Lower Thames Crossing

7.9 Transport Assessment

(Part 3 of 3)

(Tracked changes version)

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Lower Thames Crossing

7.9 Transport Assessment (Tracked changes version)

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Phase 6

8.8.59 The forecast change in traffic flows on the network, as a result of the additional construction related vehicles and the impact of the traffic management measures on the routes chosen by drivers are shown in Plate 8.57 to Plate 8.62. The maps present the change in flows, north and south of the river, for each of the modelled time periods.

8.8.60 For all journey time routes where the time changes by more than a minute or more than 10%, in either direction, the with and without construction journey times are shown in Table 8.52 to Table 8.54.

Plate 8.57 Change in flow (PCUs), north of the River Thames, phase 6 AM peak

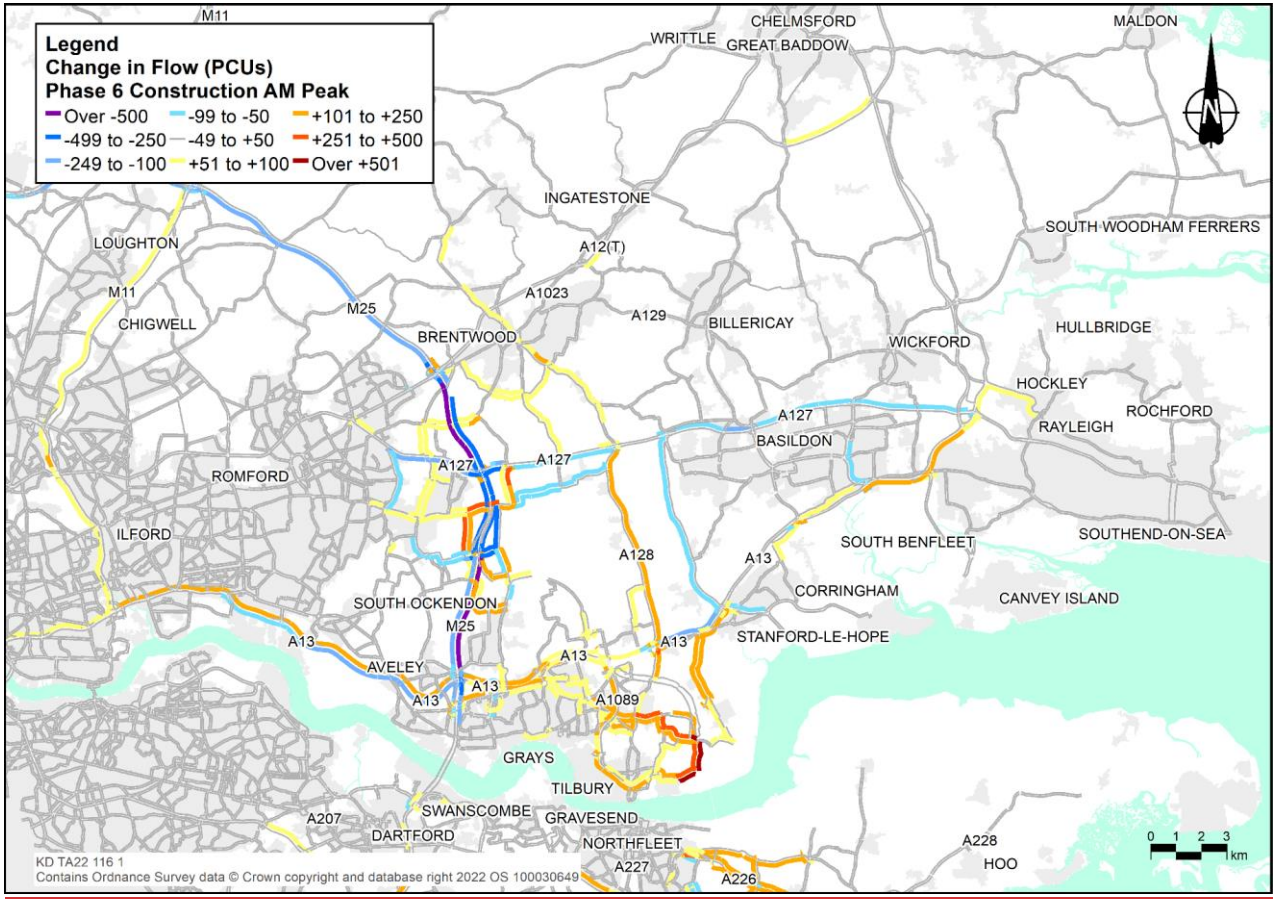


Plate 8.58 Change in flow (PCUs), north of the River Thames, phase 6 inter-peak

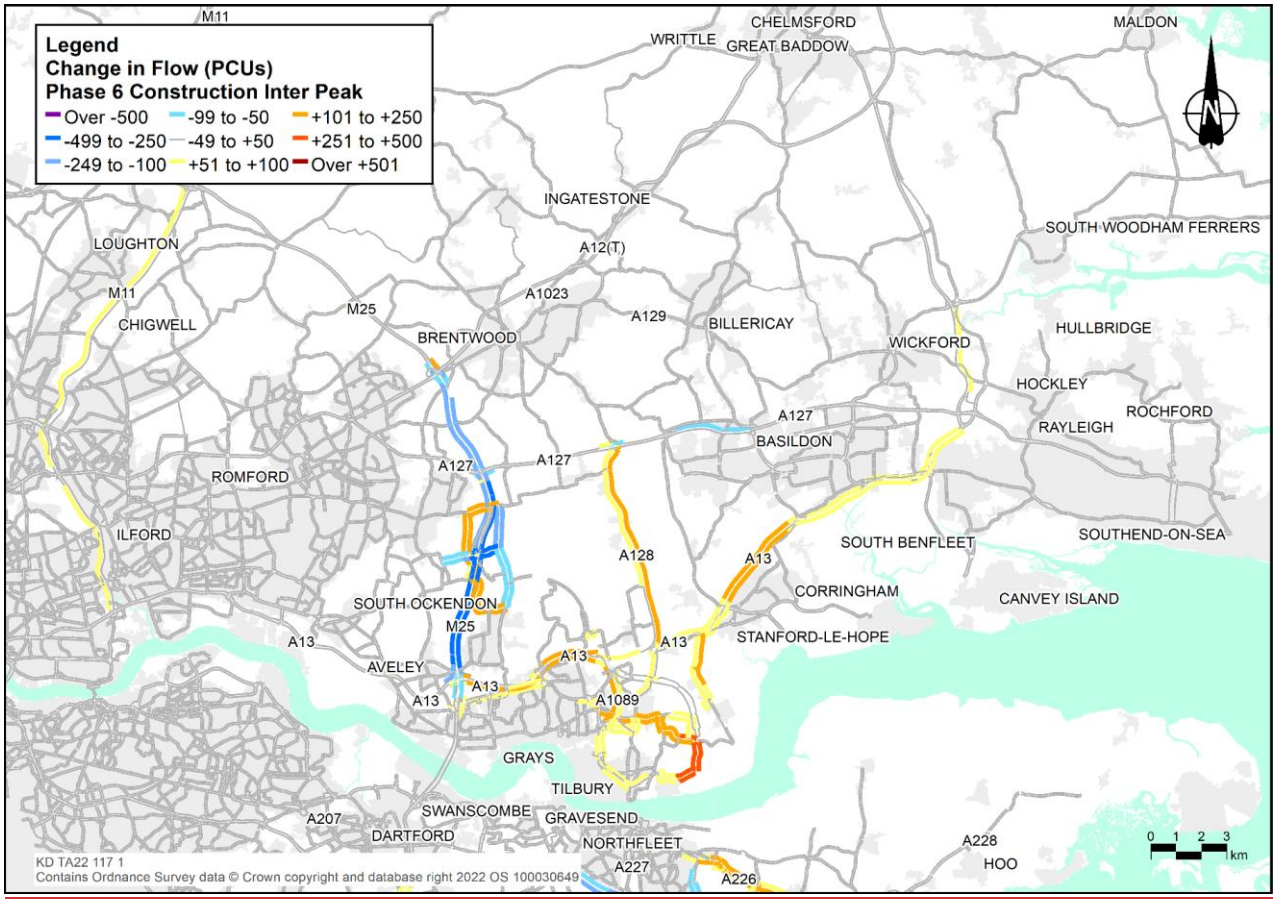


Plate 8.59 Change in flow (PCUs), north of the River Thames, phase 6 PM peak

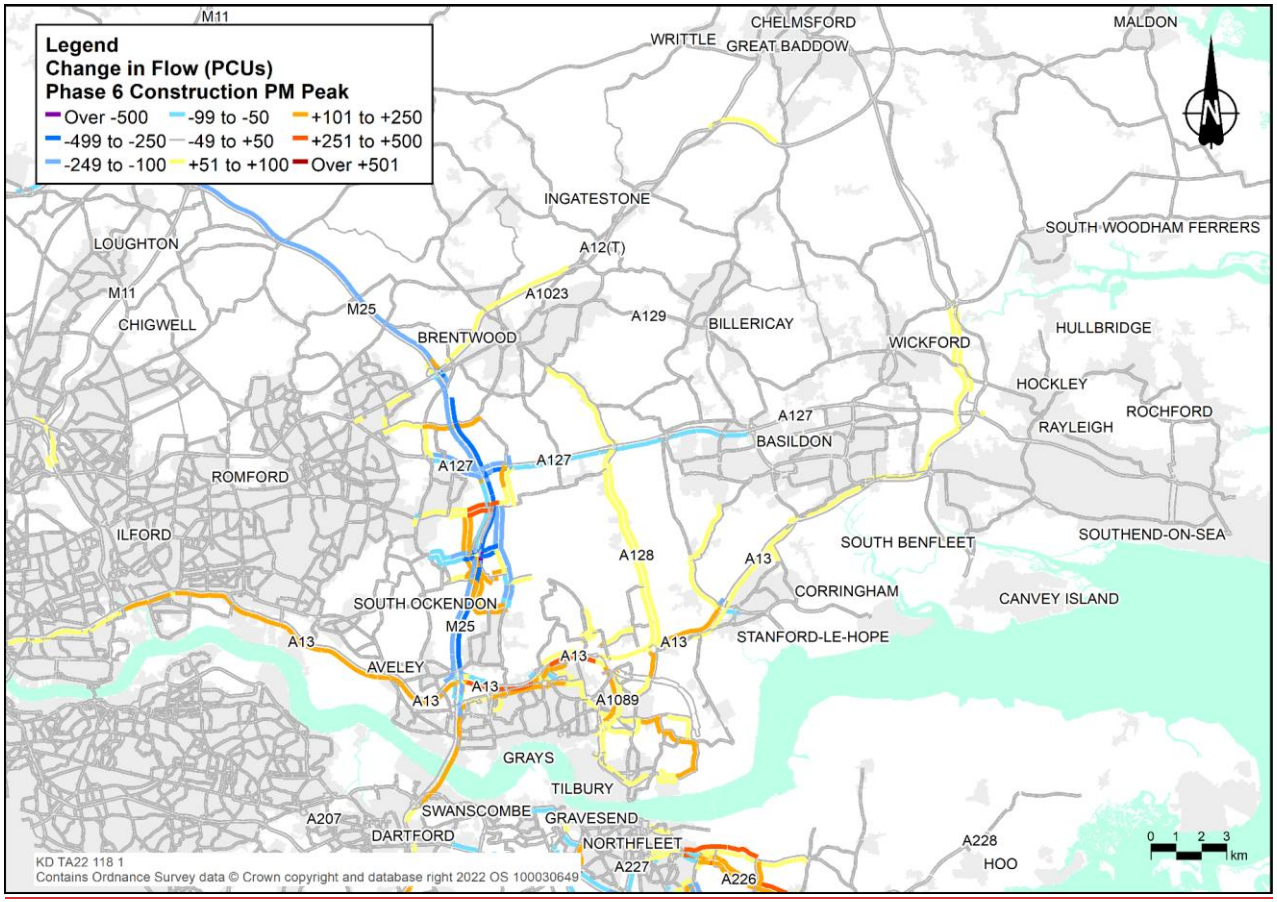


Plate 8.60 Change in flow (PCUs), south of the River Thames, phase 6 AM peak

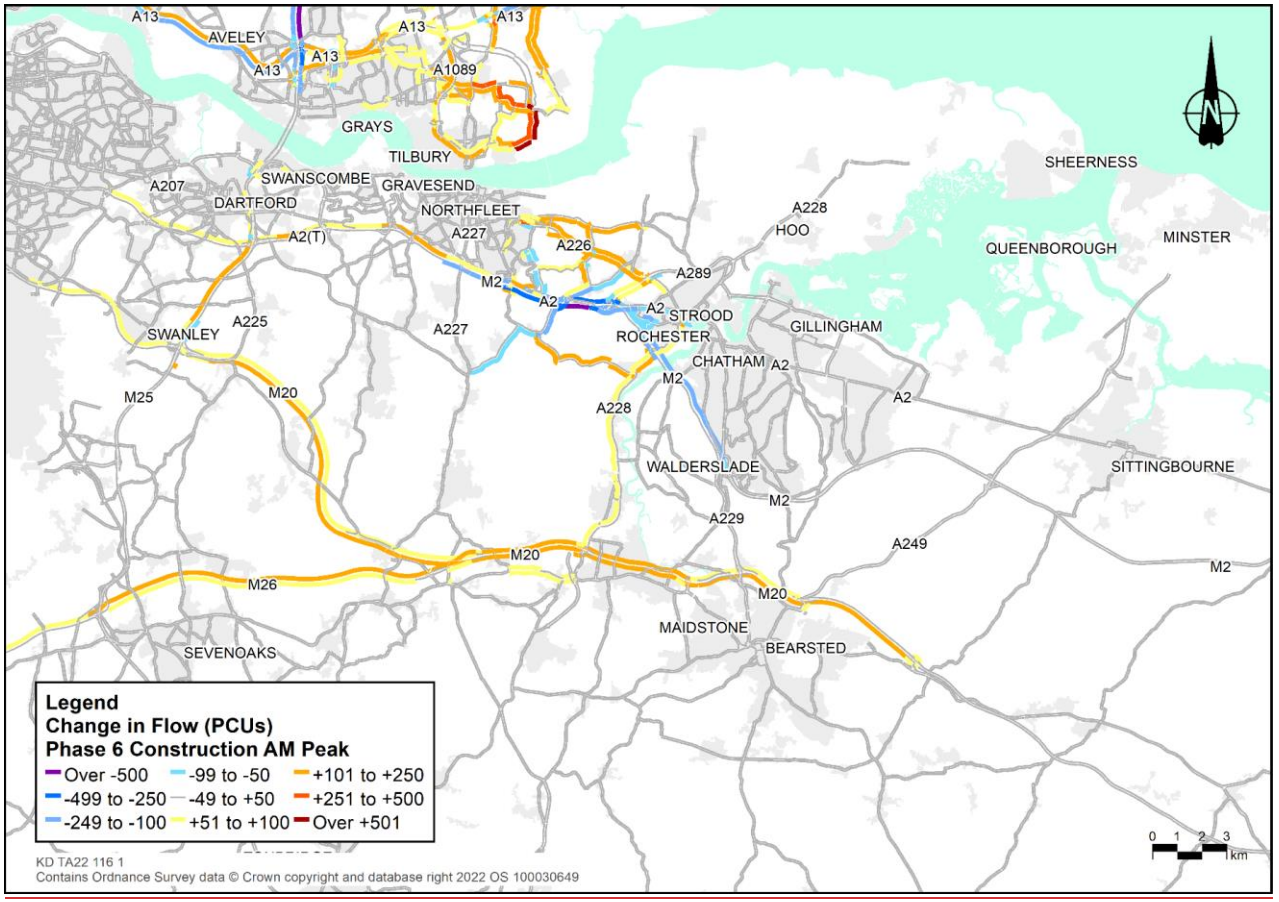


Plate 8.61 Change in flow (PCUs), south of the River Thames, phase 6 inter-peak

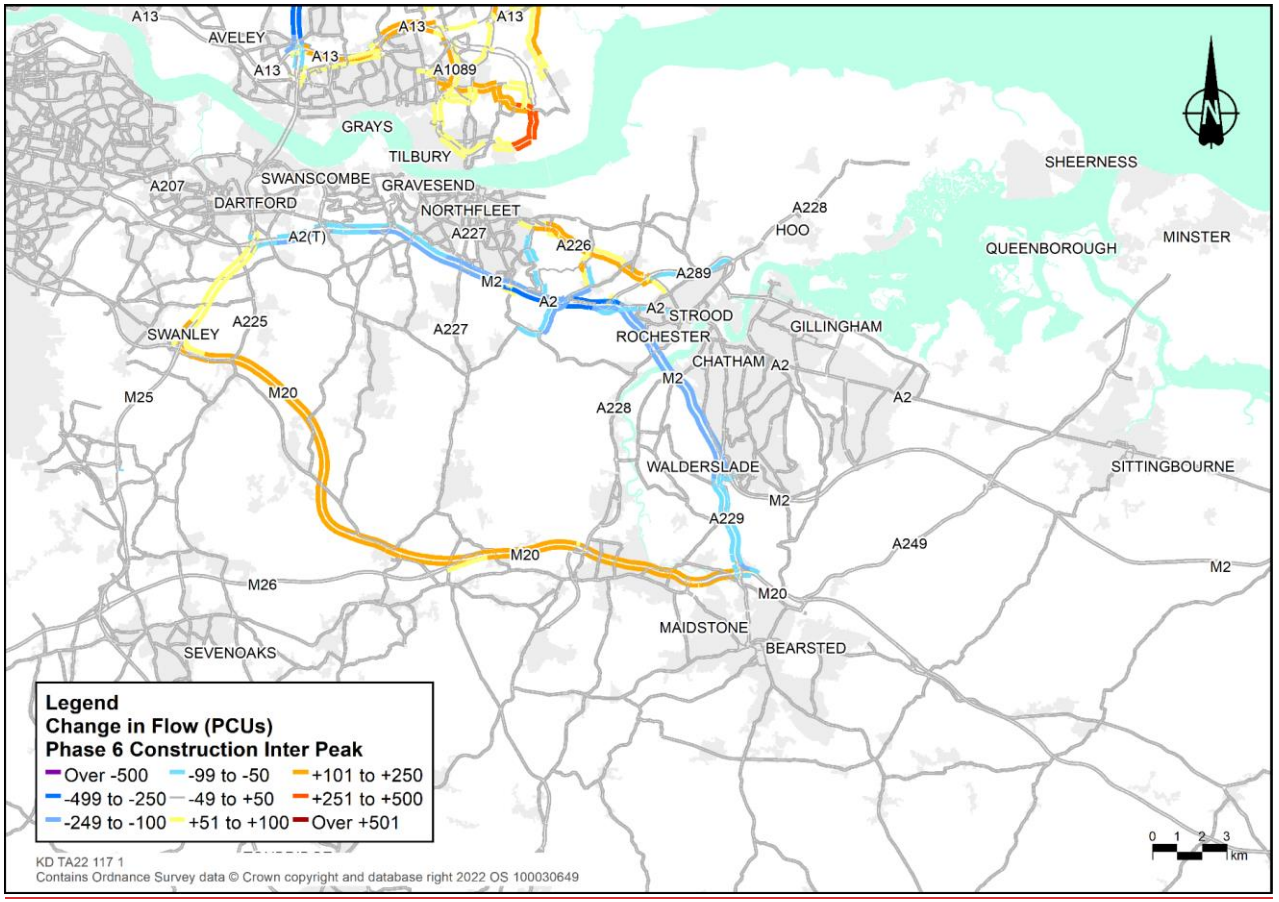


Plate 8.62 Change in flow (PCUs), south of the River Thames, phase 6 PM peak

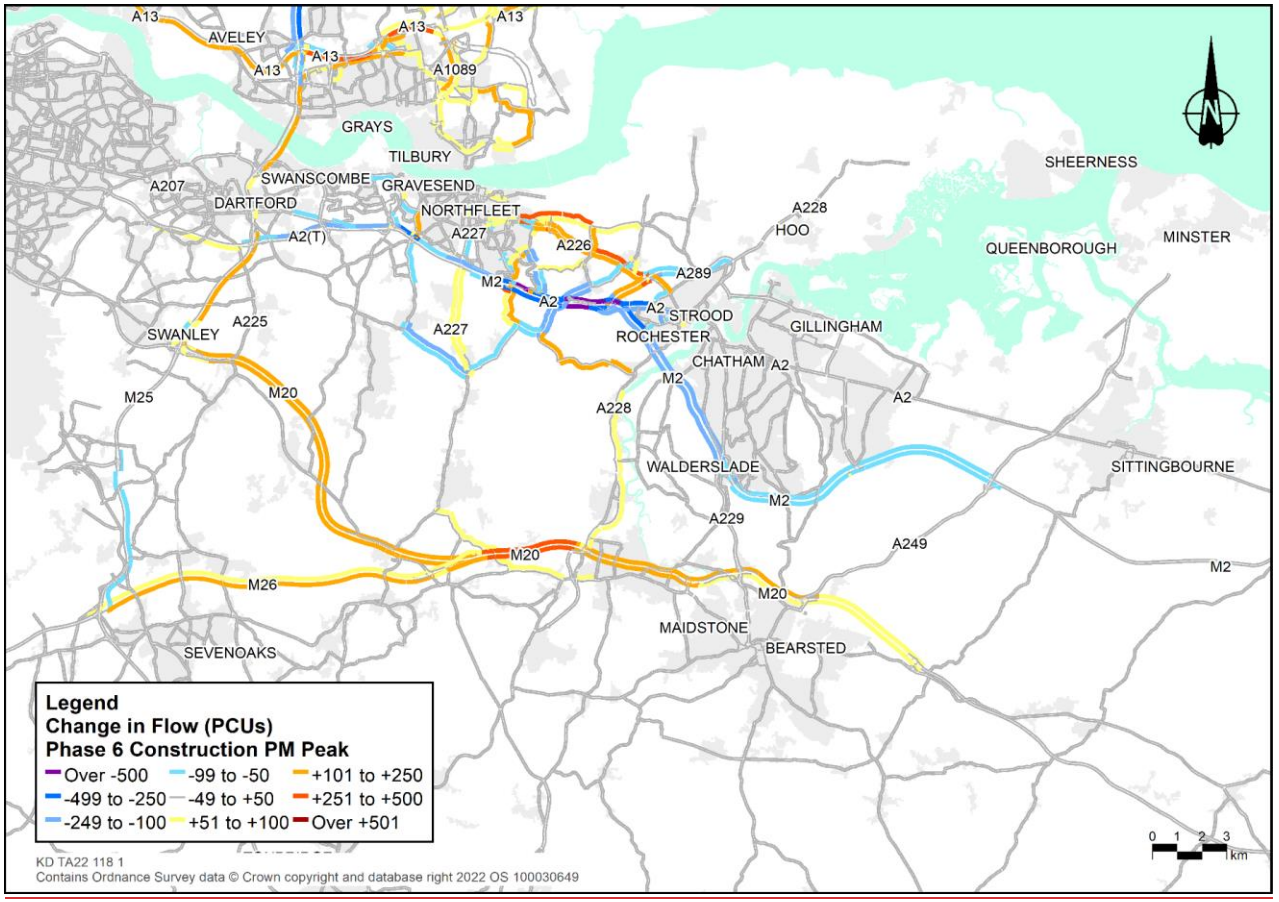


Table 8.52 Construction impact on journey times (phase 6 AM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	33.4	69.1	35.9	64.3	+2.5	-4.8	+7%	-7%
		SB	33.2	69.7	35.5	65.2	+2.3	-4.5	+7%	-6%
JT02	M2 junction 4 to A2/A2018	EB	20.7	100.0	22.3	92.8	+1.6	-7.2	+8%	-7%
		WB	30.1	68.6	32.1	64.2	+2.1	-4.4	+7%	-6%
JT03	A228: M20 to Strood	NB	14.2	49.7	14.5	48.9	+0.3	-0.8	+2%	-2%
		SB	17.8	39.8	18.9	37.5	+1.1	-2.3	+6%	-6%
JT05	A289	EB	3.7	93.4	3.6	94.2	-0.0	+0.8	-1%	+1%
		WB	7.2	60.4	9.3	46.5	+2.1	-13.9	+30%	-23%
JT07	A226	EB	9.5	48.4	10.2	45.1	+0.7	-3.3	+7%	-7%
		WB	11.7	39.4	13.1	35.1	+1.5	-4.4	+12%	-11%
JT11	A127	EB	26.1	59.0	27.3	56.6	+1.1	-2.4	+4%	-4%
		WB	35.8	43.0	37.5	41.1	+1.7	-1.9	+5%	-5%
JT13	Station Road/Fort Road/A1089	EB	11.9	64.2	12.3	62.4	+0.4	-1.8	+3%	-3%
		WB	11.1	67.1	12.5	59.4	+1.4	-7.7	+13%	-11%
JT20	East Tilbury Road/Muckingford Road	EB	6.8	53.4	7.5	48.5	+0.7	-4.9	+11%	-9%
		WB	6.9	52.5	7.2	50.6	+0.3	-1.9	+4%	-4%
JT22	Baker Street/Heath Road	NB	3.7	47.7	4.5	42.1	+0.8	-5.6	+22%	-12%
		SB	3.5	51.0	4.6	41.6	+1.1	-9.4	+32%	-18%
JT25	A2 (Strood)	EB	6.4	33.7	6.4	33.5	+0.0	-0.2	+1%	-1%
		WB	8.3	35.8	10.3	29.0	+2.0	-6.8	+23%	-19%

Table 8.53 Construction impact on journey times (phase 6 inter-peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	29.8	77.5	31.3	73.7	+1.6	-3.8	+5%	-5%
		SB	26.5	87.4	28.1	82.3	+1.6	-5.1	+6%	-6%
JT02	M2 junction 4 to A2/A2018	EB	20.5	101.0	21.9	94.3	+1.5	-6.6	+7%	-7%
		WB	21.9	94.3	23.1	89.2	+1.3	-5.1	+6%	-5%
JT05	A289	EB	3.4	100.3	3.4	100.6	0.0	+0.3	0%	+0%
		WB	4.4	98.1	5.7	76.1	+1.3	-22.1	+29%	-22%
JT22	Baker Street/Heath Road	NB	3.4	52.5	4.1	47.1	+0.7	-5.5	+20%	-10%
		SB	3.3	53.3	4.3	44.9	+0.9	-8.4	+28%	-16%
JT25	A2 (Strood)	EB	6.0	35.6	6.0	35.8	-0.0	+0.2	-1%	+1%
		WB	6.2	48.1	7.3	40.6	+1.2	-7.6	+19%	-16%

Table 8.54 Construction impact on journey times phase 6 PM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	30.0	77.0	31.8	72.6	+1.8	-4.4	+6%	-6%
		SB	30.4	76.2	33.0	70.2	+2.6	-6.1	+9%	-8%
JT02	M2 junction 4 to A2/A2018	EB	27.0	76.7	30.4	68.1	+3.4	-8.6	+13%	-11%
		WB	24.5	84.1	26.4	78.2	+1.8	-5.9	+7%	-7%
JT05	A289	EB	6.3	54.3	4.8	71.2	-1.5	+16.8	-24%	+31%
		WB	4.7	91.4	6.7	64.8	+2.0	-26.6	+41%	-29%
JT07	A226	EB	11.1	41.5	13.0	35.3	+2.0	-6.2	+18%	-15%
		WB	9.9	46.7	11.1	41.6	+1.2	-5.1	+12%	-11%
JT11	A127	EB	29.7	51.9	30.3	50.9	+0.6	-1.0	+2%	-2%
		WB	26.9	57.2	28.1	54.7	+1.2	-2.5	+5%	-4%
JT12	A13	EB	23.9	62.7	24.3	61.7	+0.4	-1.1	+2%	-2%
		WB	20.3	73.5	21.5	69.6	+1.1	-3.9	+6%	-5%
JT22	Baker Street/Heath Road	NB	3.6	49.0	4.3	44.6	+0.7	-4.5	+18%	-9%
		SB	4.4	40.4	5.4	35.4	+1.0	-5.0	+23%	-12%
JT25	A2 (Strood)	EB	7.3	29.7	6.9	31.4	-0.4	+1.7	-5%	+6%
		WB	7.8	38.0	9.9	30.2	+2.0	-7.8	+26%	-21%
JT28	M20	WB	19.2	101.6	19.4	100.7	+0.2	-0.9	+1%	-1%
		EB	22.6	85.2	23.8	81.1	+1.2	-4.1	+5%	-5%

8.8.61 The flow difference plots show the changes in total flow in the areas directly impacted by the traffic management and Project related construction traffic. M25 narrow lanes and a 60mph speed restriction continues in both directions (RNTM65 and RNTM64). This would lead to a reduction in flow on the M25 between junctions 29 and 30. Narrow lanes on the A127 (RNTM74) and a 50mph speed restriction would cause significant delays and reduction in traffic on the A127 and around the M25 junction 29. These would shift traffic away from the motorway with some dispersed to the B186 and A128.

8.8.62 The Ockendon Road closure (RNTM58) would cause traffic to reroute to Pike Lane and St. Marys Lane. Narrow lanes and a 50mph restriction on the A2 (RSTM15) would cause flow reduction along that section and an increase in flow on the M20. There would be Project related construction traffic on Muckingford Road, Marshfoot Road, Station Road and the A226 causing flow increases at those locations.

8.8.63 The journey time analysis shows that the M25 (JT01) would experience additional delay of approximately one to three minutes in both directions and all time periods. This is a result of the narrow lanes and 60 mph speed limit on the M25 in both directions (RNTM64 and RNTM65).

8.8.64 M2 junction 4 to A2/A2018 (JT02) would experience additional delay of approximately one to three minutes in both directions and each time period due to the introduction of narrow lanes (RSTM15).

8.8.65 The A228 (JT03) would experience additional delay of around one minute in the southbound direction in the AM peak due to two junctions along the route experiencing increased delays. The junction with Holborough Road in Snodland and the junction with Sycamore Road in Strood would both be above capacity in the Do Minimum, and the small increase in flow in the construction scenario would lead to an increase in delay.

8.8.66 The A289 (JT05) would experience additional delay of approximately one to two and a half minutes in the westbound direction in each time period because of the narrow lanes on the A2. In the eastbound direction there would be a reduction in journey time in the eastbound direction in the PM peak hour of approximately one minute.

8.8.67 A226 (JT07) would experience additional delay of approximately one to two minutes in both directions in the AM and PM peak hours. This is related to traffic diverting off of the A2 due to the narrow lanes on the A2 (RSTM15) during this phase.

8.8.68 There would be additional delay along the A127 (JT11) in the AM and PM peak time periods. This occurs due to the introduction of narrow lanes (RNTM74).

8.8.69 There would be additional delay on the A13 westbound (JT12) in the PM peak as a result of Project related construction traffic increasing the flow on the road.

8.8.70 There would be additional delays along journey time route Station Road / Fort Road / A1089 (JT13) in the AM peak hour particularly in the westbound direction. The additional delay would be caused by an increase in traffic on the A1089 which would cause additional delays, in particular at the Asda Roundabout and at the A1089 Westbound on-slip to the A13.

8.8.71 There would be a slight increase in delay along the East Tilbury Road/Muckingford Road journey time route (JT20) in the AM peak. The increase would be less than a minute but equates to a 10% increase and is caused by Project related construction traffic increasing the flows along the route.

8.8.72 There would be increases along Baker Street/ Heath Road (JT22) of about a minute in all time periods. This is due to the switchover (RNTM97) and crossing points (RNTM39, RNTM107) on Baker Street plus a small amount of increased traffic flow.

8.8.73 The A2 in Strood (JT25) would experience additional delay of approximately one to two minutes in the westbound direction in all time periods. In the eastbound direction there are very minor reductions in journey time in each time period. This would occur due to blocking back from the A289 WB on-slip joining the A2 at the point where narrow lanes are introduced.

8.8.74 The M20 (JT28) would experience additional eastbound delay of around one minute in the PM peak. This is due to a reassignment of traffic away from the A2 leading to increases on the M20.

Phase 7

8.8.75 The forecast change in traffic flows on the network, as a result of the additional construction related vehicles and the impact of the traffic management measures on the routes chosen by drivers are shown in Plate 8.63 to Plate 8.68. The maps present the change in flows, north and south of the River Thames, for each of the modelled time periods

8.8.76 For all journey time routes where the time changes by more than a minute or more than 10%, in either direction, the with and without construction journey times are shown in Table 8.55 to Table 8.57.

Plate 8.63 Change in flow (PCUs), north of the River Thames, phase 7 AM peak

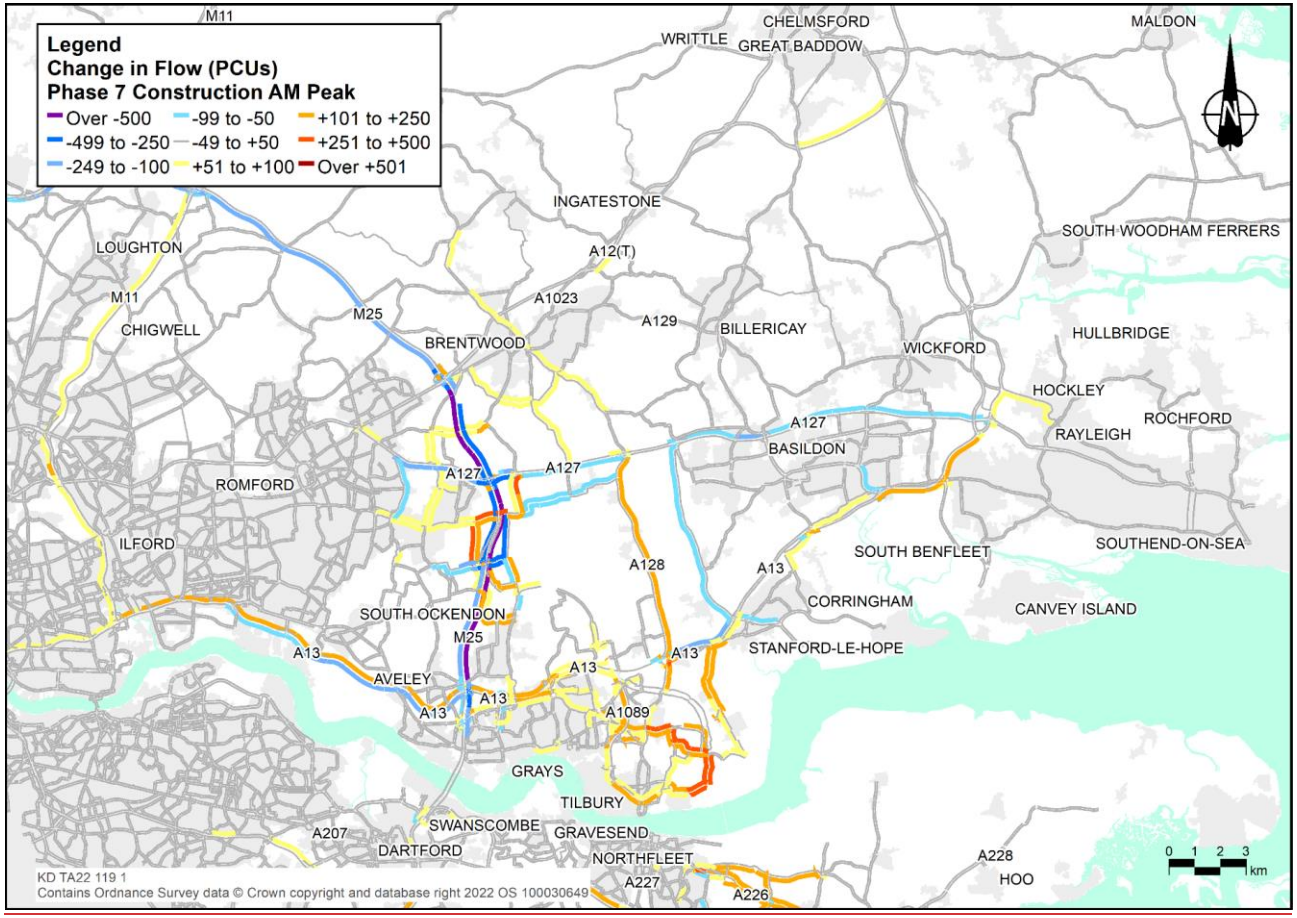


Plate 8.64 Change in flow (PCUs), north of the River Thames, phase 7 inter-peak

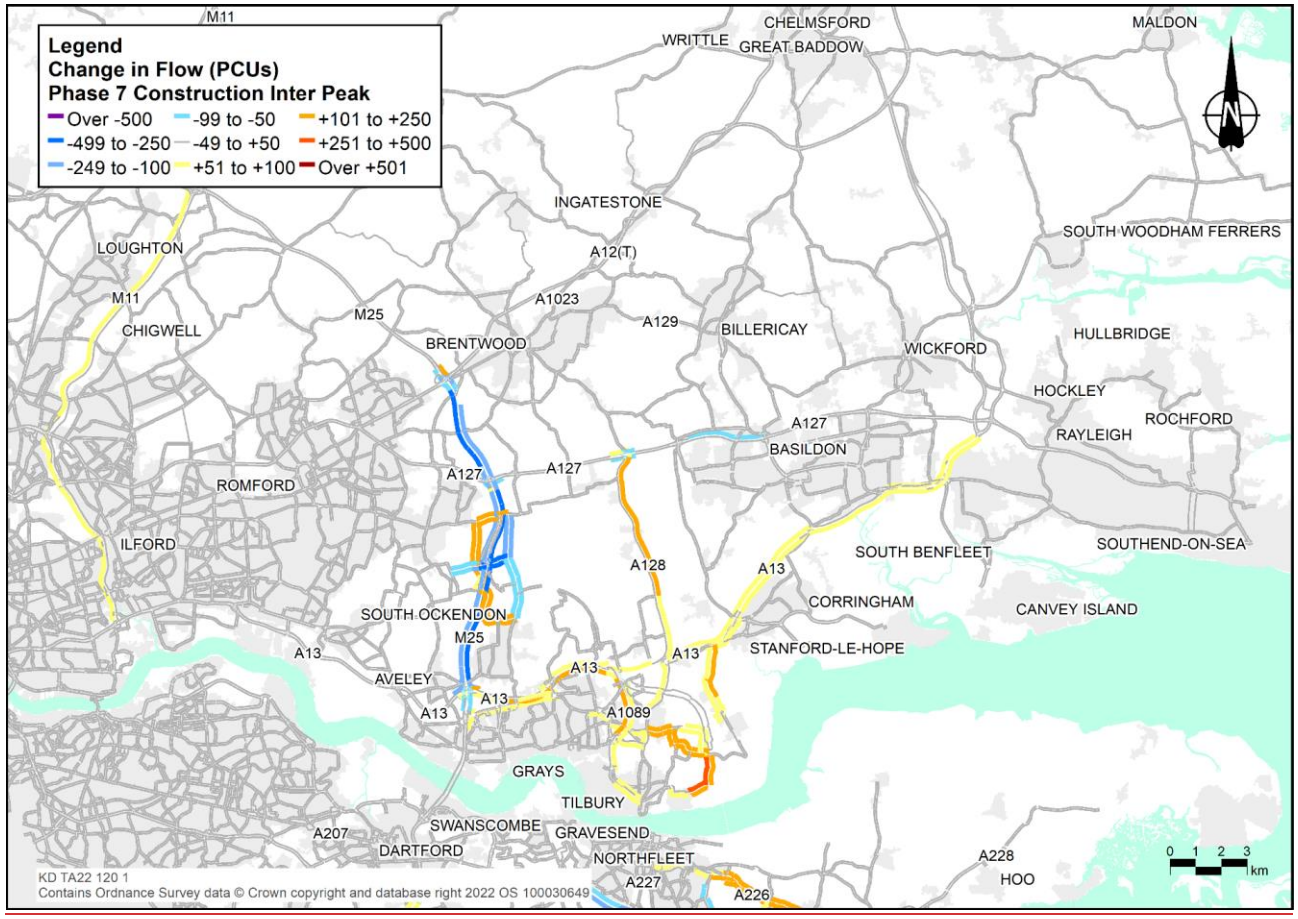


Plate 8.65 Change in flow (PCUs), north of the River Thames, phase 7 PM peak

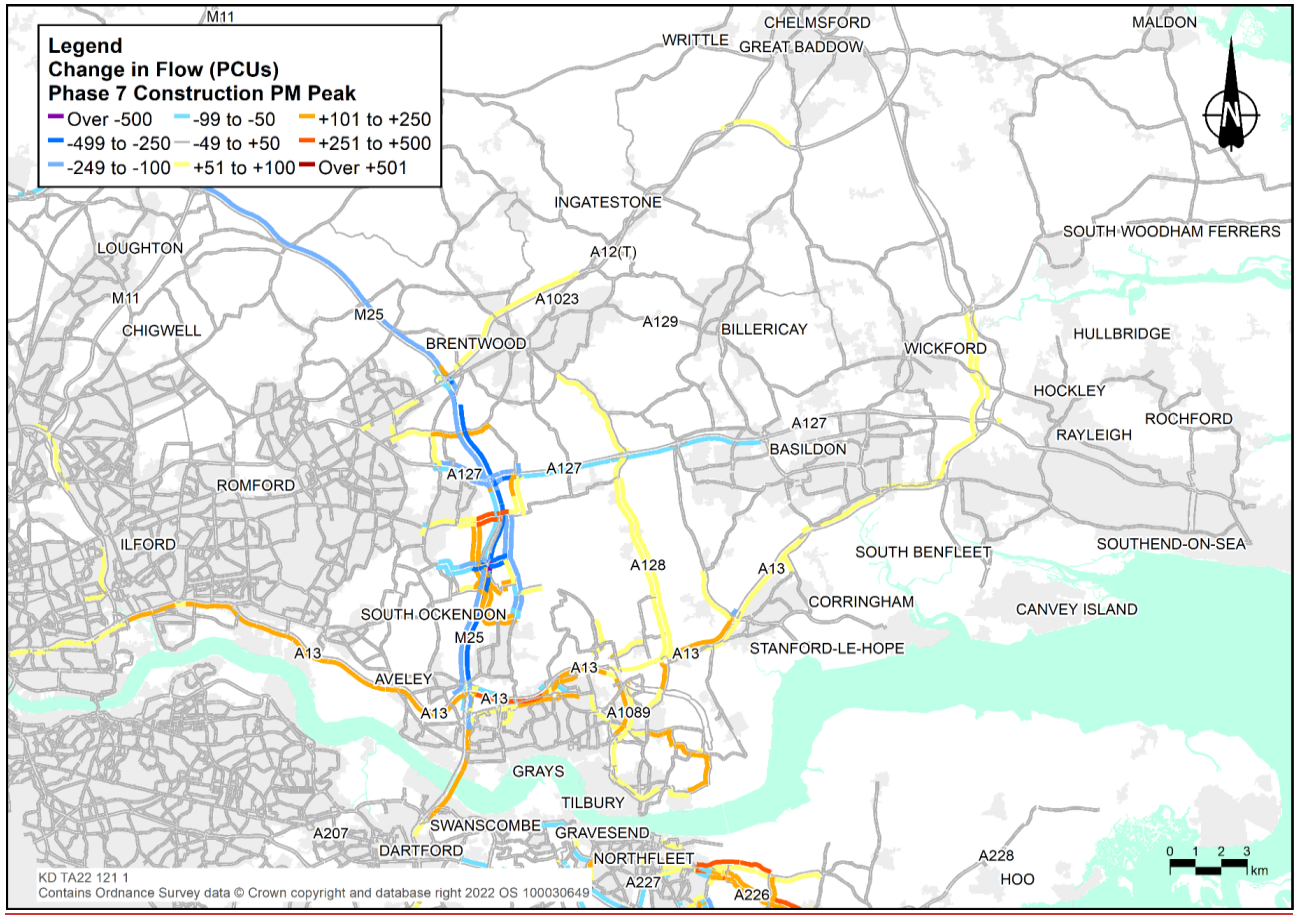


Plate 8.66 Change in flow (PCUs), south of the River Thames, phase 7 AM peak

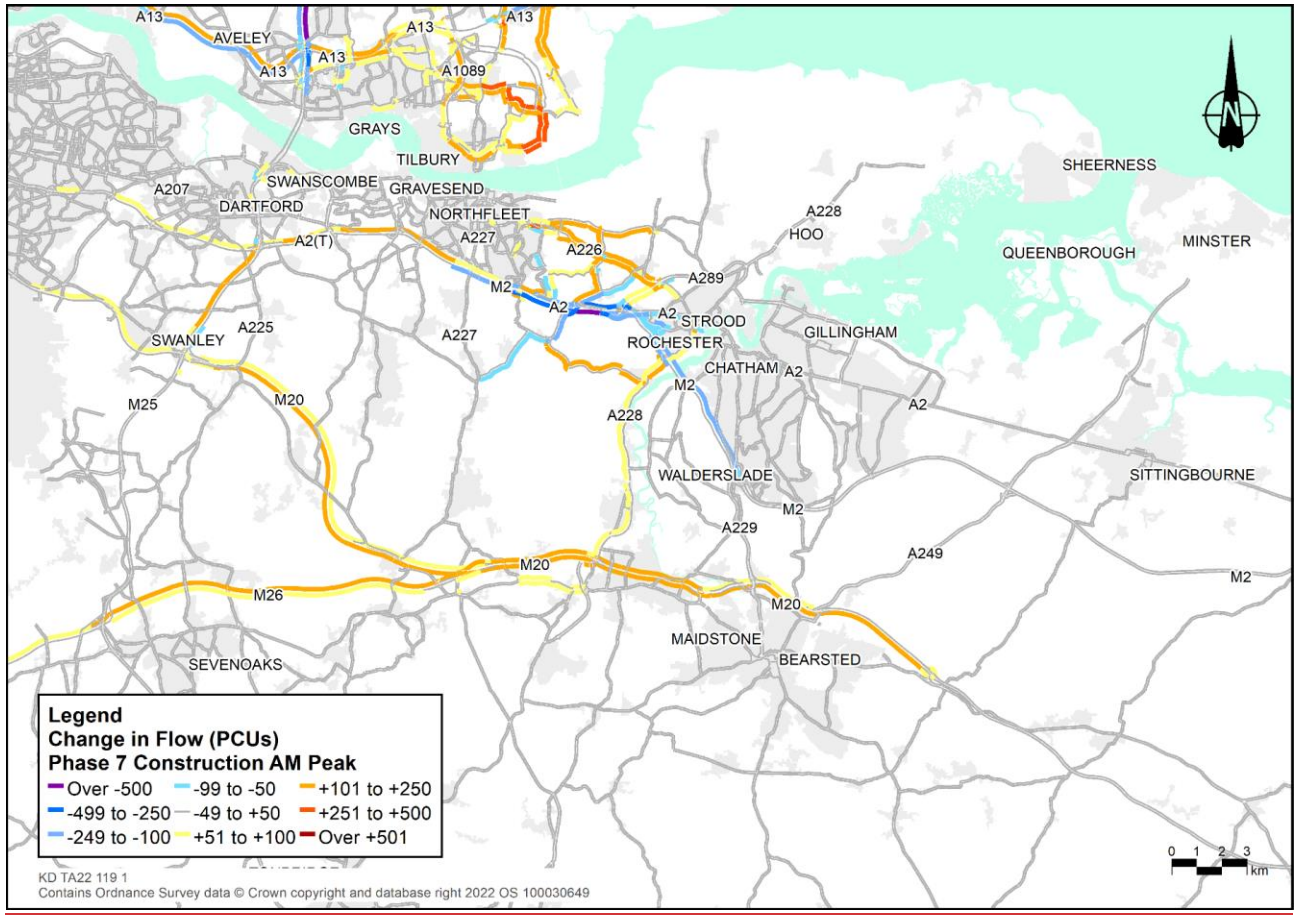


Plate 8.67 Change in flow (PCUs), south of the River Thames, phase 7 inter-peak

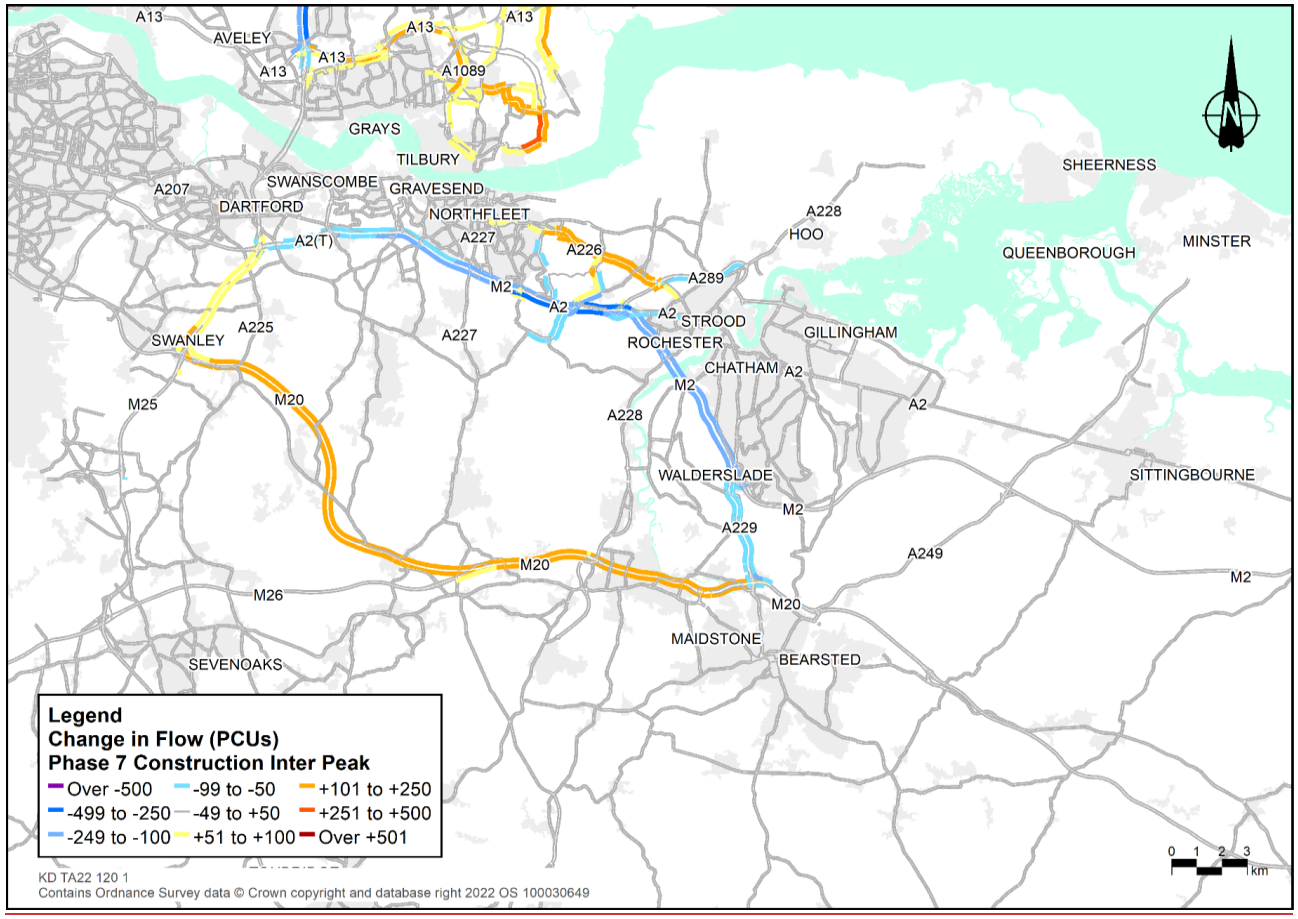


Plate 8.68 Change in flow (PCUs), south of the River Thames, phase 7 PM peak

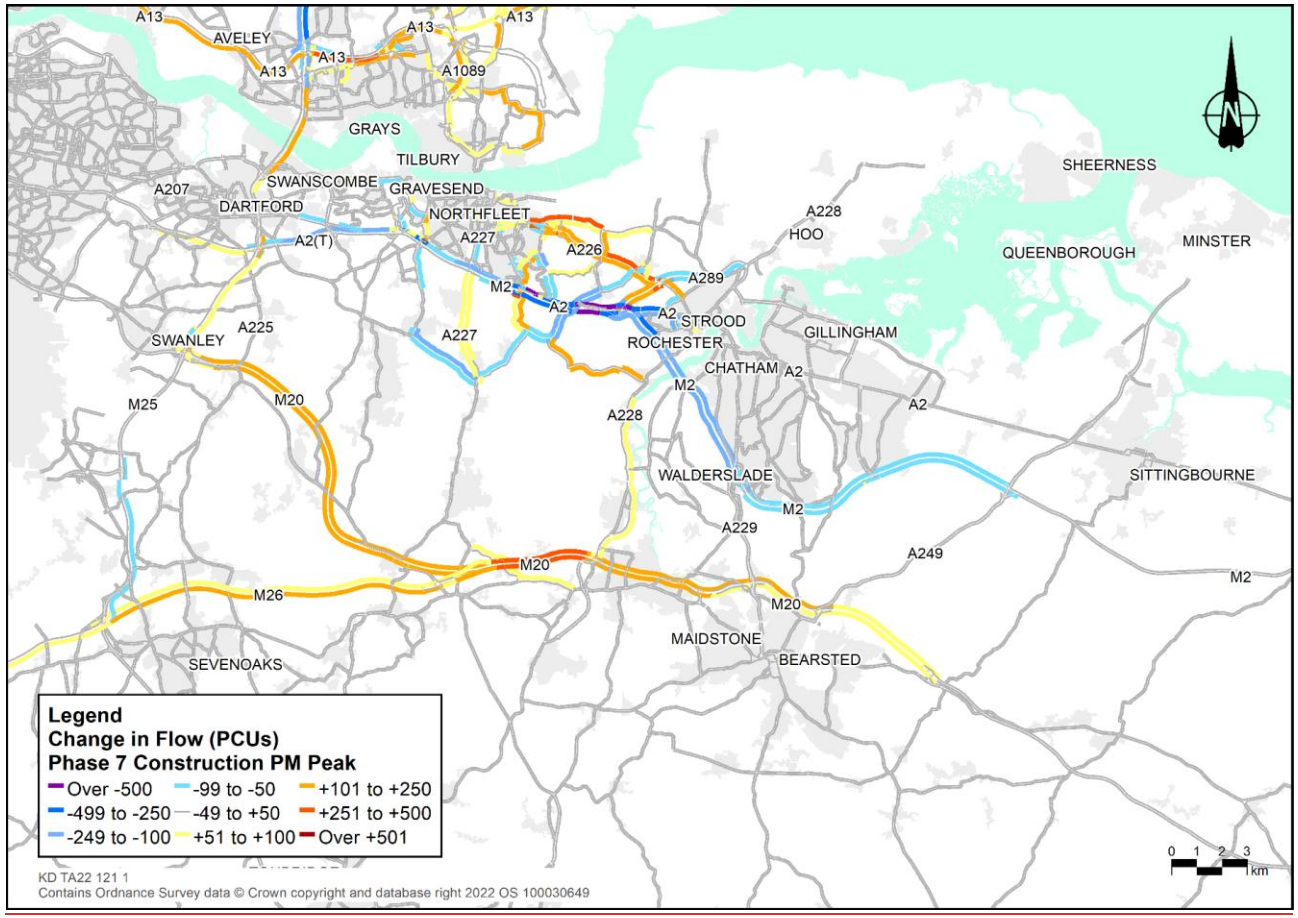


Table 8.55 Construction impact on journey times (phase 7 AM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	33.4	69.1	35.8	64.6	+2.4	-4.6	+7%	-7%
		SB	33.2	69.7	35.5	65.2	+2.3	-4.5	+7%	-6%
JT02	M2 junction 4 to A2/A2018	EB	20.7	100.0	22.3	92.8	+1.6	-7.2	+8%	-7%
		WB	30.1	68.6	32.1	64.2	+2.1	-4.4	+7%	-6%
JT03	A228: M20 to Strood	NB	14.2	49.7	14.5	48.9	+0.3	-0.8	+2%	-2%
		SB	17.8	39.8	18.9	37.5	+1.1	-2.3	+6%	-6%
JT05	A289	EB	3.7	93.4	3.6	94.2	-0.0	+0.8	-1%	+1%
		WB	7.2	60.4	9.3	46.6	+2.1	-13.8	+30%	-23%
JT07	A226	EB	9.5	48.4	10.3	44.9	+0.8	-3.5	+8%	-7%
		WB	11.7	39.4	13.1	35.1	+1.5	-4.4	+12%	-11%
JT11	A127	EB	26.1	59.0	27.3	56.6	+1.1	-2.4	+4%	-4%
		WB	35.8	43.0	37.4	41.2	+1.6	-1.9	+4%	-4%
JT13	Station Road/Fort Road/A1089	EB	11.9	64.2	12.2	62.6	+0.3	-1.6	+3%	-2%
		WB	11.1	67.1	12.1	61.4	+1.0	-5.6	+9%	-8%
JT22	Baker Street/Heath Road	NB	3.7	47.7	4.5	42.3	+0.8	-5.4	+21%	-11%
		SB	3.5	51.0	4.6	41.6	+1.1	-9.4	+32%	-18%
JT25	A2 (Strood)	EB	6.4	33.7	6.4	33.5	+0.0	-0.2	+1%	-1%
		WB	8.3	35.8	10.3	29.0	+1.9	-6.7	+23%	-19%

Table 8.56 Construction impact on journey times (phase 7 inter-peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	29.8	77.5	31.3	73.8	+1.5	-3.7	+5%	-5%
		SB	26.5	87.4	28.1	82.4	+1.6	-5.0	+6%	-6%
JT02	M2 junction 4 to A2/A2018	EB	20.5	101.0	21.9	94.3	+1.5	-6.6	+7%	-7%
		WB	21.9	94.3	23.1	89.2	+1.3	-5.2	+6%	-5%
JT05	A289	EB	3.4	100.3	3.4	100.6	-0.0	+0.3	0%	+0%
		WB	4.4	98.1	5.7	76.5	+1.3	-21.6	+28%	-22%
JT22	Baker Street/Heath Road	NB	3.4	52.5	4.1	47.1	+0.7	-5.4	+20%	-10%
		SB	3.3	53.3	4.2	45.1	+0.9	-8.2	+27%	-15%
JT25	A2 (Strood)	EB	6.0	35.6	6.0	35.8	-0.0	+0.2	-1%	+1%
		WB	6.2	48.1	7.3	40.7	+1.1	-7.4	+18%	-15%

Table 8.57 Construction impact on journey times (phase 7 PM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	30.0	77.0	31.8	72.6	+1.8	-4.4	+6%	-6%
		SB	30.4	76.2	33.0	70.3	+2.6	-5.9	+8%	-8%
JT02	M2 junction 4 to A2/A2018	EB	27.0	76.7	30.3	68.2	+3.4	-8.5	+12%	-11%
		WB	24.5	84.1	26.3	78.3	+1.8	-5.8	+7%	-7%
JT05	A289	EB	6.3	54.3	4.8	71.3	-1.5	+17.0	-24%	+31%
		WB	4.7	91.4	6.7	65.0	+1.9	-26.5	+41%	-29%
JT07	A226	EB	11.1	41.5	13.0	35.4	+2.0	-6.2	+18%	-15%
		WB	9.9	46.7	11.1	41.6	+1.2	-5.1	+12%	-11%
JT11	A127	EB	29.7	51.9	30.2	51.0	+0.6	-0.9	+2%	-2%
		WB	26.9	57.2	28.0	54.9	+1.2	-2.3	+4%	-4%
JT12	A13	EB	23.9	62.7	24.2	61.8	+0.4	-0.9	+1%	-1%
		WB	20.3	73.5	21.4	69.8	+1.1	-3.7	+5%	-5%
JT22	Baker Street/Heath Road	NB	3.6	49.0	4.3	44.6	+0.7	-4.4	+18%	-9%
		SB	4.4	40.4	5.4	35.5	+1.0	-4.9	+22%	-12%
JT25	A2 (Strood)	EB	7.3	29.7	6.9	31.4	-0.4	+1.7	-5%	+6%
		WB	7.8	38.0	9.8	30.4	+2.0	-7.7	+25%	-20%
JT28	M20	WB	19.2	101.6	19.4	100.7	+0.2	-0.9	+1%	-1%
		EB	22.6	85.2	23.7	81.2	+1.1	-4.0	+5%	-5%

8.8.77 The flow difference plots show the changes in total flow in the areas directly impacted by the traffic management and Project related construction traffic. Theresults are very similar to those of phase 6. Narrow lanes on the M25 and a 60mph speed restriction continue in both directions (RNTM65 and RNTM64), would lead to a reduction in flow on the M25 between junction 29 and 30. Narrow lanes on the A127 (RNTM74) and 50mph speed restriction would cause delays and a consequent reassignment of traffic. The M25 and A127 traffic affected by this instead would reroute away from the motorway, with some dispersed to the B186 and A128. The Ockendon Road closure (RNTM58) would cause traffic to be diverted to Pike Lane and St. Marys Lane. Narrow lanes and a 50mph speed restriction on the A2 (RSTM15) would cause reassignment from the A2 to the A226 M20, amongst other routes. Project related construction traffic on Muckingford Road, Marshfoot Road, Station Road and the A226 would cause flow increases at those locations.

8.8.78 The journey time analysis shows that the M25 (JT01) would experience additional delay of approximately one to two minutes in both directions and all time periods due to narrow lanes (RNTM64 & RNTM65).

8.8.79 M2 junction 4 to A2/A2018 (JT02) would experience additional delay of approximately one to three minutes in both directions and in all time periods. This is due to the narrow lanes on the A2 (RSTM15).

8.8.80 The A228 route (JT03) would experience additional southbound delay in the AM peak. This is due to two junctions along the route experiencing increased delays. The junction with Holborough Road in Snodland and the junction with Sycamore Road in Strood are both above capacity in the Do Minimum, and the small increase in flow in the construction scenario leads to larger increases in delay.

8.8.81 A289 (JT05) would experience additional delay of approximately one to two and half minutes in the westbound direction in all time periods because of the narrow lanes on the A2 (RSTM15). In the eastbound direction there is a reduction in journey time in the PM peak hour of approximately one minute.

8.8.82 A226 (JT07) would experience additional delay of approximately one to two minutes in both directions in the AM and PM peak hours. This is related to traffic diverting off of the A2 due to the narrow lanes (RSTM15).

8.8.83 A127 (JT11) would experience additional delay of approximately half a minute to two minutes in both directions in the AM and PM peak hours. This occurs due to the introduction of narrow lanes (RNTM74).

8.8.84 There would be additional delays along the A13 (JT12) in the westbound direction in the PM peak. This is due to Project related construction traffic increasing flow on the road.

8.8.85 There would be additional predicted delays along journey time route Station Road / Fort Road / A1089 (JT13) in the AM peak hour particularly in the westbound direction. The additional delay is caused by an increase in traffic on the A1089 which would cause additional delays, in particular at the ASDA roundabout and at the A1089 Westbound on-slip to the A13.

8.8.86 There would be additional delays of between half a minute and one minute on Baker Street / Heath Road (JT22) in all time periods in both directions. This is due to the switchover (RNTM97) and crossing points (RNTM39, RNTM107) on Baker Street plus a small amount of increased traffic flow.

8.8.87 The A2 in Strood (JT25) would experience additional delay of approximately one to two minutes in the westbound direction in all time periods period. This is due to narrow lanes on the A2 (RSTM15).

8.8.88 There would be additional delays along the M20 (JT28) in the PM peak eastbound direction. This is due to increased traffic which has reassigned from the A2 in response to narrow lanes (RSTM15).

Phase 8

8.8.89 The forecast change in traffic flows on the network, as a result of the additional construction related vehicles and the impact of the traffic management measures on the routes chosen by drivers are shown in Plate 8.69 to Plate 8.74. The maps present the change in flows, north and south of the river, for each of the modelled time periods.

8.8.90 For all journey time routes where the time changes by more than a minute or more than 10%, in either direction, the with and without construction journey times are shown in Table 8.58 to Table 8.60.

Plate 8.69 Change in flow (PCUs), north of the River Thames, phase 8 AM peak

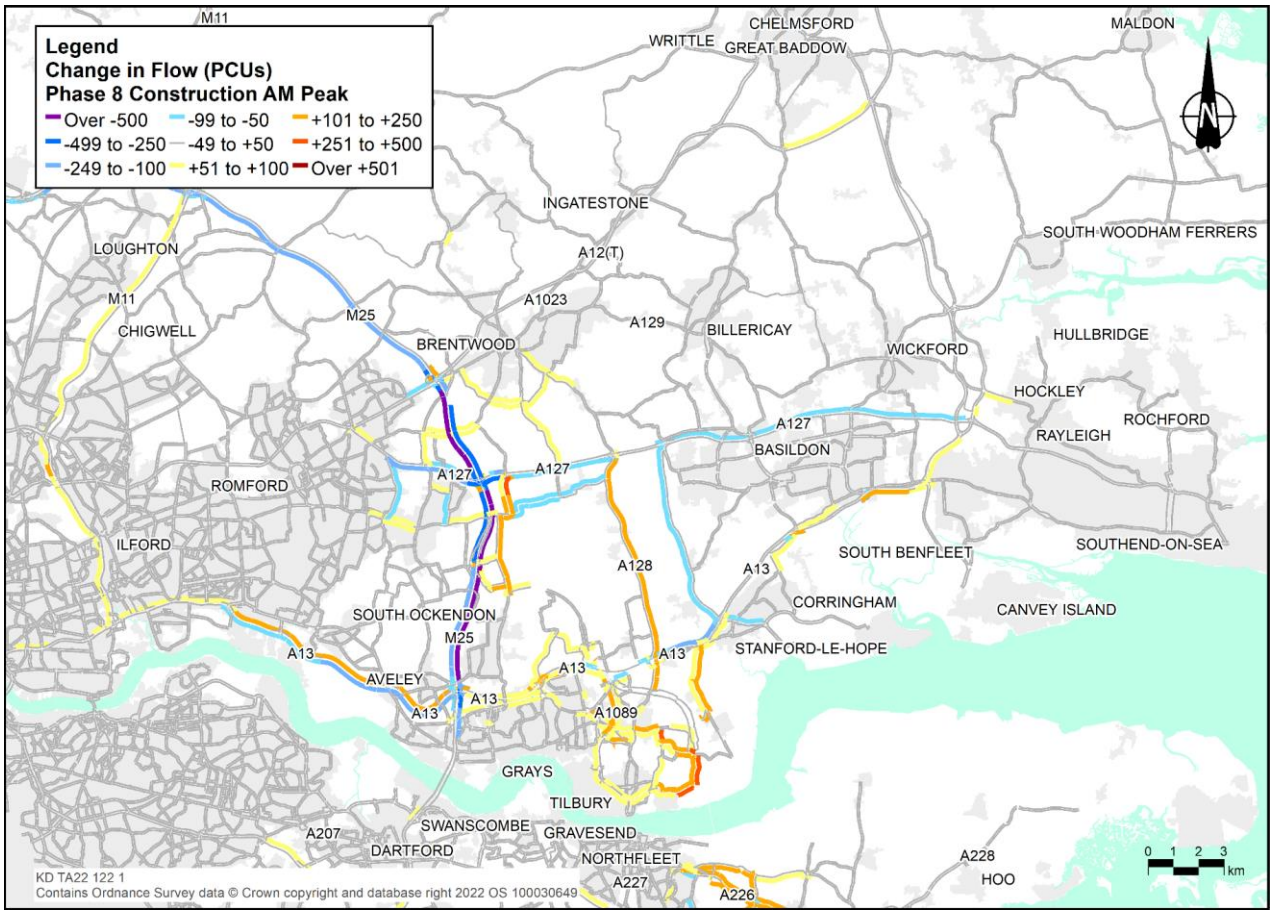


Plate 8.70 Change in flow (PCUs), north of the River Thames, phase 8 inter-peak

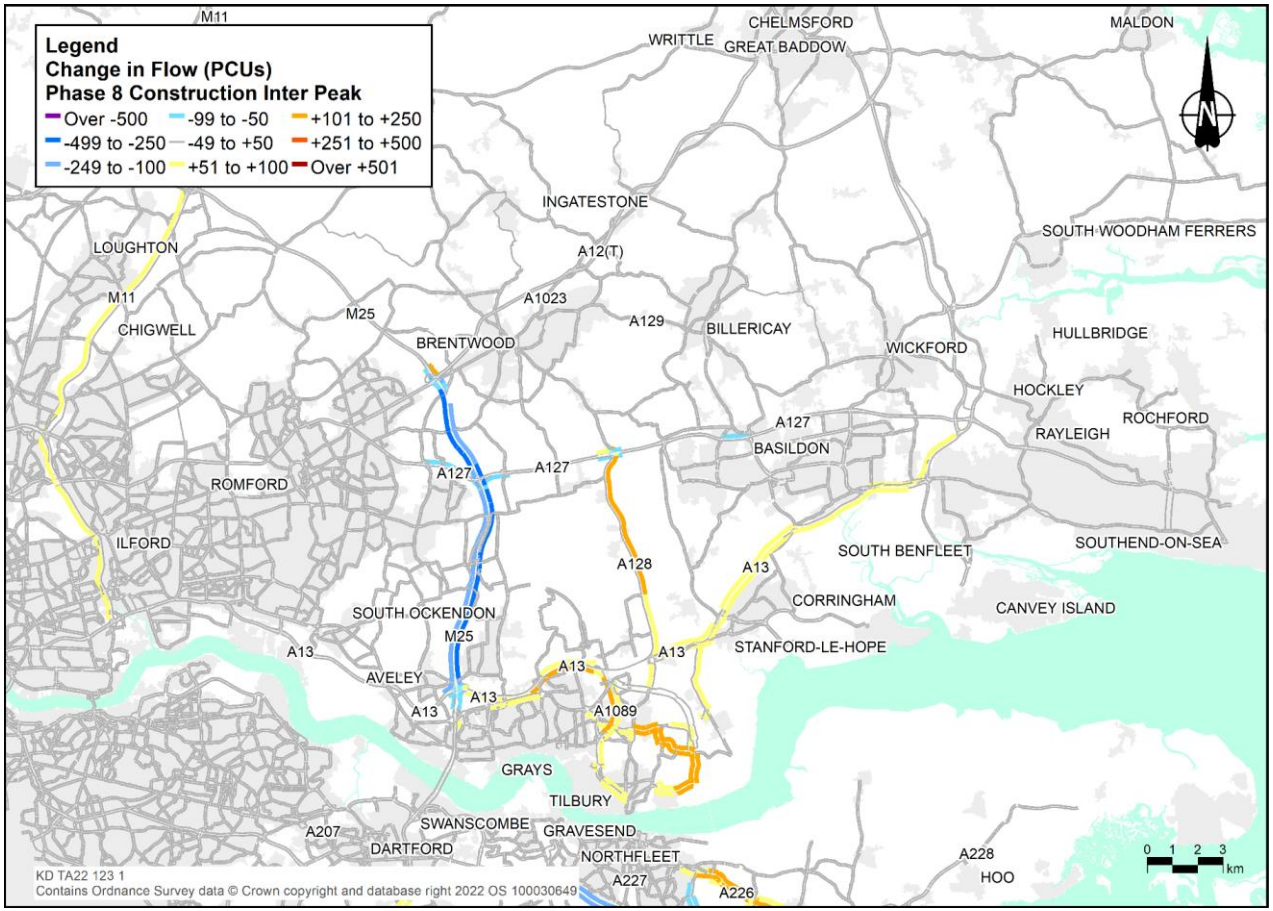


Plate 8.71 Change in flow (PCUs), north of the River Thames, phase 8 PM peak

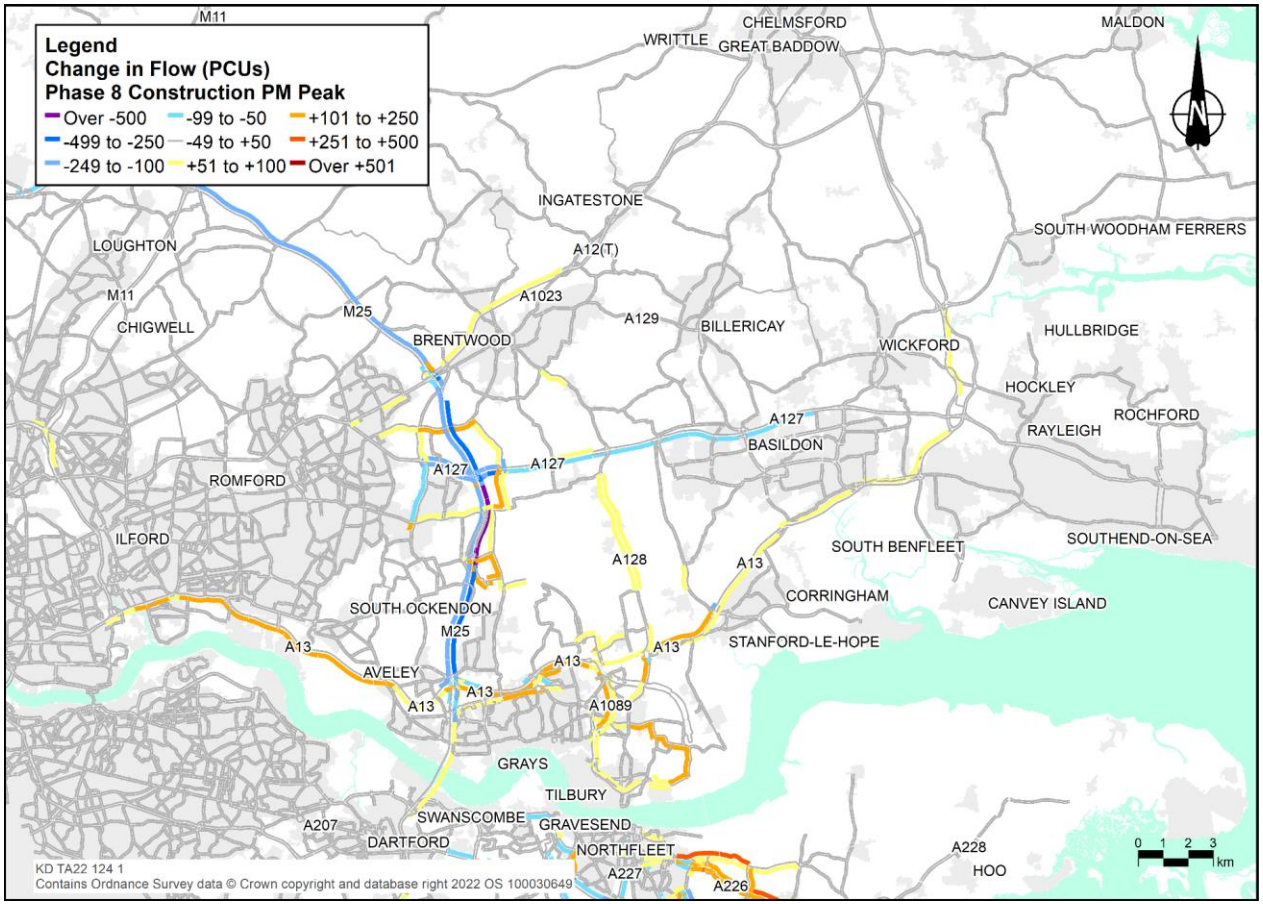


Plate 8.72 Change in flow (PCUs), south of the River Thames, phase 8 AM peak

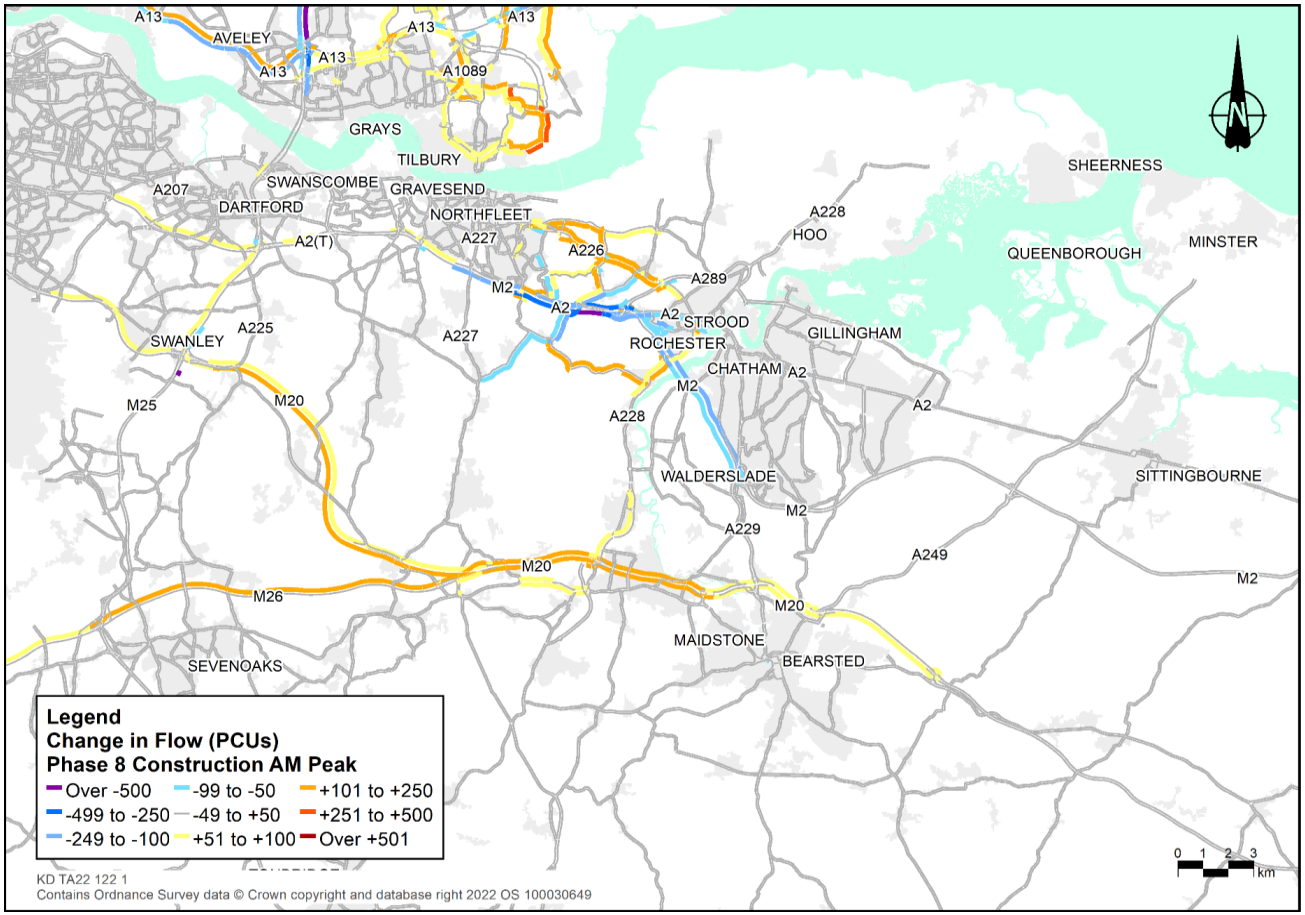


Plate 8.73 Change in actual flow (PCUs), south of the River Thames, phase 8 inter-peak

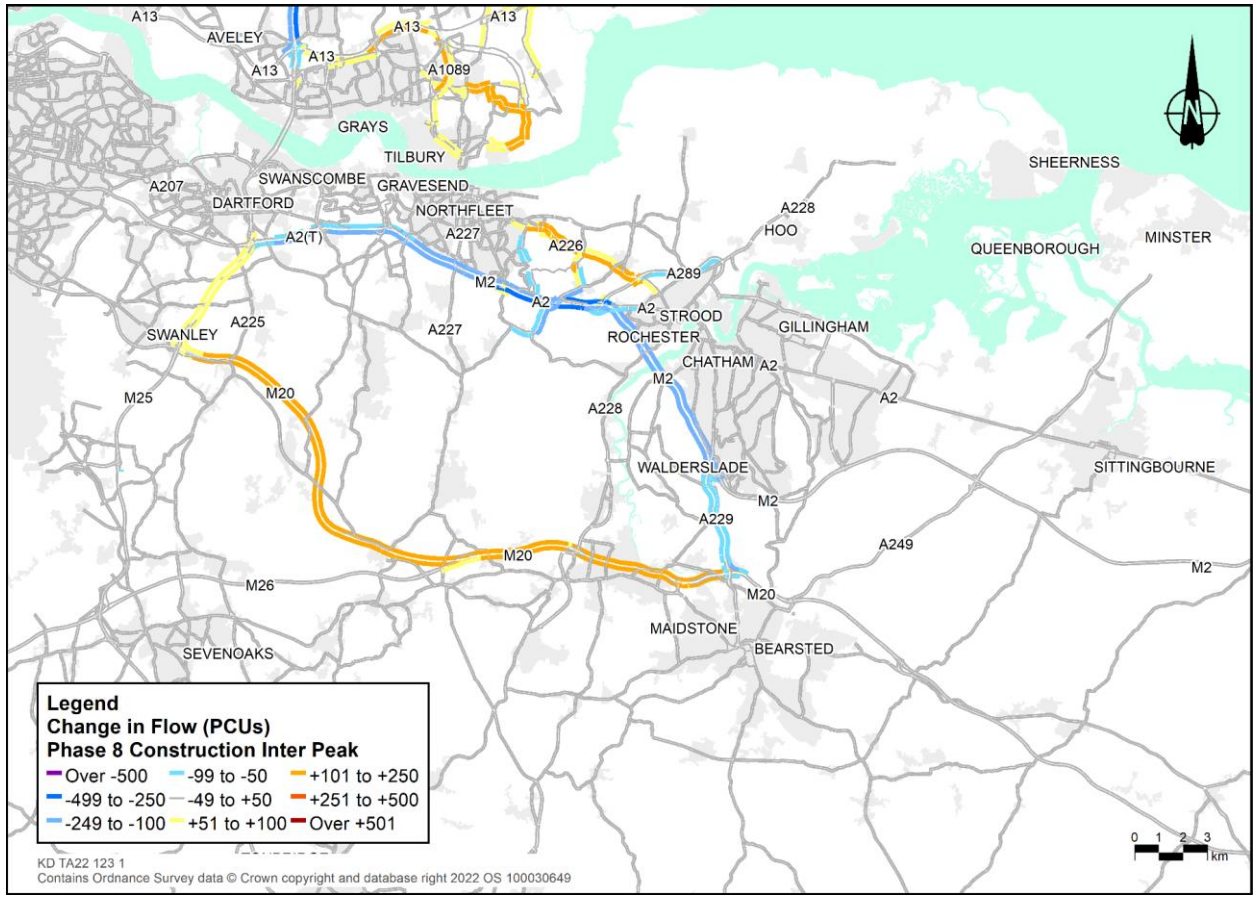


Plate 8.74 Change in flow (PCUs), south of the River Thames, phase 8 PM peak

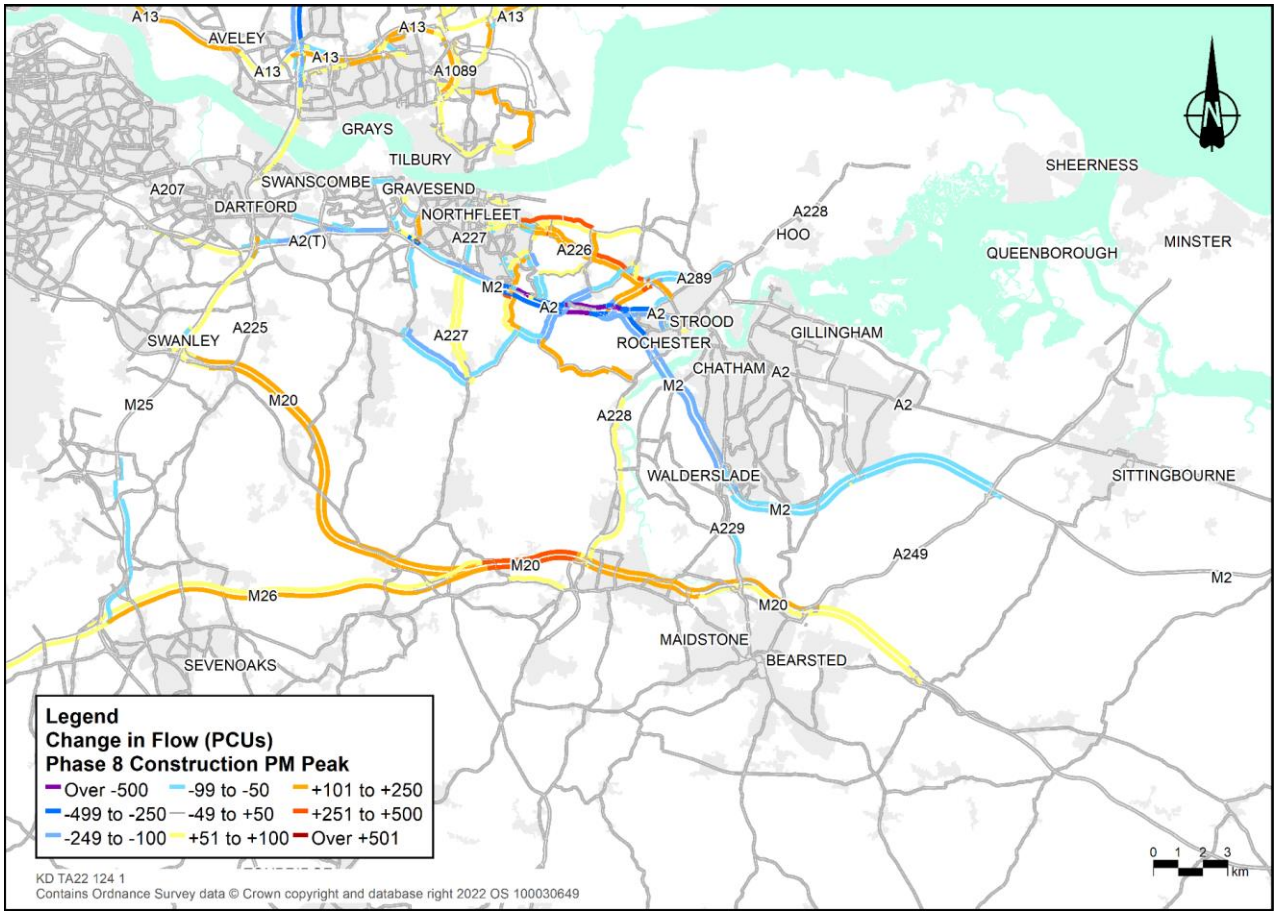


Table 8.58 Construction impact on journey times (phase 8 AM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	33.4	69.1	35.6	64.9	+2.2	-4.2	+6%	-6%
		SB	33.2	69.7	35.5	65.3	+2.3	-4.4	+7%	-6%
JT02	M2 junction 4 to A2/A2018	EB	20.7	100.0	22.2	93.0	+1.6	-7.1	+8%	-7%
		WB	30.1	68.6	31.9	64.5	+1.9	-4.1	+6%	-6%
JT03	A228: M20 to Strood	NB	14.2	49.7	14.4	49.0	+0.2	-0.7	+2%	-1%
		SB	17.8	39.8	18.9	37.6	+1.1	-2.2	+6%	-6%
JT05	A289	EB	3.7	93.4	3.6	94.2	-0.0	+0.8	-1%	+1%
		WB	7.2	60.4	9.3	46.7	+2.1	-13.7	+29%	-23%
JT07	A226	EB	9.5	48.4	10.2	45.0	+0.7	-3.5	+8%	-7%
		WB	11.7	39.4	13.1	35.3	+1.4	-4.2	+12%	-11%
JT11	A127	EB	26.1	59.0	27.2	56.6	+1.1	-2.4	+4%	-4%
		WB	35.8	43.0	37.3	41.3	+1.5	-1.7	+4%	-4%
JT22	Baker Street/Heath Road	NB	3.7	47.7	4.5	42.8	+0.8	-5.0	+20%	-10%
		SB	3.5	51.0	4.5	42.3	+1.0	-8.8	+30%	-17%
JT25	A2 (Strood)	EB	6.4	33.7	6.4	33.5	+0.0	-0.2	+1%	-1%
		WB	8.3	35.8	10.3	29.0	+1.9	-6.7	+23%	-19%

Table 8.59 Construction impact on journey times (phase 8 inter-peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	29.8	77.5	31.2	74.0	+1.4	-3.5	+5%	-5%
		SB	26.5	87.4	28.1	82.6	+1.6	-4.8	+6%	-6%
JT02	M2 junction 4 to A2/A2018	EB	20.5	101.0	21.9	94.4	+1.4	-6.6	+7%	-7%
		WB	21.9	94.3	23.1	89.3	+1.2	-5.1	+6%	-5%
JT05	A289	EB	3.4	100.3	3.4	100.7	-0.0	+0.4	0%	+0%
		WB	4.4	98.1	5.6	77.2	+1.2	-21.0	+27%	-21%
JT22	Baker Street/Heath Road	NB	3.4	52.5	4.1	47.2	+0.7	-5.4	+20%	-10%
		SB	3.3	53.3	4.2	45.1	+0.9	-8.2	+27%	-15%
JT25	A2 (Strood)	EB	6.0	35.6	6.0	35.8	-0.0	+0.2	-1%	+1%
		WB	6.2	48.1	7.3	40.9	+1.1	-7.2	+18%	-15%

Table 8.60 Construction impact on journey times (phase 8 PM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	30.0	77.0	31.6	73.0	+1.7	-4.0	+6%	-5%
		SB	30.4	76.2	32.9	70.5	+2.5	-5.7	+8%	-8%
JT02	M2 junction 4 to A2/A2018	EB	27.0	76.7	30.2	68.4	+3.3	-8.3	+12%	-11%
		WB	24.5	84.1	26.2	78.8	+1.6	-5.3	+7%	-6%
JT05	A289	EB	6.3	54.3	4.8	71.2	-1.5	+16.9	-24%	+31%
		WB	4.7	91.4	6.6	65.4	+1.9	-26.1	+40%	-29%
JT07	A226	EB	11.1	41.5	13.0	35.5	+1.9	-6.1	+17%	-15%
		WB	9.9	46.7	11.1	41.6	+1.2	-5.1	+12%	-11%
JT22	Baker Street/Heath Road	NB	3.6	49.0	4.3	44.8	+0.6	-4.2	+18%	-9%
		SB	4.4	40.4	5.3	36.0	+0.9	-4.4	+20%	-11%
JT25	A2 (Strood)	EB	7.3	29.7	6.9	31.4	-0.4	+1.7	-5%	+6%
		WB	7.8	38.0	9.7	30.8	+1.9	-7.3	+24%	-19%
JT28	M20	WB	19.2	101.6	19.4	100.8	+0.2	-0.9	+1%	-1%
		EB	22.6	85.2	23.7	81.4	+1.1	-3.8	+5%	-4%

8.8.91 The flow difference plots show the changes in total flow in the areas directly impacted by the traffic management and additional Project related construction traffic. M25 narrow lanes and a 60mph speed restriction continue in both directions (RNTM65 and RNTM64). This would lead to a reduction in flow on the M25 between junction 29 and 30. Narrow lanes on the A127 and the associated 50mph speed restriction (RNTM74) would cause reduction of traffic on the A127 around the M25/A127 junction. The traffic from the M25 and A127 TMs would shift to the B186 and A128, amongst other roads.

8.8.92 Narrow Lanes and 50mph restriction (RSTM15) on the A2 would cause flow reductions between the M2 and Wrotham Road section as traffic diverts away. The diversion from the A2 to avoid the narrow lanes would lead to an increase in flow on the M20. There would be Project related construction traffic on Muckingford Road, Marshfoot Road, Station Road and the A226 causing flow increases at those locations.

8.8.93 The journey time analysis shows that the M25 (JT01) would experience additional delay of approximately one to two and a half minutes in both directions and all time periods due to narrow lanes (RNTM64 & RNTM65).

8.8.94 M2 junction 4 to A2/A2018 (JT02) would experience additional delay of approximately one to three minutes in both directions and each time period due to narrow lanes on the A2 (RSTM15).

8.8.95 There would be additional delays along the A228 (JT03) of around one minute southbound in the AM peak. This is due to two junctions along the route experiencing increased delays. The junction with Holborough Road in Snodland and the junction with Sycamore Road in Strood would both be above capacity in the Do Minimum, and the small increase in flow in the construction scenario leads to larger increases in delay.

8.8.96 A289 (JT05) would experience additional delay of approximately one to two minutes in the westbound direction in all time periods because of the narrow lanes on the A2 (RSTM15). In the eastbound direction there would be a reduction in journey time in the eastbound direction in the PM peak hour of approximately one minute.

8.8.97 A226 (JT07) would experience additional delay of approximately half a minute to two minutes in both directions in the AM and PM peak hours. This is related to traffic diverting off of the A2 due to the narrow lanes (RSTM15).

8.8.98 There would be additional delays along the A127 (JT11) of around one minute in each direction in the AM peak. This is due to narrow lanes on the A127 (RNTM74).

8.8.99 There would be additional delays of between half a minute and one minute on Baker Street / Heath Road (JT22) in all time periods in both directions. This is due to the switchover (RNTM97) and crossing points (RNTM39, RNTM107) on Baker Street plus a small amount of increased traffic flow.

8.8.100 The A2 in Strood (JT25) would experience additional delay of approximately one to two minutes in the westbound direction in all time periods due to narrow lanes (RSTM15). In the eastbound direction there are very minor reductions in journey time in the eastbound direction in each time period.

8.8.101 The M20 would experience additional delay of approximately one minute in the eastbound direction in the PM peak only (JT28).

Phase 9

8.8.102 The forecast change in traffic flows on the network, as a result of the additional construction related vehicles and the impact of the traffic management measures on the routes chosen by drivers are shown in Plate 8.75 to Plate 8.80. The maps present the change in flows, north and south of the river, for each of the modelled time periods.

8.8.103 For all journey time routes where the time changes by more than a minute or more than 10%, in either direction, the with and without construction journey times are shown in Table 8.61 to Table 8.63.

Plate 8.75 Change in flow (PCUs), north of the River Thames, phase 9 AM peak

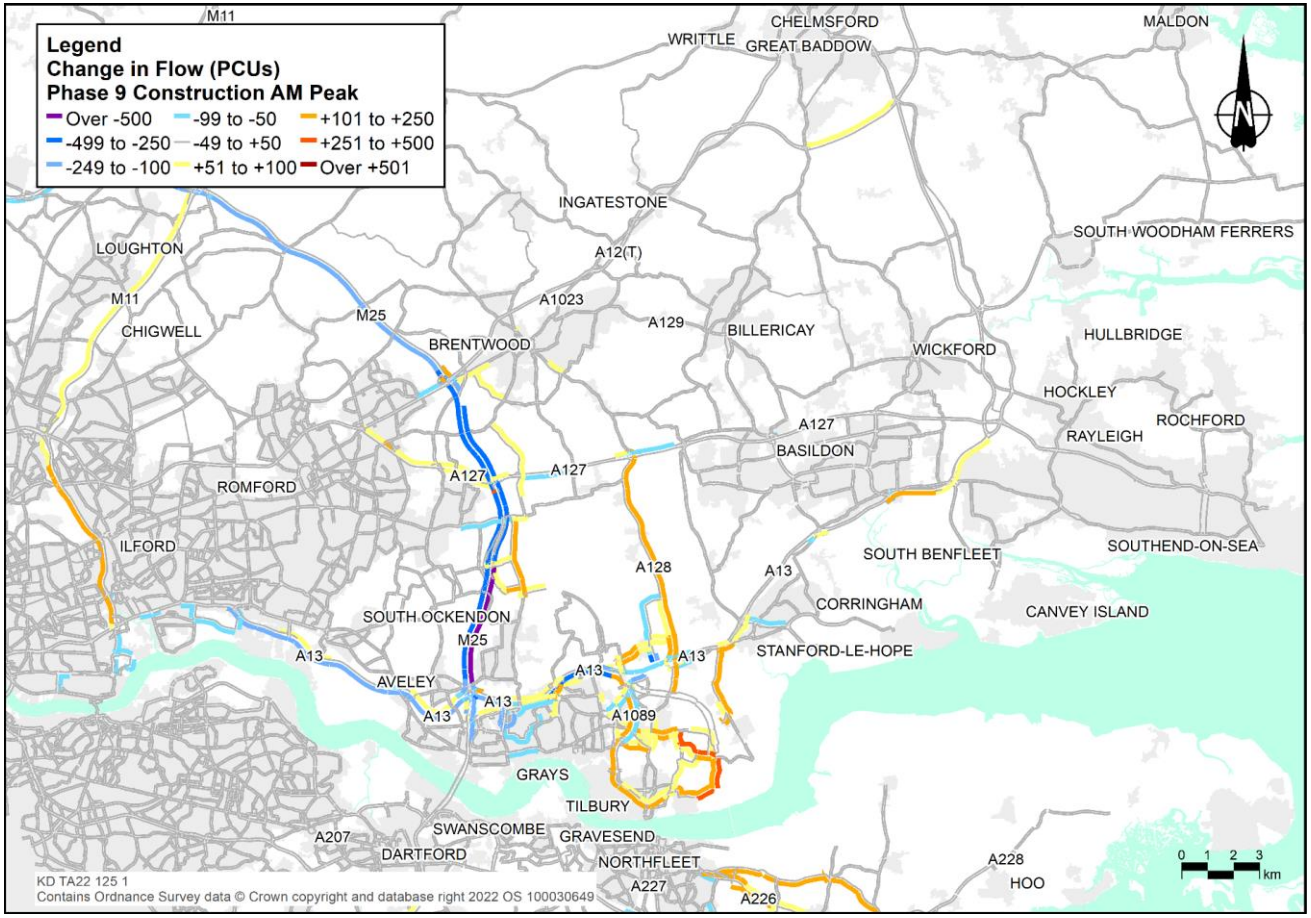


Plate 8.76 Change in flow (PCUs), north of the River Thames, phase 9 inter-peak

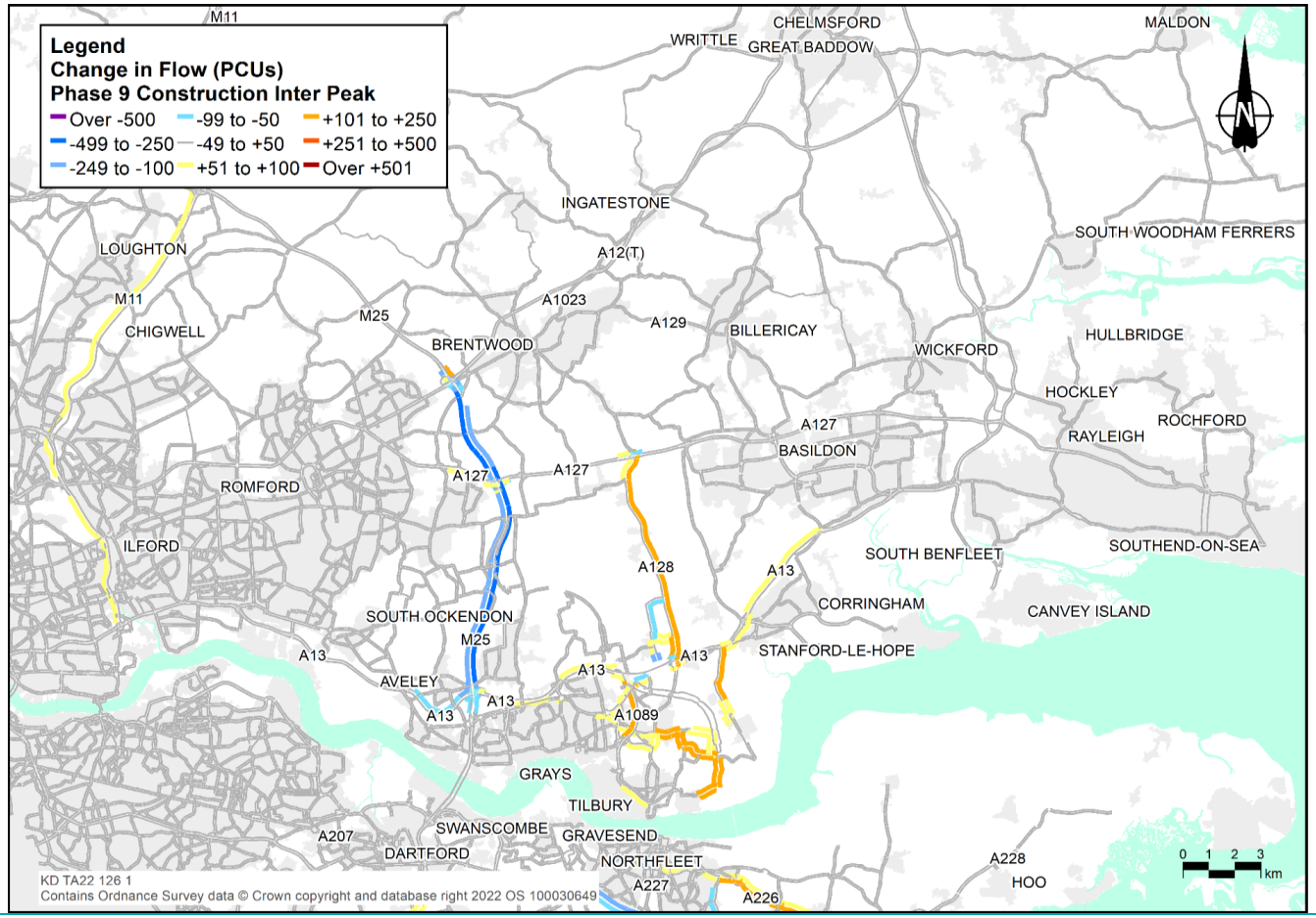


Plate 8.77 Change in flow (PCUs), north of the River Thames, phase 9 PM peak

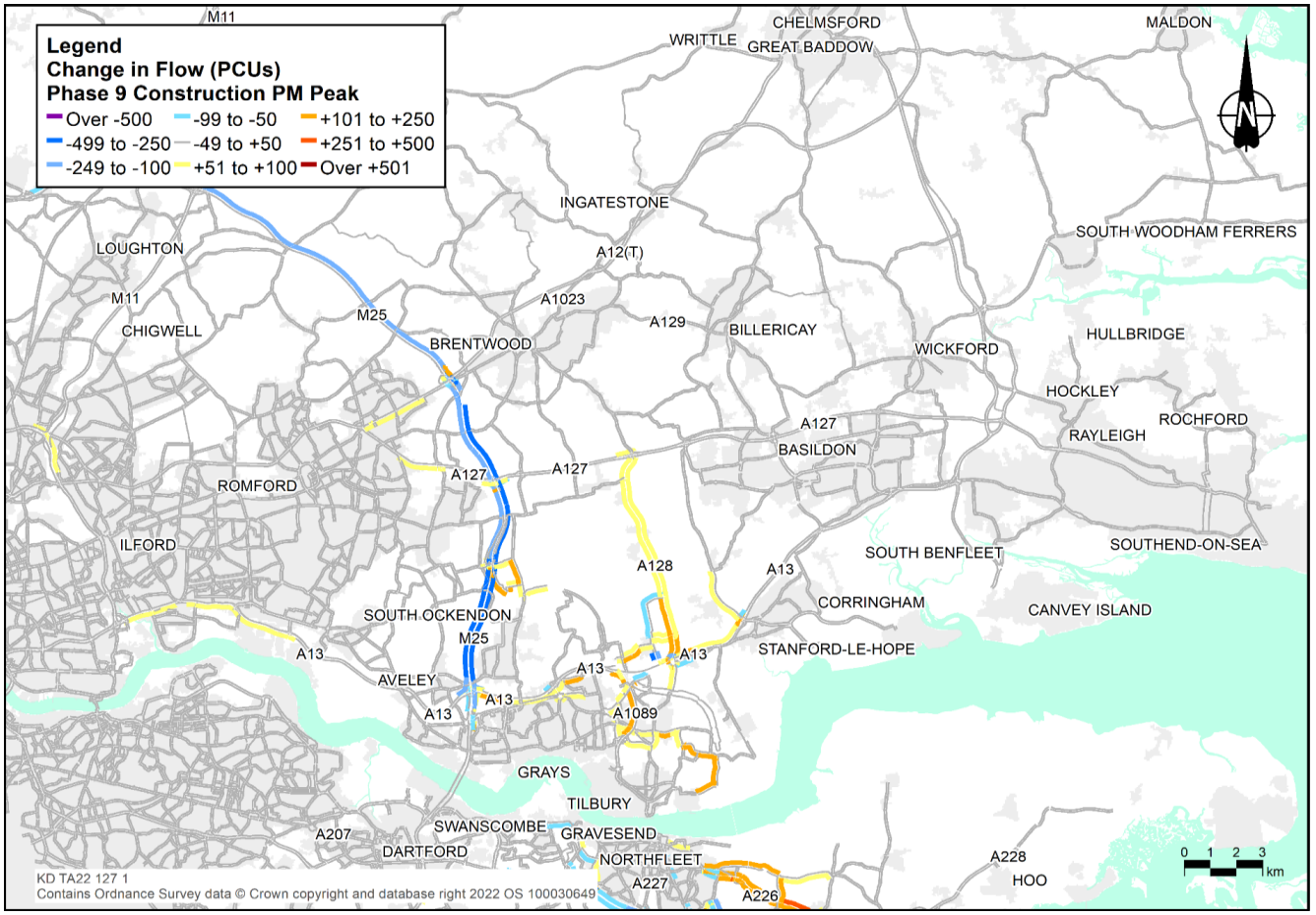


Plate 8.78 Change in flow (PCUs), south of the River Thames, phase 9 AM peak

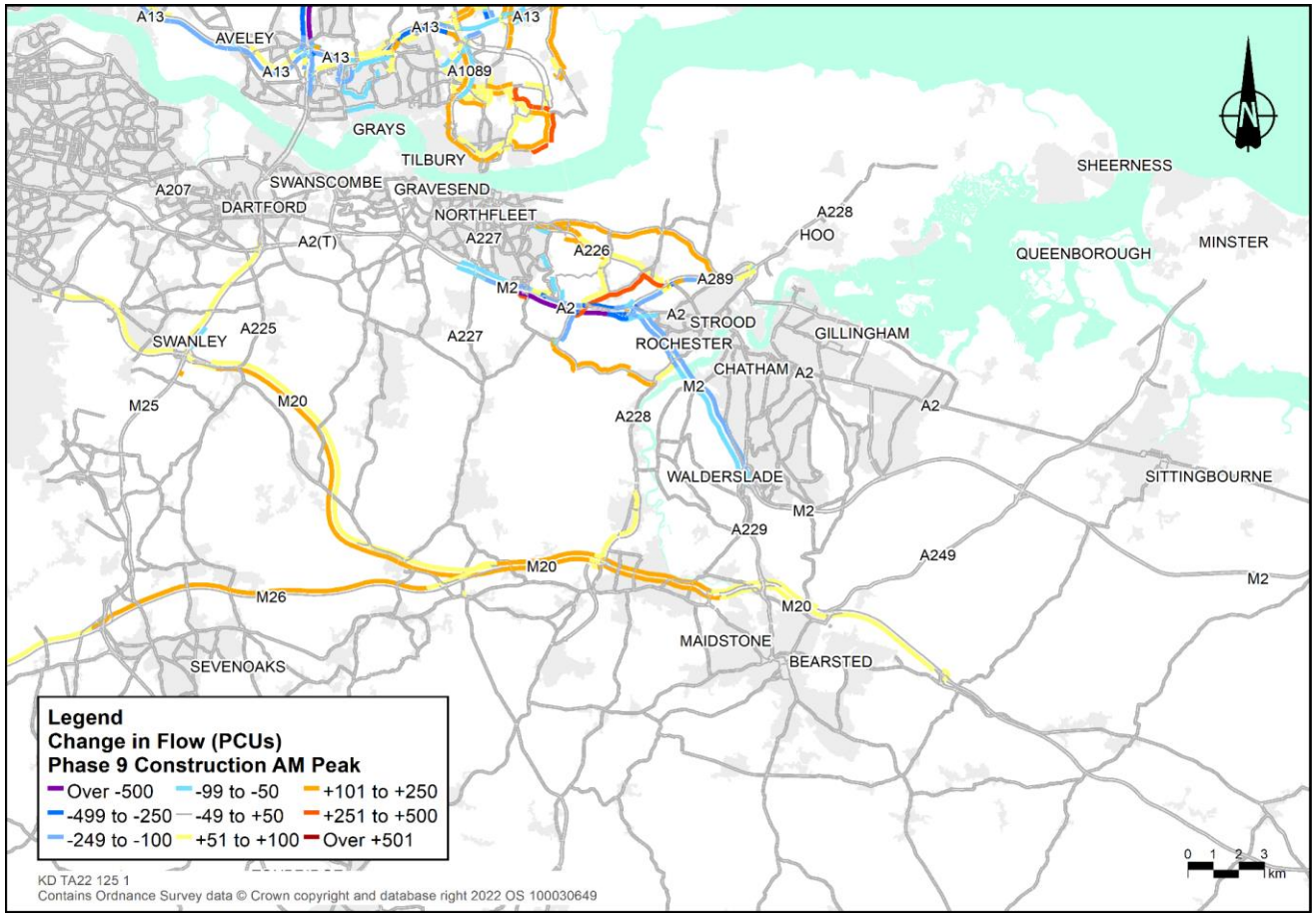


Plate 8.79 Change in flow (PCUs), south of the River Thames, phase 9 inter-peak

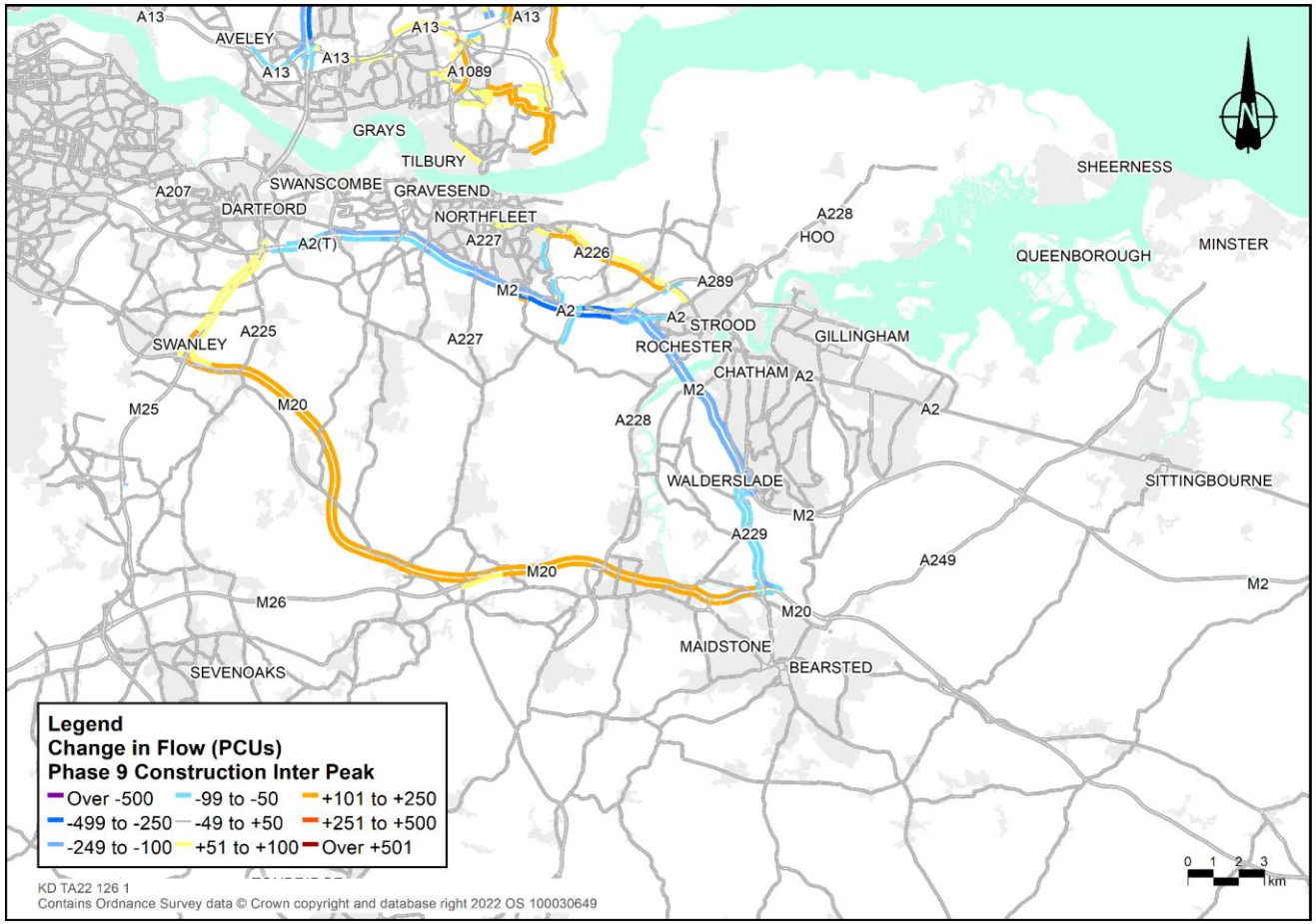


Plate 8.80 Change in flow (PCUs), south of the River Thames, phase 9 PM peak

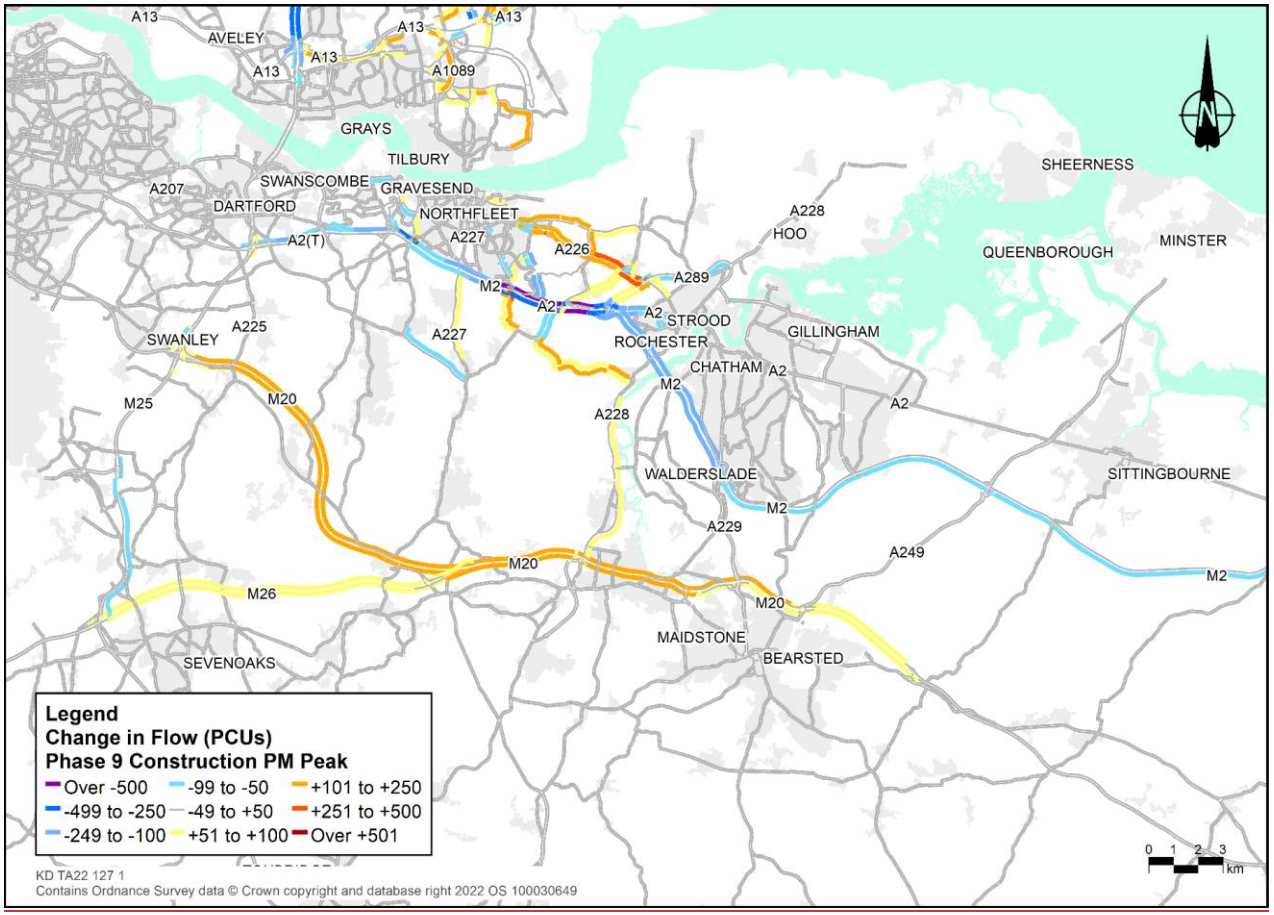


Table 8.61 Construction impact on journey times (phase 9 AM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	33.4	69.1	35.5	65.0	+2.1	-4.1	+6%	-6%
		SB	33.2	69.8	35.3	65.6	+2.1	-4.2	+6%	-6%
JT02	M2 junction 4 to A2/A2018	EB	20.7	100.0	22.2	93.1	+1.5	-6.9	+7%	-7%
		WB	30.1	68.6	32.0	64.5	+1.9	-4.1	+6%	-6%
JT05	A289	EB	3.7	93.4	3.6	94.1	-0.0	+0.7	0%	+1%
		WB	7.2	60.3	8.1	53.5	+0.9	-6.7	+13%	-11%
JT07	A226	EB	9.5	48.4	10.1	45.5	+0.6	-3.0	+7%	-6%
		WB	11.7	39.4	13.1	35.1	+1.5	-4.4	+12%	-11%
JT12	A13	EB	20.0	75.0	20.0	74.8	+0.0	-0.1	+0%	-0%
		WB	25.8	57.8	29.4	50.7	+3.6	-7.1	+14%	-12%
JT22	Baker Street/Heath Road	NB	3.7	47.7	4.5	42.5	+0.8	-5.2	+21%	-11%
		SB	3.5	51.1	4.6	41.3	+1.1	-9.8	+33%	-19%
JT25	A2 (Strood)	EB	6.4	33.7	6.4	33.5	+0.0	-0.1	+0%	-0%
		WB	8.3	35.7	9.3	31.9	+1.0	-3.8	+12%	-11%

Table 8.62 Construction Impact on journey times (Phase 9 inter-peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	29.9	77.3	31.3	73.9	+1.4	-3.4	+5%	-4%
		SB	26.5	87.4	28.1	82.5	+1.6	-4.9	+6%	-6%
JT02	M2 junction 4 to A2/A2018	EB	20.5	101.0	21.9	94.5	+1.4	-6.5	+7%	-6%
		WB	21.9	94.3	23.1	89.2	+1.3	-5.1	+6%	-5%
JT05	A289	EB	3.4	100.3	3.4	100.6	-0.0	+0.3	0%	+0%
		WB	4.4	98.1	5.1	84.3	+0.7	-13.8	+16%	-14%
JT22	Baker Street/Heath Road	NB	3.4	52.5	4.2	45.8	+0.8	-6.7	+23%	-13%
		SB	3.3	53.3	4.3	44.4	+1.0	-8.9	+29%	-17%
JT25	A2 (Strood)	EB	6.0	35.6	6.0	35.7	0.0	+0.1	0%	+0%
		WB	6.2	48.1	6.8	43.7	+0.6	-4.5	+10%	-9%

Table 8.63 Construction impact on journey times (phase 9 PM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	30.0	77.1	31.6	73.0	+1.7	-4.1	+6%	-5%
		SB	30.4	76.3	32.6	71.1	+2.2	-5.2	+7%	-7%
JT02	M2 junction 4 to A2/A2018	EB	27.0	76.7	29.6	69.9	+2.6	-6.7	+10%	-9%
		WB	24.5	84.1	25.9	79.7	+1.4	-4.4	+6%	-5%
JT05	A289	EB	6.3	54.2	4.6	74.2	-1.7	+20.0	-27%	+37%
		WB	4.7	91.5	6.2	69.4	+1.5	-22.1	+32%	-24%
JT07	A226	EB	11.1	41.5	12.7	36.3	+1.6	-5.2	+14%	-13%
		WB	9.9	46.7	10.9	42.2	+1.1	-4.5	+11%	-10%
JT22	Baker Street/Heath Road	NB	3.6	49.2	4.5	42.6	+0.9	-6.6	+24%	-13%
		SB	4.4	40.5	5.5	34.8	+1.1	-5.7	+25%	-14%
JT25	A2 (Strood)	EB	7.3	29.6	6.9	31.2	-0.4	+1.5	-5%	+5%
		WB	7.9	37.9	9.4	31.8	+1.5	-6.1	+19%	-16%

8.8.104 The flow difference plots show the changes in total flow in the areas directly impacted by the traffic management and additional Project related construction traffic. In this phase the M25 narrow lanes and a 60mph speed restriction in both directions (RNTM65 and RNTM64) continues. This would lead to a reduction in flow on the M25 between junction 28 and 30. The introduction of A13 westbound narrow lanes and 60mph speed limited (RNTM24b) in this phase would cause a large reduction in flow on that road. Also, the closure of Rectory Road (RNTM20) would shift traffic to the A128 Brentwood Road. There would be an increase in flows on the A1089 northbound due to traffic rerouting from Brentwood Road and the presence of Project construction traffic. The A2 narrow lane and 50mph restriction (RSTM15) remains in this phase and would cause flow reductions on the M2 to Wrotham Road section and an increase on the M20 as traffic diverts away. There would be Project related construction traffic on Muckingford Road, Marshfoot Road, Station Road and the A226 causing flow increases at those locations.

8.8.105 The journey time analysis shows that the M25 (JT01) would experience additional delay of approximately one to two minutes in both directions and all time periods due to narrow lanes (RNTM64 & RNTM65).

8.8.106 M2 junction 4 to A2/A2018 (JT02) would experience additional delay of approximately one to three minutes in both directions and each time period due to narrow lanes on the A2 (RSTM15).

8.8.107 A289 (JT05) would experience additional delay of approximately one to one and a half minutes in the westbound direction in each time period because of the narrow lanes on the A2 (RSTM15). In the eastbound direction there would be a reduction in journey time in the PM peak hour of approximately two minutes.

8.8.108 The A226 (JT07) would experience additional delay of approximately half a minute to one and a half minutes in both directions in the AM and PM peak hours. This is related to traffic diverting off of the A2 due to the narrow lanes on the A2 (RSTM15) during this phase.

8.8.109 There would be additional delays along the A13 (JT12) in the westbound direction in the AM peak, of around three minutes. This is due to narrow lanes on that road (RNTM24b).

8.8.110 There would be additional delays of around one minute on Baker Street / Heath Road (JT22) in all time periods in both directions. This is due to the switchover (RNTM97) and crossing points (RNTM39, RNTM107) on Baker Street plus a small amount of increased traffic flow.

8.8.111 The A2 in Strood (JT25) would experience additional delay of approximately one minute in the westbound direction in the AM and PM peaks and around half a minute in the interpeak. This is due to the narrow lanes on the A2 (RSTM15). In the eastbound direction there would be very minor reductions in journey time in the eastbound direction in each time period.

Phase 10

8.8.112 The forecast change in traffic flows on the network, as a result of the additional construction related vehicles and the impact of the traffic management measures on the routes chosen by drivers are shown in Plate 8.81 to Plate 8.86. The maps present the change in flows, north and south of the river, for each of the modelled time periods.

8.8.113 For all journey time routes where the time changes by more than a minute or more than 10%, in either direction, the with and without construction journey times are shown in Table 8.64 to Table 8.66.

Plate 8.81 Change in flow (PCUs), north of the River Thames, phase 10 AM peak

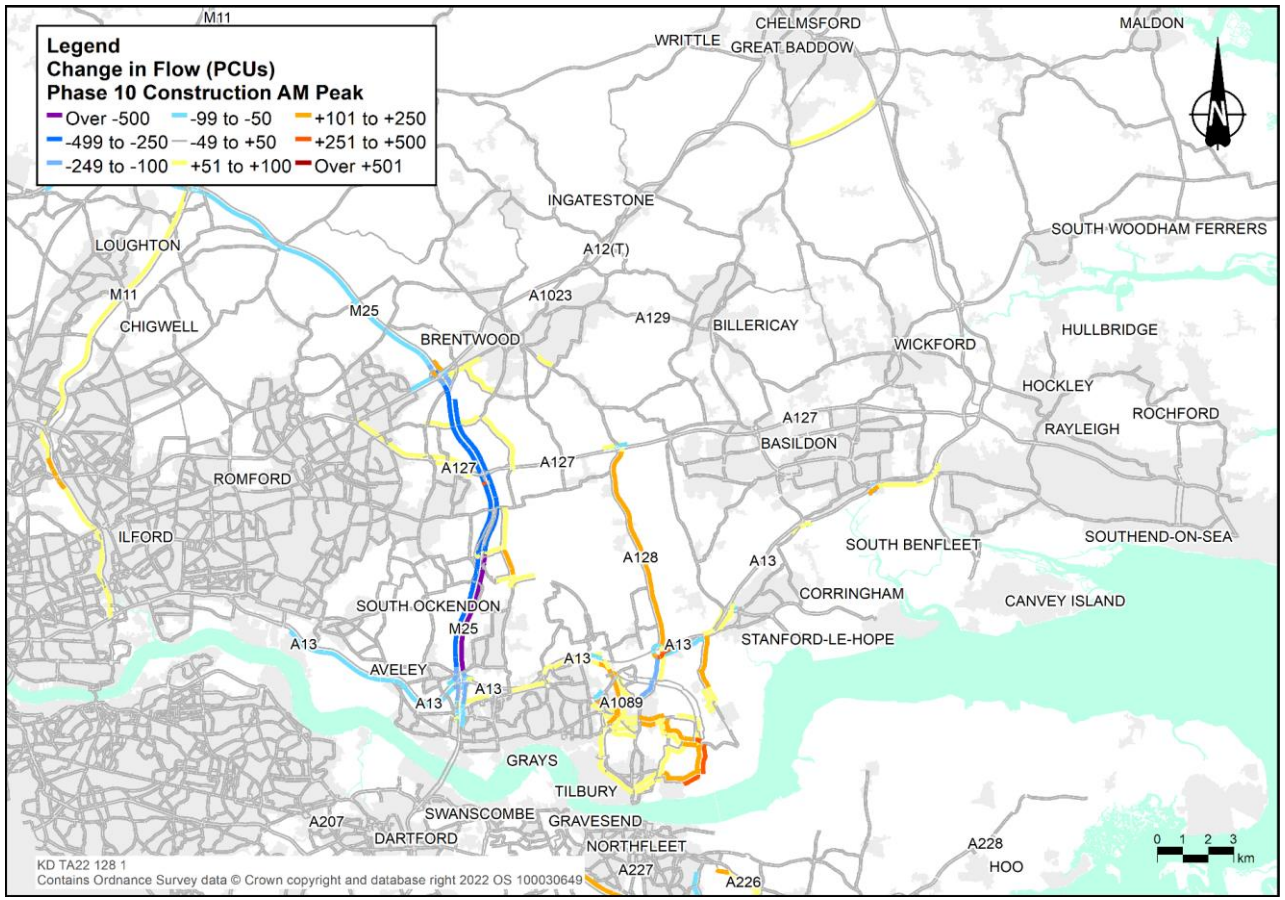


Plate 8.82 Change in flow (PCUs), north of the River Thames, phase 10 inter-peak

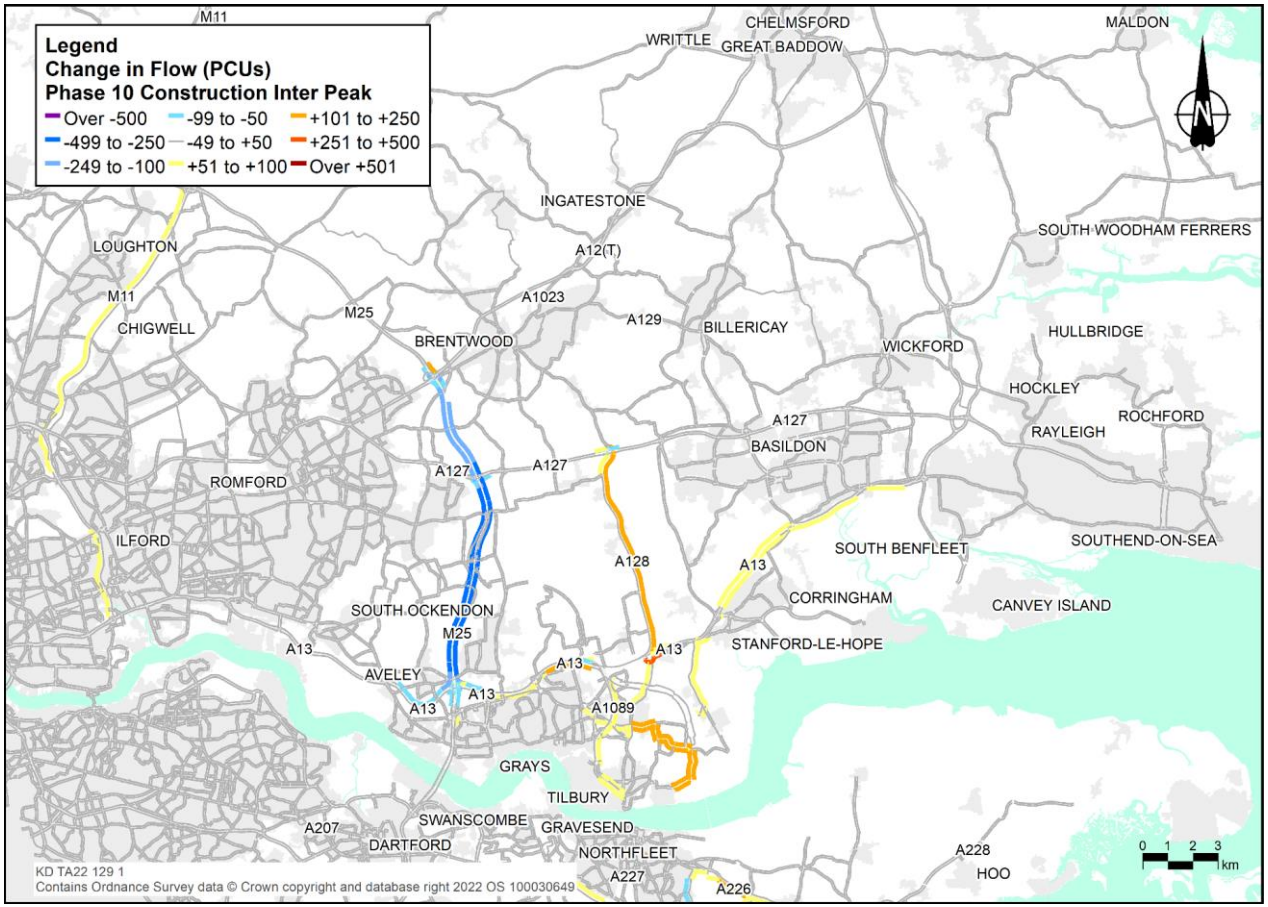


Plate 8.83 Change in flow (PCUs), north of the River Thames, phase 10 PM peak

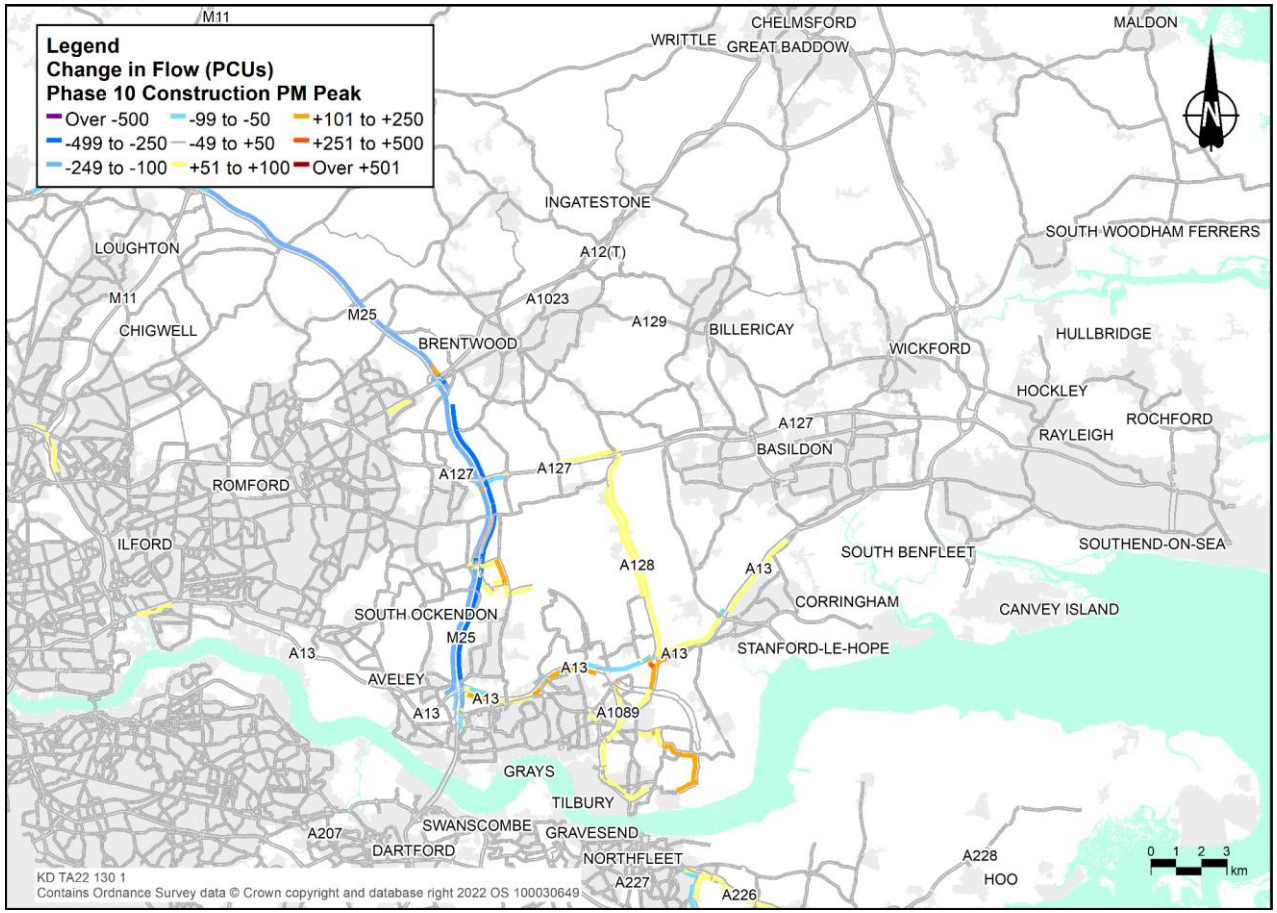


Plate 8.84 Change in flow (PCUs), south of the River Thames, phase 10 AM peak

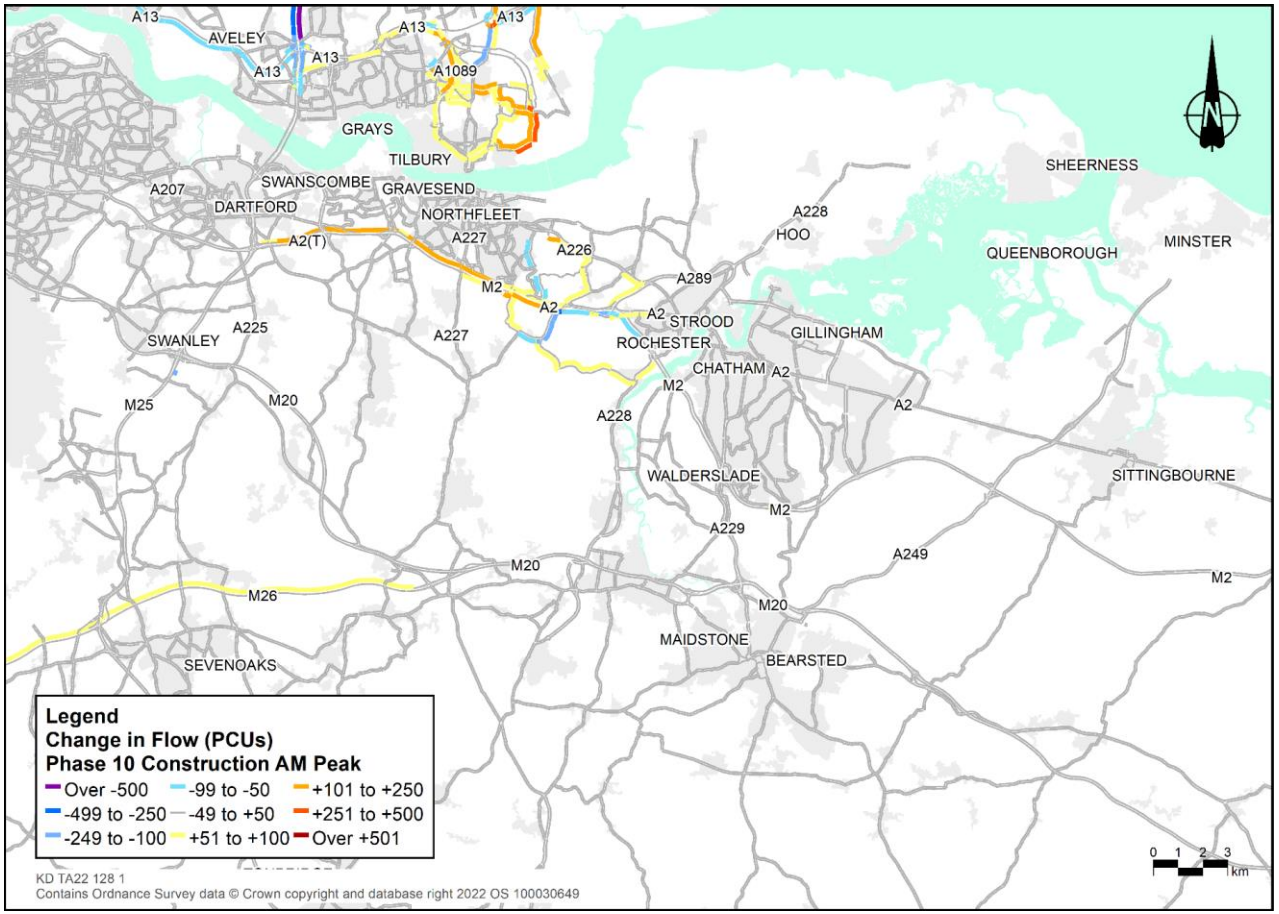


Plate 8.85 Change in flow (PCUs), south of the River Thames, phase 10 inter-peak

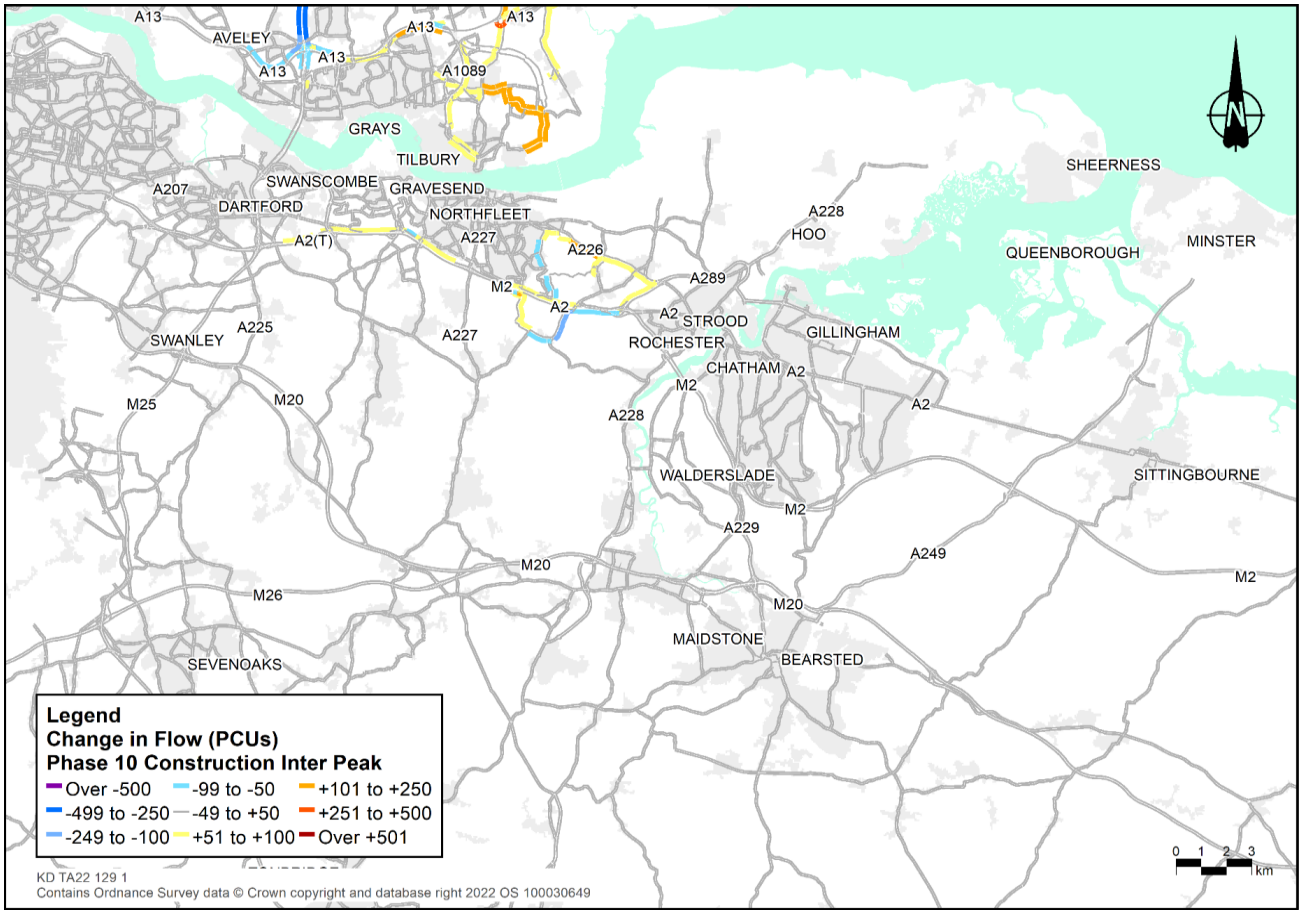


Plate 8.86 Change in flow (PCUs), south of the River Thames, phase 10 PM peak

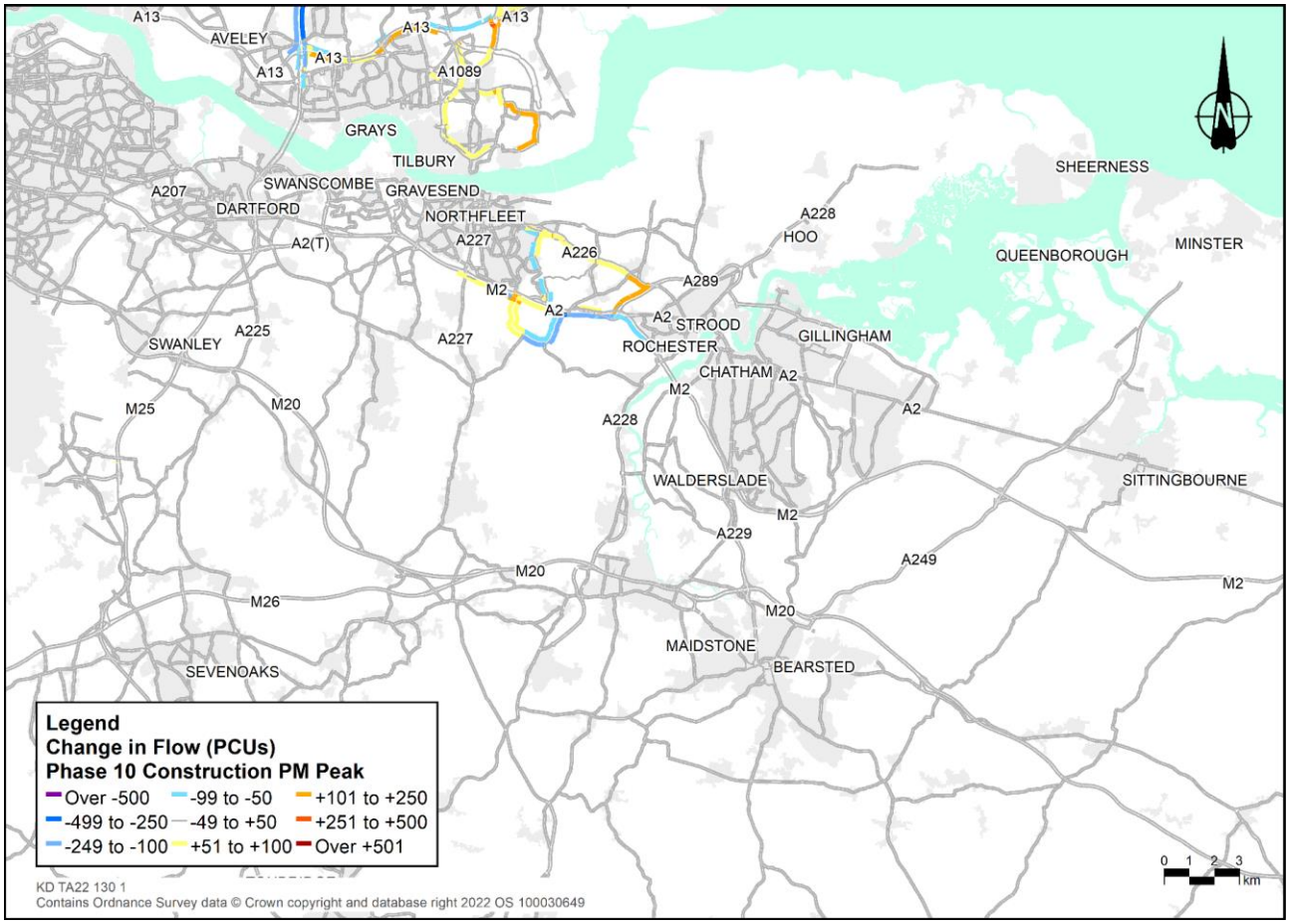


Table 8.64 Construction impact on journey times (phase 10 AM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	33.4	69.1	35.3	65.5	+1.9	-3.7	+6%	-5%
		SB	33.2	69.8	35.5	65.3	+2.3	-4.5	+7%	-6%
JT14	A1013	EB	13.9	39.4	14.6	37.6	+0.7	-1.8	+5%	-5%
		WB	14.0	37.9	15.2	34.7	+1.2	-3.1	+9%	-8%
JT18	A128 / Brentwood Road	NB	16.2	45.7	17.7	41.7	+1.5	-4.0	+9%	-9%
		SB	13.6	54.1	14.2	51.6	+0.6	-2.5	+5%	-5%
JT22	Baker Street/Heath Road	NB	3.7	47.7	4.5	42.4	+0.8	-5.3	+21%	-11%
		SB	3.5	51.1	4.1	46.1	+0.7	-5.0	+19%	-10%

Table 8.65 Construction impact on journey times (phase 10 inter-peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	29.9	77.3	31.1	74.2	+1.3	-3.1	+4%	-4%
		SB	26.5	87.4	28.0	82.8	+1.5	-4.6	+6%	-5%
JT22	Baker Street/Heath Road	NB	3.4	52.5	3.8	50.4	+0.4	-2.1	+12%	-4%
		SB	3.3	53.3	4.0	48.0	+0.6	-5.3	+19%	-10%

Table 8.66 Construction impact on journey times (phase 10 PM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT01	M25	NB	30.0	77.1	31.4	73.4	+1.5	-3.6	+5%	-5%
		SB	30.4	76.3	32.5	71.4	+2.1	-4.9	+7%	-6%
JT22	Baker Street/Heath Road	NB	3.6	49.2	4.0	47.4	+0.4	-1.8	+12%	-4%
		SB	4.4	40.5	5.0	37.9	+0.6	-2.6	+15%	-7%

8.8.114 The flow difference plots show small changes in total flow in the areas directly impacted by the traffic management and additional Project construction traffic. In this phase the M25 narrow lanes and a 60mph speed restriction in both directions (RNTM65 and RNTM64) are still in place. This would lead to a reduction in flow on the M25 between junction 28 and 30. There would be an increase in flow on the A1089 northbound with most of this coming from trips diverting from Brentwood Road due to delays at that location, plus some Project related construction traffic. The A2 westbound on- and off-slip at Thong Lane / Brewers Road junction (RSTM22 & 23) would cause a very small amount of local reassignment. There would be Project related construction traffic on Muckingford Road, Marshfoot Road, Station Road and the A2 causing some flow increases at those locations.

8.8.115 The journey time analysis shows that the M25 (JT01) would experience additional delay of approximately one to two minutes in both directions and all time periods due to narrow lanes (RNTM64 & RNTM65).

8.8.116 There would be additional delays on the A1013 (JT14) westbound in all time periods. This is caused by increased traffic through Orsett Cock Roundabout which comes about due to the switch over of the A13 to A1089 slip road (RNTM86) which requires movement through the roundabout.

8.8.117 There would be additional delays on the A128/Brentwood Road route (JT18) of one and a half minutes in the northbound direction in the AM peak only. This is also due to increased traffic through Orsett Cock as a consequence of the A13 to A1089 switchover (RNTM86).

8.8.118 There would be additional delays of less than a minute on Baker Street / Heath Road (JT22) in all time periods in both directions. Although low in real terms, this is equivalent to a greater than 10% increase. This is due to the switchover (RNTM85) and crossing point (RNTM39) on Baker Street plus a small amount of increased traffic flow.

Phase 11

8.8.119 The forecast change in traffic flows on the network, as a result of the additional construction related vehicles and the impact of the traffic management measures on the routes chosen by drivers are shown in Plate 8.87 to Plate 8.92. The maps present the change in flows, north and south of the river, for each of the modelled time periods.

8.8.120 For all journey time routes where the time changes by more than a minute or more than 10%, in either direction, the with and without construction journey times are shown in Table 8.67 to Table 8.69.

Plate 8.87 Change in flow (PCUs), north of the River Thames, phase 11 AM peak

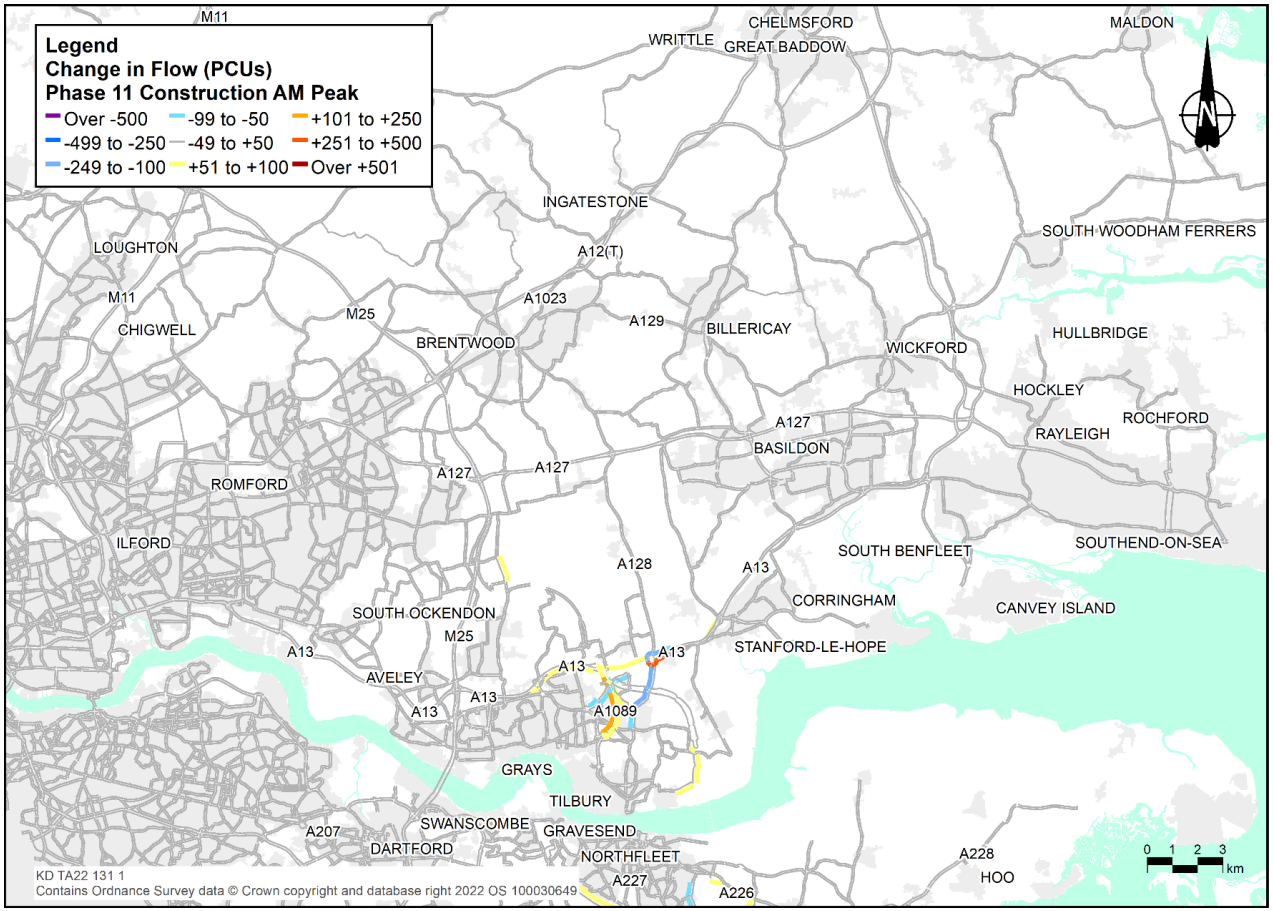


Plate 8.88 Change in flow (PCUs), north of the River Thames, phase 11 inter-peak

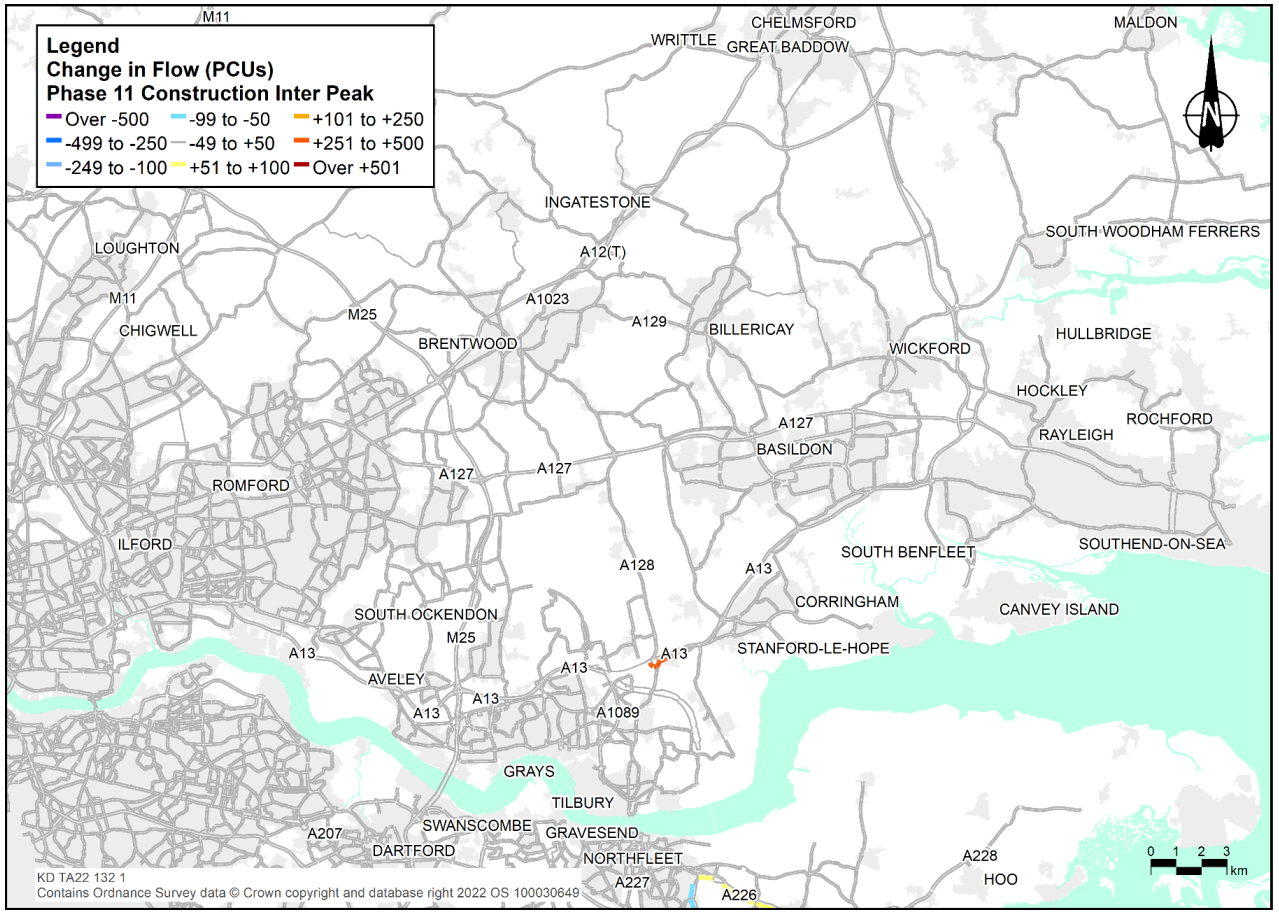


Plate 8.89 Change in flow (PCUs), north of the River Thames, phase 11 PM peak

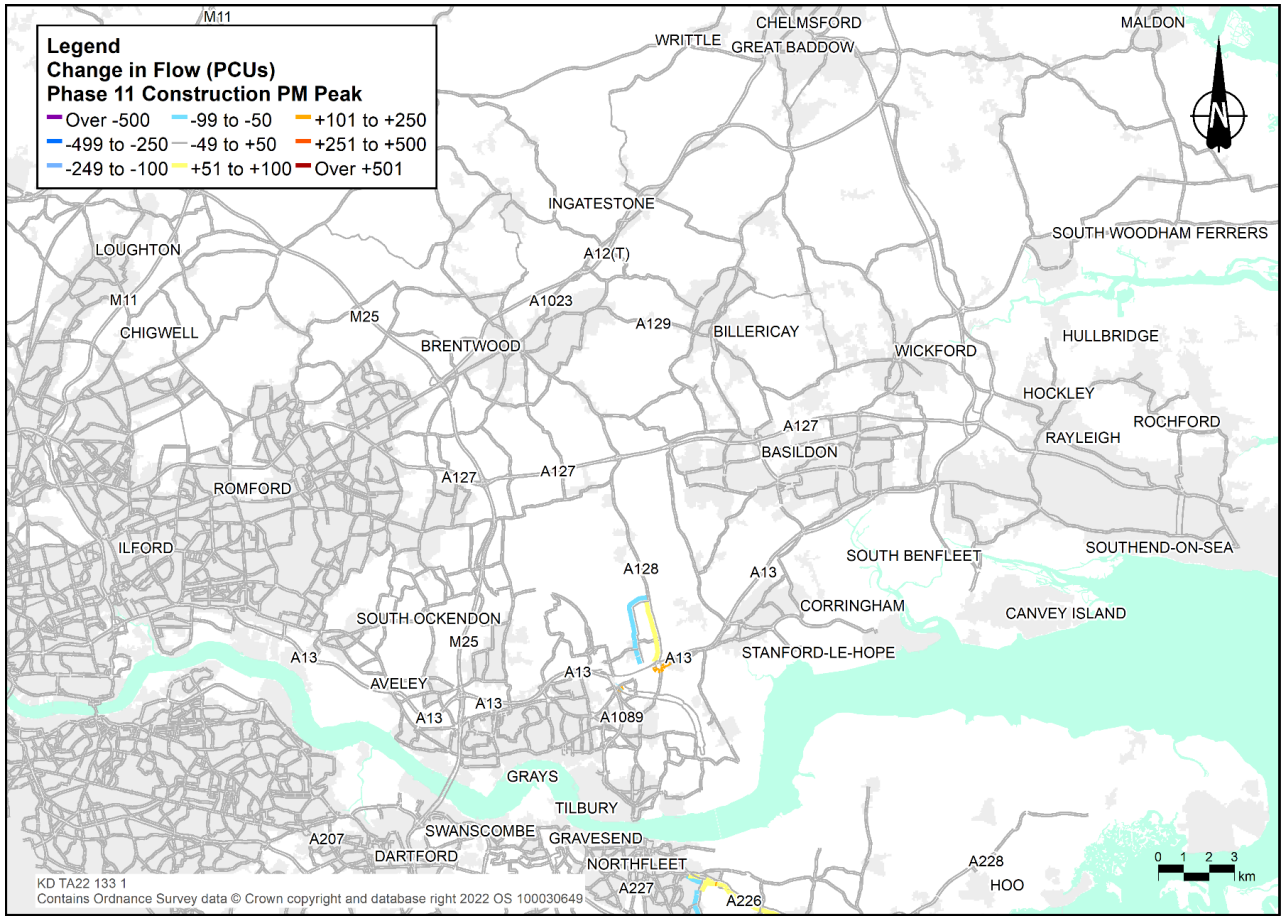


Plate 8.90 Change in flow (PCUs), south of the River Thames, phase 11 AM peak

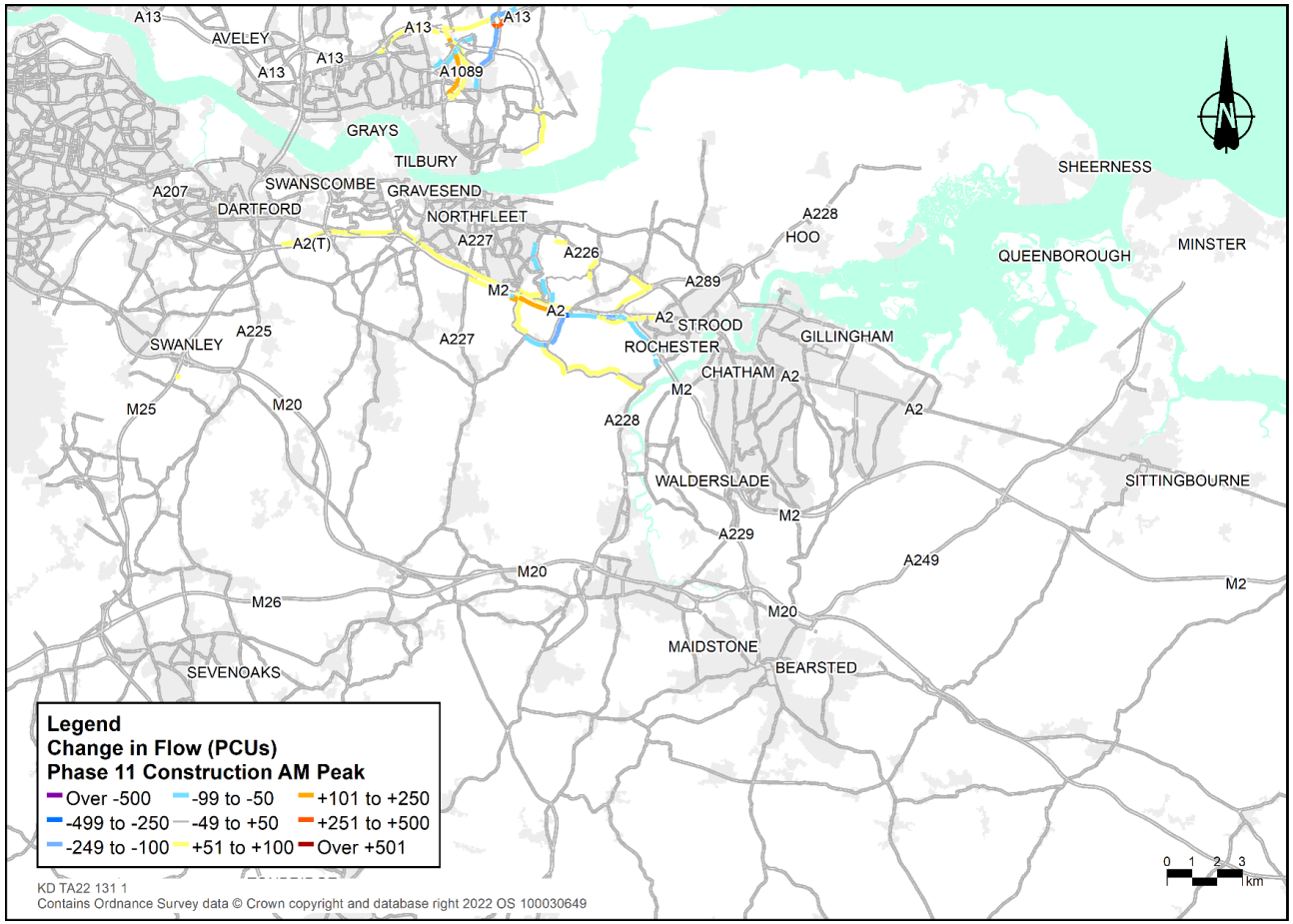


Plate 8.91 Change in flow (PCUs), south of the River Thames, phase 11 inter-peak

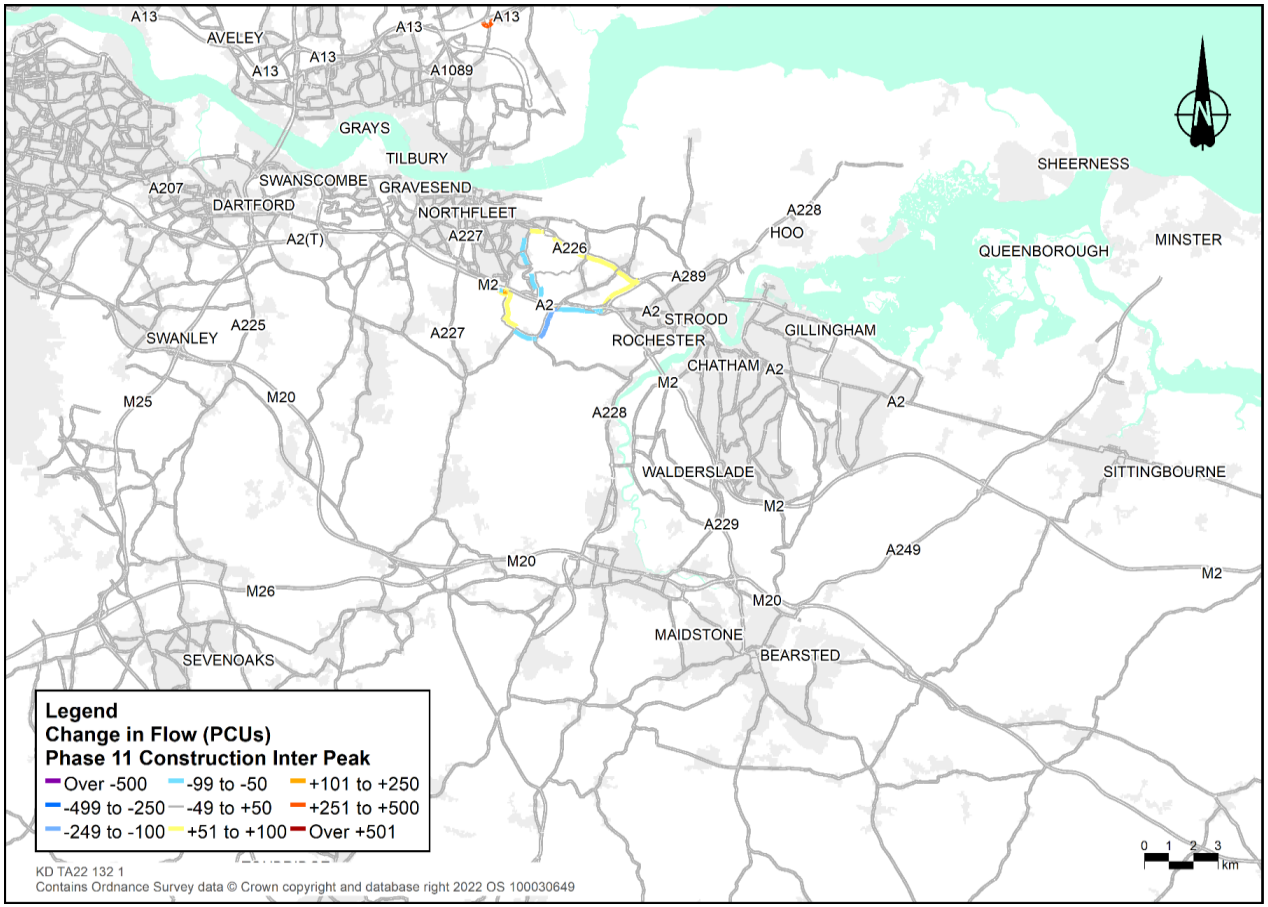


Plate 8.92 Change in flow (PCUs), south of the River Thames, phase 11 PM peak

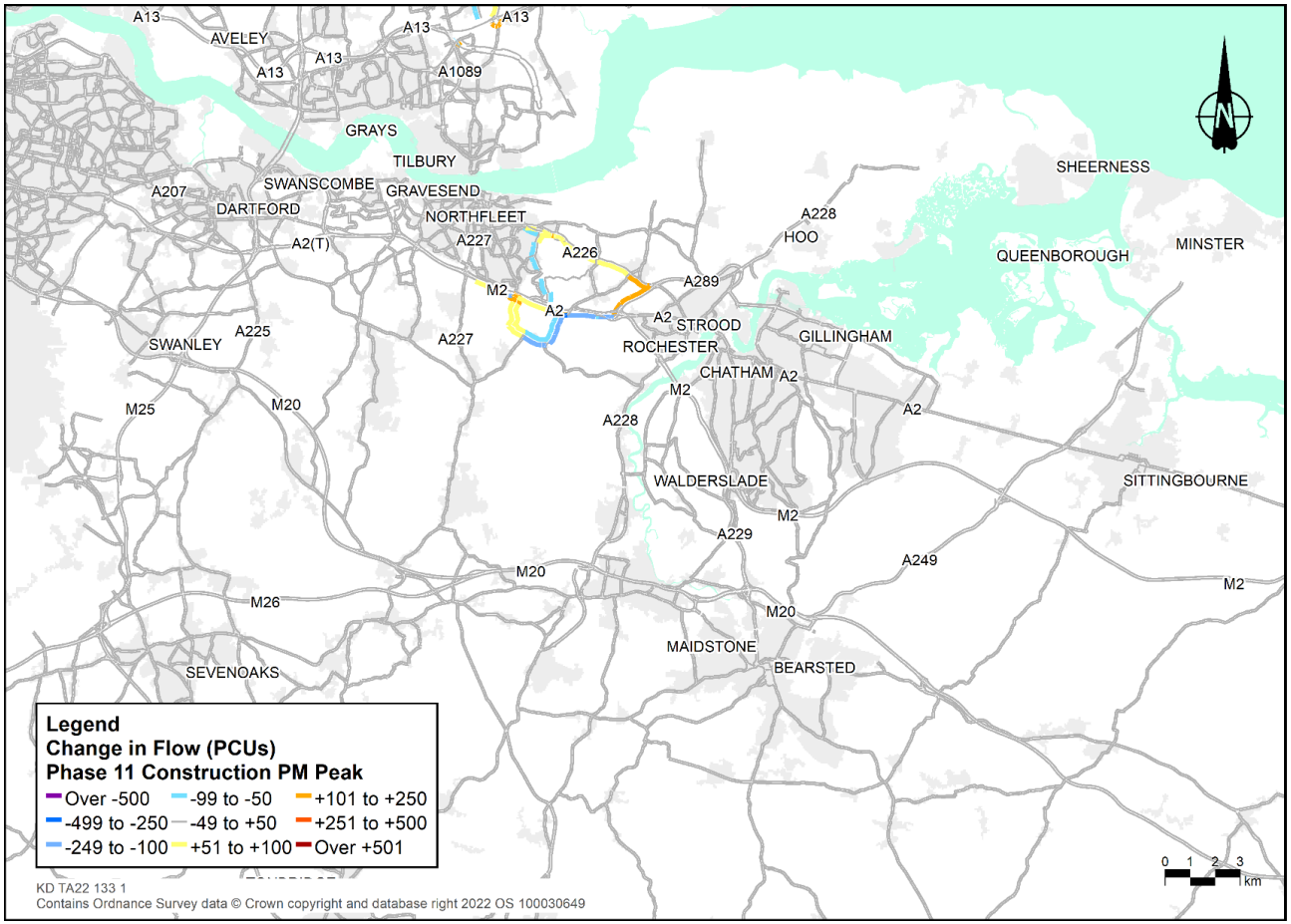


Table 8.67 Construction impact on journey times (phase 11 AM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT18	A128 / Brentwood Road	NB	16.2	45.7	17.2	42.9	+1.0	-2.8	+6%	-6%
		SB	13.6	54.1	13.7	53.6	+0.1	-0.5	+1%	-1%
JT22	Baker Street/Heath Road	NB	3.7	47.7	4.3	44.5	+0.6	-3.3	+15%	-7%
		SB	3.5	51.1	4.0	47.6	+0.5	-3.5	+15%	-7%

Table 8.68 Construction impact on journey times (phase 11 inter-peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time	Av Speed
JT22	Baker Street/Heath Road	NB	3.4	52.5	3.7	51.5	+0.3	-1.0	+9%	-2%
		SB	3.3	53.3	3.9	49.2	+0.6	-4.1	+17%	-8%

Table 8.69 Construction impact on journey times (phase 11 PM peak)

Route	Road	Dir	Without Construction		With Construction		Difference		Difference (%)	
			Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)	Time (mins)	Av Speed (km/h)
n/a	No routes meeting criteria									

8.8.121 The flow difference plots show changes in total flow across the modelled network. Compared to previous phases there are far fewer traffic management measures in place and consequently far fewer changes in traffic flow. Because the A13 westbound to A1089 southbound slip road switchover (RNTM88), there would be large increases in flow through Orsett Cock roundabout and decreases on the A13 westbound as trips from the A13 to the A1089 must now go through the roundabout. There would be increases on the A1089 northbound in the AM peak only, largely due to diverted trips from Brentwood Road. Finally, the A2 westbound on- and off-slip at Thong Lane/ Brewers Road junction (RSTM22 & 23) would cause a very small amount of local reassignment.

8.8.122 The journey time analysis shows that there would be additional delays on the A128/Brentwood Road route (JT18) of one minute in the northbound direction in the AM peak only. This is due to increased traffic through Orsett Cock as a consequence of the A13 to A1089 switchover (RNTM86).

8.8.123 There would be additional delays of around half a minute on Baker Street / Heath Road (JT22) in the AM and interpeak periods in both directions. Although low in real terms, this is equivalent to a greater than 10% increase. This is due to the switchover on Baker Street (RNTM85) plus a small amount of increased traffic flow

8.9 Impacts on the public transport network

Rail network

8.9.1 This TA considers all railway lines that cross the alignment of the Project or lie close to the Project. These are as follows:

a. The North Kent railway line from London Charing Cross to Strood which is used by Southeastern services from Kent into London and Thameslink Services which run from Kent and cross London to destinations north including St Albans, Luton and Bedford.

b. High Speed 1 (HS1) from London St Pancras to destinations in Kent and Europe.

c. The Upminster and Grays Branch/Tilbury Loop railway line from Fenchurch Street to Southend Central which is used by C2C services from Essex into London via Grays.

d. The Shoeburyness railway line from Fenchurch Street to Shoeburyness which is used by C2C railway services from Essex into London via Basildon.

8.9.2 The Project route crosses the railway at the following locations:

a. Tunnel near Gravesend (under the North Kent railway line)

b. Overpass near West Tilbury (over the Tilbury Loop railway line)

c. Footpath near North Ockendon (over the Upminster and Grays Branch railway line)

d. M25 upgrade near North Ockendon (over the Upminster and Grays Branch railway line)

Rail network impacts

8.9.3 This assessment is based on the assumption that no construction materials are delivered or removed by rail (for more information on the assumptions made, see the Outline Materials Handling Plan (Application Document 6.3, ES Appendix 2.2, Annex B)). It is assumed all construction materials would be delivered to site by road, noting that some journeys are anticipated to start at the nearby port facilities where materials are imported via the River Thames. All waste would be removed by road. These vehicle movements are included in the construction traffic demand modelling reported earlier in this chapter and are consistent with the assumptions made in the Environmental Statement.

8.9.4 However, some of the proposed construction activities would impact on the rail network, and these are set out below:

a. The construction activities (such as temporary line closures to facilitate monitoring of existing or new assets, installation of safety systems (eg protection decks, railway protection barriers), and the demolition and construction of new structures) would be developed in co-ordination with the network operators and asset owners to minimise the impact on customers. Mitigation measures would be agreed with them and where applicable with local authorities. Typical measures would include 24 hour working to reduce the duration of closures, and overnight or weekend closures to reduce the number of customers impacted.

b. Where a railway line or station would be temporarily closed as a result of the Project's construction, there would be no train services and as such customer journeys would be extended, either through the use of rail replacement transport, or alternative modes. The options available to customers would be set out by the network operators in sufficient time for customers to plan accordingly.

8.9.5 South of the River Thames, there would be the following works:

a. Three sets each of 60 hours for the North Kent railway line.

8.9.6 North of the River Thames, there would be the following works:

a. During the construction of new overpasses on the following two railway lines:

   i. The Tilbury Loop railway line near Tilbury

   ii. The Shoeburyness railway line near M25 junction 29

b. During the erection and removal of overhead powerlines and fresh and foul water connections that pass across (over or under) the Tilbury Loop railway line.

c. Installation of a new footbridge to allow FP252 to cross over the Upminster to Grays Branch railway line would require a single 48-hour weekend set of works.

d. Modifications to an existing bridge structure which is to be widened over the Shoeburyness railway line would require three 48-hour weekend sets of works.

e. Installation of a new bridge to carry the Project over the Shoeburyness railway line would require two 48-hour weekend sets of works.

f. The construction works would also be close to the HS1 railway line between Ebbsfleet International and the Medway River viaduct, the Tilbury Loop railway line to the north of the North Portal, and the Upminster and Grays Branch railway line just south of the new junction on the M25.

g. The tunnel boring machinery for the main tunnel and for the ground protection tunnel (if pursued by the contractor) would pass under the North Kent railway line.

Bus and coach network

8.9.7 The existing bus and coach networks near the Project are as follows:

a. Long-distance coach routes, including commuter services into London

b. Local bus routes in Thurrock

c. Local bus routes in Gravesham

8.9.8 Local bus routes in Thurrock include services along routes that would cross the Project's alignment and along sections of the SRN that connect to the Project.

8.9.9 Bus routes in Gravesham service local destinations (to the east of Gravesend, Chalk and Riverview Park), the Medway Towns and Maidstone via the A226 and A2.

Re-routed bus services

8.9.10 Some bus routes use roads which would be closed during construction and these bus services would follow diverted routes. This would affect services using Rectory Road, the B187 where it passes under the M25 and Brewers Road.

Impact on bus journey times

8.9.11 The bus routes in Havering, Brentwood, Thurrock, Medway, Dartford and Gravesham were coded into the LTAM and the journey times on these routes extracted from the LTAM with and without construction for each phase.

8.9.12 For each phase, a table is presented which shows the routes in each modelled hour where there is a forecast change in journey time of at least two minutes in any direction in any modelled time period. This threshold was set at a level at which to identify journey time changes on routes which would be more than negligibly impacted.

Phase 1

8.9.13 More bus routes would be affected in Phase 1 than in any other modelled construction phase. In Brentwood the 475 service would be affected northbound in the morning peak hour and southbound in the inter-peak period. In Dartford the 481 service eastbound would be affected in the evening peak hour. In Gravesham the 735 service eastbound would be affected in the morning and evening peak hours. The impact on other bus services would be in the evening peak hour and affects the 306 and 416 in both directions, the 308 northbound and the 736 eastbound.

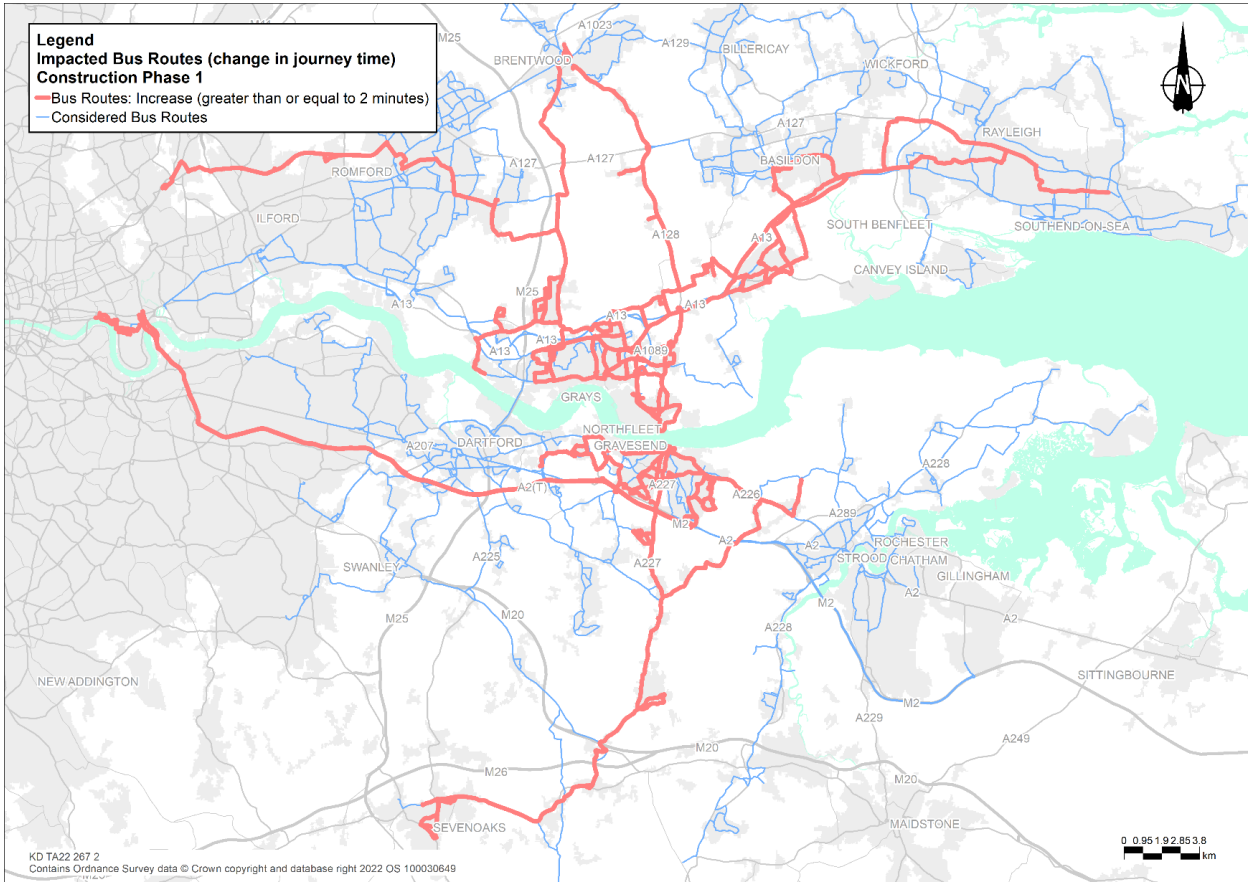
8.9.14 Sixteen bus services would be affected in Thurrock. Most of the impacts are less than three minutes. The services with an increased journey time of three or more minutes in the morning peak hour would be the 11 southbound, the 51 eastbound and the Z4 southbound. In the evening peak hour the services with an increased journey time of over three minutes would be the 66 in both directions, the 73A westbound, the 77 westbound, the 77A westbound, the 99 Loop service, the 200 northbound and the Z4 northbound. Table 8.70 provides the change in journey times for the affected bus routes in phase 1, and these are shown in Plate 8.93.

Table 8.70 Affected bus routes in phase 1

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Brentwood	475	NB	3.6	-	-
Brentwood	475	SB	-	2.3	-
Dartford	481	EB	-	-	2.4
Gravesham	306	NB	-	-	2.2
Gravesham	306	SB	-	-	2.4
Gravesham	308	NB	-	-	2.2
Gravesham	416	AC	-	-	2.2
Gravesham	416	CW	-	-	3.6
Gravesham	735	EB	2.1	-	3.1
Gravesham	736	EB	-	-	3.0
Thurrock	7A	EB	2.6	-	-
Thurrock	7A	WB	-	2.2	-
Thurrock	7B	EB	2.8	-	-
Thurrock	7B	WB	-	2.5	-
Thurrock	7C	EB	2.8	-	-
Thurrock	7C	WB	-	2.5	-
Thurrock	11	NB	-	-	2.4
Thurrock	11	SB	3.0	-	2.9

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Thurrock	51	EB	3.0	-	-
Thurrock	51	WB	-	2.5	-
Thurrock	66	EB	-	-	4.9
Thurrock	66	WB	-	-	4.8
Thurrock	73	EB	2.3	-	-
Thurrock	73A	EB	2.8	-	-
Thurrock	73A	WB	-	-	5.2
Thurrock	77	EB	2.8	-	2.4
Thurrock	77	WB	2.3	-	5.8
Thurrock	77A	EB	2.7	-	2.1
Thurrock	77A	WB	2.3	-	5.6
Thurrock	99	Loop	-	-	4.0
Thurrock	200	NB	2.1	-	3.3
Thurrock	200	SB	2.3	-	2.1
Thurrock	265	NB	-	-	2.2
Thurrock	269	NB	-	-	2.2
Thurrock	370	SB	-	-	2.1
Thurrock	Z1	EB	2.6	-	2.2
Thurrock	Z1	WB	2.5	-	2.3
Thurrock	Z4	NB	2.8	2.2	3.4
Thurrock	Z4	SB	4.3	2.2	2.1

Plate 8.93 Impacted bus routes in phase 1



Phase 2

8.9.15 In Phase 2 fewer services would be affected and all of the affected services would be in Thurrock. The biggest impacts would be in the evening peak hour. The overall journey time of the routes that would see their journey time increase by more than three minutes in the morning peak hour are 77A westbound, the 269 southbound and the 347 southbound.

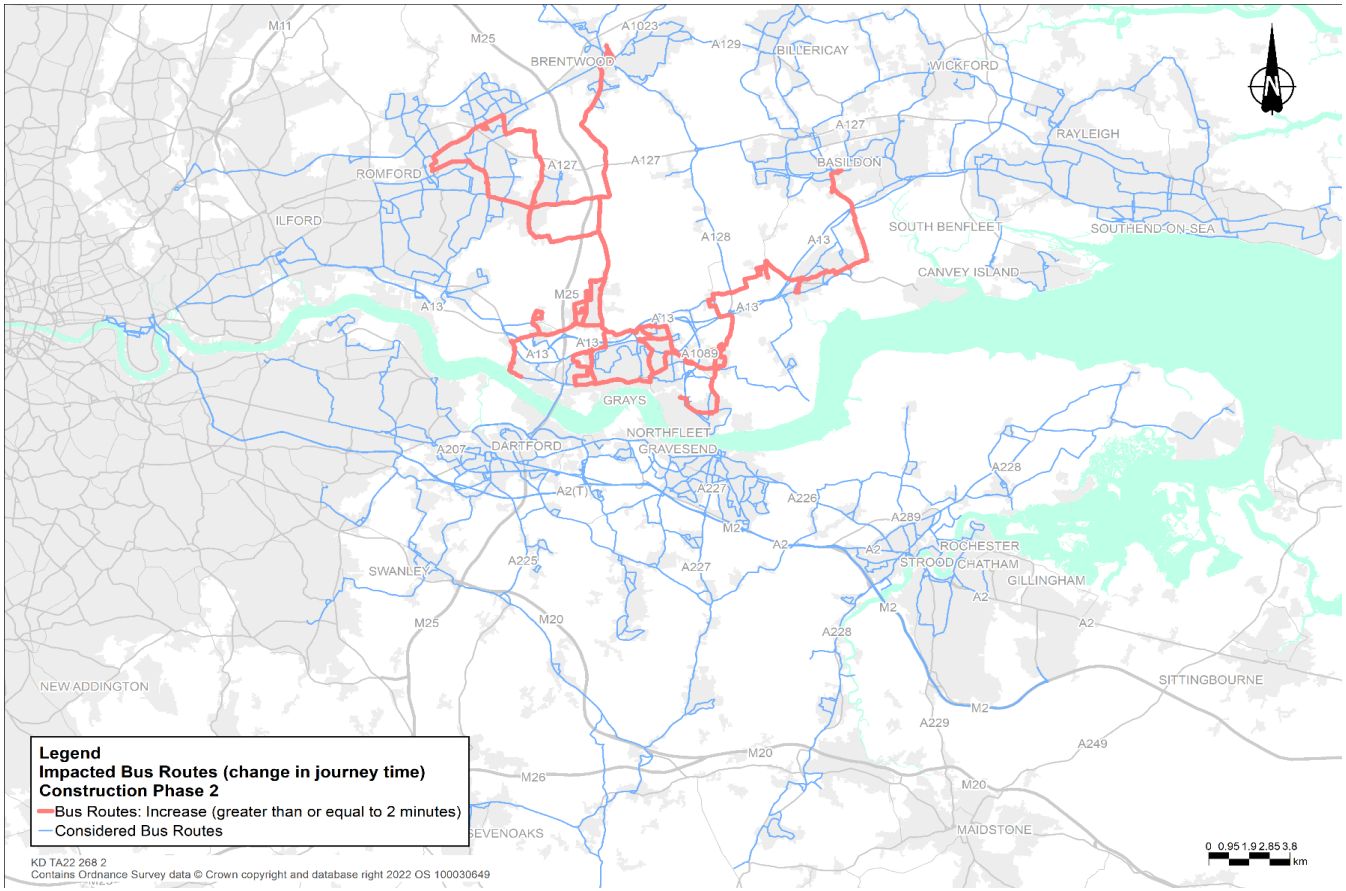
8.9.16 In the evening peak hour increases of more than three minutes would be experienced by the 77A in both directions, and the 269 and 347 northbound.

8.9.17 The forecast changes are shown in Table 8.71 and in Plate 8.94.

Table 8.71 Affected bus routes in phase 2

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Thurrock	11	NB	-	-	2.5
Thurrock	11	SB	2.7	-	2.6
Thurrock	73A	WB	-	-	2.3
Thurrock	77A	EB	2.7	2.1	3.4
Thurrock	77A	WB	3.1	2.1	3.9
Thurrock	269	NB	-	-	4.3
Thurrock	269	SB	3.6	-	2.9
Thurrock	347	NB	2.1	2.0	3.4
Thurrock	347	SB	3.6	2.1	2.9
Thurrock	370	NB	-	-	2.4
Thurrock	370	SB	-	-	2.5

Plate 8.94 Impacted bus routes in phase 2



Phase 3

8.9.18 In Phase 3 there would be a slight reduction in the number of services affected in Thurrock, with the impact here being greater in the morning peak hour. The 11 southbound, 200 southbound, and the 374 southbound would have increases in their journey times of between three and four minutes in the morning peak hour. The impact on journey times in Thurrock in the evening peak hour would be between two and three minutes for the 11 and 269 services in both directions.

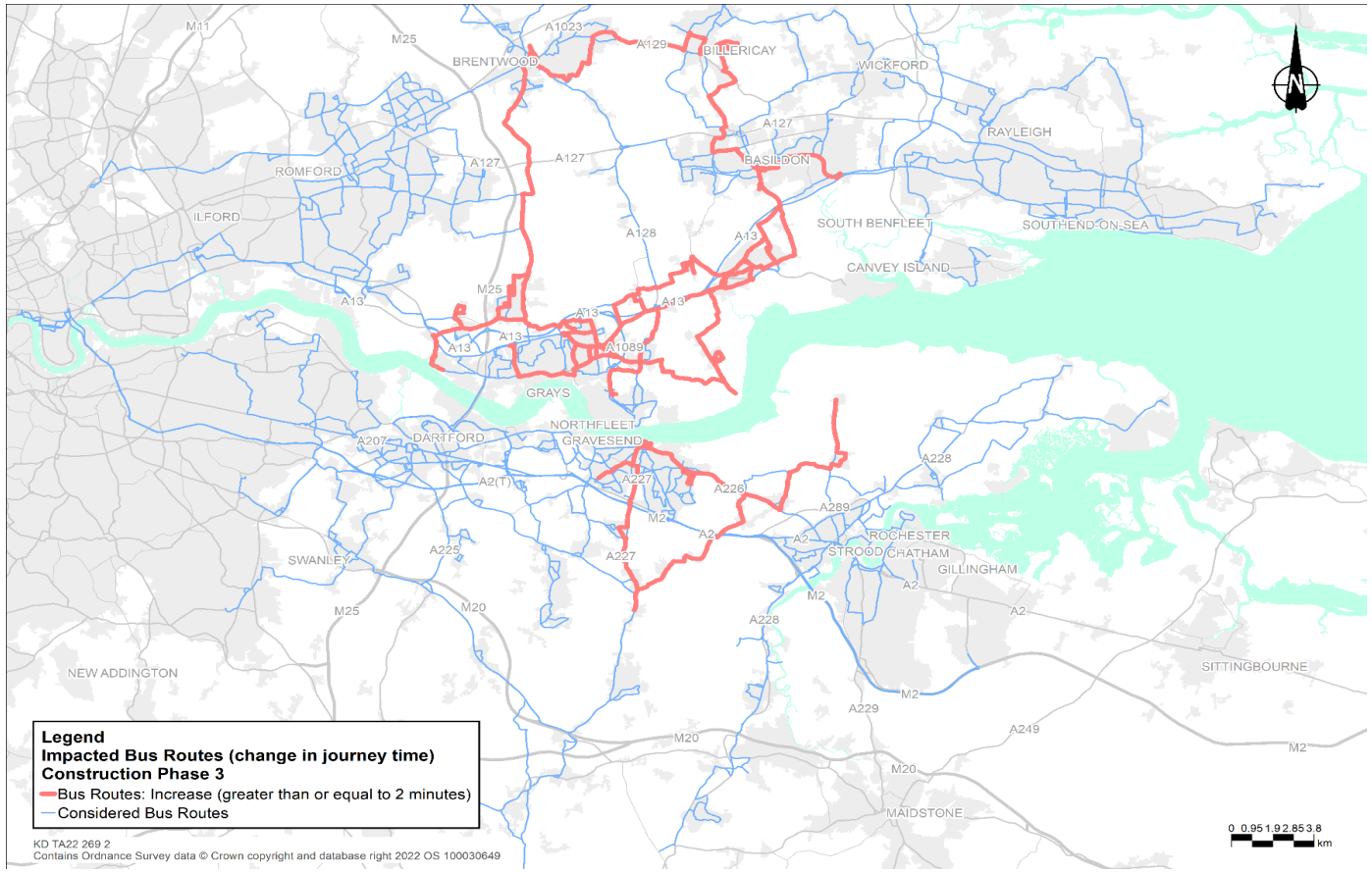
8.9.19 In Brentwood route 9 eastbound would be affected in the evening peak hour by just over two minutes. There would also be an increase in journey times of between two and three minutes in Gravesham for the 416 clockwise and the 417 in both directions in all modelled time periods and for the 736 westbound in the evening peak.

8.9.20 The changes are shown in Table 8.72 and Plate 8.95.

Table 8.72 Affected bus routes in phase 3

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Brentwood	9	EB	-	-	2.1
Gravesham	416	CW	2.1	2.1	2.3
Gravesham	417	EB	2.9	2.6	2.8
Gravesham	417	WB	2.4	2.8	3.2
Gravesham	736	WB	-	-	2.0
Thurrock	11	NB	-	-	2.2
Thurrock	11	SB	3.6	-	2.4
Thurrock	100	SB	2.5	-	-
Thurrock	200	SB	3.1	-	-
Thurrock	269	NB	-	-	2.2
Thurrock	269	SB	-	-	2.1
Thurrock	374	NB	2.1	-	-
Thurrock	374	SB	3.3	-	-
Thurrock	Z1	WB	2.0	-	-
Thurrock	Z4	SB	2.3	-	-

Plate 8.95 Impacted bus routes in phase 3



Phase 4

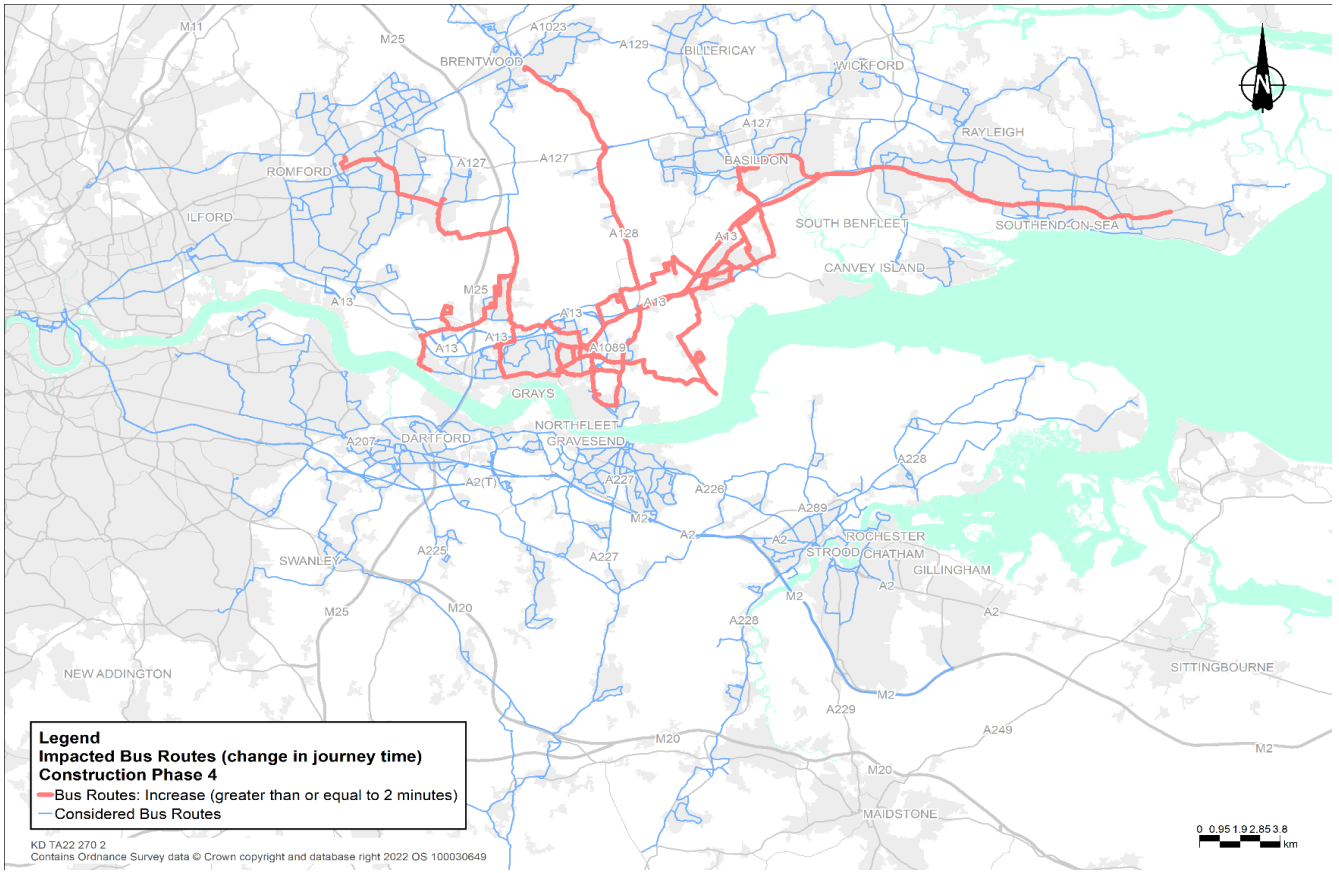
8.9.21 The impact on local bus services would be north of the river in phase 4, with the 11, 200 and 475 routes affected by the closure of Rectory Road service and the 370 service affected by the closure of the B187. Other affected routes would be the 100, 374, Z3 and Z4.

8.9.22 The forecast changes are shown in Table 8.73 and Plate 8.96.

Table 8.73 Affected bus routes in phase 4

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Brentwood	475	NB	2.2	-	-
Brentwood	475	SB	-	2.1	-
Thurrock	11	NB	-	-	2.2
Thurrock	11	SB	3.1	-	
Thurrock	100	NB	-	-	2.1
Thurrock	100	SB	3.8	-	2.8
Thurrock	200	NB	2.3	-	-
Thurrock	200	SB	4.3	-	2.6
Thurrock	370	NB	4.8	4.5	4.6
Thurrock	370	SB	6.1	5.2	6.4
Thurrock	374	SB	2.2	-	-
Thurrock	Z3	WB	2.3	-	2.3
Thurrock	Z4	SB	2.2	-	-

Plate 8.96 Impacted bus routes in phase 4



Phase 5

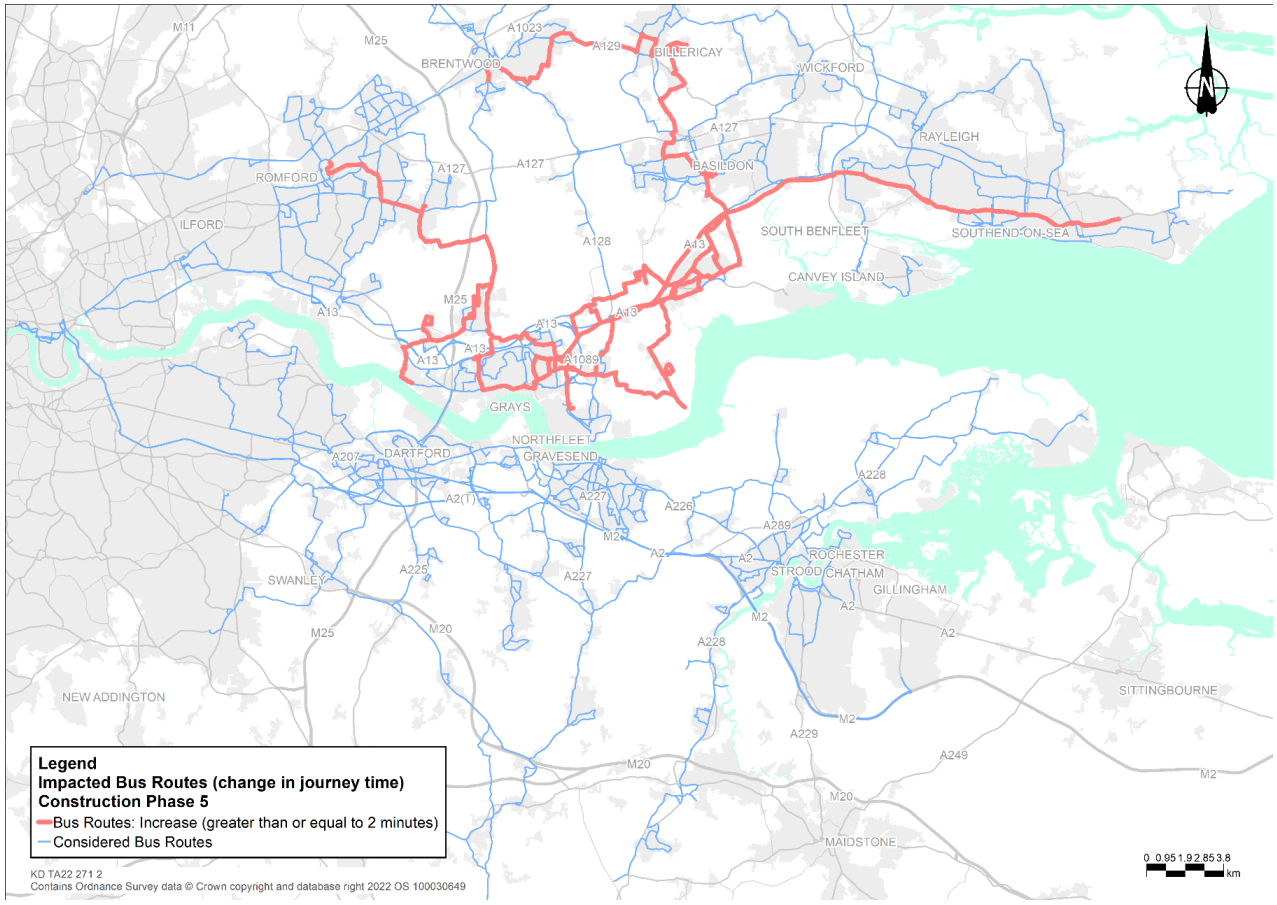
8.9.23 In phase 5 the impact on the bus routes would remain north of the River Thames. In Brentwood the number 9 eastbound service would still be affected in the evening peak. In Thurrock the greatest impact on services would be in the morning peak hour. The 11, 200 and 475 routes would be affected by the closure of Rectory Road service and the 370 service affected by the closure of the B187. These routes would operate with local diversions, that are reflected in the journey times. There would also impacts on the journey times for the 100 in both directions in the morning and evening peak hours, the 374 southbound in the morning peak hour and the Z3 eastbound in the morning peak hour and in both the morning and evening peak hour westbound.

8.9.24 The forecast changes are shown in Table 8.74 and Plate 8.97.

Table 8.74 Affected bus routes in phase 5

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Brentwood	9	EB	-	-	2.5
Thurrock	11	NB	3.9	-	3.3
Thurrock	11	SB	5.5	-	3.2
Thurrock	100	NB	2.0	-	2.0
Thurrock	100	SB	3.8	-	2.5
Thurrock	200	NB	3.2	-	-
Thurrock	200	SB	4.3	2.0	2.2
Thurrock	370	NB	4.9	4.5	4.6
Thurrock	370	SB	6.1	5.2	5.6
Thurrock	374	SB	2.5	-	-
Thurrock	Z3	EB	2.0	-	-
Thurrock	Z3	WB	2.3	-	2.0

Plate 8.97 Impacted bus routes in phase 5



Phase 6

8.9.25 In phase 6 the impacts would affect some services south of River Thames again. There would be an increase in journey times for the 311 northbound in the inter-peak period and southbound in the morning peak hour. There would be a decrease in journey times for the 416 anti-clockwise in the evening peak hour. The 417 would be the worst affected service with an increase in journey time of four to six minutes in both directions in all modelled time periods. The 700 service would also be affected throughout the day, as would be the 695 service eastbound in the morning peak hour. In Strood the 149 service would be affected in both directions in the morning and evening peak hours. The commuter coach service along the A2 would be affected westbound in the morning peak hour and in both directions in evening peak hours.

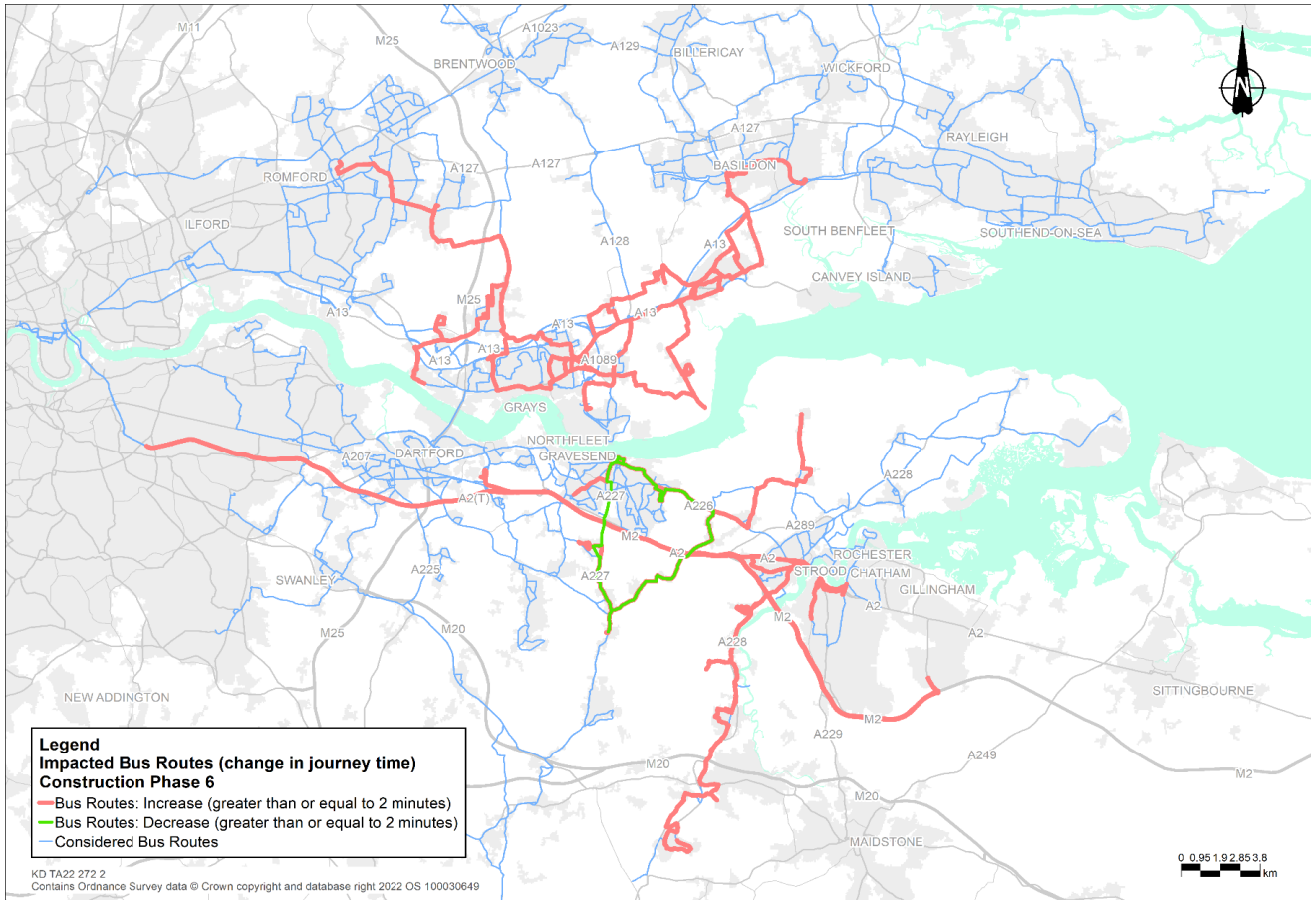
8.9.26 North of the River Thames the affected services would be the 11 in both directions, 100 southbound, 200 southbound, 374 southbound and Z4 southbound in the morning peak hour. The 370 service would be affected in both directions in all modelled time periods.

8.9.27 The forecast changes are shown in Table 8.75 and Plate 8.98.

Table 8.75 Affected bus routes in phase 6

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Brentwood	9	EB	-	-	2.0
Gravesham	311	NB	-	4.6	-
Gravesham	311	SB	5.9	-	-
Gravesham	416	AC	-	-	-2.7
Gravesham	417	EB	4.8	4.5	6.3
Gravesham	417	WB	5.9	4.6	6
Gravesham	700	EB	2.4	-	3.7
Gravesham	700	WB	3.5	2.1	2.7
Gravesham	695	EB	2.6	-	-
Strood	149	NB	2.4	-	2.9
Strood	149	SB	3.1	-	3.4
Thurrock	11	NB	2.0	-	-
Thurrock	11	SB	3.4	-	-
Thurrock	100	SB	2.9	-	-
Thurrock	200	SB	3.2	-	-
Thurrock	370	NB	4.9	4.5	4.6
Thurrock	370	SB	6.1	5.2	5.7
Thurrock	374	SB	3	-	-
Thurrock	Z4	SB	2.7	-	-
NEKent	coach	To London	2	-	2.1
NEKent	coach	From London	-	-	3.3

Plate 8.98 Impacted bus routes in phase 6



Phase 7

8.9.28 In phase 7 there would be an increase in the impact on services south of the River Thames. The greatest impacts would be on the 311 southbound in the morning peak hour and northbound in the inter-peak period. The 417 would have increased journey times of between four and six minutes in both directions in all modelled time periods. The 700 service would also be affected, by over three minutes westbound in the morning peak hour and eastbound in the evening peak hour. The commuter coach services would also be affected, with the greatest impact being a three minute journey time increase eastbound in the evening peak hour,

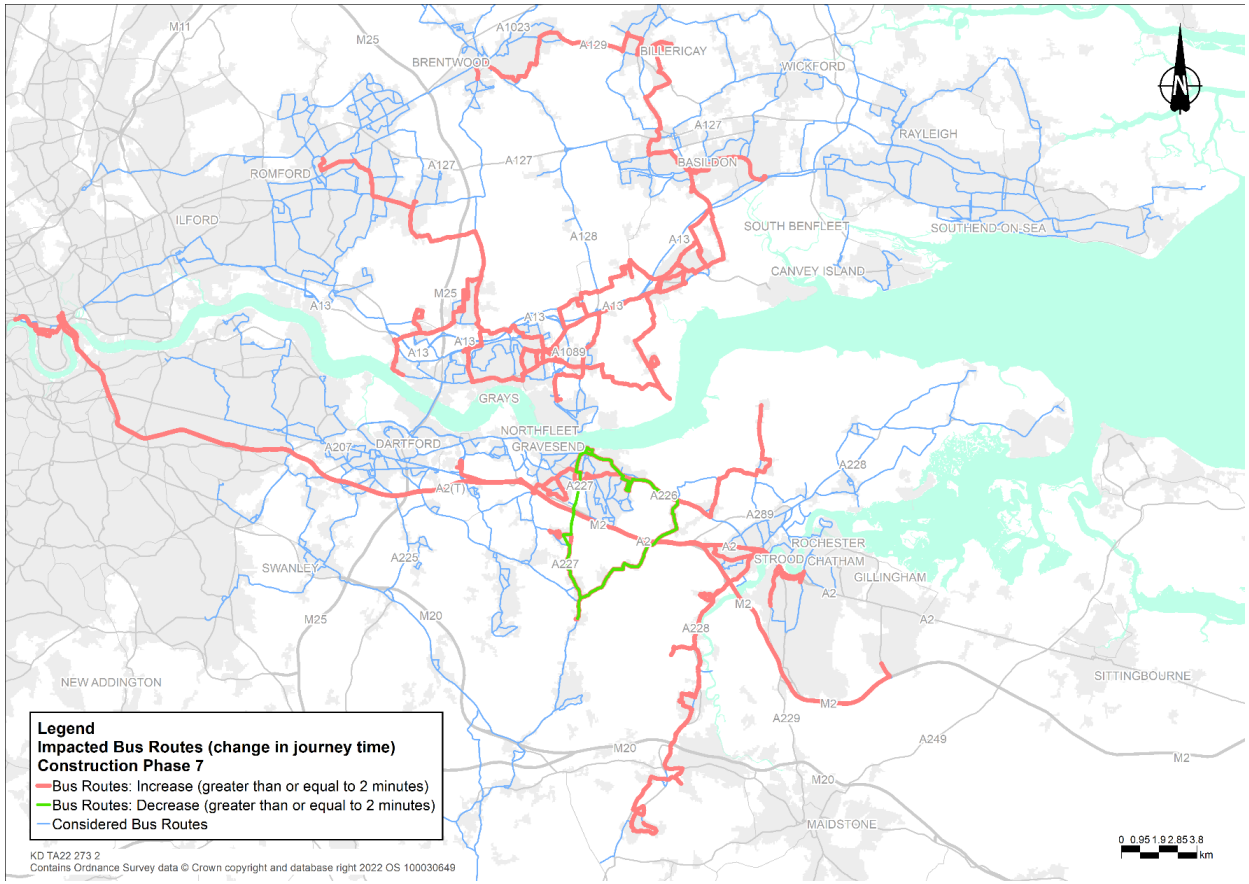
8.9.29 North of the River Thames the greatest impacts would be on the 370 service in both directions in all modelled time periods because of the diversion required by the closure of the B187.

8.9.30 The forecast changes are shown in Table 8.76 and Plate 8.99.

Table 8.76 Affected bus routes in phase 7

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Brentwood	9	EB	-	-	2.1
Gravesham	311	NB	-	4.4	-
Gravesham	311	SB	5.7	-	-
Gravesham	416	AC	-	-	-2.9
Gravesham	417	EB	4.5	4.1	5.8
Gravesham	417	WB	5.5	4.2	5.7
Gravesham	700	EB	2.5	-	4.0
Gravesham	700	WB	3.5	2.0	2.7
Gravesham	736	WB	2.8	-	-
Gravesham	695	EB	2.7	-	-
Strood	149	NB	2.5	-	3.2
Strood	149	SB	3.1	-	3.3
Thurrock	11	SB	3.0	-	-
Thurrock	100	SB	2.6	-	-
Thurrock	200	SB	2.9	-	-
Thurrock	370	NB	4.9	4.5	4.5
Thurrock	370	SB	6.1	5.1	5.6
Thurrock	374	SB	2.4	-	-
Thurrock	Z4	SB	2.2	-	-
NEKent	coach	To London	2.0	-	2.0
NEKent	coach	From London	-	-	3.2

Plate 8.99 Impacted bus routes in phase 7



Phase 8

8.9.31 In phase 8 the impact on bus services north of the River Thames would be reduced, with longer journey times for the number 9 service eastbound in the evening peak hour, and the 11 southbound, 100 southbound and 200 southbound in the morning peak hour.

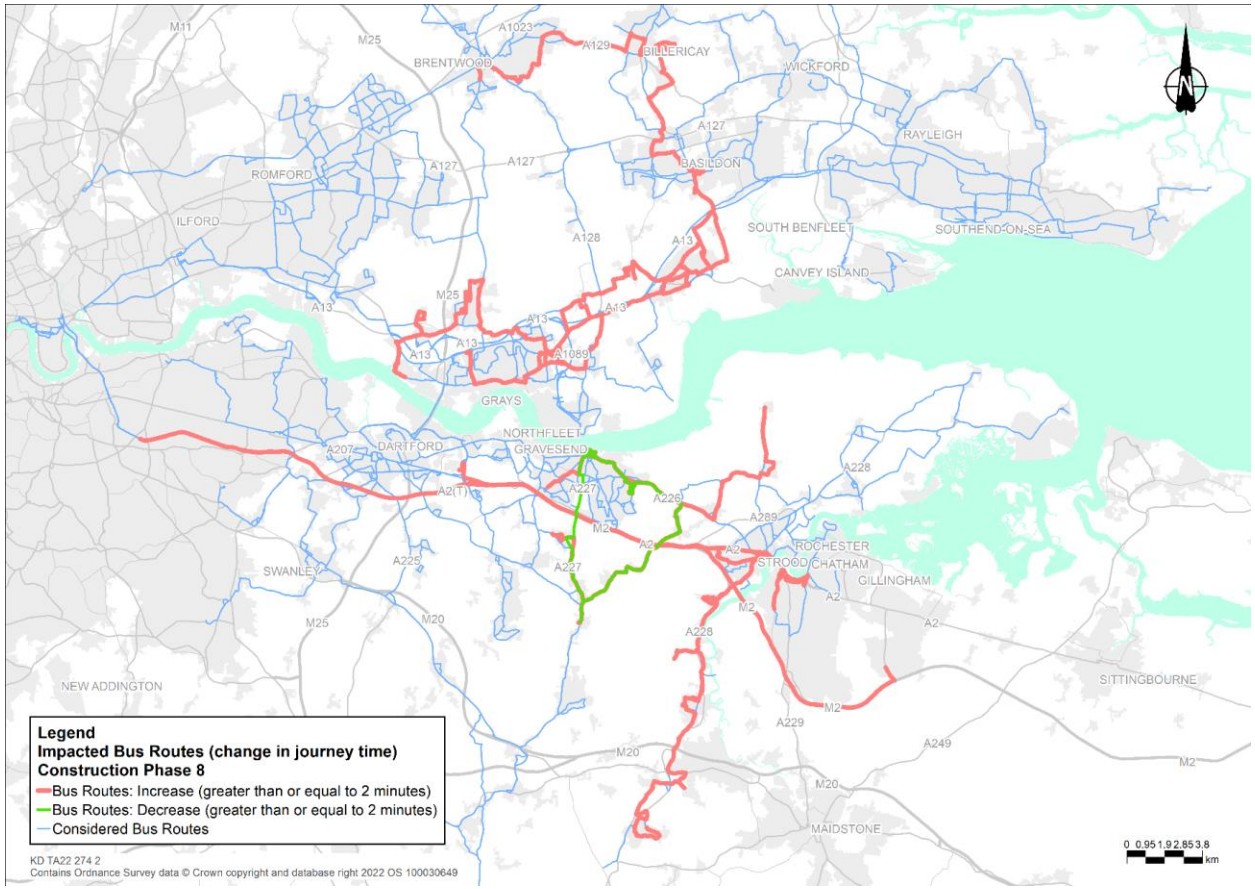
8.9.32 South of the River Thames the 149 and 700 services would be affected in both directions in the morning and evening peak hours, with the 700 westbound also being affected during the interpeak period. There would be increased journey times of over four minutes for the 311 southbound in the morning peak hour, the 311 northbound in the inter-peak period and the 417 in both directions in all modelled time periods. There would be a decrease in journey time for the 416 service in the evening peak hour. The 695 service eastbound in the morning peak hour would also be affected. The commuter coach service would be affected by a three minute journey time increase eastbound in the evening peak hour.

8.9.33 The forecast changes are shown in Table 8.77 and Plate 8.100.

Table 8.77 Affected bus routes in phase 8

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Brentwood	9	EB	-	-	2.3
Gravesham	311	NB	-	4.4	-
Gravesham	311	SB	5.6	-	-
Gravesham	416	AC	-	-	-3.0
Gravesham	416	CW	-	-	-2.0
Gravesham	417	EB	4.4	4.1	5.8
Gravesham	417	WB	5.3	4.2	5.6
Gravesham	700	EB	2.5	-	3.9
Gravesham	700	WB	3.3	2.0	2.7
Gravesham	695	EB	2.7	-	-
Strood	149	NB	2.4	-	3.0
Strood	149	SB	2.9	-	3.3
Thurrock	11	SB	2.3	-	-
Thurrock	100	SB	2.0	-	-
Thurrock	200	SB	2.4	-	-
NEKent	coach	From London	-	-	3.2

Plate 8.100 Impacted bus routes in phase 8



Phase 9

8.9.34 Road closures would continue to affect bus services in Thurrock in phase 9, with local diversions of the 11, 200 and 475 due to the closure of Rectory Road. The 68 westbound would also be affected in Thurrock.

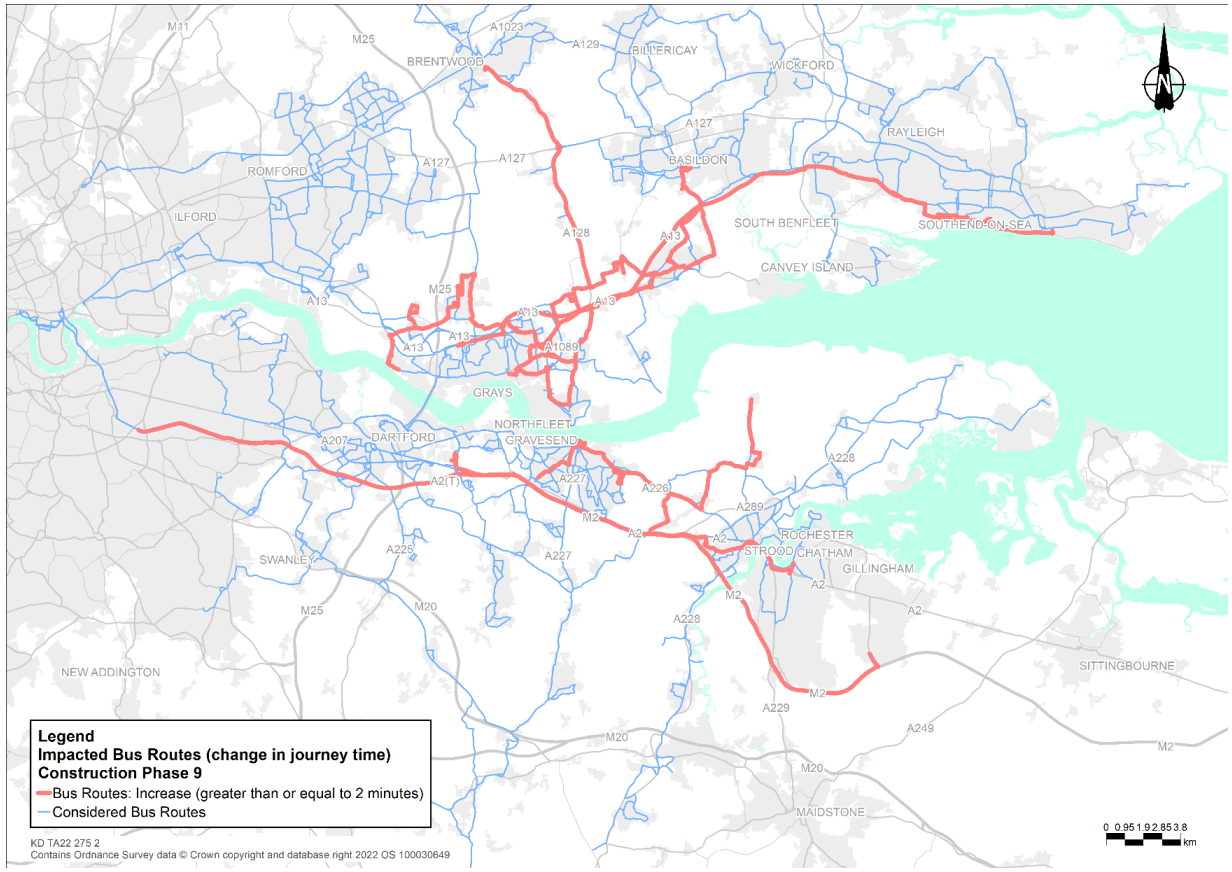
8.9.35 South of the River Thames the 417 westbound in the morning peak would be affected and there would be longer journey times for the 700 service and commuter coaches travelling eastbound from London in the evening peak hour.

8.9.36 The forecast changes are shown in Table 8.78 and Plate 8.101.

Table 8.78 Affected bus routes in phase 9

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Brentwood	475	NB	3.0	-	-
Brentwood	475	SB	-	2.3	-
Gravesham	417	WB	2.2	-	-
Gravesham	700	EB	-	-	2.8
Gravesham	700	WB	2.4	-	2.1
Thurrock	11	NB	6.5	3.9	4.7
Thurrock	11	SB	4.8	4.2	4.3
Thurrock	68	WB	3.6	-	-
Thurrock	200	NB	2.8	-	-
Thurrock	200	SB	3.9	2.0	2.3
NEKent	coach	From London	-	-	2.5

Plate 8.101 Impacted bus routes in phase 9



Phase 10

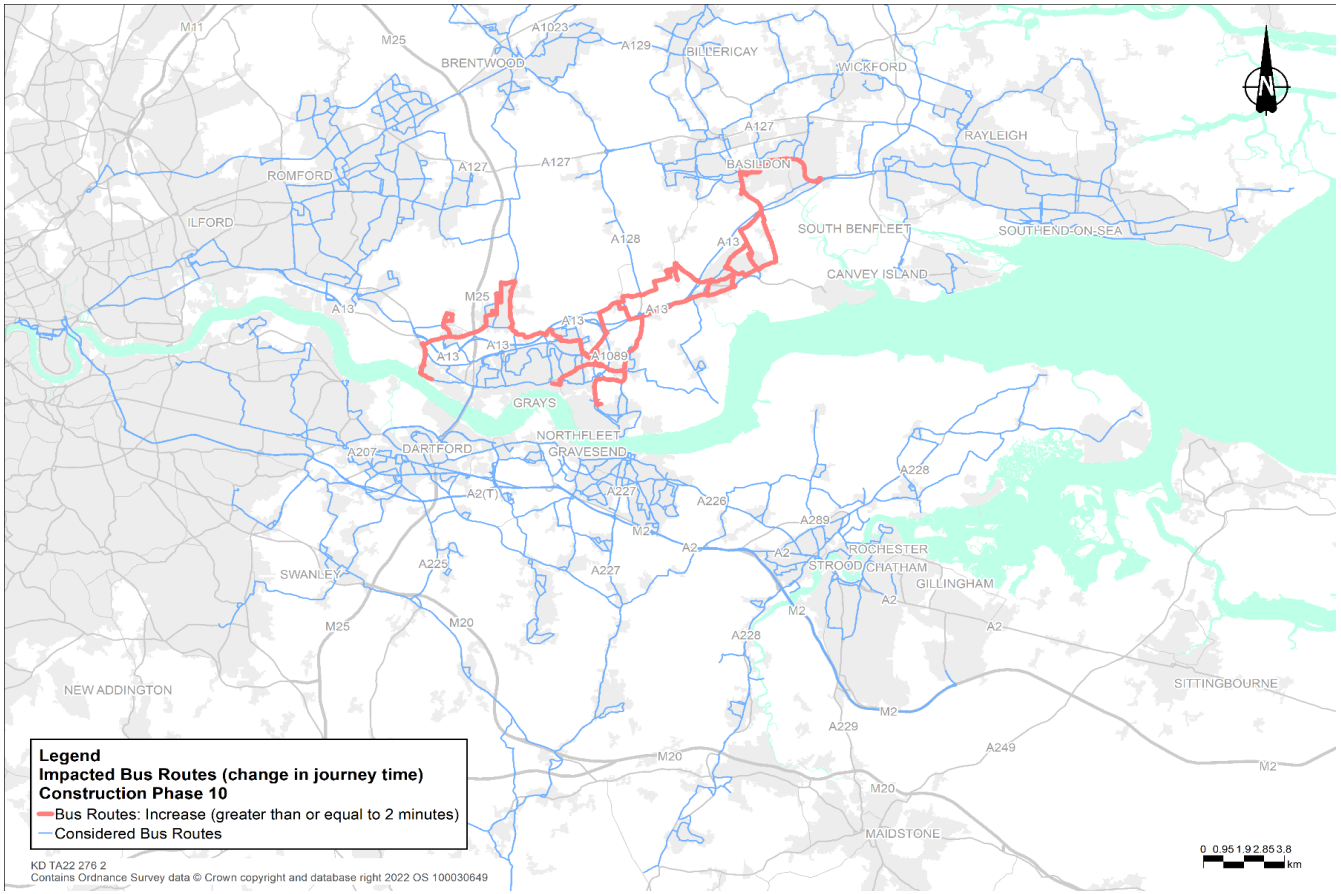
8.9.37 The only services affected in phase 10 would be the 11 northbound, the 200 southbound and the Z4 southbound in the morning peak hour and the 9 eastbound in the evening peak hour.

8.9.38 The forecast changes are shown in Table 8.79 and Plate 8.102.

Table 8.79 Affected bus routes in phase 10

Area	Route	Direction	AM	Inter-peak	PM
			Change (mins)	Change (mins)	Change (mins)
Thurrock	11	NB	2.1		
Thurrock	200	SB	2.4		
Thurrock	Z4	SB	2.3		

Plate 8.102 Impacted bus routes in phase 10



Phase 11

8.9.39 There would be no bus services where the journey time is affected by the construction of the Project by more than two minutes in this phase.

8.10 Impacts on walkers, cyclists and horse riders

8.10.1 During construction, a number of PRoW would need to be temporarily closed to enable the safe construction of the Project. Appendix A of this TA provides more details about the effects on PRoW during construction.

8.10.2 Section 5.1 of the oTMPfC (Application Document 7.14) sets out a PRoW management plan and provides a list of measures (Application Document 7.14, Appendix B) to be undertaken by National Highways, where a temporary route has been identified.

8.11 Impacts on users of the river

8.11.1 The Project is to be constructed close to the River Thames.

8.11.2 The Project has committed to making use of existing port facilities on the River Thames for the import of some bulk aggregates that would be required at the North Portal construction area. There may be further opportunities for the import of other materials via these port facilities. More information can be found within Chapter 6 of the outline Materials Handling Plan (Application Document 6.3, ES Appendix 2.2, Annex B).

8.11.3 While this would result in additional movements on the River Thames, it is not considered that these would result in any impacts to existing river users, as the number of additional movements would be very low, and would be handled by existing port facilities.

8.11.4 A detailed assessment of the forecast impact on existing users of the River Thames has been conducted in the Preliminary Navigational Risk Assessment (Application Document 7.15).

8.11.5 The impacts on river users arising from an environmental perspective as a result of the use of the river by Project vessels and material supply vessels has also been considered in the Environment Statement (Application Document 6.1). Within each topic chapter of the ES, a section is included on ‘use of the river’. These sections explain the relevance, if any, of vessel movements to the topic in question, and, where relevant, include a qualitative assessment of any effects. As a result of these assessments, no significant environmental effects resulting from vessel movements have been identified.

9 Road safety

9.1 Introduction

9.1.1 National Highways views safety as the combination of safe infrastructure design and operation ('Safer Roads'), safe driver behaviour ('Safer People') and safe vehicle technology ('Safer Vehicles'). This chapter considers the safety aspects of the design of the Project. It then presents the results of the calculation of the number and severity of collisions involving people on the road network in the wider study area over the 60 years from the opening of the Project. This analysis used the DfT (2020c) COBALT software. Finally, the pattern of recent collisions on the network, near the junctions between the Project and the existing network are shown, using data from the DfT (2020b) STATS19 database.

9.2 Safety aspects of the Project design

Design standards

9.2.1 The approach to the design of the Project is to comply with the design standards in the Design Manual for Roads and Bridges (DMRB).

9.2.2 The standards used define the horizontal and vertical alignment of the road and its cross-sections, junction layouts and road type (including the number of lanes). The standards determine the design of highway structures including the tunnel and geotechnics and earthworks. They also define the requirements for drainage, lighting, road signs and markings, traffic control technology and provision for non-motorised users such as pedestrians, cyclists and horseriders.

9.2.3 The standards define design parameters. The preliminary design for the Project has been developed to achieve, wherever possible, the required parameters taking account of the constraints.

9.2.4 The standards include a three-stage process for situations where the required design parameters cannot be achieved. The first two stages are relaxations which can be used at the discretion of the designer. The final stage is a departure which must be submitted to National Highways design specialists and agreed in principle before inclusion in the design to ensure the safety of the Project.

9.2.5 The preliminary design for the Project includes several proposed departures from the standards. The process of agreeing these departures in principle with the National Highways design specialists is underway.

9.2.6 These standards have been supplemented, where appropriate and necessary, using other documents and good practice guidance including the Manual of Contract Documents for Highways Works, British and European (Eurocodes) Standards (National Highways, 2022).

Road safety audit

9.2.7 The preliminary design has been subject to a stage 1 road safety audit (RSA). The RSA for the Project was carried out by an independent road safety audit team in accordance with the DMRB.

9.2.8 An RSA is an important part of the process for designing safe roads. An audit is carried out at four stages in the development of highway schemes starting with the completion of the preliminary design (stage 1 road safety audit), the completion of the final design (stage 2 road safety audit), at completion of construction (stage 3 road safety audit) and 12-months post-opening of the operation of the scheme (stage 4 road safety audit). The role of the auditors is to identify aspects of the engineering interventions that could give rise to road safety problems and to propose changes to the design or other mitigation measures. The RSA is carried out by auditors with experience of collision data analysis, road safety engineering experience and an understanding of highway design principles such as design requirements and best practice.

9.2.9 The stage 1 RSA was carried out on the preliminary design of the Project in May/June 2020.

9.2.10 Given that a number of design amendments have taken place since the stage 1 RSA in 2020, a repeated stage 1 RSA, focussed on the areas of change was undertaken in August 2022.

Tunnel risk assessment

9.2.11 The design of the tunnel has been subject to a risk assessment which has determined that the safety risks of both road-users and operators are as low as reasonably practicable (ALARP) and at least as safe as the adjoining road network. The assessment was reviewed and endorsed by the Safety Control Review Group (SCRG) and an independent external expert.

9.2.12 The following regulations and guidance apply to road tunnel safety and the assessment of safety risks in road tunnels in the UK:

a. GG 104 (Highways England, 2018c) establishes the safety risk assessment framework applying to all activities affecting the safety on National Highways' motorway and all-purpose trunk road network. This covers hazard identification, assessment, evaluation, safety risk management and governance.

   i. BD 78/99 (Highways Agency, 1999) defines the requirements for the design of road tunnels, including all safety-related features. This was replaced by CD 352 in March 2020 (Highways England, 2020c).

   ii. The Road Tunnel Safety Regulations 2007 (RTSR) define the minimum safety requirements for road tunnels on the Trans-European Network – Transport (TEN-T). The tunnel will be designed according to RTSR irrespective of whether the A122 Lower Thames Crossing will become part of TEN-T or not.

   iii. The Regulatory Reform (Fire Safety) Order 2005 includes articles relating to the provision and maintenance of equipment and facilities for fire and rescue service personnel.

iv. British Tunnelling Society (BTS) Joint Code of Practice for Risk Management of Tunnel Works in the UK (2003) and Code of Practice for Risk Management of Tunnel Works, international version (2012).

9.2.13 These have been considered and are complied with in the assessment and design of the A122 Lower Thames Crossing tunnel.

9.2.14 The tunnel risk assessment is based on detailed quantitative analyses that have been carried out to estimate user safety risk in the tunnel.

9.2.15 The risk assessment addresses person safety risks from hazards and incidents that could occur during the operational phase (including maintenance) of the Project tunnel. This includes incidents such as:

a. Non-fire collision during free flow (collision with/without HGV involvement)

b. Non-fire collision with a broken-down vehicle (follow-up collision with/without HGV involvement

c. Fire due to free-flow collision

d. Fire due to vehicle breakdown

e. Fire due to follow-up collision (for example, a follow-up event of primary collision or breakdown)

f. Incidents involving dangerous goods

9.2.16 The design of the Project includes key safety related features for the tunnel design including:

a. Longitudinal ventilation designed for a peak Heat Release Rate (HRR) of 100MW

b. Fixed Fire Fighting System provided in the tunnel

c. Distance between cross passages (serving as emergency exits) of 150m

d. Hard strip width of 0.3m, one on each side of the carriageway, plus a walkway of between 1.0-1.2m

9.2.17 The tunnel would also be equipped with safety features to assist in user evacuation during fires which include:

a. Loudspeaker public address (PA), siren warning and radio broadcast systems to communicate instructions and warnings to users.

b. Acoustic wayfinding measures in the form of directional sound evacuation systems/beacons to guide people to cross passage doors/emergency exits in reduced visibility conditions.

9.2.18 Visual wayfinding measures in the form of illuminated signs showing the location of the cross passage doors/emergency exits, arrows at frequent intervals showing the direction and distance to the nearest cross passage door/emergency exit and strip lighting along the tunnel wall at about hip height from the tunnel floor.

9.2.19 A longitudinal tunnel ventilation system powered by jet fans mounted on the tunnel soffit would operate automatically in day-to-day operation, in response to signals from tunnel air quality monitoring instrumentation, to maintain acceptable tunnel air quality. In the event of a fire within either tunnel bore the ventilation system would operate to control smoke movement and optimise tenability conditions for tunnel users escaping the affected tunnel bore and also for attending firefighters to undertake their activities safely. A Fixed Fire Fighting System would be activated promptly upon detection of a fire event and serves to improve tenability conditions for tunnel users during evacuation/self-rescue by reducing fire growth and size, reducing gas/smoke temperatures and restricting fire spread.

9.3 Collision analysis

9.3.1 In line with TAG guidance, DfT's COBALT software program (Cost and Benefits to Accidents-Light Touch version 2.3 (DfT, 2022) was used to forecast the total numbers of personal injury accidents (PIAs) and casualties by severity of injury (fatal, serious and slight) over the 60-year period from the opening of the Project, in the area where traffic flows are impacted by the provision of the Project. This is the method for the assessment of the safety aspects of a scheme, as set out in DfT TAG guidance (DfT, 2019).

9.3.2 The number and type of accidents that would be expected on the network is derived by allocating each link modelled in the LTAM to a specific COBALT road type. Each COBALT road type has an expected accident rate per million vehicle kilometres driven along a road of that type. The accident rates for each road type are set out in the COBALT parameter file (DfT, 2020c) and decrease over time. The total number of accidents forecast for each year are obtained by multiplying the number of vehicles using each section of road by the length of the road, to calculate the number of vehicle kilometres for that road. This is then multiplied by the appropriate accident rates for that road type.

9.3.3 The calculations are made for the road network without the Project and for the road network with the Project. The difference between the two provides a forecast of the change in accidents as a result of the Project.

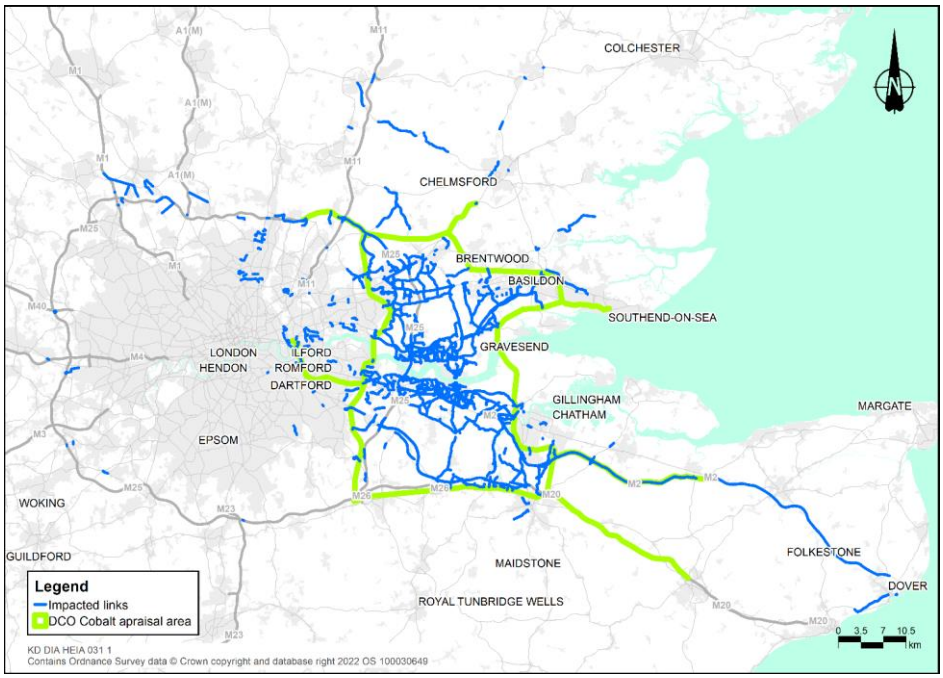
9.3.4 Plate 9.1 shows the appraisal area used for the accident appraisal of the Project. The area was determined by identifying the links with a difference in traffic flow of 5% or more, and a difference of more than 200 vehicles annual average daily traffic (AADT), in 2045 when comparing the traffic forecasts with and without the Project. In addition, some links on the SRN which extend outside the main study area were included to fully capture the benefits/disbenefits on key routes on the SRN in the fully modelled area; descriptions of the SRN extensions are provided in Table 9.1.

Table 9.1 Accident appraisal of extended SRN links

Road section	Description of extension
M2	Eastwards to junction 7
M20	Eastwards to junction 9
M25 (northern)	North to junction 26
A12	Eastwards to junction 15
A13 (eastern)	Eastwards to Southend-on-Sea
A2 (western)	Westwards to the Silvertown Tunnel project

9.3.5 A map showing the accident appraisal area is shown in Plate 9.1.

Plate 9.1 Collision analysis appraisal area



9.3.6 The accident benefits for a road project are derived by applying accident rates to the change in traffic flow on each link to estimate the change in the total number of expected accidents once the Project is built.

9.3.7 Accident rates are expressed as personal injury accidents (PIAs) per million vehicle kilometres. TAG provides default accident rates for various types of roads for appraisal. However, it is preferable to use study-area-specific accident rates when such local data is available. This is because local accident rates provide a more robust estimate of accident benefits compared to the default rates, which are based on national averages.

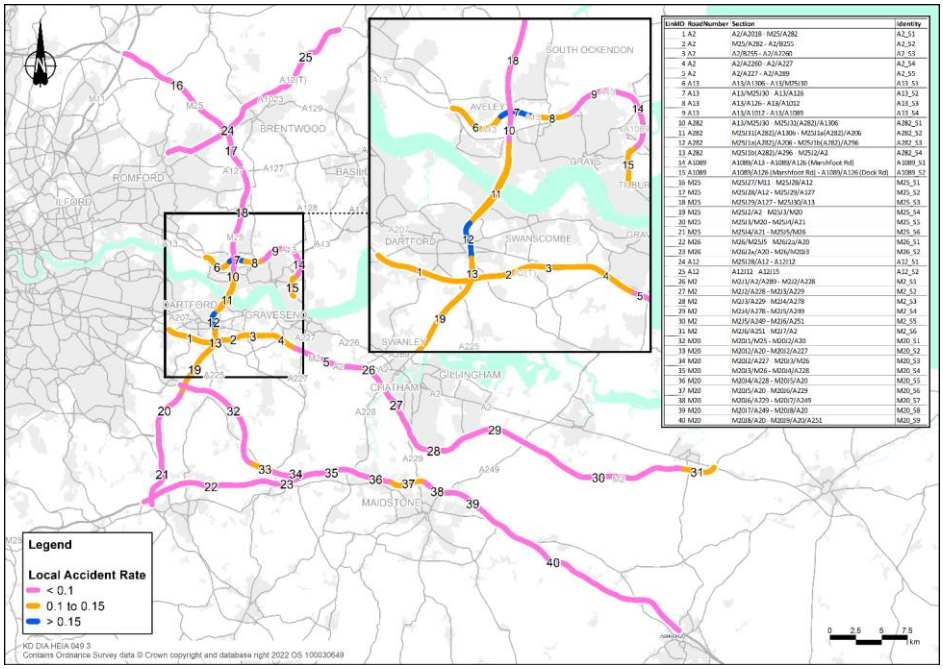
9.3.8 Local accident rates were calculated based on two data sources: STATS19 data (DfT, 2020b) and AADT data from National Highways' TRIS system of continuous traffic count sites, which are mainly located on the SRN (Highways England 2020b). Local accident rates were calculated based on data for the period from 2015 to 2019. Although STATS19 and traffic count data were available for 2020, this was removed from the analysis due to the impacts of the COVID-19 pandemic on typical traffic flows and the level of accidents.

9.3.9 It was not possible to derive local accident rates for each road link within the study area because of the lack of a sufficient quantity of robust data over a consecutive five-year period. Local accident rates were derived mainly for SRN roads within the appraisal area for which local accident rate information could be derived. Insufficient data was available from traffic count sites along the A13 in order to calculate a local accident rate based on 2015-2019 data, therefore the local accident rate for this part of the network has been calculated using the latest available five-year period of continuous data collection, from 2011 to 2015.

9.3.10 Each road was divided into sections between junctions and local accident rates were calculated for each section; Table 9.2 (A-roads) and Table 9.3 (motorways), show the summary of average accident rates for each road for which a local accident rate has been calculated. The local accident rates are also shown in Plate 9.2.

9.3.11 The national rates provided in the COBALT parameter file were used for the other roads.

Plate 9.2 Local accident rates



9.3.12 Over the study area as a whole there is predicted to be a decrease in the number of accidents per vehicle kilometre driven, but due to the increase in the total number of vehicle kilometres driven as a result of the Project there is predicted to be an overall increase in the number of accidents.

Table 9.2 Roads where local accident rates were used in the appraisal, A-roads

Road	A2	A12	A13	A282	A1089
Road type	13	10	13	13	10
Road description	Modern D3+ road	Modern D2 road	Modern D3+ road	Modern D3+ road	Modern D2 road
Number of lanes in each direction	3	2	3	3	2
Speed limit (mph)	>40	>40	>40	>40	>40
Local average accident rate*	0.119	0.064	0.144	0.129	0.101
TAG accident rate*	0.123	0.107	0.123	0.123	0.107
Percentage difference	-3.25%	40.19%	17.07%	4.88%	-5.61%

** annual number of accidents per million vehicle km driven*

Table 9.3 Roads where local accident rates were used in the appraisal, motorways

Road	M25	M26	4 lanes	3 lanes	2 lanes	M20 J1-J9
			M2 J1-J3	M2 J3-J4	M2 J4-J7	
Road type	3	1	3	2	1	2
Road description	Motorway		Motorway			
Number of lanes in each direction	4	2	4	3	2	3
Speed limit (mph)	50 / 60 / 70	50 / 60 / 70	50 / 60 / 70	50 / 60 / 70	50 / 60 / 70	50 / 60 / 70
Local average accident rate*	0.066	0.060	0.075	0.072	0.087	0.077
TAG accident rate*	0.079	0.080	0.079	0.067	0.080	0.067
Percentage difference	-16.46%	-25.00%	-5.06%	7.46%	8.75%	14.93%

** annual number of accidents per million vehicle km driven*

9.3.13 Over the study area as a whole there is predicted to be an overall increase of 2,672 casualties in the first 60 years after opening as shown in Table 9.4. This is due to the increased number of vehicle kilometres driven as a result of the Project, as some people drive to destinations further away from their current destination.

Table 9.4 Change in the number of casualties over the appraisal period

Without the Project			With the Project			Change		
Fatal	Serious	Slight	Fatal	Serious	Slight	Fatal	Serious	Slight
1,441	14,559	146,987	1,467	14,741	149,451	26	182	2,464

9.3.14 In COBALT the accidents are given a monetary value. Fatal accidents have a higher cost than serious accidents, which in turn have a higher cost than slight accidents. The monetary value of the costs, calculated for each link in the network, provides a weighted average of the accidents by severity.

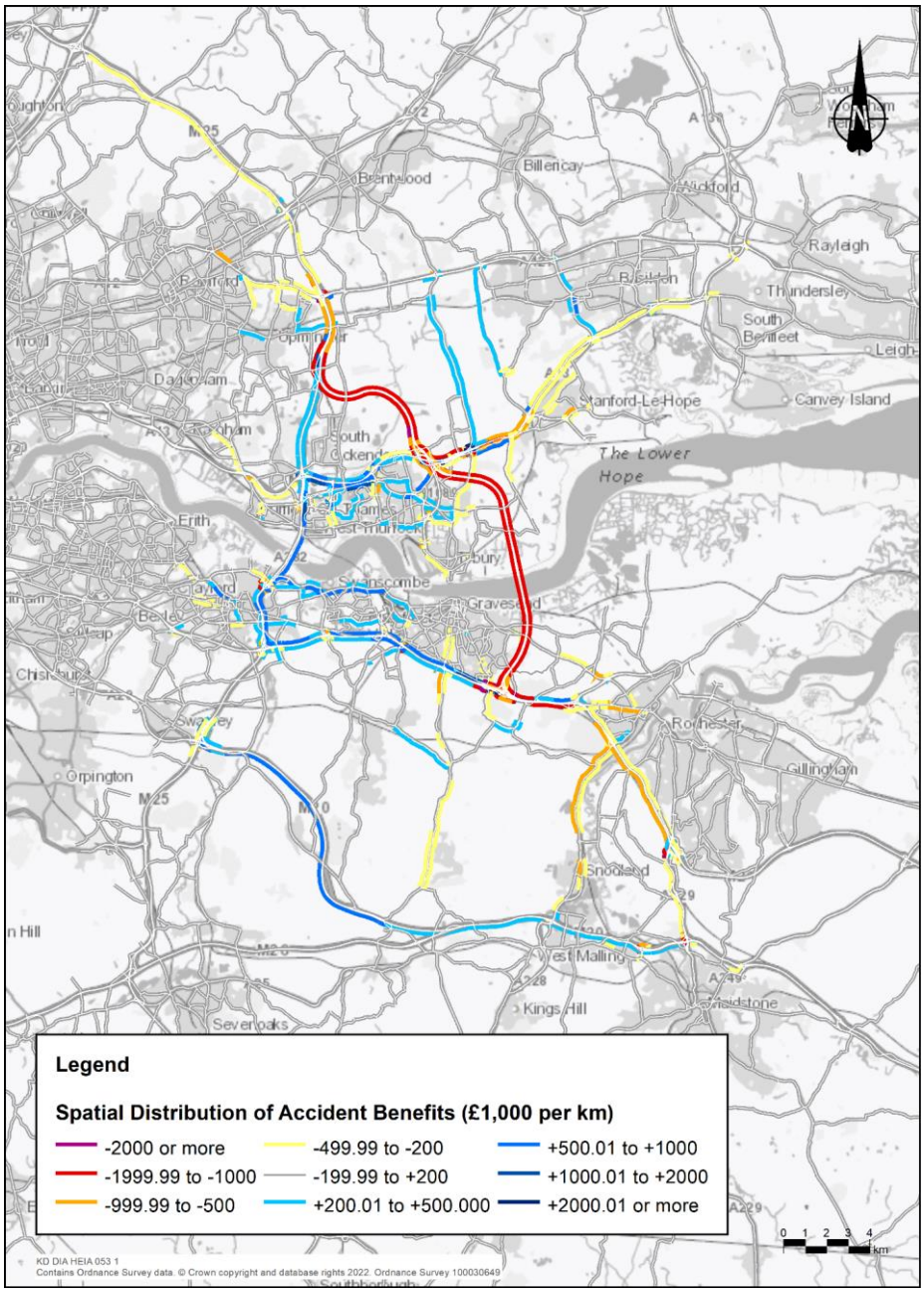
9.3.15 The value of the change in the number of accidents on each part of the network is shown in Plate 9.3. For those links where the traffic levels would fall as a result of the Project then the number of accidents would also fall. These links are coloured in blue in Plate 9.3. For links where the traffic level would rise, the numbers of accidents would also rise. These links are coloured in red.

9.3.16 Table 9.5 shows that, per kilometre driven, the number of accidents would decrease when the Project opens. This is because the Project would be designed to the latest safety standards.

Table 9.5 Accident cost per vehicle kilometre

	Without the Project	With the Project	Change
Number of accidents over 60-year appraisal period	116,899	118,566	1,667
Total network length appraised, km	2,876	2,958	82
Accident rate per million vehicle km in 2030	0.117	0.113	-0.004
Accident rate per million vehicle km in 2045	0.105	0.101	-0.004
Number of accidents per km over 60-year appraisal period	40.65	40.08	-0.6
Accident cost per km over 60-year appraisal period (£'000)	1,627	1,605	-22

Plate 9.3 Spatial distribution of accidents by value over 60 years



Vulnerable groups

9.3.17 In addition, the STATS19 data was examined to identify casualties by vulnerable group, for links with over 50 casualties and a predicted change in collision rates greater than 5%. The profile of local transport vulnerable users was then compared across the comparator region, and Great Britain, to assess whether there was likely to be any distributional impact for these categories living near the affected links. The comparator region is shown in Plate 9.4 and was the area used in the Distributional Impact Appraisal Report, Appendix D of the Combined Modelling and Appraisal Report (ComMA) (Application Document 7.7).

9.3.18 The following vulnerable group categories were considered:

a. Pedestrians

b. Cyclists

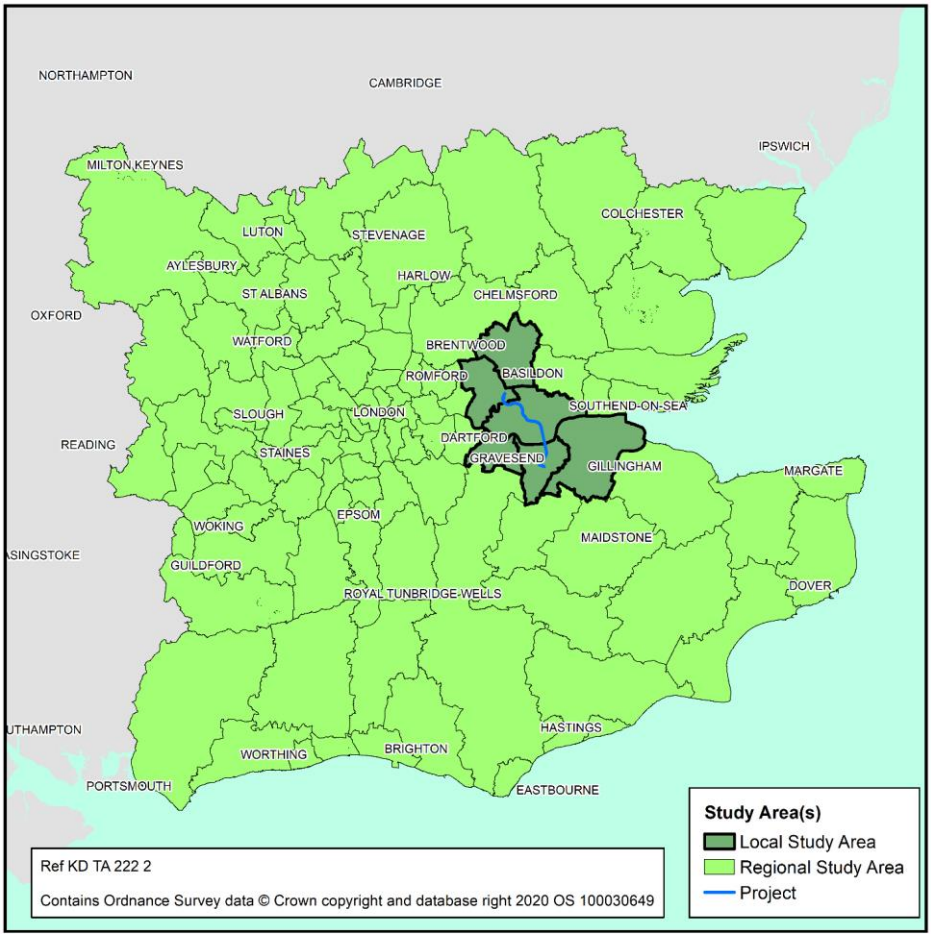
c. Motorcyclists

d. Children under 16

e. 16-25 males

f. People over 75

Plate 9.4 Comparator regional area



9.3.19 Table 9.6 compares the proportion of collision casualties for each vulnerable group within the Project's COBALT appraisal area, Great Britain and the regional study area. It shows that the proportion of pedestrian and cyclist casualties is slightly lower within the collision appraisal area than both the regional study area and Great Britain. This is likely to reflect the dominance of strategic roads within the COBALT appraisal area.

Table 9.6 Comparison of collision casualty statistics by vulnerable group

Casualties (STATS19) 2015-2019						
Category	**Great Britain**		**Regional study area**		**COBALT appraisal area**	
	Total	**Percent**	**Total**	**Percent**	**Total**	**Percent**
Pedestrians	115,617	13.6	43,574	14.9	1,615	8.3
Cyclists	90,076	10.6	35,368	12.1	895	4.6
Motorcyclists	88,920	10.4	40,737	13.9	1,869	9.6
Under 16	75,638	8.9	21,870	7.5	1,695	8.7
16 to 25, male	119,533	14.0	40,608	13.9	2,545	13.1
Over 75	37,879	4.4	10,947	3.7	676	3.5
Total	852,322	100.0	292,933	100.0	19,392	100.0

9.3.20 Overall, the Project was assessed as having a neutral impact on the distribution of accidents for vulnerable groups. Further information is contained in the Distributional Impact Appraisal Report, contained within the Economic Appraisal Package as Appendix D of the ComMA (Application Document 7.7).

9.4 Collison history near junctions with the Project

9.4.1 An analysis of collisions was undertaken of personal injury accidents on public roads that were reported to the police. This information is held in the STATS19 dataset available from DfT (2020b). The most recent fully validated data was analysed, covering the five-year period from 2015-2019.

9.4.2 The location of slight, severe and fatal accidents in the past five years near the junctions with the Project are shown in Plate 9.5 to Plate 9.7. The route of the Project is also shown to provide clarity.

9.4.3 The majority of all collisions recorded are slight, with few serious collisions. The only fatal collisions near the Project were at the A13/A1089 junction, where four fatal collisions have been recorded over a five-year period.

Plate 9.5 Collisions A2/M2 junction, 2015 - 2019

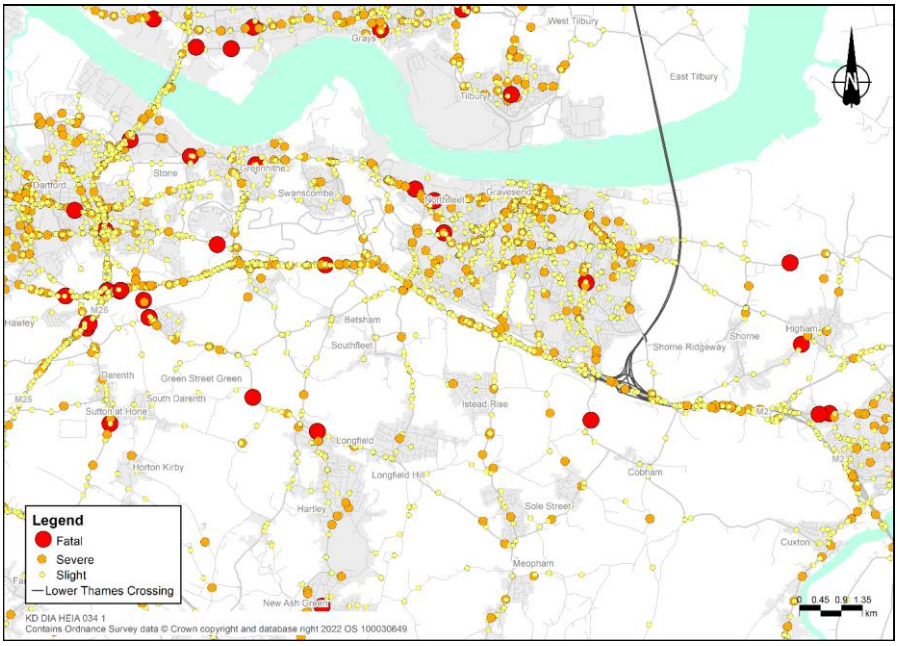


Plate 9.6 Collisions A13/A1089 junction, 2015 - 2019

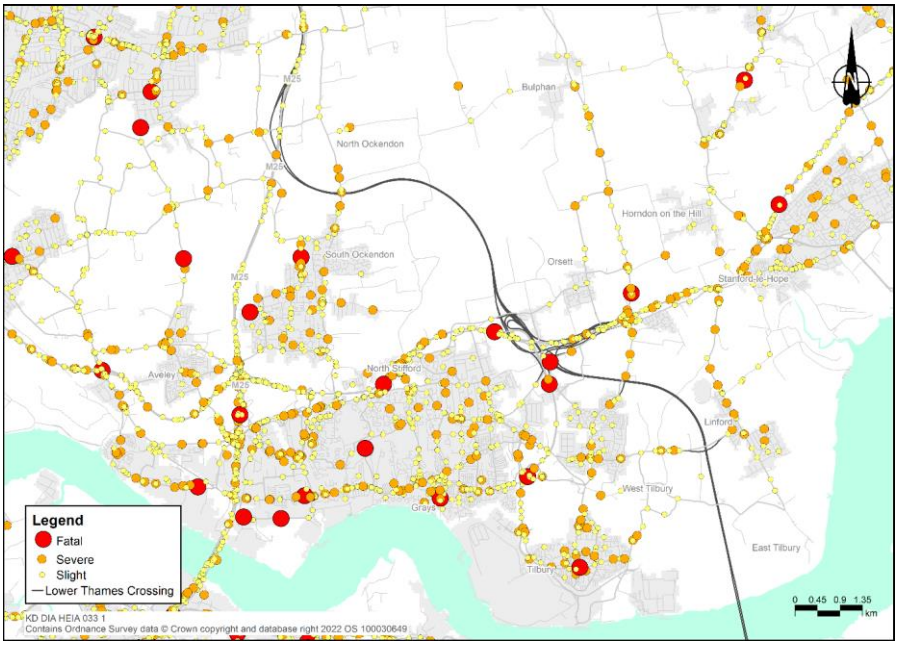
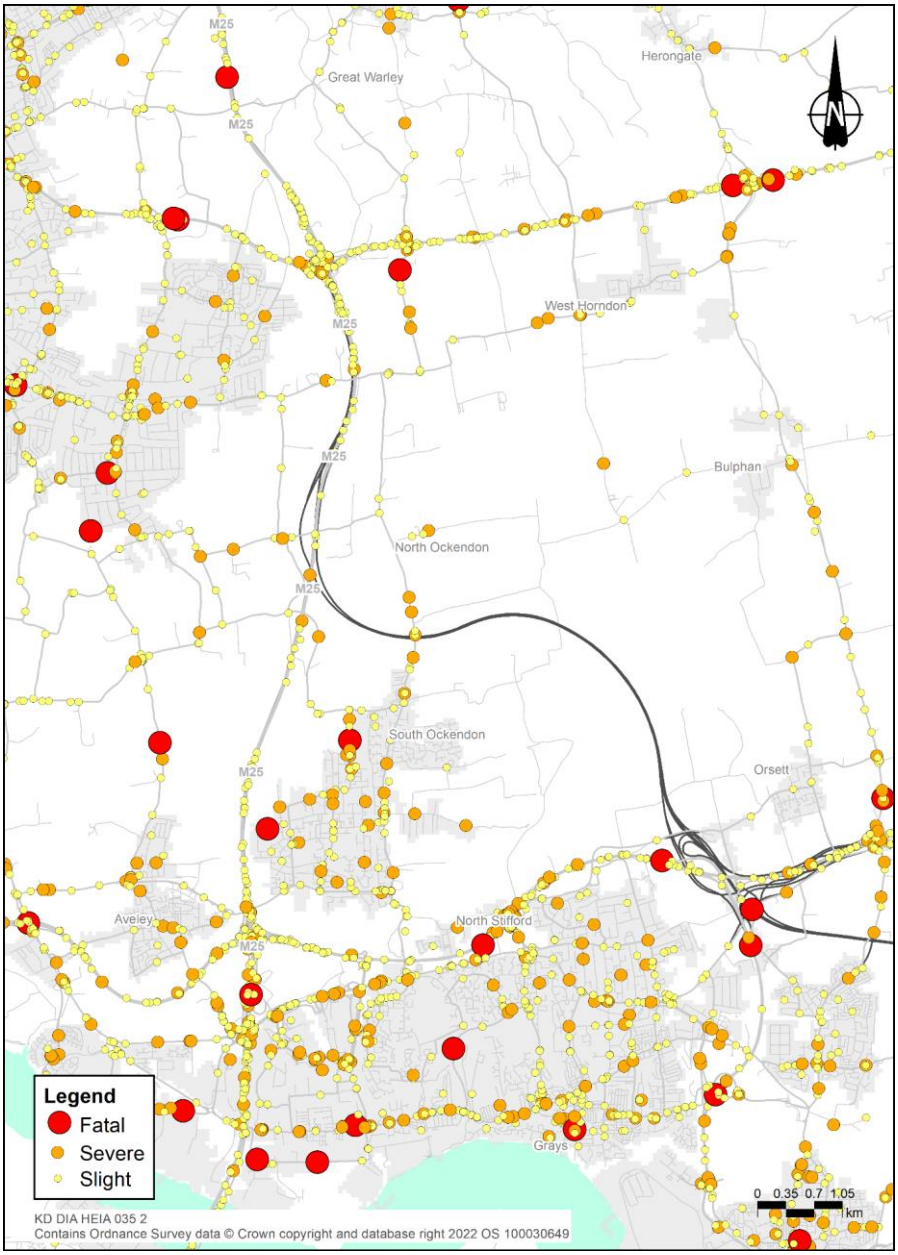


Plate 9.7 Collisions M25 junction, 2015 - 2019



10 Management of impacts

10.1 Management of impacts during construction

10.1.1 The Project would manage and reduce where practicable, adverse traffic and transport impacts and effects during construction, on local communities, local infrastructure and the environment. A comprehensive mitigation strategy has been developed as is set out in this section.

Physical measures

10.1.2 There would be physical measures implemented during construction, including the following:

a. Where reasonably practicable, site haul roads would be created adjacent to the route of the Project to transport construction materials and equipment to reduce HGV movements on public roads with access taken via the strategic road network.

b. Temporary highway measures, as required and as detailed in the outline Traffic Management Plan for Construction (Application Document 7.14), to manage the safe and efficient movement of construction vehicles.

c. Management of abnormal loads.

d. Maintenance of highways.

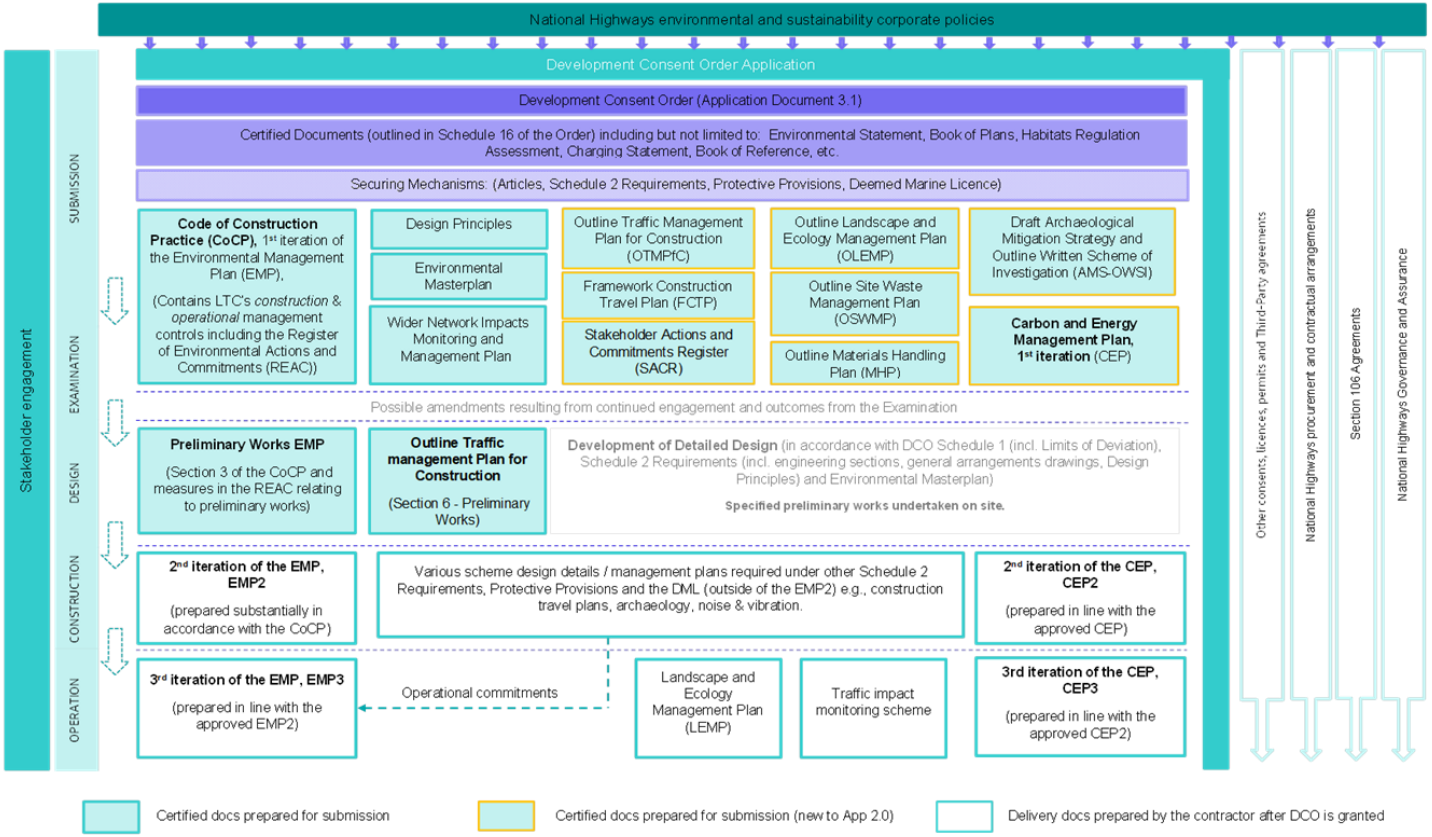
Code of Construction Practice

10.1.3 The CoCP (Application Document 6.3, ES Appendix 2.2) which, together with the Register of Environmental Actions and Commitments (REAC) (Application Document 6.3, ES Appendix 2.2) forms the first iteration of the Environmental Management Plan (EMP). It has been prepared to set out how the mitigation and management of environmental effects would be delivered and maintained during construction. This includes provisions aimed at minimising disruption to local communities and mitigating impacts on the wider environment.

10.1.4 The Contractors responsible for the delivery of construction would be required to develop an Environmental Management Plan (Second Iteration) (EMP2), prepared in accordance with the CoCP that is specific to the location and scope of works. The plans would be prepared in consultation with National Highways and use appropriate industry-standard practice and control measures for environmental impacts during the relevant works.

10.1.5 The Project has produced a suite of documents which provide more details of how these commitments will be delivered. This is summarised by the control plan as shown in Plate 10.1.

Plate 10.1 Control plan



Framework Construction Travel Plan

10.1.6 The Framework Construction Travel Plan (FCTP) (Application Document 7.13) sets out a framework with regards to the implementation of travel planning for the movement of personnel to and from the construction worksites and compounds (including the Utility Logistics Hubs (ULH)) during the construction phase of all works related to the Project.

10.1.7 The key aim of the FCTP is to minimise adverse local disruption or traffic impacts on the highway network from worker and visitor travel to and from construction worksites, construction compounds and ULHs, by reducing the number of single-occupancy vehicle trips and encouraging the uptake of sustainable and active modes of travel.

Outline Traffic Management Plan for Construction

10.1.8 The outline Traffic Management Plan for Construction (oTMPfC) (Application Document 7.14) provides outline concepts and principles that would inform the temporary traffic management measures and transport logistics for the Project. Contractors would be required to produce Traffic Management Plans for construction before commencing works as per Requirement 10 of the draft DCO (Application Document 3.1, Schedule 2, Part 1). These documents would be presented to National Highways and submitted to and approved by the Secretary of State (SoS) before the relevant part of the authorised development can commence.

10.1.9 The construction impact assessment presented in the Transport Assessment and the outline Traffic Management Plan for Construction have been developed to help refine the anticipated resource levels and to identify particular locations where the Contractors should focus their efforts to reduce the forecast impacts on the road network. The detailed construction plans and travel plans for staff would be developed once the Contractor has been appointed. As these are developed, further work would be undertaken to refine the construction planning and reduce the impacts of the works. The outline Traffic Management Plan for Construction contains a number of specific measures, such as HGV bans, that have been requested by local authorities, and which are reflected into the modelling set out in this Transport Assessment. To provide control over the works as the detailed construction plans are developed and developed, the Outline Traffic Management Plan for Construction sets out a framework within which National Highways would work with local authorities to monitor and control the works.

Outline Materials Handling Plan

10.1.10 The outline Materials Handling Plan (oMHP) (Application Document 6.3, ES Appendix 2.2, Annex B) presents the outline strategy for handling construction materials required for the construction of the project, including the handling of excavated materials and the delivery of large and/or frequent materials defined as bulk deliveries. It also includes the approach which the Project intends to reduce the impact of construction-related movements, including heavy goods vehicles (HGVs) on the road network. Contractors would be required to produce further MHPs before commencing works as per Requirement 4 of the draft DCO (Application Document 3.1, Schedule 2, Part 1). These documents would be submitted to and approved by the SoS before the relevant part of the authorised development could commence.

10.2 Impacts after opening

Impacts on walkers, cyclists and horse riders

10.2.1 The Project design has incorporated physical measures to mitigate operational impacts on walkers, cyclists and horse riders. This comprises embedded mitigation that forms part of the engineering and Project design. The mitigation is secured through ES Figure 2.4: Environmental Masterplan (Application Document 6.2) and the Design Principles (Application Document 7.5).

Impacts on the wider road network

10.2.2 The A122 Lower Thames Crossing has been designed to meet the Scheme Objectives (as set out in the Need for the Project (Application Document 7.1). The Project sits within a complex road network that faces a number of existing capacity challenges, many of which are unrelated to the congested Dartford Crossing.

10.2.3 The Project is forecast to change traffic flows at particular junctions and along particular roads on the local, major and strategic road networks during operation.

10.2.4 The wider network impacts of the Project have been captured in the traffic modelling forecasts as reported within this Transport Assessment. These impacts are monetised and captured in the economic appraisal of the Project and reflected in its benefit cost ratio (as set out in the Combined Modelling and Appraisal Report, Appendix D: Economic Appraisal Package (Application Document 7.7).

10.2.5 This Transport Assessment identifies links on the road network where the transport model forecasts there would be a change in traffic once the Project opens, and where these changes have a forecast impact on the percentage of volume to capacity.

10.2.6 Some of the increases on the road network would be as a result of the Project; others would be the result of new developments and background levels of traffic growth due to other factors such as changes in the cost of motoring.

Monitoring impacts on the wider road network

10.2.7 Requirement 14 of the draft DCO (Application Document 3.1, Schedule 2, Part 1) requires that before the tunnels comprising the Project are open for use, National Highways must submit a traffic impact monitoring scheme for the Secretary of State's approval. That monitoring scheme must be in accordance with the Wider Network Impacts Management and Monitoring Plan (Application Document 7.12), and must also contain the following information:

10.2.8 Details of a before-and-after survey to establish the baseline traffic levels and the changes in traffic

10.2.9 The locations to be monitored

a. The methodology to be used to collect the required data

b. The periods over which traffic is to be monitored

c. The method of assessment of traffic data

d. A programme for the provision of the collected data to local highway authorities

10.2.10 National Highways would monitor the impacts of the Project on the road network at a number of agreed locations and, in accordance with the framework set out in the Wider Network Impacts Management and Monitoring Plan (Application Document 7.12), provide this data to the local highway authorities. This monitoring would be undertaken within the year before opening of the Project, a year after opening and five years after opening (in alignment with National Highways Post Opening Project Evaluation (POPE) timescales).

10.2.11 The monitoring locations, and the process for the inclusion of further monitoring locations as part of this strategy, is set out in the Wider Network Impacts Management and Monitoring Plan.

10.2.12 This data would assist with providing evidence to further support potential future schemes, that are not necessary as a result of the Project but may nevertheless have their own case for funding support. These would need to be submitted into one of the available funding schemes and be considered on their own merits, against competing applications and assessed against the particular criteria of the scheme.

10.2.13 National Highways has assessed the wider network impacts of the Project and has considered these against the requirements set out in the National Policy Statement for National Networks (DfT, 2014) and other relevant policies, and considers that the adverse impacts are acceptable under this policy.

10.2.14 However, National Highways is obligated to work with local highway authorities and others to align national and local plans and investments, balance national and local needs and support better end to end journeys for road users (Highways England: Licence, paragraph 5.1.9 (DfT, 2015)). National Highways would continue to deliver against this obligation in its collaborative work with local authorities. This includes continuing to work with local authorities to help understand what projects they may wish to develop and to submit for funding consideration.

10.2.15 Monitoring during the construction phase would be undertaken to provide confirmation that traffic and vehicle control measures are effective and arrival and departure times from compounds are controlled. Further details are set out in the oTMPfC (Application Document 7.14).

11 Conclusion

11.1 Introduction

11.1.1 This TA has set out the forecast impacts of the A122 Lower Thames Crossing Project on the transport network. It has sought to provide a single document which summarises the assessment undertaken and detailed at length in other Application Documents.

11.1.2 The A122 Lower Thames Crossing would provide a new strategic highway connection to the east of London to provide much needed additional capacity on the SRN, to help provide relief to the Dartford Crossing which carries flows significantly above the capacity that it was designed for, with associated congestion, delay and poor reliability and resilience.

11.2 Planning policy and guidance

11.2.1 This TA has set out relevant planning policy and guidance which is of relevance to the production of this document.

11.2.2 Wider planning policy and guidance is considered in the Planning Statement (Application Document 7.2) and this considers how the Project is supported by both policy and guidance.

11.2.3 With respect to this document, the TA sets out a range of national, regional and local policy as well as guidance documents.

11.2.4 This TA sets out how the Project demonstrates support and/or compliance with these. This TA complies with all the relevant policy and guidance to provide a robust assessment of the forecast impacts and our proposals for mitigating these both during construction and operation.

11.3 Road safety

Design standards

11.3.1 The design standards to which the Project has been designed are detailed within the Project Design Report (Application Document 7.4), primarily being the relevant sections of the DMRB.

Safety audit

11.3.2 A Stage 1 RSA and repeat stage 1 RSA have been undertaken by independent specialists as required. The audits did not raise any significant issues, but made a number of proposals for improvements, which have been taken on board by the Project.

Collision analysis

11.3.3 An assessment of the forecast change in accidents on roads in a defined appraisal area was undertaken using the industry standard DfT COBALT software (DfT, 2020c).

11.3.4 While there is forecast to be an increase in the total number of accidents, there would be a reduction in the number of accidents per vehicle kilometre travelled within the appraisal area.

11.4 Operational assessment

Traffic flows and journey times

11.4.1 The operational assessment shows that the Project would be well used, especially by vehicles travelling from Kent and Medway to Essex along the A13 and for vehicles wishing to travel north along the M25.

11.4.2 The Project would provide considerable relief to the current levels of congestion at the Dartford Crossing, while allowing for a substantial increase in the number of vehicles able to cross the River Thames using either the Dartford Crossing or the Project.

11.4.3 The widespread change in travel patterns in the area following the opening of the Project would lead to a reduction in traffic flows in some areas, such as the A2 and A13 west of the Project, but an increase in traffic on roads leading to/and from the Project.

Public transport

11.4.4 There would be no major adverse impacts on bus services and there would be a major beneficial impact on the X80 bus that uses the Dartford Crossing.

11.4.5 There would be no impact on rail services once the Project is operational.

Walkers, cyclists and horse riders

11.4.6 A number of PRoW would be diverted, and one connection, Hornsby Lane, would be severed. In each case, however, suitable alternative provision is being provided.

11.4.7 The Project would provide an overall improvement to PRoW, both through improvements to existing routes and creation of new connections that address historic severance issues. The Project will generate approximately 36km of new or improved routes for WCH north of the River Thames and nearly 19km of new or improved routes south of the River Thames.

11.5 Construction assessment

Traffic flows and journey times

11.5.1 The construction assessment shows that the Project would result in some adverse impacts across the road network, arising from both the increase in traffic from construction and the introduction of temporary traffic management measures on the existing road network.

11.5.2 These adverse impacts would be of limited duration, would vary in location throughout the construction period, and would not continue in the same place for the entire period of construction.

Public transport

11.5.3 There would be no major adverse impacts on bus services, although there would be a number of services where the journey time would be extended by two minutes or more across the whole route. In addition, some bus services would be diverted as a result of part of their route being closed because of the construction of the Project.

11.5.4 There would be short-term impacts on rail services during construction, associated with selected short-duration construction activities. Rail passengers would be transported across any closures with rail replacement buses or alternative train services which would likely increase the time to complete their journey.

Walkers, cyclists and horse riders

11.5.5 The construction of the Project would result in temporary impacts on WCH. Temporary closure of and/or diversion of some existing footpaths and roadside footways as well as some bridleways and cycleways would be required. Diversion routes would be provided where practicable as set out in Appendix A of this TA.

11.5.6 Where site haul routes cross the existing PRoW network, active control measures would be implemented to manage the safety of PRoW users. These control measures are not expected to have a substantial impact on delays for WCH.

River Users

11.5.7 There would be no impact on users of the River Thames during construction.

11.6 Management of impacts

11.6.1 This TA recognises that there would be changes to the road network on roads away from the Project alignment in both the construction and operational phases of the Project. These are shown within the transport model that has been produced to support the Project.

11.6.2 Some of these changes would occur as a result of the Project, but others would be as a result of new developments and/or other changes in behaviour on the transport network.

11.6.3 During the operational phase, National Highways would implement a monitoring scheme at a number of defined locations as set out within the Wider Network Impacts Management and Monitoring Strategy (Application Document 7.12) and would share these results with local authorities to help form the evidence base for future schemes that are not necessary as a result of the Project but may nevertheless have their own case for funding support.

11.7 Summary

11.7.1 The A122 Lower Thames Crossing Project has been the subject of extensive design, appraisal and assessment work, much of which is summarised or detailed within this TA.

11.7.2 The Project brings a wide range of benefits to the transport network within the Lower Thames area, providing relief to the heavily congested Dartford Crossing, providing faster and more reliable journeys both across the River Thames and east-west. New journey opportunities are also created.

11.7.3 A Wider Network Impacts Management and Monitoring Plan (Application Document 7.12) sets out how National Highways would monitor traffic flows on the network once the Project was open.

11.7.4 It is considered that the Project and this TA comply with relevant policy and guidance and the Project is considered acceptable in transport planning terms.

References

Brentwood Borough Council (2022). Brentwood Local Plan. Accessed https://www.brentwood.gov.uk/adopted-local-plan

British Tunnelling Society (2003). Joint Code of Practice for Risk Management of Tunnel Works in the UK. Accessed https://firebasestorage.googleapis.com/v0/b/bts-org-uk.appspot.com/o/downloads%2Fjcop%20risk%20management%20(1).pdf?alt=media&token=91c0bc40-44bd-4875-ad62-758e4bda6c8f

British Tunnelling Society (2012). Code of Practice for Risk Management of Tunnel Works (international version). Accessed https://firebasestorage.googleapis.com/v0/b/bts-org-uk.appspot.com/o/downloads%2FInternational-Code-of-Practice-for-Risk-Management-of-Tunnel-Works.pdf?alt=media&token=50724ab8-95ec-4802-943d-01f59ef90dc8

Construction Logistics (2017). Construction Logistic Planning Guidance. Accessed http://content.tfl.gov.uk/construction-logistics-plan-guidance.pdf

Department for Transport (2007). Guidance on Transport Assessment (withdrawn). https://www.thenbs.com/PublicationIndex/documents/details?Pub=DFT&DocID=295275

Department for Transport (2009). Dartford River Crossing Study into Capacity Requirement. Accessed https://webarchive.nationalarchives.gov.uk/20100513123749/http://www.dft.gov.uk/about/strategy/capacityrequirements/dartfordrivercrossing/

Department for Transport (2013). Strategic road network and the delivery of sustainable development. Accessed https://www.gov.uk/government/publications/strategic-road-network-and-the-delivery-of-sustainable-development

Department for Transport (2014). National Policy Statement for National Networks. Accessed https://www.gov.uk/government/publications/national-policy-statement-for-national-networks

Department for Transport (2015). Highways England: Licence. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/431389/strategic-highways-licence.pdf

Department for Transport (2015a). Road investment strategy: 2015 to 2020. https://www.gov.uk/government/collections/road-investment-strategy

Department for Transport (2017). Transport Investment Strategy. https://www.gov.uk/government/publications/transport-investment-strategy

Department for Transport (2017a). National Trip End Model. https://data.gov.uk/dataset/11bc7aaf-ddf6-4133-a91d-84e6f20a663e/national-trip-end-model-ntem

Department for Transport (2017b). NTEM Planning Data, Version 7.2 – Guidance Note. https://www.tiascope.com/static/docs/NTEM72_Planning_Data_Guidance.pdf

Department for Transport (2018). Road Traffic Forecasts. https://www.gov.uk/government/publications/road-traffic-forecasts-2018

Department for Transport (2019). Transport Analysis Guidance. https://www.gov.uk/guidance/transport-analysis-guidance-tag

Department for Transport (2019a). TAG unit M4 forecasting and uncertainty. Department for Transport (2020). Road Investment Strategy 2 (RIS2): 2020 to 2025. https://www.gov.uk/government/publications/road-investment-strategy-2-ris2-2020-to-2025

Department for Transport (2020a). Gear Change: A bold vision for cycling and walking. https://www.gov.uk/government/publications/cycling-and-walking-plan-for-england

Department for Transport (2020b). Road Safety Data. Accessed March 2020. https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data

Department for Transport (2020c). COBALT TAG parameter file (version 2018.1). Accessed March 2020. https://www.gov.uk/government/publications/cobalt-software-and-user-manuals

Department of Energy and Climate Change (2011). Overarching National Policy Statement for Energy (EN-1). Accessed https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure

Department of Energy and Climate Change (2011a). National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). Accessed https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure

Department of Energy and Climate Change (2011b). National Policy Statement for Electricity Networks Infrastructure (EN-5). Accessed https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure

Essex County Council (2011). Essex Transport Strategy: The Local Transport Plan for Essex. Accessed https://www.essexhighways.org/highway-schemes-and-developments/local-transport-plan.aspx

Gravesham Borough Council (2014). Local Plan Core Strategy. Accessed September 2020. https://www.gravesham.gov.uk/home/planning-and-building/local-plan/gravesham-local-plan-core-strategy

Greater London Authority (2016). The London Plan. Accessed September 2020. https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan

Greater London Authority (2018). Mayor's Transport Strategy. https://tfl.gov.uk/corporate/about-tfl/the-mayors-transport-strategy

Greater London Authority (2021). The London Plan. https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/london-plan-2021

London Borough of Havering (2021). Havering Local Plan 2016 – 2031. https://www.havering.gov.uk/info/20034/planning/183/planning_policy/2

Highways Agency (1999). BD 78/99 - Design of Road Tunnels. Accessed November 2018. https://www.standardsforhighways.co.uk/dmrb/search/f79a55f5-a875-4714-81c9-24abe9be8ef3 [withdrawn]

Highways England (2017). Lower Thames Crossing, Environmental Impact Assessment – Scoping Report. https://highwaysengland.citizenspace.com/ltc/consultation/supporting_documents/Environmental%20Impact%20Assessment%20%20Scoping%20Report.pdf

Highways England (2018). Traffic Forecast Non-Technical Summary. https://highwaysengland.citizenspace.com/ltc/consultation/supporting_documents/LTC%206a%20Traffic%20forecast%20nontechnical%20summary.pdf-1

Highways England (2018a). Lower Thames Area Model - Local Model Validation Report. https://s3.eu-west-2.amazonaws.com/assets.highwaysengland.co.uk/Lower+Thames+Crossing/Consultation/Documents/LMVR+main+report.pdf

Highways England (2018b). Traffic Forecasting Report. https://highwaysengland.citizenspace.com/ltc/consultation/supporting_documents/Traffic%20Forecasting%20Report.pdf

Highways England (2018c). Design Manual for Roads and Bridges, GG 104 Requirements for safety risk assessment. https://www.standardsforhighways.co.uk/dmrb/search/0338b395-7959-4e5b-9537-5d2bdd75f3b9

Highways England (2019). Design Manual for Roads and Bridges, LA 105 Air Quality. Accessed https://www.standardsforhighways.co.uk/dmrb/search/10191621-07df-44a3-892e-c1d5c7a28d90

Highways England (2020). Design Manual for Roads and Bridges, LA 112 Population and Human Health. Accessed https://www.standardsforhighways.co.uk/dmrb/search/1e13d6ac-755e-4d60-9735-f976bf64580a

Highways England (2020a). Traffic Modelling Update. https://highwaysengland.citizenspace.com/ltc/consultation-2020/supporting_documents/TRAFFIC%20MODELLING%20UPDATE.pdf

Highways England (2020b). WebTRIS. https://webtris.highwaysengland.co.uk/

Highways England, (2020c). Design Manual for Roads and Bridges – CD352 Design of Road Tunnels. https://standardsforhighways.co.uk/dmrb/search/987a669b-13a1-40b9-94da-1ea4e4604fdd

Infrastructure and Projects Authority (2016). National Infrastructure Delivery Plan 2016-2021. https://www.gov.uk/government/publications/national-infrastructure-delivery-plan-2016-to-2021

Kent County Council (2016). Local Transport Plan 2016-2031https://www.kent.gov.uk/about-the-council/strategies-and-policies/transport-and-highways-policies/local-transport-plan

Lyons, G., Marsden, G. (2019). Opening out and closing down: the treatment of uncertainty in transport planning's forecasting paradigm. Transportation. https://doi.org/10.1007/s11116-019-10067-x

Medway Council (2011). Local Transport Plan 2011-2026. https://www.medway.gov.uk/downloads/file/1995/local_transport_plan_2011-2026

Ministry of Housing, Communities and Local Government (2014). Travel Plans, Transport Assessments and Statements. https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements

Ministry of Housing, Communities and Local Government (2019). Planning Practice Guidance. https://www.gov.uk/government/collections/planning-practice-guidance

Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework (NPPF). https://www.gov.uk/government/publications/national-planning-policy-framework--2

National Highways (2022), Manual of Contract Documents for Highways Works. Accessed May 2022. https://standardsforhighways.co.uk/ha/standards/mchw/index.htm

National Highways (2022a). Walkers, cyclists and horse riders. Accessed https://nationalhighways.co.uk/our-roads/lower-thames-crossing/environment/walkers-cyclists-and-horse-riders/

National Highways (2022b). Lower Thames Crossing: Walkers, cyclists and horse riders (leaflet). https://s3.eu-west-2.amazonaws.com/assets.nationalhighways.co.uk/Lower+Thames+Crossing/BED22_0008+LTC+Walkers%2C+cyclists+and+horse+riders+A5+digital+V2a.pdf

Regulatory Reform (Fire Safety) Order 2005 (SI 2005/1541). https://www.legislation.gov.uk/uksi/2005/1541/contents/made

Road Tunnel Safety Regulations 2007 (SI 2007/1520). https://www.legislation.gov.uk/uksi/2007/1520/contents/made

The Planning Inspectorate (2017). Scoping Opinion: Proposed Lower Thames Crossing. https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010032/TR010032-000033-LTC%20-%20Scoping%20Opinion.pdf

The Planning Inspectorate (2022). Thurrock Flexible Generation Plant.

https://infrastructure.planninginspectorate.gov.uk/projects/south-east/thurrock-flexible-generation-plant/?ipcsection=docs&stage=app&filter1=Environmental+Statement

Thurrock Council (2015). Core Strategy and Policies for Management of Development. Accessed https://www.thurrock.gov.uk/core-strategy-local-plan/about-core-strategy

Transport Scotland (2012). Transport Assessment Guidance. https://www.transport.gov.scot/media/4589/planning_reform_-_dpmtag_-_development_management__dpmtag_ref__17__-_transport_assessment_guidance_final_-_june_2012.pdf

Glossary

Term	Abbreviation	Explanation
A122		The new A122 trunk road to be constructed as part of the Lower Thames Crossing project, including links, as defined in Part 2, Schedule 5 (Classification of Roads) in the draft DCO (Application Document 3.1)
A122 Lower Thames Crossing	**Project**	A proposed new crossing of the Thames Estuary linking the county of Kent with the county of Essex, at or east of the existing Dartford Crossing.
A122 Lower Thames Crossing/M25 junction		New junction with north-facing slip roads on the M25 between M25 junctions 29 and 30, near North Ockendon.
A13/A1089/A122 Lower Thames Crossing junction		Alteration of the existing junction between the A13 and the A1089, and construction of a new junction between the A122 Lower Thames Crossing and the A13 and A1089, comprising the following link roads: • Improved A13 westbound to A122 Lower Thames Crossing southbound • Improved A13 westbound to A122 Lower Thames Crossing northbound • Improved A13 westbound to A1089 southbound • A122 Lower Thames Crossing southbound to improved A13 eastbound and Orsett Cock roundabout • A122 Lower Thames Crossing northbound to improved A13 eastbound and Orsett Cock roundabout • Orsett Cock roundabout to the improved A13 westbound • Improved A13 eastbound to Orsett Cock roundabout • Improved A1089 northbound to A122 Lower Thames Crossing northbound • Improved A1089 northbound to A122 Lower Thames Crossing southbound
A2		A major road in south-east England, connecting London with the English Channel port of Dover in Kent.
Application Document		In the context of the Project, a document submitted to the Planning Inspectorate as part of the application for development consent.
Annual Average Daily Traffic	**AADT**	An estimate of the average daily traffic along a defined segment of road. This value is calculated from short-term counts taken along the same section, which are then factored to produce the estimate of AADT.
AM Peak hour		The hour between 07:00–08:00 in LTAM
All-Purpose Trunk Road	**APTR**	All-Purpose Trunk Road available for all types of traffic.
Closed circuit television	**CCTV**	Closed circuit television
COsts and Benefits Appraisal - Light Touch	**COBALT**	DfT's COsts and Benefits Appraisal - Light Touch accidents appraisal software

Term	Abbreviation	Explanation
Code of Construction Practice	**CoCP**	Contains control measures and standards to be implemented by the Project, including those to avoid or reduce environmental effects.
Combined Modelling and Appraisal Report	**ComMA**	The purpose of the Combined Modelling and Appraisal Report is to inform decision makers and stakeholders on how the evidence underpinning the business case has been developed, from the initial identification of the underlying problem through the collection of data and the production of any supporting traffic models and forecast impacts of the Project on traffic to the eventual economic appraisal.
Construction		Activity on and/or offsite required to implement the Project. The construction phase is considered to commence with the first activity on site (e.g. creation of site access), and ends with demobilisation.
Dartford Crossing	**DC**	Road crossing of the River Thames in England, carrying the A282 road between Dartford in Kent to the south with Thurrock in Essex to the north. It consists of two bored tunnels and the cable-stayed Queen Elizabeth II Bridge.
Department for Transport	**DfT**	The government department responsible for the English transport network and a limited number of transport matters in Scotland, Wales and Northern Ireland that have not been devolved.
Department of Energy and Climate Change	**DECC**	The UK Government department formerly responsible for (among other things) energy and climate change issues, including the security of the UK's energy supplies. These functions have now been transferred to BEIS.
Department for Levelling Up, Housing and Communities	**DLUHC**	The Department for Levelling Up, Housing and Communities took over the duties of the Ministry for Housing Communities, and Local Government in 2021.
Design Manual for Roads and Bridges	**DMRB**	A comprehensive manual containing 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 highway authority. For the A122 Lower Thames Crossing the Overseeing Organisation is National Highways.
Development Consent Order	**DCO**	Means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects (NSIP) under the Planning Act 2008.
Development Consent Order application	**DCO application**	The Project Application Documents, collectively known as the 'DCO application'.
Do Minimum	**DM**	A future year scenario in LTAM which includes changes to the road network and planned development that is forecast to go ahead, but not the Lower Thames Crossing.
Do Something	**DS**	A future year scenario in LTAM which includes changes to the road network and planned development that is forecast to go ahead, and the Lower Thames Crossing.
Environmental Statement	**ES**	A document produced to support an application for development consent that is subject to Environmental Impact Assessment (EIA), which sets out the likely impacts on the environment arising from the proposed development.

Term	Abbreviation	Explanation
Greater London Authority	**GLA**	The Greater London Authority is the devolved regional governance body of London, with jurisdiction over both the City of London and the ceremonial county of Greater London.
Haul road/route		Temporary routes used during construction, by construction vehicles.
Heavy Goods Vehicle	**HGV**	A large, heavy motor vehicle used for transporting cargo.
Highways England	**HE**	Former name of National Highways.
High Speed 1	**HS1**	A 109km high-speed railway between London and the UK end of the Channel Tunnel. The line carries international passenger traffic between the UK and continental Europe; it also carries domestic passenger traffic to and from stations in Kent and east London, as well as Berne gauge freight traffic.
Inter-peak hour	**IP**	An average hour within LTAM to represent an hour within the period 09:00–15:00
Kilometre	**Km**	Kilometre - an SI unit of length, equivalent to a thousand metres.
Local Plan		A Local Plan sets out local planning policies and identifies how land is used, determining what will be built where. Adopted Local Plans provide the framework for local development across England.
Local planning authority	**LPA**	A local planning authority is the local authority or council that is empowered by law to exercise statutory town planning functions for a particular area of the UK. May also be referred to as 'local authority'.
Lower Thames area		The area encompassing the local authority areas of Thurrock, Havering, Brentwood, Dartford, Gravesham and Medway.
Lower Thames Area Model	**LTAM**	Transport model designed to forecast impacts of providing additional road based capacity across the River Thames at locations at or east of the existing Dartford Crossing.
M2 junction 1		The M2 will be widened from three lanes to four in both directions through M2 junction 1.
M2/A2/A122 Lower Thames Crossing junction		New junction proposed as part of the Project to the east of Gravesend between the A2 and the new A122 Lower Thames Crossing with connections to the M2.
M25 junction 29		Improvement works to M25 junction 29 and to the M25 north of junction 29. The M25 through junction 29 will be widened from three lanes to four in both directions with hard shoulders.
Ministry of Housing, Communities and Local Government	**MHCLG**	Formed in January 2018, the MHCLG took over the duties of the former Department for Communities and Local Government. Now the Department for Levelling Up Housing and Communities.
Miles per hour	**mph**	Miles per hour
National Cycling Network	**NCN**	A series of traffic-free paths and quiet, on-road cycling and walking routes that connect to every major town and city. These routes are promoted for both recreational and active travel purposes.

Term	Abbreviation	Explanation
National Highways		A UK government-owned company with responsibility for managing the motorways and major roads in England. Formerly known as Highways England
National Infrastructure Delivery Plan (2016-2021)	**NIDP**	Document published by the UK Government, setting out its strategy for meeting the infrastructure needs of the UK economy.
National Planning Policy Framework	**NPPF**	A framework published in March 2012 by the UK's Department of Communities and Local Government, consolidating previously issued documents called Planning Policy Statements (PPS) and Planning Practice Guidance Notes (PPG) for use in England. The NPPF was updated in February 2019 and again in July 2021 by the Ministry of Housing, Communities and Local Government.
National Policy Statement	**NPS**	Set out UK government policy on different types of national infrastructure development, including energy, transport, water and waste. There are 12 NPS, providing the framework within which Examining Authorities make their recommendations to the Secretary of State.
Overarching National Policy Statement for Energy (EN-1)	**NPS EN-1**	Sets out the need for the Government's policy for delivery of major energy infrastructure. This Overarching National Policy Statement for Energy (EN-1) is part of a suite NPSs initially issued by the Secretary of State for Energy and Climate Change (now the Department for Business, Energy and Industrial Strategy). There are a further five technology-specific NPSs for the energy sector.
National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)	**NPS EN-4**	Sets out the need for the Government's policy for delivery of major energy infrastructure and provides the primary basis for decisions by the Planning Inspectorate on applications it receives for gas supply infrastructure and gas and oil pipelines.
National Policy Statement for Electricity Networks Infrastructure (EN-5)	**NPS EN-5**	Sets out the needs for the Government's policy for delivery of major energy infrastructure and provides the primary basis for decisions taken by the Planning Inspectorate on applications it receives for electricity networks infrastructure.
National Policy Statement for National Networks	**NPSNN**	Sets out the need for, and Government's policies to deliver, development of Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks in England. It provides planning guidance for promoters of NSIPs on the road and rail networks, and the basis for the examination by the Examining Authority and decisions by the Secretary of State.
Nationally Significant Infrastructure Project	**NSIP**	Major infrastructure developments in England and Wales, such as proposals for power plants, large renewable energy projects, new airports and airport extensions, major road projects etc that require a development consent under the Planning Act 2008.
National Trip End Model	**NTEM**	

Term	Abbreviation	Explanation
North Portal		The North Portal (northern tunnel entrance) would be located to the west of East Tilbury. Emergency access and vehicle turn-around facilities would be provided at the tunnel portal. The tunnel portal structures would accommodate service buildings for control operations, mechanical and electrical equipment, drainage and maintenance operations.
Office for National Statistics	**ONS**	
Operation		Describes the operational phase of a completed development and is considered to commence at the end of the construction phase, after demobilisation.
Order Limits		The outermost extent of the Project, indicated on the Plans by a red line. This is the Limit of Land to be Acquired or Used (LLAU) by the Project. This is the area in which the DCO would apply.
Outline Traffic Management Plan for Construction	**oTMPfC**	Sets the principles which would be applied during the construction of the Project
Passenger car unit	**PCU**	A metric to allow different vehicle types within a traffic model to be assessed in a consistent manner.
Planning Act 2008		The primary legislation that establishes the legal framework for applying for, examining and determining Development Consent Order applications for Nationally Significant Infrastructure Projects.
PM peak hour		The hour between 17:00–18:00 within LTAM
Post Opening Project Evaluation	**POPE**	Checks whether investments in Major Projects are delivering the outcomes documented in the Appraisal Summary Table published prior to scheme approval. National Highways produces the reports 'one year after' and 'five years after' road opening.
Project road		The new A122 trunk road, the improved A2 trunk road, and the improved M25 and M2 special roads, as defined in Parts 1 and 2, Schedule 5 (Classification of Roads) in the draft DCO (Application Document 3.1).
Project route		The horizontal and vertical alignment taken by the Project road.
Public Right of Way.	**PRoW**	A right possessed by the public, to pass along routes over land at all times. Although the land may be owned by a private individual, the public may still gain access across that land along a specific route. The mode of transport allowed differs according to the type of public right of way which consist of footpaths, bridleways and open and restricted byways.
Road Investment Strategy	**RIS**	The Government's long-term strategy to improve England's motorways and major A roads. The first RIS (known as RIS 1) was published in 2015 and covers the period 2015-2020.
Road Investment Strategy 2	**RIS2**	The Government's long-term strategy to improve England's motorways and major A roads. The second RIS (RIS 2) was published in 2020, and covers the post-2020 period.
Road Safety Audit	**RSA**	The formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users

Term	Abbreviation	Explanation
Safety Review Control Group	**SRCG**	Provides a forum for reviewing and accepting 'safety work' associated with the activity before it's submitted for formal approval
Secretary of State	**SoS**	The Secretary of State has overall responsibility for the policies of the Department for Transport (DfT).
Scheme Objectives		• To support sustainable local development and regional economic growth in the medium to long term • To be affordable to government and users • To achieve value for money • To minimise adverse impacts on health and the environment • To relieve the congested Dartford Crossing and approach roads and improve their performance by providing free-flowing north-south capacity • To improve the resilience of the Thames crossings and the major road network • To improve safety
South Portal		The South Portal of the Project (southern tunnel entrance) would be located to the south-east of the village of Chalk. Emergency access and vehicle turn-around facilities would be provided at the tunnel portal. The tunnel portal structures would accommodate service buildings for control operations, mechanical and electrical equipment, drainage and maintenance operations.
Strategic Road Network	**SRN**	The core road network in England managed by National Highways
STATS19		A database of all road traffic accidents that resulted in a personal injury and were reported to the police within 30 days of the accident. The data are collected by the police at the roadside or when the accident is reported to them by a member of the public in a police station.
The tunnel		Proposed 4.25km (2.5 miles) road tunnel beneath the River Thames, comprising two bores, one for northbound traffic and one for southbound traffic. Cross-passages connecting each bore would be provided for emergency incident response and tunnel user evacuation. Tunnel portal structures would accommodate service buildings for control operations, mechanical and electrical equipment, drainage and maintenance operations. Emergency access and vehicle turn-around facilities would also be provided at the tunnel portals.
Thurrock Flexible Generation Plant	**TFGP**	A flexible generation and storage power plant proposed by Thurrock Power Ltd on land to the north of Tilbury substation, Thurrock. Comprising a gas fired electricity generating station and a battery storage facility.
T junction		A three-way junction is a type of road intersection with three arms
Transport Assessment	**TA**	Transport Assessment
Transport Analysis Guidance published by DfT	**TAG**	Transport Analysis Guidance published by DfT

Term	Abbreviation	Explanation
Tunnel boring machinery	**TBM**	Machinery used to excavate tunnels with a circular cross-section.
Trip End Model Program	**TEMPRO**	DfT software for viewing data from DfT's National Trip End Model
Trans-European Transport network.	**TEN-T**	Acronym for the Trans-European transport network.
Transport for London	**TfL**	The integrated body responsible for London's transport system
Volume Over Capacity ratio	**V/C**	
Walkers, cyclists and horse riders	**WCH**	

Appendices

The following are included as separate documents as appendices to the Transport Assessment:

- Transport Assessment Appendix A Public Rights of Way
- Transport Assessment Appendix B Journey Time Changes 2030
- Transport Assessment Appendix C Journey Time Changes 2045
- Transport Assessment Appendix D Scale of Impacts Maps
- Transport Assessment Appendix E Construction Traffic Assessment Supporting Information
- Transport Assessment Appendix F Wider Network Impacts Management and Monitoring Plan Policy Compliance
- Transport Assessment Appendix G Construction Percentage Change in Flows by Phase
- Transport Assessment Appendix H Construction Journey Time Maps
- Transport Assessment Appendix I Policy Compliance

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