Lower Thames Crossing

9.15 Localised Traffic Modelling Appendix J - ASDA roundabout VISSIM Forecasting Report

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Lower Thames Crossing

9.15 Localised Traffic Modelling
Appendix J - ASDA roundabout VISSIM Forecasting Report

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1 Introduction

1.1 Purpose of document

1.1.1 The purpose of this document is to present the findings from the traffic operation appraisal for the Asda roundabout (A1089) in Tilbury in the 2030 Do Minimum (without the Project) and Do-Something (with the Project) scenarios.

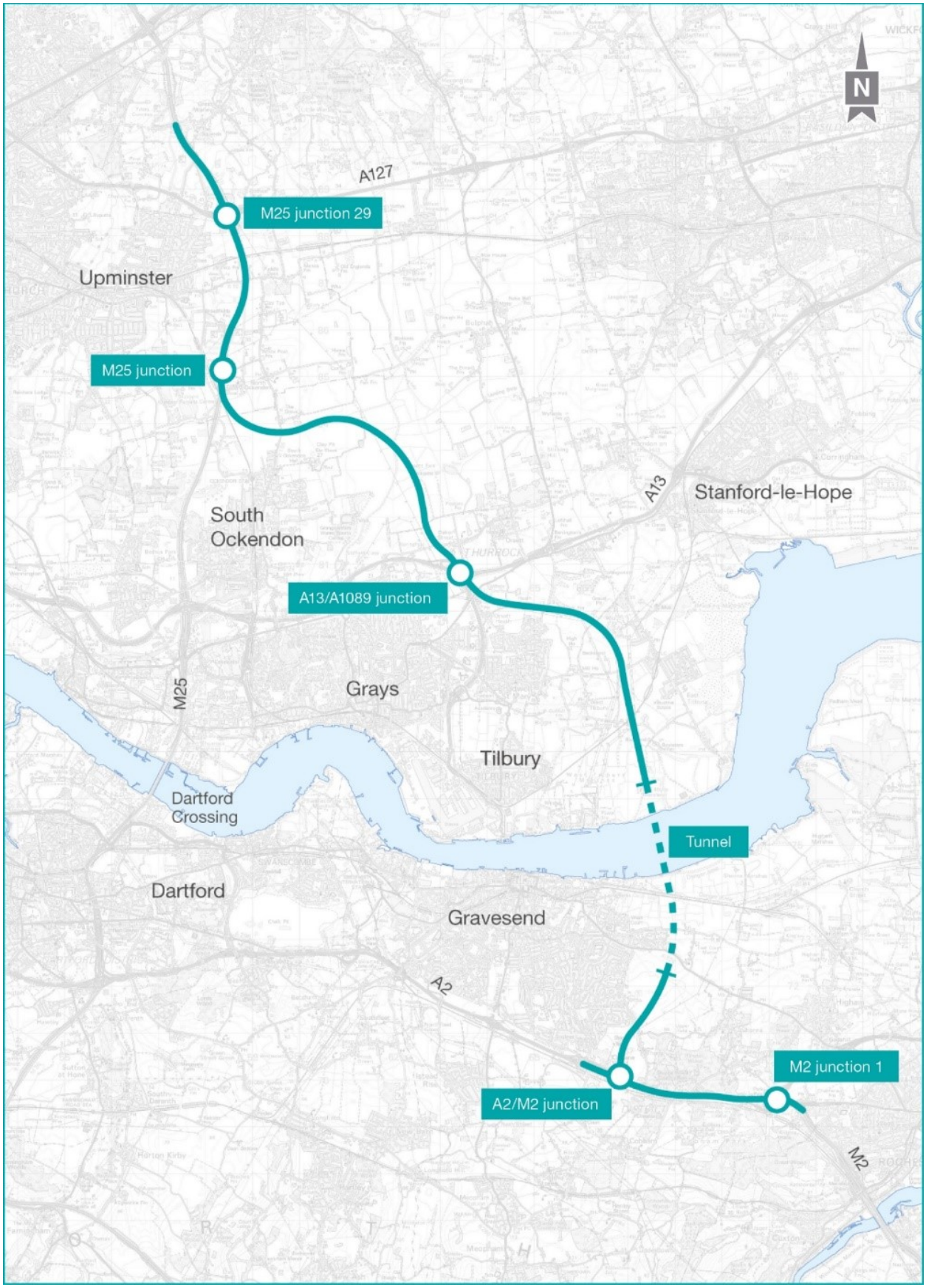
1.2 Modelling software

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 Lower Thames Crossing 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 in this section is a summary of the key issues contained within the document.

Plate 1.1 Lower Thames Crossing route



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 NPSNN 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.

2 Modelling scope

2.1.1 The study area as shown in Plate 2.1 is located on the A1089 next to Asda and Amazon in Tilbury, it includes the Asda roundabout and extends to the Tilbury Port access and Amazon southern access on A126 Dock Road in the South.

Plate 2.1 Traffic Operations Study Area

2.1.2 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.

2.1.3 The key characteristics of the junction are:

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 like 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 which uses this for staff access).

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

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

2.1.4 The VISSIM base year model was developed to reflect the road network and traffic condition 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 for the 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 PM peak hour of the junction.

2.1.5 Following this, Do Minimum models representing forecast years 2030 and 2045 without the Project, and Do Something models with the Project, were developed.

2.1.6 This report explains how the Do Minimum (DM) and Do Something (DS) models were developed and compares the results from both models for understanding how network operating conditions will change from Do Minimum without the Project to a Do Something with the Project.

3 Forecast model development & forecasting

3.1 Introduction

3.1.1 This chapter describes the development of the DM and DS VISSIM models in terms of:

a. Network development

b. Forecast traffic demand

c. Public transport

d. Model calibration

3.2 Network development

3.2.1 The 2030 and 2045 DM and DS scenarios retain the same model network from the 2018 base year model.

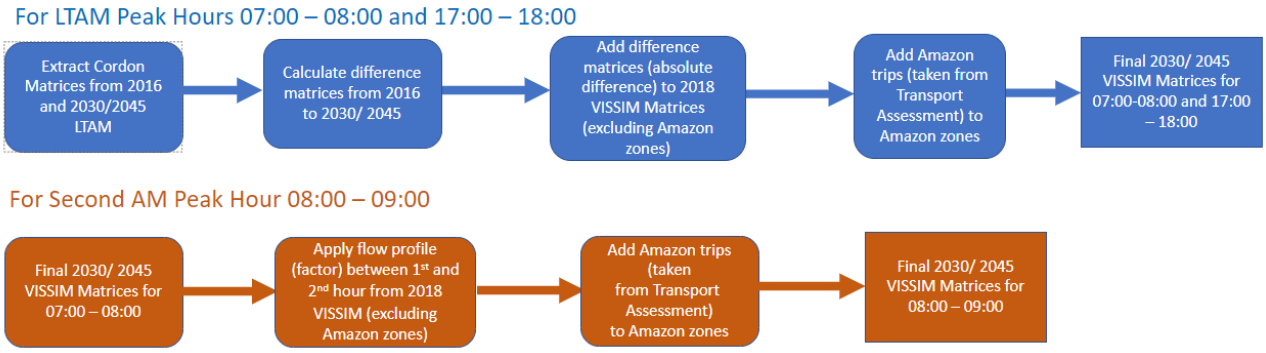
3.2.2 There are two network changes between the base year network in 2018 and the forecast year networks in 2030 and 2045. These are the operation of the traffic signals of the pedestrian crossing on Thurrock Park Way which were installed but not operational in 2018.

3.2.3 In addition, the speed limit on the northbound section on A1089 between the Asda roundabout and the off-slip to the Marshfoot Road junction was changed from 70mph in the 2018 base year to 50mph in 2020. This change in speed has been reflected in all the future year scenarios.

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 and 2045 DM forecast traffic demand in VISSIM were determined by examining the differences in forecast traffic flows (for model zones) predicted by the 2016 base year (N108R1) and DM LTAM (CM49) models 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 2018 base year VISSIM model to develop the 2030 DM matrices. This was undertaken on the basis of origin-destination matrices so applying a matrix of 'flow differences' to the 2018 base year matrix to create the future year matrices.

3.3.4 Where applying absolute differences resulted in negative values, the percentage difference was used instead of the absolute difference. This was the case for the origin-destination pairs for which the LTAM forecast indicated negative growth. If the 2018 base year flows in VISSIM were lower than the LTAM base flows, applying this negative flow difference would lead in some instances to a negative number, therefore it was preferred to use percentage difference instead where this occurred.

3.3.5 For the second hour in the AM (08:00–09:00), which is not available from the LTAM, the existing base year flow profile in VISSIM (derived from count data) was used to factor the future year 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 forecasting 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 Amazon site operates with a large volume of staff, with shift work. The staff arrival and departure events are concentrated into a short duration during the shift change. The shift staggers operate during the following times presented in Table 3.1.

Table 3.1 Amazon shift times

Morning shift:	Evening shift:
Stagger 1: 07:30–18:00	Stagger 1: 18:45–05:15
Stagger 2: 08:00–18:30	Stagger 2: 19:15–05:45

3.3.8 Staff arrive and depart the Amazon site via the southern access which connects on to the roundabout on the A126 Dock Road. The staff traffic generated by the Amazon shift change during the modelled peak hours are 792 vehicles arriving at Amazon in the first morning peak (07:00–08:00). Outside the staff shift changeovers, Amazon will generate significantly less traffic of 115 vehicles arriving in the 08:00 – 09:00 hour and 100 vehicles departing in the 17:00 – 18:00 hour.

3.3.9 The 2030 and 2045 DS forecast traffic demand matrices in VISSIM were determined using the same method as the 2030 and 2045 DM, that is by examining the differences in forecast traffic flows predicted by the 2018 base year and LTAM forecasts for 2030 DS and 2045 DS (CS72).

3.3.10 The 2030 and 2045 hourly matrices have been split into 15-minute intervals using the flow profiles from the base year VISSIM model. In summary, the comparison of the 2018 base and future year total traffic demand in Table 3.2 indicates that the overall traffic demand is forecast to increase by over 30% in the AM peak hours in the 2030 DM and increase further by 3 to 5% between 2030 and 2045.

3.3.11 In the PM peak traffic is predicted to increase by 30% in the 2030 DM and by a further 8% in the 2045 DM.

3.3.12 Comparing the DS and DM scenarios indicates traffic demand in the DS increases by 6% in 2030 and 9% in 2045.

Table 3.2 Traffic volumes in study area by scenario

Peak	Vehicle Type	2018 Base	2030 DM	2030 DS	2045 DM	2045 DS
AM (07:00–08:00)	Car	1,622	2,184	2,285	2,265	2,390
	LGV	277	320	297	317	324
	HGV	589	842	846	847	852
	Total	2,489	3,345	3,428	3,429	3,566
AM (08:00–09:00)	Car	1,538	1,887	2,034	2,041	2,273
	LGV	225	278	258	277	282
	HGV	579	864	868	868	872
	Total	2,342	3,028	3,159	3,186	3,428
PM (17:00–18:00)	Car	2,025	2,596	2,798	2,838	3,149
	LGV	280	345	350	370	385
	HGV	404	582	590	588	595
	Total	2,708	3,523	3,739	3,796	4,129

3.4 Public transport

3.4.1 Bus services and location of bus stops in the DM and DS 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 DS models were kept consistent with those calibrated in the base year model.

4 Traffic condition analysis

4.1 Introduction

4.1.1 This chapter compares the results of the 2030 and 2045 DM and DS 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 In order to be consistent with the base year model validation, the results of the DM and DS models are the averages of the same 20 random seeds used in the base model.

4.2 Number of random seed records

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

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-minute time periods.

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 (Transport for London (TfL) Traffic Modelling Guidelines, Version 4.0)

   ii. Typically recommended being 10 (Section 5.5.2: Guidelines for the Use of Microsimulation 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 conditions at the Asda roundabout

Approach	Flow (vehicles)					Average delay per vehicle (seconds)				Mean maximum queue (m)			
	Base 2018	DM 2030	DS 2030	DM 2045	DS 2045	DM 2030	DS 2030	DM 2045	DS 2045	DM 2030	DS 2030	DM 2045	DS 2045
A1089 Dock Road (North)	1,248	1,888	1,890	1,915	1,915	7	7	7	7	71	69	67	65
London Distribution Park	24	41	41	41	41	111	101	109	101	39	36	40	36
A126 Dock Road	415	357	405	417	549	26	29	34	49	32	44	50	132
A1089 St Andrew's Road (South)	379	625	617	586	523	7	9	9	14	45	49	48	53
Thurrock Park Way	228	273	277	303	309	9	10	10	11	13	13	14	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 free-flowing with delays of less than 15 seconds and short queues during the 07:00–08:00 period.

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

4.3.8 It should be noted that from the Amazon site, the heavy goods vehicles join the Asda roundabout directly along the London Distribution Park access. The light goods vehicles and cars associated with the Amazon site use a southern access to the site that joins with the A126 Dock Road at a small roundabout just south of Asda roundabout. Therefore, the flows on the A126 Dock Road consist of local traffic from Tilbury area and cars and light goods vehicles from the Amazon site.

4.3.9 In general, delays in the DM and DS at the Asda roundabout are similar on most of the approaches in the 07:00–08:00 hour. The only exception is the A126 Dock Road approach, where delays and queues increase in the 2045 DS scenario compared to the 2045 DM scenario as flows increase by over 100 vehicles.

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

Approach	Flow (vehicle)					Average delay per vehicle (seconds)				Mean maximum queue (m)			
	Base 2018	DM 2030	DS 2030	DM 2045	DS 2045	DM 2030	DS 2030	DM 2045	DS 2045	DM 2030	DS 2030	DM 2045	DS 2045
A1089 Dock Road (North)	1,088	1,293	1,328	1,344	1,379	5	5	6	6	22	27	27	28
London Distribution Park	24	61	61	61	61	42	41	48	48	28	28	29	30
A126 Dock Road	412	565	649	656	663	42	54	91*	181*	97	175	226	1,478
A1089 St Andrew's Road (South)	430	677	654	625	570	26	49	46	61	86	130	115	135
Thurrock Park Way	318	411	417	449	456	15	17	16	16	34	35	37	37

** Combined delays on this approach at the ASDA roundabout and delays on the northbound approach at the small roundabout by Amazon Southern Access as queues extend pass the small roundabout in both DM and DS*

4.3.10 In the 08:00–09:00 period, the traffic conditions on the A1089 Dock Road (North) and Thurrock Park Way approaches are similar to the 07:00–08:00 period and are predicted to be free flowing with delays of less than 15 seconds.

4.3.11 Comparing to the 07:00–08:00 period, delays on London Distribution Park arm are lower in the 08:00–09:00 hour due to less traffic from the northern A1089 arm heading south.

4.3.12 On the A126 Dock Road approach delays and queues are predicted to increase in the DS due to an increase in demand from Tilbury town. Queues in the 2045 DS scenario are predicted to extend past the small roundabout by the Amazon southern access.

4.3.13 Flows at the A1089 St. Andrew's Road (South) arm are forecast to reduce slightly in the DS but delays increase in comparison to the DM. This is due to higher flow from the A126 Dock Road.

PM peak period

Table 4.3 PM 17:00–18:00 traffic conditions at the Asda roundabout

Approach	Flow (vehicle)					Average delay per vehicle (seconds)				Mean maximum queue (m)			
	Base 2018	DM 2030	DS 2030	DM 2045	DS 2045	DM 2030	DS 2030	DM 2045	DS 2045	DM 2030	DS 2030	DM 2045	DS 2045
A1089 Dock Road (North)	882	1,372	1,462	1,516	1,714	6	7	7	9	38	44	47	70
London Distribution Park	40	68	68	67	67	50	74	90	181	32	38	41	61
A126 Dock Road	347	379	425	432	545	21	27	33	63	26	38	47	126
A1089 St Andrew's Road (South)	643	818	885	834	1079	10	15	13	42	54	67	59	191
Thurrock Park Way	721	823	830	869	633	21	28	28	62	107	150	177	281

4.3.14 In the PM peak hour, traffic conditions on the A1089 Dock Road (North) are forecast to be free flowing with minimal delays in both the DM and DS. There is a very small increase in delays and queues in the DS when compared with the DM despite flows increasing in the DS.

4.3.15 Delays on the London Distribution Park arm are the highest of all approaches due to the high flow from A1089 (North) arm. Delays are also forecast to increase in the DS but queues remain relatively short as demands from London Distribution Park are low.

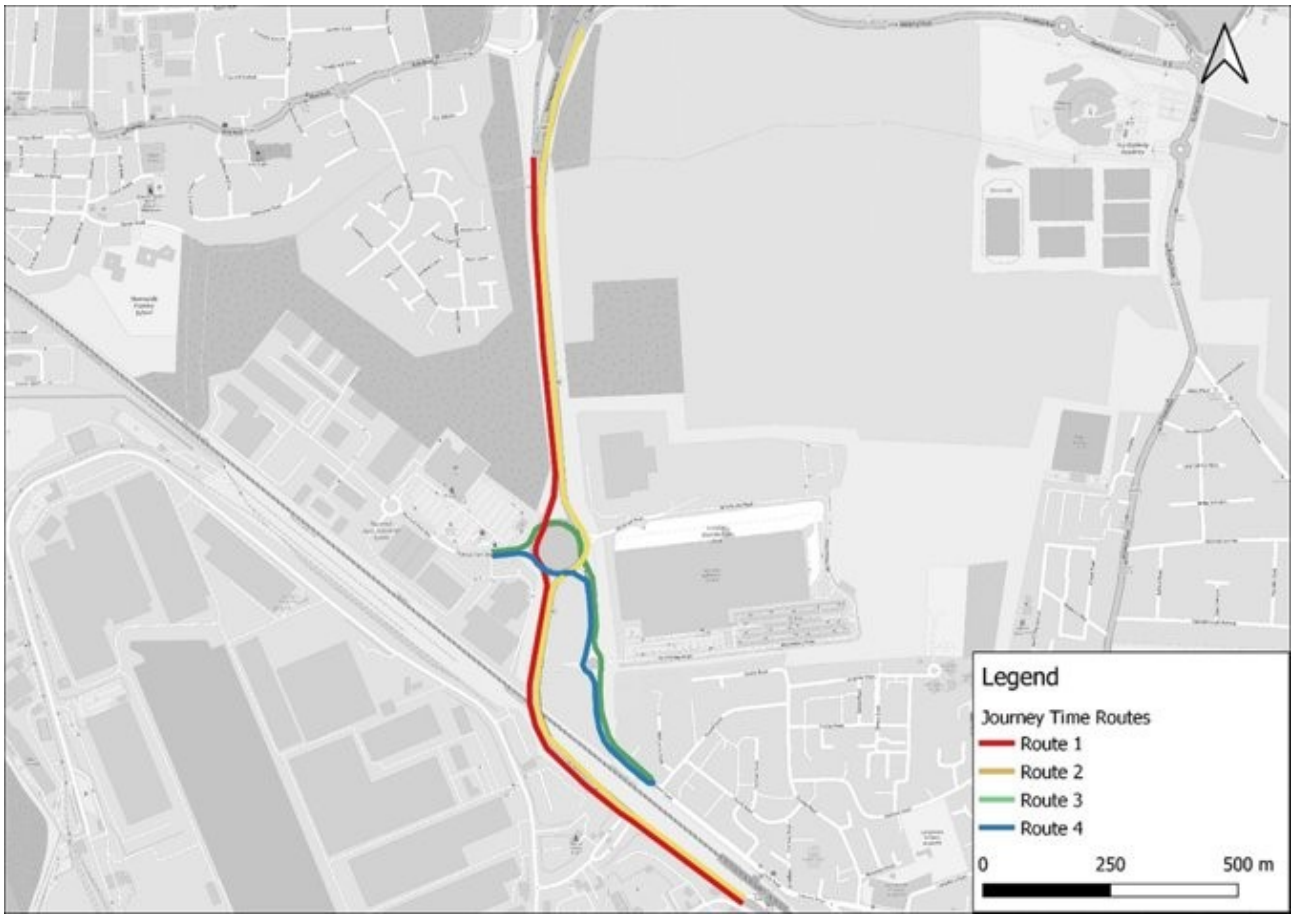
4.3.16 On the A126 Dock Road approach, delays and queues are similar in the DM and DS for 2030. There are bigger increases in delays and queues in 2045 DS as the flows on this approach increase by more than 100 vehicles and flows from the A1089 (North) also increase.

4.3.17 Delays and queues on A1089 St. Andrew's Road (South) and Thurrock Park Way also increase in the 2045 DS compared to the 2045 DM due to the increase in flows from A126 Dock Road.

4.4 Journey times

4.4.1 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 DS scenarios in 2030 and 2045 for the 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 2030	DS 2030	DM 2045	DS 2045	DM 2030	DS 2030	DM 2045	DS 2045
1	A1089 St Andrew's Road to A1089 Dock Road	NB	111	114	114	118	34	33	33	32
2	A1089 Dock Road to A1089 St Andrew's Road	SB	110	110	110	109	38	38	39	39
3	Thurrock Park Way to Dock Road	SB	81	82	82	83	20	20	20	20
4	Dock Road to Thurrock Park Way	NB	96	101	106	137	15	15	14	11

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 DS.

4.4.4 Average journey times on Route 4 from A126 Dock Road to Thurrock Park Way are predicted to increase by 31s in 2045 DS compared to 2045 DM due to delays at the A126 Dock Road approach.

Table 4.5 Journey Time Comparison AM 08:00–09:00

Route ID	Route	Direction	Journey time (seconds)				Average speed (mph)			
			DM 2030	DS 2030	DM 2045	DS 2045	DM 2030	DS 2030	DM 2045	DS 2045
1	A1089 St Andrew's Road to A1089 Dock Road	NB	131	166	158	177	28	22	24	21
2	A1089 Dock Road to A1089 St Andrew's Road	SB	105	106	106	106	40	40	40	40
3	Thurrock Park Way to Dock Road	SB	86	87	87	86	19	19	19	19
4	Dock Road to Thurrock Park Way	NB	122	162	186	396	12	9	8	4

4.4.5 The journey time comparison for the second AM peak hour shows no significant change in journey times on Routes 2 and 3 between DM and DS.

4.4.6 Average journey times on Route 1 from A1089 (South) to A1089 (North) are predicted to increase slightly in the DS for both 2030 and 2045.

4.4.7 Average journey times on Route 4 are predicted to increase in the DS by one minute in 2030 and three minutes in 2045 due to delays at the A126 Dock Road approach.

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

Route ID	Route	Direction	Journey time (seconds)				Average speed (mph)			
			DM 2030	DS 2030	DM 2045	DS 2045	DM 2030	DS 2030	DM 2045	DS 2045
1	A1089 St Andrew's Road to A1089 Dock Road	NB	112	118	115	179	33	32	32	21
2	A1089 Dock Road to A1089 St Andrew's Road	SB	104	105	105	108	41	40	40	39
3	Thurrock Park Way to Dock Road	SB	93	98	98	126	18	17	17	13
4	Dock Road to Thurrock Park Way	NB	91	97	104	153	16	15	14	10

4.4.8 In the 17:00–18:00 PM peak hour, the comparison between DM and DS shows no significant change in journey times in 2030 on all routes.

4.4.9 In 2045, the comparison between DM and DS shows no significant change in journey times on route 2 and a small increase of 28 seconds on route 3. Journey times on routes 1 and 4 increase by 64 seconds and 49 seconds respectively due to the increase in flows and delays on the A1089 St. Andrew's Road (NB) and A126 Dock Road (NB) 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 are shown in Plate 4.2 to Plate 4.7. They 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 DM and DS 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)

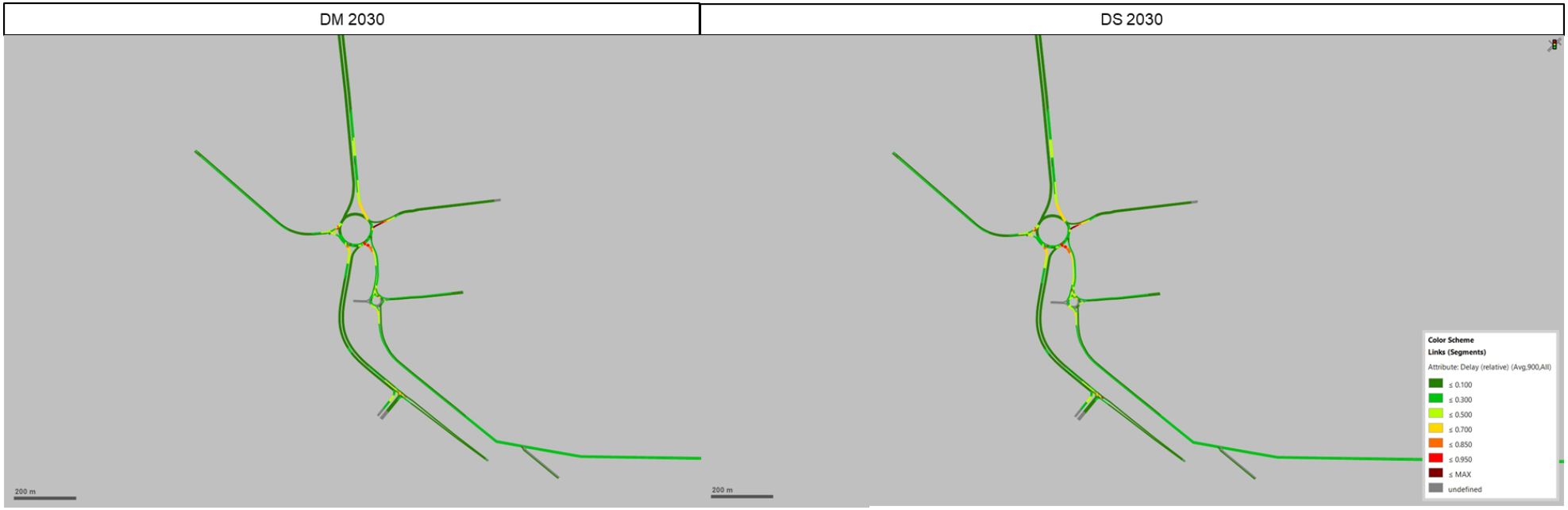


Plate 4.3 Relative delay plot (2030 DM and DS 08:00–09:00)

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

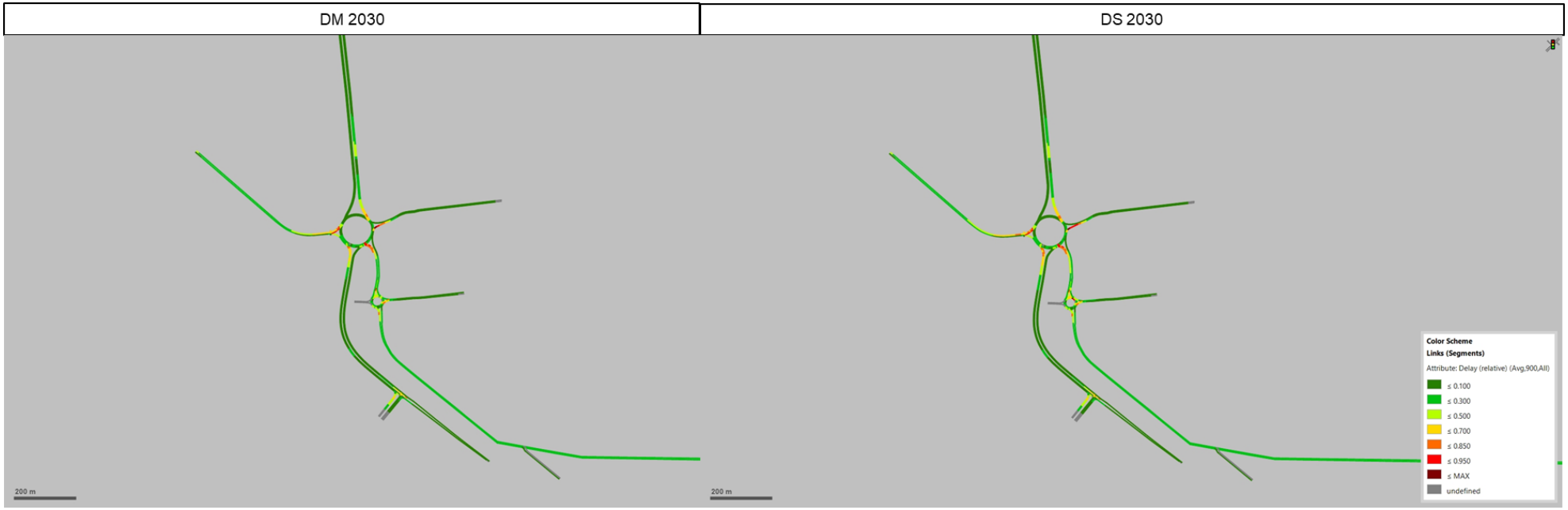


Plate 4.5 Relative delay plot (2045 DM and DS 07:00–08:00)

Plate 4.6 Relative delay plot (2045 DM and DS 08:00–09:00)

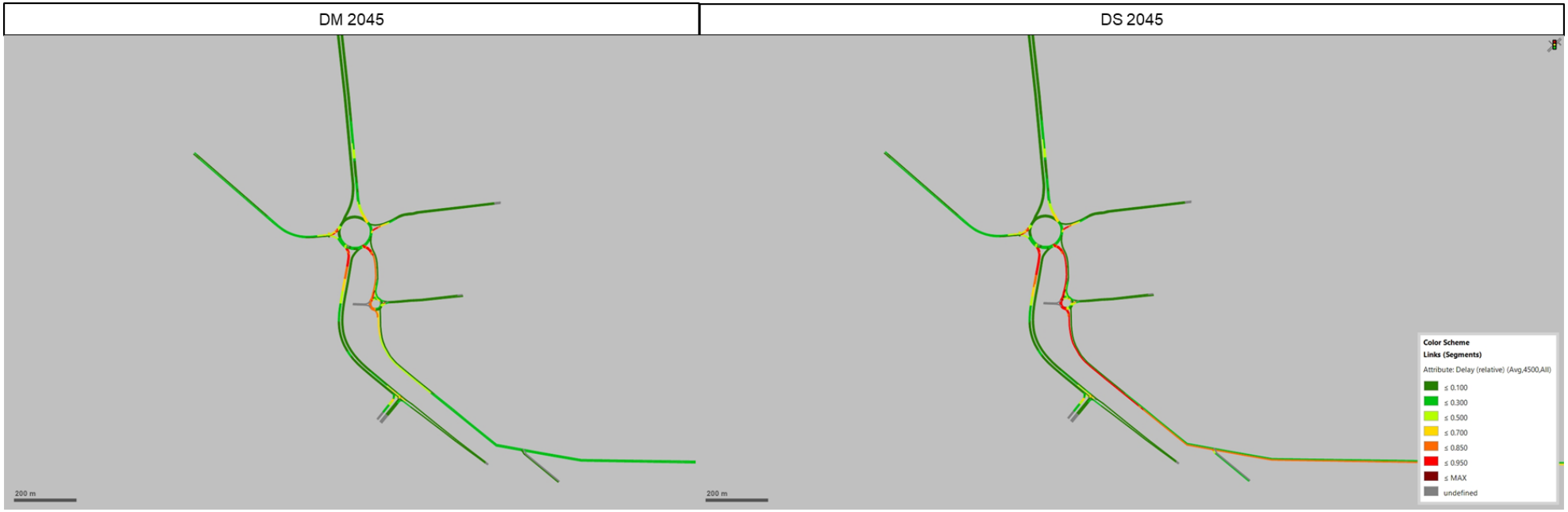
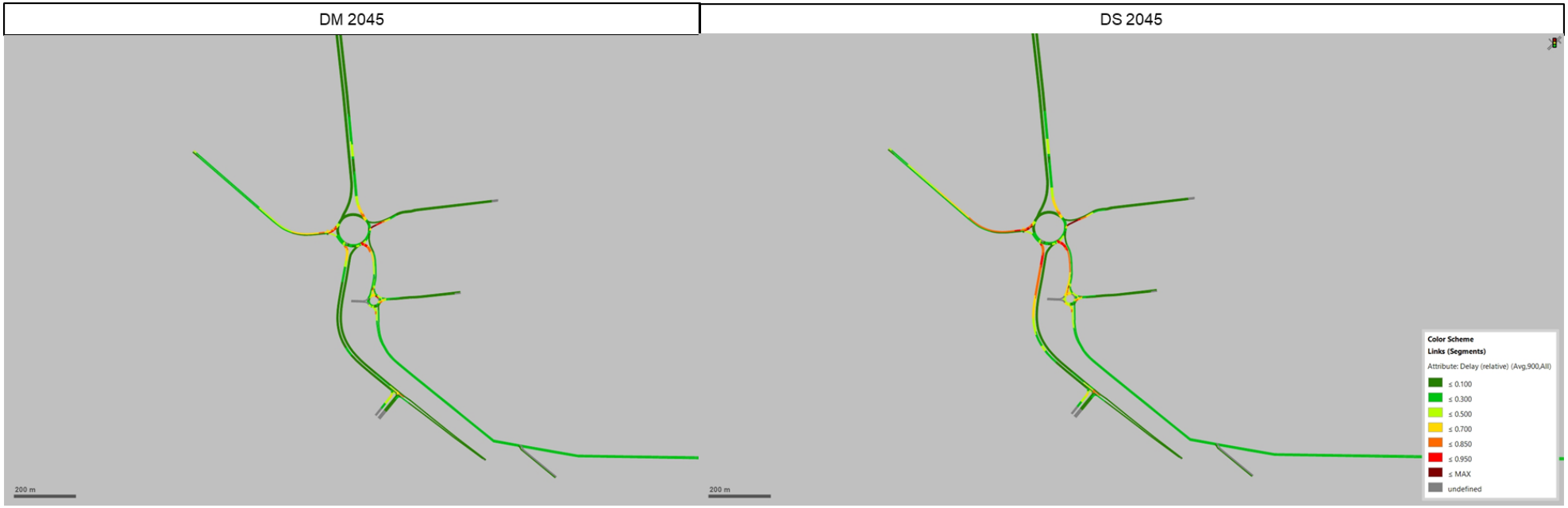


Plate 4.7 Relative delay plot (2045 DM and DS 17:00–18:00)



5 Conclusions

5.1.1 This report describes the development of the 2030 and 2045 Do Minimum (DM) and 2030 and 2045 Do Something (DS) VISSIM models of the Asda roundabout study area. It also compares the results between the four models.

5.1.2 The analysis of the 2030 and 2045 traffic conditions at the Asda roundabout show overall delays and queueing increase at the junction with the implementation of the Project in 2030 and 2045; particularly with an increase of queues on the A126 Dock Road by 78m in 2030 and by 1.2km in 2045 between 08:00–09:00 due to increase in traffic demand from Tilbury traveling to the A1089 via the A126 Dock Road.

5.1.3 Traffic conditions on the A126 Dock Road approach in the 08:00 – 09:00 hour are predicted to worsen with the increase traffic in the DS (with the Project) with increases in journey times and queues extending to the small roundabout providing the southern access to the London Distribution Park.

5.1.4 The analysis of the 2045 traffic condition at A1089 (South) approach shows an increase of queue by 131m in the PM peak. This is due to increase in traffic on this approach combine with an increase in opposing traffic from A126 Dock Road.

References

i-Transport LLP (2015). Transport Assessment London Distribution Park, Tilbury https://regs.thurrock.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NZG3LFQGMG700

Port of Tilbury London (2017). TILBURY2 document ref: POTLL/T2/EX/50 TR030003-000676-PoTLL_Non-Technical Summary v2 - Clean.pdf (planninginspectorate.gov.uk)

Transport for London (2017). Model Auditing Process (MAP) Version 3.5. Engineer Guide for Design Engineer (DE), Checking Engineer (CE) and Model Auditing Engineer (MAE). https://content.tfl.gov.uk/map-v3-5-engineer-guide.pdf

Transport for London (2021). Traffic Modelling Guidelines Version 4.0. https://content.tfl.gov.uk/traffic-modelling-guidelines.pdf

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
PTV	German for Planning Transport and Traffic Software package
Random Seed	This value initialises 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

Term	Explanation
TAG	Transport Analysis Guidance published by DfT
TfL	Transport for London - The integrated body responsible for London's transport system
VISSIM	Micro-simulation software developed by PTV. Verkehr In Städten - SIMulationsmodell (German for “Traffic in cities - simulation model”)
WB	Westbound

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