMVR	Local Model Validation Report
NB	Northbound
OS	Ordnance Survey
P1	Construction Phase 1
P6	Construction Phase 6
PTV	German for Planning Transport and Traffic Software package

Term	Explanation
Random Seed	This value initializes a random number generator. The use of random seeds allows for stochastic variations of traffic arrivals in VISSIM, which helps account for variations in real-world traffic conditions. If two or more simulation runs in the same VISSIM network each use different random seeds, then the stochastic functions in VISSIM will be assigned a different value sequence in each simulation run. This consequently changes the traffic flow and operational attributes (e.g., speed, travel time, delay) in the network from seed to seed.
SATURN	Simulation and Assignment of Traffic to Urban Networks
SB	Southbound
TAG	Transport Analysis Guidance published by DfT
TfL	Transport for London - The integrated body responsible for London's transport system
V/C	Volume over capacity ratio
VISSIM	Micro-simulation software developed by PTV. Verkehr In Städten - SIMulationsmodell (German for "Traffic in cities - simulation model)
WB	Westbound

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